Sea Grant Association

Sea Grant's "Community Resilience to Natural Disasters" Program

Enhancing Community Resilience to Natural Disasters through Science-based Planning, Mitigation, Restoration, and Education

Background: Coastal areas of the U.S. comprise only 10 percent of our land mass, and yet they are home to more than 54 percent of Americans. Risks to life, property, and the environment from coastal natural hazard events will increase with growth of coastal populations over the next several decades. Unprecedented hurricane damage and personal despair during 2005 has tested government at all levels, and has left many unanswered questions regarding the level of our preparedness to deal with and respond to disasters of this magnitude.

Hurricanes, typhoons, and tsunamis are compounded by other trends, including coastal inundation (due to rising sea level and land subsidence), increasing storm intensity, uneven enforcement of building codes, lack of adequate zoning ordinances, poor planning and construction, continued development in high risk areas, and the inexperience of coastal dwellers to prepare for and recover from these events. Despite significant progress in the application of science and technology to disaster reduction, communities remain challenged by disaster preparation, response, and recovery (NSTC 2005). These observations underscore the need for a dedicated national effort to provide science-based information towards the reduction of the social, economic, and environmental costs of natural hazards to our coastal communities.

Program Goal: The National Science and Technology Council's (NSTC) 2005 document, *Grand Challenges for Disaster Reduction* offers six Grand Challenges for sustained Federal investment in science and technology related to disaster reduction. The goal of Sea Grant's program is to join with its diverse partners[1] to provide university-based research, extension, and education programs, based on the six *Grand Challenges*, to enhance community preparedness and reduce the loss of human life, property, and ecological resources from coastal natural hazards in the United States.

Program Objectives: Sea Grant will join with its partners in government, business, industry, and schools to

- Assess the threats facing the nation's coastal regions from future coastal hazards and storms,
- Generate science-based information to improve understanding about natural hazards phenomena,
- Develop educational/public awareness initiatives to transfer research information to emergency preparedness and planning officials, local government personnel, and the general public.

Budget Request: Sea Grant's **Community Resilience to Natural Disasters** program is planned as a $6 million/year investment over a five-year period.

Benefits: The events preceding and subsequent to the 2005 storm season have underscored the need for greatly improved information transfer to enable and empower communities to better plan, prepare, respond, and rebuild. To address theses needs, Sea Grant will engage its network of more than 200 universities and laboratories to address critical research needs, and employ its existing nationwide coastal community outreach and education program network, which now reaches municipalities in and beyond the nation's 673 coastal counties, boroughs, and parishes, to provide "resilient community" services and products. Sea Grant's collective contributions in these situations can be greatly enhanced through a comprehensive strategic research, education, mitigation, and planning program.

[1] Including the NOAA Coastal Services Center, NOAA National Weather Service, U.S. Geological Survey, Federal Emergency Management Agency, Institute for Building and Home Safety, National Homebuilders Association, National Emergency Management Association, Association of State Floodplain Managers, National Association of Counties, National League of Cities, Coastal States Organization, National Federation of Regional Associations (IOOS), and American Planning Association.

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Program Objectives – Sea Grant's Role

Coastal Hazard Identification and Risk Assessment:

- Evaluate and improve structural and non-structural components and systems used in residential construction for resistance to hazard-induced loads (from winds and flooding) and their ability to protect the structure's envelope and foundation.
- Investigate hazard vulnerability (including wind, surge and inundation impacts) through risk identification and assessment, incorporating factors of uncertainty, biophysical elements and socio-economic impacts into planning and assessment models and decision-support tools.
- Generate hazards-based environmental/ecological information through research and monitoring programs and establish community level baseline environmental data for use in pre- and post-disaster assessments.

Community-based Applied Research and Technology Transfer:

- Expand Sea Grant's capacity to respond to coastal communities requests for assistance in understanding the environmental and ecological consequences of various development scenarios, particularly as they relate to potential disaster exposure and risk.
- Working with the Institute of Building and Home Safety, enhance awareness among home builders, design professionals, building officials, elected leaders, lenders, insurers and homeowners on newly developed, tested and cost-effective methods and materials for building new and retrofitting existing structures for enhanced resistance to hazards.
- Provide information and training to local community officials, in partnership with the American Planning Association and its state chapters, to implement land use policies under the rubric "Smart Growth, Safe Growth" that (1) protect and restore critical environmental/ecological buffers against intense storms, (2) guide development and redevelopment activities toward areas that are less vulnerable to coastal hazards, and (3) avoid development that contributes to structural vulnerability, coastal erosion and wetland loss.
- Develop and deliver products generated on hazards mapping (especially for floods and inundation), risk analysis and other mitigation-related research to governmental decision makers as a guide to policy development and community planning to reduce total costs of future natural hazard events.

Public Awareness, Training and Education:

- Monitor and assess public awareness and acceptance of hazard mitigation measures in selected communities over time and, with the National Hazards Center, evaluate the impact of education efforts on this awareness.
- Develop and deliver targeted, community-level educational programs to inform local and state governments, the private sector and the general public of the true costs of natural hazard events.
- Create extension education programs specifically designed to address hazard-related needs and mitigation responsibilities of traditional Sea Grant constituent groups, with a focus on coastal communities, local governments, the seafood industry, ports and harbors, and other coastal and marine-related businesses.

