Climate Fund Source Project Reports FY13

Program	AK
Project Title	Sea Grant Climate Adaptation 2011: Shaktoolik Alaska – Climate Change Adaptation for an at-risk Community
Investigators	Gay Sheffield (Alaska Sea Grant); Terry Johnson (Alaska Sea Grant);
Partner	City of Shaktoolik; Kawerak, Inc.; Native Village of Shaktoolik; Shaktoolik Native Coorporation;
Description	All of the project activities and deliverables are designed to directly benefit the Alaska community at risk from climate change impacts, and by extension, similar communities in the region by providing useful information and a process model for their consideration. The specific benefits will include: information about adaptation measures that can be implemented in an Arctic community, an evaluation of current relocation efforts of Alaska communities, on-site advice from the Newtok tribal administrator about his relocation efforts, roundtable discussions with community representatives and experts in a variety of subjects, climate change information and planning tools from Sea Grant, a list of funding sources, and completion of an adaptation plan for the Community of Shaktoolik. This project will benefit other coastal communities facing risks from climate change in two primary ways. First, research from the project will be made available to other at-risk communities, including the documents on adaptation measures (Activity #1), lessons learned from relocation efforts of Alaska communities (Activity #2), and analysis of potential funding source for adaptation measures (Activity #4). Second, other coastal communities will benefit from the process developed by Shaktoolik for making decisions about climate change adaptation (Activity #11).
Progress	
Summary	

Program	AK
Project Title	Alaska Sea Grant Community Environmental Hazard Response Resources: Online Information and Training
Investigators	Paula Cullenberg (Alaska Sea Grant);

Partner	Alaska Native Tribal Health Consortium; Alaska Ocean Observing System (AOOS);
Description	Alaska Sea Grant, together with appropriate partners, proposes to develop two new websites to provide resources for Alaska coastal communities facing climate-driven or other environmental changes. The first site will be developed in partnership with an existing network of trained, community-based environmental observers. It will provide those observers with access to timely information, expertise and training as they encounter new or changing natural phenomena in their communities. The second site will provide a central registry of, and forum for, numerous "citizen science" community-based environmental programs, enabling an enhanced awareness of programs statewide and fostering exchange of information, ideas, and best practices.
Progress	
Summary	

Program	CA
Project Title	California Sea Grant Climate Adaptation Capacity Building
Investigators	Monique Myers (California Sea Grant Extension Program); Richard M. Starr (California Sea Grant Extension Program);
Partner	California Coastal Commission (CA RESOURCES, CCC);
Description	The National Sea Grant minibus proposal provides an opportunity for California Sea Grant to develop a partnership with the California Coastal Commission (CCC), the state's primary coastal planning body. Generally, the goal of this project is to begin the process of developing capacity throughout California to help provide coastal communities with information to make better informed decisions, and ultimately develop and implement customized solutions to the hazards and climate change challenges which threaten their economic, environmental, and social well-being. Specifically, our goals for this proposal are to build capacity within California Sea Grant and the California Coastal Commission (CCC) by funding a Sea Grant Extension Fellow to work with the CCC. Our project objectives include: 1) Collaborate with the California Coastal Commission to develop an agreement to accept and partially pay for a California Sea Grant Extension Fellow, 2) Advertise and select a recent postgraduate to accept the Fellowship, 3) Conduct an initial meeting with

	California Coastal Commission leaders and California Sea Grant Extension Advisors to define a project of mutual interest that is related to extension of climate change adaptation information to coastal communities, 4) Identify and try to engage local experts as well as tapping NOAA and other regional and national experts to support the project, 5) Conduct outreach to coastal communities to support the project, 6) Attend a national climate extension meeting to be held in late 2012 or early 2013, 7) Periodically meet with California Coastal Commission leaders and California Sea Grant Extension Advisors to adaptively manage the project so the climate change adaptation information reaches as many communities as possible. Our target is to provide information/training to 1--5 coastal communities each year of the grant.
Progress	RELEVANCE: Former CA Gov. Arnold Schwarzenegger in 2008 signed an Executive Order (S-13-08) directing state agencies to develop a strategy for adapting to climate change. RESPONSE: With partial support from California Sea Grant, nearly 600 California coastal planners and managers were surveyed on their attitudes and knowledge about climate change, their 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 (see partners). RESULTS: 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.
Summary	A survey of coastal professionals led by USC Sea Grant in partnership with California Sea Grant is helping California's coastal communities plan and prepare for rising sea levels and other impacts of climate change.

Program	CT
Project Title	Encouraging Rain Gardens as Climate Change Adaptation Tools: Creating a Rain Garden "App" for the iPhone
Investigators	David Dickson (University of Connecticut (UCONN)); Michael Dietz (University of Connecticut (UCONN));
Partner	University of Connecticut, Center for Land Use Education and Research (UCONN); University of Connecticut, Non-point Education for Municipal Officials (UCONN NEMO);
Description	OBJECTIVES: To expand the scope and visibility of the Connecticut Sea Grant (CTSG) Program in meeting the research, education and outreach needs of the maritime community. Build the core capability of the CTSG Program by improving infrastructure and supporting personnel development for Sea Grant staff. Build partnerships within the CTSG network of

	universities and colleges, government agencies, non-governmental organizations and private industry. METHODOLOGY: Identify emerging issues and problems that fall within Sea Grant focus area, and deliver seed money to foster research, education and outreach initiatives in these areas. Deliver funds for new approaches and technology resulting from previous research efforts to facilitate dissemination and application of the results. Support projects that address emerging and critical needs related to CTSG theme areas. Establish a dialogue with private organizations and industry to identify their research and information needs, and promote the formulation of partnerships and joint projects. Send individuals to workshops and training sessions to expand their perspective, train them in new techniques and skills, and enable them to most effectively contribute to the CTSG effort. Upgrade the computer and communications infrastructure to provide a state-of-the-art capability to support the CTSG program. RATIONALE: By providing resources and support funds for pilot projects, research initiatives, workshops, and publications CTSG is promoting the growth of the research community, and providing valuable information through outreach efforts to the general populace of the state.
Progress	With support from Connecticut Sea Grant, UConn CLEAR extension staff worked with a graduate student in computer science to develop a UConn Rain Garden smart phone "App". The App, the first general use App to be developed at UConn, is designed to help individuals and companies with every detail in planning and installing a rain garden. Free via iTunes, the app covers topics from choosing the size and location of a garden to selecting plants to installing the garden. Video tutorials, maps, a sizing calculator, cost calculator, plant database with photos, examples and much more are included. Within seven weeks of its launch, the App had been downloaded more than 1000 times. An Android version is expected to be released soon, and the collaborators are seeking support to develop a national version, as the imagery and plant lists are specific to Connecticut.
Summary	

Program	CT
Project Title	Encouraging Rain Gardens as Climate Change Adaptation Tools: Creating a Rain Garden “App” for the iPhone
Investigators	David Dickson (University of Connecticut (UCONN)); Michael Dietz (University of Connecticut (UCONN));
Partner	University of Connecticut, Center for Land Use Education and Research (UCONN); University of Connecticut, Non-point Education for Municipal Officials (UCONN NEMO);

Description	OBJECTIVES: To expand the scope and visibility of the Connecticut Sea Grant (CTSG) Program in meeting the research, education and outreach needs of the maritime community. Build the core capability of the CTSG Program by improving infrastructure and supporting personnel development for Sea Grant staff. Build partnerships within the CTSG network of universities and colleges, government agencies, non-governmental organizations and private industry. METHODOLOGY: Identify emerging issues and problems that fall within Sea Grant focus area, and deliver seed money to foster research, education and outreach initiatives in these areas. Deliver funds for new approaches and technology resulting from previous research efforts to facilitate dissemination and application of the results. Support projects that address emerging and critical needs related to CTSG theme areas. Establish a dialogue with private organizations and industry to identify their research and information needs, and promote the formulation of partnerships and joint projects. Send individuals to workshops and training sessions to expand their perspective, train them in new techniques and skills, and enable them to most effectively contribute to the CTSG effort. Upgrade the computer and communications infrastructure to provide a state-of-the-art capability to support the CTSG program. RATIONALE: By providing resources and support funds for pilot projects, research initiatives, workshops, and publications CTSG is promoting the growth of the research community, and providing valuable information through outreach efforts to the general populace of the state.
Progress	RELEVANCE: With every rainfall, water runs off impervious surfaces such as roofs, driveways, roads and parking lots, collecting pollutants along the way. This runoff has been cited by the United States Environmental Protection Agency as a major source of pollution to our nation's waterways. RESPONSE: Connecticut Sea Grant and the Connecticut Nonpoint Education for Municipal Officials (NEMO) program have developed outreach programs and webinars to teach landscape professionals, municipal officials, homeowners, and students about the effectiveness of rain gardens as a means for mitigating the deleterious effects of runoff and stormwater. In 2012, two additional trainings with installations were held in at Kelly Middle School in Norwich and at the Middlesex County Extension Office in Haddam, where the rain garden will serve as a second demonstration installation for training purposes in addition to providing stormwater filtration services. RESULTS: Thirty-three (33) municipal maintenance staff and landscape professionals received hands-on training by participating in the installation of the Norwich rain garden, while 200 middle school students and their teachers learned about the basic function of a rain garden and how to maintain it. The installation of the Haddam garden was filmed for use in the rain garden "App" that was developed and launched in 2012. Since 2011, the combined environmental benefit of six rain garden installations is substantial: an average of 615,700 gallons of water annually is diverted from the stormwater system and infiltrated into the ground. Over time, this will help reduce impacts to downstream water bodies and ultimately coastal waters like Long Island Sound.
Summary	Six rain gardens installed over two years provide hands-on training for professional while diverting more than 615,700 gallons of water annually away from stormwater systems and into the ground, reducing downstream water quality impacts.

Program	CT
Project Title	Analysis of Shoreline Change in Connecticut – 100 Years of Erosion and Accretion
Investigators	Bruce Hyde (University of Connecticut (UCONN)); Joel Stocker (University of Connecticut (UCONN)); Juliana Barrett (University of Connecticut (UCONN));
Partner	Connecticut Department of Environmental Protection—Office of Long Island Sound Programs (CT DEP); University of Connecticut, Center for Land Use Education and Research (UCONN);
Description	OBJECTIVES: To determine areas of erosion and accretion along the shoreline by conducting a GIS time series analysis with maps of the Connecticut shoreline from several different time periods over the last 100 years using the Digital Shoreline Analysis System (DSAS). METHODOLOGY: 1) During the late 1800's, the US Army Corps of Engineers surveyed areas of the Connecticut shoreline in order to determine the high tide line. As part of this survey, the coastal shoreline was mapped. These maps have been scanned and rectified by Connecticut Dept of Energy and Environmental Protection Office of Long Island Sound staff. We will use these maps and shoreline maps from more recent time periods (1933, 1984 and 2006) to look at shoreline erosion and accretion over the past 100 years+ using the Digital Shoreline Analysis System (DSAS). 2) An educational module on shoreline geology, erosion and accretion will be developed that incorporates the results of the shoreline analysis. A webinar of the module will be provided to all interested municipalities. In addition, meetings will be held with individual towns as requested to review results and discuss adaptation solutions. Connecticut Department of Energy and Environmental Protection, Office of Long Island Sound Programs personnel will partner with CTSG, providing input and participation on all aspects of the analysis and module development and delivery, as well as in individualized meeting with towns. They will provide access to maps and assist with using the Digital Shoreline Analysis System. University of Connecticut Extension, UConn Center for Land Use Education and Research (CLEAR) will provide input to resources, planning and adaptation solutions. RATIONALE: Coastal erosion is on the forefront of coastal homeowners and municipal officials in the wake of Tropical Storm Irene which heavily eroded parts of the Connecticut shoreline in August 2011 damaging and destroying numerous homes and buildings. A Shoreline Preservation Task Force was established in February 2012 and is looking at short-term fixes and long term solutions. Specifically the Task Force is studying and making legislative recommendations pertaining to storm impacts on homeowners and businesses as well as looking at impacts of climate change and efforts to preserve and protect coastal communities. The task force is charged with making recommendations to the General Assembly for legislation that will assist those still rebuilding and recovering from Tropical Storm Irene by: 1) Developing new policies that specifically address the unique needs of shoreline and waterfront residents and businesses with respect to shoreline erosion, rising sea levels, and future storm planning. 2) Making sure new policies complement legislation that

	may be developed regarding emergency communications between towns and the state; utility company preparedness, response and accountability. With bills being considered in the current legislative session to ease restrictions relative to construction of sea walls and other hard structures, an understanding of sand/sediment movement and coastal erosion and accretion is a critical part of a coastal municipality's climate change vulnerability analysis.
Progress	Coastal erosion is on the forefront of coastal homeowners and municipal officials in the wake of Tropical Storm Irene in 2011 and Superstorm Sandy in 2012, which heavily eroded parts of the Connecticut shoreline, damaging and destroying numerous homes and buildings. Using the Digital Shoreline Analysis System (DSAS), Connecticut Sea Grant and UConn CLEAR extension educators used maps from 1800s, 1933, 1984 and 2006 to look at shoreline erosion and accretion over the past 100 years. A Shoreline Preservation Task Force established by the Connecticut General assembly in February 2012 is looking at short-term fixes and long term solutions. Specifically the Task Force is studying and making legislative recommendations pertaining to storm impacts on homeowners and businesses as well as looking at impacts of climate change and efforts to preserve and protect coastal communities. The task force is charged with making recommendations to the General Assembly for legislation that will assist those still rebuilding and recovering from the coastal storms. To help inform those recommendations, once the changes in shoreline are analyzed, an educational module on shoreline geology, erosion and accretion will be developed that incorporates the analysis results. Meetings will be held with individual towns as requested to review results and discuss adaptation solutions.
Summary	

Program	DE
Project Title	Enhancing community awareness of future flood risk and vulnerability through use of mapping visualization tools
Investigators	Wendy Carey (University of Delaware (UDEL));
Partner	
Description	Mapping visualization tools provide one of the best ways of representing and communicating flood risk and vulnerabilities, and are useful for mitigation planning and implementation of adaptation strategies. In the future, an increasing percentage of Delaware’s coastal population will be threatened by flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and

	are based on historic data. New mapping technologies can be more effective than existing floodplain maps for communicating risk because both present and future levels of flood risk can be depicted. The proposed project includes development of community flood visualization maps for several Inland Bay communities, as well as Delaware City, adjacent to Delaware Bay. Various flood scenarios will be included in the visualization maps, including the 100-year floodplain plus one- to two-feet of additional flooding which will serve as depictions of future flood risk from storms and/or sea-level rise. 1) Community flood visualization maps will be created depicting floods of the recent past as wells as how potential sea level rise scenarios may impact water levels and will be developed through a combination raster and vector data analysis using the best available LiDAR derived elevation and FEMA flood map data. Data to be included on the maps include FEMA's 100 year floodplain plus 1-2' of additional flooding. For geographic areas where high water mark data is available, 1998 northeaster flood levels will also be incorporated. Updated flood information from FEMA's new coastal floodplain maps will be incorporated when available (2012/2013). 2) Evacuation route profiles will be created depicting the 10-year and 100-year floodplain plus 1-2' of additional flooding. 3) Meetings and workshops will be convened with DelDOT, DEMA, Sussex County Emergency Management officials, and community representatives to inform and extend the map visualization tools. 4) Information and guidance related to planning for future flood risk will be added to the Delaware StormSmart Coasts and Delaware Sea Grant websites. This project will enhance hazard mitigation planning, emergency response, and public awareness through improved flood visualization products. The maps and evacuation route profiles will provide critical flood and coastal hazard information to end users and will be useful awareness and disaster preparedness tools for individuals and communities. The ability to visualize the potential depth and inland extent of water and inundation impacts provides a better understanding of impacts and consequences of future flood risk, no matter what the cause.
Progress	Management effort provided long-range planning, overall program direction, required reporting, and policy through quarterly and ad hoc meetings of the management staff. In support of the Omnibus proposal the DESG management team completed the Omnibus submission process. Two meetings were held (spring and fall) with the Delaware Sea Grant (DESG) management team and the Delaware Sea Grant Advisory Council (DE SGAC). Applications for both the Coastal Management and Dean John Knauss Marine Policy fellowships were solicited, reviewed, interviews completed, and final submissions made for both the Delaware applicants and three applicants from Washington, DC, in accordance with an agreement between the National Sea Grant Office, and the Virginia and Maryland Sea Grant Programs. Applications for funding under the National Sea Grant Office Aquaculture NSI were solicited, PI inquiries were addressed, and proposals were submitted to the National Office. Three members of the DESG Management Team participated in Sea Grant Week, 2012 to increase collaboration and communication across the Sea Grant Network. The 2014-2016 Request for Proposals (RFP) was developed from the content of the new strategic plan, with renewed attention to the outreach efforts associated with research based largely on a review of Sea Grant network 2012-2014 RFPs. Data management plan guidance was developed and included to reflect the new NOAA guidance and ensure the DESG 2014-2016 Omnibus will be in full compliance. The Management Team worked with six Sea Grant programs (NY,

	NJ, PA, MD, VA, NC) to establish the Mid-Atlantic Sea Grant Regional Research competition for the 2014-2016 Omnibus. The Management Team again secured FY2013 funding from the Delaware Legislature, with a slight increase over prior years to $564,000.
Summary	

Program	DE
Project Title	Enhancing community awareness of future flood risk and vulnerability through use of mapping visualization tools
Investigators	Wendy Carey (University of Delaware (UDEL));
Partner	
Description	Mapping visualization tools provide one of the best ways of representing and communicating flood risk and vulnerabilities, and are useful for mitigation planning and implementation of adaptation strategies. In the future, an increasing percentage of Delaware's coastal population will be threatened by flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and are based on historic data. New mapping technologies can be more effective than existing floodplain maps for communicating risk because both present and future levels of flood risk can be depicted. The proposed project includes development of community flood visualization maps for several Inland Bay communities, as well as Delaware City, adjacent to Delaware Bay. Various flood scenarios will be included in the visualization maps, including the 100-year floodplain plus one- to two-feet of additional flooding which will serve as depictions of future flood risk from storms and/or sea-level rise. 1) Community flood visualization maps will be created depicting floods of the recent past as wells as how potential sea level rise scenarios may impact water levels and will be developed through a combination raster and vector data analysis using the best available LiDAR derived elevation and FEMA flood map data. Data to be included on the maps include FEMA's 100 year floodplain plus 1-2' of additional flooding. For geographic areas where high water mark data is available, 1998 northeaster flood levels will also be incorporated. Updated flood information from FEMA's new coastal floodplain maps will be incorporated when available (2012/2013). 2) Evacuation route profiles will be created depicting the 10-year and 100-year floodplain plus 1-2' of additional flooding. 3) Meetings and workshops will be convened with DelDOT, DEMA, Sussex County Emergency Management officials, and community representatives to

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Progress	Using Site Review Team input, strategic planning began in the fall of 2011 with Delaware Sea Grant Advisory Council discussions, followed by public surveys were distributed via the internet to identify public concerns about Delaware's coastal economy and ecosystems, and develop focus areas for strategic planning. A stakeholder workshop was held to review the survey input, foster discussion, and identify priorities for the 2014-2017 Strategic Plan. Upon release of the draft National Sea Grant Strategic Plan, the Delaware Sea Grant management team composed comments for consideration by the National Sea Grant Office, and incorporated appropriate alignments into the draft 2014-2017 Delaware Sea Grant Strategic Plan. The Delaware plan was submitted to the National Sea Grant Program and approved. The PRP process was completed, with submission of data to PIER and completion of a 20-page PRP Summary document, and submission of response comments upon receipt of the PRP final report.
Summary	

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Investigators	Wendy Carey (University of Delaware (UDEL));
Partner	
Description	Mapping visualization tools provide one of the best ways of representing and communicating flood risk and vulnerabilities, and are useful for mitigation planning and implementation of adaptation strategies. In the future, an increasing percentage of Delaware's coastal population will be threatened by flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and

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Progress	A collaborative project has been initiated to develop map products that depict community flood risk and vulnerabilities. Project partners include Delaware Department of Natural Resources and Environmental Control (DNREC) and U. S. Geological Survey (USGS), with additional input from the Sussex County Emergency Operations Center and the community of Delaware City. Discussions have been held regarding available data sets that could/should be used in depictions of 100-year floodplain plus one- to two-feet of additional flooding for project sites including Delaware City and low-lying areas surrounding Delaware Inland Bays – Rehoboth, Indian River, and Little Assawoman Bays. Consideration will also be given to using newly developed DFIRM data that will be available in January 2013. The project planning meetings have also included discussions of evacuation route elevation profiles referenced to various flood heights, coordination with partner agencies such as DelDOT, DEMA and Sussex County Office of Emergency Management, as well as final map products and outreach strategies. In the aftermath of Hurricane Sandy, site visits were conducted to several possible study locations in Sussex County adjacent to Rehoboth, Indian River and Little Assawoman Bays, including Oak Orchard, Pot Nets, Long Neck, south side of Indian River Bay, and Fenwick Island bayside.
Summary	

