Welcome!

- Using your **3 sticky notes**, please write down the **top 3 natural hazards** that concern you in Charlevoix County
  - Use 1 sticky note per hazard
  - Place your sticky note on the wall, grouping similar responses together

Extreme heat | Extreme cold | High winds| Inland Flooding | Lightning | Tornado | Shoreline erosion | Shoreline flooding | Rip Current | Seiche | Drought | Wildfire | Thunderstorm | Winter Storm | Heavy snow | Ice | Hail | Invasive Species | Pandemic

Charlevoix County Community Meeting

January 23, 2023

Networks Northwest

Talent / Business / Community

Introductions

- Networks Northwest - Community Planners
  - Jennifer Neal, AICP
  - Stephanie Loria
- Community Partners
  - Sienna Wenz, Emergency Management Coordinator

Agenda

- Thank you for joining us!
- We will be discussing the following:
  - Purpose of the Natural Hazard Mitigation Plan
  - Community Survey Results
  - Your Community Vulnerabilities
  - Site Specific Hazard Concerns

Purpose

Hazard Mitigation Planning

“The effort to reduce loss of life and property by lessening the impact of disasters”

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Billion-Dollar Disasters Shattered U.S. Record in 2020

The 22 events that each caused at least $1 billion in damage show the increasing costs of climate change

By Thomas Frank, E&E News on January 11, 2021

An aerial view of flood waters from Hurricane Delta surrounding structures destroyed by Hurricane Laura on October 10, 2020 in Creole, Louisiana. Credit: Mario Tama *Getty Images*

Planning Grant Application	Project Initiated	Community Profile	Historic Hazard Analysis	Hazard Mapping	Goals and Objectives	Mitigation Strategies	Draft Plan Review	Plan Adoption	BRIC Grant Application
January	May	August	November	January	May	August	January	January	January
2021	2022			2023			2024	2025	2026
		Land use	Extreme Winter Weather (*ice, frost/freeze, heavy snowfall, lake effect snow, blizzard, winter storm)*				MSP	Charlevoix County	$600 million available in FY 2020
		Population	Severe thunderstorms and wind				FEMA	All local jurisdictions	Acquisition
		Housing units	Lightning						Structural retrofits
		Economic profile	Tornado						Drainage improvement
			Hail						Slope stabilization
			Flooding (*Riverine and Urban*)						Utility retrofits
			Shoreline Hazards (*flooding, erosion, rip current, seiche*)						
			Extreme temperatures *(heat/cold)*						
			Drought						
			Wildfire						
			Invasive species (can cause damage to forests, crops, native species, etc.)						
			Public Health Emergency						

Presidential and Governor Declared Emergencies/Disasters

Date of Incident	Type of Incident	Affected Area	Type of Declaration/Federal ID #	Notes
March 2020	COVID-19; COVID-19 Pandemic	Statewide & National	State of Emergency, National Emergency (3455), and Governor and Presidential Declared Major Disaster (4494)	
1/29/2019	Extreme Cold	Statewide	Governor Declared Emergency	
9/4/2005 and 9/7/2005	Hurricane (Katrina) Evacuation	Statewide	Governor Declared Disaster and Presidential Declared Emergency (3225)	Declared due to the emergency conditions in the State of Michigan, resulting from the influx of evacuees from states impacted by Hurricane Katrina beginning on August 29, 2005.
1/26-27/1978	Blizzard, Snowstorm	Statewide	Presidential Declared Emergency (3057); Governor Declared Disaster	
3/2/1977	Drought	44 Counties, including Antrim, Benzie, Charlevoix, Emmet, Grand Traverse, Kalkaska, Leelanau, Manistee, Missaukee, Otsego, Roscommon and Wexford.	Presidential Declared Emergency (3035)	

Historic Weather Events

- 243 events were reported between 01/01/1950 and 09/30/2022 (26,571 days)

* 5 Presidential and Governor Declared Emergencies/Disasters

Type of Event	# of Events	Event Location	Year Event Recorded
Extreme Winter Weather	144	Statewide; Region	1978*, 1996-2022
Thunderstorms and Severe Winds	51	County and Region	1955-2022
Hail	34	Countywide	1955-2022
Tornadoes	4	Countywide	1955, 1977, 1989, 2002
Extreme Temperatures (Heat / Cold)	2 / 3	Region; Statewide	2001, 2018 / 2007, 2015, 2019*
Drought	3	Countywide and Region	1977*, 2007, 2007
Flash Flood / Flooding	1	Countywide and Region	2012
Shoreline Hazards (Lakeshore Flood)	3	County/Region	2019, 2020, 2020
Lightning	1	County/Region	2000
Wildfire	173	MDNR Lands	1981-2018
Public Health Emergency (COVID-19 Pandemic)	1	Statewide/National	2020*
Invasive Species	-	County/Region	Ongoing

Survey Results

Community Representation

All Cities, Village, and Townships have at least one response

Except for Hudson Township

Role/Organization Role

Resident
Appointed Official
Elected Official
Other organization stakeholder

Survey Results

Q10: What type of natural hazard events are likely to have the largest impact on your community?

 # 1 Winter storms (35)

 # 2 Wind (32)

 # 3 Flooding (20)

#4 Illness outbreak (13)

#5 Erosion (8)

#6 Tornado (7)

Q11: Does your community have concerns about infrastructure withstanding a natural hazard event in the future?

