Planning for Resilient Coastal Communities

WELCOME

Port Austin – October 15, 2019

Tonight's Agenda

- Introduction to Master Planning and Coastal Resilience
- Presentation – What is Community Resilience
- Activity 1 – Preserve, Improve, Create
- Presentation – Great Lakes Coastal Shoreline Dynamics
- Presentation – Placemaking for Community Sustainability
- Activity 2 – Mapping assets & opportunities
- Presentation – Legal Complexities: Shoreline and the Public Trust Doctrine
- Activity 3 – Project prioritization
- Next steps

A Unique Master Planning Effort

Planning for a Resilient Port Austin

A different way of viewing the master plan process, focusing on the cooperative preparation, adaptation and the creative development of **community systems in the face of changing conditions and circumstances**.

What is a Master Plan?

A formal assessment of the strengths & weaknesses of the community

Through civic engagement, it's the expressed vision for the future of the community

A formal policy guide or "blueprint" for community development

A flexible document - should respond to changing conditions, innovations, new information

How is a Master Plan used?

Basis for land use regulation (e.g., zoning)

Guides decisions on development and public capital improvements

Provides support and improves eligibility for potential projects

- Grant Requests
- Millage
- Public/Private Partnerships

Provides a guide for the conservation of community resources and quality of life

Positions community to meet future challenges

Building Resiliency In Coastal Communities

Funding Provided By

Michigan Coastal Zone Management Program

The **PURPOSE** of this program:

- 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

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

Establishing a Framework for Building Community Resilience

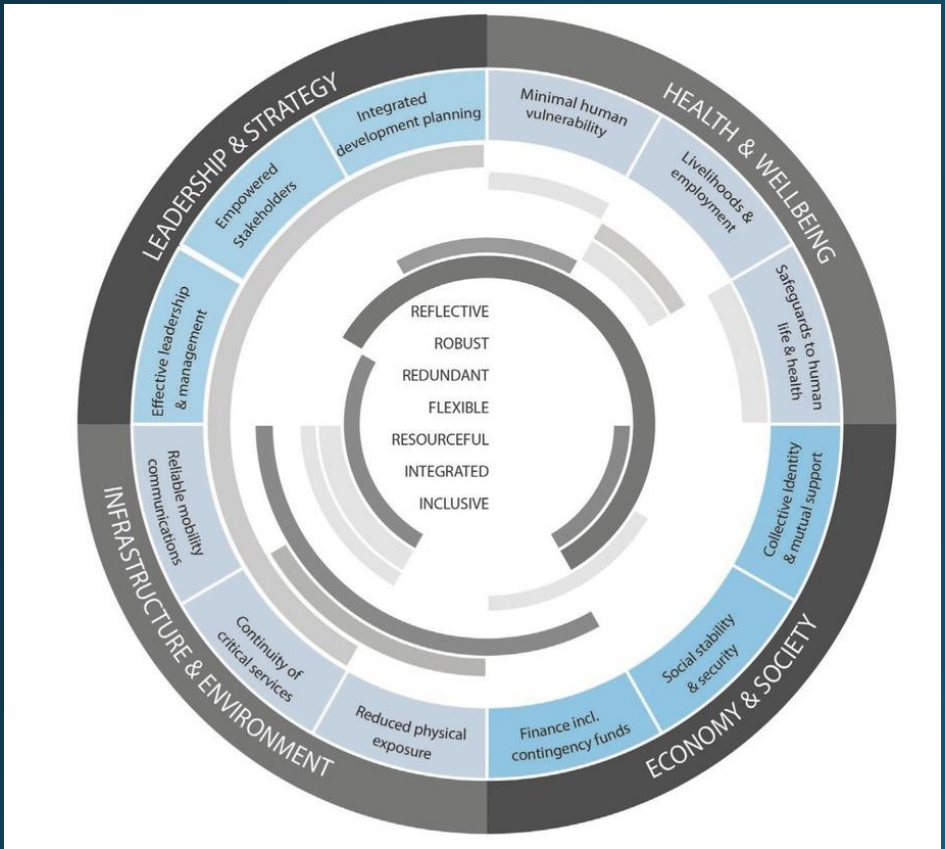


Image: ARUP and the Rockefeller Foundation

Resilient Systems

- Local Governance and Leadership
- Infrastructure (green & grey)
- 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)

Establishing a Framework for Building Community Resilience

Efforts at the Federal Level

- EPA - Collecting data, technical assistance, outreach and policy
- CDC - Programs in Environmental health, infectious disease
- DOD - Climate Change Adaptation Roadmap
- NOAA - Climate information and data
- FHWA – Technical assistance to improve resilience and reduce energy use and emissions
- DOE – Supports research and innovation to invest in alternative energy

Efforts at the State Level

- Michigan Climate Action Plan (2009)
- Michigan Army National Guard
- Michigan Department of Environmental Quality
- Michigan Department of Health and Human Services
- Michigan Department of Natural Resources
- Michigan State Police
- Michigan Economic Development Corporation
- Michigan Public Services Commission
- Michigan Public Governmental/Planning Associations (MAP, MML, MTA)

Establishing a Framework for Building Community Resilience

Efforts at the Local Level

Existing Plans

Communities with Climate Actions Plans, Resiliency Plans, and/or Sustainability Plans, either in process or adopted as of February 2017.

- *Alger County*
- *Baraga Township*
- *Bay City*
- *Beaver Island*
- *Benton Harbor*
- *Camp Grayling Joint Maneuver Training Center*
- *City of Ann Arbor*
- *City of Dearborn*
- *City of Detroit*
- *City of East Jordan*
- *City of Farmington Hills*
- *City of Grand Haven*
- *City of Grand Rapids*
- *City of Hancock*
- *City of Hazel Park*
- *City of Holland*
- *City of Kalamazoo*
- *City of Ludington*
- *City of Marquette*
- *City of Monroe*
- *City of Muskegon*
- *City of Southgate*
- *City of St. Joseph*
- *City of Traverse City*
- *City of Trenton*
- *City of Ypsilanti*
- *Coastal Macomb County*
- *Fort Custer Training Center*
- *Frenchtown Charter Township*
- *Grand Haven Charter Township*
- *Hamlin Township*
- *Meridian Township*
- *Monroe Charter Township*
- *Muskegon County*
- *Pere Marquette Charter Township*
- *Selfridge Air National Guard Base*
- *Village of Northport*
- *Village of Sebewaing*

Establishing a Framework for Building Community Resilience

SIX CLIMATE-CHANGE CONCERNS FOR MICHIGAN

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

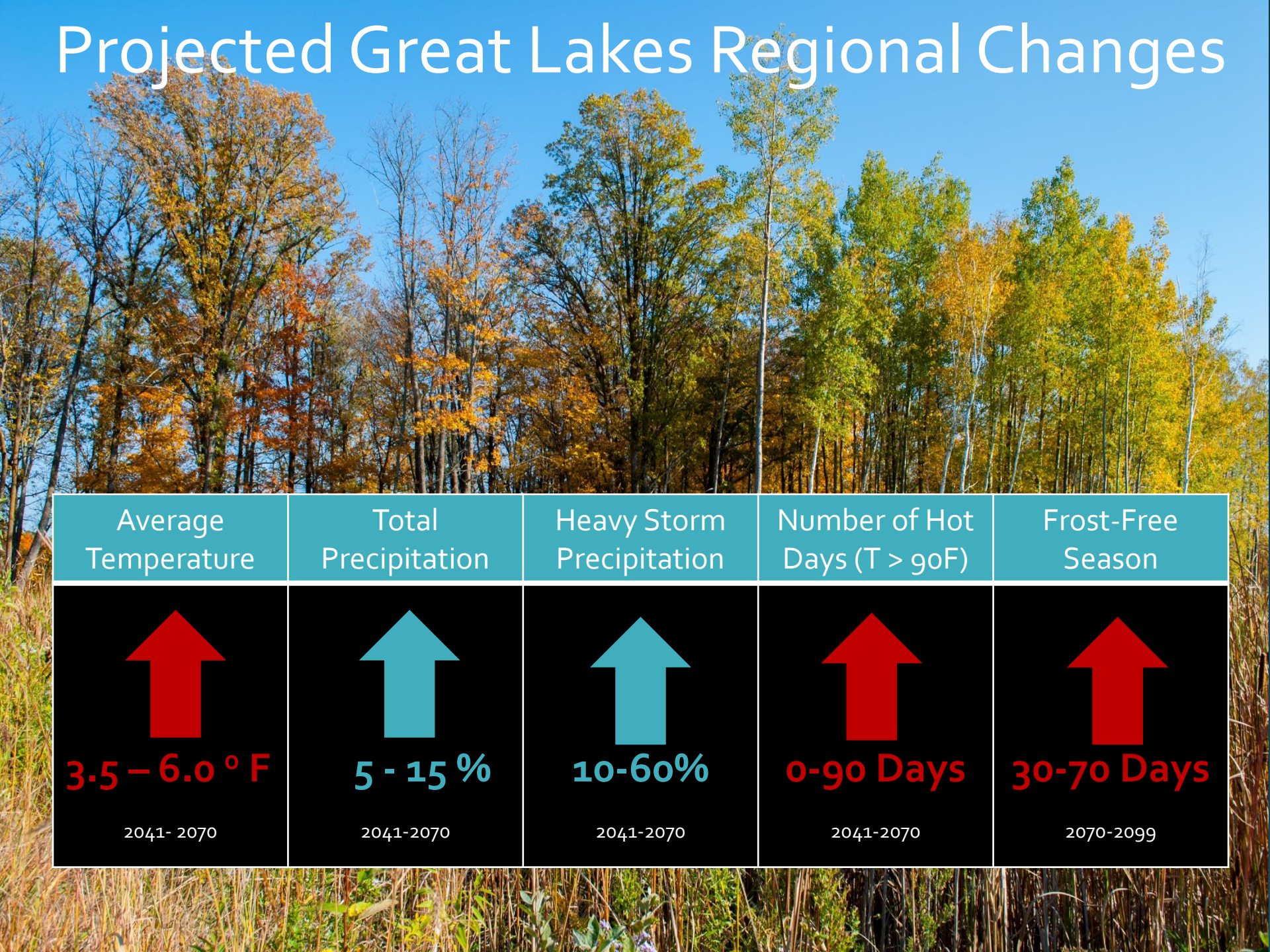
Photo Credit: Sonya Lampre
Detroit Free Press

2. **Stresses.** Stresses are factors that pressure a community on a daily or re-occurring basis, such as fluctuating lake levels

Great Lakes Observed Regional Changes

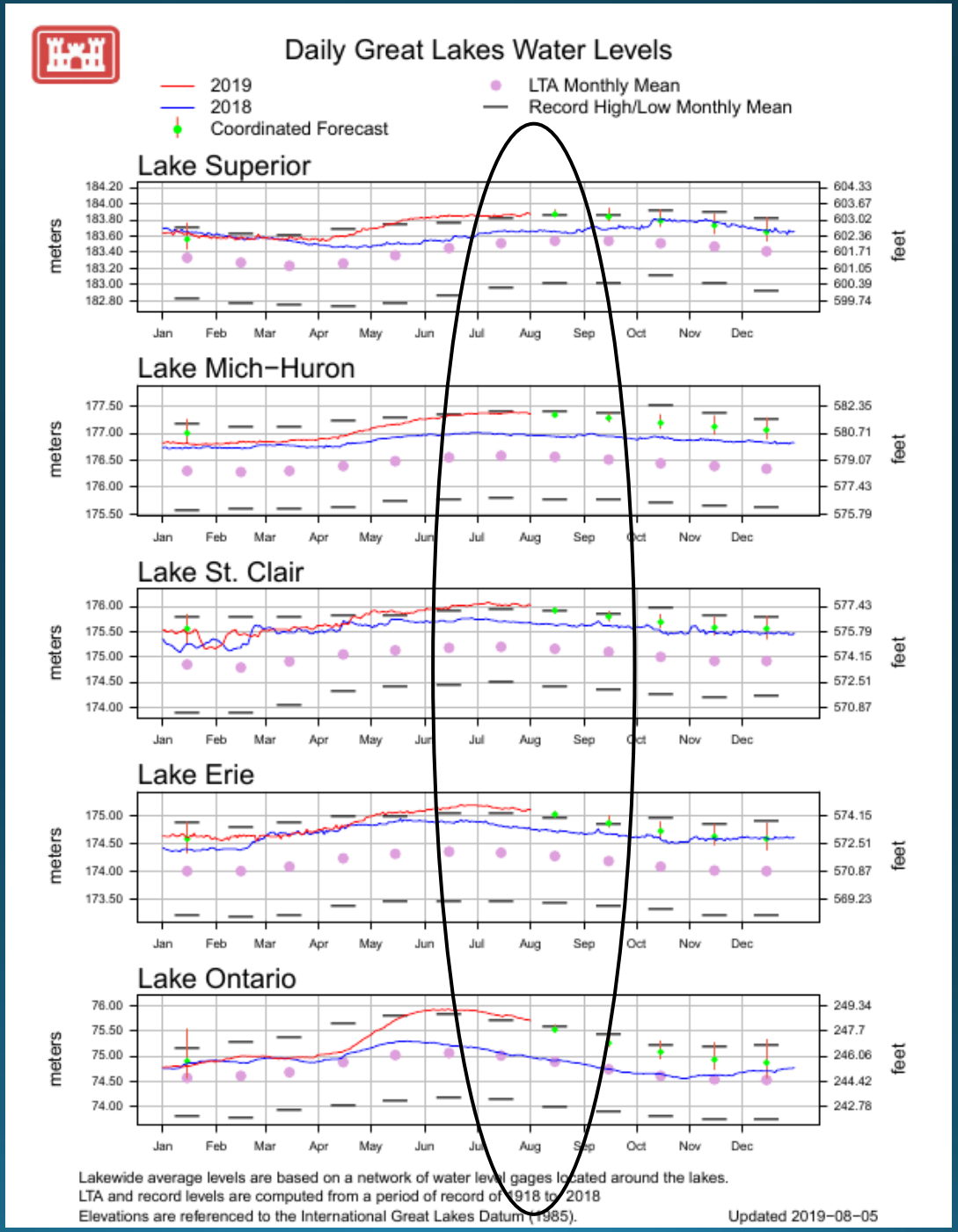
Average Temperature	Total Precipitation	Heavy Storm Precipitation	Great Lakes Ice Coverage	Frost-free Season
↑ 2.0°F 1900-2012	↑ 11% 1900-2012	↑ 37% 1958-2012	↓ 71% 1973-2010	↑ 9 Days 1958-2012

Projected Great Lakes Regional Changes



Average Temperature	Total Precipitation	Heavy Storm Precipitation	Number of Hot Days (T > 90F)	Frost-Free Season
3.5 – 6.0 ° F	5 - 15 %	10-60%	0-90 Days	30-70 Days
2041- 2070	2041-2070	2041-2070	2041-2070	2070-2099

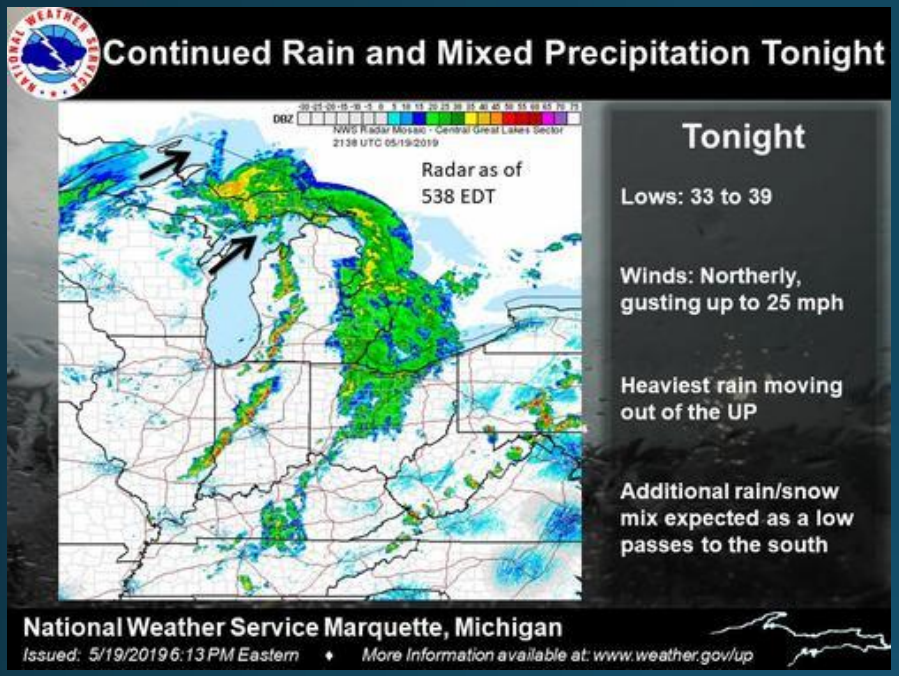
Current Coastal Dynamics and Climate Trends

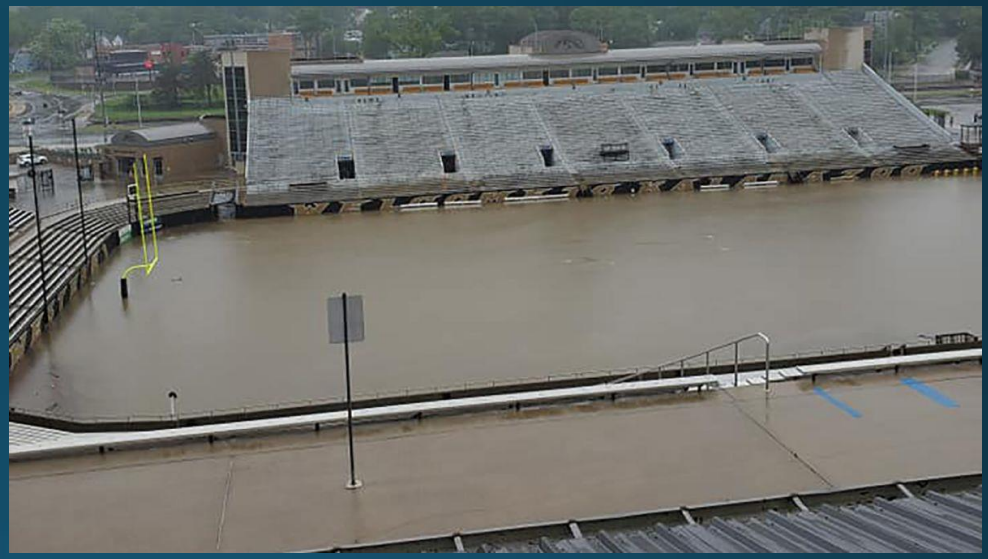


Great Lakes Water Levels Are Influenced by Three Factors

1. Rain and Snowfall Over the Lakes
2. Evaporation Over the Lakes
3. Runoff the Enter the Lakes from the Surrounding Land through rivers and Tributaries