Resources, Leadership and Coordination:

- Evaluate and analyze incentive and policy alternatives that seek to encourage mitigation and safe growth strategies at all government levels, as well as among manufacturers, lending institutions, insurance companies, home builders and among individual homeowners.
- Identify and recommend innovative financial incentives that can be used by both the private sector and government to decrease costs and reduce risks.
- Examine ways in which mitigation planning is being effectively incorporated into public policy and planning decisions.
- Create communications strategies to encourage (1) acceptance by the nation's citizenry of the need to take personal responsibility for protecting themselves, their property and their community against personal and public losses due to natural hazards, and (2) a public demand for effective mitigation measures.
- Sea Grant, in collaboration with its partners, will develop a "Risk-Wise" educational program for local decision-makers to improve the safety and resiliency of communities threatened by coastal hazards.

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Objectives, Tasks, and Performance Metrics

Coastal Hazard Identification and Risk Assessment:

- Evaluate and improve structural and non-structural components and systems used in residential construction for resistance to hazard-induced loads (from winds and flooding) and their ability to protect the structure's envelope and foundation.
- Investigate hazard vulnerability (including wind, surge and inundation impacts) through risk identification and assessment, incorporating factors of uncertainty, biophysical elements and socio-economic impacts into planning and assessment models and decision-support tools.
- Generate hazards-based environmental/ecological information through research and monitoring programs and establish baseline environmental data at the community level for use in pre- and post-disaster assessments.

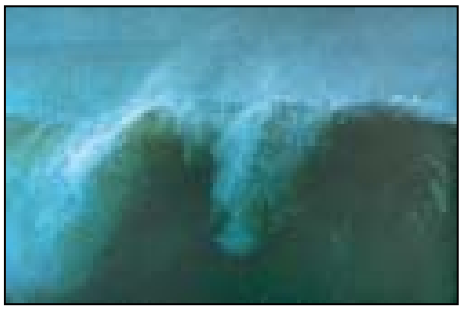
  - ***Task:*** Sea Grant will evaluate existing planning and zoning ordinances and assist local communities in ordinance development and revision to enhance preparedness, planning, response, and environmental restoration efforts.
    - ***Performance measure:*** Number of coastal communities with improved ability to reduce the adverse impacts of coastal natural hazards on people, structures, and the environment.

Community-based Applied Research and Technology Transfer:

- Expand Sea Grant's capacity to respond to coastal communities requests for assistance in understanding the environmental and ecological consequences of various development scenarios, particularly as they relate to potential disaster exposure and risk.
- Working with the Institute of Building and Home Safety, enhance awareness among home builders, design professionals, building officials, elected leaders, lenders, insurers and homeowners on newly developed, tested and cost-effective methods and materials for building new and retrofitting existing structures for enhanced resistance to hazards.
- Provide information and training to local community officials, in partnership with the American Planning Association and its state chapters, to implement land use policies under the rubric "Smart Growth, Safe Growth" that (1) protect and restore critical environmental/ecological buffers against intense storms, (2) guide development and redevelopment activities toward areas that are less vulnerable to coastal hazards, and (3) avoid development that contributes to structural vulnerability, coastal erosion and wetland loss.
- Develop and deliver products generated on hazards mapping (especially for floods and inundation), risk analysis and other mitigation-related research to governmental decision makers as a guide to policy development and community planning to reduce total costs of future natural hazard events.

  - ***Task:*** Sea Grant extension specialists will partner with organizations (e.g., American Planning Association, Institute for Building and Home Safety, etc.) to identify and transfer research and technical information to state and local governments.
    - ***Performance measure:*** Number of coastal communities with improved ability to reduce the adverse impacts of coastal natural hazards.

- ***Task:*** During the next five years, Sea Grant will sponsor directed research in the areas of physical oceanography and hydrology (e.g., to improve storm surge and inundation modeling and prediction), wind engineering (e.g., to improve hazard-resistant construction techniques), coastal ocean studies (e.g., to model and predict changes in shoreline characteristics related to erosion), and coastal habitat reconstruction (e.g., for mitigation of storm events and critical habitat replacement).
  - ***Performance measure:*** Cumulative number of tools and technologies developed that improve the hazard resiliency of coastal communities, ecological resources, and targeted SG constituencies.

