An Assessment of Coastal Resilience in Great Lakes Communities

Basinwide Resources & Local Efforts in Response to a Changing Coastline

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Background

Binationally, the Great Lakes and St. Lawrence River basin (Great Lakes basin) is home to over 120 indigenous communities, 34 million residents, and 3,500 species of plants of animals, including over 170 fish species.[1] If considered a country, the binational Great Lakes region would be the third largest economy in the world with a GDP of $3 trillion.[2]

The drastic fluctuation between the low lake levels in 2013-14 and high lake levels in 2017-20 has created a window of opportunity for coastal resilience work.[3,4] There is now greater political, programmatic, and institutional attention on Great Lakes coastal issues. Residents and government officials alike desire urgent action to protect homes, properties, infrastructure, and public space. There is also an influx of funding from the federal and state governments to support this work.

However, there are challenges to this window of opportunity. First, this is a window, and at some point, it will close as the water drops and memories fade. Additionally, the Great Lakes shoreline is lined with hundreds of municipalities, dozens of indigenous tribes and nations, myriad state and provincial agencies, two countries, and multiple binational organizations. By virtue of scale, coordination is incredibly difficult, but by virtue of the interconnected ecosystem and social networks, coordination is necessary. Finally, the urgency and disjointed nature of the work can mean that equity is put to the side or simply not considered. This project arose from this opportunity window: to assess these challenges and to aid in navigating them.

The Study

To address the challenges and opportunities in basin-wide coastal resilience, the team examined the current state of coastal resilience programs across Great Lakes shoreline municipalities, explored existing resources and funding, and identified barriers to implementation.

OBJECTIVES

The team's objectives were to:

1. Compile and assess existing coastal resiliency information resources and funding opportunities.

2. Identify enabling and constraining factors (e.g., regarding communication, funding, or focus) of local coastal resilience work in the Great Lakes and St. Lawrence basin.

3. Make recommendations to local governments and Great Lakes practitioners for how to effectively and collaboratively advance future coastal resilience work.

DATA

The data collected falls into two broad categories:

Implementation Data
Provided by local government staff

Focus:

-   Local coastal resilience measures
-   Challenges faced by local coastal decision makers
-   Impacts of lakeshore coastal dynamics and coastal flooding

Resource Provider Data
Provided by federal, state, regional, and local agencies and organizations

Focus:

-   Experiences of individuals and organizations creating and sharing technical, financial, and programmatic resources to support implementation efforts

1   Michigan Sea Grant. (2022). Great Lakes fast facts | Michigan Sea Grant. https://www.michiganseagrant.org/topics/great-lakes-fast-facts/
2   NOAA Office for Coastal Management. (n.d.). *NOAA Report on the U.S. Marine Economy: Regional and State Profiles*.
3   Environment and Climate Change Canada & U.S. National Oceanic and Atmospheric Administration. (2021). *2020 Annual Climate Trends and Impacts Summary for the Great Lakes Basin*.
4   Gronewold, A., & Rood, R. (2019, June 4). Climate Change is driving rapid shifts between high and low water levels on the Great Lakes. *The Conversation*. https://theconversation.com/climate-change-is-driving-rapid-shifts-between-high-and-low-water-levels-on-the-great-lakes-118095

The data was collected through the following methods:

IMPLEMENTATION INTERVIEWS

44
Municipal officials
from

40
Municipalities

8
US States

2
Canadian
Provinces

7
Bodies of water
(including Lake St. Clair)

RESOURCE PROVIDER INTERVIEWS

18
Individuals
representing

16
Organizations
& agencies

Representing

State & Federal Agencies, Collaboratives, Boundary
Organizations, Non-Profits, Academic Institutions

FOCUS GROUPS

2
Groups
from US Coastal
Management Programs
& US Great Lakes Sea
Grant Network

30
Participants
total

RESOURCE & FUNDING LIBRARIES

Reviewed web pages, toolkits, documents, & existing
resource libraries. End Products:

1,117
Resilience resources

2
Condensed versions
of libraries with
recommended resources

127
Resources
covering the most up-to-
date funding opportunities

Map of
implementation
interviewees

Recommendations

The following challenges, recommendations, and strategies were pulled from the results of our data collection and analysis. The full results section can be found in the full-length report: https://dx.doi.org/10.7302/4334

While tailored to our clients, the Cities Initiative and NOAA Office for Coastal Management, our recommendations also include strategies for municipalities bolded at the top with summarized recommendations for resource providers below.