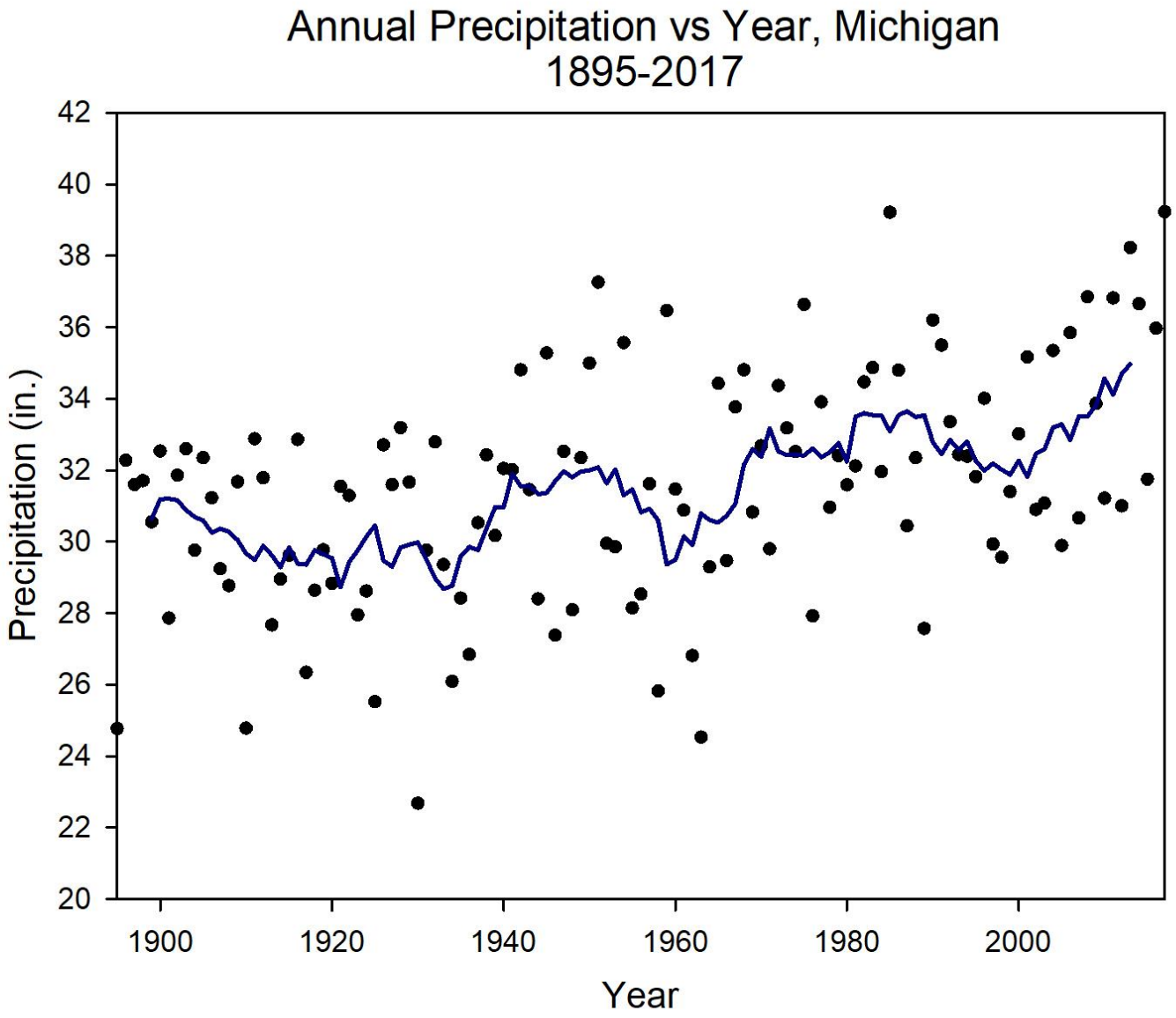
Persistent Upper Air Pattern Is Bringing Active Storms and Heavy Precipitation Across the Midwest Basin





June 2019
https://www.cnn.com/2019/06/20/us/western-michigan-football-stadium-flooding-trnd/index.html

Michigan Climate Trends



Activity One

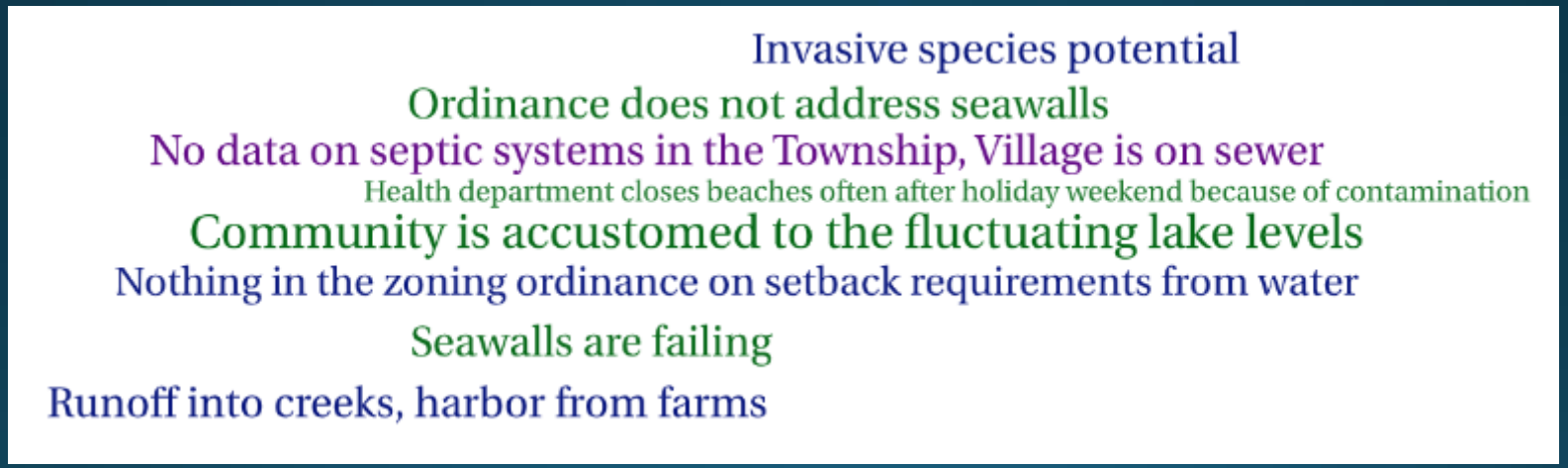
Preserve, Improve, Create

What we heard…

Economy

What we heard…

Coastal Resilience



What we heard…

Housing

Low number of permits applied for to build

Cost of new construction is high

Seasonal residents want to stay in their home or downsize

Almost no affordable rental housing during peak tourism for seasonal workers

A lot of recent upgrading of the housing stock

More new builds – demand is high for new housing

Lack of affordable housing for young families

County allowing pole structures to be built as housing

Local ownership (year-round) is increasing while non-local ownership is decreasing

Blighted properties - both commercial and residential

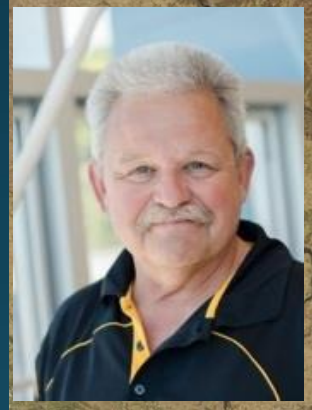
What we heard…

Community Amenities & Services

What we heard…

Transportation

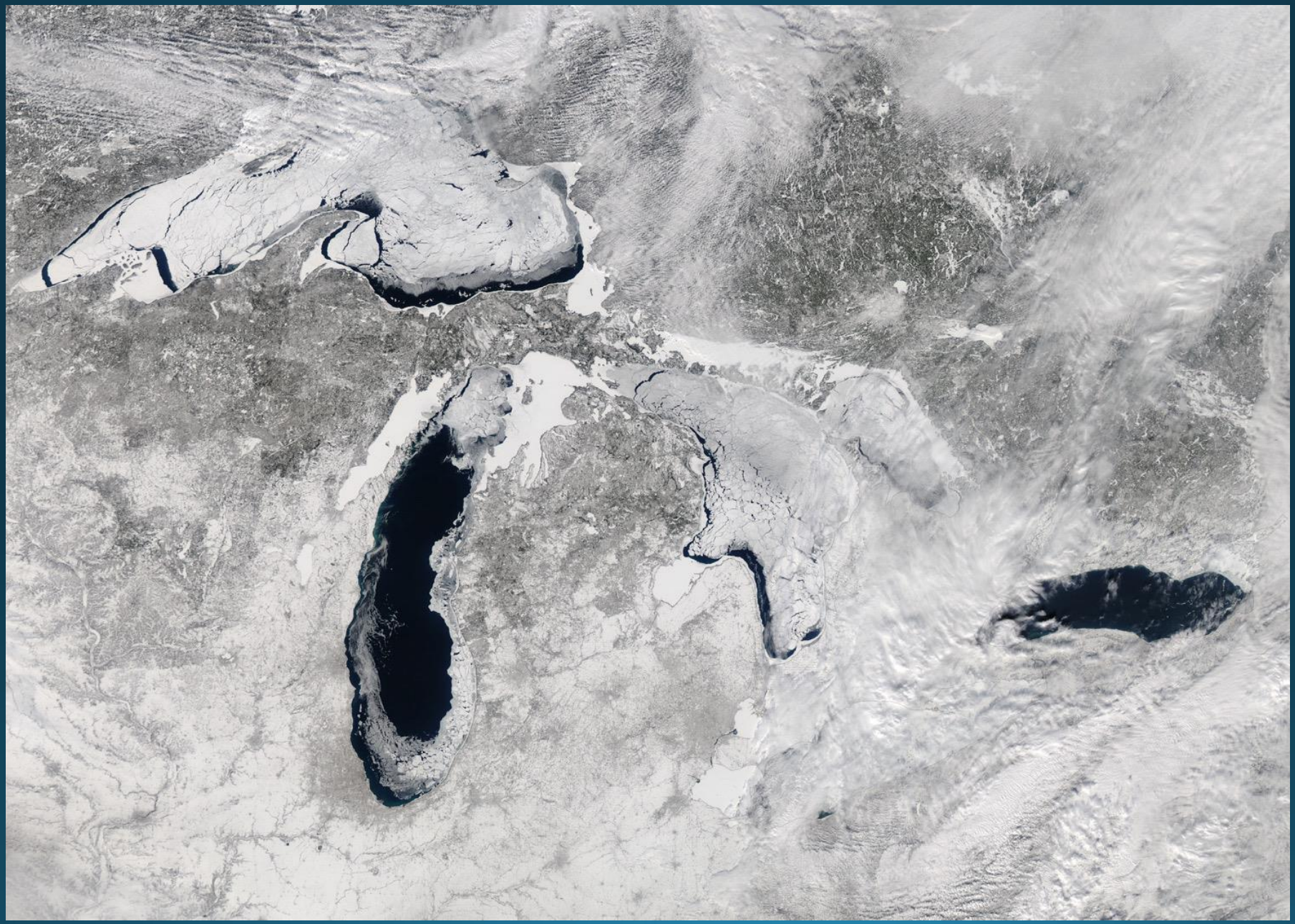
Great Lakes Coastal Shoreline Dynamics



Guy Meadows,
Director Great Lakes Research Center, Michigan Tech

February 20, 2014

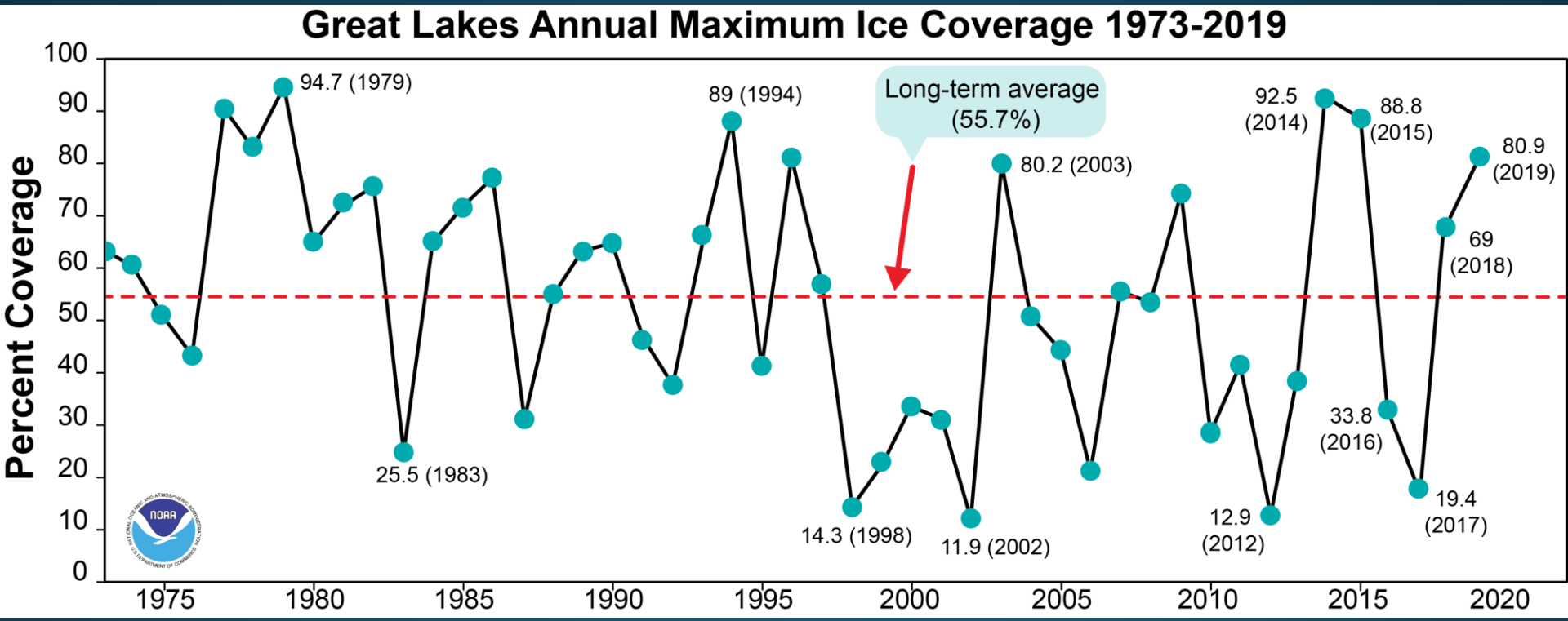
(92.5% Ice Coverage)



February 19, 2017 (19.4%)

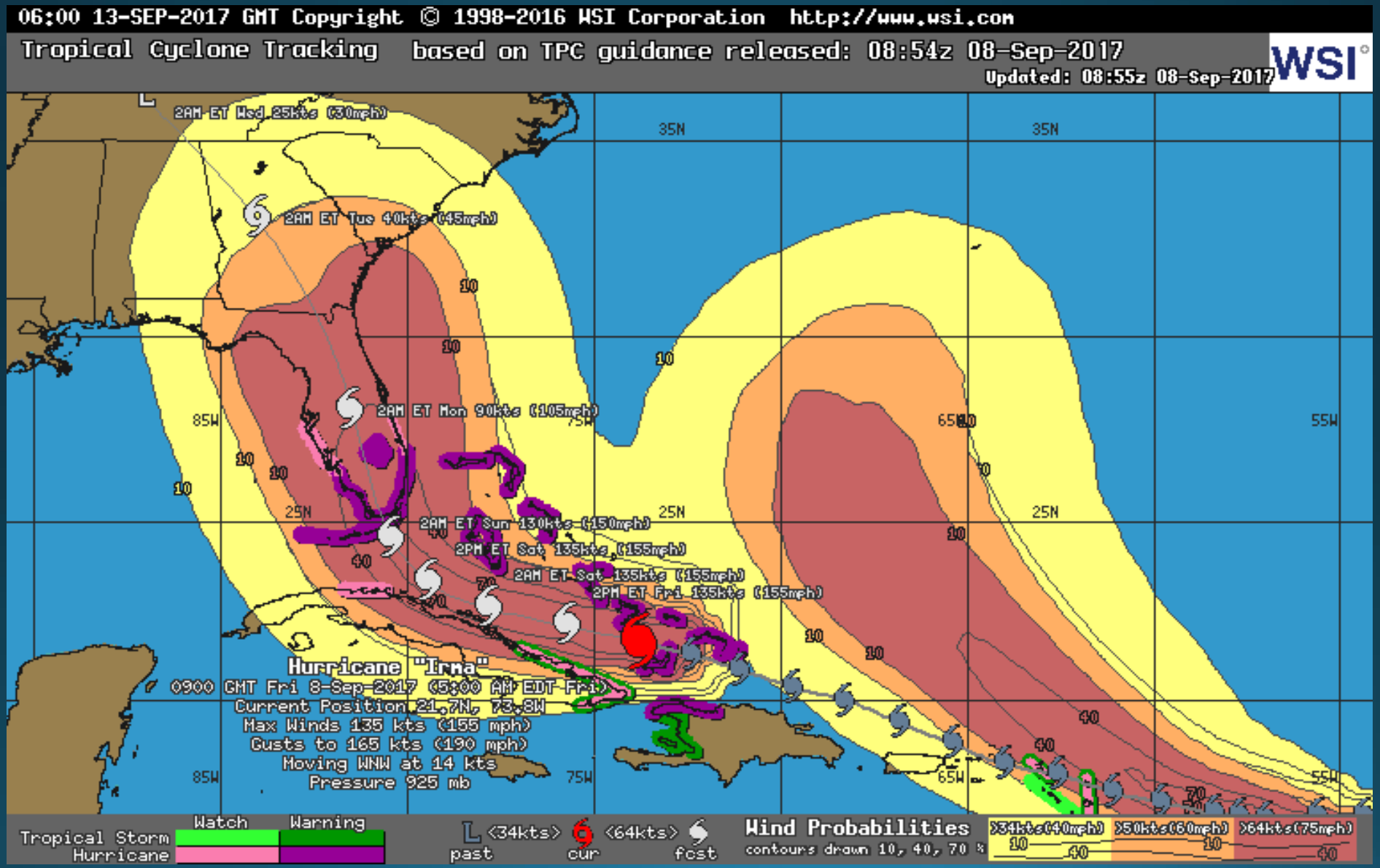
Ice as an Indicator of Storminess

Frequency and Intensity of Storms



Storms Are Increasing Everywhere

September 2017



Fall Storms of 2017

Lake Superior

Wave energy is 25% greater when lake levels are high

Fall Storms of 2017

Lake Superior

Blackrocks Waves on

Secure | https://www.youtube.com/watch?v=pjuVLxzJfwA

Apps | Sign in to Office 365 | Resilient Michigan - | Google | LIAA Project List | Michigan Great Lake | GoToMeeting | The Ticker Traverse C | Detroit Free Press - B | Other bookmarks

YouTube | Search

Blackrocks Waves on 10 24 17

2,623 views

LIKE | DISLIKE | SHARE

Up next | AUTOPLAY

The Greatest STORM in the WORLD 2017, big Waves 20 m

THE TOP 10

10M views

Skee-Lo - I Wish (Official Video)

Altra Moda Music

Recommended for you

Justin Timberlake - Not a Bad Thing (Audio)

Justin Timberlake

Recommended for you

Zedd & Elley Duhé - Happy Now (Lyrics)

