Charlevoix County Hazard Mitigation Plan Update

November 21, 2022

Networks Northwest

Talent / Business / Community

Welcome

- Thank you for joining us!
- We will be discussing the following:
  - Purpose
  - Historic Weather Events
  - Hazard Identification

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

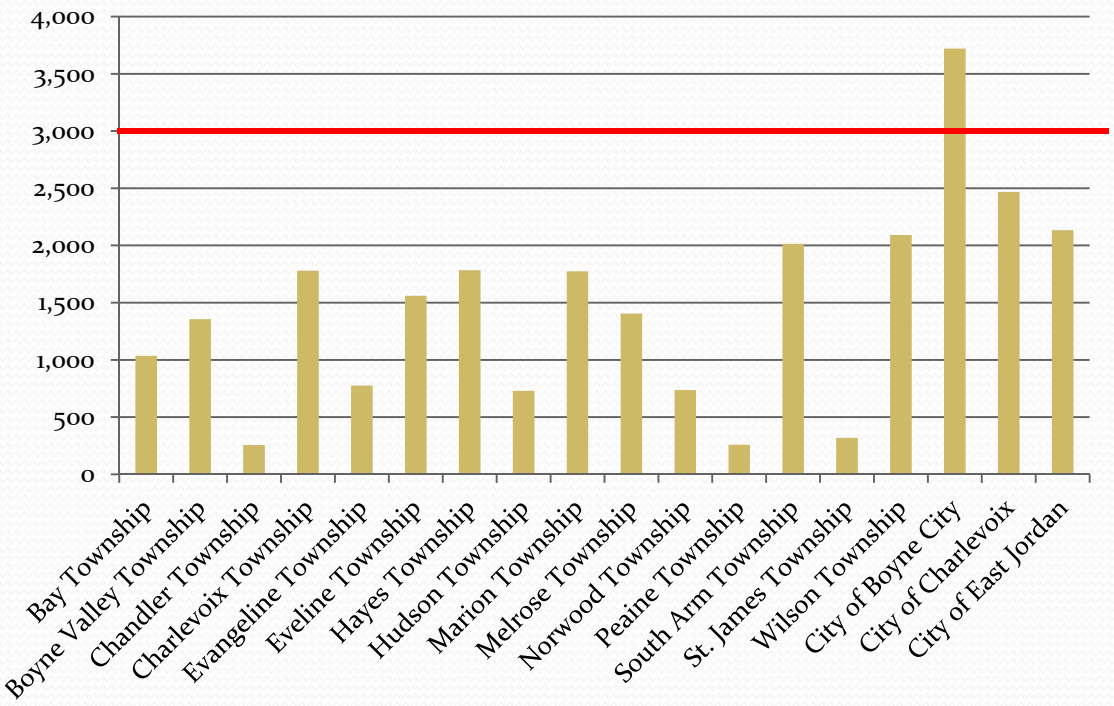
By Thomas Frank, E&E News on January 11, 2021

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*

2020 FEMA Grant Awards

Building Resilient Infrastructure & Communities (BRIC) Funding Program

- $600 million available for each state for FY 2020
- Awards for small impoverished communities
  - **3,000 or fewer individuals**
  - *Note that Boyne Valley Twp.'s estimate includes that of the Village of Boyne Falls, which as of the 2020 ACS, had 343 persons.