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Project Title	Enhancing community awareness of future flood risk and vulnerability through use of mapping visualization tools
Investigators	Wendy Carey (University of Delaware (UDEL));
Partner	
Description	Mapping visualization tools provide one of the best ways of representing and communicating flood risk and vulnerabilities, and are useful for mitigation planning and implementation of adaptation strategies. In the future, an increasing percentage of Delaware's coastal population will be threatened by flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and are based on historic data. New mapping technologies can be more effective than existing floodplain maps for communicating risk because both present and future levels of flood risk can be depicted. The proposed project includes development of community flood visualization maps for several Inland Bay communities, as well as Delaware City, adjacent to Delaware Bay. Various flood scenarios will be included in the visualization maps, including the 100-year floodplain plus one- to two-feet of additional flooding which will serve as depictions of future flood risk from storms and/or sea-level rise. 1) Community flood visualization maps will be created depicting floods of the recent past as wells as how potential sea level rise scenarios may impact water levels and will be developed through a combination raster and vector data analysis using the best available LiDAR derived elevation and FEMA flood map data. Data to be included on the maps include FEMA's 100 year floodplain plus 1-2' of additional flooding. For geographic areas where high water mark data is available, 1998 northeaster flood levels will also be incorporated. Updated flood information from FEMA's new coastal floodplain maps will be incorporated when available (2012/2013). 2) Evacuation route profiles will be created depicting the 10-year and 100-year floodplain plus 1-2' of additional flooding. 3) Meetings and workshops will be convened with DelDOT, DEMA, Sussex County Emergency Management officials, and community representatives to inform and extend the map visualization tools. 4) Information and guidance related to planning for future flood risk will be added to the Delaware StormSmart Coasts and Delaware Sea Grant websites. This project will enhance hazard mitigation planning, emergency response, and public awareness through improved flood visualization products. The maps and evacuation route profiles will provide critical flood and coastal hazard information to end users and will be

	useful awareness and disaster preparedness tools for individuals and communities. The ability to visualize the potential depth and inland extent of water and inundation impacts provides a better understanding of impacts and consequences of future flood risk, no matter what the cause.
Progress	A collaborative project has been initiated to develop map products that depict community flood risk and vulnerabilities. Project partners include Delaware Department of Natural Resources and Environmental Control (DNREC) and U. S. Geological Survey (USGS), with additional input from the Sussex County Emergency Operations Center and the community of Delaware City. Discussions have been held regarding available data sets that could/should be used in depictions of 100-year floodplain plus one- to two-feet of additional flooding for project sites including Delaware City and low-lying areas surrounding Delaware Inland Bays – Rehoboth, Indian River, and Little Assawoman Bays. Consideration will also be given to using newly developed DFIRM data that will be available in January 2013. These preliminary shapefiles will include updated flood zones and base flood elevation information for coastal areas in Sussex County. Investigations will also be made into availability of FEMA Region III Risk MAP effort and Flood Risk Study products that include coastal flood hazard analysis maps for New Castle and Sussex counties. The project planning meetings have also included discussions of evacuation route elevation profiles referenced to various flood heights, coordination with partner agencies such as Delaware Department of Transportation, Delaware Emergency Management Agency and Sussex County Office of Emergency Management, as well as final map products and outreach strategies. In the aftermath of Hurricane Sandy, site visits were conducted to several possible study locations in Sussex County adjacent to Rehoboth, Indian River and Little Assawoman Bays, including Oak Orchard, Pot Nets, Long Neck, south side of Indian River Bay, and Fenwick Island bayside.
Summary	

Program	DE
Project Title	Enhancing community awareness of future flood risk and vulnerability through use of mapping visualization tools
Investigators	Wendy Carey (University of Delaware (UDEL));
Partner	
Description	Mapping visualization tools provide one of the best ways of representing and communicating flood risk and

	vulnerabilities, and are useful for mitigation planning and implementation of adaptation strategies. In the future, an increasing percentage of Delaware's coastal population will be threatened by flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and are based on historic data. New mapping technologies can be more effective than existing floodplain maps for communicating risk because both present and future levels of flood risk can be depicted. The proposed project includes development of community flood visualization maps for several Inland Bay communities, as well as Delaware City, adjacent to Delaware Bay. Various flood scenarios will be included in the visualization maps, including the 100-year floodplain plus one- to two-feet of additional flooding which will serve as depictions of future flood risk from storms and/or sea-level rise. 1) Community flood visualization maps will be created depicting floods of the recent past as wells as how potential sea level rise scenarios may impact water levels and will be developed through a combination raster and vector data analysis using the best available LiDAR derived elevation and FEMA flood map data. Data to be included on the maps include FEMA's 100 year floodplain plus 1-2' of additional flooding. For geographic areas where high water mark data is available, 1998 northeaster flood levels will also be incorporated. Updated flood information from FEMA's new coastal floodplain maps will be incorporated when available (2012/2013). 2) Evacuation route profiles will be created depicting the 10-year and 100-year floodplain plus 1-2' of additional flooding. 3) Meetings and workshops will be convened with DelDOT, DEMA, Sussex County Emergency Management officials, and community representatives to inform and extend the map visualization tools. 4) Information and guidance related to planning for future flood risk will be added to the Delaware StormSmart Coasts and Delaware Sea Grant websites. This project will enhance hazard mitigation planning, emergency response, and public awareness through improved flood visualization products. The maps and evacuation route profiles will provide critical flood and coastal hazard information to end users and will be useful awareness and disaster preparedness tools for individuals and communities. The ability to visualize the potential depth and inland extent of water and inundation impacts provides a better understanding of impacts and consequences of future flood risk, no matter what the cause.
Progress	An increasing percentage of Delaware's coastal population will be threatened by future flooding due to rising sea levels and the increased frequency and magnitude of extreme storm events. Existing floodplain maps depict current or past risk, and are based on historic data. New mapping technologies can be more effective for communicating present and future risks/vulnerabilities, and are useful for adaptation strategy implementation and mitigation planning. Maps are currently being developed for Delaware City using the best available LiDAR-derived elevation in combination with the latest FEMA flood mapping products and high water elevations associated with historic events to create a series of community flood visualization maps. Additionally, evacuation route profiles were created to depict the 10-year and 100-year floodplain plus 1-2' of additional flooding (meant to depict potential sea-level rise impacts). Delaware City is planning to incorporate these visualization maps into their on-going hazards/climate adaptation planning project.
Summary	

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments
Investigators	James Falk (University of Delaware (UDEL)); Wendy Carey (University of Delaware (UDEL));
Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard mitigation planning is a common effort and procedure undertaken by many communities, the present process is structured so that communities plan for future hazards based on current and historic risks. Climate change adaptation planning, with a longer term view of impacts and risks, focuses on understanding expected future impacts and the community's ability to address them. The integration of climate change into natural hazard mitigation planning is an important step in ensuring that local communities are prepared for today's hazards as well as future risks. By merging together traditional hazard mitigation planning concepts with climate adaptation planning concepts, local communities can be engaged in an intuitive and step-wise process. The outcome of this process is enhanced local knowledge of existing and future vulnerabilities – knowledge that is essential when making local decisions to increase resilience in areas such as infrastructural upgrades, zoning changes, ecosystem protection, and future development. The training program will be focused on developing and enhancing existing processes, incorporating existing tools, expanding local knowledge of climate change issues, and creating action oriented solutions to identified problems. The project involves a combined project partnership among Delaware Sea Grant, the Partnership for the Delaware Estuary (a National

	Estuary Program), The Resiliency Place (a business that specializes in providing long-term climate focused strategic planning to local governments), and the New Jersey Sea Grant Consortium which merges multiple levels of expertise and experience in hazard mitigation, climate change science, climate adaptation, and community engagement. The partners will work with Delaware City to enhance the preparedness planning process and create a locally applicable action plan that is responsive to changing conditions and impacts to community elements such as built infrastructure, environmental resources, and social/economic entities. Additionally, Pennsylvania Sea Grant will work in collaboration with the project partnership to extend community climate adaptation outreach efforts to local governments on a regional basis.
Progress	Management effort provided long-range planning, overall program direction, required reporting, and policy through quarterly and ad hoc meetings of the management staff. In support of the Omnibus proposal the DESG management team completed the Omnibus submission process. Two meetings were held (spring and fall) with the Delaware Sea Grant (DESG) management team and the Delaware Sea Grant Advisory Council (DE SGAC). Applications for both the Coastal Management and Dean John Knauss Marine Policy fellowships were solicited, reviewed, interviews completed, and final submissions made for both the Delaware applicants and three applicants from Washington, DC, in accordance with an agreement between the National Sea Grant Office, and the Virginia and Maryland Sea Grant Programs. Applications for funding under the National Sea Grant Office Aquaculture NSI were solicited, PI inquiries were addressed, and proposals were submitted to the National Office. Three members of the DESG Management Team participated in Sea Grant Week, 2012 to increase collaboration and communication across the Sea Grant Network. The 2014-2016 Request for Proposals (RFP) was developed from the content of the new strategic plan, with renewed attention to the outreach efforts associated with research based largely on a review of Sea Grant network 2012-2014 RFPs. Data management plan guidance was developed and included to reflect the new NOAA guidance and ensure the DESG 2014-2016 Omnibus will be in full compliance. The Management Team worked with six Sea Grant programs (NY, NJ, PA, MD, VA, NC) to establish the Mid-Atlantic Sea Grant Regional Research competition for the 2014-2016 Omnibus. The Management Team again secured FY2013 funding from the Delaware Legislature, with a slight increase over prior years to $564,000.
Summary	

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments

Investigators	James Falk (University of Delaware (UDEL)); Wendy Carey (University of Delaware (UDEL));
Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard mitigation planning is a common effort and procedure undertaken by many communities, the present process is structured so that communities plan for future hazards based on current and historic risks. Climate change adaptation planning, with a longer term view of impacts and risks, focuses on understanding expected future impacts and the community's ability to address them. The integration of climate change into natural hazard mitigation planning is an important step in ensuring that local communities are prepared for today's hazards as well as future risks. By merging together traditional hazard mitigation planning concepts with climate adaptation planning concepts, local communities can be engaged in an intuitive and step-wise process. The outcome of this process is enhanced local knowledge of existing and future vulnerabilities – knowledge that is essential when making local decisions to increase resilience in areas such as infrastructural upgrades, zoning changes, ecosystem protection, and future development. The training program will be focused on developing and enhancing existing processes, incorporating existing tools, expanding local knowledge of climate change issues, and creating action oriented solutions to identified problems. The project involves a combined project partnership among Delaware Sea Grant, the Partnership for the Delaware Estuary (a National Estuary Program), The Resiliency Place (a business that specializes in providing long-term climate focused strategic planning to local governments), and the New Jersey Sea Grant Consortium which merges multiple levels of expertise and experience in hazard mitigation, climate change science, climate adaptation, and community engagement. The partners will work with Delaware City to enhance the preparedness planning process and create a locally applicable action plan that is responsive to changing conditions and impacts to community elements such as built infrastructure, environmental resources, and social/economic entities. Additionally, Pennsylvania Sea Grant will work in collaboration with the project partnership to extend community climate adaptation outreach efforts to local governments on a

	regional basis.
Progress	Using Site Review Team input, strategic planning began in the fall of 2011 with Delaware Sea Grant Advisory Council discussions, followed by public surveys were distributed via the internet to identify public concerns about Delaware's coastal economy and ecosystems, and develop focus areas for strategic planning. A stakeholder workshop was held to review the survey input, foster discussion, and identify priorities for the 2014-2017 Strategic Plan. Upon release of the draft National Sea Grant Strategic Plan, the Delaware Sea Grant management team composed comments for consideration by the National Sea Grant Office, and incorporated appropriate alignments into the draft 2014-2017 Delaware Sea Grant Strategic Plan. The Delaware plan was submitted to the National Sea Grant Program and approved. The PRP process was completed, with submission of data to PIER and completion of a 20-page PRP Summary document, and submission of response comments upon receipt of the PRP final report.
Summary	

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments
Investigators	James Falk (University of Delaware (UDEL)); Wendy Carey (University of Delaware (UDEL));
Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard

	mitigation planning is a common effort and procedure undertaken by many communities, the present process is structured so that communities plan for future hazards based on current and historic risks. Climate change adaptation planning, with a longer term view of impacts and risks, focuses on understanding expected future impacts and the community's ability to address them. The integration of climate change into natural hazard mitigation planning is an important step in ensuring that local communities are prepared for today's hazards as well as future risks. By merging together traditional hazard mitigation planning concepts with climate adaptation planning concepts, local communities can be engaged in an intuitive and step-wise process. The outcome of this process is enhanced local knowledge of existing and future vulnerabilities – knowledge that is essential when making local decisions to increase resilience in areas such as infrastructural upgrades, zoning changes, ecosystem protection, and future development. The training program will be focused on developing and enhancing existing processes, incorporating existing tools, expanding local knowledge of climate change issues, and creating action oriented solutions to identified problems. The project involves a combined project partnership among Delaware Sea Grant, the Partnership for the Delaware Estuary (a National Estuary Program), The Resiliency Place (a business that specializes in providing long-term climate focused strategic planning to local governments), and the New Jersey Sea Grant Consortium which merges multiple levels of expertise and experience in hazard mitigation, climate change science, climate adaptation, and community engagement. The partners will work with Delaware City to enhance the preparedness planning process and create a locally applicable action plan that is responsive to changing conditions and impacts to community elements such as built infrastructure, environmental resources, and social/economic entities. Additionally, Pennsylvania Sea Grant will work in collaboration with the project partnership to extend community climate adaptation outreach efforts to local governments on a regional basis.
Progress	Delaware Sea Grant (DESG) was awarded NSGO Coastal Community Climate Adaptation funding to work with a community on preparing for climate change. DESG, the Partnership for the Delaware Estuary (a national estuary program) and The Resiliency Place (a climate change consulting group) are partnering with Delaware City, DE to enhance the preparedness planning process for today's hazards and future risks. The project's ultimate goal is to provide knowledge and guidance to the City as they chart a course for how to become resilient to natural hazards and climate change. As Delaware City continues its efforts to plan and prepare for natural hazards, a collaborative program is currently underway to improve community sustainability and resiliency. In collaboration with project partners and the City Manager, DESG worked to establish a Community Task Force to represent Delaware City and provide leadership throughout the project planning process. Through a series of four workshops, Sea Grant provided step-wise guidance as the community assessed vulnerabilities, reviewed best practices and actions implemented by other communities, and developed a list of priority strategies to meet specific needs of Delaware City with regard to hazard mitigation and climate adaptation. Throughout the Delaware City adaptation planning project, the intent is to work closely with a group of committed stakeholders and with the broader community to develop an action plan that will help to improve the City's economic, social and environmental well-being over time. DESG provided assistance to the community in

	establishing an Advisory Committee of subject-matter experts and practitioners who are willing to share their expertise and resources about collaborative opportunities and possible actions the City can take to reduce risk and vulnerabilities. Advisory Committee members are committed to provide assistance via leveraged expertise as adaptation actions are identified and implementation plans are developed. They have also agreed to support an on-going commitment with the community by maintaining communication with Delaware City with regard to opportunities for funding, coordination, and collaboration in the future.
Summary	

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments
Investigators	James Falk (University of Delaware (UDEL)); Wendy Carey (University of Delaware (UDEL));
Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard mitigation planning is a common effort and procedure undertaken by many communities, the present process is structured so that communities plan for future hazards based on current and historic risks. Climate change adaptation planning, with a longer term view of impacts and risks, focuses on understanding expected future impacts and the community's ability to address them. The integration of climate change into natural hazard mitigation planning is an

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Progress	As Delaware City continues its efforts to plan and prepare for natural hazards, a collaborative program is currently underway to improve community sustainability and resiliency. Delaware Sea Grant, the Partnership for the Delaware Estuary and The Resiliency Place are partnering with Delaware City to enhance the preparedness planning process for today's hazards and future risks. The project's ultimate goal is to provide knowledge and guidance to the City as they chart a course for how to become resilient to natural hazards and climate change. Specific accomplishments related to the project include: preliminary meetings and discussions with the City Manager, and local planning committee that was established for the project; multiple conference calls with project partners to plan and organize project approach, suggestions for task force and steering committee members, and workshop topics, agendas, schedule; background research on Delaware City and information collection and synthesis on topics such as flood mitigation planning, hazard mitigation planning, building codes, emergency management, etc. – e.g. review of Delaware City Comprehensive Plan, Hazard Mitigation Plan, and Flood Mitigation Plan. A synthesis / compilation of information related to potential risks and vulnerabilities from natural hazards and climate change impacts to Delaware City has been conducted, and relevant information has been documented and compiled for fact sheets and a final report.
Summary	

Climate Fund Source Project Reports FY13

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments
Investigators	James Falk (University of Delaware (UDEL)); Wendy Carey (University of Delaware (UDEL));
Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard mitigation planning is a common effort and procedure undertaken by many communities, the present process is structured so that communities plan for future hazards based on current and historic risks. Climate change adaptation planning, with a longer term view of impacts and risks, focuses on understanding expected future impacts and the community's ability to address them. The integration of climate change into natural hazard mitigation planning is an important step in ensuring that local communities are prepared for today's hazards as well as future risks. By merging together traditional hazard mitigation planning concepts with climate adaptation planning concepts, local communities can be engaged in an intuitive and step-wise process. The outcome of this process is enhanced local knowledge of existing and future vulnerabilities – knowledge that is essential when making local decisions to increase resilience in areas such as infrastructural upgrades, zoning changes, ecosystem protection, and future development. The training program will be focused on developing and enhancing existing processes, incorporating existing tools, expanding local knowledge of climate change issues, and creating action oriented solutions to identified problems. The project involves a combined project partnership among Delaware Sea Grant, the Partnership for the Delaware Estuary (a National Estuary Program), The Resiliency Place (a business that specializes in providing long-term climate focused strategic planning to local governments), and the New Jersey Sea Grant Consortium which merges multiple levels of expertise and experience in hazard mitigation, climate change science, climate adaptation, and community engagement. The partners will work with Delaware City to enhance the preparedness planning process and create a locally applicable action plan

	that is responsive to changing conditions and impacts to community elements such as built infrastructure, environmental resources, and social/economic entities. Additionally, Pennsylvania Sea Grant will work in collaboration with the project partnership to extend community climate adaptation outreach efforts to local governments on a regional basis.
Progress	In collaboration with project partners and the City Manager, Delaware Sea Grant worked to establish a Community Task Force to represent Delaware City and provide leadership throughout the project planning process. Through a series of four workshops, Sea Grant provided step-wise guidance as the community assessed vulnerabilities, reviewed best practices and actions implemented by other communities, and developed a list of priority strategies to meet specific needs of Delaware City with regard to hazard mitigation and climate adaptation.
Summary	

Program	DE
Project Title	Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments
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Partner	
Description	The goal of the proposed project entitled Weathering Change - Integrated Hazard and Adaptation Training to Create Resilient Local Governments is to integrate climate change adaptation's forward looking planning process with existing hazard mitigation actions of local governments. Given that coastal communities in the Mid-Atlantic currently face threats from natural hazards that may be exacerbated by climate change impacts creating a positive vision of resilience through the projects integrated hazard/climate change process will have regional and local salience. Delaware City, Delaware, is the specifically identified community partner for this project, but the initiative will also result in a step-wise training program and template that will be available to other communities to develop integrated hazard mitigation and climate change adaptation action plans. Materials will be developed in such a way that local governments can access them independently and adopt the information that is relevant to specific needs. Additionally, partner organizations and agencies can continue to provide these trainings and resources for other interested local governments. While hazard mitigation planning is a common effort and procedure undertaken by many communities, the present process is

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Progress	Throughout the Delaware City adaptation planning project, the intent is to work closely with a group of committed stakeholders and with the broader community to develop an action plan that will help to improve the City's economic, social and environmental well-being over time. Delaware Sea Grant provided assistance to the community in establishing an Advisory Committee of subject-matter experts and practitioners who are willing to share their expertise and resources about collaborative opportunities and possible actions the City can take to reduce risk and vulnerabilities. Advisory Committee members are committed to provide assistance via leveraged expertise as adaptation actions are identified and implementation plans are developed. They have also agreed to support an on-going commitment with the community by maintaining communication with Delaware City with regard to opportunities for funding, coordination, and collaboration in the future.
Summary	

Climate Fund Source Project Reports FY13

Program	FL
Project Title	Building Local Capacity: Workshops on Legal Issues in Sea-Level Rise Adaptation for Local Governments in Florida and Providing Adaptation Assistance to Local Governments
Investigators	Ruppert, Thomas (University of Florida (UF));
Partner	
Description	OBJECTIVES: Increase the level of knowledge that local government planners, attorneys, and decision makers possess about the science of sea-level rise (SLR), the likely impacts of SLR, and options available to local governments to address SLR. METHODOLOGY: Year 1 will focus primarily on implementation of 3 or 4 full-day workshops that focus on legal issues that are important for local governments to consider when evaluating potential adaptation strategies for SLR. Year 2 will focus mostly on one of two options. The first option is development of a paper, with case studies, of "strategic relocation" as a way in which Floridians have in the past sometimes addressed coastal hazards. The second option is development of a module on coastal planning and SLR to introduce newly-elected local government officials to the basics of good coastal planning, hazard mitigation, and SLR planning/adaptation. During both years a portion of the time supported by these funds will be dedicated to allowing Florida Sea Grant and Mr. Ruppert to respond to inquiries or requests for SLR information, presentations, and technical assistance. RATIONALE: The State of Florida has not demonstrated leadership in adaptation to one of the most important aspects of climate change for the state: SLR. Until recently, SLR was not even mentioned in Florida statutes and only appeared once in the several volumes of Florida's administrative code. Despite this, a few local governments continue to forge ahead. A group of pioneering local governments developed the Southeast Climate Compact (SECC), representing four counties comprising 1/3 of Florida's population. The SECC has requested that Florida Sea Grant present the workshop "Adaptive Planning for Sea-Level Rise: Legal Issues for Local Government" in southeast Florida, but the SECC has no funds to support this. Year one will allow Florida Sea Grant and Thomas Ruppert to accomplish this. The funds will also allow Mr. Ruppert to respond to requests from local governments for information on SLR and SLR adaptation.
Progress	Florida is one of the most at-risk locations in the U.S. for sea-level rise impacts, due to its low topography, and the concentration of more than 80 percent of its population in the coastal zone. While some major cities have begun planning for sea-level-rise, most coastal locations are ill- prepared for it. Nonetheless, many are already experiencing negative impacts, both in the built and natural environments. Florida Sea Grant is applying innovative approaches to develop policies that address issues of hazard resilience. Examples include hurricane and risk assessment workshops that educate coastal residents in Pinellas, Franklin, Lee, Wakulla, Monroe and Sarasota counties about evacuation zones, hurricane planning, and how to secure property and possessions. Furthermore, Florida Sea Grant's Coastal Planning Specialist conducted a series of sea-level-rise adaptation planning forums in Wakulla, Collier, and Sarasota counties that

	applied a new mapping and visualization technology called CommunityViz to facilitate public engagement and community decision-making about identifying hazards and planning for sea-level-rise. In 2012, 3,644 coastal residents, 168 resource managers and 97 local government officials participated in Florida Sea Grant hazard resilience programming.
Summary	Florida Sea Grant outreach applies new technologies to help coastal residents and communities increase hazard resiliency.