Zedd

Recommended for you

8 Letters - Why Don't We [Official Music Video]

Why Don't We

Recommended for you

New

9:16 PM

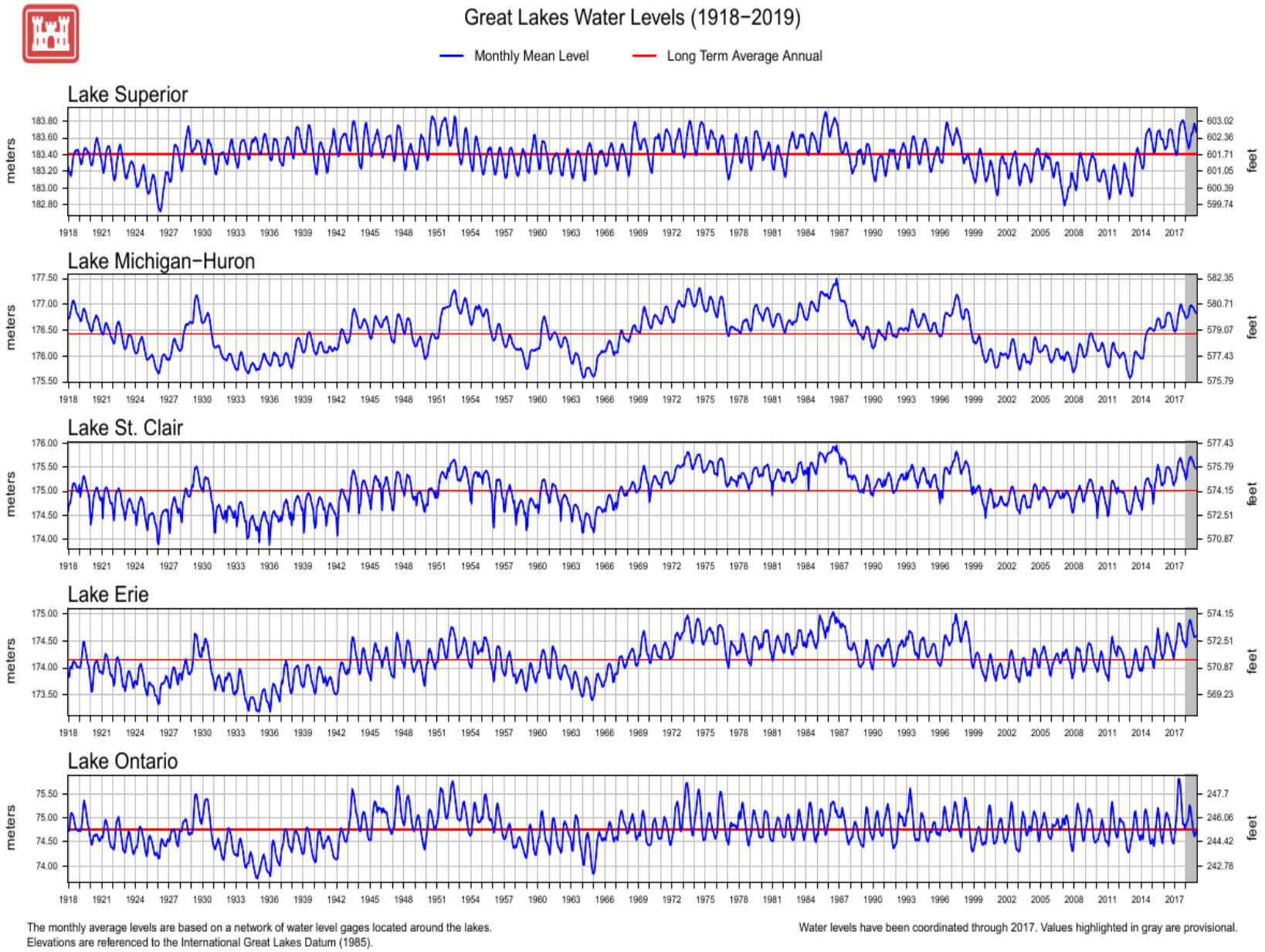
8/26/2018

Meteotsunami – Grand Traverse Bay

18 –inch increase in water in ½ hr. June 2018

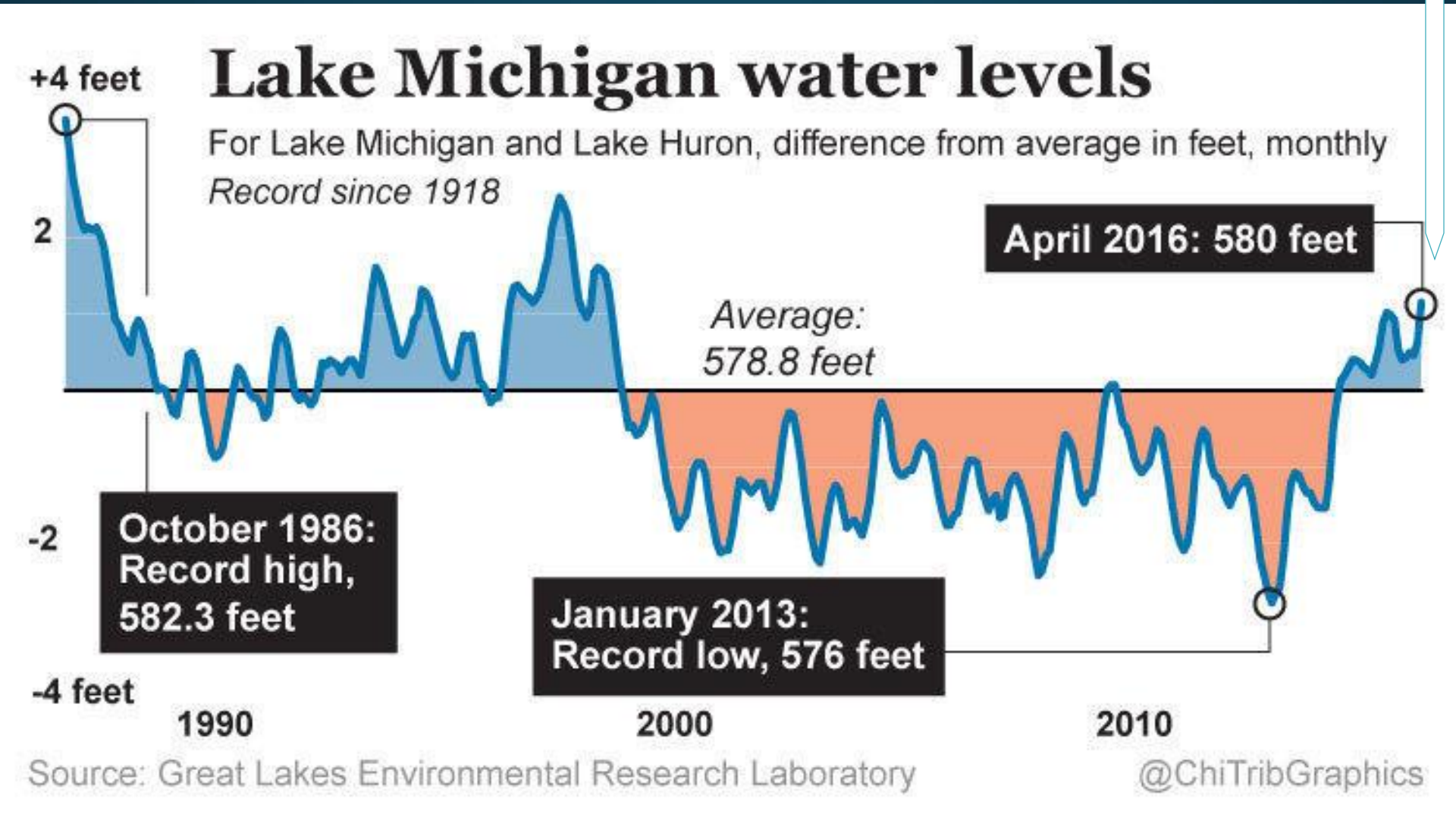
Clinch Park, Traverse City

Great Lakes Water Levels (1918 – 2019)



Water Levels Recent History

Aug 2, 2019: 581.86 feet



Water Levels Are High Again

Especially Lake Superior

- April 2019: Just 3-inches below all-time high (602.11 feet)
- Expected to meet or exceed record high in June, July and August

US Corps Engineers

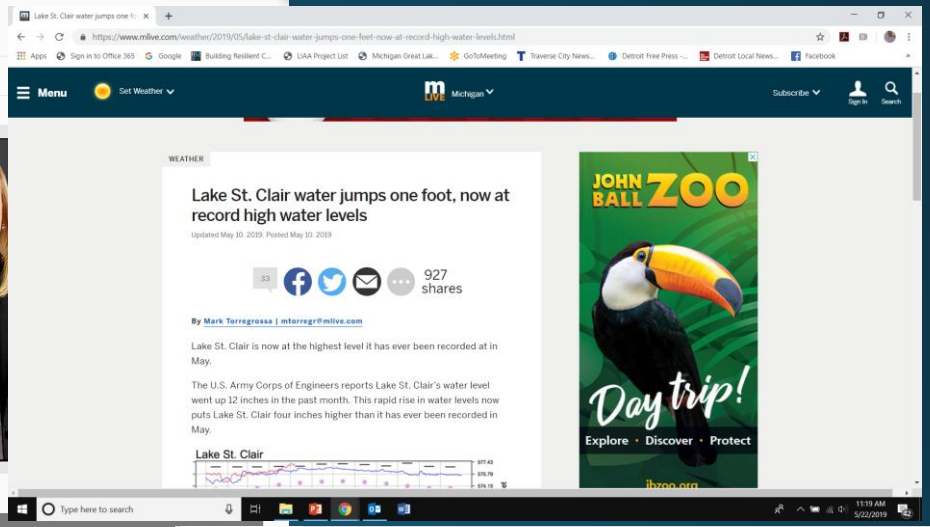
Great Lakes water levels surge; some record highs predicted

Leonard N. Fleming, The Detroit News Published 2:54 p.m. ET May 6, 2019 | Updated 9:01 a.m. ET May 7, 2019

CONNECT TWEET LINKEDIN COMMENT EMAIL MORE

A U.S. Army Corps of Engineers report released Monday says the lakes have been rising steadily for several years and are getting an extra boost as winter's melting snow mingles with recent heavy rainfall. *(Photo: John L. Russell, Special to the Detroit News/John L. Russell)*

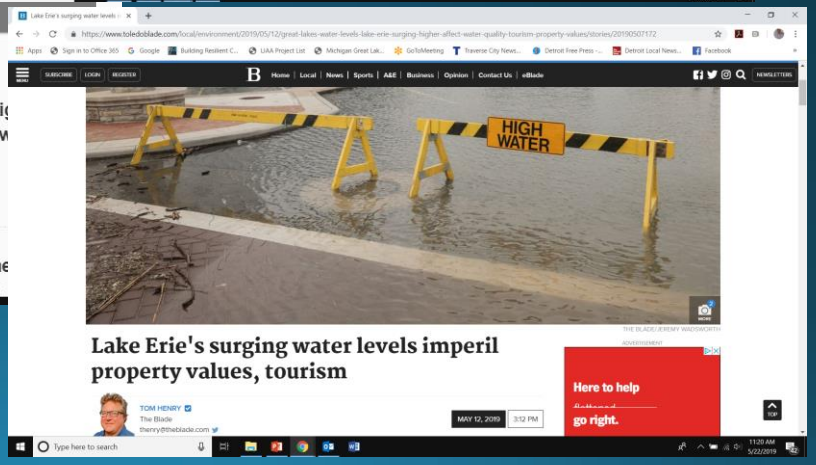
Water levels will surge to record highs in some areas of the Great Lakes over the next



MORE STORIES

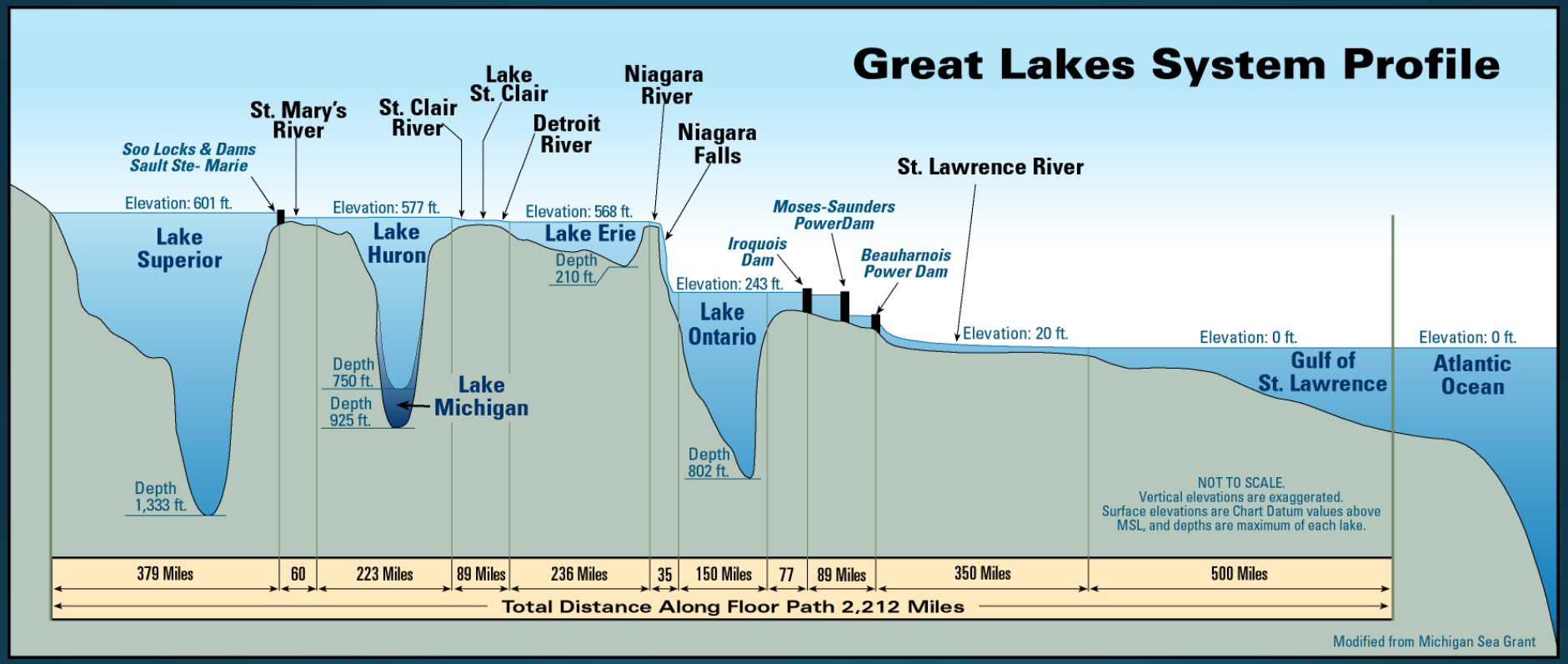
Detroit's LED streetlig
going dark after a few
May 7, 2019, 8:03 a.m.

Meatsplainer: How ne
plant-based burgers



Detroit News – May 6th 2019

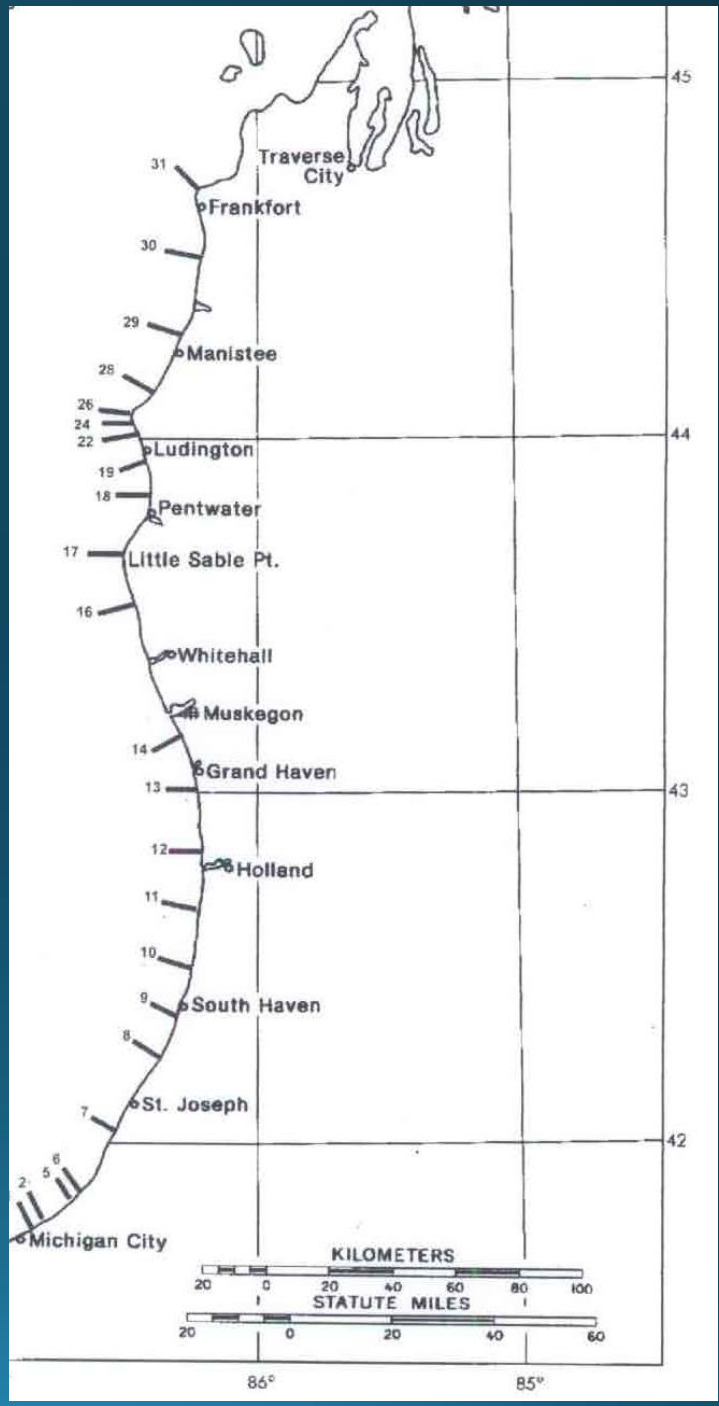
Great Lakes Water System
It starts in Lake Superior



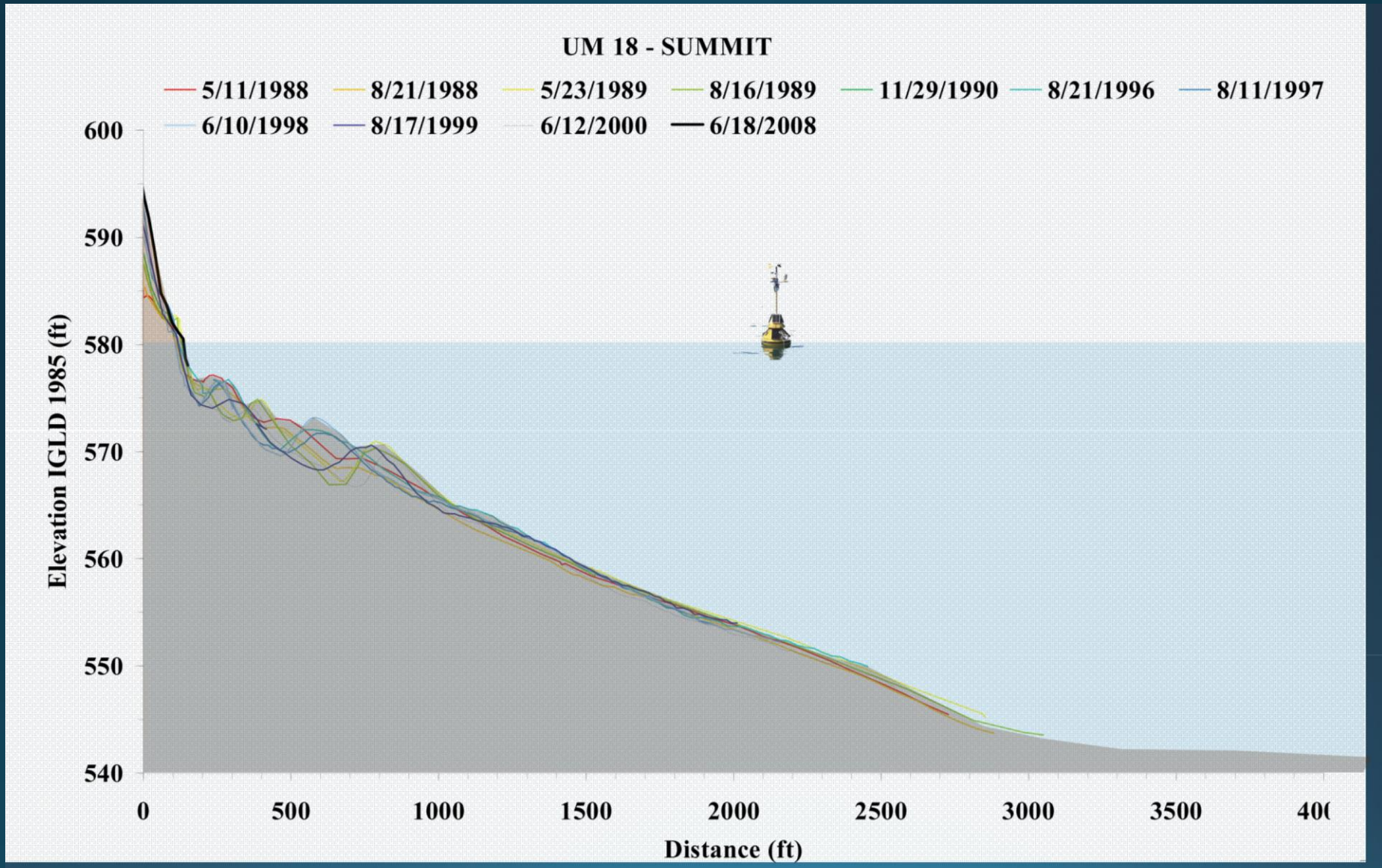
Graphic: Ohio Department of Natural Resources

Historic Survey Data

- 45 Survey Sites
- 31 on Lake Michigan
- 1988-2008 (periodically)
- Primarily MDEQ funded
- Referenced to known bench marks (vertically and horizontally)