Dams

Utilities

Culverts

Bridges

Vulnerabilities in Your Community

People

Economy

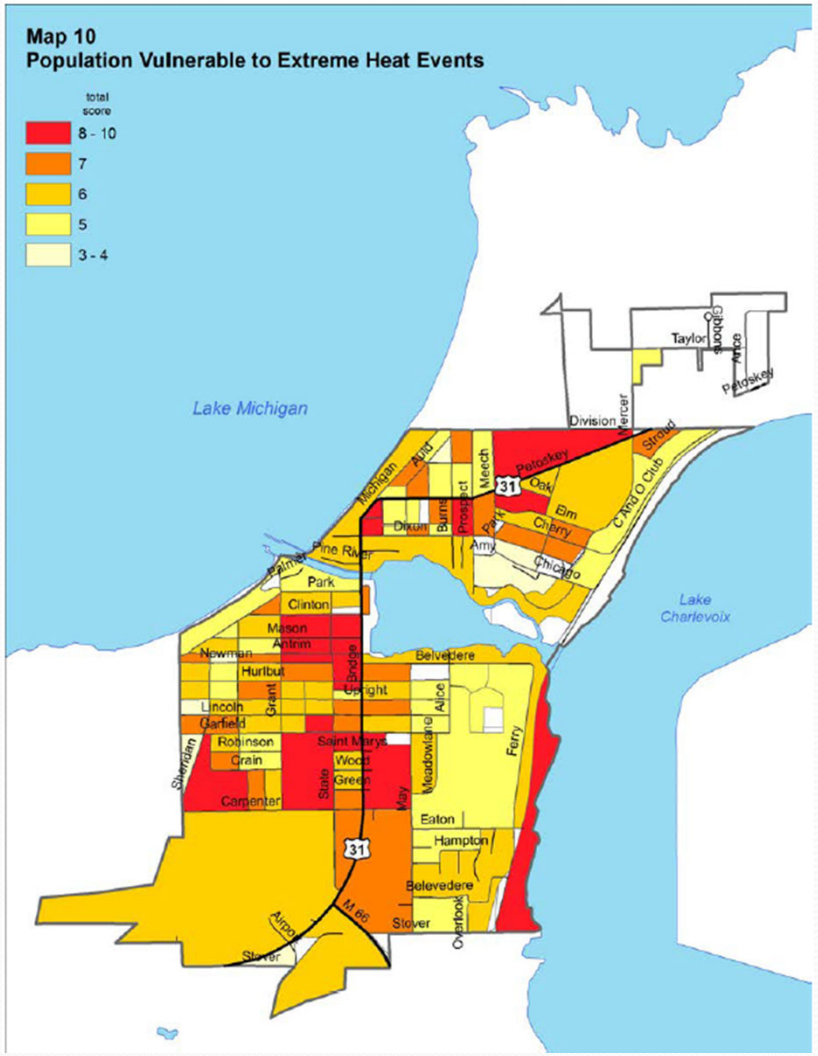
Built Environment

Natural Environment

Vulnerable Populations

LIAA's NW MI Coastal Resilience Atlas – Heat Vulnerability Assessment

- Vulnerability = Exposure to the hazard (tree canopy and impervious surface) + Sensitivity
- Population Characteristics of Sensitivity:
  - Persons > age 65
  - Persons living alone
  - Minority (non-white) persons
  - Persons living below the poverty threshold
  - People > age 25 with less than a high school education
  - Disability status (i.e., ambulatory difficulty, mental disability)



Vulnerable Populations
Full Group Discussion

- Who are your primary vulnerable populations?
- Where are they located?
- What mechanisms are in place to aid these populations in the event of a natural hazard?

Pandemic Experiences – Full Group

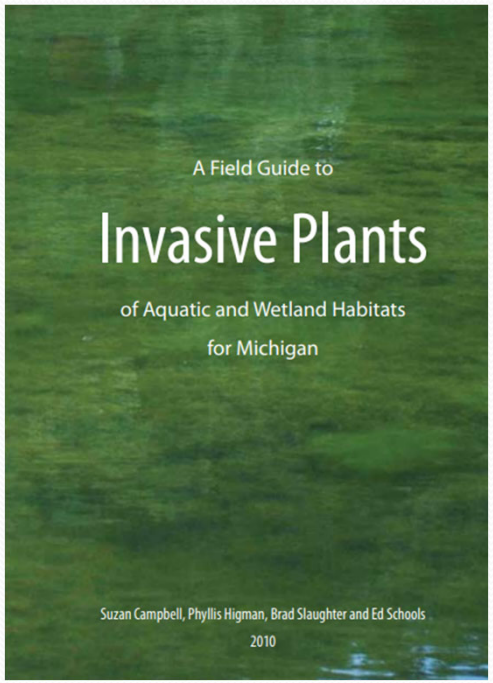
- From a hazard mitigation perspective, what **lessons did the community learn** from the pandemic?
- What **shortcomings** did the community experience in its ability to mitigate the effects of the pandemic?
- What **successes** did the community have?

Vulnerable Natural Resources
Full Group Discussion

- What are your primary natural resources
- What role do they play in the economy, quality of life, natural habitat?
- What mechanisms are in place to manage or restore natural features in the event of a natural hazard?

Invasive Species

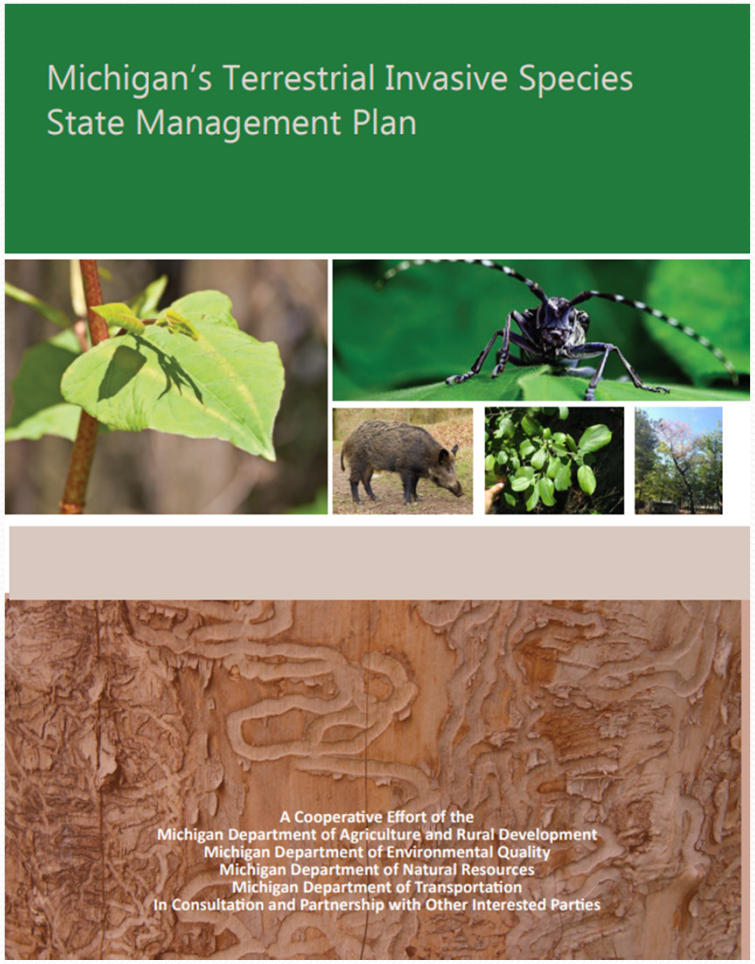
- An invasive is a species that is **non-native to the ecosystem** under consideration AND whose introduction causes or is likely to cause **economic or environmental harm**
- Only a small fraction of non-native plants are invasive
- Lake-moderated climates along Lake Michigan, Lake Erie, Saginaw Bay, Thumb, and Lake St. Clair are milder and have high potential to harbor species typically found to the south.



