NOAA GREAT LAKES COASTAL STORMS PROGRAM

Great Lakes Planning and Mitigation Needs Assessment of Coastal Storm Hazards

Survey Summary

PREPARED BY THE UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE

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The Great Lakes Coastal Storms Program seeks to provide resources to Great Lakes communities to help them plan and implement mitigation strategies to reduce the impacts of these coastal storm hazards.

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Planners identified coastal storm hazards that impact the coastal communities where they work. On a scale of 1–4, they rated various hazards as "does not impact," "somewhat impacts," "moderately impacts" and "greatly impacts."

Coastal communities in the Great Lakes are faced with several storm hazards, including bluff and shoreline erosion, runoff pollution and flooding. The increasing frequency and severity of weather events make planning for coastal storm hazards an important part of helping Great Lakes communities become more resilient to climate change. The Great Lakes Coastal Storms Program seeks to provide resources to Great Lakes communities to help them plan and implement mitigation strategies to reduce the impacts of these coastal storm hazards.

The University of Wisconsin Sea Grant Institute, in conjunction with the NOAA Great Lakes Coastal Storms Program, conducted a survey in February 2014 to learn the planning and implementation needs of Great Lakes coastal planners and managers to mitigate and adapt to coastal storm hazards. Survey results will be used to develop and target outreach, products and tools that will help Great Lakes communities prepare for coastal storm hazards.

This survey targeted coastal community planners and managers who work in coastal counties adjacent to the Great Lakes and Lake Champlain. It included representatives from local, state and regional jurisdictions with planning roles related to emergency services and response, public administration, parks and recreation, sustainability, zoning, stormwater management, port and harbor management, and natural resource management. Although private interests (e.g., planning/engineer consultants), non-profit organizations (e.g., watershed organizations) and state and regional government entities were not targeted, their participation in the survey was not excluded.

An online survey was distributed by email through the American Planning Association (APA) chapters in Great Lakes states and through several Coastal Zone Management (CZM) programs in those states. All eight Great Lakes states plus Vermont were represented by 186 survey respondents.

Wisconsin had the highest number of respondents by state with 78 responses or 42%. Overall, respondents primarily represented counties adjacent to Lake Michigan and Lake Superior, with fewer responses from counties adjacent to Lake Erie, Lake Ontario, Lake Huron and Lake Champlain. Given the number of states and cities that lie adjacent to Lake Erie, we feel this lake is underrepresented in the survey.

This effort builds upon a survey conducted by the APA in 2011. That survey, titled the Digital Coast Needs Assessment Survey, evaluated the needs of APA members who use geospatial tools and data in coastal community planning. It found that among the 385 planners surveyed, the primary constraints to using coastal data and tools were:

1. not knowing what data and information are available (56% respondents),
2. lack of trained staff (49.5%), and
3. ability to compare and analyze alternatives (38.4%).

These results indicate a great need among coastal planners for improved information distribution and training. Our survey was designed to address this need.

RESULTS SUMMARY

Of the 186 survey respondents, more than 50% were planners in various sectors, including community, urban, regional, transportation and zoning. The remainder identified themselves as natural resource managers, planning consultants, engineers, local government staff, landscape architects, academics, geographic information system specialists and emergency managers. Approximately half of the respondents work at a regional and state planning scale and half work in local jurisdictions (county, city, town and village). Two-thirds of respondents work across multiple communities and one-third of the respondents work within a single coastal community.

The largest number of respondents work on Lake Michigan coastlines (62%) followed by Lake Superior (19%), Lake Erie (16%), Lake Ontario (8%), Lake Huron (4%) and Lake Champlain (3%). Also, a small percentage (4%) work on Great Lakes connecting water bodies, mostly Lake St. Clair. More than one-third of respondents work in Wisconsin (42%), followed by Michigan (17%), Illinois (17%), New York (9%), Minnesota (7%), Ohio (6%), Indiana (5%), Pennsylvania (2%) and Vermont (<1%). Given that Michigan is adjacent to four of the five Great Lakes and has the most coastline of all the states in this assessment, we feel that Michigan is underrepresented in the survey (36 out of 186 respondents).

Planners identified coastal storm hazards that impact the coastal communities where they work. On a scale of 1–4, they rated various hazards as "does not impact," "somewhat impacts," "moderately impacts" and "greatly impacts."

Great Lakes planners rated the following as the top five coastal storm hazards that moderately to greatly impact their communities:

1. Bluff and shoreline erosion (67%)
2. Stormwater/agricultural runoff pollution (e.g., nutrients, heavy metals, pesticides, petroleum hydrocarbons) (62%)
3. Stormwater/agricultural runoff sedimentation (60%)
4. Overflow of combined sewer and stormwater systems (57%)
5. Stormwater flooding of residential and commercial developments (55%)

These results affirm the importance of two of the three focus areas of the Coastal Storms Program: **1) enhancing shoreline mapping, visualization and management** and 2) **addressing impacts of stormwater on natural resources and promoting best-management practices.**

Respondents who work in only one community were asked if they had planning mechanisms for coastal storm hazards (21 have planning mechanism, 32 do not). The top reasons cited for not planning for coastal storm hazards included:

1. Limited budgets/lack of funding (43%)
2. My agency/department/organization is not responsible for developing a hazard plan (40%)
3. Other pressing community issues (37%)
4. Coastal storm hazards do not exist in my community (37%)

The majority of planners surveyed indicated that their communities were not planning for coastal storms. These results indicate a low perception of risk in many coastal communities. Outreach for these communities should include increased coastal hazard awareness and risk assessment.

Of the 40% of those single-community respondents who do have a planning mechanism, the majority (83%) indicated they do not incorporate information based on climate change projections. This result points to a significant planning gap and the need to identify climate related risks in coastal communities. Efforts should focus on collecting data and building tools that help demonstrate potential impacts of projected conditions relevant to regional and local planning scales.