The nine recommendations below are built off perceived challenges from our research and each is followed by potential strategies and actions. Recommended actors for each strategy provided in brackets.

1

CHALLENGE

Communities are constrained by a range of institutional structures that favor short-term, reactive projects.

RECOMMENDATION

Initiate long-term planning and monitoring to drive sustained action, despite changing conditions and decision-makers.

Coastal resilience action in the Great Lakes basin is predominantly driven by changing coastal conditions and election cycles. When water levels swing, local interest in coastal resilience piques and political will heightens. This causes municipalities to take reactionary measures to mitigate short-term effects and damage but fails to consider long-term dynamics and consequences. Municipalities must embody a long-term view by developing (and prioritizing funding for) future-oriented plans to manage their coast and prepare for hazards. This approach ensures communities are proactively improving their capacity to prepare for, adapt to, and recover from changing coastal conditions.

STRATEGIES

1. **Integrate projections from long-term data and coastal modeling into local planning and decision-making. [NOAA, Municipalities]**

2. **Identify and prioritize potential local coastal management projects and ensure their inclusion in capital improvement plans (if applicable). Develop shovel-ready designs. [Municipalities]**

3. **Participate in regional and local coastal data monitoring, modeling, and analysis. [Municipalities]**

4. Support development of local coastal management plans (see the Michigan Planning Association's and the Michigan Department of Environment, Great Lakes, and Energy's Coastal Leadership Academy). [Resource Providers]

2

CHALLENGE

Information and expertise are siloed across the Great Lakes basin; stifling communication, collaboration, and comprehension and resulting in duplicative (or lacking) efforts and programming.

RECOMMENDATION

Intentionally facilitate binational, basinwide communication, relationship-building, and information-sharing on coastal resilience.

Relationships are the linchpin to local success on coastal resilience. However, establishing reciprocal and lasting relationships takes time, communication, and trust. Both implementers and resource providers can more proactively foster relationships and establish lines of communication before urgent situations arise. Establishing forums, hubs, and events to build relationships can lead to quicker action, more effective distribution of resources, and increased collaboration.

STRATEGIES

1. **Proactively establish two-way communication between communities and government agencies before emergencies occur. [NOAA, GLSLCI, Municipalities]**

2. **Engage in basinwide and statewide communities of practice on coastal resilience hosted by boundary organizations or statewide organizations. [Municipalities]**

3. **Participate in collaboration and intermunicipal information sharing related to best practices. [Municipalities]**

4. Support municipalities in the above strategies via the refinement of GLSLCI's existing coastal resilience Best Practices Library and the formation of communities of practice. [GLSLCI, Resource Providers]

5. Establish a designated staff person to serve as a conduit or liaison between local entities and government agencies. [GLSLCI, NOAA, CMPs, Sea Grant, Conservation Authorities, Regional Planning Agencies]

3

CHALLENGE

Stakeholders face an overwhelming number of resources and actors involved with coastal resilience and are uncertain about how to effectively seek information and help.

RECOMMENDATION

Identify a primary hub for coastal resilience resources and build capacity of existing sub-hubs.

The wave of interest and momentum in coastal resilience following the 2017 and 2019 high water level events spurred the creation of resources to support local action on this topic. Organization and curation of this wealth of resources into a more user-friendly, centralized hub will guide stakeholders to resources most compatible to their needs and skill level. Creating additional resources, information, clearinghouses, and hubs could further confuse stakeholders and dilute the impact of existing resources. Instead, efforts should be invested in improving the capacity and usability of the existing resources based on user feedback and recent data.

STRATEGIES

1. **Incentivize co-production of science-informed management strategies through collaboratives with university partners. [Municipalities, GLSLCI]**

2. Improve access to and development of resources for decision makers via (1) ensure usability of existing resources and data; (2) consult with target users before, during, and after resource development; and (3) use surveys to better understand usage of specific resources and hubs. [NOAA, GLSLCI, Resource Providers]

3. Improve usability of existing highly-utilized resource sub-hubs, refrain from creating additional dispersed platforms, and identify a focal hub for binational resource compilation efforts. [Resource Providers]

4

CHALLENGE Coastal decision-makers and residents remain confused about coastal and climate processes and potential resilience solutions.

RECOMMENDATION Educate coastal communities about coastal and climate processes and potential resilience solutions and include residents in local coastal management planning and decision-making.