Invasive Species

- The State of Michigan estimates 42% of threatened or endangered species are considered at risk due to non-native species.
- Visitors spent over $22 billion dollars in Michigan in 2014, supporting nearly 327,000 jobs (Tourism Economics 2014). Invasive species impact the use and beauty of Michigan's shorelines, trails and parks, which may result in a reduction in visitor spending and citizen enjoyment
- Michigan's Forest Products Industry supports 96,000 jobs and contributes more than $20 billion to the state's economy each year (Michigan DNR 2015). Invasive forest pests including emerald ash borer, oak wilt and beech bark disease kill trees and significantly impact the value of urban properties, forests and timber resources. The estimated cost of treating or removing dead ash within developed land in Michigan's communities due to emerald ash borer was $230 million in 2009. A map of oak wilt cases in Kalkaska County is below.

Source: Kovacs, K.F., R.G. Haight, D.G. McCullough, R.J. Mercader, N.W. Siegert and A.M. Liebhold. 2010. Cost of potential emerald ash borer damage in U.S. communities, 2009–2019. Ecological Economics 69: 569-578.



Invasive Species – Small Group Discussion

- In groups of 5-6, discuss how invasive species affects your community
  - **Choose 1 person in your group to be the recorder**; this person will write each person's responses and will report key findings to the whole group
- What are your **greatest concerns** pertaining to **invasive species?**
  - Think of forests, rivers, Great Lakes, agriculture, etc.
  - Write concern on sticky note

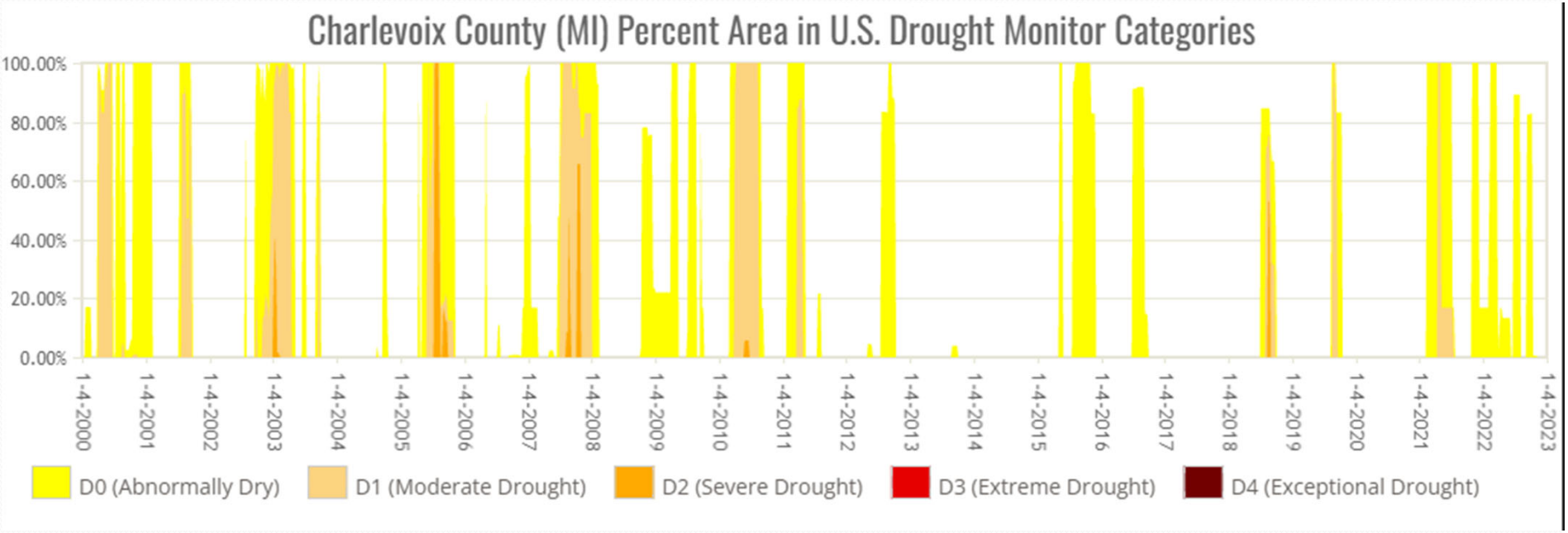
Winter Storms and Thunderstorms/Wind

- Winter weather events include: Winter weather, winter storms, lake-effect snow, ice storm, heavy snow, frost/freeze, blizzard
- Most common type of hazard: 144 Events total
- Caused $295,000 in property damages and $7,500,000 in crop damages
- Largely due to March 2012 heavy snow event and April 2012 frost/freeze event

- Thunderstorms and Severe Winds include thunderstorm events and high wind events
- Second most common type of hazard: 52 Events total
- Caused $323,000 in property damages $0 in crop damages

Drought

- Definition: Drought is a consequence of a natural reduction in the amount of expected precipitation over an extended period of time, usually a season or more in length.
- There have been three major drought in the past - Presidential declared emergency in 1977, 2007 and 2007
- Charlevoix County drought fluctuations



Drought – Key Issues

Agricultural Production Losses

The primary direct economic impact of drought in the agricultural sector is crop failure and pasture losses. These costs are often passed on to consumers through increased prices and/or they may be offset through government disaster assistance programs. Indirect impacts of drought in the sector can include reduced supplies to downstream industries, such as food processors, and reduced demand for inputs, such as fertilizer and farm labor. The non-market impacts of production losses include mental health strain on farmers.

Decreased Water Availability for Agriculture

The depletion of water availability in soils causes significant declines in crops and livestock productivity. In addition, surface and groundwater supplies may decline during drought, affecting water availability and increasing costs to access water for crop or forage irrigation and watering livestock. With a return to normal precipitation, soil moisture typically recovers long before surface and groundwater supplies are replenished.

Pests and Diseases

Drought, coupled with high temperatures, may expand the distribution and incidence of pests and diseases that affect crops, forage, and livestock.