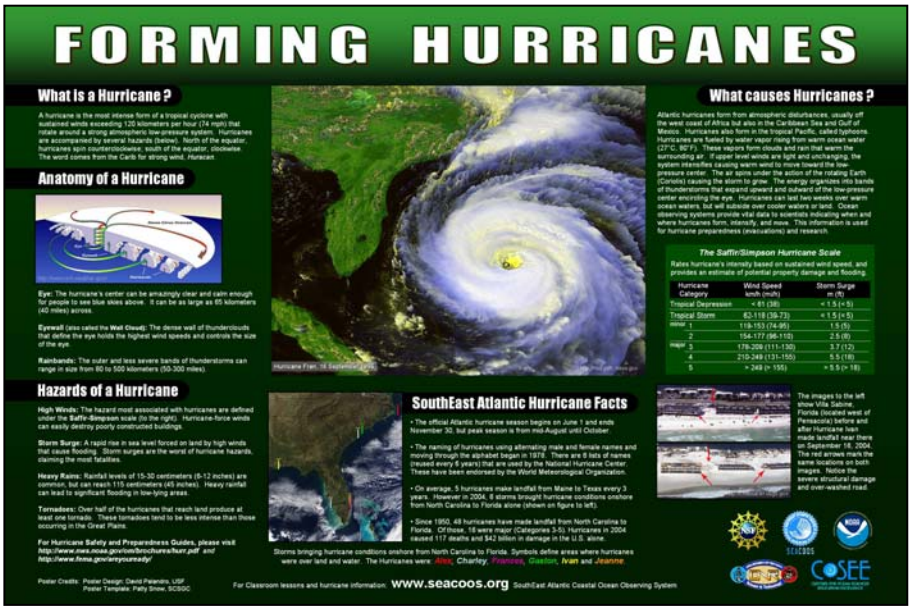


- ***Task:*** Sea Grant will sponsor research to develop fill gaps in storm surge and inundation (surge plus waves on top of surge) predictors for use by communities in planning and the development of zoning and (re-)building ordinances.
  - ***Performance measure:*** Number of decision makers trained in hazard mitigation best practices.

<u>Public Awareness, Training and Education:</u>

- Monitor and assess public awareness and acceptance of hazard mitigation measures in selected communities over time and, with the National Hazards Center, evaluate the impact of education efforts on this awareness.
- Develop and deliver targeted, community-level educational programs to inform local and state governments, the private sector and the general public of the true costs of natural hazard events.
- Create extension education programs specifically designed to address hazard-related needs and mitigation responsibilities of traditional Sea Grant constituent groups, with a focus on coastal communities, local governments, the seafood industry, ports and harbors, and other coastal and marine-related businesses.

  - ***Task:*** Sea Grant will develop educational materials and programs for use by students and teachers in formal classroom and informal learning settings.
    - ***Performance measure:*** Number of students and teachers reached with natural hazards educational programs and materials.



  - ***Task:*** A Web-based portal containing links to university-based technical and extension publications, fact sheets, Web sites, electronic media and other information will be developed in 2005 as a component of the Sea Grant network's HazNet Web site (www.haznet.org).
    - ***Performance measure:*** Number of user interactions with HazNet web pages.

  - ***Task:*** Sea Grant will sponsor science-based outreach programs in local communities for targeted constituent groups on the importance of maintaining and restoring estuarine, wetland, beach and dune habitat as a means of reducing impacts from natural hazard events.

- **Performance measure:** Number of local government officials, technical staff, and volunteers trained in hazard mitigation "best practices."

- ***Task:*** Sea Grant will coordinate and implement a well-integrated national outreach strategy (through Sea Grant Extension and involving the Extension Hazards Education Network) for use by Federal agencies (NOAA, FEMA, USGS, USEPA, etc.) to deliver relevant coastal disaster preparedness education and science-based information products to communities and local government officials.
  - ***Performance measure:*** Number of federal agency personnel engaged in delivering science-based information to local communities.

- ***Task:*** Sea Grant will provide outreach programs to train local communities on how to preserve and restore estuarine, wetland, beach and dune habitat as a means of reducing impacts from severe storm events.
  - ***Performance measure:*** Number of community personnel trained in ecological preservation and restoration practices.

Resources, Leadership and Coordination:

- Evaluate and analyze incentive and policy alternatives that seek to encourage mitigation and safe growth strategies at all government levels, as well as among manufacturers, lending institutions, insurance companies, home builders and among individual homeowners.
- Identify and recommend innovative financial incentives that can be used by both the private sector and government to decrease costs and reduce risks.
- Examine ways in which mitigation planning is being effectively incorporated into public policy and planning decisions.
- Create communications strategies to encourage (1) acceptance by the nation's citizenry of the need to take personal responsibility for protecting themselves, their property and their community against personal and public losses due to natural hazards, and (2) a public demand for effective mitigation measures.
- Sea Grant, in collaboration with its partners, will develop a "Risk-Wise" educational program for local decision-makers to improve the safety and resiliency of communities threatened by coastal hazards.

- ***Task:*** Sea Grant scientists and specialists will serve in an advisory capacity on community planning and zoning commissions and boards to provide technical and educational expertise.
  - ***Performance measure:*** Number of community leaders and staff educated about hazard mitigation best practices related to social, economic, and environmental concerns.

- ***Task:*** Sea Grant and its partners will sponsor and convene a National Conference on Building Resilient Coastal Cities and Communities, which will include topics related to "resilient communities, "smart" growth, and "safe" growth principles for redevelopment and future development along the nation's coastlines.
  - ***Performance measure:*** Number of decision makers trained in hazard mitigation best practices.