Sample Survey Data



Summit Township Park, Mason County

Lake Michigan Beach in 1988

Summit Township Park, Mason County

Lake Michigan Beach in 1988

Chikaming Township Park, Berrien County

Lake Michigan Beach in 1988

Ludington - North

Lake Michigan Beach in 1988

Buttersville Park - Ludington South

Ludington (Juanita Street): 1989

Ludington (Juanita Street): 1989

Ludington (Juanita Street): 2008 and 2019

Summit Township Park: 1989 & 2008

Lake Michigan Beach in 1988

Near Michigan/Indiana State Line

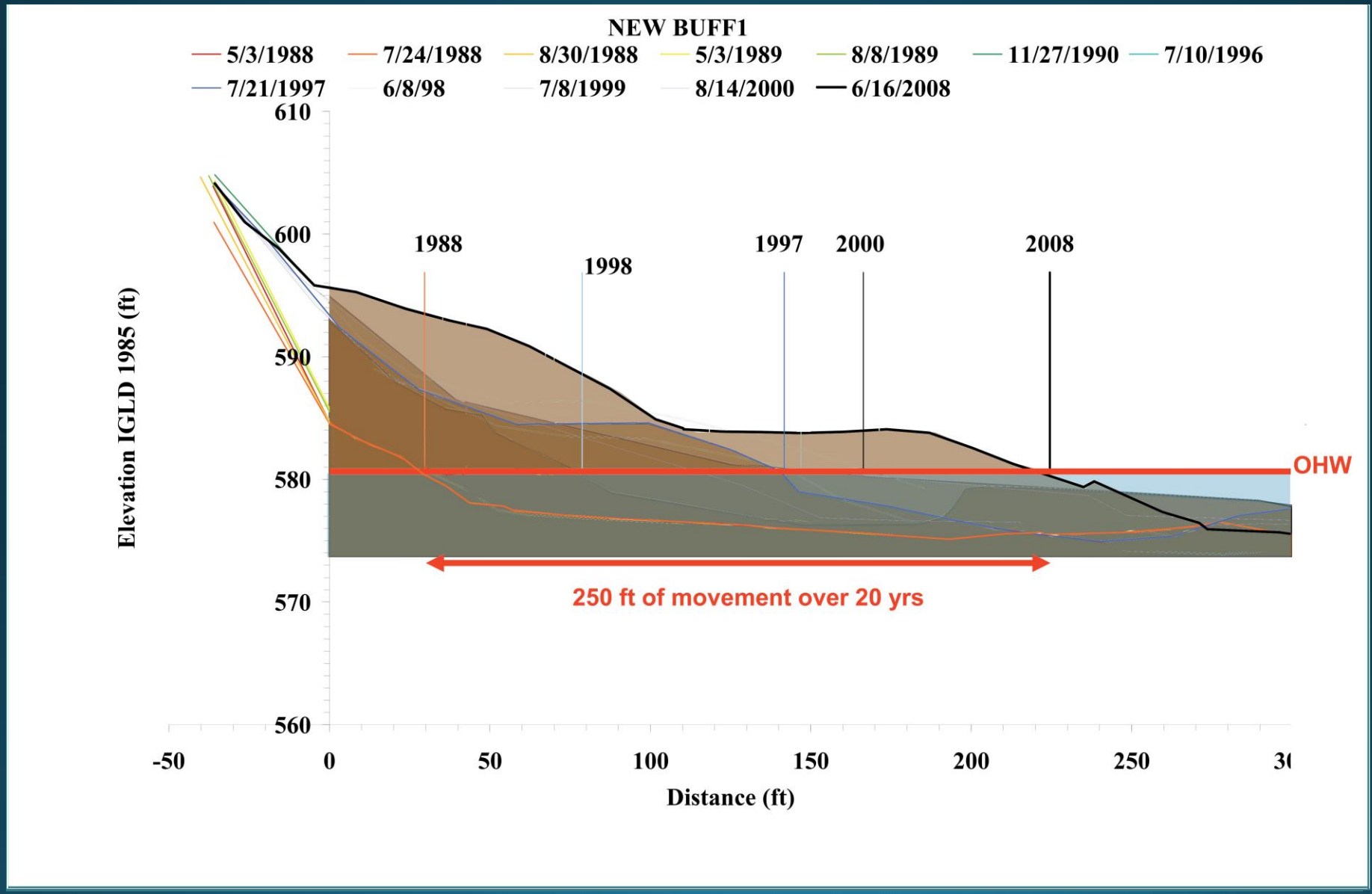
Lake Michigan Beach in 2008

Near Michigan/Indiana State Line

Lake Michigan Beach in 2018

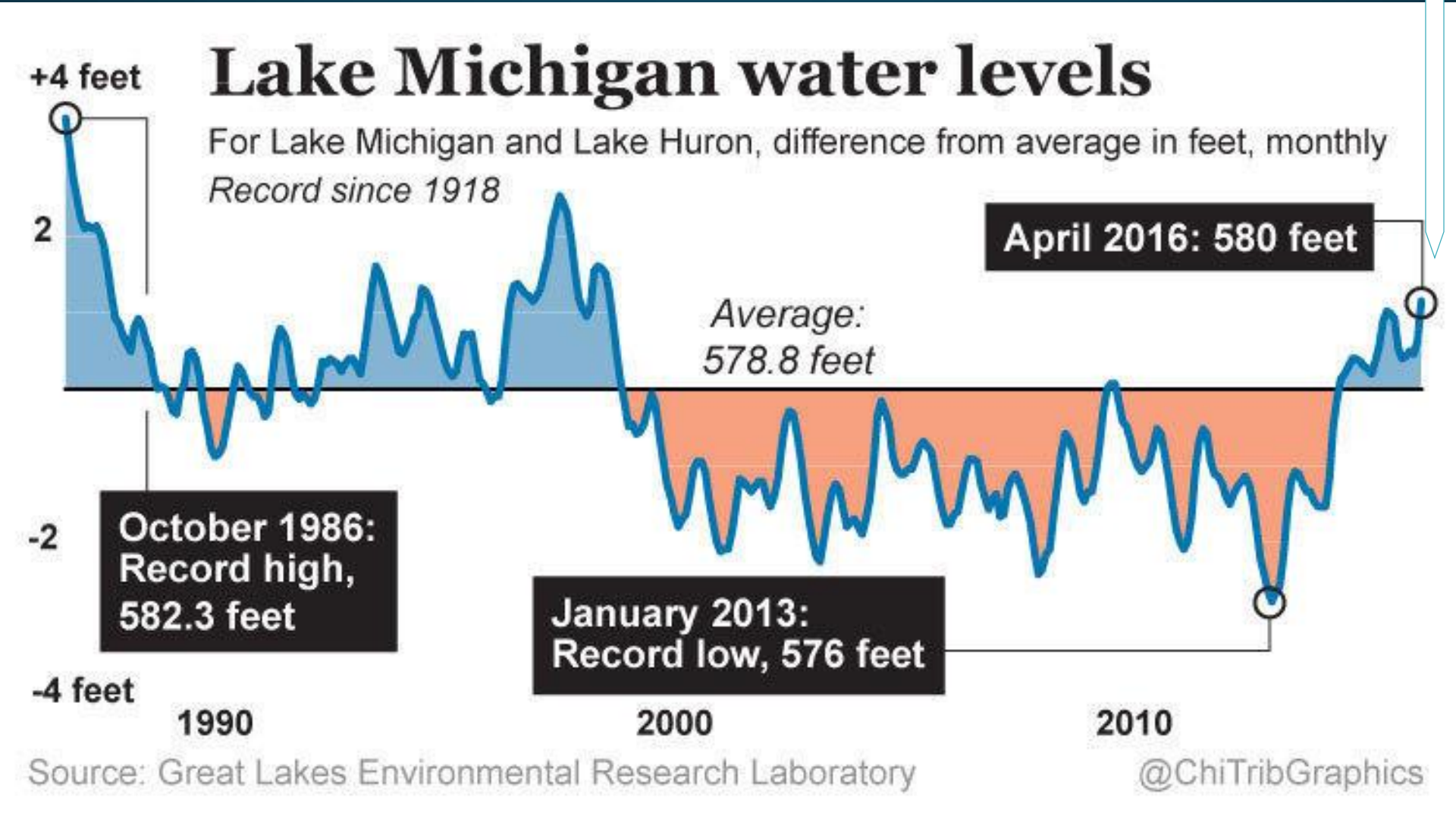
Near Michigan/Indiana State Line

New Buffalo, Michigan – Historical Beach Profile



Water Levels

May 21, 2019: 580.35 feet

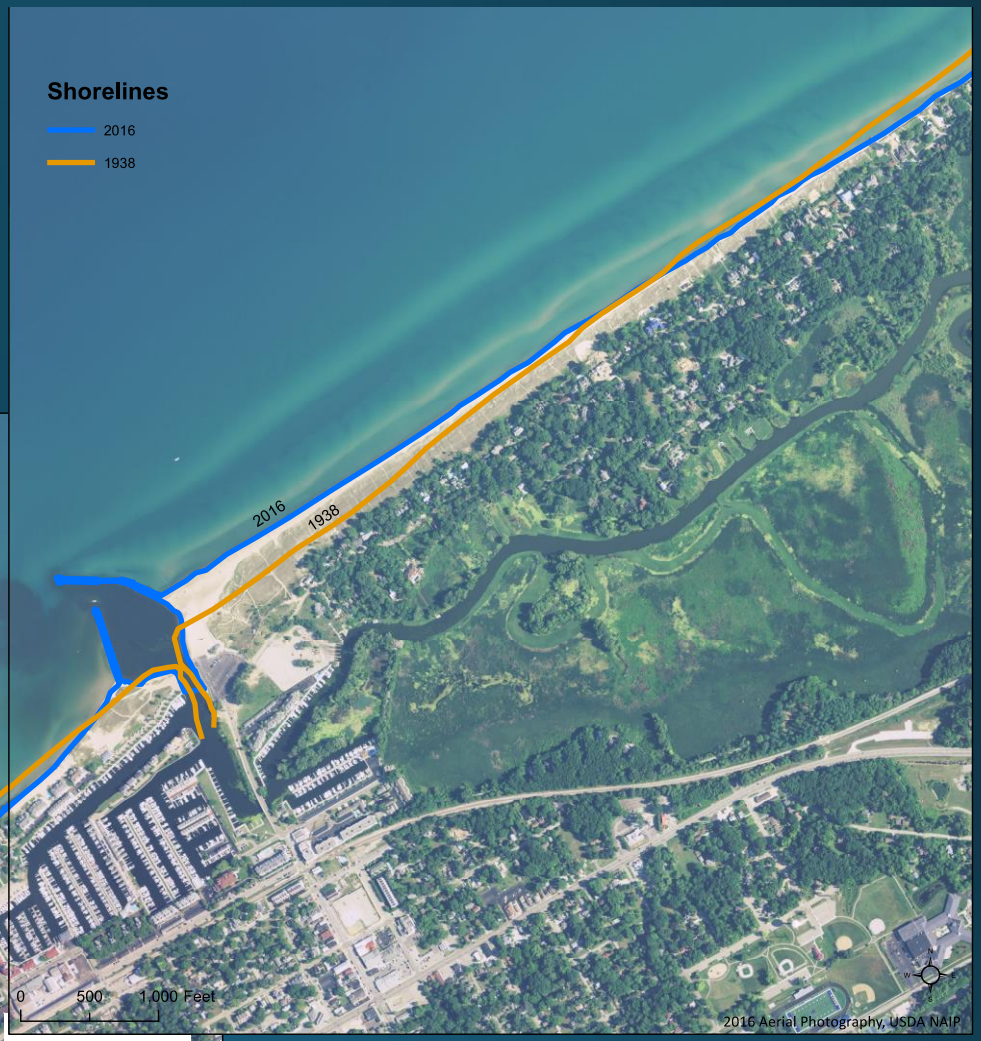


Arial Photo: 1998

Water level very close to 580.5 ft.

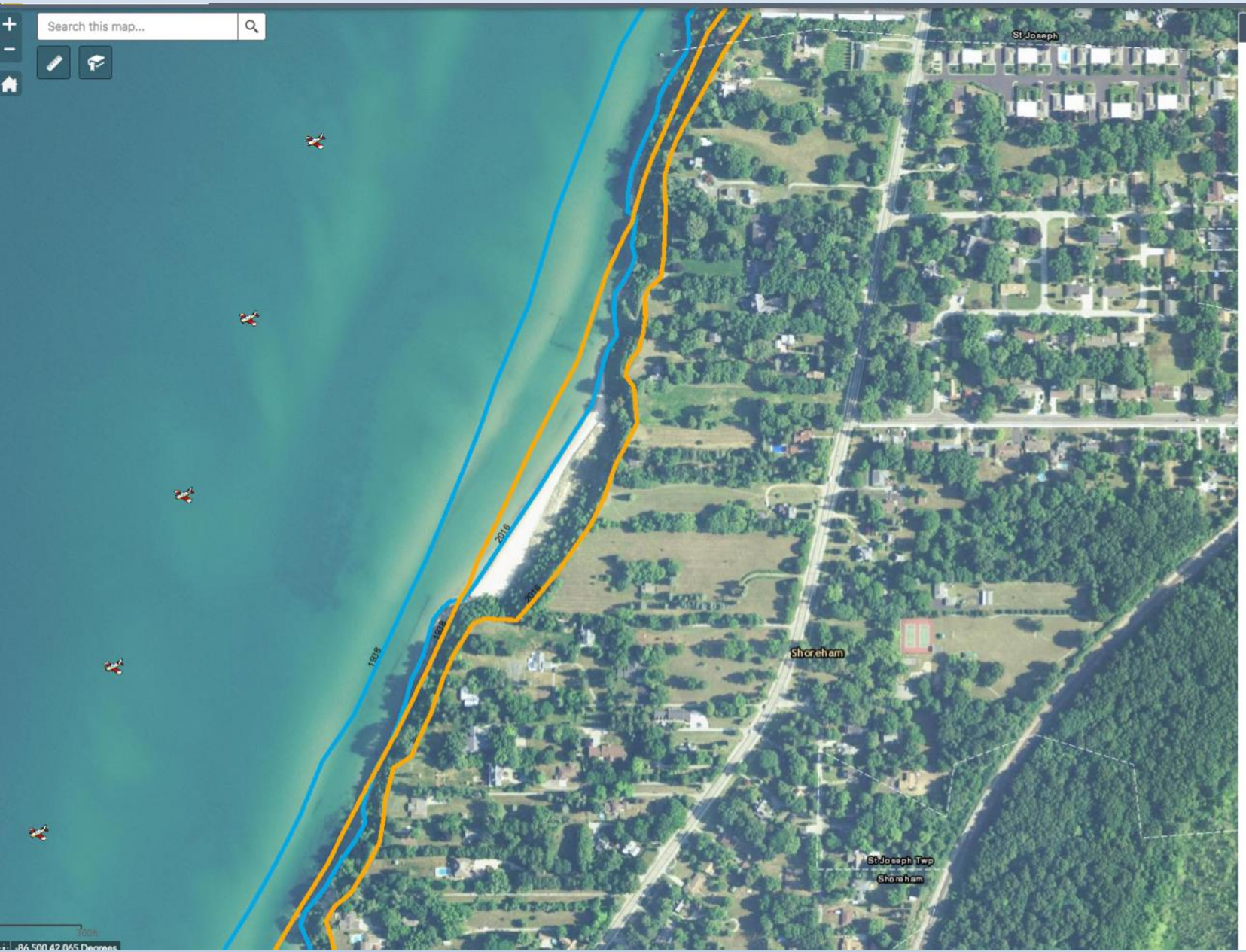
Arial Photo: 2008

The 80 Year "Look"



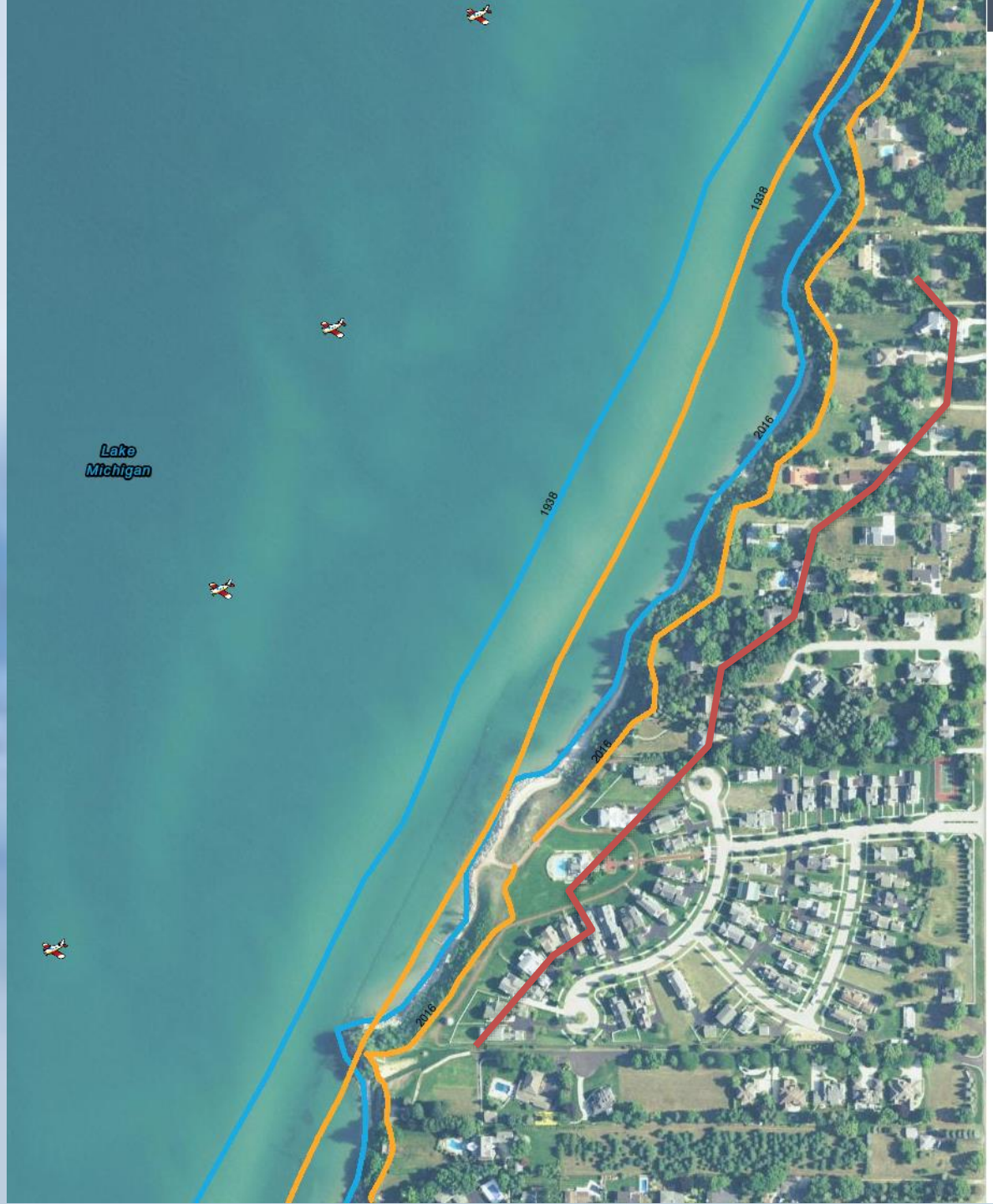
Great Lakes Research Center
Michigan Technological University

Produced at the Geospatial Research Facility, Great Lakes Research Center, Michigan Technological University 12/19/2017



Great Lakes Research Center
Michigan Technological University

Great Lakes Research Center
Michigan Technological University



Legend

2015 Coastal Photos

Oblique Photography

1938 (Water Elev: 57

1938 Shoreline

1938 Bluffline

2016 (Water Elev: 58

2016 Shoreline

2016 Bluffline

Great Lakes Research Center
Michigan Technological University

Great Lakes Research Center
Michigan Technological University

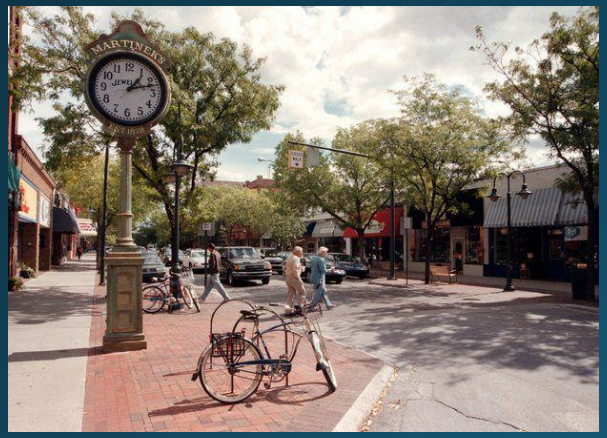
Beaches Change Quickly…And Will Forever Continue to Do So

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

St Joseph, MI

Placemaking for Community Sustainability

Presented by Zach Vega



Source: MLive

Source: Michigan Municipal League

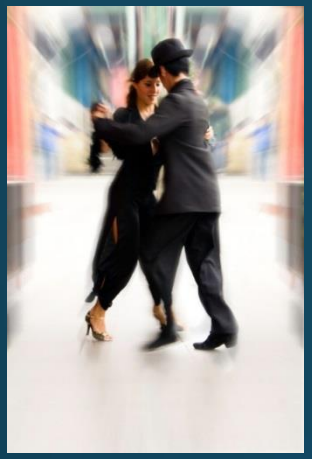
Source: Michigan Municipal League

What is Placemaking?