Program	FL
Project Title	Climate Change Adaptation 2012: Sarasota County, FL: Processes and Tools for Stakeholders
Investigators	Thomas Ruppert (University of Florida (UF));
Partner	
Description	This project will design and implement facilitated, collaborative processes with an innovative visualization software and hardware combination to engage stakeholders representatives in Sarasota County, Florida. The project's purpose is to develop a policy to address rebuilding of damaged structures after a storm; this is a critical element to allow completion of the current draft Post-Disaster Recovery Plan (PDRP) of Sarasota County
Progress	Florida is one of the most at-risk locations in the U.S. for sea-level rise impacts, due to its low topography, and the concentration of more than 80 percent of its population in the coastal zone. While some major cities have begun planning for sea-level-rise, most coastal locations are ill- prepared for it. Nonetheless, many are already experiencing negative impacts, both in the built and natural environments. Florida Sea Grant is applying innovative approaches to develop policies that address issues of hazard resilience. Examples include hurricane and risk assessment workshops that educate coastal residents in Pinellas, Franklin, Lee, Wakulla, Monroe and Sarasota counties about evacuation zones, hurricane planning, and how to secure property and possessions. Furthermore, Florida Sea Grant's Coastal Planning Specialist conducted a series of sea-level-rise adaptation planning forums in Wakulla, Collier, and Sarasota counties that applied a new mapping and visualization technology called CommunityViz to facilitate public engagement and community decision-making about identifying hazards and planning for sea-level-rise. In 2012, 3,644 coastal residents, 168 resource managers and 97 local government officials participated in Florida Sea Grant hazard resilience programming.

Summary	Florida Sea Grant outreach applies new technologies to help coastal residents and communities increase hazard resiliency.

Program	GA
Project Title	Tybee Island, GA – Developing a 50-year Climate Adaptation Plan for a Highly Vulnerable Barrier Island Community
Investigators	Charles Hopkinson (Georgia Sea Grant); David Bryant (Georgia Sea Grant); Jason Evans (Carl Vison Institute of Government (UGA)); Rob McDowell (Carl Vison Institute of Government (UGA));
Partner	Carl Vison Institute of Government (UGA); Chatham County Chatham County - Savannah Metropolitan Planning Commission; Coastal Regional Development Agency ; Georgia Department of Natural Resources, Coastal Resources Division (GA DNR, CRD); Georgia Departmen
Description	This project is a partnership between the City of Tybee Island, the University of Georgia, Georgia Sea Grant, and the Coastal Resources Division of the Georgia Department of Natural Resources (CRD) to develop a detailed climate adaptation plan for the barrier island community of Tybee Island, Georgia. The plan will be developed through a series of community workshops facilitated through the Vulnerability Consequences Adaptation Planning Scenarios (VCAPS) process. Detailed cost-benefit analyses of future vulnerabilities and specific adaptation scenarios will be performed through with the Coastal Adaptation to Sea level rise Tool (COAST), an advanced GIS package that models and visualizes specific sectoral impacts from storm surges and coastal flooding. Results from the VCAPS discussion and COAST scenarios will be used as a foundation for prioritizing, developing timescales, and initiating municipal finance planning for the development of the adaptation action plan. The City of Tybee Island has formally agreed to consider adopting the recommendations developed by this project through appropriate local ordinances, infrastructural improvements, and other municipal actions, with Georgia Sea Grant, CRD, the University of Georgia, and other state agencies providing outreach and extension support through this implementation phase. It is expected that this project will serve as a model for advanced adaptation planning and implementation for other coastal communities of Georgia, the southeast region, and across the nation.
Progress	In May 2012, the project team, led by Jason Evans of the UGA's Carl Vinson Institute of Government and Chuck Hopkinson of Georgia Sea Grant, convened an introductory public meeting at the Tybee Island City Hall. The meeting introduced the proposed planning process to the mayor, city staff, the city council, the Savannah-Chatham Metropolitan Planning Commission and members of the general public. In August, the process began in earnest with another public meeting that identified potential problems, prioritized adaptation options and chose SLR scenarios for which to plan. At

	both meetings, public and institutional representatives were very engaged and considerable media coverage was generated: http://www.redandblack.com/news/uga-georgia-sea-grant-help-tybee-island-prepare-for-climate/article_352f0976-96dd-56d9-81c3-e6d8ceebd33d.html http://savannahnow.com/news/2012-08-06/tybee-island-hosting-workshops-prepare-rising-sea-levels http://savannahnow.com/news/2012-05-08/tybee-planning-rising-sea-levels http://www.wtoc.com/story/18345283/grant-to-help-tybee-island-with-climate-change?clienttype=printable http://www.csc.noaa.gov/digitalcoast/stories/tybee http://www.gpb.org/news/2012/08/07/tybee-addresses-rising-sea-levels http://www.wtoc.com/story/21447607/tybee-residents-to-discuss-flood-prep-due-to-rising-sea-levels
Summary	

Program	LA
Project Title	Adapting to Climate Change through the Integration of Land Use Planning and Hazard Mitigation in Coastal Communities: Lafourche Parish, LA and Abbeville, LA
Investigators	Daigle, M. (Louisiana Sea Grant); Wilkins, J. (Louisiana Sea Grant);
Partner	Lafourche Parish, LA; Louisiana State University, AgCenter (LSU); Vermilion Parish, LA;
Description	Objectives The focus of this project is to strengthen parish and local leadership in Lafourche Parish, Louisiana, and Abbeville, Louisiana, as the both face adaptation to climate change. The PIs will provide technical assistance and guidance to local officials on how to best implement sea level rise into their planning process. The PIs will also prepare and distribute educational materials in a variety of formats concerning climate change and adaptation tools. Methodology The PIs will coordinate with local government leaders, city and parish agencies, and community organizations through onsite meetings and workshops. The PIs will provide information and written materials to their constituents, as well as provide community members with access to recorded presentations. The PIs will work with various groups, such as the Southern Climate Impacts Planning Program, and local marine extension agents. Rationale The PIs will target two communities with the project, one each year of the project. The first community targeted will be Lafourche Parish, Louisiana. Areas of the parish are very low, and the risk of flooding will only increase with climate change. Port Fourchon, located at the southern portion of the parish, supports 18% of the nation's energy needs and is a vital asset to national energy security. The second community will be Abbeville, Louisiana. Abbeville is located in Vermillion Parish. The city prides itself on its closeness to the coast and its community priorities, including family, faith,

	and friends. A long-term plan incorporating climate change in decision-making will allow Lafourche and Abbeville to grow sustainably and resiliently.
Progress	
Summary	

Program	ME
Project Title	Enhancing Sea Grant's Ability to Help Coastal Communities Adapt to Climate Change
Investigators	Esperanza Stancioff (Maine Cooperative Extension Service); Kristen Grant (Maine Sea Grant);
Partner	Maine Coastal Program, State Planning Office; Maine Cooperative Extension Service; Normandeau Associates; Woods Hole Oceanographic Institution Sea Grant (WHOI);
Description	
Progress	RELEVANCE: Coastal property owners and municipal officials lack access to accurate information on options for and the effectiveness of climate change adaptation strategies in Maine. RESPONSE: Maine Sea Grant created a series of outreach materials (seagrant.umaine.edu/program/sarp and seagrant.umaine.edu/coastal-hazards-guide) and helped form the state's first professional Climate Adaption Providers' Network. RESULTS: The State of Maine has incorporated Maine Sea Grant's resources into the Basic Land Use, Shoreland 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.
Summary	Maine Sea Grant's climate adaptation resources have been integrated into the state's Code Enforcement Officer trainings and informed creation of the state's first professional Climate Adaption Providers Network.

Climate Fund Source Project Reports FY13

Program	ME
Project Title	Sea Grant Climate Adaptation 2011: City of Ellsworth, ME – Coastal Infrastructure Resiliency in a Changing Climate
Investigators	Joyce (Esperanza) Stancioff (University of Maine Cooperative Extension (UMaine)); Kristen Grant (Maine Sea Grant); Shaleen Jain (University of Maine, Orono (UMO));
Partner	City of Ellsworth, ME; Hancock County, ME Emergency Management Team; Maine Department of Environmental Protection (ME DEP); Maine Department of Transportation (ME DOT); Maine Sea Grant; NOAA Sector Applications Research Program (US DOC, NOAA, OAR, CPO, SA
Description	(22) OBJECTIVES: Goal: The City of Ellsworth Maine will effectively prepare for, respond to, and reduce impacts from future stormwater and flooding. Objectives Work collaboratively with the City of Ellsworth, ME to: 1.develop a community based adaptation model to address management protocols for stormwater and flood protection infrastructure. 2.develop a network decision- making map and decision calendar to direct local governance processes in the face of coastal hazards. (23) METHODOLOGY: The project team (including federal, state, regional, local decision makers, and project staff) will contribute to the development of a network decision-making map (local, regional, state and federal decision makers involved in the maintenance, repair, replacement, and financing of culverts), as well as the compilation of scientific and engineering information needed to assess the adequacy of culvert design, quantification of flood risk for a select set of culverts on multiple time horizons. Project staff then drafts Integration of hydrologic design modeling with data and information system for the City of Ellsworth, including downscaled extreme precipitation scenarios based on the Intergovernmental Panel on Climate Change's A1B emissions scenarios for the 21st century. The Project team then analyzes the feasibility of climate adaptation options related to stormwater and flood-protection infrastructure. Next, project staff conduct geospatial mapping of the climate related risk premised on recent extreme precipitation and future scenarios with existing infrastructure (small watershed modeling, coupled with culvert size assessment). Maps will then be developed, by the Project Team, showing climate-related risk, based on multiple decision criteria (flooding, economic costs, future development scenarios, and potential for flood-related disruption). Project staff next develop a draft working group protocol for information sharing and coordination, which includes, however, is not limited to the City of Ellsworth, State DOT, Inland Fish and Wildlife, and USDA NRCS. Project staff then develops draft schematic of network decision-maker map and decision calendar, which is finalized by the Project team. Project team plans and hosts a community meeting to present findings and show tools to be utilized and incorporated into Ellsworth Comprehensive Plan and Mitigation Plan and the project evaluation implemented. (24) RATIONALE: Adaptation in a changing climate is an urgent priority for coastal communities. Maine's coastal communities represent an excellent laboratory to investigate adaptation strategies that mobilize science-based approach with a clear appreciation of local contexts, governance, and information needs. Individual extreme events, such as Summer 2009, exemplify the widespread societal and economic impacts on Maine's coastal communities. The Maine Healthy Beaches

	Program, which monitors coastal water quality, experienced 250 beach advisories or closures due to rain events. This greatly impacts tourism, which is the largest industry in Maine. Municipal infrastructure and coastal ecosystem function are compromised with such extreme events, as was also demonstrated by the 2005 Patriot's Day Storm which flooded many areas in southern Maine and a more recent landslide from a bluff area in Stockton Springs. Extreme meteorological events, sea-level rise, ageing infrastructure, and increasing concentration of development along the coast reinforce the notion that transferable models of management, planning, and governance at community-level are needed to improve responsiveness and anticipate investments and resource allocation. Based on a 2008 estimate, Maine's coastal zone counties account for 77% of the statewide jobs in the industrial sector, and 81% of the jobs in the leisure and hospitality sector. Consequently, new approaches that increase resiliency to climate and coastal hazards will lead to benefits for coastal communities and the economic sector. Results from our previous work with town and city officials affirm the needs to mitigate the recurrent impacts from extreme rain events—planning and decision-making related to maintenance, repair, replacement of stormwater infrastructure, including culverts are viewed as a major issues.
Progress	
Summary	

Program	MI
Project Title	Outreach Strategies for Enhancing Grand Traverse Bay Watershed Climate Integrated Assessment
Investigators	Charles Pistis (Michigan State University County Extension Offices (MSU)); Jennifer Read Donahue (Michigan Sea Grant);
Partner	
Description	Objectives: 1) Enhance the outreach activities proposed for the Sea Grant sponsored, two year integrated assessment project titled: Quantifying the Impacts of Projected Climate Changes on the Grand Traverse Bay Region: an Adaptive Management Framework. Methodology: Task One: Enhance Sea Grant Extension Support for the Project. The integrated assessment project stakeholder engagement strategy and team will be enhanced with the addition of the district Sea Grant extension educator to the stakeholder team. Mark Breederland has 17 plus years' experience in

	extension education including the past eight years in northwest Michigan. Breederland's leadership on sustainable coastal development, coastal land use and land use planning and redevelopment and coastal wetlands make him an important additional asset to the integrated assessment. He will facilitate the outreach team's objectives, by linking the project with community leadership and collaborating with the development and implementation of the stakeholder survey described in task two below. Task Two: Administer Stakeholder Survey to Assess perceptions of climate, climate change, effects of climate change on watershed, and opportunities for/acceptability of adaptive management Most of the management changes necessary in response to climate change must be undertaken by three general groups of people: 1) local governments, 2) public and private sector resource managers, 3) individual residents who make daily decisions that both affect and respond to climate change. A set of surveys is proposed to assess the implications of perceptions and actions of members of these three groups for proposed adaptive management in response to climate change. The results of these surveys will, in a very targeted way, supplement information that has been compiled through: 2007 Social Benchmark Survey conducted by the Watershed Center and Northwestern Michigan College assessing the views of local residents on issues affecting the watershed; a 2010 Core Values study by the Watershed Center consisting of a series of one-on-one interviews with residents to determine key values related to the environment and natural resources; and numerous studies of public opinions and values and economic activity in the region. Questions asked in the surveys will address four primary areas: What do individuals from the identified groups of people know and believe about climate change and its impacts? What natural resource, including weather, changes have individuals from the identified groups of people observed that they believe may be related to climate change? What management actions that have been undertaken are known to the individuals? How have they been involved with or affected by management actions? What are the responses of the individuals to a specific set of additional recommended management actions? In addition, basic demographic data will be collected. Two surveys will be conducted. The first will be undertaken during late summer and early fall 2012. The second will be undertaken two years later. The Dillman mail survey technique will be used in both rounds. Results of the surveys will be analyzed to determine responses to the four questions posed above. Task 3: Deliver Sea Grant/NOAA Training Modules to Targeted Decision Makers/Stakeholders These funds will be used to host at least one additional, centralized training event developed under separate grant ("Enhancing Outreach on Climate Change, Variability, and Uncertainty in the Great Lakes Region") and continue to enhance accompanying outreach materials. Under that one-year project, Michigan Sea Grant hired a climate outreach specialist who is in the process of integrating current GL climate data and resources into outreach resources , developing outreach materials on themes of uncertainty and risk in climate science and working with regional partners and other Sea Grant programs to host a series of train-the-trainer workshops. The concluding task is to host at least one centralized training event in the Grand Traverse Bay watershed with the target audience(s). The additional ~ month of support for the climate outreach specialist will enable her to arrange an additional workshop and enhance accompanying materials. Rationale: Sea Grant supported integrated assessment project, Quantifying the Impacts of Projected Climate Changes on the Grand Traverse Bay Region: an Adaptive Management Framework,

	currently has a good stakeholder engagement strategy, however due to budget limitations there were some key elements that were unable to be accommodated in the original budget. Some of these elements will be supported with these climate adaptation outreach resources. Project support includes: additional effort for district Sea Grant extension educator, Mark Breederland, to provide overall support to the integrated assessment stakeholder team; support for a stakeholder survey to gauge perceptions of climate, climate change, effects of climate change on the Grand Traverse Bay watershed and opportunities for adaptive management among project stakeholders; and support for at least one adaptive management training targeted to local decision makers and planners in the Grand Traverse Bay watershed, to be conducted by the Sea Grant climate outreach specialist in partnership with the district Sea Grant extension educator.
Progress	
Summary	

Program	MN
Project Title	Climate Change Challenges - Tools for Vulnerability Assessments and Integration of Adaptation Goals and Strategies into Local Plans
Investigators	Jeffrey L. Gunderson (University Of Minnesota (UMN));
Partner	University of Wisconsin, Madison (UW); Wisconsin Sea Grant;
Description	This is a joint project of Wisconsin and Minnesota Sea Grant to provide climate adaptation implementation assistance for Great Lakes communities. A half-time specialist based at Minnesota Sea Grant in Duluth will focus on the Lake Superior coast of Minnesota and Wisconsin through collaboration with the Lake Superior National Estuarine Research Reserve (LS-NERR) in Superior. The project is modeled after the EPA/NOAA Smart Growth Implementation Assistance for Coastal Communities program that ran from 2003 through 2006. The program provided direct technical assistance from planning experts to communities interested in incorporating smart growth techniques in their development projects. Several efforts exist in Wisconsin and Minnesota to provide workshops and training on coastal climate adaptation. The next logical step is to provide direct technical assistance to coastal communities, including coastal tribal governments, to promote action on climate adaptation. The new climate extension staff will guide communities through a climate adaptation checklist. Assistance will be provided in a face-to-face informal format in local

	government offices complemented by a driving tour of coastal facilities and potentially threatened resources. A summary report, including the completed checklist, will be provided to the community shortly after the visit. If more detailed follow-up assistance is desired by local governments on specific climate adaptation topics, it would be provided by existing Wisconsin/Minnesota Sea Grant outreach specialists.
Progress	RELEVANCE – 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. Recent climatic changes, including an increased frequency of intense storms, warmer air and lake temperatures, changing lake levels, and more unreliable winter weather, are causing uncertainty and difficulty for coastal communities and businesses. RESPONSE – 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. MNSG partnered with WISG to hire a Climate Adaptation Extension Educator for Lake Superior communities. A checklist, "A Self-Assessment to Address Climate Change Readiness in Your Community," was developed to introduce communities to climate change issues, the community's climate-related vulnerabilities, and adaptation strategies. In addition, MNSG collaborated with MI and IL/IN Sea Grants to host climate adaptation training for Great Lakes Sea Grant and National NEMO Network conference participants. RESULTS – Communities need more information about intense storm frequency preparedness, winter tourism impacts, and a better understanding of what climate adaptation means according to assessments. In 2012, two Lake Superior communities completed the self-assessment checklist, identifying areas of potential vulnerability for their community; another two communities are in the process of completing the assessment. MNSG is working to assist these communities in following up on the results of the assessment. The City of Duluth agreed to share significant data resources with MNSG and the NOAA Coastal Services Center in a flood mitigation and green infrastructure project.
Summary	Lake Superior Communities are becoming more prepared for a changing climate as a result of MNSG's activities.

Program	MN
Project Title	Climate Change Challenges - Tools for Vulnerability Assessments and Integration of Adaptation Goals and Strategies into Local Plans
Investigators	Jeffrey L. Gunderson (University Of Minnesota (UMN));
Partner	University of Wisconsin, Madison (UW); Wisconsin Sea Grant;

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Progress	RELEVANCE – As the nation prepares for a changing climate, adaptation and mitigation efforts often involve seeking financial support. Sources for this support are available but it can be challenging to identify them. RESPONSE – MNSG staff worked with staff at 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). RESULTS – “Climate Funding Opportunities” was posted to the Collaboratory website as a PDF on January 9, 2013, and received 946 hits in 7 days.
Summary	Sea Grant worked to produce an abstract list of climate change adaptation-related funding opportunities. The downloadable PDF provides application, grant award amounts, and eligibility information for climate change adaptation-related funding opportunitie

Program	MN

Project Title	Climate Change Challenges - Tools for Vulnerability Assessments and Integration of Adaptation Goals and Strategies into Local Plans
Investigators	Jeffrey L. Gunderson (University Of Minnesota (UMN));
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Description	This is a joint project of Wisconsin and Minnesota Sea Grant to provide climate adaptation implementation assistance for Great Lakes communities. A half-time specialist based at Minnesota Sea Grant in Duluth will focus on the Lake Superior coast of Minnesota and Wisconsin through collaboration with the Lake Superior National Estuarine Research Reserve (LS-NERR) in Superior. The project is modeled after the EPA/NOAA Smart Growth Implementation Assistance for Coastal Communities program that ran from 2003 through 2006. The program provided direct technical assistance from planning experts to communities interested in incorporating smart growth techniques in their development projects. Several efforts exist in Wisconsin and Minnesota to provide workshops and training on coastal climate adaptation. The next logical step is to provide direct technical assistance to coastal communities, including coastal tribal governments, to promote action on climate adaptation. The new climate extension staff will guide communities through a climate adaptation checklist. Assistance will be provided in a face-to-face informal format in local government offices complemented by a driving tour of coastal facilities and potentially threatened resources. A summary report, including the completed checklist, will be provided to the community shortly after the visit. If more detailed follow-up assistance is desired by local governments on specific climate adaptation topics, it would be provided by existing Wisconsin/Minnesota Sea Grant outreach specialists.
Progress	Note: Below, the "Activity" subheadings refer to the MNSG Implementation Plan. The activities are coded according to focus area, crosscutting goal, and strategic initiative. Activity EXT1: (II-B-5, II-B-3, II-B-2) MNSG conducted maritime transportation outreach benefitting the Great Lakes region by participating in numerous Great Lakes maritime industry meetings in both the US and Canada and by extending information to a variety of audiences. MNSG continued to expand Sea Grant's role in informing the maritime industry and port communities about the threats and opportunities in the transportation environment due to policy, climate, infrastructure, and technology changes. Through presentations on Climate Change and industry adaptation strategies at maritime industry meetings, MNSG contributed to an increasing general awareness and successfully petitioned both USACE and USCG in the Great Lakes to designate an official climate change liaison. MNSG presented at the GreenTec 2012 Conference in Quebec and published in July-Sept issue of the Great Lakes Seaway Review Magazine. MNSG served on the Harbor Technical Advisory Committee for Duluth/Superior. Ocean Policy and Marine Spatial Planning in the Great Lakes - In 2012, MN Sea Grant began participating with the NOAA Ocean Policy Team to consider "Marine Spatial Planning" in the Great Lakes. This was largely an "unfunded mandate" with limited resources for actual product development. In spite of this, MN Sea Grant volunteered to coordinate the