Specialty Crops

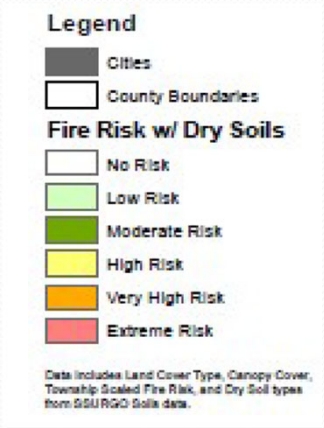
Most specialty crops (such as fruits, vegetables, tree nuts, and medicinal herbs) are more vulnerable to drought than field crops and have a higher value per unit of land/water. They may therefore represent a higher risk for experiencing economic loss in drought if the crop water demand exceeds water supply.

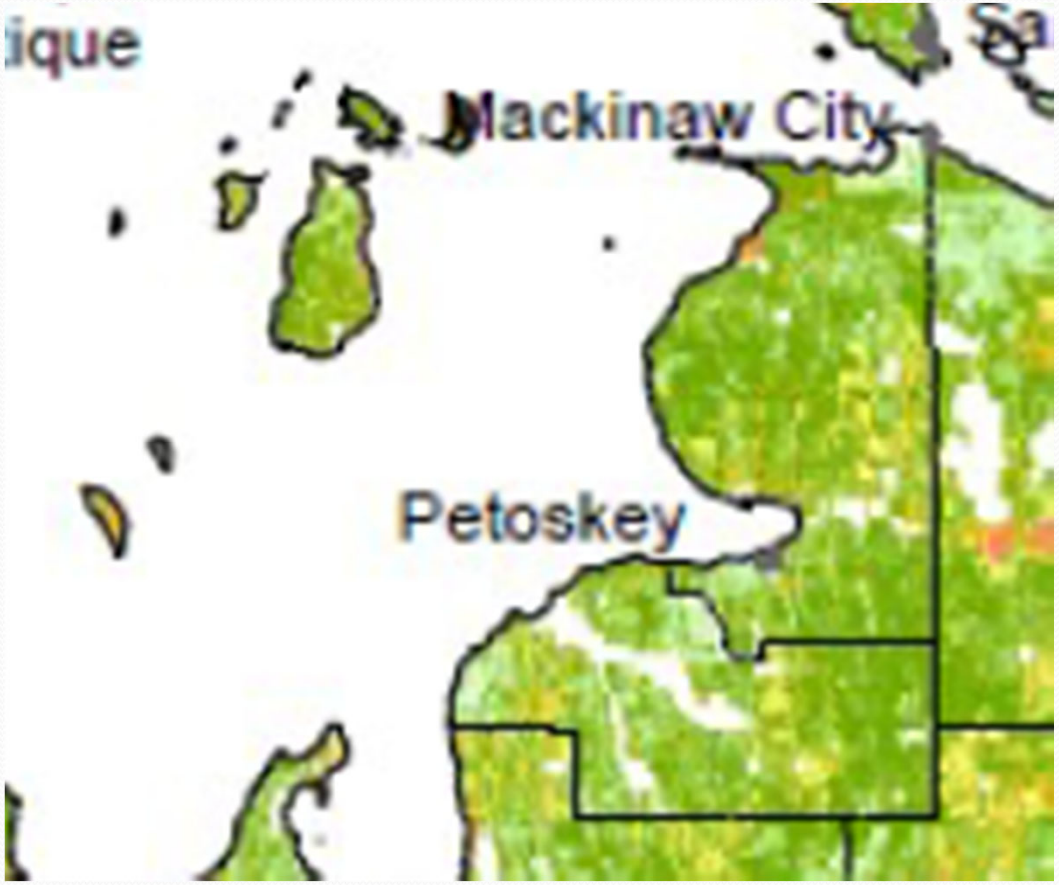
Wildfire

- A wildfire is an **unplanned, uncontrolled fire** in grassland, brushland, or forested areas.
- **173 wildfires occurred on lands under MDNR jurisdiction within Charlevoix County** from 1981-2018, resulting in 522.2 acres burned.
- **= average of 13.7 acres burned and 4.6 wildfires per year**

Wildfire Risk

- Higher risk areas
  - Eastern forest areas





Source: Wildfire Risk Map - MDNR Forest Resources Division

Small Group Discussions

- In groups of 5-6, discuss how these hazards affect your community
- What is the potential for this hazard to affect your **economy, natural environment, or population**?
- Please answer this question for the following hazards
  - Severe Thunderstorm – wind, tornado, hail, lightning, seiche
  - Winter Weather – wind, ice, heavy snow, extreme cold
  - Wildfire, Extreme heat, and drought
- Spend **5-7 minutes** on each hazard

