



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY

# Michigan Coastal Management Program

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## Mission

To protect, preserve, restore, enhance, and wisely develop the coastal natural resources and cultural heritage on the nation's longest freshwater coastline.

# Provide Technical and Financial Assistance to Partners for Creative Coastal Projects

Public  
Access

Community  
Development

Coastal  
Hazards

Coastal  
Waters

Coastal  
Habitat

# Resilient Michigan Collaborative

- Mini-grant program to assist coastal communities conduct a Sustainability Assessment.



**FRESH COAST BEST COAST**  
**MICHIGAN COASTAL MANAGEMENT PROGRAM**  
**Coastal Community Resiliency**

**Michigan's Dynamic Coast**  
 The Great Lakes are experiencing all time high lake water levels. Great Lakes water levels rise and fall due to changes in precipitation, runoff, ice cover, and evaporation. Michigan's coastal communities are challenged by the unpredictability of these ever-changing lake levels and increasingly intense seasonal storms impacting the coast. Coastal Managers need to adapt within seasons for lake level changes measured in feet coupled with storms bringing higher waves and associated flooding and erosion impacts.

The Michigan Coastal Management Program (MCMP) is encouraging coastal communities to become a resilient community where the community can absorb and adapt to changes in the Great Lakes levels, coastal storms and floods; manage social and environmental changes; and build a better and more reliable local economy. Preserving natural systems can provide better protection than seawalls or revetments while providing additional recreational and economic benefits. Hazard-ready communities provide space for beach and dunes to migrate naturally, so they can continue to serve the community, which includes functioning to absorb erosion and flooding impacts.

**What type of solutions are best for my community?** Depending on your shoreline type and the wave energy level at the site, the type of protections needs to be customized to your community. Scenario-based planning can assist in devising the best options while maintaining community character.

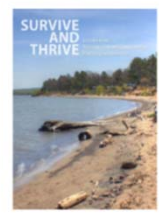
EGLE Environmental Assistance Center 800-462-6279 [Michigan.egle.state.mi.us](http://Michigan.egle.state.mi.us)



Scenario based planning incorporates risk scenarios to help visualize what the "Expected - Lucky - Perfect Storm" may look like through a range of physical conditions. These scenarios, along with model plan and ordinance language are being developed to increase the knowledge for local decision-makers. A Resilient Master Plan better aligns with the community's vision for their coast and help institutionalize management measures to adapt, accommodate and 'step back' development from sensitive and dynamic coastal features.

Incorporating resilient principles into a master plan is a coastal community's first step to becoming resilient. Once these principles are in your master plan and priority areas are identified, communities can then use zoning ordinances to set standards such as set backs and building standards.

Learn more about coastal resilience planning concepts, including lessons-learned from early-adopting communities in Michigan Association of Planning's "Survive and Thrive: Lessons from Michigan Coastal Communities Planning for Resiliency" booklet. The booklet, available at <https://www.planningmi.org/community-resiliency>, was developed with MCMP support.



**What can I do to get started?** The MCMP provides annual funding opportunities where communities can seek grant funding for development of Resilient Master Plans and ordinances. For technical assistance and grant funding opportunities, visit us at [www.michigan.gov/coastalmanagement](http://www.michigan.gov/coastalmanagement)

Additionally, the MCMP is partnering with LIAA in the Michigan Resilient Collaborative. To become a participating community, visit [www.resilientmichigan.org](http://www.resilientmichigan.org) for program information and grant funding opportunities.

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# Resilient Michigan Collaborative project

## Funding Provided by

### Michigan Coastal Management Program



[www.Michigan.gov/ResilientCoast](http://www.Michigan.gov/ResilientCoast)

- Study and analyze the potential coastal hazards along the Great Lakes
- Engage citizens, public officials and community stakeholders
- Help inform local land-use policy and future master planning efforts
- Create hazard-ready coastal communities



LIAA serves the planning, technology and media needs of local governments and other nonprofits in Michigan to build local capacities and increase community resilience.



# What is Community Resilience?

- The ability of a community to anticipate, accommodate and positively adapt to or thrive amidst changing climate conditions or hazard events and enhance quality of life, reliable systems, economic vitality and conservation or resources for present and future generations.

Urban Sustainability Directors Network

- *The sustained ability of a community to understand and use available resources to respond to, withstand, and recover from adverse situations.*
- Help address “wicked” problems that defy local control, such as climate change and global economic challenges