*Placemaking is the process of creating **quality places** where people want to live, work, play, shop, learn or visit*.

The Second Globe Theatre in Auckland, New Zealand

WHY must we do Placemaking?
People want more urban choices than presently available!



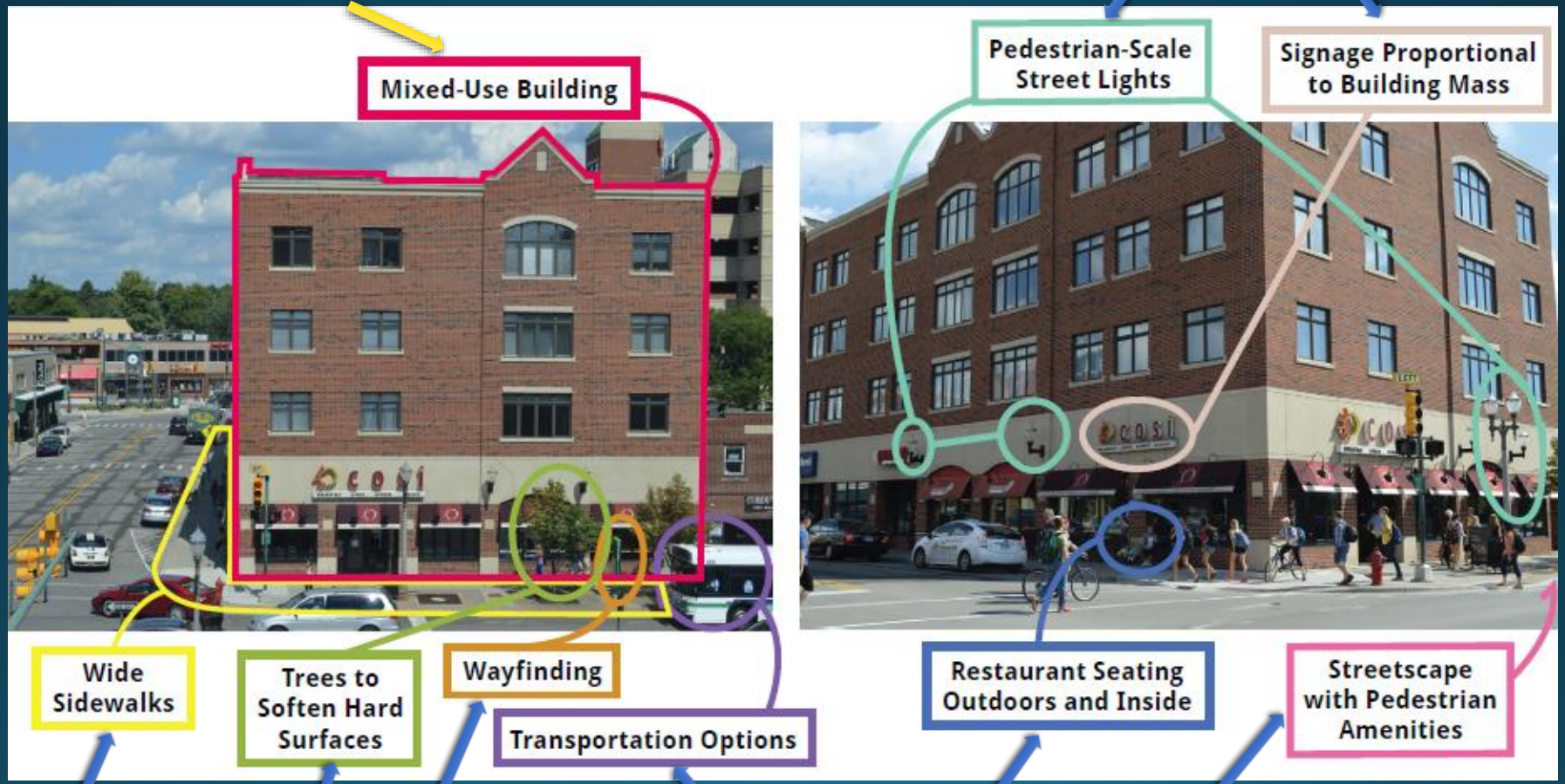
They want more choices in **housing** and **transportation**; they want more variety in entertainment, **cultural** offerings, **green space**, and recreation; they want more **diversity** in ages, races, sexual orientation and cultural heritage; they want Quality Places with *allure*, *pizzaz* and *interest*.

What are Quality Places?

Quality places are places with good form, function and social

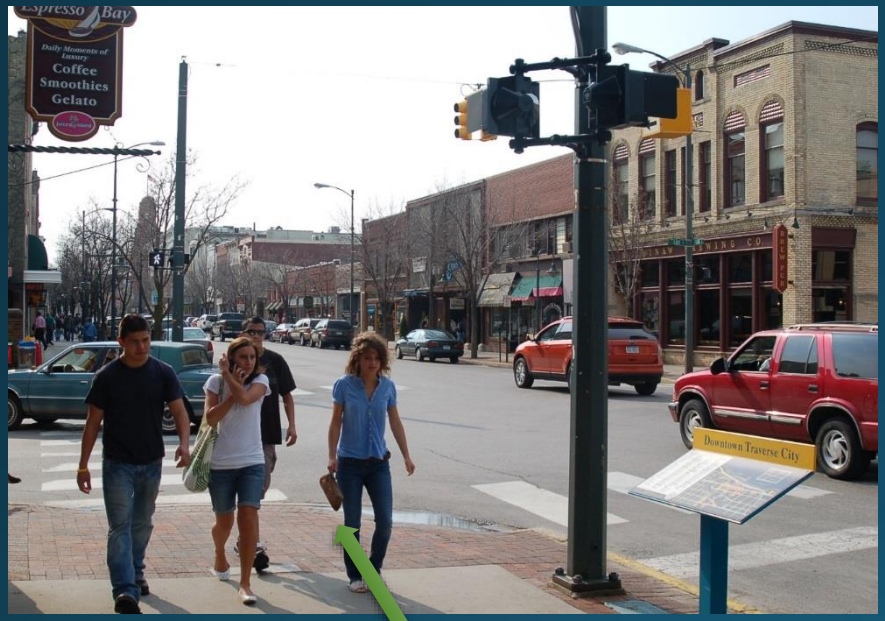
Photos by the Michigan Municipal League/www.mml.org (left); Allen Market P

Characteristics of a Quality Urban Place



Photos by the MSU Land Policy Institute

Comparison of Walkable Urban with Auto-oriented Sub-urban



Wide sidewalks
Narrow street
Projecting signs
Windows at eye level

Walkable

Auto-Oriented

Deep setbacks

Front parking

Large lots

Many driveways

Lots of pavement

No sidewalks (see paths from walkers)

Many large streetside signs

Wide street

Photos by Kurt H. Schindler, AICP, MSU Extension.

Placemaking Can Help Create Quality Places

So, how does Placemaking create quality places? How can a community go from being auto-dominated to being walkable and having other quality characteristics?

- Most change is ***incremental*** and takes place over a long period of time.
- Sometimes change is ***physical***, like projects that result in new buildings or infrastructure.
- Sometimes it is ***new activity*** in an existing place.
- Sometimes it is *both*.
- Often it is ***transformational*** as illustrated on the next three slides.

Photo by Steve Price, Urban Advantage.


Graphic by Steve Price, Urban Advantage.

Graphic by Steve Price, Urban Advantage.

Quality Places are Attractive to Business

- Businesses attracted to: good schools and access to amenities.
- Several quality places – downtown and at nodes along key corridors.
- Largest small towns in region need quality places.
- Start in the Downtown!

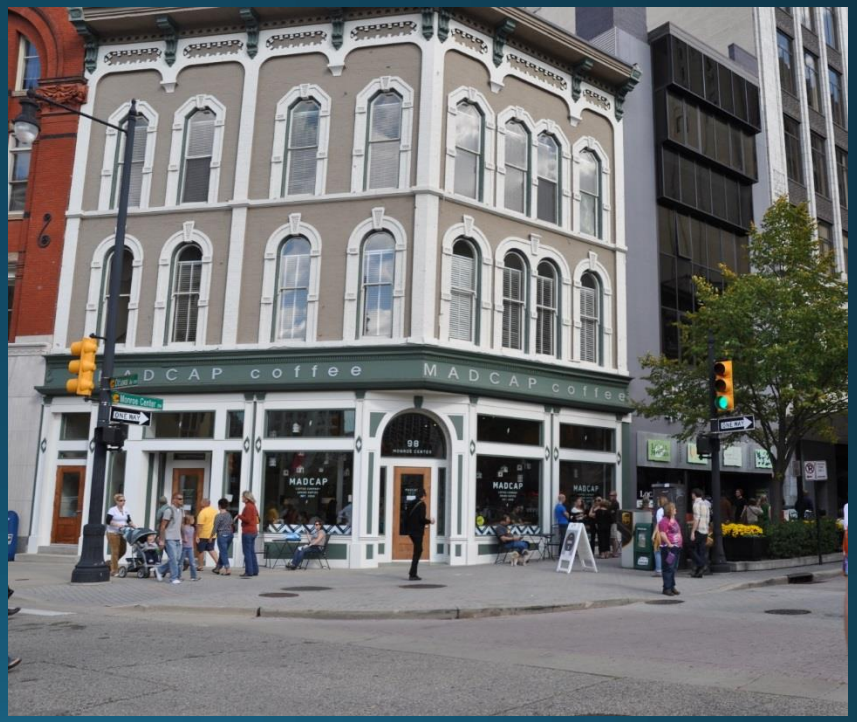


Photo by the Michigan Municipal League/www.mml.org.

Quality Places Improve Quality of Life for Everyone

- Placemaking is a low-risk proposition.
- New/improved trails/parks, community infrastructure, mass transit, destinations, etc. and more housing choices benefit everyone AND are good

Proper Physical Form

+

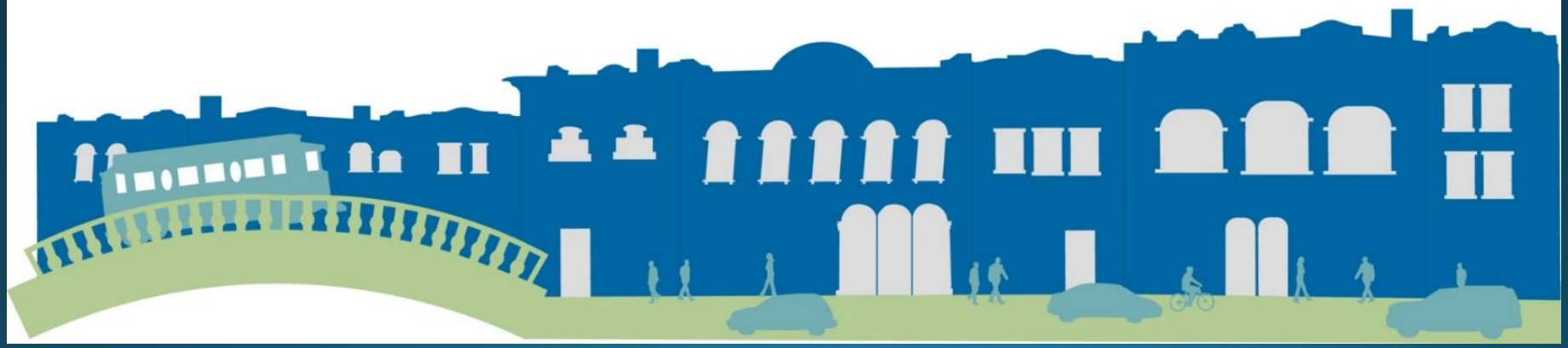
Proper Mix of Land Uses and Functions

+

Proper Mix of Social Opportunity

=

Quality Activities in QUALITY PLACES and a Strong Sense of Place



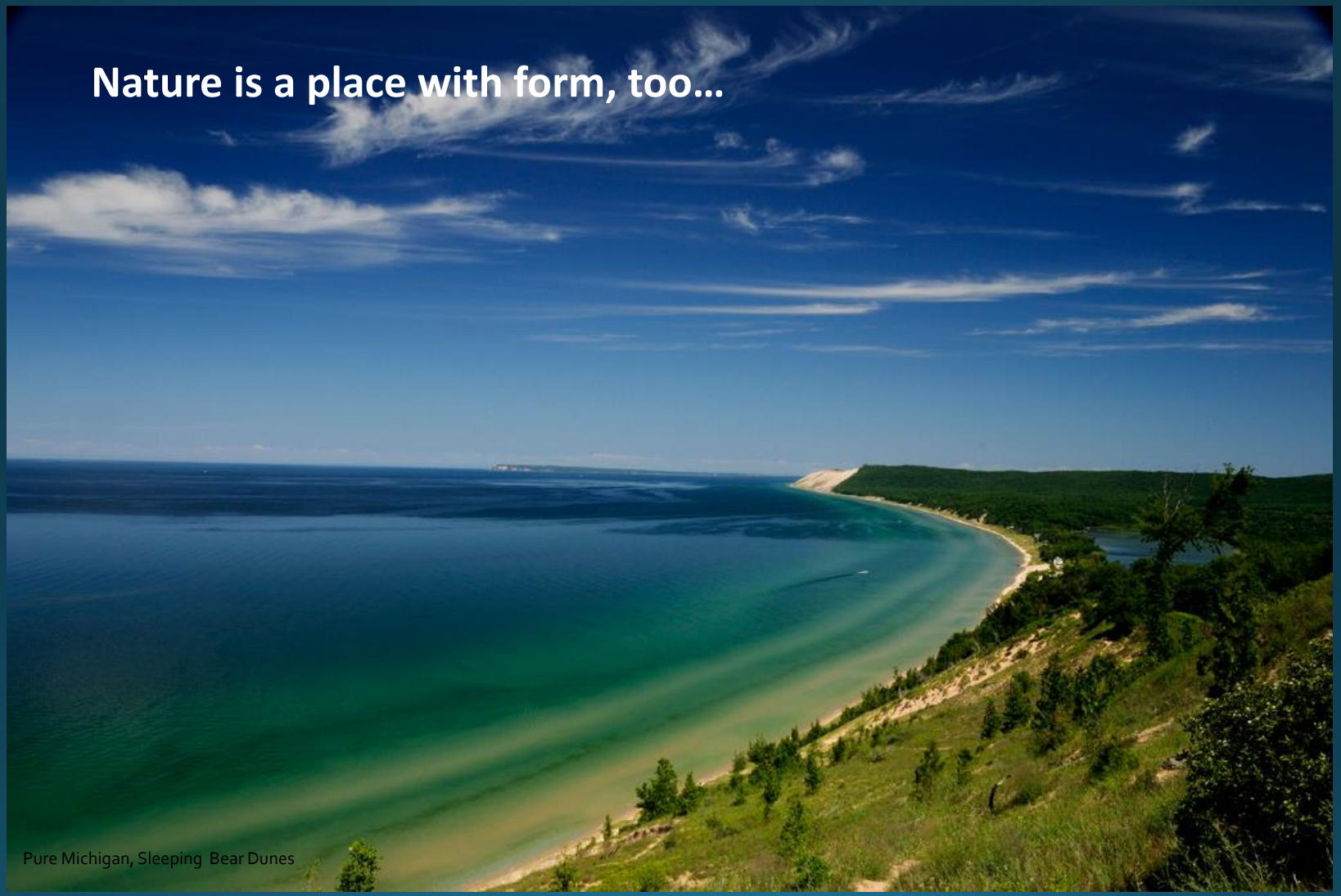
Tuckey, MSHDA

MML, Kalamazoo Mall

Good Form contains natural features…

Tischler, Mackinac Island

Nature is a place with form, too…



Pure Michigan, Sleeping Bear Dunes

Natural places and human activity combine to create Rural Form.

Tischler

Good Form leads to Activity…

MSHDA

Social Activity…

MSHDA

MSHDA

Programmed sport Activity…

MSHDA

MSHDA

MSHDA

MSHDA

Positive emotional response leads to…

Urban farming in Detroit

Connor Creek Greenway Trail

Playing jumprope in a park

Strong Sense of Place

The People – Place Connection…

Good Form…

…naturally sustains Activity…

…yields Positive Feelings

…and results in Economic Activity

Traverse City, MML

Quality Urban Places are….

Walkable & Bikeable

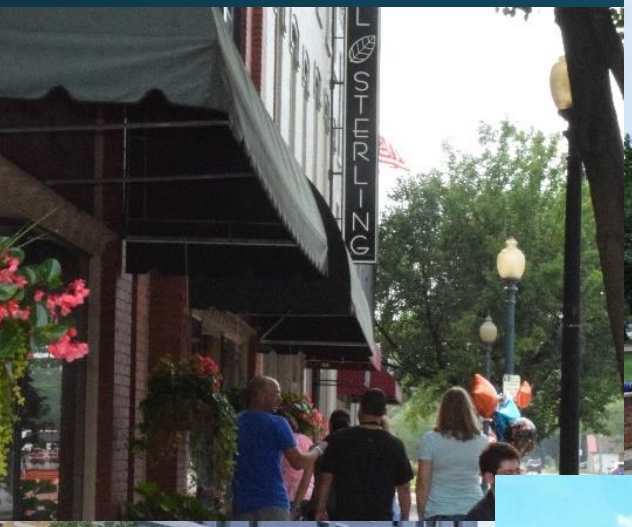
Pedestrian-Oriented

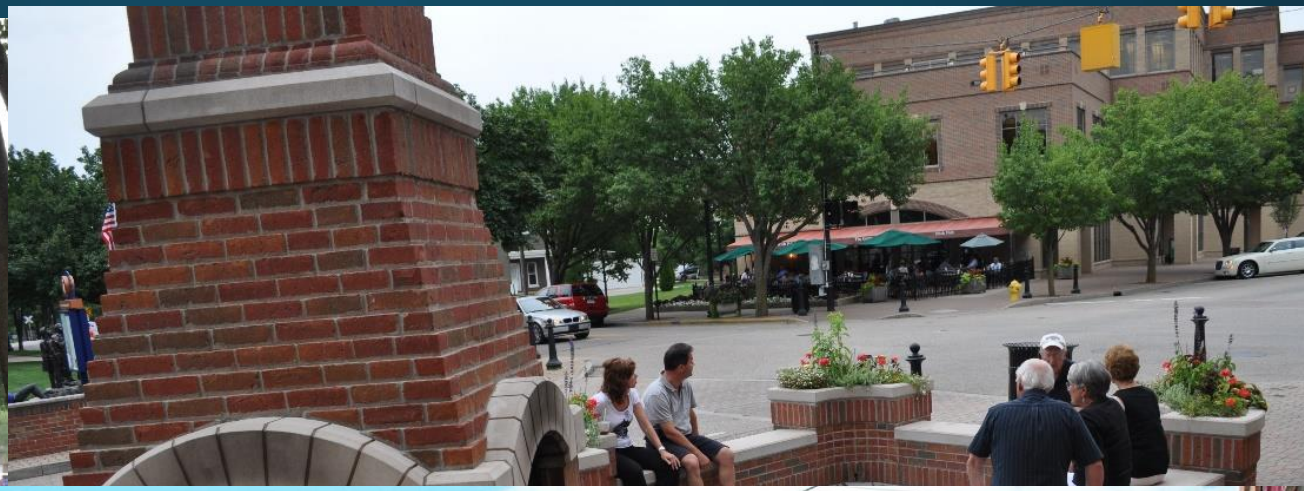
Mixed-Use

Transportation Friendly

Full of Housing Options

Photos by the Michigan Municipal League/ www.mml.org; Boyne City downtown (top right)