- 1 Flood/Flash Flood event - $2,000 in property damages

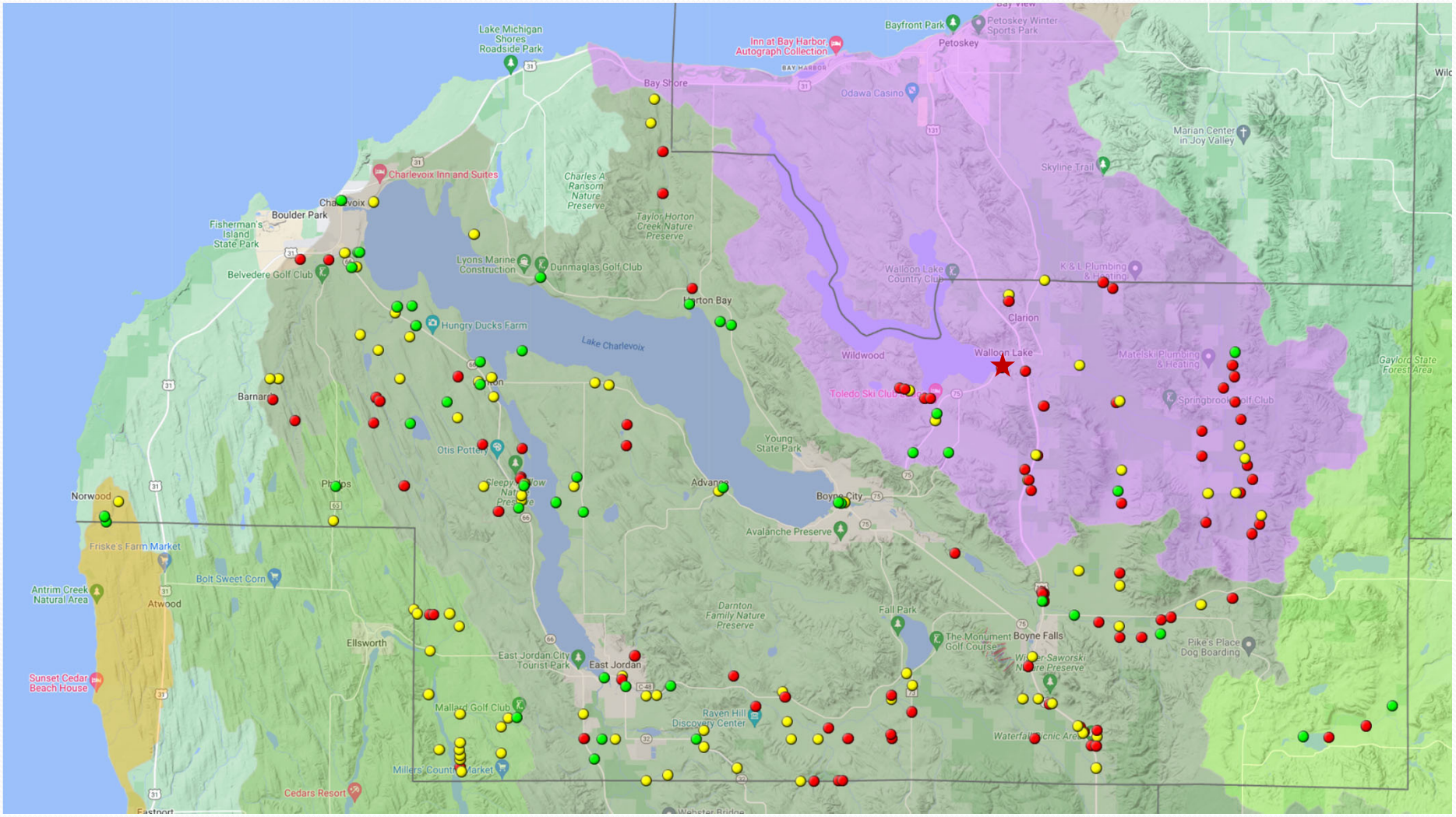
Date	Location	Episode Narrative	Event Narrative
June 18, 2012	Countywide/ Regional	**A warm front allowed warm and moist air to surge north into Northern Michigan. Initial thunderstorms developed in Eastern Upper Michigan in the afternoon; some of these produced large hail. Incoming thunderstorms organized into a line as they crossed Northern Lake Michigan; this squall line produced many reports of 40 to 55mph winds, but only a few pockets of wind damage, in addition to a single tornado.**	**High water closed US-31 between Garfield and St Marys in the city of Charlevoix.**

3 Shoreline Flooding events - $235,000 in property damages

Date	Location	Episode Narrative	Event Narrative
October 21, 2019	Countywide/ Regional	**Strong northerly to easterly winds resulted in another round of substantial coastal flooding and beach erosion, this time on both Lake Michigan and Lake Huron, for the 21st into the 22nd.**	**Just west of Bayshore, a portion of the Little Traverse Wheelway Bike Path was destroyed.**
April 13, 2020	Charlevoix County	**Strong low pressure passed just north of eastern upper Michigan on the morning of the 13th. Gusty west to northwest winds developed during the day, in the wake of the low. Gusts of 40 to 50 mph were common across northern Michigan, especially during the afternoon. The highest measured wind gust was 58 mph at the airport in Gaylord. Some localized power outages resulted. Lakeshore flooding also occurred along portions of the Lake Michigan coastline of northwest lower Michigan. The city boat launch in Frankfort experienced flooding of docks and the parking lot. And severe coastal erosion destroyed a portion of the Little Traverse Wheelway between Petoskey and Charlevoix.**	
November 15, 2020	Charlevoix County	**Gusty winds increased on the 15th, as strong low pressure moved directly over northern Michigan before departing. Gusts of 50 to 55 mph were common along the Lake Michigan coastline. A peak gust of 59 mph was measured at Grand Traverse Light. Hunting activities were significantly disrupted (the 15th is opening day of the firearms season for deer in Michigan). Lakeshore flooding also developed along portions of Lake Charlevoix.**	**Boyne City experienced flooding along the shore of Lake Charlevoix. Veterans Park and streets near the park flooded, resulting in a few vehicles being briefly stranded.**

Road Stream Crossings

Five Watersheds- East Bay Shoreline & Tributaries, Lake Charlevoix, Little Traverse Bay, Six Mile Lake, and Sturgeon River