# Establishing a Framework for Building Community Resilience

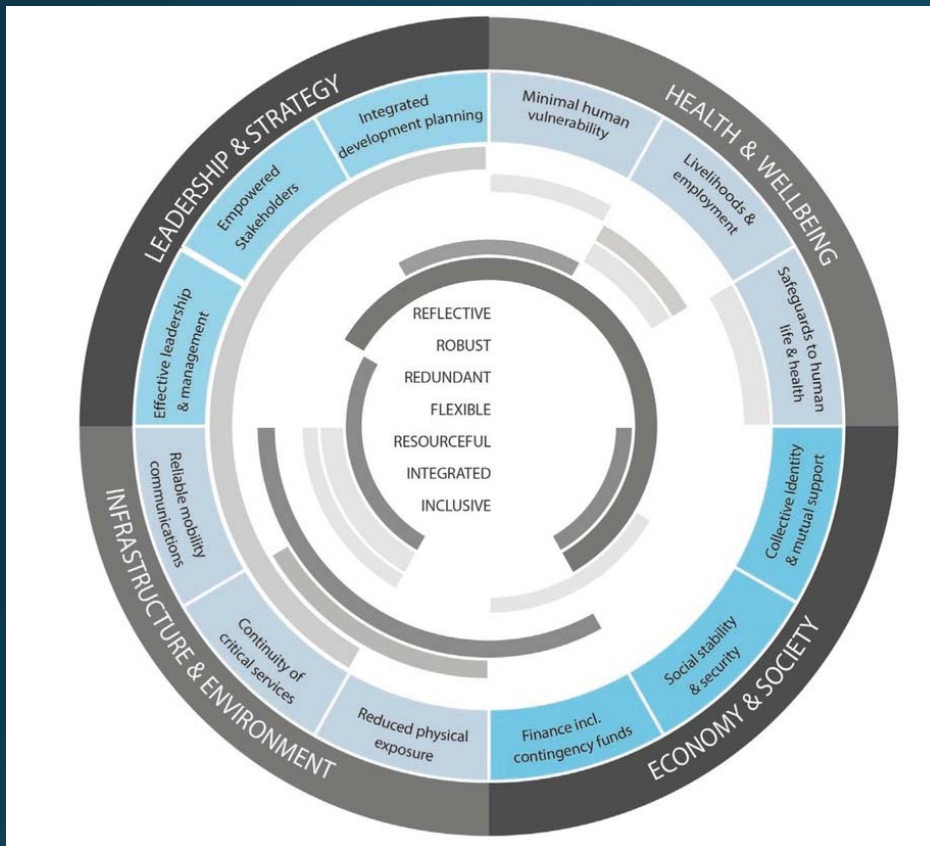


Image: ARUP and the Rockefeller Foundation

## *Resilient Systems*

- Local Governance and Leadership
- Infrastructure (green & gray)
- Transportation
- Local Food Systems
- Housing and Neighborhoods
- Natural Resources
- Public Health
- Coastal Processes
- Energy
- Economy and jobs

*A System is an interconnected set of elements that is coherently organized in a way that achieves something.*

*Thinking in Systems, Donella Meadows (2008)*

# Started with Master Planning

- Updated master plan for City of Monroe; master plan content for Frenchtown Charter Township and Monroe Charter Township
- Comprehensive look at community systems... built and natural environment, economy, placemaking, climate change
- Got us thinking...





# What is Coastal Community Resilience?

## Responding to:

1. **Shocks**. Shocks are typically considered single-event disasters, such as a severe storm and flooding (impacts associated with climate change)

Metro Detroit – August 2014



Houghton – June 2018



Photo Credit: Sonya Lampre  
Detroit Free Press

2. **Stresses**. Stresses are factors that pressure a community on a daily or reoccurring basis, such as development, fluctuating lake levels and climate change