	effort to "map" the marine transportation needs of the Seaway. Working closely with the USCG, and NOAA, MNSG began exploring sources for basic data. MNSG coordinated a regional team to examine resources and interest. Ultimately we were able to collaborate with other groups like the "Great Lakes Environmental Assessment and Mapping program" (GLEAM) and the "USCG Marine Cadastre" to collect initial data. This has improved the data available to GLEAM, and added new dimensions to their data product. In the coming year, we plan to share the data collected with end users to see if it "tells the complete story" about areas of use and need for access. The map of maritime transportation use in the Great Lakes will be the first "interest specific" map to be completed and will set the standard for data quality, and appropriate mapping strategies for other interest groups as they begin to develop their "GIS maps of interest." Activity EXT2: (II-C-3) MNSG provided information on technical issues related to ballast water exchange and treatment options to professional, academic and lay audiences by helping to organize, sponsor and facilitate a meeting of the Great Lakes Ballast Water Collaborative (8/12, Duluth, MN). We also produced the meeting report, to inform state and federal ballast water policies, used by all the Great Lakes States (and Federal Agencies: EPA, USCG). In addition, we presented data and information to a variety of venues (MPCA Board Meeting, Upper-Midwest Invasive Species Conf. 2012, Duluth/Superior HTAC and to other local organizations). During 2012 the USCG and EPA promulgated their initial ballast water regulations. The work of the BWC changed how both Great Lakes stakeholders (US and Canadian) and the participating US Federal Agencies communicate and relate to each other in addressing critical Great Lakes issues. During 2012 the Great Lakes States were able to harmonize their ballast water treatment numeric standards for the first time; two lawsuits were withdrawn, and two were dismissed based on the work of the GL Ballast Water Collaborative. Activity EXT3: (IV-B-1) MNSG presented Lake Superior-specific climate change information relevant to maritime transportation to a variety of groups (International Joint Commission, Harbor Technical Advisory Committee, Propeller Club of America, Green Marine, St. Lawrence Seaway Development Corp., and the public). Activity EXT4: (II-B-6) MNSG continues to partner with industry, academia, and the government to understand and balance threats and opportunities unique to the Duluth-Superior Harbor. This includes providing support for the development of the Erie Pier national pilot dredge re-use program, spearheading the 21st Ave. W. restoration and mitigation project (74 acres), and participating on the harbor's Freshwater Corrosion Task Force. MNSG staff served as Vice Chair of the Harbor Technical Advisory Committee, and worked closely the Duluth Seaway Port Authority, the Coast Guard and the Army Corps of Engineers, state agencies, and the Cities of Duluth, MN and Superior, WI. Activity EXT5: (II-B-5) MNSG supported Green Ports and Harbors programs, as well as the Great Lakes Network Clean Marina GLIR program and the international Green Marine initiative. 2012 marked the first certified "MN Clean Marinas." Activity EXT8: (II-C-4) MNSG's efforts to understand, communicate, and address concerns related to accelerated-freshwater corrosion continues through collaborations, research, and participation on the harbor's Freshwater Corrosion Task Force. Activity EXT8: (II-C-5) Disposing of dredge materials is a critical issue to maintaining commercial and private ports and harbors in the Great Lakes. MNSG's efforts continue to inform and build strategies for addressing this issue. MNSG provided leadership and support for the development of Erie Pier, a national pilot dredge re-use program. (See

	impact statement.) Activity EXT9: (II-C-3, II-C-6, II-B-6) MNSG consulted with dozens of cities, watersheds, and University units about stormwater, nonpoint source pollution, and sustainable landuse. MNSG continued long-standing educational work with the Regional Stormwater Protection Team (RSPT) and the University of Minnesota Duluth Stormwater Committee. We assisted with education during the RSPT co-sponsored rain barrel sale, where 338 rain barrels were sold. We assisted homeowners with determining the best way to set up their barrel, and answered questions about how to use the water. During 2012, RSPT reached 2,391 individuals with a stormwater protection message, not including contacts at booths or through television or website resources. In 2012 MNSG applied for, and was awarded, a Minnesota GreenCorps position through the MN Pollution Control Agency. This provided a full-time Americorps position to MNSG to work with on stormwater education from October 2012-August 2013. This position has expanded the capacity of RSPT to reach individuals, students, and businesses, and will leave behind resources that others can continue using. Accomplishments to January 2012 include: 1. Developed a new set of displays for RSPT, including seasonally-adjustable content 2. Coordinated a winter sidewalk and parking lot maintenance workshop, where 95% of participants would recommend the event to their colleagues, and 100% believed they could save money by following the recommendations. 3. Surveyed teachers to help coordinate classroom presentations through RSPT UMD Stormwater Committee - MNSG's assistance with the UMD Stormwater committee included revising, entering results, and analyzing a stormwater survey for students and staff, and coordinating the fall 2012 UMD Stormwater Steering Committee meeting. LEED Professional Course - MNSG collaborated with the UMD Continuing Education Department on developing a stormwater course for LEED professionals after being asked by the MN Chapter of the US Green Building Council to develop such a course to fulfill needed continuing education credits by LEED professionals. During 2012, MNSG designed the course instructional materials, which include approx. 2.5 hours of presentation, 5 exercises, and various supporting materials. The course has been reviewed by the MN Chapter of the USGBC, and we are in the process of finalizing before its expected release during 2013. Activity EXT10: (II-B-2) The Lakeside Neighborhood Stormwater Reduction pilot project continues to mature. In 2012, MNSG led field trips to the project to show off stormwater best management practices (BMPs). Activity EXT11: (II-C-6) NEMO continues to be an active statewide program, and during 2012 the program expanded with 5 additional U of MN Extension Educators becoming engaged in NEMO programming statewide. Fourteen NEMO programs were conducted reaching hundreds of community leaders. The Northland NEMO website (www.northlandnemo.org) was visited about 1380 times a month in 2012. Training conducted by MNSG in "Linking Land Use to Water Quality" and the Watershed Game, and a new presentation focused on rural communities, has provided extension educators with the tools to begin programming in different parts of the state. Understanding the value of the National NEMO University conference (NEMO U), MNSG staff convinced the NEMO Hub that our program could find the financial resources to successfully host NEMO U8 in Duluth, MN. ($5,750 in sponsorships and a grant from the National Sea Grant Office to cover $7,143 of expenses associated with the overlap day between NEMO U8 and the Great Lakes Sea Grant Network Conference). Because of the capacity building between NEMO U8 and the Network Conference, 7 workshops (including a Watershed Game Facilitator's Training and a Climate

	Adaptation Workshop) and a variety of site visits provided training for participants from both conferences. NEMO U8 scored high marks from the ~60 participants; 100% ranked the event either "Truly Splendid" (42%) or "Well Worth the Trip" (58%). NEMO efforts in the Vadnais Lakes Area resulted in participants leaving with a better understanding of phosphorous standards established by the TMDL (75%); this was a primary educational objective. Activity EXT12: (II-C-6) The City of Duluth zoning ordinance updates are complete. The Unified Development Chapter of the Duluth Legislative Code was passed in 2010. MNSG is extending the message about Duluth's laudable progress in protecting Lake Superior (see http://www.seagrant.umn.edu/newsletter/2012/02/a_new_chapter_for_a_seaside_city.html). Activity EXT13: (II-B-6, II-C-1) MNSG engaged communities in discussions about conservation design and smart growth. MNSG collaborated with the Landscape Arboretum on the 2012 Clean Water Summit where 82% of respondents said they left with a better understanding of the role of soil in green infrastructure and stormwater management. MNSG staff co-chaired the Summit, which attracted 225 participants. Ditch and Culvert Maintenance and Design - Previous work with the Weber Stream Restoration Initiative identified road ditch and culvert design and maintenance as priority issues for North Shore streams. As part of the GLRI, NRRI and Sea Grant received funding to develop a road ditch maintenance guidebook. This project kicked off in 2012 with the creation of an advisory committee and development and solicitation of a Request for Qualifications from consulting firms. We are currently awaiting MPCA approval before notifying the selected contractor. Culvert Workshop - We also assisted DNR personnel in developing a culvert workshop for the region. This workshop was subsequently developed jointly with MNDNR, Laurentian Resources Conservation and Development, and BWSR, with funding from Minnesota's Lake Superior Coastal Program and is scheduled for March 2013. This workshop will focus upon on ditch and culvert design in the Lake Superior Watershed that will minimize hydrologic impacts, system failure/subsequent erosion, and maximize cost effective installation, and maintenance. The "Tipping Points" project is a Great Lakes Sea Grant Network project to develop ecological tipping point parameters for land use and water quality, and translate these tipping points into a tool to engage communities in developing action plans to address priority issues. During 2012, MNSG participated in developing the community engagement tools and attended the kickoff workshop at Purdue. Activity EXT14: (II-B-1) With funding from the Great Lakes Observing System, MNSG held two workshops in Duluth for educators regarding the Teaching with Great Lakes Data website, (greatlakeslessons.com) housed at Michigan Sea Grant, and introduced two lessons created by MNSG that rely on buoy data from the western end of Lake Superior to teach about lake stratification, upwelling, and effects on Great Lakes fisheries. A third workshop was held in Madison, WI, in cooperation with WISG. A total of 72 K-12 teachers and informal educators were trained. Activity EXT16: (II-B-6) MNSG facilitated 5 meetings, forums, workshops, and events to improve sustainable environmental and economic decision-making. In addition, MNSG facilitated a multi-step process to develop a scoping document, outlining necessary precursor steps to take before convening a statewide "Water Congress" to review state statutes, policies, procedures, and plans related to managing state ground and surface water resources. We worked with the Water Resources Center and Humphrey Institute of UMN and the Minnesota Environmental Initiative to organize and facilitate the steering committee that developed the document, which was

	then submitted to the Minnesota legislature. MNSG also facilitated the strategic planning for the Forestry Team and Woodland Advisor Team of UMN Extension. Activity COM1: (II-B-3) Spilhaus biography: The University of Minnesota Press is reviewing the completed manuscript but has not committed to being its publisher (yet). Activity COM2: (II-B-1) Mass communication about Sustainable Coastal Development reached a potential audience of 3,992,239. MNSG increased maritime transportation awareness and scientific/maritime literacy within the general public and among policy makers through numerous articles, presentations and on-line resources. MNSG facilitated the delivery of science-based information and resources to formal and informal education communities by participating in River Quest, and other outreach/educational events in 2012. Excluding the Northland NEMO website activity (visits=16,556), there were 2,955 unique page views to coastal development topics on the MNSG website: • Coastal Communities minus hypothermia and rip currents: 1,759 • Maritime: 1,196 Activity EDU1: (II-B-4) As in 2011, on-the-water programs, similar to A View from the Lake (conducted on Lake Superior), were conducted through the Northland NEMO program with the Mississippi Watershed Management Organization. Local elected and appointed leaders participated in the MNSG/NEMO Workshops "A View from the Big River." 85% indicated a gain in knowledge and some participants identified concepts that they did not know before the excursion. The lessons and materials developed from the Lake Superior cruise series were used in two educator professional development workshops and the "A View from the Lake educational website" is pending. Activity EDU2: (II-B-4) The Watershed Game continues to be a valuable tool for working with local governments, citizen and school groups, and other organizations. In 2012, the three Watershed Game versions (lake, river, and stream) were revised and improved through the experiences of 17 facilitators. Train-the-trainer sessions added 85 facilitators in 10 states. The Indiana Watershed Academy has incorporated the Watershed Game as parts of its annual curriculum. The majority of participants in Watershed Game Train-the-Trainer sessions indicated the training provided them with skills strong enough to lead the curriculum in their own programs. The Watershed Game also won the "Superior Outreach Award" at the Great Lakes Sea Grant Network conference. Presentations at professional meetings about the game included the National American Fisheries Society Annual Meeting, August 2012. Activity EDU3: (II-C-2) MNSG used data, graphics, water quality impact information, best management practices, and data visualization tools from Lake Superior Streams to enrich seven workshops, as well as several presentations at professional meetings and outreach venues, including the Minnesota Wastewater Operators and a Northland News segment. Two lessons based on Lake Superior stratification and upwelling data from Lake Superior Streams data visualization tools and the Large Lakes Observatory Buoy were developed as part of the Great Lakes Observing System (GLOS) education project and will be posted on the Teaching with Great Lakes Data educational curriculum website hosted by Michigan Sea Grant.
Summary	MNSG contributed to ballast water management issues, the recycling of dredge materials, marine spatial planning, and community sustainability.

Program	MN
Project Title	Climate Change Challenges - Tools for Vulnerability Assessments and Integration of Adaptation Goals and Strategies into Local Plans
Investigators	Jeffrey L. Gunderson (University Of Minnesota (UMN));
Partner	University of Wisconsin, Madison (UW); Wisconsin Sea Grant;
Description	This is a joint project of Wisconsin and Minnesota Sea Grant to provide climate adaptation implementation assistance for Great Lakes communities. A half-time specialist based at Minnesota Sea Grant in Duluth will focus on the Lake Superior coast of Minnesota and Wisconsin through collaboration with the Lake Superior National Estuarine Research Reserve (LS-NERR) in Superior. The project is modeled after the EPA/NOAA Smart Growth Implementation Assistance for Coastal Communities program that ran from 2003 through 2006. The program provided direct technical assistance from planning experts to communities interested in incorporating smart growth techniques in their development projects. Several efforts exist in Wisconsin and Minnesota to provide workshops and training on coastal climate adaptation. The next logical step is to provide direct technical assistance to coastal communities, including coastal tribal governments, to promote action on climate adaptation. The new climate extension staff will guide communities through a climate adaptation checklist. Assistance will be provided in a face-to-face informal format in local government offices complemented by a driving tour of coastal facilities and potentially threatened resources. A summary report, including the completed checklist, will be provided to the community shortly after the visit. If more detailed follow-up assistance is desired by local governments on specific climate adaptation topics, it would be provided by existing Wisconsin/Minnesota Sea Grant outreach specialists.
Progress	With the Great Lakes Sea Grant Network, we obtained Great Lakes Restoration Initiative funding to continue ship- and land-based educator professional development throughout the Great Lakes states for the next four years, through a newly-minted program called Center for Great Lakes Literacy (www.cgll.org). Three graduate students (one in environmental education and two in MS programs in the aquatic sciences) and one technician (interested in graduate school in survey design and evaluation) were mentored in internship programs to develop their skills in outreach, lesson development, and evaluation. In cooperation with the Lake Superior NERR Education Coordinator, MNSG sponsored an Outreach and Educator Roundtable in fall 2012. The goal of what is intended to be a twice annual event is to alert other educators in the region to workshops, professional development opportunities we are planning, and ideas for shared products, lists of educators, and other tools that will improve our efficiency, provide economy of scale, and result in a “one-stop-shop” for teachers looking for opportunities to improve their knowledge of the Great Lakes and ability to

	incorporate Great Lakes literacy into their classrooms. We worked with the Great Lakes Aquarium to sponsor and organize a live-streaming event in association with Gustavus Adolphus College's Annual Nobel Conference during fall, 2012 (called "Our Global Oceans"). Local scientists presented short descriptions of their Great Lakes freshwater research paired with each of the live-streamed research talks. Sea Grant graduate students spoke with over 50 participants during this two-day event. MNSG worked with the National NEMO HUB to successfully host NEMO U8 in Duluth, in conjunction with the Great Lakes Sea Grant Network conference. NEMO U was successful; MNSG staff managed to find $5,750 in sponsorships and secured a grant from the National Sea Grant Office to cover $7,143 of expenses associated with the overlap day between NEMO U8 and the GLSG Network Conference, where a series of 7 workshops (including a Watershed Game Facilitator's Training and a Climate Adaptation Workshop) and site visits provided capacity-building training for participants from both conferences. NEMO U8 scored high marks from all 60 participants; 100% ranked the event either "Truly Splendid" (42%) or "Well Worth the Trip" (58%). The Great Lakes Sea Grant Network conference in fall 2012 was also successful. This event kicked off with the overlap day of training discussed above, and focused on significant time for project breakout sessions, with a total of 4.5 hours dedicated to currently active projects. This time was used for project planning purposes, to showcase completed work, and to strategize for future activities, as the work teams saw fit. Evaluations indicated that this event was highly rated among participants as well, with 100% rating the event as Excellent (61.5%) or Good (38.5%). One additional outcome of this event was securing Duluth as the location for the second session of the 2013 Sea Grant Academy, the first time the Academy will have been held on the Great Lakes. Program development funding was provided to a Large Lakes Observatory researcher to collect and analyze data after the 500 year flood event in June, 2012, to determine effects of the flood on the western arm of Lake Superior. Program development funding also went to a relatively new UMD researcher to begin evaluating PAH issues in local stormwater runoff ponds and the streams that drain them.
Summary	In 2012 MNSG accomplished outreach, education, and other activities that are worth noting.

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH;

	Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
Description	In the Northeast, occurrences of extreme precipitation and the intensity of rainfall are increasing. Local officials have had to deal with the flooding, damaged infrastructure and property, culvert failures, human health issues, effects of polluted runoff and pressure on municipal budgets and services that accompany extreme precipitation numerous times in recent years. In coastal areas in the Northeast, these effects are often exacerbated by high rates of imperviousness and flood prone development. The serious economic, environmental and social effects of severe weather and projected changes in climate behoove communities to do what they can to prevent damage and prepare for a "new normal" in terms of climate conditions, however planning and readiness activities at the municipal level are often usurped by immediate threats, budgetary restraints, political pressures and discomfort accessing or applying scientific data. N.H. Sea Grant in collaboration with its partners can help coastal communities make progress in climate adpatation by offering assistance to communities when, where, how and with what they need help.
Progress	N.H. Sea Grant carries out much of its climate-related work in partnership with the New Hampshire Coastal Adaptation Workgroup (NHCAW or CAW), a coalition of 19 organizations and agencies focused on helping coastal communities in New Hampshire prepare for extreme weather and climate effects. CAW provides communities with education, facilitation and technical assistance that improve their access to climate-related information and people, as well as helps them build their capacity and adjust their plans, regulations and actions to take changing climate conditions into account. In 2012, CAW received the Daniel Quinlan award for Outstanding Achievement in Community and Regional Planning from the Rockingham Planning Commission. The award recognizes those in the region who have made significant contributions to sound community and regional planning and have fostered inter-municipal cooperation and collaboration. This award stems from the successes of five public workshops around climate change hosted by CAW since 2010, a quarterly CAW newsletter, and nearly a dozen collaborative climate change adaptation projects with N.H. coastal communities.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);

Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	Recognizing and implementing climate adaptation, as such, is a relatively new task for municipalities and for those who support local decision making. In recognition of this challenge, in 2012 N.H. Sea Grant staff compiled a set of about 45 observed and potential outcomes communities might achieve with assistance from adaptation practitioners. The list was developed to help recognize, guide and document steps communities take to improve their resilience. The outcomes are grouped into five categories – Increasing Community Capacity, Conducting Research and Assessments, Modifying Plans, Adopting Regulations and Policies, and Taking Municipal Actions (voluntarily). The outcomes were shared with the 19 partner organizations and agencies composing New Hampshire's Coastal Adaptation Workgroup (CAW) and are being adopted and used as a tool to help define climate adaptation for CAW and partners at the community- and project-level. Having a shared definition of community-based adaptation outcomes should help climate adaptation practitioners within the region and elsewhere to communicate more clearly, coordinate efforts more effectively, and track results collectively over time. It also helps communities recognize what types of actions constitute climate adaptation. The list will continue to evolve as new outcomes emerge and others fade based on actual community actions.
Summary	

Program	NH

Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	With funding from a National Sea Grant Law Center grant, N.H. Sea Grant coordinated legal research to accompany the development of new 100-year floodplain maps by a UNH-led team for a coastal watershed. The new maps reflect risk from current and projected precipitation rates and land use and differ from the most recently available FEMA maps. Engagement between the mapping team and a local advisory committee was an important component of the project in order to ensure the maps were relevant and to help identify users and barriers to use. The legal research was inspired by suggestions from the advisory committee that fear of legal challenges could be a barrier to use of the maps. The study, carried out by four faculty and 18 students at Vermont Law School, investigated five primary questions, including one exploring possible options available to communities for managing development within floodplains. The results, publically reported in 2012, confirm that N.H. communities can and should do what they can through planning, regulatory and non-regulatory strategies to protect health and property within the new floodplains. In order to minimize the likelihood of legal challenges, community actions should be based on sound planning, appropriate statutes and clear purposes, and they should preserve some economic viability for the affected land. It is anticipated that the information from this important study will help reduce barriers to communities taking action to protect health and property on evolving floodplains. The results of the legal research were presented in June 2012, both to a national audience at the Coastal Society Conference as well as in a public forum within the mapped watershed. Several opportunities are planned to share the findings with institutional, state and regional audiences.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	Beginning in 2010, a UNH-led team funded by the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) developed a new set of 100-year floodplain maps for a coastal N.H. watershed based on current and projected climate and land use conditions. The mapping team engaged an advisory committee in order to make sure that the maps were relevant for community use and to help identify users and barriers to use. NHSG worked with the mapping team in 2012 to assess the effects of engaging with the advisory committee on the map products and the project overall. Seven substantial changes to the maps were made by the technical team based on input from the advisory committee. These included changes to the terminology, symbology, scenarios and tables used. The advisory committee also identified the need for legal research in order to reduce barriers to use of the maps. Based on NHSG's initial assessments, the mapping team produced better products based on input from the advisory committee. The advisory committee as well as other stakeholders pointed out the need for training to accompany the maps, so training

	and additional use assessment are being planned for 2013-14.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	N.H. Sea Grant carries out most of its climate adaptation work with its partners in the N.H. Coastal Adaptation Workgroup (CAW), a coalition composed of representatives from 19 federal, state, regional, municipal and academic institutions. CAW members support communities wishing to improve their climate adaptation and community resilience by delivering information, education, facilitation and technical assistance in tune with a community's social, economic and environmental situation. CAW members deliver adaptation outreach to broad audiences through events like its workshops series, Water, Weather, Climate and Community, and its website, newsletter and blog located within StormSmart Coasts, an online resource for coastal decision makers. CAW held its first workshop in 2010 and two more each in 2011 and 2012. The 2012 workshops introduced a regional climate assessment, Climate Change in the