Charlevoix County Dams –

Listed on the National Inventory of Dams

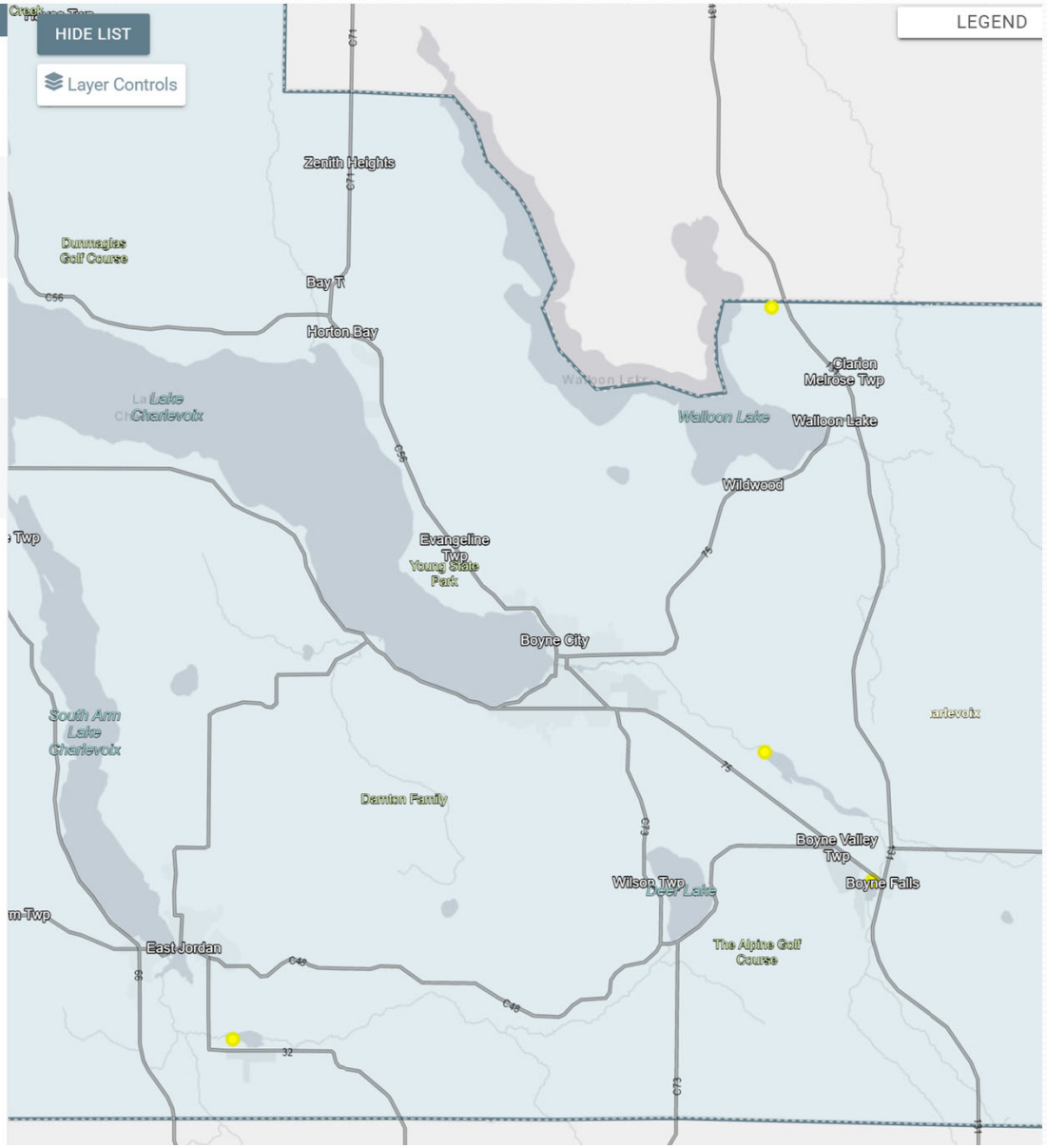
4 Dam(s) Found

Boyne Falls Dam
Hazard Potential Classification: Significant
Emergency Action Plan: Yes
Owner Name: Village of Boyne Falls
Primary Purpose: Recreation

East Jordan Dam
Hazard Potential Classification: Significant
Emergency Action Plan: Yes
Owner Name: East Jordan Plastics
Primary Purpose: Recreation

Walloon Lake Cc Dam #14
Hazard Potential Classification: Significant
Emergency Action Plan: Not Required
Owner Name: Walloon Lake Country Club
Primary Purpose: Recreation

Boyne River
Hazard Potential Classification: Low
Emergency Action Plan: Yes
Owner Name: Boyne USA Inc
Primary Purpose: Hydroelectric



Coastal Flooding & Shoreline Erosion

- **Land Information Access Association (LIAA)** – Traverse City-Based Non-Profit
- **Northwest Lower Michigan Coastal Resilience Atlas** http://www.resilientmichigan.org/nw_atlas.asp