# Great Lakes Coastal Shoreline Dynamics



Guy Meadows,  
Director, Great Lakes Research Center, Michigan Tech

# Takeaway: Shorelines Change Quickly... And Will Forever Continue to Do So

- Above the water
- On the water
- Below the water

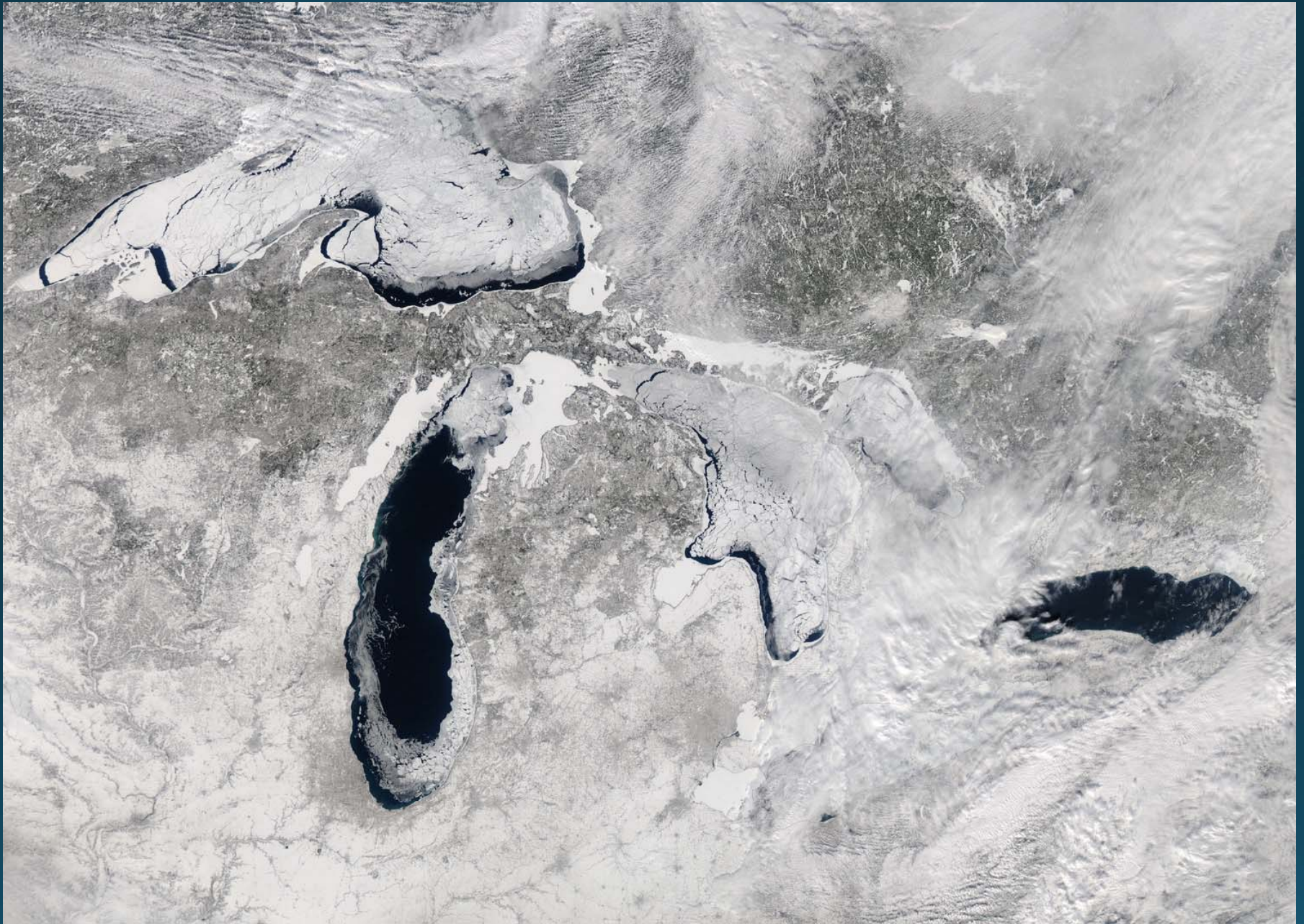


St Joseph, MI



**Highly Variable**

**2014: 92.5% Ice Coverage**



**Highly Variable**

**2017: 19.4%**



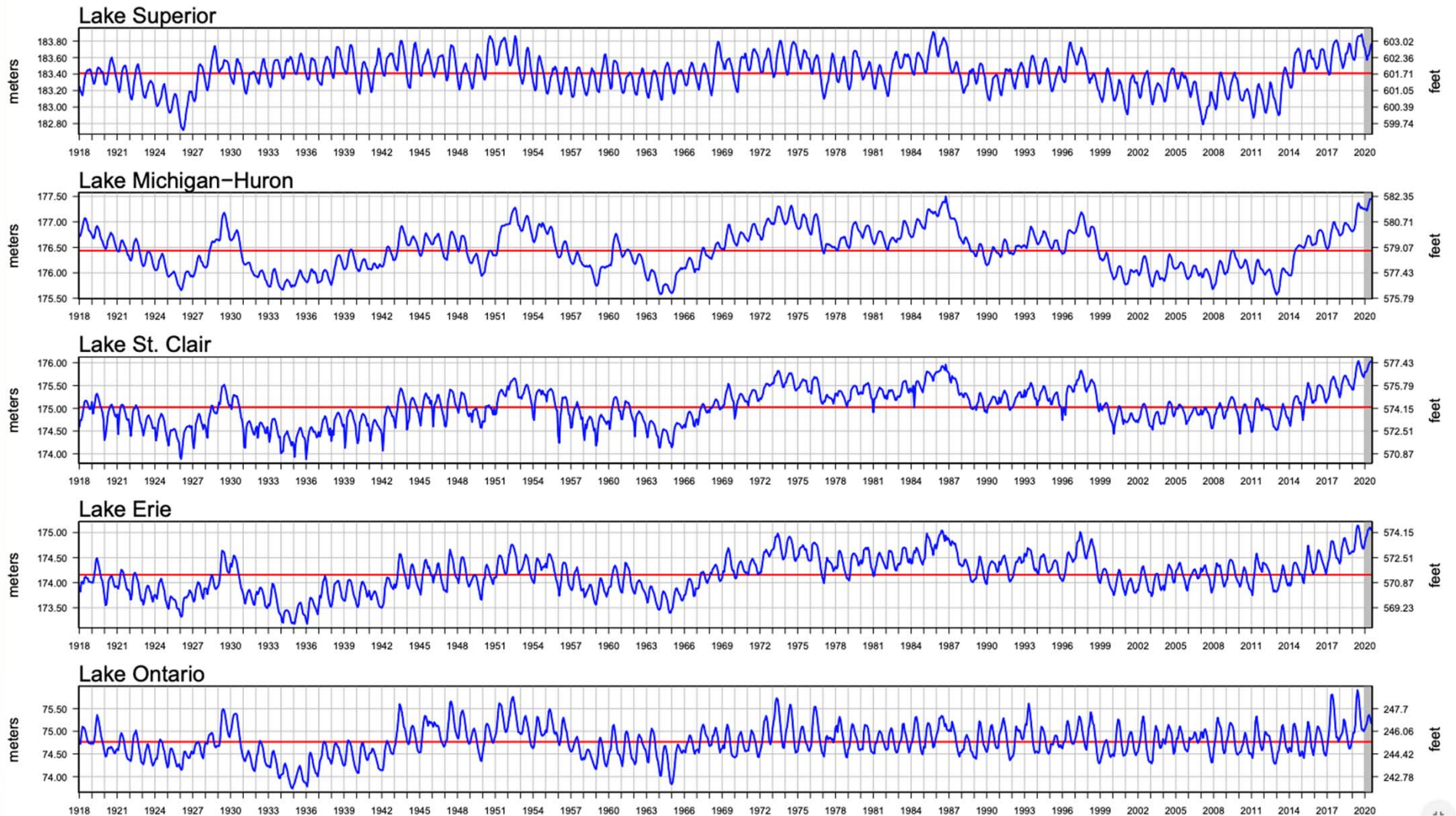


# Higher Highs and Lower Lows



Great Lakes Water Levels (1918–2020)

— Monthly Mean Level    — Long Term Average Annual



The monthly average levels are based on a network of water level gages located around the lakes. Elevations are referenced to the International Great Lakes Datum (IGLD).

Water levels have been coordinated through 2019. Values highlighted in gray are provisional.