	Piscataqua/Great Bay Region: Past, Present and Future and New Hampshire based examples of climate adaptation. By the end of 2012, CAW had worked with representatives from over 25 communities in three different states. The sixth workshop on Building Resilience through Better Floodplain Management is scheduled for spring 2013. CAW also conducts targeted outreach through specific funded projects. Since its inception, CAW members have secured over $2.5M in grant funding for technical tool development, technical assistance and community engagement and received a regional planning award. In terms of community accomplishments, CAW has generated increases in knowledge, motivation and confidence levels related to climate adaptation as reported by over 200 community participants and documented community changes in capacity building (human, financial and technical resources), data and information access, planning tools, regulation and policies, and voluntary actions for over 15 communities. Presentations about CAW's projects, methods and measures will be offered at national, state and institutional conferences and meetings during 2013. A formal evaluation of the model is being considered so that successful elements of the coalition and its methods can be shared with other programs and improvements can be made.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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	immediate threats, budgetary restraints, political pressures and discomfort accessing or applying scientific data. N.H. Sea Grant in collaboration with its partners can help coastal communities make progress in climate adpatation by offering assistance to communities when, where, how and with what they need help.
Progress	In 2012, N.H. Sea Grant and the Great Bay National Estuarine Research Reserve, along with an interdisciplinary team of researchers from the University of New Hampshire and staff from the town of Exeter, embarked on a two-year collaborative effort to develop a robust climate adaptation plan for Exeter (CAPE). Sea Grant's participation in the project's engagement committee has led to a sound outreach plan to connect with stakeholders in a meaningful way, including plans to coordinate a citizen working group to guide the implementation of the project. Sea Grant leveraged its connections with the N.H. Coastal Adaptation Workgroup to bring in a partner with expertise on – and an ongoing interaction with – the business community. This effectively created a complete outreach effort to all sectors of the community. N.H. Sea Grant has also started development of a CAPE project website for the community to access information about climate change, information about the project, the timeline of activities, and how to contact the members of the project team. Sea Grant's partnership on the CAPE project benefits Exeter through increased awareness and understanding of the project thorough engagement and access to the project team.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	In 2011, University of New Hampshire researchers released an assessment of the climate of coastal New Hampshire titled, Climate Change in the Great Bay/Piscataqua Region: Past, Present, and Future. During 2012, N.H. Sea Grant condensed the 54-page assessment into a two-page user-friendly handout appropriate for lay audiences at workshops and events, and also made it available online. This tool was distributed at several workshops as well as to 129 people in the winter edition of the Coastal Adaptation Workgroup's newsletter, The Crow's Nest, which is composed and edited by NHSG staff. This climate assessment summary efficiently and effectively communicates the state of coastal N.H.'s climate, and is of great benefit to partners and to the diverse audience affected by climate change who seek to gain knowledge and understanding of the local climate.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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	terms of climate conditions, however planning and readiness activities at the municipal level are often usurped by immediate threats, budgetary restraints, political pressures and discomfort accessing or applying scientific data. N.H. Sea Grant in collaboration with its partners can help coastal communities make progress in climate adpatation by offering assistance to communities when, where, how and with what they need help.
Progress	N.H. Sea Grant and project partners are working with the City of Dover to create a role-play game simulation to aid area communities in planning for climate change. During 2012, N.H. Sea Grant and partners interviewed Dover city officials, emergency management professionals, concerned citizens, business owners and community leaders to collect the data for the game. This project is one of four concurrent case studies investigating the utility of this approach in fostering adaptation planning. The results from this effort will benefit the target communities and others around the country searching for an effective way to identify climate vulnerabilities and to think through socially, economically and environmentally acceptable adaptation strategies.
Summary	

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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	Sea Grant in collaboration with its partners can help coastal communities make progress in climate adpatation by offering assistance to communities when, where, how and with what they need help.
Progress	RELEVANCE: N.H.'s coastal watershed includes 42 communities, most of which are small and have few professional staff members. Recent studies, including one conducted by Clean Air-Cool Planet (2011), indicate that such communities are experiencing the effects of a changing climate, but are unsure what to do about it. RESPONSE: In 2012 using leveraged funding, New Hampshire Sea Grant staff and partners applied a modified version of the NOAA Roadmap (a participatory community-based process) to assist Newfields, a coastal watershed community, to assess its climate vulnerabilities, identify priorities and take steps to improve its preparedness for climate effects. RESULTS: Newfields formed committees that developed an adaptation action plan with two foci: stormwater management and emergency preparedness. Their stormwater management strategies include hosting Forging the Link (an education program about the economics of low impact development), inventorying their stormwater infrastructure, updating their master plan for climate effects, and adopting subdivision and site plan review regulations to reduce polluted runoff. The town is actively improving preparedness through a new emergency communication system and development of a calendar for town residents with storm-related tips. Residents are also purchasing discounted generators through a bulk purchase approved by the town's selectboard, representing a combined $600 in savings of purchase and installation costs and further economic benefit from recaptured lost productivity during power outages.
Summary	RECAP: A small coastal community in New Hampshire uses assistance from NHSG to take concrete steps to become more resilient in the face of a changing climate.

Program	NH
Project Title	Coastal Climate Change Adaptation Initiative
Investigators	Julia Peterson (New Hampshire Sea Grant);
Partner	Antioch University New England; Carbon Solutions New England (CSNE); City of Dover, NH; City of Portsmouth, NH; Clean Air — Cool Planet; Coastal Services Center (US DOC, NOAA, NOS, CSC); Coastal Services Center, Northeast Region (US DOC, NOAA, NOS, CSC);
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Progress	In 2012, N.H. Sea Grant helped to create a new webpage on StormSmart Coasts, The Journalists Room, as a resource to support local journalists in reporting rich and accurate stories related to climate change. Journalists can quickly access key information for reporting on climate change, including climate science 101 materials, climate impacts, climate media, and contact information for community leaders to get local perspectives.
Summary	

Program	NY
Project Title	Preparing Coastal Constituents and Communities for Climate Change
Investigators	Bunting-Howarth, Katherine (New York Sea Grant);
Partner	American Society of Civil Engineers (ASCE); Cornell Cooperative Extension; Great Lakes Sea Grant Network; New York State Department of Environmental Conservation (NY DEC); New York State Department of State;
Description	New York Sea Grant and the National Sea Grant Office both have priorities related to preparing coastal communities for the hazards associated with climate change. Two projects-one on Long Island and the other in the Great Lakes -will be conducted which will address these priorities. In Long Island the objective of the project is to have coastal decision makers and stakeholders better prepared to respond and adapt to shoreline erosion impacts associated with climate change by increasing awareness and encouraging the proper use of living shorelines as an environmentally sustainable erosion management strategy. This will be achieved by establishing a Living Shorelines Steering Committee/Working Group which will compile, synthesize and distribute information and data on existing living shorelines with emphasis on potential NY applications. This information will be used to convene a technical workshop on living shorelines in February for state and local officials, property owners and managers, marine consultants and contractors, and NGOs. The

	information and resources resulting from this effort will also be used as a basis for producing written and web based materials. In the Great Lakes project, NYSG will collaborate with the Great Lakes Sea Grant Network (GLSGN) to develop tools in support of the climate change component of Sea Grant's coastal resiliency efforts. Developed tools will: identify the needs of target audience; identify the need for risk assessment tools; communicate the needs to tool development; coordinate tool development and field testing; assess the cost/benefit of planning efforts; and assist in drafting adaptation plans when necessary.
Progress	With funding from Save Our Seashores, Inc., a non-profit organization focused on beach conservation and utilization, New York Sea Grant updated and revised its popular bulletin, "Long Island's Dynamic South Shore: A Primer on the Forces and Trends Shaping our Coast". Over 2,000 copies have been requested and are being distributed by the National Park Service (NPS), Soil Conservation and Water Conservation Service, shorelines homeowner groups, teachers and the public. NPS incorporated portions of the bulletin in their Fire Island Visitor's web site. Newsday, Long Island's largest daily is using the publication in the development of an upcoming series on climate change and sea level rise and has requested permission to use graphics in their paper.
Summary	

Program	NY
Project Title	Preparing Coastal Constituents and Communities for Climate Change
Investigators	Bunting-Howarth, Katherine (New York Sea Grant);
Partner	American Society of Civil Engineers (ASCE); Cornell Cooperative Extension; Great Lakes Sea Grant Network; New York State Department of Environmental Conservation (NY DEC); New York State Department of State;
Description	New York Sea Grant and the National Sea Grant Office both have priorities related to preparing coastal communities for the hazards associated with climate change. Two projects-one on Long Island and the other in the Great Lakes -will be conducted which will address these priorities. In Long Island the objective of the project is to have coastal decision makers and stakeholders better prepared to respond and adapt to shoreline erosion impacts associated with climate change by increasing awareness and encouraging the proper use of living shorelines as an environmentally sustainable erosion management strategy. This will be achieved by establishing a Living Shorelines Steering Committee/Working Group which will compile, synthesize and distribute information and data on existing living shorelines with emphasis on

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Progress	RELEVANCE The Town of Shelter Island requested NYSG assistance in evaluating an erosion problem on a barrier spit protecting an important harbor. RESPONSE 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. RESULTS 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. The managers of the land trust used information provided by NYSG to modify their beach management practices to eliminate ineffective dune building practices saving resources and money and reducing marine debris.
Summary	The Town of Shelter Island and Local NGO used NYSG information to eliminate ineffective dune building practices.

Program	NY
Project Title	Preparing Coastal Constituents and Communities for Climate Change
Investigators	Bunting-Howarth, Katherine (New York Sea Grant);
Partner	American Society of Civil Engineers (ASCE); Cornell Cooperative Extension; Great Lakes Sea Grant Network; New York State Department of Environmental Conservation (NY DEC); New York State Department of State;
Description	New York Sea Grant and the National Sea Grant Office both have priorities related to preparing coastal communities for the hazards associated with climate change. Two projects-one on Long Island and the other in the Great Lakes -will be conducted which will address these priorities. In Long Island the objective of the project is to have coastal decision

	makers and stakeholders better prepared to respond and adapt to shoreline erosion impacts associated with climate change by increasing awareness and encouraging the proper use of living shorelines as an environmentally sustainable erosion management strategy. This will be achieved by establishing a Living Shorelines Steering Committee/Working Group which will compile, synthesize and distribute information and data on existing living shorelines with emphasis on potential NY applications. This information will be used to convene a technical workshop on living shorelines in February for state and local officials, property owners and managers, marine consultants and contractors, and NGOs. The information and resources resulting from this effort will also be used as a basis for producing written and web based materials. In the Great Lakes project, NYSG will collaborate with the Great Lakes Sea Grant Network (GLSGN) to develop tools in support of the climate change component of Sea Grant's coastal resiliency efforts. Developed tools will: identify the needs of target audience; identify the need for risk assessment tools; communicate the needs to tool development; coordinate tool development and field testing; assess the cost/benefit of planning efforts; and assist in drafting adaptation plans when necessary.
Progress	As a member of the American Society of Civil Engineers Coastal Ocean and Ports Research Institute's Coastal Zone Committee, NYSG provided leadership in the creation of the Living Shorelines subcommittee to develop engineering standards for living shoreline erosion control projects. NYSG is working with this committee to develop a national online database of living shoreline projects that will provide managers, planners, engineers and property owners with better information on the design and performance of these projects. (American Society of Civil Engineers). NYSG is serving on the planning committee for the Northeast Shore and Beach Preservation Association Biennial Regional Conference to be held in New Jersey in 2013. As a result of Sea Grant's participation, the committee will be including a special session on Living Shorelines which will be co-chaired by NY Sea Grant's coastal processes specialist.
Summary	

Program	OH
Project Title	Climate Initiative -- Ohio Sea Grant Minibus FY2012/2013
Investigators	Christina Dierkes (Ohio Sea Grant); Jill Jentes Banicki (Ohio Sea Grant);
Partner	

Description	Objectives: A new dedicated Climate Extension Educator will be hired and located at the Columbus OHSG program office. An advisory group representing potential end users, as well as those representing key state, regional, and federal partners in climate change education and training will be established. Overall goals and objectives are to develop Great Lakes capacity to extend climate information, products, and services to resource managers and the general public and includes the following: Increase capacity for climate adaptation training and delivery; Develop K-12 climate curriculum to be shared with state educational programs; and Work with others in the development of the GLRI and other funded climate education, outreach and literacy campaign. Rationale: A changing Great Lakes climate has implications for long-term environmental, economic, and social stability. Communities can better prepare for these changes by bolstering their ability to diversify revenue sources in response, mitigating impacts before they occur, and adapting to new conditions. Yet their abilities and motivations to do so are often constrained by lack of knowledge about available resources, limited dedicated staff, lack of knowledge about climate change and its impacts, and lack of technical capabilities. Community delays in enacting climate preparedness may also be due to lack of citizen and political demand for change. This lack of demand is based on inadequate knowledge and awareness at the constituency level, demonstrating a need to enact programming at both the decision maker and local citizenry levels. Ohio Sea Grant (OHSG) has been a leader for more than 20 years in developing regional climate change outreach strategies and in coordinating and assessing Great Lakes Sea Grant Network activities to reduce redundancy and strengthen Sea Grant's efforts to make a difference. Through its Great Lakes climate curricula and Stone Laboratory climate courses, OHSG has created regional climate change curricula and led education programs to train and inform teachers and the public on climate-related impacts facing the Great Lake region. However, much more needs to be done for Great Lakes citizens and communities to adequately prepare for a changing climate. Methodology: Increased Extension capacity through a dedicated Climate Educator will be achieved through extension outreach methods and activities that allow OHSG to build upon its existing climate-related work, as well as to develop new strategies for creating change. Proven outreach education methodology (including new high technology) will be utilized including use of advisory committees and local extension outreach. The project methods will include: Increasing OHSG and Great Lakes capacity for climate adaptation training and delivery; Work on developing K to 12 climate curriculum to be shared with state educational programs; and, Work with others in the development of the GLRI and other funded climate education, outreach and literacy campaigns.
Progress	2012 Relevance: Climate change and its related impacts affect factors that influence the daily lives of the general public, such as infrastructure, public health, agriculture, and water quantity. Yet very few understand what impacts they could face from a state or Great Lakes regional perspective. Response: 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 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 we will encounter regionally as our climate changes. Results: More than 2,650 participants representing 200 organizations from around the country have attended the 10 monthly webinars in 2012 with 93% acknowledging they learned new information and would share it. The National Park Service and USEPA, as well as 8 secondary schools and college courses are using the webinars as teaching tools and the website is used as a professional development resource for natural resources professionals with 21,000 unique visitors. More than 5,775 people have participated in the 26 webinars since the series inception in 2009 and another 14,000 have accessed its webinar archives.
Summary	Recap: In 2012, the OSU Climate Change Outreach Team, a multi-departmental effort that created the monthly Global Change, Local Impact climate webinar series, have helped nearly 21,000 unique web visitors better understand the regional impacts of climate

Program	OR
Project Title	Climate communications with Oregon communities and citizens to assist with decision making
Investigators	Cone, Joe (Oregon Sea Grant);
Partner	
Description	Objectives: Overall, we have two objectives: 1) Exploit ongoing initiatives led by OSG to understand needs and barriers of local decision makers in order to produce decision-relevant communications for communities and citizens; 2) Assist specific coastal communities to integrate climate, hazard, and sustainable development information into watershed-scale community planning. These objectives directly address OSG's mini-strategic plan goals in that plan's "Priority area 1: Capacity Building" and "Priority area 2: Community Adaptation and Resilience." Methods We will undertake the following numbered projects to facilitate metrics identified in the national plan, namely, a) Communities provided with information/trained re climate/hazards resilience; b) Citizens provided with information/trained re climate/hazards resilience; c) Communities adopted sustainable development practices. Various methods in the projects listed below will involve Sea Grant staff Joe Cone (PI and communication lead), Dave Hansen (Extension program lead), Pat Corcoran (coastal hazards Extension specialist), Jamie Doyle (coastal Extension specialist), Mark Farley (information technology specialist), and Steve Roberts (videographer); and Kirsten Winters (PhD student in Political Science), Miriah Russo Kelly (PhD student in Environmental Sciences and communication). Rationale: For the Climate Adaptation Capacity Building

	Initiative (CACBI), Oregon Sea Grant (OSG) will build on five years of previous experience in implementing climate adaptation and hazard resilience projects funded by Sea Grant and the NOAA Climate Program Office. That experience has focused on deployment of a risk communication approach that has involved 1) empirical research with target populations to understand their climate-risk-related views and needs; 2) development of research-based communication products and strategies in response to that understanding; and 3) direct engagement on adaptation planning with coastal communities. Under PI Joe Cone, elements of this approach have been conducted not only in Oregon but in eight partner Sea Grant programs and states, through funding from the NOAA Climate Program Office (SARP). During the last round of NSGO CCCAI funding, OSG established a climate change working group that developed a "mini" strategic plan for OSG's activities in this domain. That document, submitted to OSG program leadership in April 2011, guides the objectives in this CACBI proposal.
Progress	
Summary	

Program	PA
Project Title	Helping a Tidal Riverfront Community Build Capacity to Adapt to Climate Change (Chester, PA)
Investigators	Ann Faulds (Penn State Behrend (PSU));
Partner	
Description	Chester, Pennsylvania, located near Philadelphia and just ten miles northeast of Wilmington, DE, is a financially distressed community that is particularly susceptible to the impacts of climate change. Increased storms, sea level rise and extreme heat will affect Chester populations that are already vulnerable due to poverty, lack of services, and other social and economic stressors. The City of Chester also needs to protect resources that will be critical to its revitalization, such as property along the city's waterfront that has potential for redevelopment. Chester's once nearly abandoned waterfront now features class A office space, entertainment destinations, and public access along the Delaware River. Continuing this waterfront redevelopment is important, so it is crucial for the City to find ways to protect existing resources from the impacts of climate change, while also identifying ways to enable future development that will be

	resilient to anticipated changes. A coalition of planners and coastal outreach specialists from Pennsylvania Sea Grant and their project partners will team up with community stakeholders to identify how climate change can exacerbate "on-going" problems facing Chester, such as water availability, sewage treatment and storm water management, while showing how climate change can intensify extreme weather events. This two-year project will bring the best available data, resources, and information to help the Chester community make informed decisions and implement adaptation strategies.
Progress	
Summary	

Program	PA
Project Title	Pennsylvania Sea Grant Climate Adaptation (2012-14)
Investigators	Robert Light, Ph.D. (Penn State Behrend (PSU));
Partner	
Description	City of Erie Coastal Community: A comprehensive strategy for climate change adaptation does not currently exist for the City of Erie, one of Pennsylvania's significant coastal communities. This project aims to convene key decision makers and municipal officials in the City of Erie, together with climate adaptation experts and resources, to facilitate climate adaptation planning on the city level. Pennsylvania Sea Grant proposes to host an 8-hour workshop on climate adaptation planning focused on the City of Erie, Pennsylvania. This workshop will utilize the "Climate Ready Great Lakes" modules developed by the NOAA Great Lakes regional team drawing mainly from Module 2, which guides users through an overview of the climate adaptation planning process, assesses vulnerabilities and opportunities, and identifies specific adaptation strategies. A major goal of the Erie City engagement process will be to include key decision makers and municipal staff and officials in the planning process. Delaware County Coastal Communities: Pennsylvania requests Climate Adaptation funds to further engage coastal municipalities in Delaware County, Pa in assessing and planning for climate hazards. We propose to build upon the work begun at the 2010 Roadmap to Planning for Coastal Risk workshop where we worked with a number of municipalities in Delaware County. The facilitated planning process will further

	engage three of the following waterfront communities: Eddystone, Marcus Hook, Tinicum, Norwood, Folcroft, and Ridley. Over a two year period, we will take the recommendations of the 2010 Roadmap workshop and develop three localized workshops for participating municipalities so that it's convenient for decision makers and community members to attend. To further enhance the effectiveness of our workshops and more fully engage our audience, PASG will utilize Texas Sea Grant's weTable interactive, multimodal tools to enhance climate adaptation understanding and planning for coastal Pennsylvania.
Progress	
Summary	

Program	PR
Project Title	Climate change adaptation capacity building initiative
Investigators	
Partner	National Park Service (US DOI, NPS); Puerto Rico Department of Natural and Environmental Resources; Puerto Rico Environmental Quality Board; Puerto Rico Health Department;
Description	OBJECTIVES: To provide coastal communities with sufficient information to consider alternatives, enable them to make better informed decisions, and ultimately develop and implement customized solutions to the hazards and climate change challenges which threaten their economic, environmental, and social well-being. And coastal citizens, NGOs, government agencies, trade organizations, and industries that recognize the complex inter relationships between social, economic and environmental values in coastal areas and work together to balance multiple uses and optimize environmental sustainability. METHODOLOGY: Field observations and at least nine focus groups in coastal communities in the Municipalities of Cabo Rojo, Añasco, Aguada, Rincón, and Aguadilla will be conducted to determine the knowledge about coastal vulnerability, hazards and resiliency capacity. Present a report on the results and recommendations from the focus groups and field observations to elected officials, legislators, and representatives of the west coast. Begin the development of action plans to attend priority issues on vulnerability and resiliency of these communities. Develop a document of Public Policy Guidelines for Climate Change Adaptation in Puerto Rico. The development of this document will include interviews to 10 local stakeholders on climate change adaptation in Puerto

	Rico, three meetings with decision makers to provide their input and recommendations to the draft and final document. Presentation of the final document to legislators and representatives of the Government of Puerto Rico and encourage them to adopt these guidelines to attend climate change adaptation issues in the island. RATIONALE: Islands are uniquely vulnerable to many of the potential consequences of climate change. It's important that residents of coastal communities understand the risks of climate change and learn what they can do to reduce their vulnerability and response quickly and effectively when the events occur. This will be achieved following the recommendations of the Strategic and Implementation plans. BENEFITS: Coastal decision-makers have the knowledge and skills to assess local risk vulnerability and respond with appropriate policies and regulations. Coastal opinion leaders and decision-makers take proactive measures to ensure that hazards, risks, and vulnerabilities are communicated to property owners and prospective purchasers. Coastal residents and decision makers are aware of and understand the physical processes that produce hazards and climate change and the implications of those events for their communities. Coastal decision makers are knowledgeable of the tools and practices to mitigate the impacts of hazards and climate change and the implications, and implement strategies for their mitigation.
Progress	Relevance: The west coast of Puerto Rico comprises the municipalities of Mayagüez, Cabo Rojo, Añasco, Rincón, Aguada and Aguadilla. Most of the residents of these municipalities are settled on coastal areas, including those of several communities that historically established on beaches, wetlands and river basins and others that are migrating to the coast, attracted by the coastal natural attractions and economic and recreational opportunities. Little is known about the capacity of these coastal dwellers to take deliberate actions to reduce risk from coastal hazards in order to avoid disaster or to accelerate recovery in the event of a hurricane, earthquake, flood or tsunami. Response: Current efforts of this project integrated these five municipalities to consolidate a framework for community based programs and disaster management. A total of fifteen coastal communities are currently participating in the project. Efforts are aimed to enhance their resiliency capacities in the areas of community development, coastal management and disaster management. Our team held three (3) focus groups to gather information about the communities and conducted over 100 individual interviews with residents. Participants provided information about their knowledge and practices regarding socioeconomic and cultural conditions for resilience (old and sick residents, disabled persons, poor, religious), human uses of coastal resources in order to maintain environmental and ecosystem resilience (fishing villages, ports, marinas, airports) and preparedness, response, recovery and mitigation to reduce human and structural losses from coastal hazards (tsunamis, hurricanes, storm surge) and their response actions (evacuation routes, infrastructure and home safety protocols). Results: Participants identified the following issues as points of concern: climate change, natural hazards and their resilience capacity. Specifically they now understand and are aware of hazards and know where to look for risk information to make appropriate decisions. Two of the communities are capable of receiving notifications and alerts of coastal hazards, reducing the impact of at risk population (old and sick). Efforts were made to establish and maintain mechanisms and networks to respond quickly to coastal disasters and address emergency needs at the community level. It was evident that plans to accelerate disaster recovery from hazard events are not in place

	and that communities need to be engaged in the recovery process in order to minimize negative environmental, social, and economic impacts. As part of this effort we coordinated a workshop at the UPR in Mayagüez where all the government agencies with responsibilities regarding emergency management for natural hazards were present and community leaders presented their communities (population, location, average age of residents, disadvantage populations), situations, problems, opportunities, needs and concerns and the agencies offered information about their responsibilities, services offered capabilities, contact information and willingness to collaborate with the communities. One important point brought by the agencies was that it is a big advantage to be able to meet with the communities out of an emergency, make connections, establish channels of communication and discuss problems beforehand with time to solve the problems. Municipal and insular governments need to evaluate the relocation of some of these communities. Educational programs and outreach services from local and state agencies were also identified as a priority in order to conjointly develop future plans regarding relocation and evacuation routes based on their different needs and the socioeconomic and cultural characteristics of their respective communities.
Summary	UPR Sea Grant promotes and encourages coastal communities' residents to develop an education and outreach agenda on climate change adaptation, coastal hazards, and guidelines to develop resilient coastal communities.