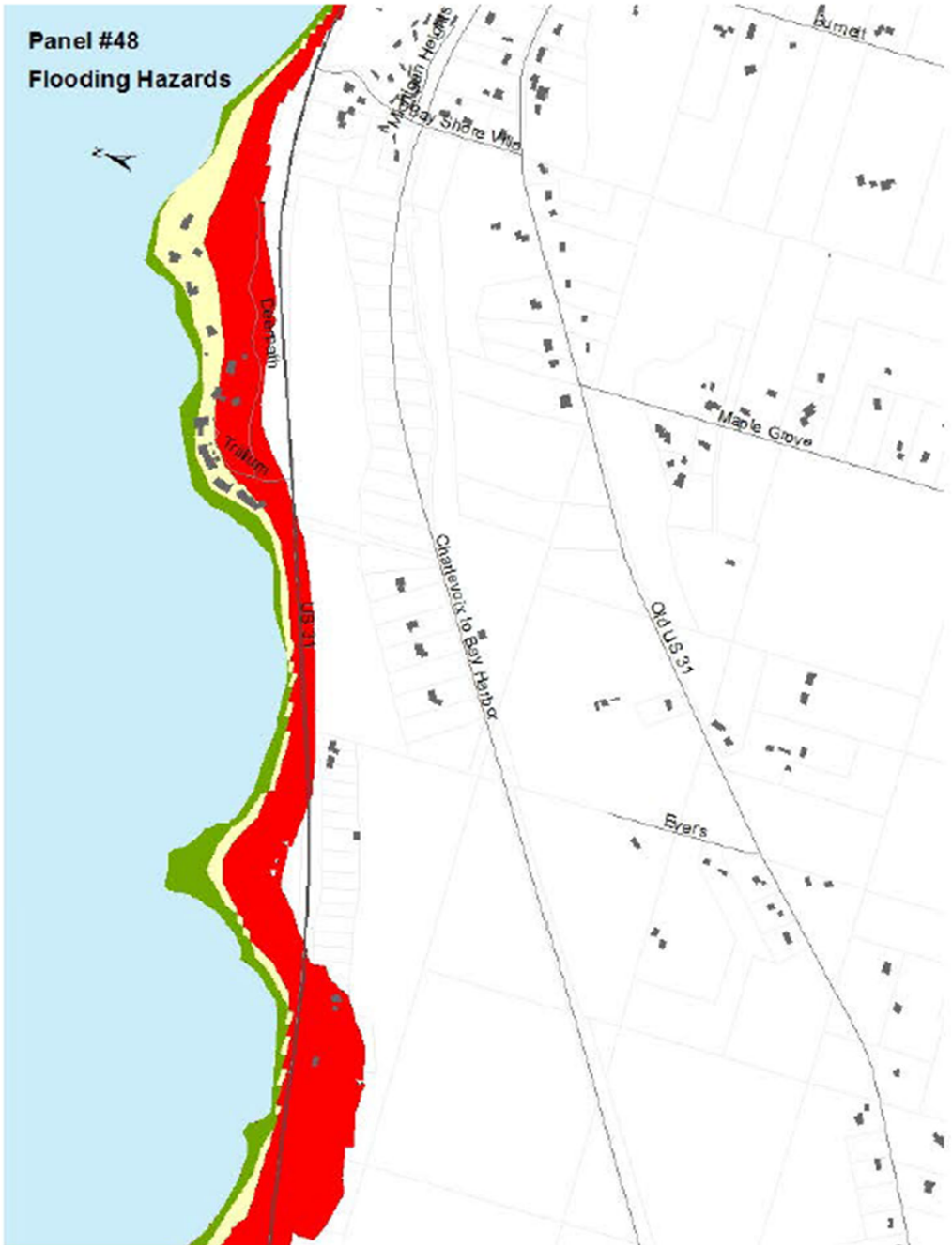
Coastal Dynamics

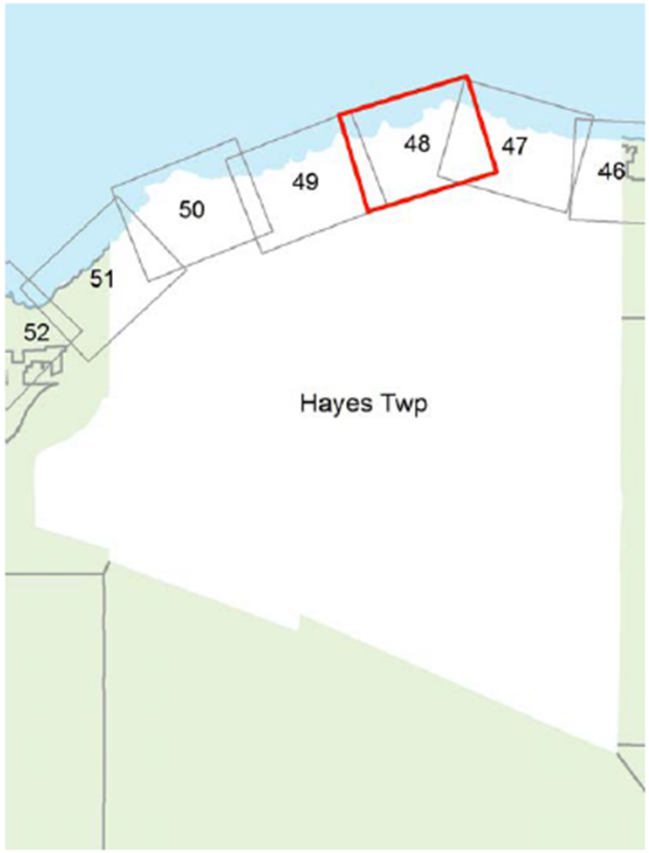
- Decadal variability of lake water levels – Record highs in 2020 and 1986
- Wave Energy and Height
  - Erosion
  - Changing conditions
- Climate change on the Great Lakes
  - Increased precipitation events and storminess
  - Water temperature increasing

Charlevoix County

Coastal Flooding Scenario Impacts

Charlevoix County			
Total SEV	Lucky	Expected	Perfect Storm
$ 820,165,551.00	$ 90,079,300.00	$ 180,384,000.00	$ 295,602,100.00


Panel #48
Flooding Hazards
Burnett
Michigan Heights
Bay Shore Villa
Deerpath
Trillium
Maple Grove
Charlevoix to Bay Harbor
Old US 31
US 31
Byers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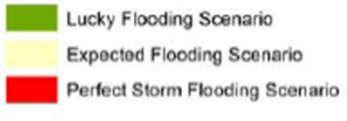
Hayes Twp

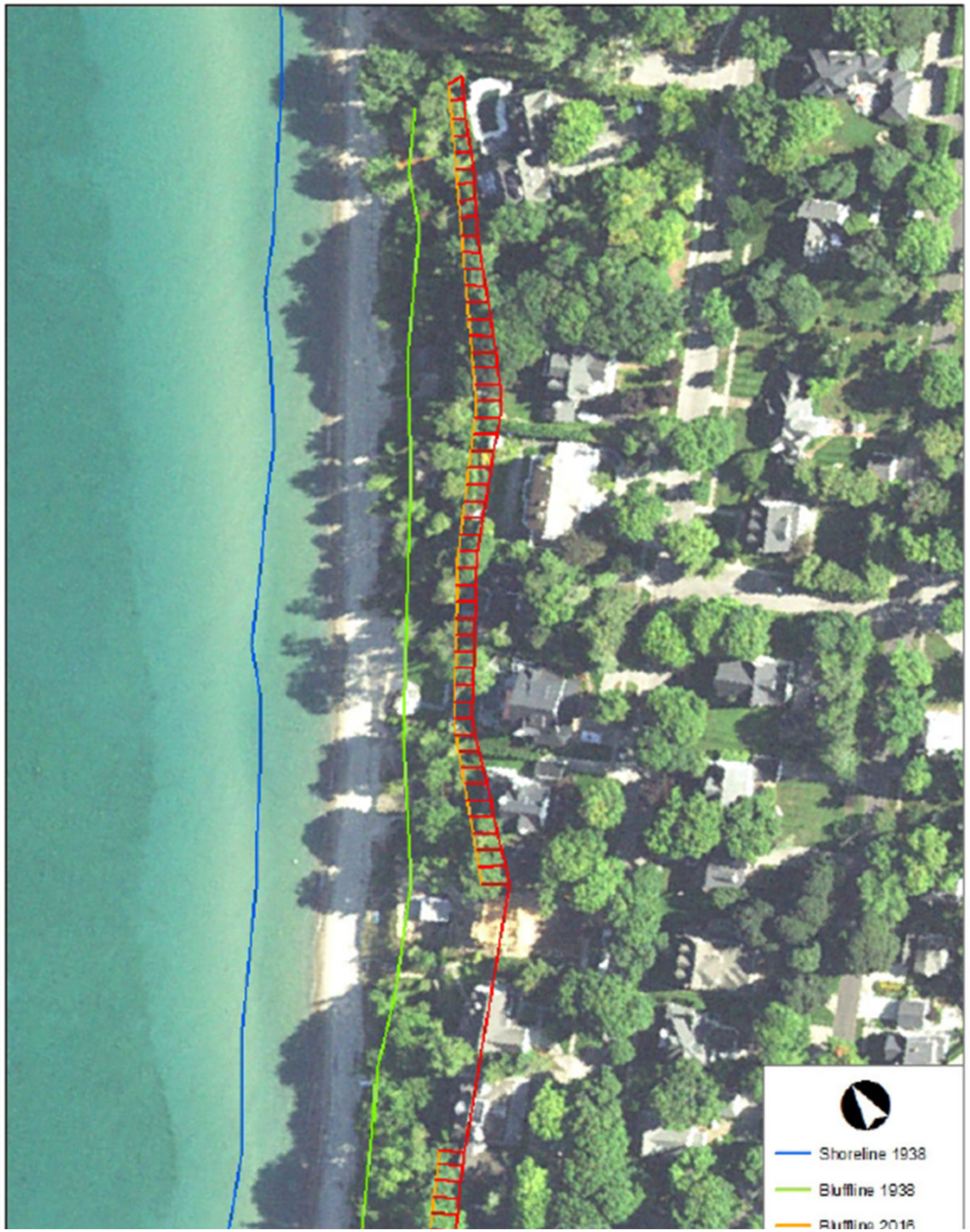

Lucky Flooding Scenario
Expected Flooding Scenario
Perfect Storm Flooding Scenario