# Lake Michigan Beach in 1988

Near Michigan/Indiana State Line





# Lake Michigan Beach in 2008

Near Michigan/Indiana State Line



# Lake Michigan Beach in 2018

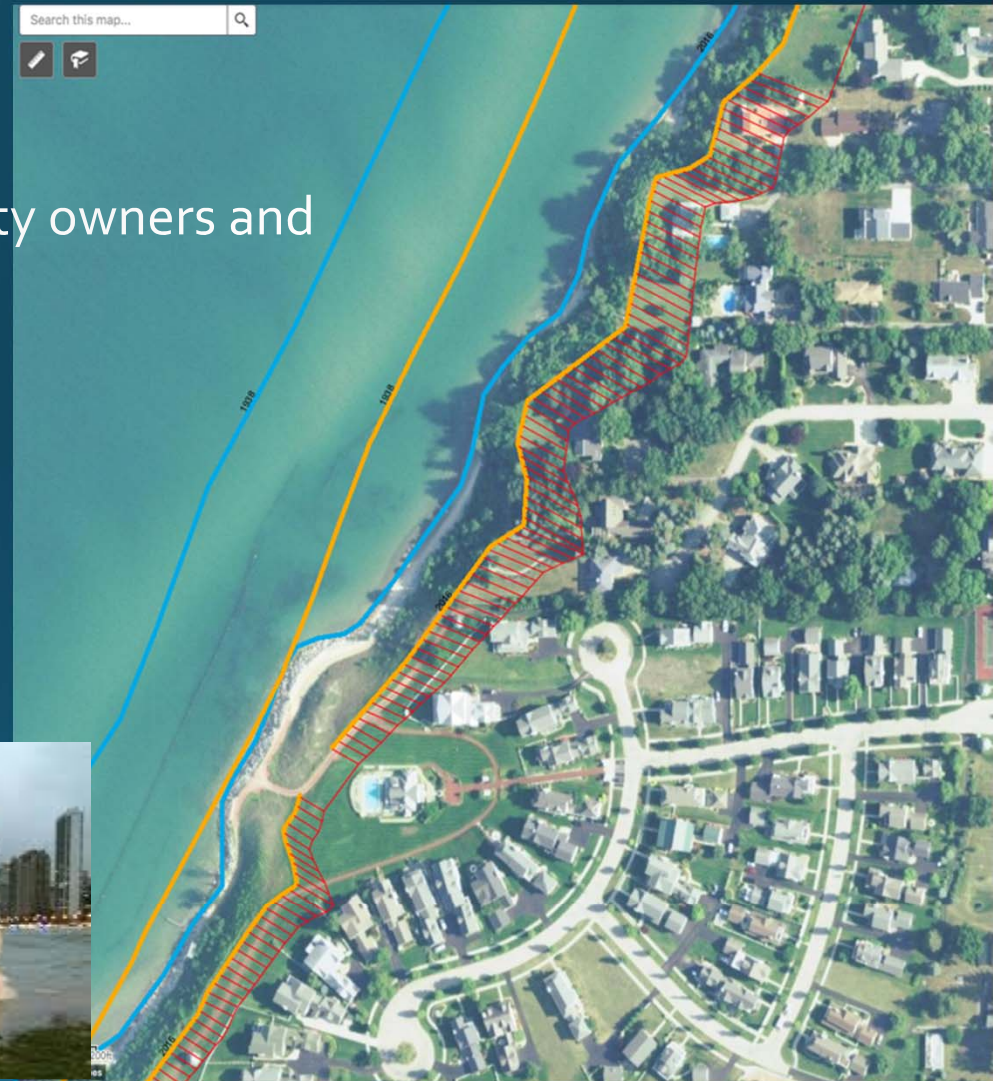
Near Michigan/Indiana State Line





# MTU Shoreline Viewer, 1938-present

- An 80-year look at the shoreline
- Inform coastal communities, property owners and coastal planners