Photos by Michigan Municipal League, www.mml.org (top row); NCI and Dover, Kohl & Partners with Urban Advantage, 2013 (bottom left); MDOT (bottom right)

Photos by Michigan Municipal L

Placemaking helps meet the triple-bottom line

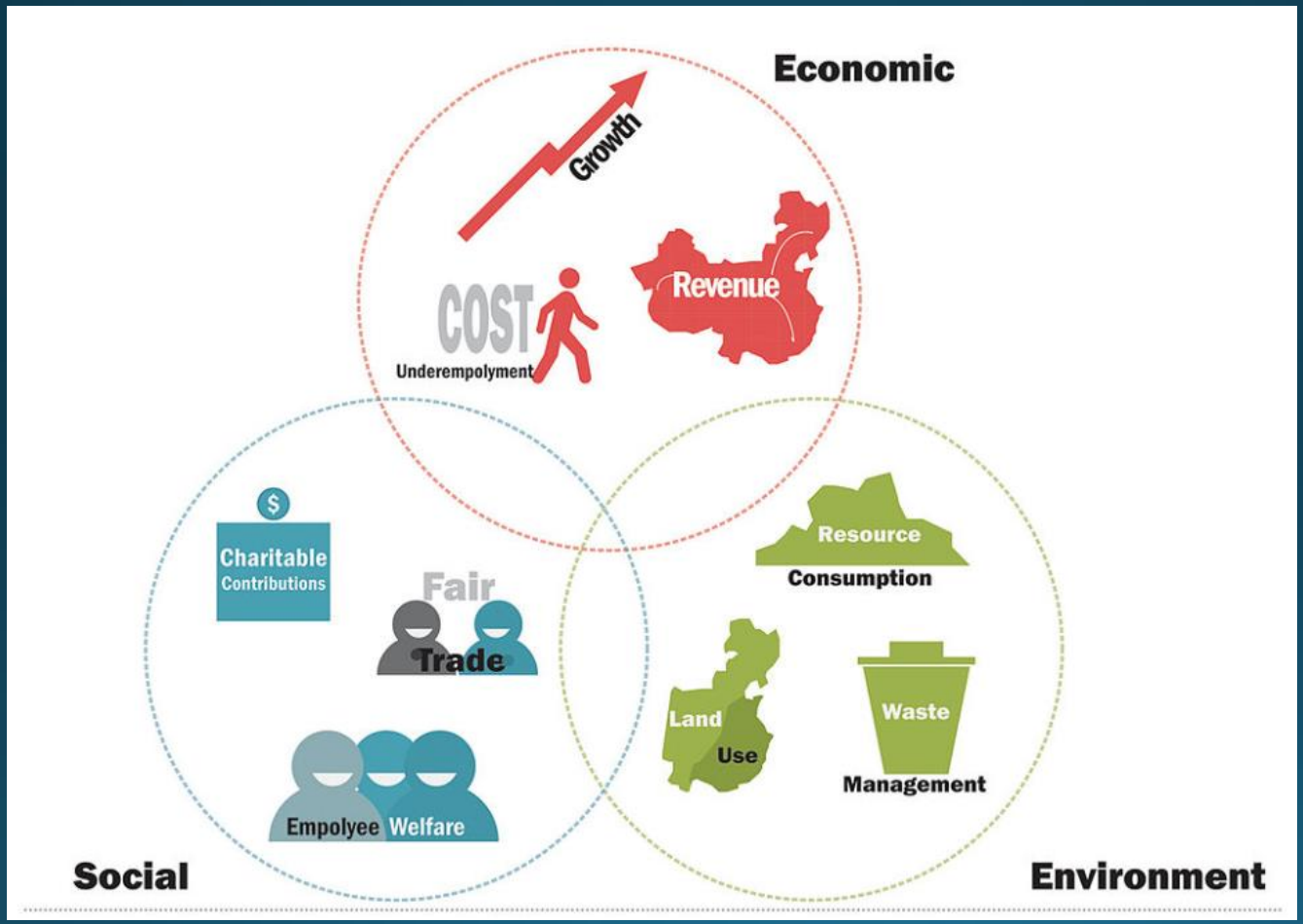


Photo: https://en.wikipedia.org/wiki/Triple_bottom_line#/media/File:Triple_Bottom_Line_graphic.jpg

Credits

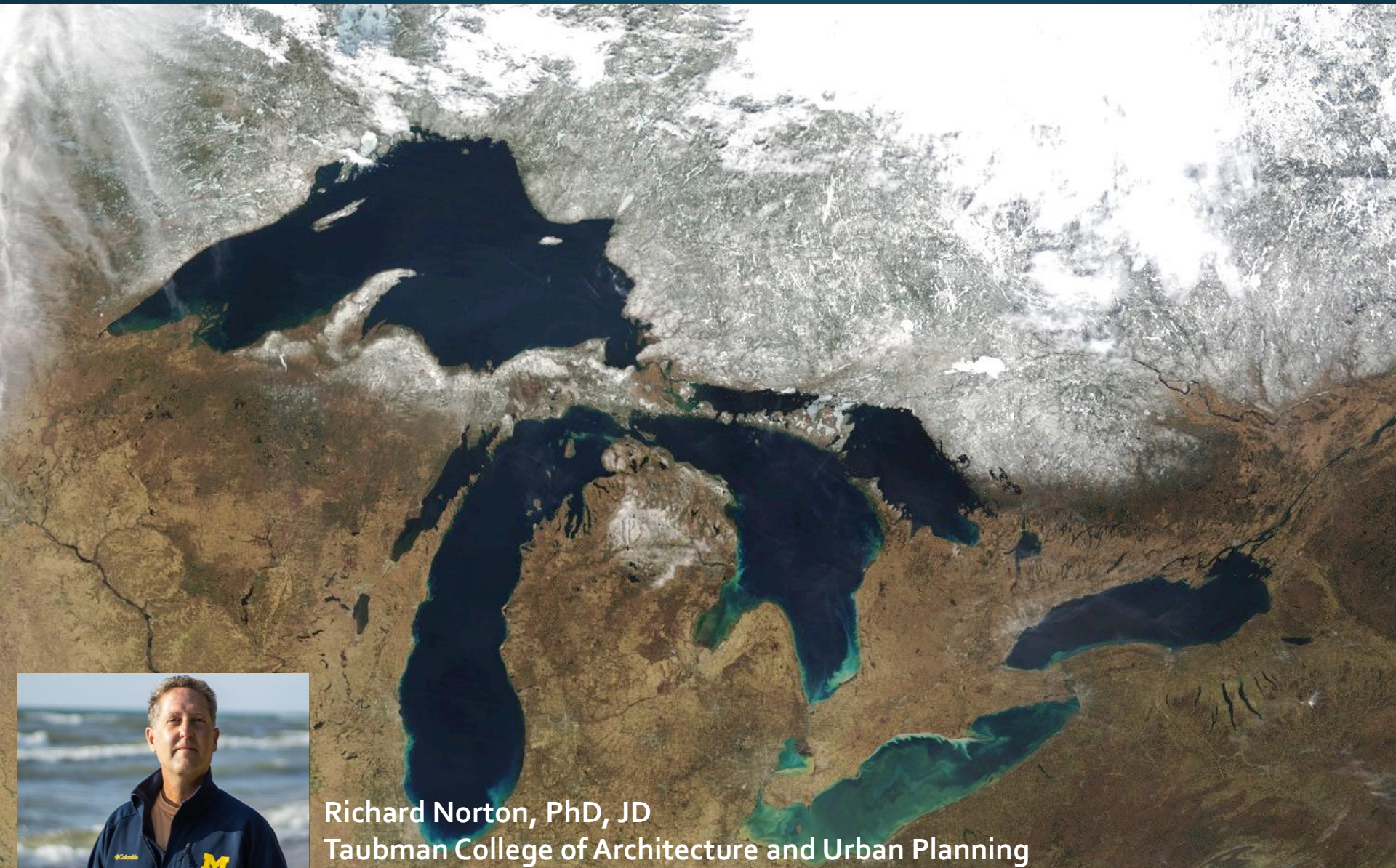
Content provided by:

- MSU Land Policy Institute
  - http://www.canr.msu.edu/landpolicy/
- Michigan Economic Development Corporation
  - https://www.miplace.org/
- Based on Placemaking Curriculum 5.0, Dec. 2015
- Based on Placemaking Guidebook, Dec. 2015

Activity 2

Mapping assets and opportunities

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."

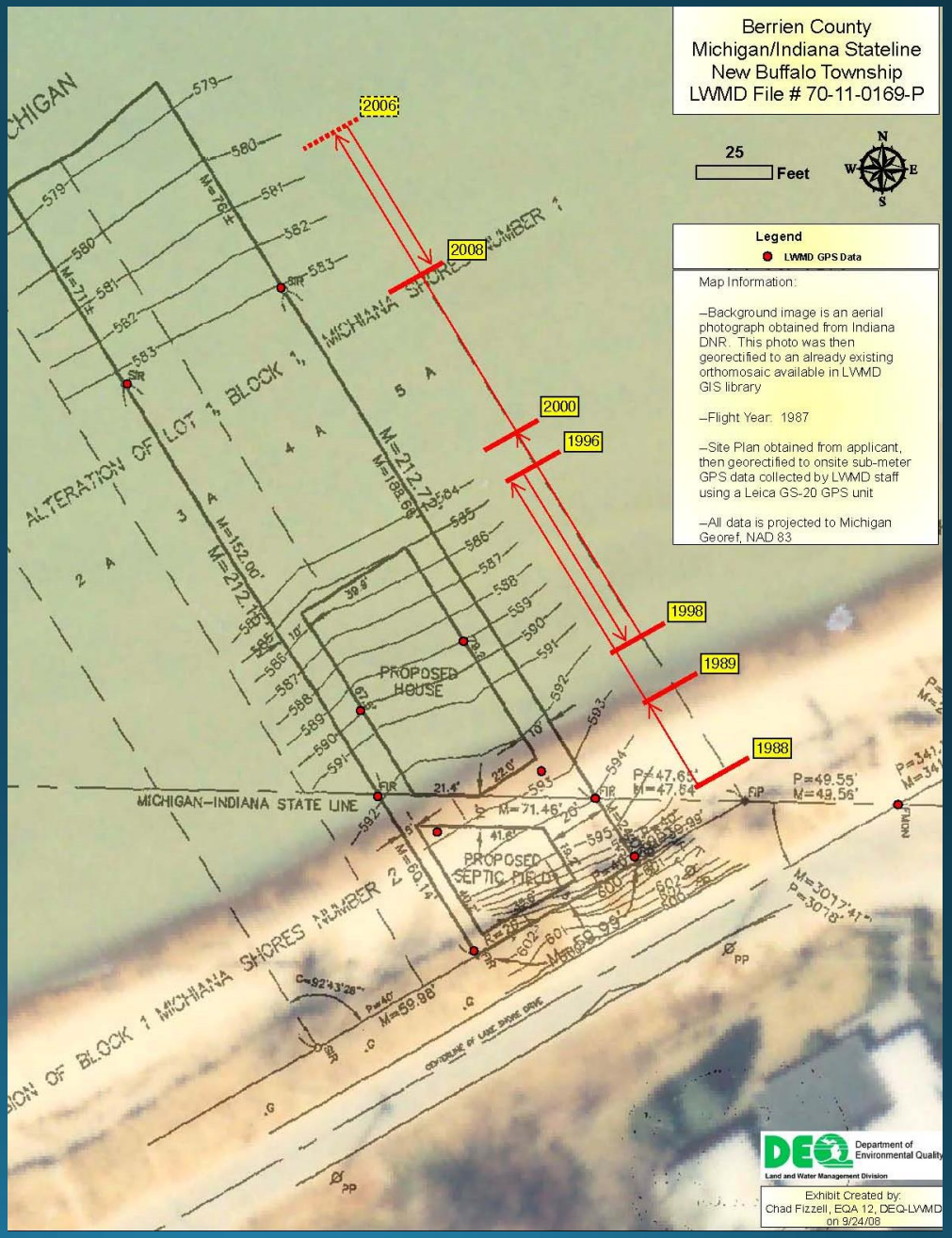
"Public Trust Beach"

Scientific & Legal Uncertainties

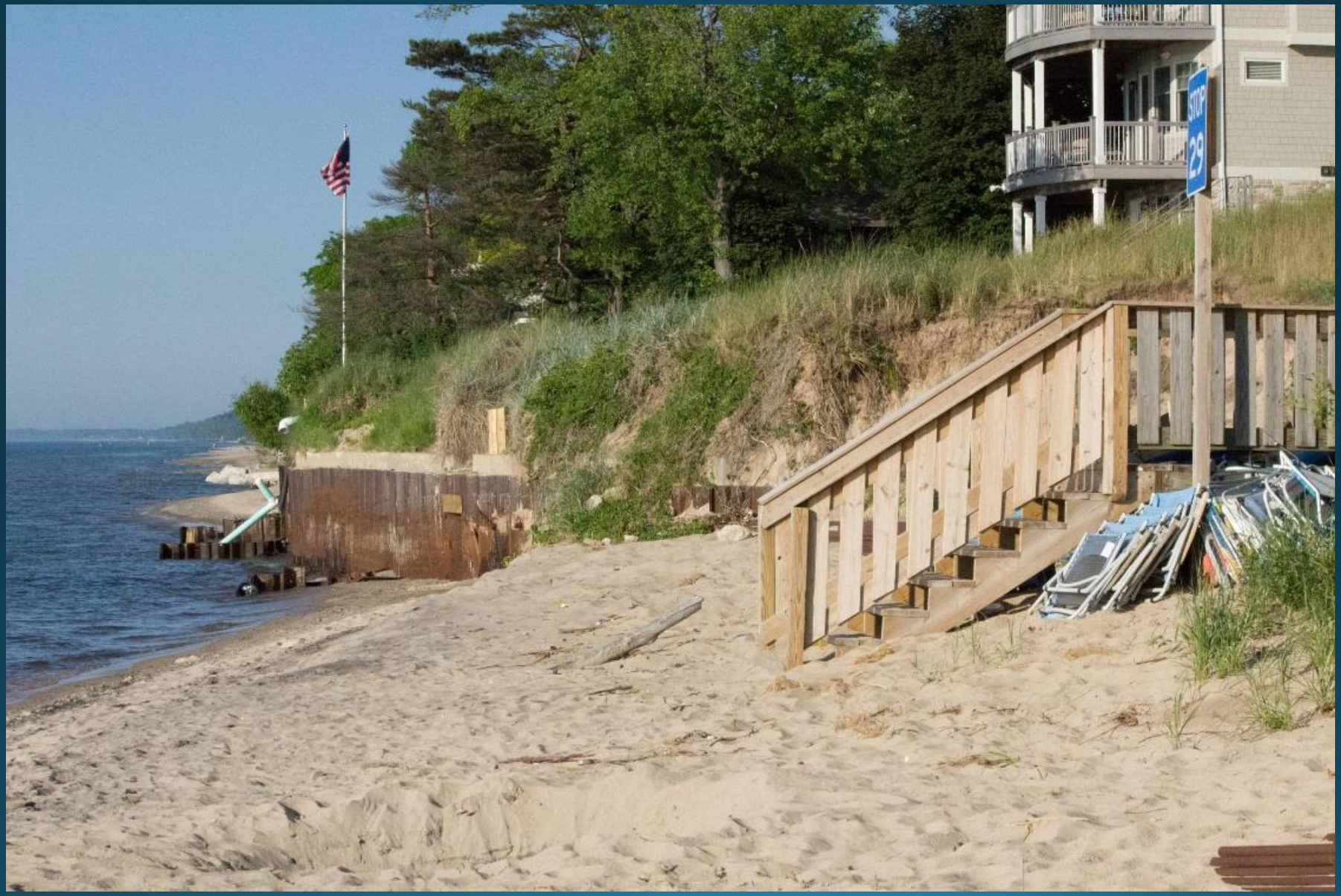
Two Ordinary High Water Marks:

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)