2020 FEMA Grant Awards

Building Resilient Infrastructure & Communities (BRIC) Funding Program

- Income not to exceed 80% of the national per capita income
- In 2019, US per capita income was $35,384. 80% = $28,307.2
- City of East Jordan per capita income in 2020, $28,878
- 77% of small impoverished applications were awarded

2020 FEMA Grant Awards

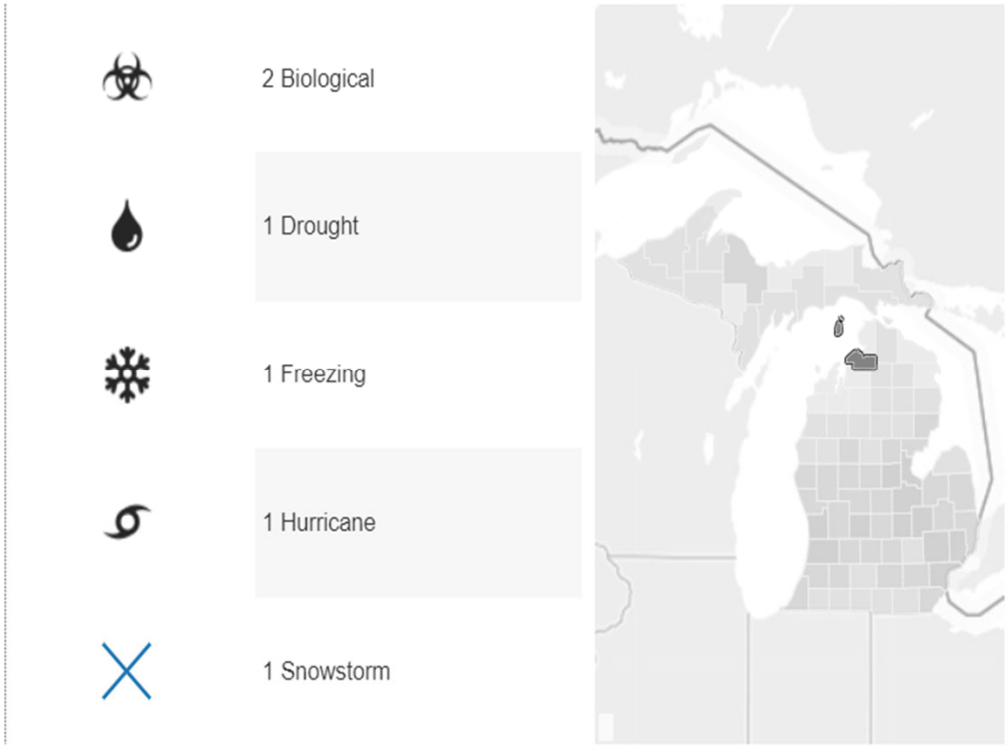
Building Resilient Infrastructure and Communities (BRIC) Funding Program

- Awards for Capability and Capacity Building
  - Building code activities to support efforts in increasing community resiliency
  - 12 of 22 competitive projects were flood control project
  - 18 of 22 included nature-based solutions into the mitigation project

Potential Natural Hazard Events

- Extreme Winter Weather (*ice, frost/freeze, heavy snowfall, lake effect snow, blizzard, winter storm)*
- Severe thunderstorms and wind
- Lightning
- Tornado
- Hail
- Flooding (*Riverine and Urban*)
- 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*

Historic Federal and Governor Declared Emergencies/Disasters



FEMA's Records of Disaster Declarations for States and Counties: https://www.fema.gov/data-visualization/disaster-declarations-states-and-counties

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

143 Extreme Winter Weather Events

* Presidential and Governor Declared Emergencies/Disasters

Event Type	Total Events	Property Damage	Crop Damage	Event Years
Winter Weather	1	-	-	2006
Winter Storm	61	$45,000	-	1996-2022
Heavy Snow	50	$250,000	-	1996-2018
Ice Storm	3	-	-	2001, 2005, 2008
Lake-Effect Snow	22	-	-	2006-2016
Blizzard	6	-	-	1978*, 1997, 1998, 1999, 2002, 2019
Frost/Freeze	1	-	$7,500,000	2012
TOTAL	**143**	**$295,000**	**$7,500,000**	**-**