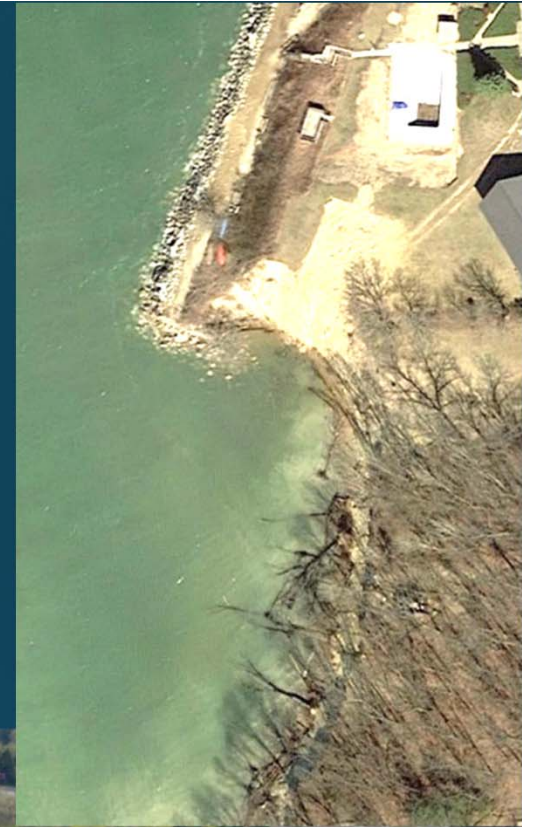


<https://geospatialresearch.mtu.edu/czmp>



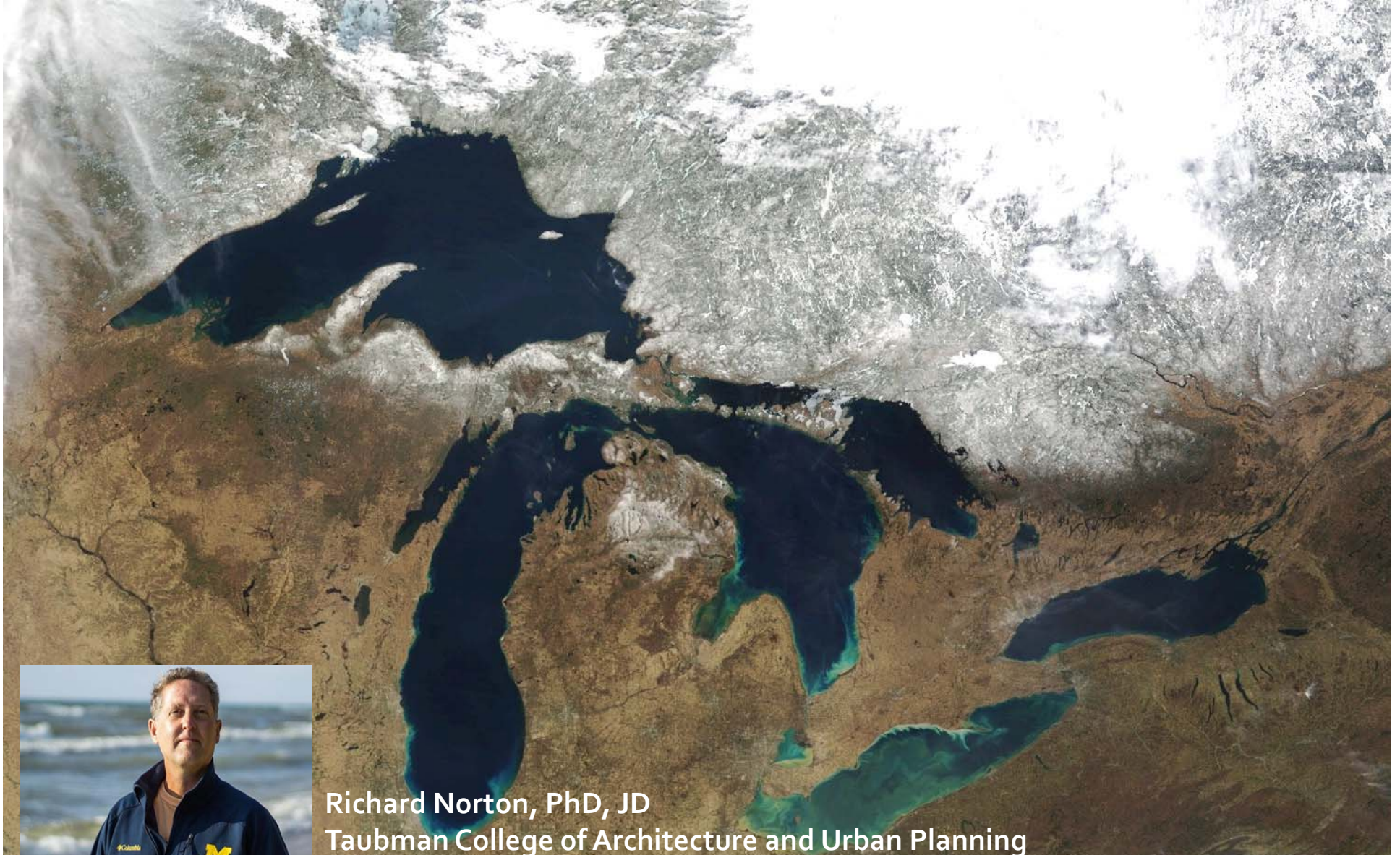
# Armoring the Shoreline is Not a Permanent Solution

- “Hard Engineering” structures can produce adverse impacts





# Legal Complexities – Shoreline & the Public Trust Doctrine



Richard Norton, PhD, JD  
Taubman College of Architecture and Urban Planning

# Scientific and Legal Uncertainties

## Two Ordinary High Water Marks:

1. “natural” (beach walking)
2. “elevation” (regulatory)

### *Glass v Goeckel* (MI S Ct 2005)

“The point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.”

“Public Trust Beach”





# Scientific & Legal Uncertainties





# Scientific & Legal Uncertainties

## Two Ordinary High Water Marks:

1. "natural" (beach walking)
2. "elevation" (regulatory)

### MI GLSLA (1955)

Elevation-based mark set by statute for Lake Michigan and Huron at 580.5 ft. (IGLD 1985)





# Potential Consequences of No Local Control





# Potential Consequences of No Local Control







# Coastal Community Resilience Matching Grants

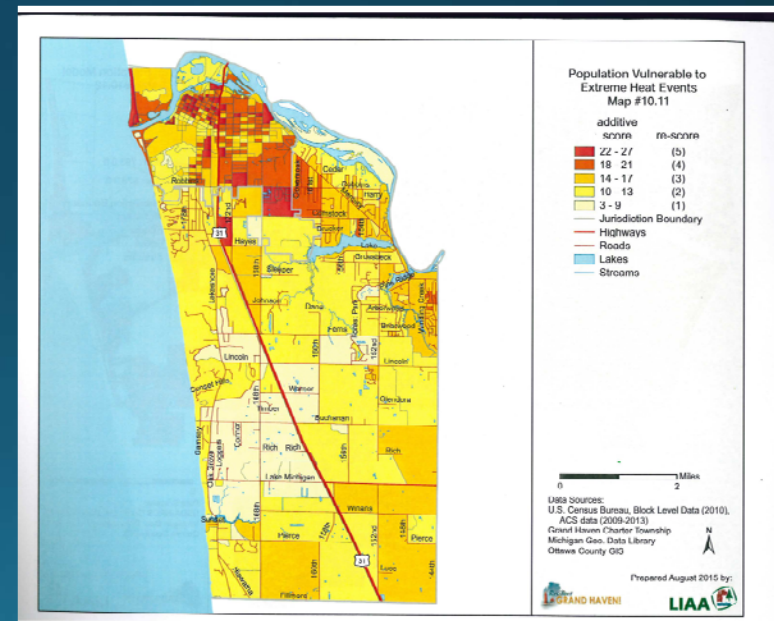
[www.ResilientMichigan.org](http://www.ResilientMichigan.org)

Guide communities through a sustainability self-assessment tool to develop tailored recommendations for master plan amendments, a master plan chapter, and/or zoning amendments based on community needs.