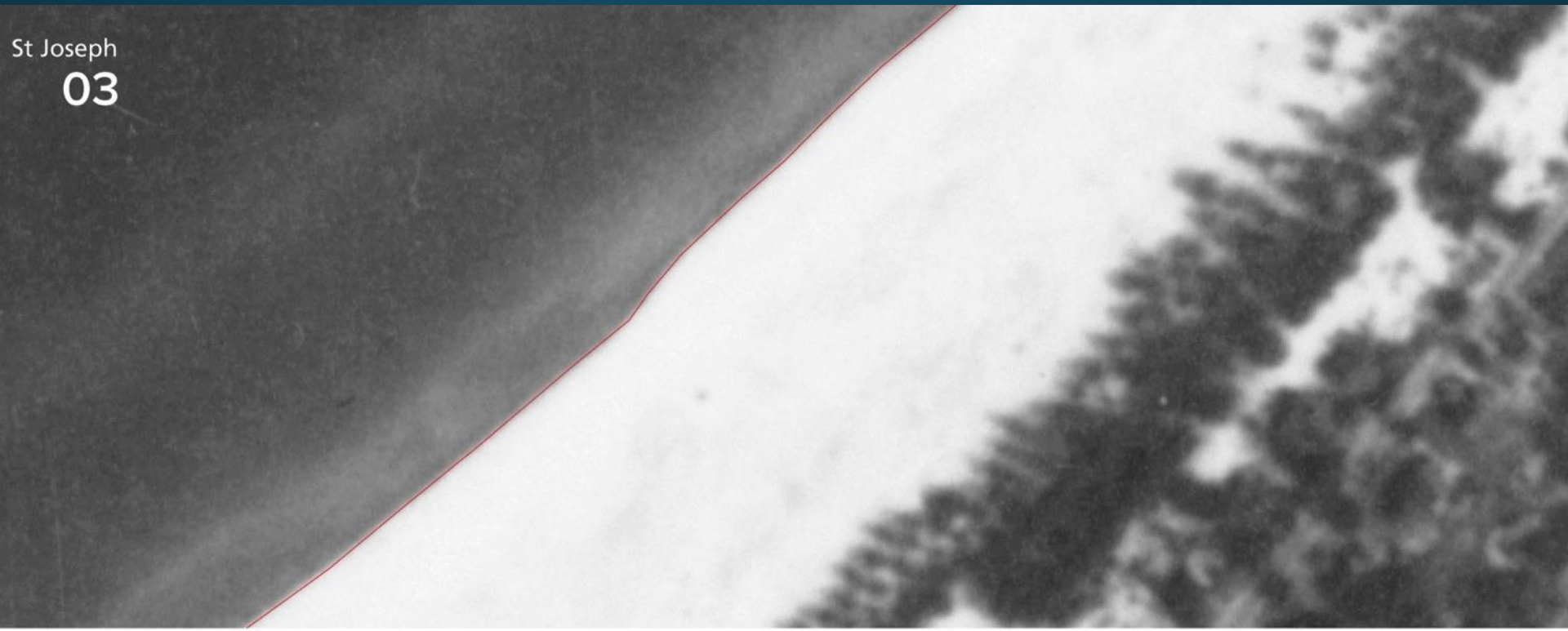


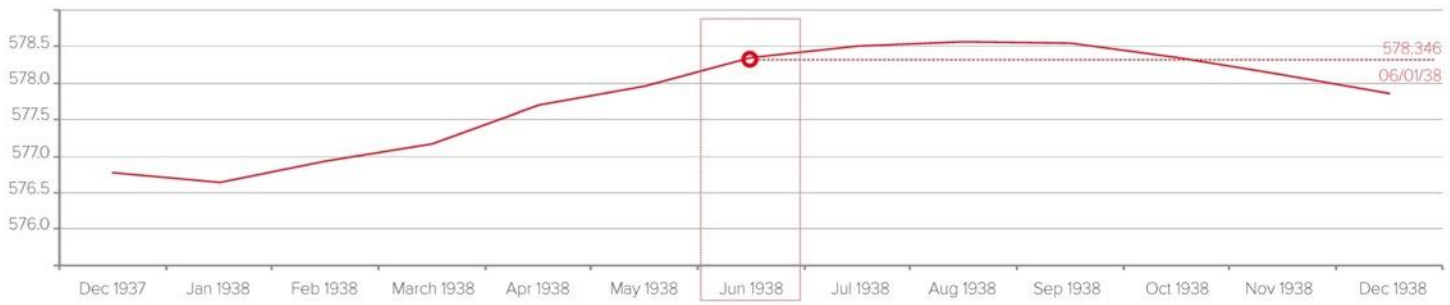
Scientific & Legal Uncertainties



Potential Consequences of No Local Control

St Joseph
03

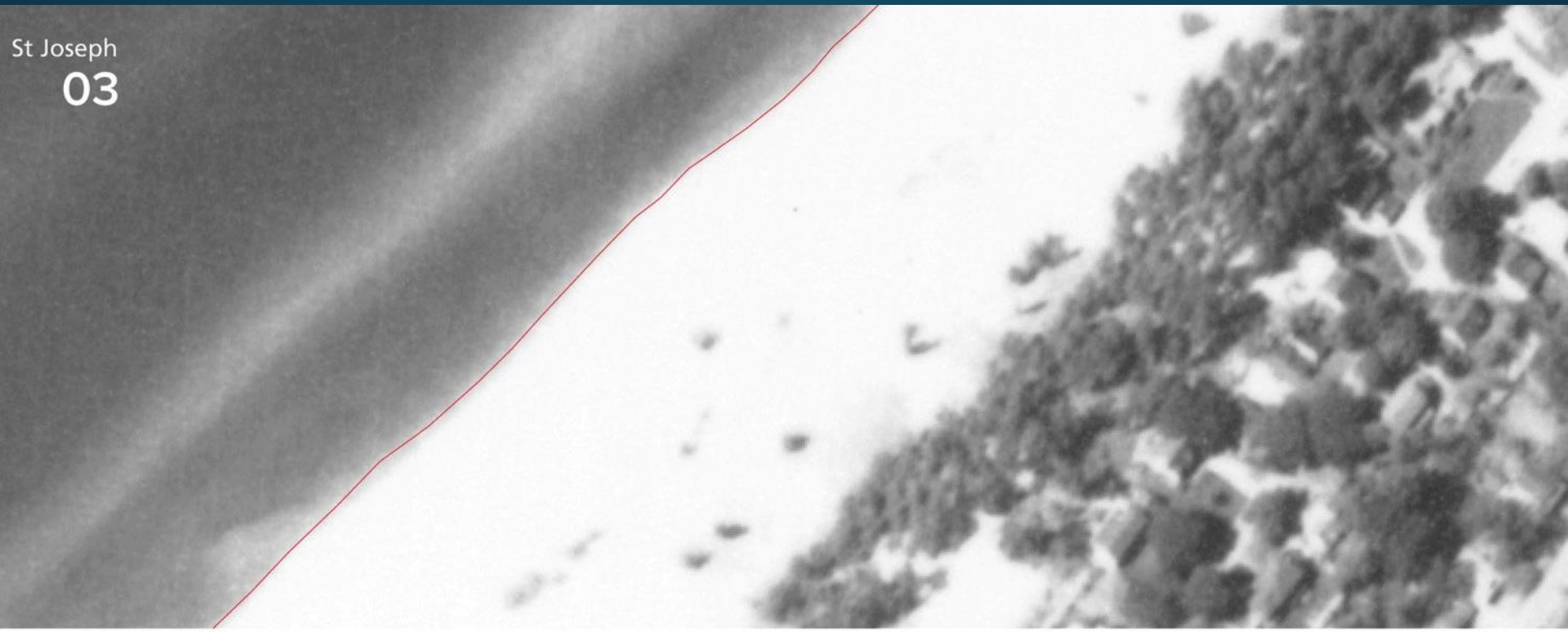




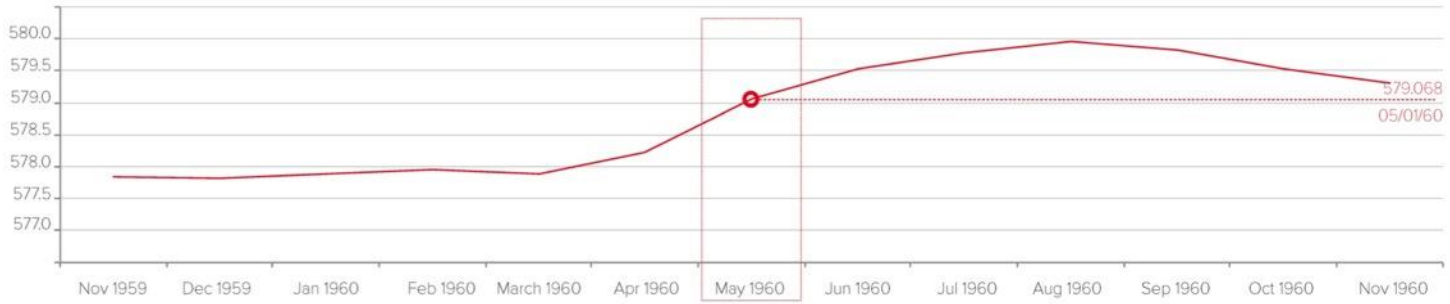
JUNE 1938
AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and after the survey

St Joseph
03



1960

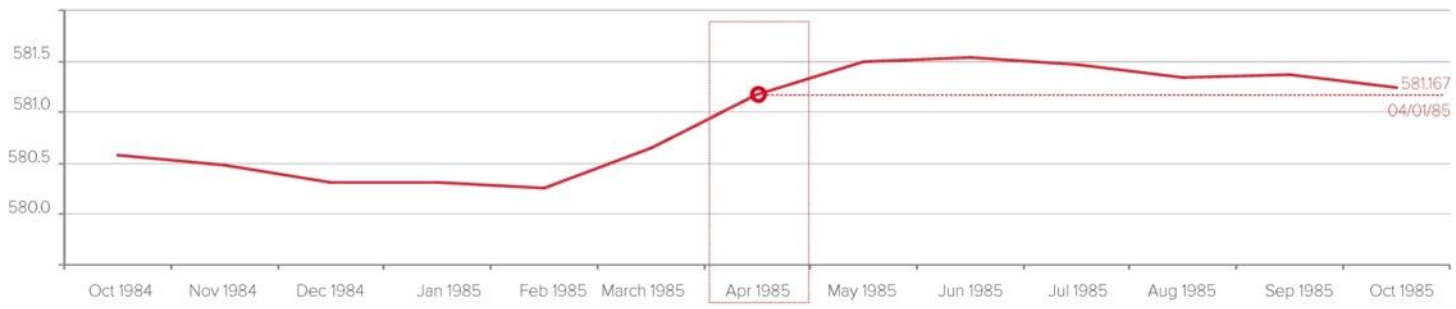


MAY 1960
AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and after the survey

St Joseph
03

1985

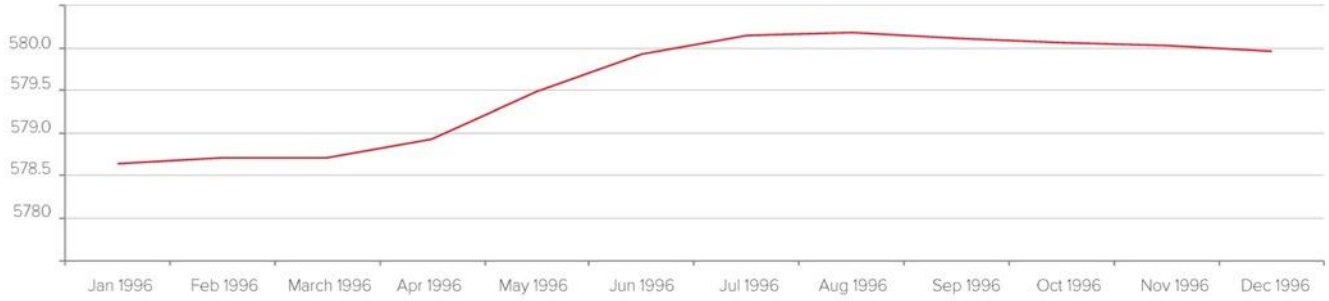


APRIL 1985
AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03

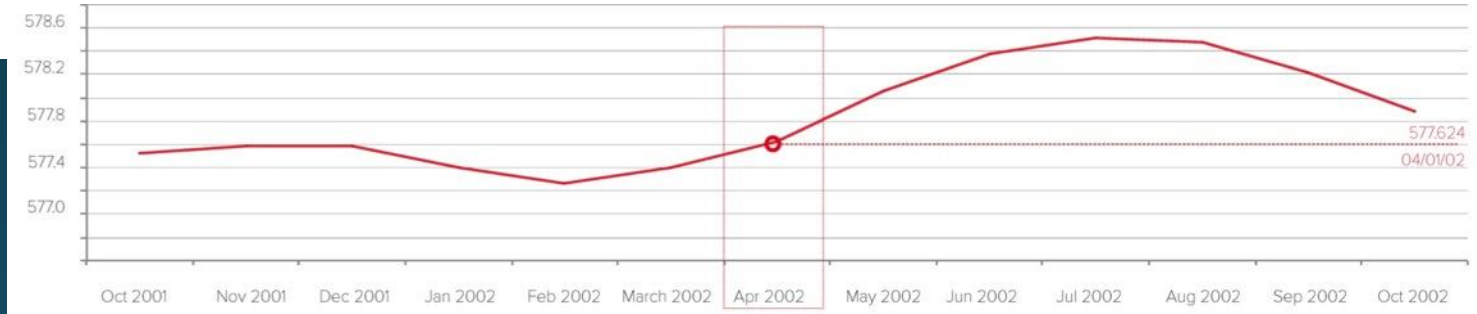
1996



1996 (12530195)
AERIAL PHOTO

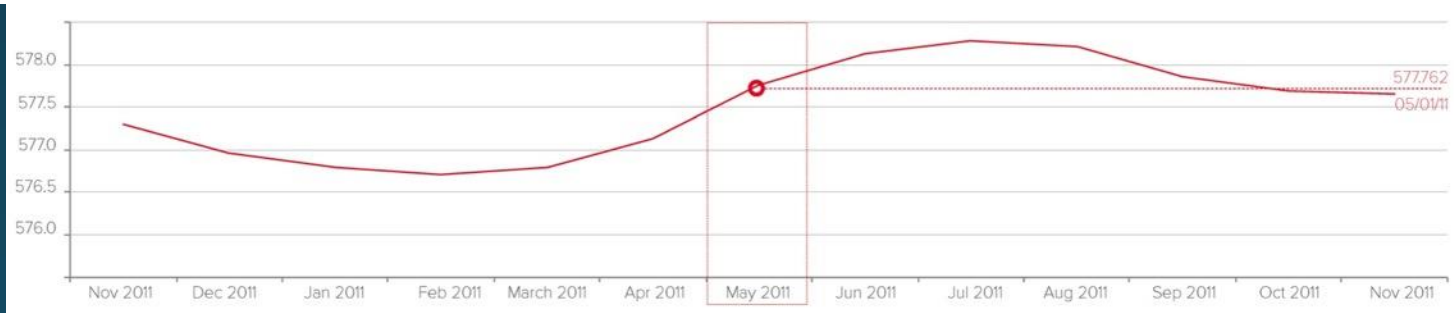
GRAPH: LAKE LEVELS
during the year

St Joseph
03



APRIL 2002
AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey



MAY 2011
AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and after the survey

St Joseph
03

June 1938

future scenario:
projected conditions 1938

St Joseph
03

May 1960

future scenario:
projected conditions 1960

St Joseph
03

April 1985

future scenario:
projected conditions 1985

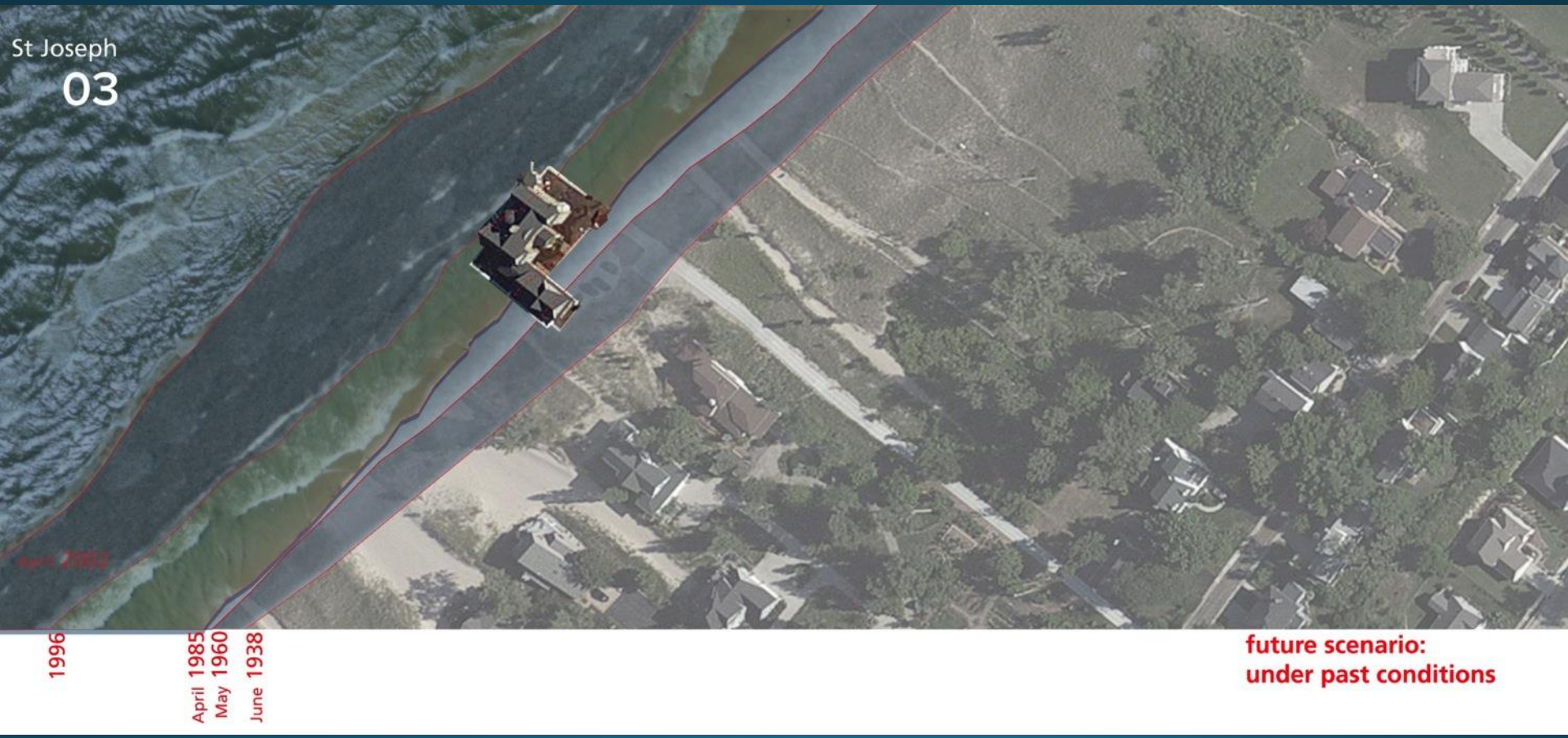
St Joseph
03

1996

future scenario:
projected conditions 1996

future scenario:
projected conditions2002

Potential Consequences of No Local Control

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WEEK IN REVIEW


WSJM FM 94.9
News • Talk • Sports
WEEK IN REVIEW

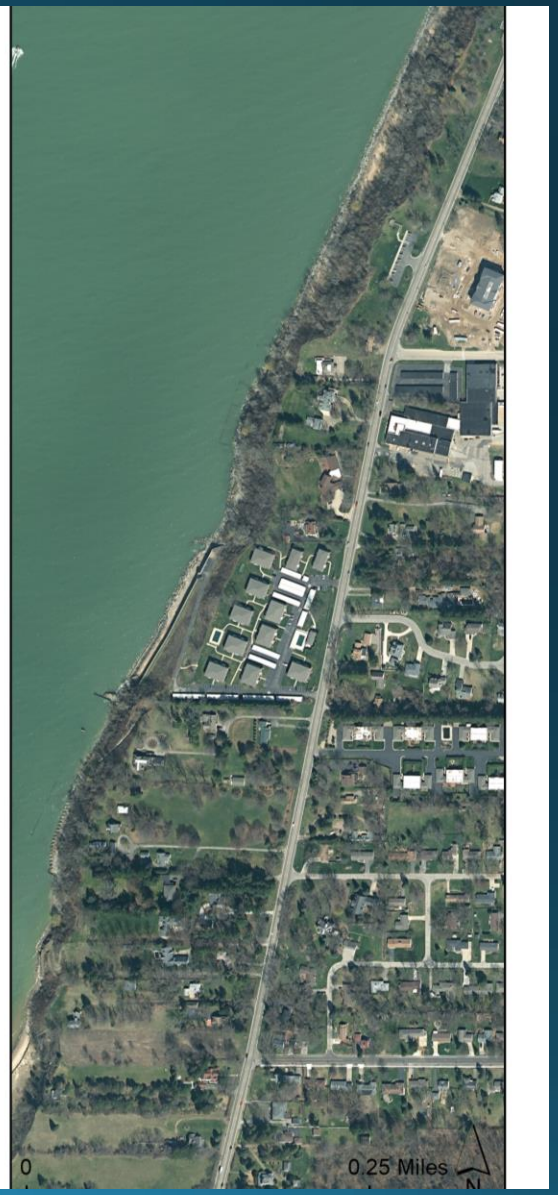
Looming Legal / Policy Problem
Shoreline Armoring

Looming Legal / Policy Problem
Shoreline Armoring

The Bluff Will Look the Same from the Beach, but… It's Moving!

Looming Legal / Policy Problem
Shoreline Armoring

Looming Legal / Policy Problem
Shoreline Armoring



Planning for Great Lakes Coastal Community Resilience Planning Issues & Considerations

Issues

Climate change

- Increased droughts
- Increased heat waves (tempered by lake effects)
- Increased storminess (frequency, intensity)
- Ecosystem storminess/public health effects

Layered upon natural lake level fluctuations

Coastal Hazard Threats
(inundation, high-energy waves)

Additional Considerations

- **Community & social vulnerabilities**
- **Economic sustainability (tourism, facilities, industry**
- **Fairness (disaster mitigation, recovery, equity in opportunities & impacts)**

Introduction to Scenario-Based Planning

Scenario-Based Planning Framework

Management Options	Climate Futures		
	Lucky	Expected	Perfect Storm
Current Development	Scenario 1A	Scenario 1B	Scenario 1C
Current Zoning Build-Out	Scenario 2A	Scenario 2B	Scenario 2C
BMP Build-Out	Scenario 3A	Scenario 3B	Scenario 3C

Introduction to Scenario-Based Planning

Helps Navigate Uncertainty

- Plot different, but reasonable future narratives against each other (e.g., climate futures and growth management options).

Assumptions from available data / info in order to craft these narratives

- For example, use 100 years of observed water level data to estimate future low, "average", and high water elevations.

Can complete planning analyses from framework

- Such as, potential structures at risk of flooding under each combination of climate futures and management options (i.e., under each "scenario").