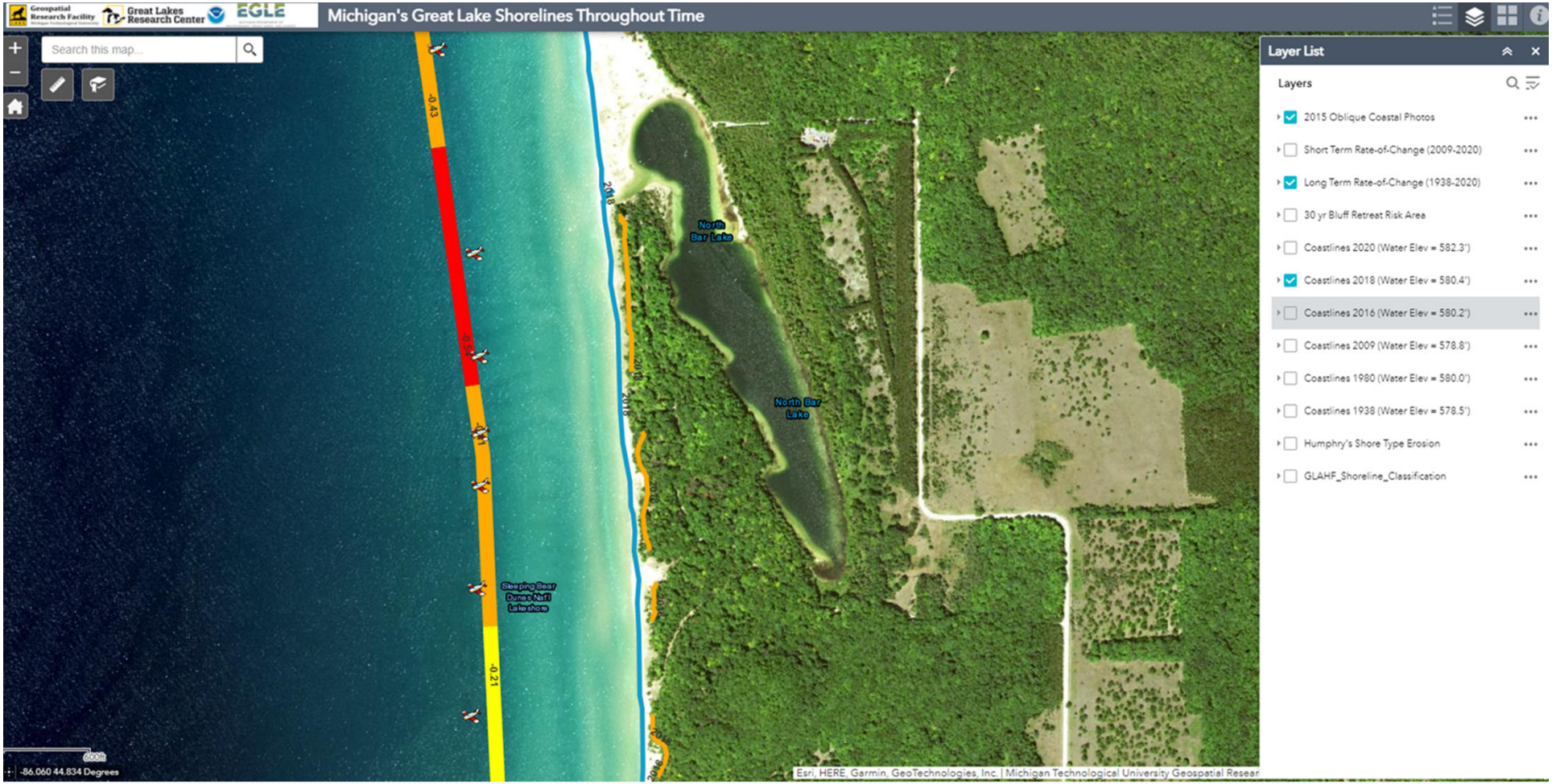

Charlevoix County

BLUFF RECESSION DETAIL

At least one "zoomed in" detail example of historic bluffline recession and future projections is provided at the beginning of each county section of this chapter. Shoreline and bluffline recession data can be viewed in greater detail online at http://geospatialresearch.mtu.edu/czmp.

Bluff Detail, Panel 53, Charlevoix





https://portal1-geo.sabu.mtu.edu/mtuarcgis/apps/webappviewer/index.html?id=d758800bb18e460ab39aa66631051156

OR search “Michigan Tech shoreline mapping site”

Pros and Cons of Short-Term Coastal Mitigation Options

	Armor	Nourish	Relocate
Pros	Slows erosional processes	Slows erosional processes	Conserver natural Public Trust beach and shoreline
Cons	Loss of natural shoreline and Public Trust beach; damage to neighboring shoreline	Short-term solution (e.g. one storm may destroy the investment)	Cost of relocation, loss of land
Owner's Interest	Safeguarding infrastructure prioritized over the cost of armor, loss of Public Trust beach, and damage elsewhere	Safeguarding property and structures prioritized over cost and feasibility	Preservation of infrastructure and natural shoreline prioritized over cost of relocation
Public Interest	Owner's interest prioritized over loss of natural beach and potential future public cost of cleanup when armor fails	Safeguarding property and structures prioritized over cost and feasibility	Preservation of natural beach prioritized over cost of relocation and loss of land

Mapping Activity

- Using the map provided, mark the following:
  - Inland flooding - riverine and urban (blue marker)
    - Potential for dam failure
    - Locations where floods have occurred in the past
    - Locations where floods have a higher probability of occurring
  - Coastal flooding and recession (purple marker)
    - Locations of particular concern along the community's shoreline and bluffs
  - Wildfires (red marker)
    - Locations where wildfires have occurred in the past
    - Locations where wildfires have a higher probability of occurring
  - Invasive Species (orange marker)
    - Locations where invasive species are occurring; if unknown…
    - Locations where invasive species have a higher probability of occurring or may cause significant damage