## Deliverables

- Research and mapping
- Community vulnerability assessments, flooding and heat
- Interactive educational programs
- Work sessions and public meetings
- Draft new guidance

Half Cost – 50% Paid by Grant

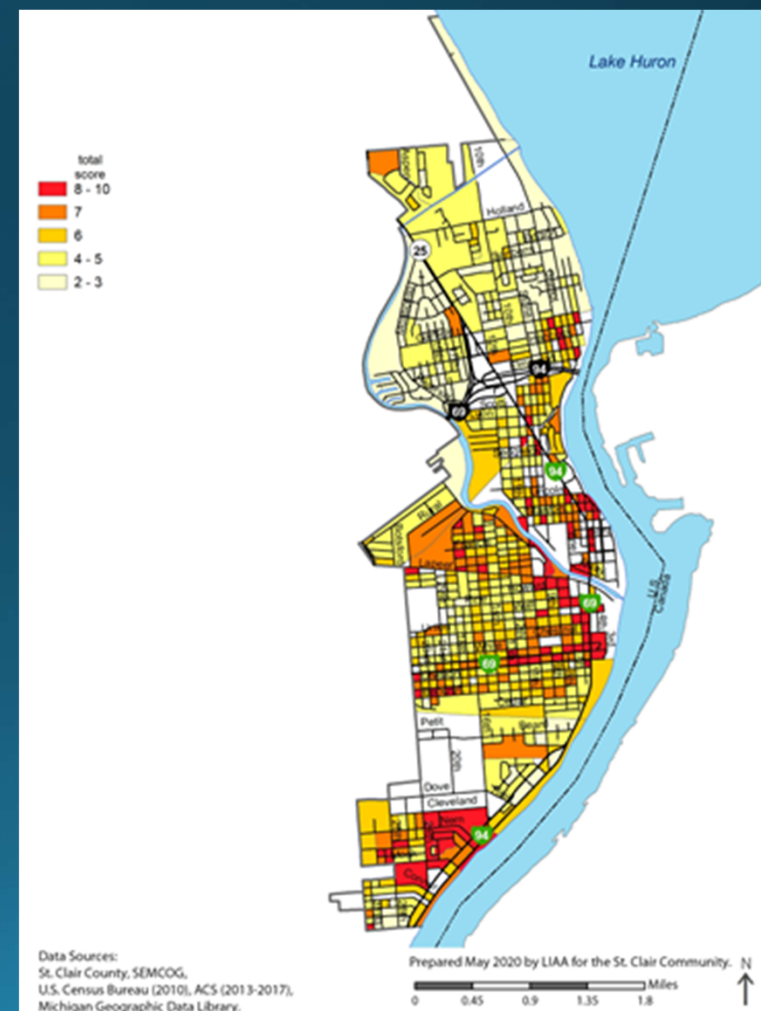
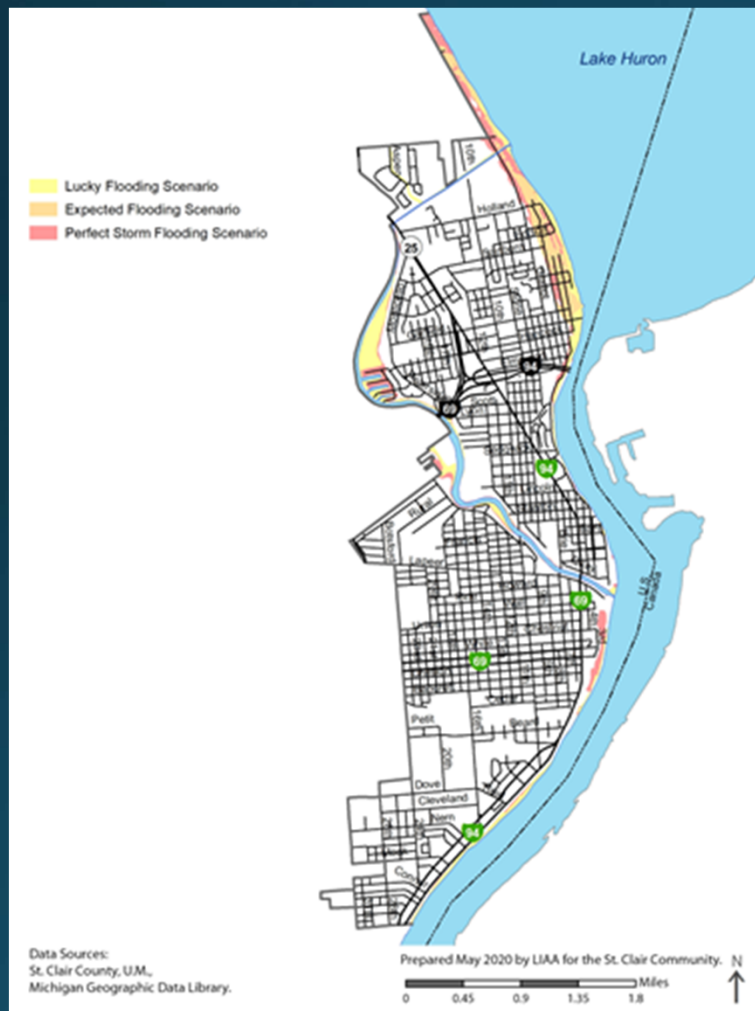




# Task 1: Vulnerability Mapping

## Mapping Flooding Scenarios and Heat Vulnerability

Examples from Port Huron, St. Clair County



# Task 2: Conduct Community Assessments

- Community Sustainability Self-Assessment Tool analysis of current coastal policies in master plans and zoning ordinances
- Seek municipalities interested in participating
- Requires involvement of knowledgeable local officials – phone meeting or two