Planning Applications: Crafting Climate Futures

Possible climate futures (*not predictions*)

Lucky = low storminess (~ 50-year storm) + low water levels

Expected = increased storminess (~100-year storm) + average water levels

Perfect Storm = very stormy (~500-year storm) + all-time high water levels

Varying

- Storminess
- Great Lakes still water levels

Planning Applications: Crafting Climate Futures

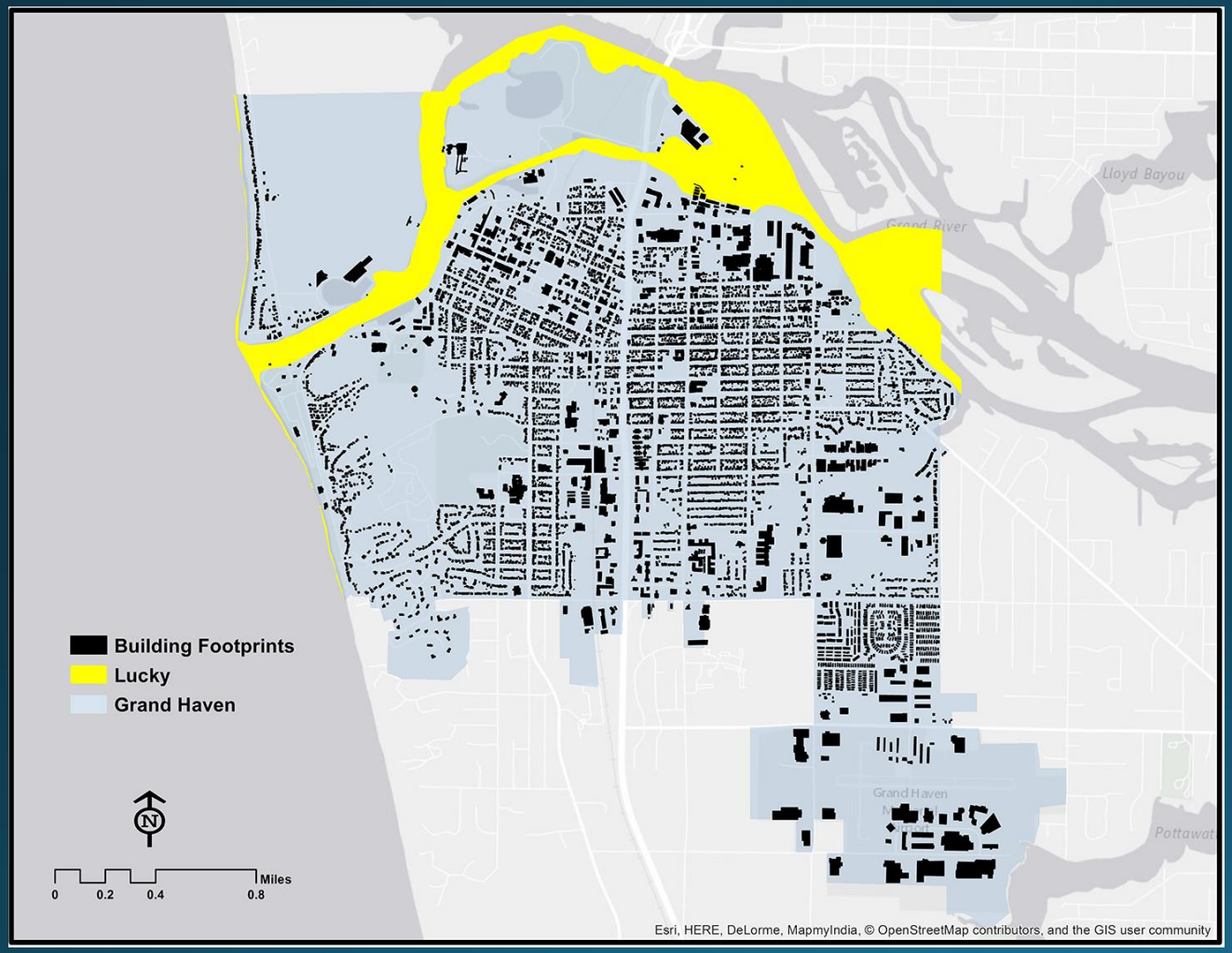
Derived by combining

- FEMA FIRMs
- Coastal inundation areas (FEMA)

Coastal inundation areas determined by overlaying

- Great Lakes still water levels (GLERL/NOAA) + storm surge elevations (MTU)
- Topography of coastal community (available DEMs)

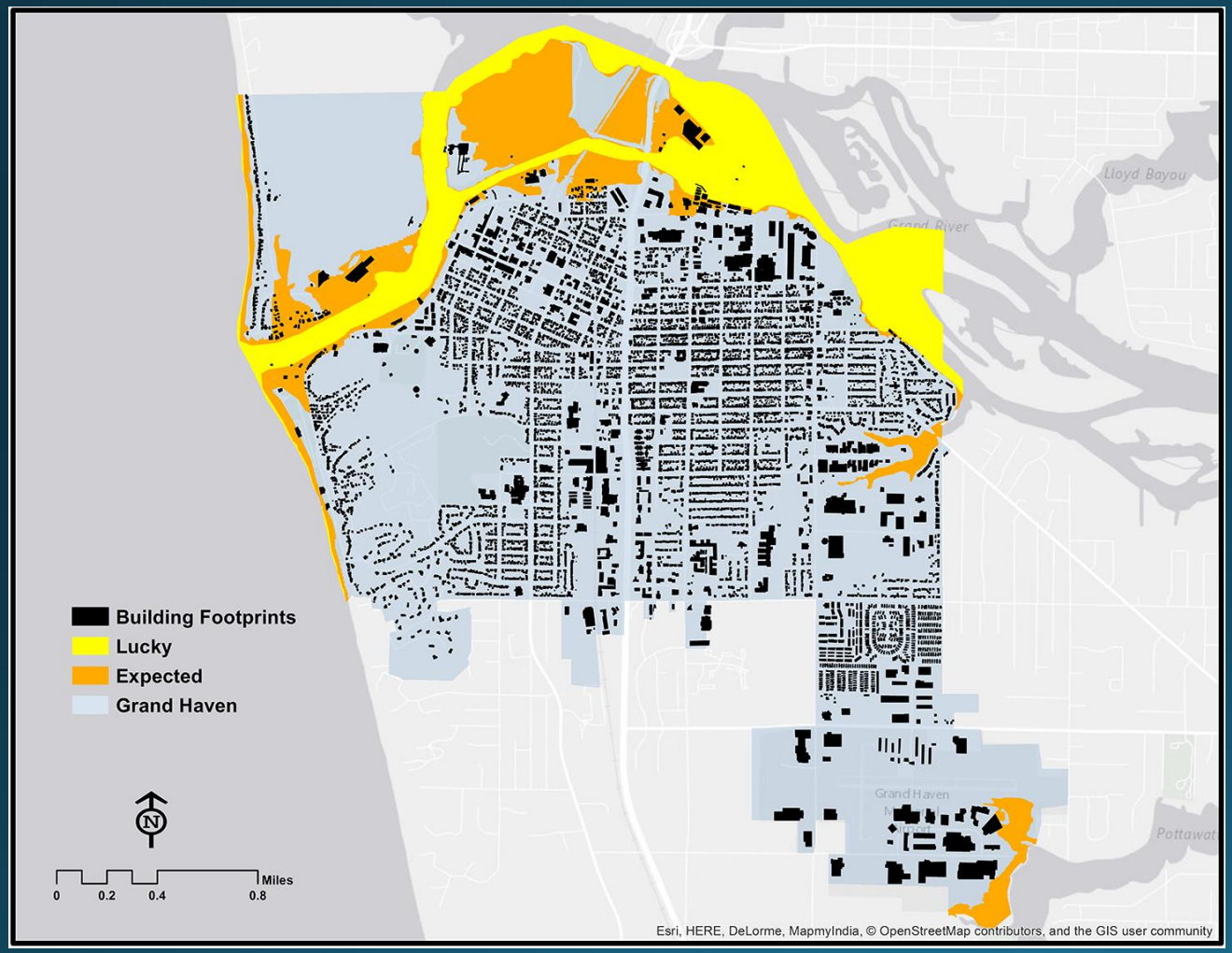
Planning Applications: Crafting Climate Futures



Lucky

- All-time low lake water levels, no wave action (i.e., no VE)
- Current FIRM floodway + Proposed 2% coastal base flood elevations ("coastal floodway")
- Planning (~50-year) storm = current 2% storm

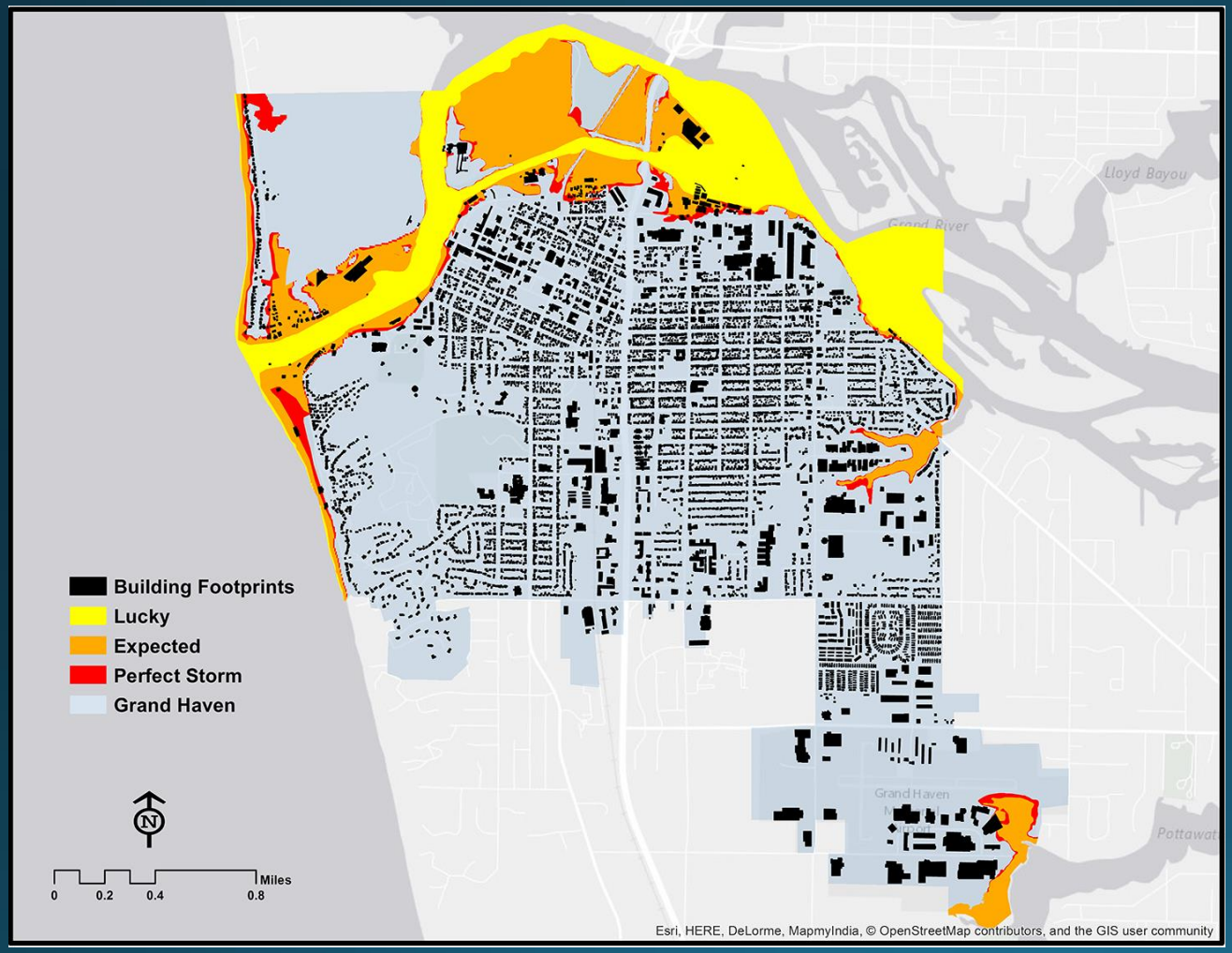
Planning Applications: Crafting Climate Futures



Expected

- Long-term mean lake water levels
- Current FIRM base flood elevations ("coastal floodplain") + elevation-derived storm surge extent
- Planning (~50-year) storm = current 1% storm + VE (more stormy)

Planning Applications: Crafting Climate Futures



Perfect Storm

- All-time high lake water levels
- Current mapped .2% flood area (Shaded-X) + elevation-derived storm surge extent
- Planning (~50-year) storm = current 0.2% storm + VE (super stormy)

Planning Applications: Mapping Management Options

Possible build-out futures (*not predictions*)

1. **Current Development** = current structures & infrastructure

2. **Current Zoning Build-Out** = current structures & infrastructure + full build-out under current zoning code

3. **BMP Build-Out** = current structures & infrastructure + build-out if BMP's are adopted

Varying

- Zoning regulations & other growth policies
- Allowable development in or near high risk flood areas

Planning Applications
Mapping Management Options

Derived By

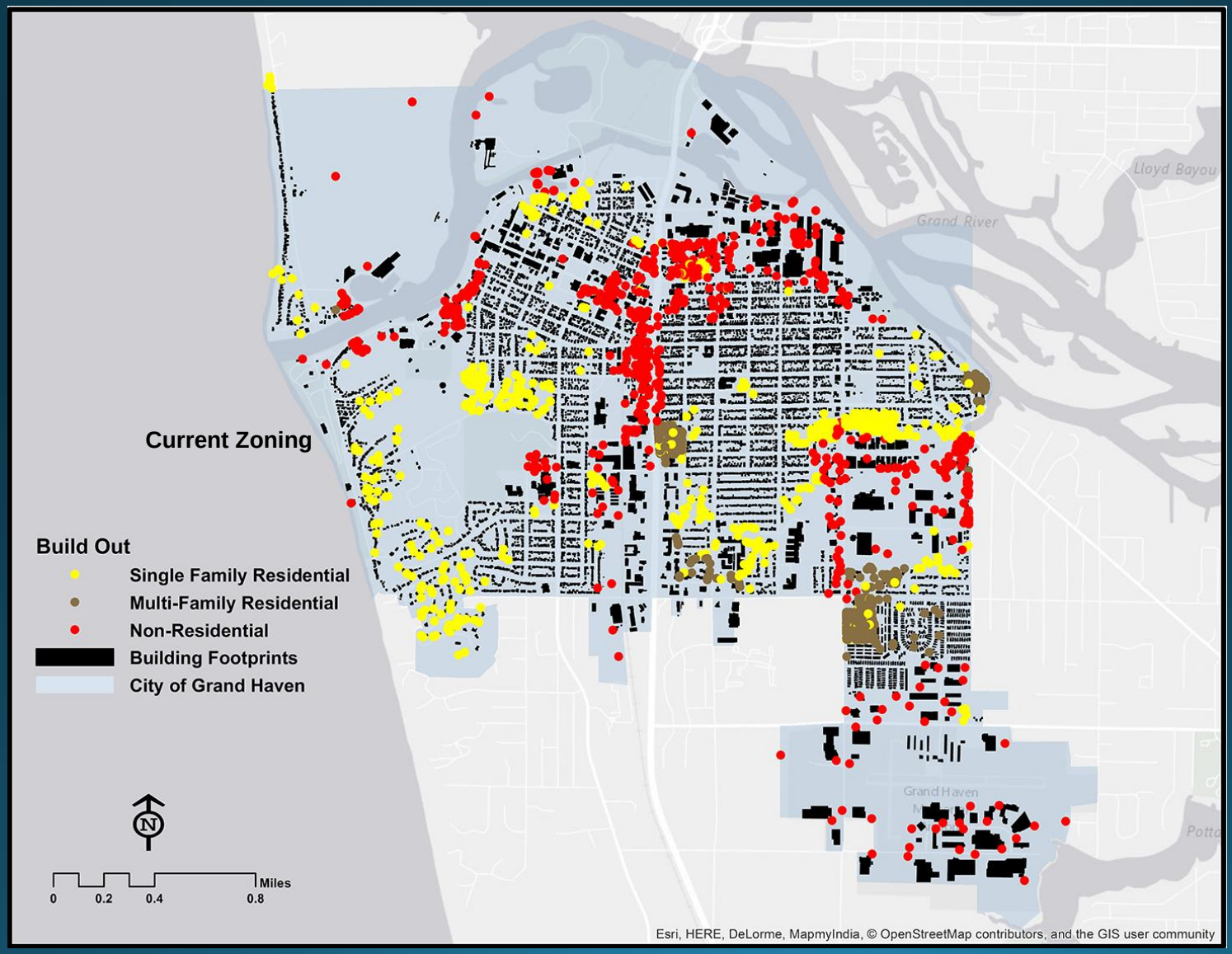
- Community master plan, zoning ordinance, and other ordinances (e.g., stormwater management ordinance)
- Spatial avoidance best management practices

Build-Outs Mapped With

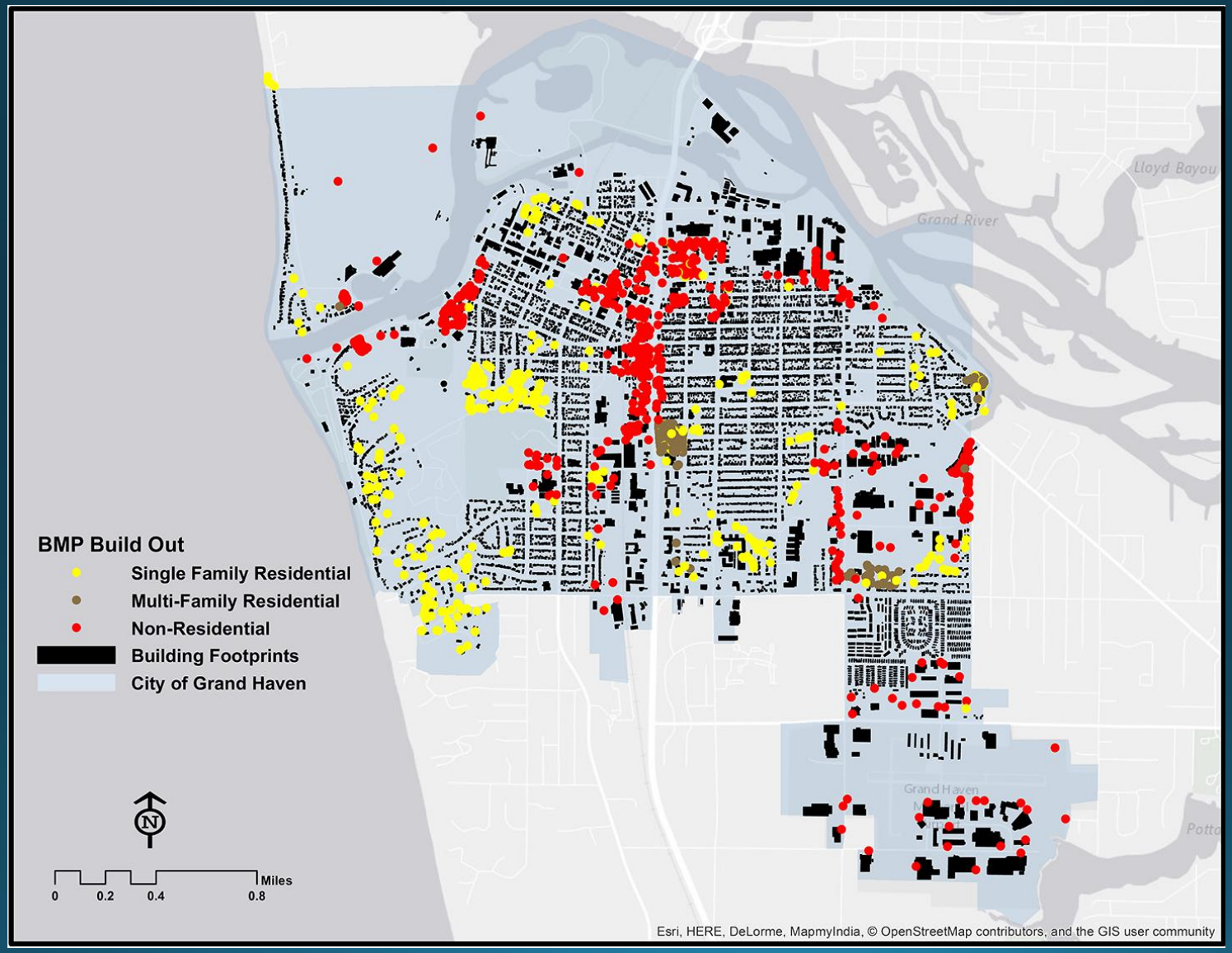
- CommunityViz Software (an ArcGIS extension program)

Planning Applications
Mapping Management Options

Planning Applications
Mapping Management Options



Planning Applications
Mapping Management Options



Using Coastal Data + Scenario-Based Planning to Inform Local Planning

Potential Structures at Risk in Grand Haven

	Lucky	Expected	Perfect Storm
Current Development	17	142	189
Current Zoning Build-Out*	+2	+182	+234
BMP Build-Out*	+2	+25	+41

* Additional potential structures at risk

Activity 3

Project prioritization

Next Steps

1. We will review tonight's input and put it into a summary document
2. Week of October 21 (Date & Location TBD), join us for a joint planning commission meeting to begin drafting goals and objectives
3. Attend planning commission meetings to provide more input into the master plan update

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Stay up to date on the *Resilient Port Austin* master plan update by visiting:

resilientmichigan.org/portaustin

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Land Information Access Association (LIAA)