Funding and budget limitations are frequently cited barriers to mitigation and planning efforts.

Funding and budget limitations are frequently cited barriers to mitigation and planning efforts. Outreach and extension specialists are uniquely able to help communities with coordination and technical assistance. Outreach efforts could include identifying methods that help communities assess overlap and gaps among the various hazard agencies and bringing together additional partners (e.g., university, federal government) that can provide technical assistance.

Planners identified the relevant data, tools and training that address coastal storm hazards in the communities where they work. On a scale of 1-4, they rated these items as "not relevant," "somewhat relevant," "moderately relevant" and "very relevant." The top five moderately and very relevant needs were:

1. Updated 100-year and 500-year flood maps (80%)
2. Local ordinance, zoning and building code assessment and analysis maps (79%)
3. Shoreline erosion mapping and predictions (69%)
4. Public communication of risks and disaster response (69%)
5. Predictions about public health impacts (e.g., waterborne illness and heat vulnerability) (66%)

Generally, planners working only in single communities (33%) ranked their needs similarly to those working in multiple communities; however, planners in single communities also ranked "public communication of storm surge/flooding" and "vulnerability mapping" in their top needs. *(See Table 1.)* The top data, tools and training needs closely match the highly ranked coastal storm hazards communities face (i.e., bluff and shoreline erosion, runoff pollution and flooding). Planners and managers need training and workshops that focus on data and tools that could help update watershed and regional flood maps, analyze and map local ordinances/codes and assess shoreline erosion risk.

With the exception of "navigation safety equipment" and "improved storm surge forecasting," all other data, tools and training needs were rated moderately to very relevant by more than 50% of respondents. Identifying and using methods that help groups assess gaps in expertise and prioritize planning and implementation needs (e.g., resilience and climate adaptation scoping exercises) could help tailor planning and implementation strategies for individual communities.

TABLE 1. RELEVANCY OF DATA, TOOLS AND TRAINING FOR COASTAL PLANNERS AND MANAGERS WORKING WITH SINGLE AND MULTIPLE COMMUNITIES.

	Single Community Served	Multiple Communities Served
Types of Data, Tools and Training Needs	**Percentage of Moderately and Very Relevant Needs**	**Percentage of Moderately and Very Relevant Needs**
Updated 100-year and 500-year flood maps	71%	85%
Local ordinance, zoning and building code assessment and analysis	69%	84%
Shoreline erosion mapping and predictions	53%	76%
Public communication of risks and disaster response	61%	72%
Predictions about public health impacts (e.g., waterborne illness and heat vulnerability)	63%	68%
Public communication of storm surge/flooding	56%	65%
Vulnerability mapping	56%	66%
Multiple scenarios and vulnerability mapping, assessment, forecasts and visualization	47%	68%
Bluff failure mapping and predictions	42%	68%
Improved high-winds forecasting	44%	64%
High-resolution field measurements of bathymetry, elevation, substrate types, regional precipitation patterns, watershed hydrology and runoff intensity	46%	65%
Improved flooding forecasts and warnings	38%	62%
Access to real-time hazard information for planning and evacuation purposes	32%	60%
Improved heavy-wave-action forecasting	30%	57%
Sedimentation tools	39%	53%
Improved storm surge forecasting	18%	48%
Navigation safety equipment	24%	24%

When respondents were asked who they would like to work with more in planning for coastal storm hazards, the top three entities were:

1. Local government agencies (49%)
2. State department of natural resources or environment (41%)
3. State Coastal Zone Management Program (39%)

The National Oceanic and Atmospheric Administration, university extension and Sea Grant programs ranked significantly lower than the top three, suggesting that these entities have lower visibility among planners as resources for coastal storm hazard mitigation and resiliency planning. Outreach efforts should be made to bring experts from the federal and university sectors together to help fill knowledge and technical gaps at the local planning level.

OUTREACH RECOMMENDATIONS

This survey summary provides a starting point for targeting outreach and the development of products and tools to help coastal communities plan for and mitigate coastal storm hazards. Based on the results of this needs assessment, outreach recommendations include:

- Identifying high-risk communities that are not currently planning for coastal storm hazards and developing outreach targeted at increasing awareness.
- Developing information and tools that demonstrate projected climate conditions and community impacts.
- Identifying methods that help communities assess gaps and overlap among various hazard agencies and bringing together additional partners (e.g., university, federal government, etc.) that can provide technical assistance.
- Conducting trainings and workshops that focus on data and tools needed to update watershed and regional flood maps, analyze and map local ordinances/codes, and assess shoreline erosion risk and flooding, including mapping and vulnerability and risk analysis.
- Identifying and assessing available resources (e.g., online mapping and visualization tools, data portals and sources, information services) related to coastal resiliency, climate adaptation and storm hazard mitigation and planning. The Great Lakes Coastal Resilience Guide is an online resource that provides case studies, data, online tools, research and communication research. **greatlakesresilience.org**
- Further identifying planning and implementation needs along coastlines that were underrepresented in this survey (i.e., Michigan, Ohio) through Coastal Zone Management programs, Sea Grant programs and planning networks.

NEXT STEPS

Information from individual communities will be provided to Sea Grant outreach staff so that they can follow up with planners and work to meet their coastal storm hazards preparation and mitigation needs. In addition, follow-up focus groups will be conducted throughout the Great Lakes region to more fully ascertain the usefulness of existing NOAA Coastal Storm Program (CSP) products in the Digital Coast (**seagrant.wisc.edu/glcsp**) and determine needs for new CSP products. For more information about this report or to host a focus group in collaboration with the Coastal Storms Program, please contact:

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