Without awareness and understanding of coastal and climate processes and resilience solutions, municipal coastal resilience efforts will continue to lack public support and broad adoption of residential resilience solutions. Effective coastal resilience requires public engagement to ensure solutions are relevant, broadly applicable, and supported. Education of decision-makers and residents can improve understanding of the drivers of coastal variability and potential coastal management solutions. By establishing grassroots stewardship programs, communities can cultivate local champions to maintain momentum towards coastal resilience and expand implementation beyond city-owned properties.

STRATEGIES

1. **Work with Sea Grant programs, Conservation Authorities, or university extension programs to provide workshops and training for residents on coastal and climate processes and resilience solutions. [Municipalities, State Agencies, NOAA]**

2. **Provide opportunities for residents to co-create coastal management projects with municipalities and share input on proposed plans. [Municipalities]**

3. **Encourage resident participation in coastal stewards ambassador programs that empower shoreline residents to promote coastal resiliency. [Municipalities]**

4. Launch and maintain a robust train-the-trainer coastal stewards ambassador program to empower and grow a network of on-the-ground coastal stewards (see Michigan Natural Shoreline Partnership's Michigan Shoreland Stewards Ambassador Program). [NOAA, CMPs, State Agencies, Sea Grant, Conservation Authorities]

5. Diversify communication strategies and language around climate change to ensure outreach is compatible with residents' capacities. [State Agencies, Sea Grant, Conservation Authorities]

5

CHALLENGE

Municipalities lack time and staff to digest information, apply for grants, and oversee coastal resilience projects.

RECOMMENDATION

Invest in regional scale grant writing expertise and capacity to support local coastal resilience.

Financial information and other coastal resilience resources are not effectively incorporated into local coastal planning. This is due to limited staff capacity and underutilization of existing intermediate agencies like Regional Planning Agencies, Conservation Authorities, and state Coastal Zone Management Programs. With competing demands, few employees, and staff turnover; efforts to bolster in-house capacity often fall short, especially in small municipalities. Rather than continuously relearning the latest science, technology, and funding opportunities when acute high water levels occur, municipalities are better served by third-party experts for guidance on grants and engineering. These agencies can invest in expertise to remain a valuable tool for municipal resilience planning and management.

STRATEGIES

1. **Partner with an external organization (e.g., non-profit organization, Conservation Authority, Regional Planning Agencies) on projects; allow the external partner organization to manage and administer projects. [Municipalities]**

2. Identify a designated staff person and an organizational email helpline or virtual help center to provide support and accessible technical assistance to help municipalities digest, process, and use data and technical information. [NOAA, GLSLCI, Resource Providers]

3. Provide platforms for municipalities to learn from each other's challenges and successes. [NOAA, GLSLCI]

4. Develop a centralized list of contacts to support coastal resilience efforts, including contractors, data scientists, grant managers, and other resource providers. [GLSLCI]

5. Increase state and regional level staff expertise in leading data science and financial information to inform management decisions. [Regional Planning Agencies, Conservation Authorities, CMPs]

6

CHALLENGE

Many municipal governments are at the beginning of their coastal resilience journeys and require assistance with project planning, grant seeking, and aligning coastal resilience goals across municipal departments.

RECOMMENDATION

Familiarize municipal staff with general funding and financing procedures, to improve self-reliance in the absence of a grant writer.

Improving in-house knowledge base on funding and project management leads to stronger applications. While there are agencies that provide assistance, it is key that municipalities have their own tools to get started on coastal resilience projects. Teaching municipal employees the basics on strategic applications will concentrate efforts and lead to more successful grant applications.

STRATEGIES

1. **When possible, hire a grant writer with a holistic understanding of the funding process outside of the application cycle. [Municipalities]**

2. **Train staff with grant writing responsibilities on the full process of funding procurement outside of the application cycle. [Municipalities]**

3. **Register with major federal grant programs before the municipality is interested in or actively applying to a specific grant. [Municipalities]**

4. **Identify municipality's funding "sweet spot" (i.e., manageable award amount, relevant project type, and alignment with goals and needs) to improve opportunities for funding. [Municipalities]**

5. Coach municipalities and other local fund-seeking entities on how to more strategically approach funding applications. [GLSLCI]

6. Include more general funding knowledge in webinars and informational materials aimed at local municipalities and coastal management professionals. [NOAA, GLSLCI]

7

CHALLENGE

Funding application processes and high match requirements create barriers to access for low-resource communities.

RECOMMENDATION

Improve accessibility to funding and financing opportunities for low-resource communities.

Many funding and financing options exclude applicant groups that need it most. Existing funding programs should strive to attract a wider range of applicants and improve grant success rates among disadvantaged applicants. This can be done by: providing technical assistance for grant applications, reducing match dollars, and directing applicants to project management partners that can strengthen an application.