Program	PR
Project Title	Climate change adaptation capacity building initiative
Investigators	
Partner	National Park Service (US DOI, NPS); Puerto Rico Department of Natural and Environmental Resources; Puerto Rico Environmental Quality Board; Puerto Rico Health Department;
Description	OBJECTIVES: To provide coastal communities with sufficient information to consider alternatives, enable them to make better informed decisions, and ultimately develop and implement customized solutions to the hazards and climate change challenges which threaten their economic, environmental, and social well-being. And coastal citizens, NGOs, government agencies, trade organizations, and industries that recognize the complex inter relationships between social, economic and environmental values in coastal areas and work together to balance multiple uses and optimize environmental sustainability. METHODOLOGY: Field observations and at least nine focus groups in coastal communities in the Municipalities of Cabo Rojo, Añasco, Aguada, Rincón, and Aguadilla will be conducted to determine the knowledge about coastal vulnerability, hazards and resiliency capacity. Present a report on the results and

	recommendations from the focus groups and field observations to elected officials, legislators, and representatives of the west coast. Begin the development of action plans to attend priority issues on vulnerability and resiliency of these communities. Develop a document of Public Policy Guidelines for Climate Change Adaptation in Puerto Rico. The development of this document will include interviews to 10 local stakeholders on climate change adaptation in Puerto Rico, three meetings with decision makers to provide their input and recommendations to the draft and final document. Presentation of the final document to legislators and representatives of the Government of Puerto Rico and encourage them to adopt these guidelines to attend climate change adaptation issues in the island. RATIONALE: Islands are uniquely vulnerable to many of the potential consequences of climate change. It's important that residents of coastal communities understand the risks of climate change and learn what they can do to reduce their vulnerability and response quickly and effectively when the events occur. This will be achieved following the recommendations of the Strategic and Implementation plans. BENEFITS: Coastal decision-makers have the knowledge and skills to assess local risk vulnerability and respond with appropriate policies and regulations. Coastal opinion leaders and decision-makers take proactive measures to ensure that hazards, risks, and vulnerabilities are communicated to property owners and prospective purchasers. Coastal residents and decision makers are aware of and understand the physical processes that produce hazards and climate change and the implications of those events for their communities. Coastal decision makers are knowledgeable of the tools and practices to mitigate the impacts of hazards and climate change and the implications, and implement strategies for their mitigation.
Progress	Relevance: This effort established a dialog with experts from different academic disciplines to generate recommendations for a climate change adaptation public policy for Puerto Rico. Response: A roundtable of twenty-seven (27) experts on the fields of planning, economy, environmental sociology, agriculture, biology, ecology, engineering and the insurance sector participated in this process. Results: As a result of Sea Grant's effort and leadership a meeting with the President of the Puerto Rico Planning Board has been scheduled for June 6, to present the climate change and coastal hazards adaptation recommendations to be adopted by the Puerto Rico Land Use Plan to be completed by October of 2013. A draft document with the recommendations has been completed and is under review by the panel of experts. This document will be presented to the Puerto Rico Planning Board, the Department of Natural and Environmental Resources, the Puerto Rico Senate and the House of Representatives, to be considered and adopted as the Climate Change Adaptation Public Policy for Puerto Rico.
Summary	Sea Grant Puerto Rico is a respected leader in climate change and coastal hazards adaptation strategies for Puerto Rico and is in a very good position to establish the Public Policy for Climate Change and Coastal Hazards Adaptation in Puerto Rico.

Climate Fund Source Project Reports FY13

Program	RI
Project Title	Enhancing Sea Grant's ability to help coastal communities adapt to climate change.
Investigators	Pamela Rubinoff (University of Rhode Island, Coastal Resources Center (URI));
Partner	City of Newport, RI; National Estuarine Research Reserve System (US DOC, NOAA, NOS, NERRS); Rhode Island Emergency Management Agency; Rhode Island Climate Commission; Rhode Island Coastal Resources Management Council (RI CRMC); Rhode Island Division of P
Description	Objectives: The objective is to build upon the Climate Change Collaborative research achieved during its first two years and test communication tools upon a Rhode Island municipality. Methodology: This work would be tested out in the Rhode Island coastal community of Newport, as it is an existing climate change adaptation project site for CRC/SG. In 2012, we will work with the city and community members to collect and analyze data, create a series of detailed sea level rise maps, and provide workshops and forums for open dialogue regarding solutions and adaptations to climate change impacts. With enhancement funds for the Climate Change Collaborative, we will be able to develop specific communication tools that message to people who are at different phases of believing in climate change. Rationale: We have been asked by the state and communities to provide this support because: 1) It is difficult for decision-makers to determine on their own which climate change information is correct and should serve as a basis of policy making; and 2) There is little capability currently available to governments, either state or local, which would enable them to produce and develop elevation map and data products, to assess vulnerability and prioritize risks, and to implement appropriate state policies and programs tailored to their specific needs. We have carried out these efforts for the Town of North Kingstown and the South Kingstown Land Trust, and we are now starting this work with the City of Newport, which is already investing in waterfront redevelopment efforts and needs to incorporate climate change science and policymaking into the initiative to make it viable for the long term. With additional funds, we would likely be able to start work with the Town of Narragansett as well and hire a graduate student to support the project and gain a learning opportunity.
Progress	RELEVANCE: The ability for graduate students to engage with professionals in a real world setting provides the opportunity to grow through experiential learning. One mechanism to promote and foster such engagement is a fellowship. RESPONSE: In collaboration with the University of Rhode Island Department of Marine Affairs, Rhode Island Sea Grant established the Sea Grant Marine Affairs Fellowship which provides tuition and stipend support for select Master's level graduate students. RESULTS: Clara Ruben, the first Sea Grant Marine Affairs Fellow, who began her fellowship fall semester 2011, presented her thesis research efforts on sea level rise adaptation through local land trusts at The Coastal Society 23rd International Conference in Miami, FL, during June 2012. Her presentation was presented an award from Best Student Presentation given at the conference.

Summary	The first Sea Grant Marine Affairs Fellow, Clara Ruben, presented her thesis research on using local land trusts to achieve sea level rise adaptation measures, won Best Student Presentation at The Coastal Society 23rd International Conference in June 2012

Program	SC
Project Title	Integrating Climate Vulnerability and Working Waterfront Preservation
Investigators	
Partner	ACE Basin National Estuarine Research Reserve (US DOC, NOAA, NOS, NERRS); Albemarle-Pamlico National Estuary Program (US EPA, NEP); Beaufort, SC; Carolina's Integrated Sciences and Assessment Center; Centers for Ocean Sciences Education Excellence, Southe
Description	
Progress	RELEVANCE: The Kitchen Table Climate Study Group of McClellanville, SC (KTCSG) is a community group interested in encouraging adaptation to climate change in their small fishing village, but they need assistance with getting relevant information out to residents. The town government is uncertain about how best to deal with future challenges from increasing rainfall variability and sea level rise. McClellanville also faces several other hazard and climate-related stressors; it sustained severe damage during Hurricane Hugo in 1989, and its low elevation and flat topography already complicate planning for and managing stormwater runoff and erosion. The KTCSG needs a better understanding of what local perceptions are of environmental issues so they can craft an outreach message that addresses adaptation in the context of these other local concerns. RESPONSE: In 2011, the S.C. Sea Grant Consortium partnered with the Social and Environmental Institute (SERI) and the Carolinas Integrated Sciences and Assessments (CISA) center at the University of South Carolina to assist decision-makers in the Town of McClellanville to explore the consequences climate variability and change may have on stormwater management. The facilitated discussion used the Vulnerability and Consequences Adaptation Planning Scenario (VCAPS) process, developed by SERI, CISA, and S.C. Sea Grant, to begin the first formal discussion about climate variability and change among town decision-makers in McClellanville. To build on this work, in 2012 the S.C. Sea Grant Consortium and Oregon Sea Grant conducted 12 interviews with McClellanville residents and community leaders about their perceptions of environmental issues and climate change using funding from NOAA's Sectoral Applications Research Program (SARP) via Oregon Sea Grant. RESULTS: Trained facilitators provided town

	officials with information about potential climate hazards and then guided them through identifying the consequences of heavy rainfall events, more variable precipitation, and sea level rise on storm-water and drainage in the historic fishing village. Participants described potential impacts of flooding and standing water on the local mosquito population, increased pollutant loads impacts on shellfish beds, and elevated water table heights on private property drainage. They determined that the Town could reduce some of the negative consequences by developing more proactive relationships with County stormwater management, as well as starting educational initiatives for private citizens. Interviewees indicated the forest and marshes surrounding McClellanville are very important to the town's identity, as are opportunities for fishing. The changes most often observed by McClellanville residents involved pressures from development, but participants also cited changes in creek water quality and beach erosion. Only three respondents indicated that climate is changing and humans are the main cause; others expressed belief that changes are primarily natural or did not know what could be causing changes. Over half cited public apathy as a significant barrier to adapting to climate change. S.C. Sea Grant is working with the KTCSG to develop public displays and outreach materials that identify how climate change could impact marshes and fishing in McClellanville, this work will be completed in June 2013. The displays will be accompanied by a town workshop to acquire additional public feedback on these issues. The Town of McClellanville will apply the results from the VCAPS process and the workshop activities to begin analyzing how the town can better manage its stormwater and educate its citizens under the conditions of climate variability and change.
Summary	A local citizen's group, the Kitchen Table Climate Study Group of McClellanville, SC, concerned about the impact of climate change and variability on its small fishing village, requested assistance in acquiring information about how and what to communicat

Program	SC
Project Title	Sea Grant Climate Adaptation 2011: Beaufort County, SC-Using Participatory Scenario-Building to Encourage Climate-Resilient Zoning in the Coastal Carolinas
Investigators	
Partner	
Description	The generalized objectives of this project and relevant activities include: 1. Develop an initial assessment of the consequences climate change could have on current zoning and new form-based codes in Beaufort County, SC 2. Build

	new scenarios of how zoning- and code-related adaptation decisions could impact the resilience of Beaufort County to climate change 3. Write a plan for priority actions to update zoning and form-based codes in the future to encourage cliamte resilience 4. Share lessons learned with other communities in South and North Carolina who are interested in begining to consider climate change but as yet unwilling to commit to doing so
Progress	RELEVANCE: Beaufort County is one of South Carolina's eight coastal counties, located along the southern third of the state's coastal region. Some fifty-one percent of Beaufort County's over 162,000 residents currently live in a FEMA-designated flood zone. The county's rapid growth – 34% since 2000 – ensures that an ever-increasing number of people become exposed to flood hazards and the effects of climate change. As part of its 2012 Comprehensive Plan, Beaufort County recognized flooding and sea level rise as a threat, and states that "The potential impacts of sea level rise on low-lying areas should be a consideration in future land use planning, site plan review, and the location of future roads and other public facilities." However, enacting plans that include information on future climate and sea level rise has been difficult for the county because climate scenarios for temperature, precipitation, and sea level rise present a wide range of possible climate futures. RESPONSE: Beaufort County's new emphasis on enacting form-based codes offered an opportunity to incorporate such planning by ensuring that zoning ordinances encouraging economic development and preserving local sense of place also enhance resilience to environmental change. One answer to coping with the lack of precision in available climate data was to focus on building Beaufort County's resilience to a variety of climatic conditions, rather than planning for specific actions in anticipation of specific projections. To do this, Beaufort County required additional expertise and partnerships on climate resilience. In response, the Beaufort County Planning Department partnered with the S.C. Sea Grant Consortium and the Social and Environmental Institute to develop a plan for making the county's zoning more resilient to climate change by using two participatory tools. The team successfully competed for a $99,778 grant from the National Sea Grant Office's Coastal Community Climate Adaptation Initiative (CCCAI) to support climate change resilience work in Beaufort County, S.C. RESULT: The team completed initial scoping for the project, including a preliminary assessment of initial concerns and of county plans that are relevant for climate adaptation. This initial work provided the background necessary for the S.C. Sea Grant Climate Extension Specialist to lead the use of two participatory modeling groups with Beaufort County's Planning Department. S.C. Sea Grant's climate extension specialist organized an initial meeting and strategizing session with the Beaufort County Planning Department. A compilation of Beaufort County's plans and ordinances that may be impacted by climate change has been completed and will inform both interviews in March 2013 and a Vulnerability, Consequences, and Adaptation Planning Scenario (VCAPS) exercise in April 2013. The VCAPS process allows community staff and decision-makers to diagram the impacts of potential climate stressors on municipal management issues and the consequences these impacts would have. The Coastal Community Future Adaptive Capacity Scenario (CC-FACS) process will use the VCAPS diagrams to create scenarios that visualize possible consequences of adaptation actions.
Summary	The S.C. Sea Grant Consortium received a $99,778 competitive grant to help Beaufort County, SC develop scenarios that address climate change resilience in its zoning and ordinances.

Program	TX
Project Title	Climate Adaptation Capacity Building Initiative
Investigators	John Jacob (Texas A&M University (TAMU));
Partner	
Description	OBJECTIVES (PHASE I): Texas Sea Grant aims to assist coastal communities along the Texas Coast to deal with future stresses associated with climate change and population growth. TSG has developed several tools, most notably the Coastal CHARM model and the weTable delivery system, that enable Texas coastal citizens to directly participate in complex planning processes, and in the process to become much more aware themselves of how any one development decision can have multiple ramifications, whether negative or positive. Our objective is to build a system where we can assist any community on the Texas Gulf Coast (and eventually the entire Gulf Coast) in a visioning exercise in relatively short order. We need to build a robust armature and set of algorithms (see below) that will enable us to work with communities over a range of scales and issues. Our aim is to be able to set up a visioning exercise anywhere on the coast with relatively little additional development of the model, recognizing that all communities are unique and that some customization will always be necessary. Investing now in a system that puts in place 95% of the information needed for community planning exercises will greatly facilitate enabling communities large and small to use scenarios for planning with little addition investment. METHODOLOGY: Texas Sea Grant will focus its climate change adaptation efforts over the next few years on the development and deployment of the Coastal CHARM (Community Health and Resource Management) model. The CHARM model has proven to be robust community planning tool. It already covers a good number of planning issues in its current form, which makes it a very powerful tool as it is. But there is so much more that can be added. To begin to realize the full potential of the CHARM model we first need to build additional algorithms associated with coastal growth stresses into the model, and second, we need to develop a coast-wide place-based armature on which the model can be run at a variety of scales and locations.The current CHARM model has dozens of algorithms that allow us to quantify development impacts associated with growth and climate change. We can measure stormwater runoff, water demand, pollutant loads, storm surge damage estimates, and impacts to municipal services, among other impacts. The algorithims are created by assigning relationships between data sets and defining fields within the data sets, which enables information be updated and recorded as growth scenarios are built out. These

	algorithms perform their work on a framework or armature that consists of a grid and geospatial data sets. See the accompanying figure. In FY 2013 we will focus on building a robust grid for the entire 8-county Houston-Galveston metropolitan planning region. We will build the grid at a significantly smaller cell size than we use for the West Galveston Bay (WGB) exercise funded with the previous version of this funding. The WGB grid was based on a 40-acre cell. We will likely use a 15-acre or smaller-size grid. Developing this grid for the entire region will consume most of the funding for one year. In FY 2013 we will also develop new and better "paints". If new tools and functions are to be incorporated into CHARM, then the development 'paints' will need to be updated with more robust data and assumptions about development impacts. Each paint represents a style or pattern of development, i.e., rural single family homes, high density single family homes, town center condos, or downtown highrises, among others. Each development style requires that assumptions about impacts (household size, impervious surface, job demand, water demand, sewage created, etc) be assigned to each paint. This allows the GIS model to calculate estimates about growth scenarios. In addition to the paints, it would be possible to include overlay districts as is practiced by local governments. The overlay districts may include, among others, agricultural protections, construction code regimes, water conservation areas, and hazard mitigation zones. Armature: The current CHARM model is built on a single data layer consisting of a grid of 40-acre cells. This is referred to as the CHARM layer. The layer includes information about wetlands, open space, existing development, and water. This information is pre-analyzed and assigned to each cell in the CHARM layer. This base-line dataset is necessary for calculating how much growth could be accommodated in each cell. For rapid deployment across the Texas Gulf Coast, it will be necessary to develop this layer for the entire coast with basic planning themes incorporated into the grid. The basic themes would include at a minimum floodplains, storm surge zones, hurricane evacuation zones, wetlands, prairies, forests, transportation networks, aerial photography, parcel data, and municipalities. We will build this grid on a much smaller cell size than the current 40 acre size. The goal is to create CHARM layers for the coast that would enable scenarios to be created for a range of scales and for selectable project areas. For scenarios on a regional scale, the smaller cells could be aggregated into larger cells, thus keeping accurate the ground-level information about open space and existing development. OBJECTIVES (PHASE II): Texas Sea Grant aims to assist coastal communities along the Texas Coast to deal with future stresses associated with climate change and population growth. TSG has developed several tools, most notably the Coastal CHARM model and the weTable delivery system, that enable Texas coastal citizens to directly participate in complex planning processes, and in the process to become much more aware themselves of how any one development decision can have multiple ramifications, whether negative or positive. Our objective is to build a system where we can assist any community on the Texas Gulf Coast (and eventually the entire Gulf Coast) in a visioning exercise in relatively short order. We need to build a robust armature and set of algorithms (see below) that will enable us to work with communities over a range of scales and issues. Our aim is to be able to set up a visioning exercise anywhere on the coast with relatively little additional development of the model, recognizing that all communities are unique and that some customization will always be necessary. Investing now in a system that puts in place 95% of the information needed for community planning exercises will greatly

	facilitate enabling communities large and small to use scenarios for planning with little addition investment. METHODOLOGY: Texas Sea Grant will focus its climate change adaptation efforts over the next few years on the development and deployment of the Coastal CHARM (Community Health and Resource Management) model. The CHARM model has proven to be robust community planning tool. It already covers a good number of planning issues in its current form, which makes it a very powerful tool as it is. But there is so much more that can be added. To begin to realize the full potential of the CHARM model we first need to build additional algorithms associated with coastal growth stresses into the model, and second, we need to develop a coast-wide place-based armature on which the model can be run at a variety of scales and locations . The current CHARM model has dozens of algorithms that allow us to quantify development impacts associated with growth and climate change. We can measure stormwater runoff, water demand, pollutant loads, storm surge damage estimates, and impacts to municipal services, among other impacts. The algorithims are created by assigning relationships between data sets and defining fields within the data sets, which enables information be updated and recorded as growth scenarios are built out. These algorithms perform their work on a framework or armature that consists of a grid and geospatial data sets. See the accompanying figure. In FY 2014 we will focus on refining the algorithms that are the basis of the CHARM model. We will focus foremost on algorithms that relate most closely to climate change. The following list details new and improved algorithms that we have determined would be useful in the CHARM model. For FY14, we will complete at least 5 of the algorithms on this list, drawn for the most part from the top of this list, but we reserve the right to select from others on the list depending on the needs and interests of the communities we work with. 1. Coastal Hazards. This is the area most directly associated with climate change. FEMA's HAZUS model quantifies in great detail structural damage associated with surge and other effects of coastal storms. We will incorporate some of the more prominent HAZUS functions to enhance how CHARM estimates the impacts from modeled growth such as damage estimates to critical facilities, residences, and commercial buildings. Since some of the estimates are tied to construction methods, this enables CHARM to estimate damages with and without these methods. Tools will be selected that would assist the public in understanding what actions would improve local resiliency. 2. Ecological services. Ecological services refers to the ability of healthy natural systems to protect coastal communities, mitigate pollution, and support human economies. Many of the natural features included in the model have ecosystem service value, and by measuring the loss, impairment, or conservation of these features in a growth scenario CHARM can help participants understand the impacts from growth on these natural resources. 3. Incorporate watershed boundaries. The current model can estimate pollutant loads for the study area, however these loads cannot be assigned to any specific watersheds within the study area. By including watershed layers we gain the ability to allocate pollution loads to specific watersheds. In either impaired or pristine watersheds, this information can show how future development will impact water quality. Likewise, alternative development patterns can have different impacts on water quality. 4. Domestic water demand. Water resources will be stretched to meet increasing water demand. Conservation and the smart use of water will be critical for providing water growing regions. Options can be added to the model that would give participants the ability to better understand how existing water

	resources may fare in a growth scenario and under a variety of conservation regimes. More detailed water consumption picture—not just landscape issues, but indoor consumption based on water conserving fixtures etc. Cost versus benefit. 5. Placemaking issues—walkability, walk score. Placemaking is important to resiliency and quality of life. One of the best metrics for placemaking is by quantifying the walkability of neighborhoods. This can be achieved by assessing the distance between homes, parks, schools, shopping, work, and entertainment. Could incorporate Walkscore algorithms. 6. Service Capacity of Municipal Services. Municipalities are constantly planning for how to measure and plan for future capacity of local services. Many facilities, like waste water treatment plants, are typically located in flood prone areas. How many will be needed and where they will go are critical questions that come with community growth. When we have estimates for growth, the model could quickly estimate the future demand for schools, libraries, and public safety services like fire and police. Tools for these facilities could let participants test where and how many of these facilities would be required along with the cost estimates of these public facilities. 7. Improved Representation of Existing Development Densities. This improvement is needed to help participants better see the similarities between the paints we ask them to use and the development actually on the ground today. This would require additional analysis of existing population and development data before it is incorporated into the model's CHARM grid layer. 8. Climate Change Mitigation issues. More than half of all carbon production and energy use is tied to vehicle miles and building construction and maintenance. Vehicle miles in particular are spatially determined and can be handled in GIS using assumptions about employment centers and neighborhoods. Other metrics pertaining to building codes or LEED standards could be incorporated for a snap shot of energy use under a set of building rules. 9. Evacuation/Emergency Response. We can currently "paint" new or infill development on the CHARM grid. We do not have the ability to paint new roads nor the ability to model the capacity of existing or new roads to evacuate threatened populations in a timely manner. Adding this capacity will help coastal communities envision one of the most important features of coastal living that they are familiar with. CHARM will enable coastal communities to quickly see what incremental amounts of SLR or surge intensity will do to evacuation times, with our without population growth. 10. Jobs. With growth comes jobs. The current model provides very crude employment estimates based up on simplified assumptions. These assumptions will be improved to provide a better picture of the local employment and jobs. can we spiff up retail/commercial/industrial parameters? More detail?? 11. Mapping Annotation. Annotation is a way to record a workgroup's reasoning and concerns as they build their scenarios. Annotation will include both text and free-form contours and sketches. 12. The SG Coastal Resiliencey Index. Elements of the CRI scoring system can be incorporated in to the CHARM model. Through the identification of locations of critical facilities and other public infrastructure, it would be possible to highlight areas of potential concern for the communities. The CHARM model could compare present day CRI scores with scores for the hypothetical growth scenarios.
Progress	
Summary	