## Data gathering and mapping

Benchmark	Self-Assessment	Description
24.7		Do any plans, and especially the Hazard Mitigation Plan, describe the damage and cost of previous storms, floods or erosion? Dollar amounts for past damages can help community members decide how risk averse they want to be going forward.
24.8		Does the community track repetitive loss properties within the National Flood Insurance Program? A repetitive loss property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.
24.9		Are maps or spatial data used to predict the probable extent of future coastal hazards? Similar to benchmark 24.7, measuring the probability of different coastal scenarios (100-year storm versus 500-year storm, for example) can help community members and decision makers decide to what extent they want to avert coastal risks.
24.10		Do community plans estimate the potential financial losses that may result from lake-level rise? Along with understanding the sites most at risk of taking on damages, the community also benefits from knowing the potential costs of future damages so they can plan accordingly.
24.11		Does the municipality share the findings from risk and vulnerability assessments with planning staff, public works officials, transportation planners, emergency management, elected officials and the general public? It is important for each municipal department to be on the same page, especially regarding hazard mitigation efforts. This can help increase consensus and buy-in around decision-making.
24.12		Has the community conducted a buildout analysis using current zoning to better understand the potential for development in at-risk areas? While a full buildout is rare, communities should be aware of the potential for increased development to occur in risk-prone areas. This may help inform zoning changes to improve resilience.

Y—Yes I—Yes, but should improve N—No ?—Don't know NA—Not applicable



# Task 3: Community Outreach

## Convene a public meeting in each assessment community

- Participants invited to watch background videos before meeting as “homework”
- Remote meeting, public welcome, to review assessment:
  - What are the current challenges the community is facing because of changes in the Great Lakes?
  - Is the community doing everything it might to address coastal community resiliency through its planning and zoning? If not, why not?
  - What changes could help it do more?
  - If push comes to shove and we cannot do both, should we prioritize protecting the natural beach or protecting the built environment?
  - Who should take the lead in making difficult decisions like that — local or state government?

# Task 4: Summary Reporting & Data Sharing

- LIAA provides a summary report of each sustainability assessment an overview of what was discussed in the key stakeholder meeting, and recommendations.
- The deliverables provide each jurisdiction with a snapshot of its barriers and opportunities for coastal resilience.

[www.ResilientMichigan.org/Chikaming](http://www.ResilientMichigan.org/Chikaming)





# Chikaming Township Background and Current Conditions

- David Bunte, Township Supervisor



# Chikaming Township Coastal Sustainability Assessment

September 23, 2021





[Home](#) » [Communities](#) » [Chikaming Township](#)

## RESILIENT CHIKAMING TOWNSHIP

Chikaming Township is in the process of updating its master plan to become a more resilient community. The master plan will serve as a guide for local policies and initiatives aimed at reducing the effects of exterior shocks and stressors that Michigan communities have to face, from climate change and shifts in economies to rising and falling lake levels. Residents are encouraged to attend all public meetings to give their input on their vision for the future and what they would like to see preserved, improved and created in their community.

The community will partner with the nonprofit Land Information Access Association (LIAA) to review current local regulations and gain input from citizens and community stakeholders to incorporate into the master plan. LIAA will assist the township by conducting a sustainability assessment that considers resilience in the following subject areas: Coastal, Environmental, Economic, and Social.


Interested parties are encouraged to attend meetings as they occur throughout the process. **The kickoff meeting will be held on Thursday, September 23, 2021 at 6:00pm-7:30pm in the Township Center Meeting Room located at 13535 Red Arrow Hwy, Harbert, MI 49115.**

Continue to check this website for upcoming meetings and public documents as they are made available.

[Coastal Resilience Presentation](#)

[Meeting Documents](#)



 231-929-3696

 [info@liaa.org](mailto:info@liaa.org)

Financial assistance for this project was provided, in part, by the Michigan Coastal Zone Management Program, Department of Environment, Great Lakes, and Energy, and is supported through a grant under

Visit [resilientmichigan.org/Chikaming](https://resilientmichigan.org/Chikaming) to follow this project as it progresses

# How to Use the Assessment Tool

Each sustainability principle features various benchmarks that are used as an indicator of local resilience

	Benchmark	Self-Assessment	Description
2.4	Does the master plan, zoning ordinance or other municipal plan, regulation or program call for incentivizes or regulations for developments to include affordable housing options?		For a community to effectively address housing issues, it should have adopted plans that describe the local goals, objectives and action steps to achieve greater sustainability as it pertains to housing. Support for these plans acts as support for the “sticks and carrots” that the municipality can use to implement the community’s vision for its housing.

- Yes (Y) - The community has included this sustainability principle in its planning efforts
- Yes, but should improve (I) - The community either practices this sustainability principle but does not explicitly include it in its planning documents, or the principle could be implemented to a greater degree
- No (N) - The community has not considered this sustainability principle
- Don't know (?) - Unclear if the community is practicing this sustainability principle
- Not applicable (NA) - This sustainability principle is not applicable given local conditions