STRATEGIES

1. **Include considerations of social and climate equity in funding applications. [Municipalities]**
2. Educate low-resource communities on the ways that their application packages may be favored at the federal and state level. [Funders, NOAA]
3. Provide more direct funding application support and regional-level technical support in grant writing to help small, low-income, and/or disadvantaged communities access funds, especially the Infrastructure Investment and Jobs Act funding. [Funders, NOAA, CMPs, Conservation Authorities, Regional Planning Agencies]

8

CHALLENGE

Limited grant opportunities create competition between small- and mid-sized communities, and between larger and all other communities.

RECOMMENDATION

Encourage and facilitate collaboration across municipalities along the same shoreline to maximize effectiveness of available dollars.

By pooling resources across municipalities, more money becomes available to take on higher-cost and larger-scale projects. Collaboration along the shoreline allows for coastal resilience projects to cover more area and prevents negative climate change impacts from getting pushed to the neighboring municipality. Implementing nature-based solutions over gray infrastructure is a sustainable and low-cost option that is likely to gain popularity in a collaborative environment where successes are communicated and shared.

STRATEGIES

1. **Seek out education on nature-based solutions and alternative funding sources (e.g., green bonds and philanthropic donations) that break the cycle of project-based, reactive funding. [Municipalities]**
2. **Prioritize cooperation, collaboration, and knowledge sharing across jurisdictions. [Municipalities]**
3. Support municipalities by facilitating the above strategies. [NOAA, GLSLCI]

9

CHALLENGE

Consideration of marginalized or minority stakeholders (e.g., tribes, BIPOC communities, and French speakers) is not universally prioritized when advancing coastal resilience strategies and developing resources to support these strategies.

RECOMMENDATION

Integrate equity considerations during the project development stage.

There is an opportunity for increased intentionality related to equity and inclusion within coastal resilience programs. Existing shortcomings in equity consideration create segregation of resources based on language, culture, or border; leading to disjointed efforts and perpetuated barriers for marginalized or minority communities in accessing information and resources. Despite an organization's geographic scope (NOAA) or membership (GLSLCI), equity consideration on a basinwide scale can lead to wider-reaching coastal resilience solutions and more inclusive implementation.

STRATEGIES

1. **Consult with tribes and other marginalized groups (e.g., communities of color) early and often during project development and implementation. Be aware of, and adhere to, cultural norms or practices during collaboration. Provide dedicated time to listen, learn, and build relationships. [NOAA, GLSLCI, Municipalities]**

2. **Integrate consideration of Traditional Ecological Knowledge (TEK) into project ideation. [NOAA, GLSLCI, Municipalities]**

3. Consider Canadian perspectives and seek feedback from Canadian stakeholders during the development of basinwide resources to mitigate United States bias in coastal resilience resources. Increase French translation of basinwide resources and technical support. [NOAA, US-Based Organizations]

4. Make resources and data publicly available in multiple different delivery formats to promote universal access and easy delivery across and remove barriers. [NOAA, GLSLCI]

Advice from Across the Basin

Collected during the implementation interviews, these are snippets of advice that municipal staff would give to neighboring municipalities who were starting their resilience journey.

"It is always a very important thing to get to know those people that you'll need to talk to during an emergency before the emergency happens. So networking and making sure you know the right people to call beforehand are also very critical."

"Be flexible and lean towards nature."

Plan for low water levels during high water periods, and vice versa.

You can't move forward until you know what is threatened; an asset inventory or a vulnerability assessment are good places to start towards that end.

"Talk to them early and often. Have them at the table from day one. Don't go to them with a completed plan and say, 'This is what we want to do. So how about if you give us a comment or two on it.' Because that just adds to that alienation and bad feelings. We're all neighbors, we all have to work together. So let's sit down together on day one, be at the table and do the work together. That's how you get it done."

"In order for us to actually be prepared for any future, but especially a future where there could be an opportunity for equitable, just growth in the Great Lakes Region, addressing our current inequalities, and the current failure of our infrastructure and social systems is critical. We will not get to a period of growth and security without addressing the past and reconciling that with who we are today and who we want to be."

Provide easy-to-access information to residents regarding protecting their shorelines, existing ordinances, and where to seek help.

Resilience is a process, not a destination. You don't need a big resilience plan in order to integrate resilience into all parts of your planning.

Communicate with other municipalities, share successes and struggles, people are happy to help.

Ensure that your existing codes, zoning, plans, and insurance align with the work you want to do.