Program	TX
Project Title	Texas Coastal CHARM: Coastal Resiliency Tools for Local Officials
Investigators	John Jacob (Texas A&M University (TAMU));
Partner	
Description	Project Abstract Local officials from the City of Rockport, TX and its partners will collaborate with Texas Sea Grant to develop the Texas Coastal CHARM model to assess how their communities can plan, adapt, and respond to climate change impacts over time. The CHARM (Community Health and Resources Management) model is a GIS-based tool designed as a public workshop exercise using a weTable setup. The model allows participants to map out areas of forecasted growth, which the model uses to calculate a range of impacts. Resiliency metrics calculated by the model provides participants the ability to see and understand the potential impacts of growth in certain areas. The model also allows participants to test variables--hurricane strength, construction costs, building codes, water demand, and others--which are used to update automatically model results. The model is an instructional tool to support local decision-making. Upon completion, local officials in project communities can use the modeling results to take concrete steps to address specific existing and future vulnerabilities along their coast. Results would be used to update official plans, local priorities, and the use of public resources. Objectives Develop an advisory group consisting of local officials, municipal staff, and local stakeholders from the four participating jurisdictions; Conduct four Coastal Resiliency Index exercises; Develop 6 to 8 community specific metrics to incorporate into the CHARM model for assessing impacts from future growth and coastal risks; Gather and clean up approximately 24 GIS data layers for incorporation into the CHARM model; Create a working, updated version of CHARM for Rockport and partner communities; Conduct a speakers series for 3 to presentations on approaches to resiliency planning in coastal communities; Host 2 CHARM workshops for local officials and the public; Perform CHARM model analyses on three preferred growth scenarios; Prepare a Rockport-Aransas Coastal Resiliency Report for delivery to partner communities. Methodology Texas Coastal CHARM relies on outreach, education, and resiliency planning exercises to enable local officials to take steps to address coastal hazards in their community. The planning exercises are built on two existing tools--the Coastal Resiliency Index and the CHARM model. These will be supported with expertise provided by the PIs and a speaker series on approaches to resiliency

	planning in coastal communities. The PIs, with input from local officials, will improve and update the CHARM model with local GIS data and assign coefficients for development types in the model. The model allows participants to create growth scenarios, review existing conditions, and modify assumptions about environmental and economic values in the model. The CHARM exercise is conducted on a weTable that allows teams and non-experts having no GIS experience to prepare their own growth scenarios. The PIs will conduct a CHARM public workshop where participants will be asked to create growth scenarios that meet certain minimum metrics. The PIs will then work with the local advisory group to define three preferred growth scenarios. Outcomes from the CRI exercise, the CHARM public workshop, and the three preferred growth scenarios will be incorporated into a Rockport-Aransas Coastal Resiliency Report. Rationale The City of Rockport and surrounding Aransas County are located on Texas' central gulf coast. It is a low-lying coastal community where the economy, quality of life, and its environment is inseparable from its coastal location. It is also a community whose future is tied to long-term climate change impacts. Communities that are informed about the frequency and intensity of coastal hazards in the future will be in a better position today to plan and prepare for them. The CHARM model achieves this awareness by having participants use a hands on mapping exercise that requires participants to balance the needs of growth with the potential risks of living in a coastal setting, today and in the future. The model is conducted as a public workshop exercise using a weTable. The weTable allows teams to collaboratively explore and use computer-based data on any table-top surface. It is an ideal tool for community projects where participants use data and maps to talk about and define planning priorities and strategies. Together, these approaches will provide local officials with a firm understanding of resiliency goals and what steps they can take to update local plans, policies, and public resources.
Progress	
Summary	

Program	USC
Project Title	
Investigators	JAMES FAWCETT (University of Southern California Sea Grant (USC)); Juliette Finzi-Hart (University of Southern California Sea Grant (USC)); Phyllis Grifman (University of Southern California Sea Grant (USC));
Partner	City of Los Angeles, CA Public Works Agency; City of Los Angeles;

Description	Project Abstract: Coastal communities in California are anticipating a climate change scenario in which temperatures will warm significantly during the 21st century, and thus expect an increase in the frequency, magnitude and duration of heat waves and sea level rise (SLR) extremes (Cayan et al. 2009). As such, coastal Californians have recognized the need to plan for the impacts of climate change, specifically SLR. City of Los Angeles (L.A.) Mayor Antonio Villaraigosa has made climate change adaptation one of his top priorities in this region of fourteen million, home to the nation's busiest seaport. Having a champion such as the mayor is an important first step in implementing any adaptation planning efforts, which require not only astute consideration of potential impacts, but the political will to effect change (Young, 2007). In response to a request from the Mayor, USC Sea Grant is proposing to develop a city-led, science-based, and stakeholder-supported process ("AdaptLA") to help the City begin planning for the impacts of climate change, focusing first on SLR. We will work with the City to develop the baseline analyses necessary to effective adaptation plan, including an existing conditions report and a review of existing City policies. To achieve this we have established 4 major milestones: • Milestone 1: Develop and train AdaptLA planning teams • Milestone 2: Conduct existing conditions analysis • Milestone 3: Conduct review of existing policies • Milestone 4: Build support within the broader L.A. community for AdaptLA planning process The development of effective and supported planning teams will be the most important step in this process. Planning teams will consist of an Adaptation Planning Team (APT), a Technical Advisory Committee (TAC, comprised of city officials and select subject matter experts), and a Stakeholder Working Group (SWG, comprised of L.A. City Council staff, County of L.A. representatives, business, industry, government associations, and non-governmental organizations, among others). Both the existing conditions analysis and review of existing policies, though led by USC Sea Grant and project partners, will be primarily developed by input from the TAC and SWG. These reports will also be reviewed by the broader L.A. community in several public fora within the City's coastal communities. We hypothesize that, using our proposed methodology, AdaptLA, will be supported by City officials, stakeholders and the broader LA community, leading to an efficient and effective planning process. This is in comparison to a plan created by a top-down process, which then requires seeking support and buy-in from agencies, stakeholders, and the public in order to achieve successful implementation (SPIDR, 1997). As one of the largest cities in the nation, Los Angeles faces complex challenges preparing for the impacts of a changing climate on infrastructure operations and the safety of its large population. Strategies developed for the City of L.A. will address many of the issues faced by other large cities around the nation and the world as they grapple with their own preparedness. We envision that the process we have outlined for this project will be used not only by the City of L.A., but also by the County of L.A. and the region as climate change adaptation planning continues in some jurisdictions and commences in others. We will have developed a planning model that incorporates scientific expertise, multiple management jurisdictions, stakeholder input and that has the backing of political leaders from the outset. It will be robust and capable of assessing and prioritizing the most pressing issues and developing methodologies for addressing them. Lastly, outreach to the broader L.A. community will be an important component of AdaptLA, for any city-led planning effort will meet perhaps insurmountable resistance

	without community support. USC Sea Grant, experts in communication of research, will partner with the City of L.A.'s communication and community outreach departments to hold public fora in which the L.A. community will have the opportunity to learn about the AdaptLA goals and process and to provide feedback on the existing conditions report and existing policy review.
Progress	Relevance: Climate change and its effects—sea level rise, increased temperatures, increased intensity of storms, etc—have made it critical for coastal communities to plan current and future adaptation strategies. Climate change adaptation planning is especially crucial for the City of Los Angeles. With a population of 4 million, the City of LA owns and maintains coastal infrastructure including two wastewater treatment plants, two power plants and the Port of LA. LA's economy is dependent upon beach tourism and recreation, accounting for more than $15 billion in expenditures and $8 billion in tax revenues annually. In LA, there is a considerable need for capacity building and enhanced collaboration, vulnerability assessments, and guidelines and metrics to measure the effectiveness of various adaptation strategies. USC Sea Grant 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. USC commissioned four studies to examine the risk to coastal assets, and the physical, social and economic vulnerabilities of sea level rise and intensifying coastal storms to city infrastructure, resources and communities. The process and studies are summarized in overall report developed by USC and will be released in the Summer 2013. Results: 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. The project has significantly enhanced collaboration and coordination in the region, and has led to a sea level rise regional planning process that formed in May 2013 to examine impacts and vulnerabilities across LA region. The methodology developed in the AdaptLA project is being used as a model to develop a LA regional planning process.
Summary	USC Sea Grant led the development of sea level rise adaptation planning process for the City of Los Angeles to help the City identify vulnerable assets, resources and communities, recommends actions that can be taken in the near term, and provides guidanc

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Project Title	
Investigators	JAMES FAWCETT (University of Southern California Sea Grant (USC)); Juliette Finzi-Hart (University of Southern California

	Sea Grant (USC)); Phyllis Grifman (University of Southern California Sea Grant (USC));
Partner	City of Los Angeles, CA Public Works Agency; City of Los Angeles;
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	pressing issues and developing methodologies for addressing them. Lastly, outreach to the broader L.A. community will be an important component of AdaptLA, for any city-led planning effort will meet perhaps insurmountable resistance without community support. USC Sea Grant, experts in communication of research, will partner with the City of L.A.'s communication and community outreach departments to hold public fora in which the L.A. community will have the opportunity to learn about the AdaptLA goals and process and to provide feedback on the existing conditions report and existing policy review.
Progress	Relevance: Decision-makers in California's coastal counties recognize that climate change will impact their communities and coastline and understand they need to begin planning for these impacts. Many different organizations in CA have started providing training and scientific information to these communities to help them begin planning – often times overwhelming communities. Response: During the summer of 2011, with the goal of coordinating statewide efforts, USC Sea Grant, in partnership with 14 other CA-based organizations, conducted a survey to understand the needs and barriers coastal communities have in planning for climate change. One major goal of the survey was to develop appropriate and targeted trainings and technical assistance for communities and to determine the best way to link communities to resources and tools already available. Results: Approximately 600 coastal professionals, representing all CA coastal counties, responded to the survey. Results demonstrated that CA coastal professionals overwhelmingly believe climate change is real and exacerbated by human activities. Despite limited staff and financial resources, many communities either have or are ready to begin planning. The survey allowed the 15 partner organizations to identify important next steps to help these coastal communities plan for climate change. As a direct result of the survey, the CA Ocean Protection Council has launched a $2.5 million program to help coastal communities include climate change in updating local coastal plans. Moreover, the survey partners formed the California Climate Adaptation Trainers Coalition (C-CATC), with the goal of further coordinating community assistance efforts.
Summary	A statewide survey led by USC Sea Grant, in partnership with CA Sea Grant and 13 other organizations, demonstrated that CA coastal professionals are ready to begin planning for climate change. Results of the survey prompted the allocation of $2.5 million

Program	USC
Project Title	Climate Adaptation Planning for Los Angeles
Investigators	Juliette Finzi-Hart (University of Southern California Sea Grant (USC));

Partner	City of Los Angeles, CA Bureau of Sanitation; City of Los Angeles, CA Environmental Monitoring Division; City of Los Angeles, CA Public Works Agency; City of Los Angeles; County of Los Angeles, CA Department of Public Works; Los Angeles, CA City Council;
Description	OBJECTIVES: USC Sea Grant currently has a number of ongoing climate change adaptation projects underway (see below). The main objectives for all projects include: • Providing the best scientific information available to local and regional climate adaptation planning • Developing communication and outreach products that help local communities plan for climate change • Developing and leveraging partnerships with local communities and regionally to advance climate adaptation planning. METHODOLOGY: California Coastal Climate Adaptation Needs Assessment Survey With funding from the FY10 CCCAI, USC Sea Grant, in partnership with California Sea Grant and 15 other California-based coastal organizations, led the development of a statewide survey of California coastal professionals to understand: current coastal management challenges; concerns, knowledge, and actions to prepare for climate change impacts; and, information, technical assistance, and training needs to support adaptation planning and implementation. The survey was conducted in 2011 and analysis of survey results in underway. An initial report is under review and will be released at the end of May 2012. We request funds to: continue analyzing the survey results; disseminate the findings; begin to develop programs to address identified stakeholder needs; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). City of Los Angeles Sea Level Rise Adaptation Planning (AdaptLA) The City of L.A. owns and maintains critical coastal infra¬structure, including two power plants, two water treat¬ment plants, and the Port of Los Angeles. All are vulnerable to impacts from coastal change and accelerating sea level rise (SLR). In partnership with the city, we have developed a city-led, science-based, and stakeholder-supported process to help the city begin planning for the impacts of climate change. The first effort will focus on the impacts of coastal change and SLR on the city's coastal infrastructure and properties. Major milestones include: developing an existing conditions report; conducting a physical and social vulnerability assessment; identifying appropriate SLR adaptation measures; and, developing an SLR adaptation plan. We were granted one of the larger $100,000 CCAI grants earlier this year, which is supporting a large portion of this work, including the development of the process and collaboration with ICLEI – Local Governments for Sustainability to conduct the physical vulnerability assessment. We request further funds to work with a consultant to conduct an economic analysis of the impacts of climate change for the City, develop communication/outreach products of AdaptLA planning effort; local travel to City meetings; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). Los Angeles Regional Collaborative for Climate Action and Sustainability USC Sea Grant is on the steering committee of the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC). LARC is a network designed to encourage greater coordination and cooperation at the local and regional levels by bringing together leadership from government, the business community, academia, labor, environmental and community groups. The purpose of this collaboration is to share information, foster partnerships, and develop system-wide strategies to address climate change and promote a green economy through

	sustainable communities. USC Sea Grant has taken a leadership role with LARC and is leading LARC's climate adaptation efforts, primarily through the AdaptLA effort. LARC has also begun coordinating with the two other major regional climate change planning efforts across the state (in San Diego and San Francisco Bay area, currently tentatively called the "Collaboration of Collaboratives of California – or CoCoCal). This group will be holding meetings over the course of the next year, in partnership with the California Governor's Office of Planning and Research, to leverage resources, share lessons learned and work with the state of California to identify appropriate next steps for climate planning across the state. We request funds to attend to a statewide meeting of the CoCoCal. RATIONALE: Through the various efforts we have described above, USC Sea Grant is quickly becoming recognized as the leader for climate adaptation planning (specifically for sea level rise) in the greater Los Angeles region. Through our work with the City of Los Angeles and through our leadership role in the LARC, the model for climate adaptation planning that we have developed for the City of L.A. is being emulated by the other 88 cities within Los Angeles County. With a population of over 10 million, the outcomes of our work have far reaching impacts.
Progress	Relevance: Climate change and its effects—sea level rise, increased temperatures, increased intensity of storms, etc—have made it critical for coastal communities to plan current and future adaptation strategies. Climate change adaptation planning is especially crucial for the City of Los Angeles. With a population of 4 million, the City of LA owns and maintains coastal infrastructure including two wastewater treatment plants, two power plants and the Port of LA. LA's economy is dependent upon beach tourism and recreation, accounting for more than $15 billion in expenditures and $8 billion in tax revenues annually. In LA, there is a considerable need for capacity building and enhanced collaboration, vulnerability assessments, and guidelines and metrics to measure the effectiveness of various adaptation strategies. USC Sea Grant 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. USC commissioned four studies to examine the risk to coastal assets, and the physical, social and economic vulnerabilities of sea level rise and intensifying coastal storms to city infrastructure, resources and communities. The process and studies are summarized in overall report developed by USC and will be released in the Summer 2013. Results: 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. The project has significantly enhanced collaboration and coordination in the region, and has led to a sea level rise regional planning process that formed in May 2013 to examine impacts and vulnerabilities across LA region. The methodology developed in the AdaptLA project is being used as a model to develop a LA regional planning process.
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Investigators	Juliette Finzi-Hart (University of Southern California Sea Grant (USC));
Partner	City of Los Angeles, CA Bureau of Sanitation; City of Los Angeles, CA Environmental Monitoring Division; City of Los Angeles, CA Public Works Agency; City of Los Angeles; County of Los Angeles, CA Department of Public Works; Los Angeles, CA City Council;
Description	OBJECTIVES: USC Sea Grant currently has a number of ongoing climate change adaptation projects underway (see below). The main objectives for all projects include: • Providing the best scientific information available to local and regional climate adaptation planning • Developing communication and outreach products that help local communities plan for climate change • Developing and leveraging partnerships with local communities and regionally to advance climate adaptation planning. METHODOLOGY: California Coastal Climate Adaptation Needs Assessment Survey With funding from the FY10 CCCAI, USC Sea Grant, in partnership with California Sea Grant and 15 other California-based coastal organizations, led the development of a statewide survey of California coastal professionals to understand: current coastal management challenges; concerns, knowledge, and actions to prepare for climate change impacts; and, information, technical assistance, and training needs to support adaptation planning and implementation. The survey was conducted in 2011 and analysis of survey results in underway. An initial report is under review and will be released at the end of May 2012. We request funds to: continue analyzing the survey results; disseminate the findings; begin to develop programs to address identified stakeholder needs; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). City of Los Angeles Sea Level Rise Adaptation Planning (AdaptLA) The City of L.A. owns and maintains critical coastal infra¬structure, including two power plants, two water treat¬ment plants, and the Port of Los Angeles. All are vulnerable to impacts from coastal change and accelerating sea level rise (SLR). In partnership with the city, we have developed a city-led, science-based, and stakeholder-supported process to help the city begin planning for the impacts of climate change. The first effort will focus on the impacts of coastal change and SLR on the city's coastal infrastructure and properties. Major milestones include: developing an existing conditions report; conducting a physical and social vulnerability assessment; identifying appropriate SLR adaptation measures; and, developing an SLR adaptation plan. We were granted one of the larger $100,000 CCAI grants earlier this year, which is supporting a large portion of this work, including the development of the process and collaboration with ICLEI – Local Governments for Sustainability to conduct the physical vulnerability assessment. We request further funds to work with a consultant to conduct an economic

	analysis of the impacts of climate change for the City, develop communication/outreach products of AdaptLA planning effort; local travel to City meetings; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). Los Angeles Regional Collaborative for Climate Action and Sustainability USC Sea Grant is on the steering committee of the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC). LARC is a network designed to encourage greater coordination and cooperation at the local and regional levels by bringing together leadership from government, the business community, academia, labor, environmental and community groups. The purpose of this collaboration is to share information, foster partnerships, and develop system-wide strategies to address climate change and promote a green economy through sustainable communities. USC Sea Grant has taken a leadership role with LARC and is leading LARC's climate adaptation efforts, primarily through the AdaptLA effort. LARC has also begun coordinating with the two other major regional climate change planning efforts across the state (in San Diego and San Francisco Bay area, currently tentatively called the "Collaboration of Collaboratives of California – or CoCoCal). This group will be holding meetings over the course of the next year, in partnership with the California Governor's Office of Planning and Research, to leverage resources, share lessons learned and work with the state of California to identify appropriate next steps for climate planning across the state. We request funds to attend to a statewide meeting of the CoCoCal. RATIONALE: Through the various efforts we have described above, USC Sea Grant is quickly becoming recognized as the leader for climate adaptation planning (specifically for sea level rise) in the greater Los Angeles region. Through our work with the City of Los Angeles and through our leadership role in the LARC, the model for climate adaptation planning that we have developed for the City of L.A. is being emulated by the other 88 cities within Los Angeles County. With a population of over 10 million, the outcomes of our work have far reaching impacts.
Progress	Relevance: Climate change and its effects—sea level rise, increased temperatures, increased intensity of storms, etc—have made it critical for coastal communities in California to plan current and future adaptation strategies. Enhancing knowledge and understanding of climate science, vulnerability and risk assessment, and strategies for adaptation is crucial for agencies and organizations planning for a changing climate. Response: As a result of the California needs assessment survey as well as expressed need by local jurisdictions engaging in adaptation planning efforts (e.g. AdaptLA), USC Sea Grant partnered with the NOAA Coastal Services Center and others to deliver an intensive and highly interactive three-day training course providing participants with a climate adaptation toolkit to proactively address adaptation planning priorities in the context of local government priorities. We brought in local adaptation and climate science experts from the Los Angeles region to discuss adaptation planning concepts to address coastal climate change issues, and how to integrate strategies into policy, plans and programs. Results: This project trained 21 individuals in climate change processes and adaptation strategies. This group consisted of land use planners, coastal managers, public works staff, port managers, local officials, municipal boards, community groups, and environmental organizations, building capacity and understanding in the Los Angeles region. As a result, many of those trained served as stakeholder participants in the AdaptLA process and are now actively engaged in regional sea level rise planning in the greater Los