# Category 1 – Data Gathering & Mapping

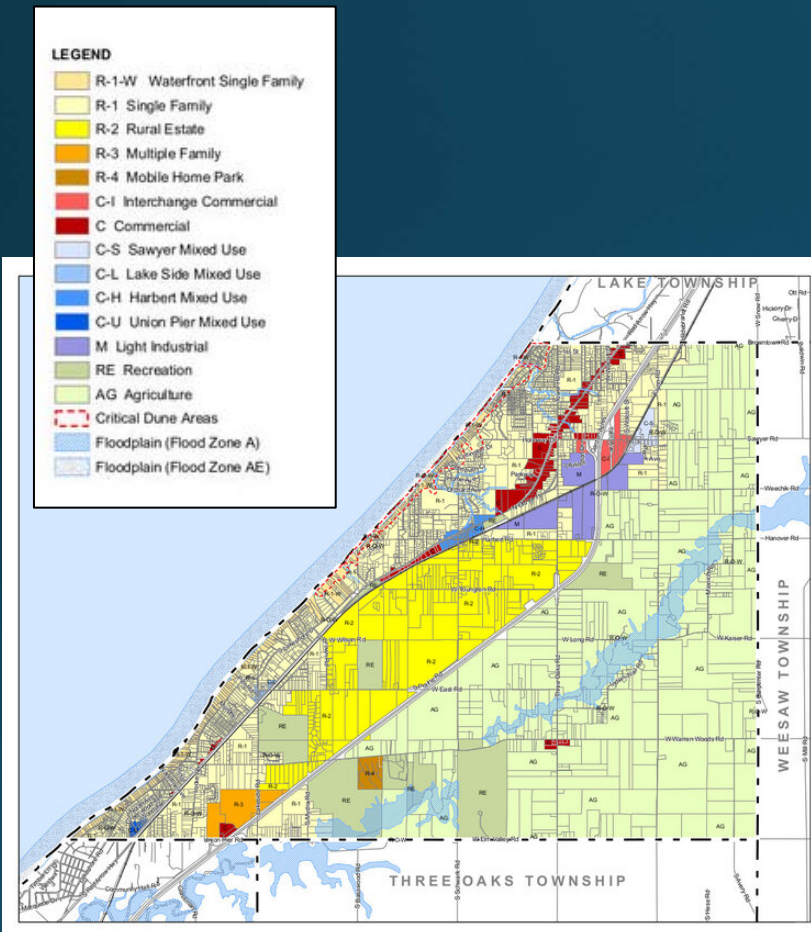
Data and mapping that is well-organized and easily presented can help to educate community residents on the importance of planning ahead for potential risks.

- Township does require waterfront setbacks and uses a unique and accurate method utilizing drone imagery not seen in other communities
- Partners with County to provide services for mapping and Emergency Management
- Could analyze potential risks based on current ordinances



# Category 2 – Zoning Regulations

Zoning regulations are a useful tool for preserving natural assets. Local government should engage the community to explain the potential risks that natural hazards pose to community assets.



- Chikaming requires setbacks and minimum building standards to minimize flood/erosion damage
- Regulates some native plantings but could add specific vegetation
- Separate ordinance addresses shoreline armoring



# Category 3 – House Siting

While structural design benchmarks are important factors in sustaining natural ecosystems, house siting can also contribute to the well-being of the natural environment, especially for dunes.

- Some requirements are considered for yard setbacks along Lake Michigan and in flood plains
- Community relies on permitting through building regulations and EGLE to address location of homes with relation to dune crests



# Category 4 – Critical Facilities & Infrastructure

Sustainable communities can experience a natural disaster and continue to provide public services to residents before, during and immediately after the emergency.



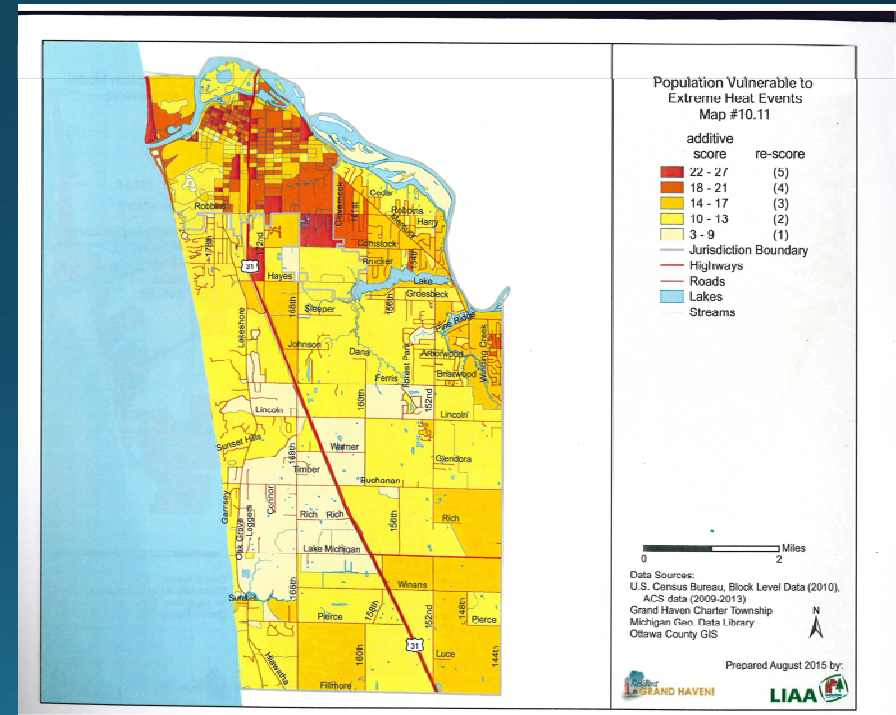
- Very little public infrastructure is located in critical dune areas or wetlands, resulting in minimal impact to services in the event of a natural disaster
- New or rebuilt public facilities are reviewed by consultants to assure safety and compliance with regulations



# Category 5 – Disaster Preparedness

Historical coastline data and projections can help municipalities implement scenario-based plans. For instance, flood risks can be predicted based on lucky, expected or worst-case scenarios.

- Community engages with the Countywide Emergency Management Department
- Facilities are identified to provide shelters and distribution in the event of an emergency
- The Township could involve Planners and Engineers in the Capital Improvement Process (CIP)



# Category 6 – Professional Training

Communities working to implement the best practices described in the assessment tool are better positioned to do so when they have a staff that is highly trained in their respective profession.



- Professional staff has access to training and is supported by Township Board
- Township does not have a floodplain manager or planner but does partner with County for this service
- Township does have a Planning Commission with some formal training



# Category 7 – Hazard Planning

Plans should consider short and long-term risks and, in doing so, should identify short and long-term projects toward increased sustainability.

- Continue to work with the County on Hazard Mitigation Plan update
- Community does not have hazard plans for certain infrastructure on coastline (like wastewater treatment plant), but does not need it as there are no potentially impacted facilities



# Community Q & A and Next Steps

[www.ResilientMichigan.org/Chikaming](http://www.ResilientMichigan.org/Chikaming)