	Angeles region.
Summary	To enhance knowledge and understanding of climate change processes and strategies for adaptation in the Los Angeles region, USC and partners developed and delivered a Climate Change Adaptation Training, customized for Los Angeles planners, policy-makers a

Program	USC
Project Title	Climate Adaptation Planning for Los Angeles
Investigators	Juliette Finzi-Hart (University of Southern California Sea Grant (USC));
Partner	City of Los Angeles, CA Bureau of Sanitation; City of Los Angeles, CA Environmental Monitoring Division; City of Los Angeles, CA Public Works Agency; City of Los Angeles; County of Los Angeles, CA Department of Public Works; Los Angeles, CA City Council;
Description	OBJECTIVES: USC Sea Grant currently has a number of ongoing climate change adaptation projects underway (see below). The main objectives for all projects include: • Providing the best scientific information available to local and regional climate adaptation planning • Developing communication and outreach products that help local communities plan for climate change • Developing and leveraging partnerships with local communities and regionally to advance climate adaptation planning. METHODOLOGY: California Coastal Climate Adaptation Needs Assessment Survey With funding from the FY10 CCCAI, USC Sea Grant, in partnership with California Sea Grant and 15 other California-based coastal organizations, led the development of a statewide survey of California coastal professionals to understand: current coastal management challenges; concerns, knowledge, and actions to prepare for climate change impacts; and, information, technical assistance, and training needs to support adaptation planning and implementation. The survey was conducted in 2011 and analysis of survey results in underway. An initial report is under review and will be released at the end of May 2012. We request funds to: continue analyzing the survey results; disseminate the findings; begin to develop programs to address identified stakeholder needs; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). City of Los Angeles Sea Level Rise Adaptation Planning (AdaptLA) The City of L.A. owns and maintains critical coastal infra¬structure, including two power plants, two water treat¬ment plants, and the Port of Los Angeles. All are vulnerable to impacts from coastal change and accelerating sea level rise (SLR). In partnership with the city, we have developed a city-led, science-based, and stakeholder-supported process to help the city begin planning for the impacts

	of climate change. The first effort will focus on the impacts of coastal change and SLR on the city's coastal infrastructure and properties. Major milestones include: developing an existing conditions report; conducting a physical and social vulnerability assessment; identifying appropriate SLR adaptation measures; and, developing an SLR adaptation plan. We were granted one of the larger $100,000 CCAI grants earlier this year, which is supporting a large portion of this work, including the development of the process and collaboration with ICLEI – Local Governments for Sustainability to conduct the physical vulnerability assessment. We request further funds to work with a consultant to conduct an economic analysis of the impacts of climate change for the City, develop communication/outreach products of AdaptLA planning effort; local travel to City meetings; and, salary support for Phyllis Grifman (Associate Director) Juliette Hart (Regional Research and Planning Specialist) and Marika Schulhof (USC Sea Grant intern). Los Angeles Regional Collaborative for Climate Action and Sustainability USC Sea Grant is on the steering committee of the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC). LARC is a network designed to encourage greater coordination and cooperation at the local and regional levels by bringing together leadership from government, the business community, academia, labor, environmental and community groups. The purpose of this collaboration is to share information, foster partnerships, and develop system-wide strategies to address climate change and promote a green economy through sustainable communities. USC Sea Grant has taken a leadership role with LARC and is leading LARC's climate adaptation efforts, primarily through the AdaptLA effort. LARC has also begun coordinating with the two other major regional climate change planning efforts across the state (in San Diego and San Francisco Bay area, currently tentatively called the "Collaboration of Collaboratives of California – or CoCoCal). This group will be holding meetings over the course of the next year, in partnership with the California Governor's Office of Planning and Research, to leverage resources, share lessons learned and work with the state of California to identify appropriate next steps for climate planning across the state. We request funds to attend to a statewide meeting of the CoCoCal. RATIONALE: Through the various efforts we have described above, USC Sea Grant is quickly becoming recognized as the leader for climate adaptation planning (specifically for sea level rise) in the greater Los Angeles region. Through our work with the City of Los Angeles and through our leadership role in the LARC, the model for climate adaptation planning that we have developed for the City of L.A. is being emulated by the other 88 cities within Los Angeles County. With a population of over 10 million, the outcomes of our work have far reaching impacts.
Progress	Relevance: Decision-makers in California's coastal counties recognize that climate change will impact their communities and coastline and understand they need to begin planning for these impacts. Many different organizations in CA have started providing training and scientific information to these communities to help them begin planning – often times overwhelming communities. Response: During the summer of 2011, with the goal of coordinating statewide efforts, USC Sea Grant, in partnership with 14 other CA-based organizations, conducted a survey to understand the needs and barriers coastal communities have in planning for climate change. One major goal of the survey was to develop appropriate and targeted trainings and technical assistance for communities and to determine the best way to link communities to resources and tools already available. Results: Approximately 600 coastal professionals, representing all

	CA coastal counties, responded to the survey. Results demonstrated that CA coastal professionals overwhelmingly believe climate change is real and exacerbated by human activities. Despite limited staff and financial resources, many communities either have or are ready to begin planning. The survey allowed the 15 partner organizations to identify important next steps to help these coastal communities plan for climate change. As a direct result of the survey, the CA Ocean Protection Council has launched a $2.5 million program to help coastal communities include climate change in updating local coastal plans. Moreover, the survey partners formed the California Climate Adaptation Trainers Coalition (C-CATC), with the goal of further coordinating community assistance efforts.
Summary	A statewide survey led by USC Sea Grant, in partnership with CA Sea Grant and 13 other organizations, demonstrated that CA coastal professionals are ready to begin planning for climate change. Results of the survey prompted the allocation of $2.5 million

Program	USC
Project Title	Climate Adaptation Planning for Los Angeles
Investigators	Juliette Finzi-Hart (University of Southern California Sea Grant (USC));
Partner	City of Los Angeles, CA Bureau of Sanitation; City of Los Angeles, CA Environmental Monitoring Division; City of Los Angeles, CA Public Works Agency; City of Los Angeles; County of Los Angeles, CA Department of Public Works; Los Angeles, CA City Council;
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Progress	Relevance: Coastal managers in California are faced with the challenge of protecting coastal environments and resources from the impacts of climate change. Shoreline change, resulting from the confluence of sea level rise, coastal

	erosion, storm surge, El Niño, flooding, and inundation, threatens coastal communities, infrastructure, and natural habitats. As more models and tools have become available to aid in the development of vulnerability assessments and adaptation strategies, coastal managers expressed their need to better understand the purpose and capabilities of these different models and tools. Equally, a need was expressed among scientists to better understand practitioner needs as they develop models and tools to support those needs. Response: USC Sea Grant and partners developed a workshop convening speakers to share information about the latest science behind sea level rise projections, and help bridge the gap between coastal managers and modelers. The workshop provided a forum for pairs of scientist and manager teams to present on California-based case studies to illustrate available model approaches and applications. The workshop also provided an opportunity to describe state and federal guidance on sea level rise, provide demonstrations on tools, and provide a breakout session for scientists and practitioners to discuss barriers in moving models to the next level. 78 attendees representing 47 organizations and agencies participated in the event. Results: This workshop not only served as a venue for building capacity and knowledge of climate science and models among California's planners and policy-makers, but also served as an opportunity for bi-directional information transfer to occur among scientists and practitioners. Scientists heard from managers about management needs and tool utility (i.e. the "holy grail" of desired modeling) to inform future research and modeling efforts. Likewise, managers heard from scientists about the state-of-the science and application constraints.
Summary	USC Sea Grant and partners delivered a cutting-edge workshop to bring together sea level rise and shoreline change modelers and the practitioners working on developing adaptation strategies. This workshop built capacity in California and served as a venue

Program	VA
Project Title	Hampton Roads Adaptation Forum: Knowledge Management Network to Spur Innovation and Adoption of Adaptation Best Practices [VASG]
Investigators	Troy Hartley (Virginia Sea Grant);
Partner	Chesapeake Bay Office (US DOC, NOAA, NMFS); City of Chesapeake; City of Franklin; City of Newport News; City of Norfolk, VA; City of Suffolk; Coastal Services Center (US DOC, NOAA, NOS, CSC); Gloucester County; Hampton Roads Planning District Commission;
Description	OBJECTIVES: To address this Hampton Roads climate adaptation challenge, we propose to assemble a local community-university team to build local adaptation capacity by: - Supplying the knowledge management system and facilitative

	services for the Hampton Roads Adaptation Forum that enhances information sharing and effective, efficient community adaptation responses and improves the capacity of coastal communities - Identifying and addressing the greatest risks and vulnerabilities in specific sub-systems within Hampton Roads, with feasible, widely adoptable solutions. - Producing demonstrable outcomes through enhanced knowledge management and on- the-ground adaptation activities by local authorities that directly contribute to community adaptation activities. - Fostering and building a comprehensive adaptation response in Hampton Roads that facilitates and promotes local-state-Federal synchronization. METHODOLOGY: The Hampton Roads Adaptation Forum will be launched by VASG and its' institutional partner, ODU, and its' community partner, HRPDC, and in conjunction with our collaborating local, state and federal government partners. Steps to be taken include: 1) Appointing a Forum coordinator and coordinating mechanism, including hosting a knowledge management scoping workshop to identify available information technology options. 2) Administer a Forum, including inviting members from Hampton Roads municipalities, state and Federal agencies, identify additional potential members, design and hold quarterly Forum meetings, and establish topical sub-workgroups and meeting schedule. 3) Design and implement a comprehensive knowledge management system consisting of IT and facilitative communication and coordination strategies; establish knowledge management network performance benchmarks and monitor function against performance; adapt knowledge management system. 4) Design and host two facilitated public town hall meetings, aligned with existing local government decision-making procedures, as appropriate. 5) Track implementation of specific adaptation solutions adopted on local community-scales. RATIONALE: Virginia coastal communities face multiple challenges in their efforts to adapt to sea level rise, increased beach and wetland erosion, and flooding from heavy rain events and storm surges. These communities need to protect the value of their economic and community development infrastructure (e.g., tourism, port and maritime trades, military facilities, etc.), including transportation structures and amenities such as beaches. They also need to find ways of managing flood risks to protect residential areas and emergency response facilities. In some cases, where flooding is especially severe or frequent, there may be a need to relocate residences or public facilities. Private sector insurance companies are changing their policies to recognize the increased risk exposure of many land parcels, leaving large numbers of residential customers in these communities uninsured or dependent upon public insurance programs. Further, responsibilities and authority for responding to these challenges fall upon a wide array of public, private, and non-profit organizations at the local, state and federal level. Thus it is extremely difficult to make effective, generalized plans for change when each case of protection and adaptation involves such unique and specific site conditions and agency jurisdictions.
Progress	
Summary	

Program	VA
Project Title	Hampton Roads Adaptation Forum: Knowledge Management Network to Spur Innovation and Adoption of Adaptation Best Practices [ODU]
Investigators	Ariel Pinto (Old Dominion University (ODU)); Benjamin McFarlane (Hampton Roads Planning District Commission); Larry Atkinson (Old Dominion University (ODU));
Partner	
Description	OBJECTIVES: To address this Hampton Roads climate adaptation challenge, we propose to assemble a local community-university team to build local adaptation capacity by: - Supplying the knowledge management system and facilitative services for the Hampton Roads Adaptation Forum that enhances information sharing and effective, efficient community adaptation responses and improves the capacity of coastal communities - Identifying and addressing the greatest risks and vulnerabilities in specific sub-systems within Hampton Roads, with feasible, widely adoptable solutions. - Producing demonstrable outcomes through enhanced knowledge management and on- the-ground adaptation activities by local authorities that directly contribute to community adaptation activities. - Fostering and building a comprehensive adaptation response in Hampton Roads that facilitates and promotes local-state-Federal synchronization. METHODOLOGY: The Hampton Roads Adaptation Forum will be launched by VASG and its' institutional partner, ODU, and its' community partner, HRPDC, and in conjunction with our collaborating local, state and federal government partners. Steps to be taken include: 1) Appointing a Forum coordinator and coordinating mechanism, including hosting a knowledge management scoping workshop to identify available information technology options. 2) Administer a Forum, including inviting members from Hampton Roads municipalities, state and Federal agencies, identify additional potential members, design and hold quarterly Forum meetings, and establish topical sub-workgroups and meeting schedule. 3) Design and implement a comprehensive knowledge management system consisting of IT and facilitative communication and coordination strategies; establish knowledge management network performance benchmarks and monitor function against performance; adapt knowledge management system. 4) Design and host two facilitated public town hall meetings, aligned with existing local government decision-making procedures, as appropriate. 5) Track implementation of specific adaptation solutions adopted on local community-scales. RATIONALE: Virginia coastal communities face multiple challenges in their efforts to adapt to sea level rise, increased beach and wetland erosion, and flooding from heavy rain events and storm surges. These communities need to protect the value of their economic and community development infrastructure (e.g., tourism, port and maritime trades, military facilities, etc.), including transportation structures and amenities such as beaches. They also need to find ways of managing flood risks to protect residential areas and emergency response facilities. In some cases, where flooding is especially severe or

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Progress	
Summary	

Program	VA
Project Title	Virginia Sea Grant Climate Adaptation Capacity Building Initiative
Investigators	Troy Hartley (Virginia Sea Grant);
Partner	
Description	OBJECTIVES: VASG aims to provide coastal communities with sufficient information to consider alternatives, enable them to make better informed decisions, and ultimately develop and implement customized solutions to the hazards and climate change challenges which threaten their economic, environmental and social well-being through two community and VASG capacity-building activities: 1) Faculty-student technical assistance on adaptation to sea level rise for Virginia's coastal communities; and 2) Staff capacity to support a growing Hampton Roads Adaptation Forum, advancing a knowledge management network to spur innovation and adoption of adaptation best practices. METHODOLOGY: VASG will leverage and expand existing capacity in the VASG network of partner academic institutions to support two program areas. (1) VASG-University of Virginia (UVA) Faculty-Student Technical Assistance. The UVA VASG Faculty-Student Technical Assistance will be conducted through a collaborative project with a coastal community client (e.g., municipality, regional planning district, private sector, etc.) who jointly define the scope of the project, dedicated graduate courses focusing on the climate adaptation project, and a comprehensive knowledge management

	system and approach that complements ongoing and emerging projects in the Virginia coastal zone, and shares lessons learned and materials to replicate activities broadly throughout the Mid-Atlantic and beyond. See attached work plan for more details. (2) VASG-Old Dominion University Hampton Roads Forum. Shortly, VASG will be awarded a National Sea Grant Office (NSGO) Community Climate Adaptation Initiative 2011 grant with our partner academic institution, Old Dominion University (ODU). The VASG-ODU Hampton Roads Forum project will address the Hampton Roads climate adaptation challenge by building local adaptation capacity among engineers, planners, facility managers, etc. In support of the VASG-ODU Hampton Roads Forum, ODU has a pending internal request for $50,000 toward a joint ODU-VASG permanent staff member to advance implementation of projects emerging from the Forum. VASG proposes to use a portion of the NSGO Climate Adaptation Capacity Building Initiative to leverage and support the ODU-VASG staff position. If the internal ODU staff position is not approved by ODU administration, VASG will provide additional funds to the UVA partnership to enhance its integration with and support of the NSGO Community Climate Adaptation Initiative-funded VASG-ODU Hampton Roads Forum. RATIONALE: Virginia coastal communities face multiple challenges in their efforts to adapt to sea level rise, increased beach and wetland erosion, and flooding from heavy rain events and storm surges. These communities need to protect the value of their economic and community development infrastructure (e.g., tourism, port and maritime trades, military, etc.) that will be affected by flooding and erosion, including transportation structures and amenities such as beaches. They also need to find ways of managing flood risks to protect residential areas and emergency response facilities. In some cases, where flooding is especially severe or frequent, there may be a need to relocate residences or public facilities. Private sector insurance companies are changing their policies to recognize the increased risk exposure of many land parcels, leaving large numbers of residential customers in these communities uninsured or dependent upon public insurance programs that provide fewer guarantees. It is difficult to make generalized plans for change when each case of protection and adaptation involves unique and specific site conditions.
Progress	
Summary	

Program	VA
Project Title	Faculty-Student Technical Assistance on Adaptation to Sea Level Rise for VA Communities

Investigators	Timothy Beatley (University Of Virginia, Charlottesville (UVA));
Partner	
Description	OBJECTIVES: Expected Outcomes: (1) tailored climate adaptation design and planning options that meet the needs of specific coastal community clients in the vulnerable Virginia coastal zone; (2) expanded future design and planning professionals workforce with climate adaptation capacity; and (3) expanding knowledge management repository for information transfer and adoption beyond the particular coastal community client, to the state and region. Performance Metrics: (1) one coastal community will be provided with innovative climate adaptation design and planning tools, techniques, and best practices; (2) over fifty communities will utilize the web-based repository by YR2 to access tools, techniques, and best practices; and (3) broader Hampton Roads community will share and adopt at least one tool, technique or best practice. METHODOLOGY: The UVA VASG Faculty-Student Technical Assistance will be conducted through a collaborative project with a coastal community client (e.g., municipality, regional planning district, private sector, etc.) who jointly define the scope of the project, dedicated graduate courses focusing on the climate adaptation project, and a comprehensive knowledge management system and approach that complements ongoing and emerging projects in the Virginia coastal zone, and shares lessons learned and materials to replicate activities broadly throughout the Mid-Atlantic and beyond. RATIONALE: Virginia coastal communities face multiple challenges in their efforts to adapt to sea level rise, increased beach and wetland erosion, and flooding from heavy rain events and storm surges. These communities need to protect the value of their economic and community development infrastructure (e.g., tourism, port and maritime trades, military, etc.) that will be affected by flooding and erosion, including transportation structures and amenities such as beaches. They also need to find ways of managing flood risks to protect residential areas and emergency response facilities. In some cases, where flooding is especially severe or frequent, there may be a need to relocate residences or public facilities. Private sector insurance companies are changing their policies to recognize the increased risk exposure of many land parcels, leaving large numbers of residential customers in these communities uninsured or dependent upon public insurance programs that provide fewer guarantees. It is difficult to make generalized plans for change when each case of protection and adaptation involves unique and specific site conditions.
Progress	
Summary	

Climate Fund Source Project Reports FY13

Program	WI
Project Title	Climate Change Adaptation Initiative – 2012-2014
Investigators	Philip Moy (Wisconsin Sea Grant);
Partner	
Description	General Objective Statement: To extend the resources and products about climate change and potential means of adaptation from NOAA, Sea Grant, and Wisconsin Initiative on Climate Change Impacts (WICCI) to about 50% (19 to 20) of Wisconsin's coastal communities which include 22 cities and 16 villages. Methodology: In year one of the project, we will build upon the established relationships with Wisconsin coastal communities developed by one of our graduate students, Evan Murdock. Over the last year as part of the Sea Grant Climate Adaptation Extension project, Evan has been working with coastal communities to help community planners and leaders understand the potential impacts of climate change, projected increases in storm frequency and precipitation and options to adapt to these changing weather patterns. Continued funding of this position will facilitate further contact with these and other coastal municipalities as well as allow more in-depth collaboration with Minnesota Sea Grant, our partner program in the original climate adaptation proposal. We will also hire an hourly student to develop background research on the prospective communities in preparation for community visits. This background may include review of hazard mitigation plans, identification and mapping of vulnerable infrastructure and determination of any current climate adaptation strategies the communities currently have in place. We will support travel for the RA within Wisconsin to meet with communities and potentially to regional climate meetings. Part of the proposed work in Year 1 will be for the research assistant and a member of the Wisconsin Sea Grant outreach staff to attend the national climate change extension meeting planned for late 2012 or early 2013. By June 30, 2013 of the project we will contact 10 communities (cities or villages) with climate adaptation information and/or training events. Year 2 $30,000 In Year 2 we will provide partial salary support and travel funding for our new coastal storms outreach specialist, who will be based in our Green Bay outreach office. Our recent successful proposal for funding from the NOAA Coastal Storms Program provides half-time support for the outreach specialist position. Wisconsin Sea Grant is providing the balance of the salary support to make it a full-time position. We propose to use this climate adaptation funding to help support a portion of the outreach specialist salary, provide travel support to allow the successful candidate to connect with Wisconsin's coastal communities and deliver information and adaptation resources from NOAA, Wisconsin Sea Grant and our expanding WICCI collaboration. We will ensure that the coastal storms specialist joins with the newly-formed WICCI outreach and adaptation work groups and works with them to share NOAA climate change resources throughout the state of Wisconsin. Rationale: Investing the Year 1 funds to support the existing Research Assistant (RA), who is currently

	working on the Climate Change Adaptation Initiative, will allow us to realize almost immediately meaningful contacts and interaction with coastal communities interested in employing NOAA resources to adapt to climate change. In Year 2, we will use the funding to support the efforts of our new Coastal Storms Outreach specialist. One projected regional consequence of climate change (using recently-downscaled climate modeling) is increasing frequency and intensity of storms. Providing Wisconsin's coastal communities information about the anticipated impacts of these storm events, the storm water runoff and waves generated from these events will be a critical role of the new coastal storms outreach specialist. Drawing upon the support offered by the climate adaptation initiative and pairing that with the half-time support for the outreach specialist will facilitate integration of these two coastal adaptation and outreach initiatives in Wisconsin. We anticipate the coastal storms/climate adaptation outreach specialist will become a permanent position with Wisconsin Sea Grant.
Progress	
Summary	

Program	IL-IN
Project Title	SG-Community Adaption and Mitigation for Climate Change
Investigators	Martin Jaffe (IIllinois-Indiana Sea Grant);
Partner	Illinois State Water Survey; National Oceanic and Atmospheric Administration (US DOC, NOAA);
Description	Illinois-Indiana Sea Grant (IISG) will collaborate with the Midwestern Regional Climate Center (MRCC) to develop additional climate expertise for climate adaptation and mitigation activities, leveraging Sea Grant's expertise in planning and outreach, and providing MRCC expertise in climate science. The MRCC is a cooperative program of the Illinois State Water Survey (University of Illinois) and the National Climatic Data Center (NOAA). We propose to focus on areas related to community climate adaptation and climate literacy.
Progress	
Summary	