- 143 Extreme Winter Weather Events
  - March 2, 2012 Heavy Snow Event Narrative

Low pressure tracked from Missouri, to southern Lower Michigan, and on to eastern Canada, while rapidly strengthening. Precipitation surged northward into the region on the evening of the 2nd. This was primarily snow, except in parts of east central Lower Michigan (especially near Lake Huron), where temperatures were mild enough for rain. Snow wound down on the morning of the 3rd, and though somewhat blustery winds occurred behind the system on the 3rd, blowing snow was limited because the snowfall was so wet. Snow totals ranged from 6 to 14 inches across most of Northern Michigan. Higher amounts fell near and west of Grand Traverse Bay, with a maximum amount of 20 inches near Lake Ann. With relatively warm temperatures, the snow was very wet; Traverse City saw around a foot of snow during the night, with a low temperature of 33 degrees. The snow stuck to everything, with the weight of the snow downing many, many trees and power lines. Power outages were widespread, with an outright majority of Northern Michigan residents losing power at some time during or after the storm. In Benzie County, 95 percent of residents lost power. Outages lasted up to a week in some spots. Great Lakes Energy described it as the worst snowstorm (in regards to power outages) in 30 years. A number of counties and communities opened shelters to aid those without power or heat.

  - April 27, 2012 Frost/Freeze Event Narrative

A killing freeze caused extreme damage to agriculture, particularly in the fruit belt of Northwest Lower Michigan. Traverse City saw low temperatures of 25 degrees on the 27th, 31 degrees on the 28th, and 26 degrees on the 29th. These values were not exceptionally colder than normal lows, which are in the middle 30s. Ultimately, the main culprit was a stretch of unprecedented warmth in mid-March, which included five consecutive 80-degree days (17th-21st). This caused fruit trees to bud out far, far ahead of schedule, and left them vulnerable to even relatively normal weather as the spring progressed. The tart cherry crop was a total loss, while other orchard fruits such as sweet cherries, apples, pears, and peaches saw losses in excess of 90% of the expected crop.

- Lightning Events (1) 2000 – No deaths, injuries, or damages in Charlevoix; Deaths and injuries occurred in other counties from this storm event
- Tornado events (4) 1955, 1977, 1989, 2002 - No deaths or injuries, $3,000 in property damages in Charlevoix; Deaths and injuries occurred in other counties from this storm event

Severe Thunderstorms/High Winds

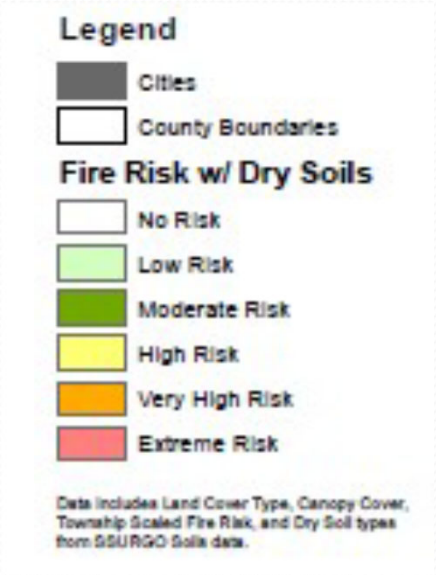
Event Type	Number of Events	Property Damage	Crop Damage	Event Year(s)
Thunderstorm Wind	40	$ 224,000	$ -	1955-2021
High Wind	11	$ 99,000	$ -	1998-2021
TOTAL	**51**	**$537,000**	**$ -**	

- 34 Hail (1950-2022), No deaths or injuries, $45,000 in property damages, largest hail is 3" diameter

Appearance	Approximate Size in Inches
Pea	0.25-0.5 inch
Penny	0.75 inch
Nickel	0.88 inch
Quarter	1.00 inch
Walnut/Ping Pong	1.50 inch
Golf Ball	1.75 inch
Hen Egg	2.00 inch
Tennis Ball	2.50 inch
Baseball	2.75 inch
Tea Cup	3.00 inch
Grapefruit	4.00 inch
Softball	4.50 inch

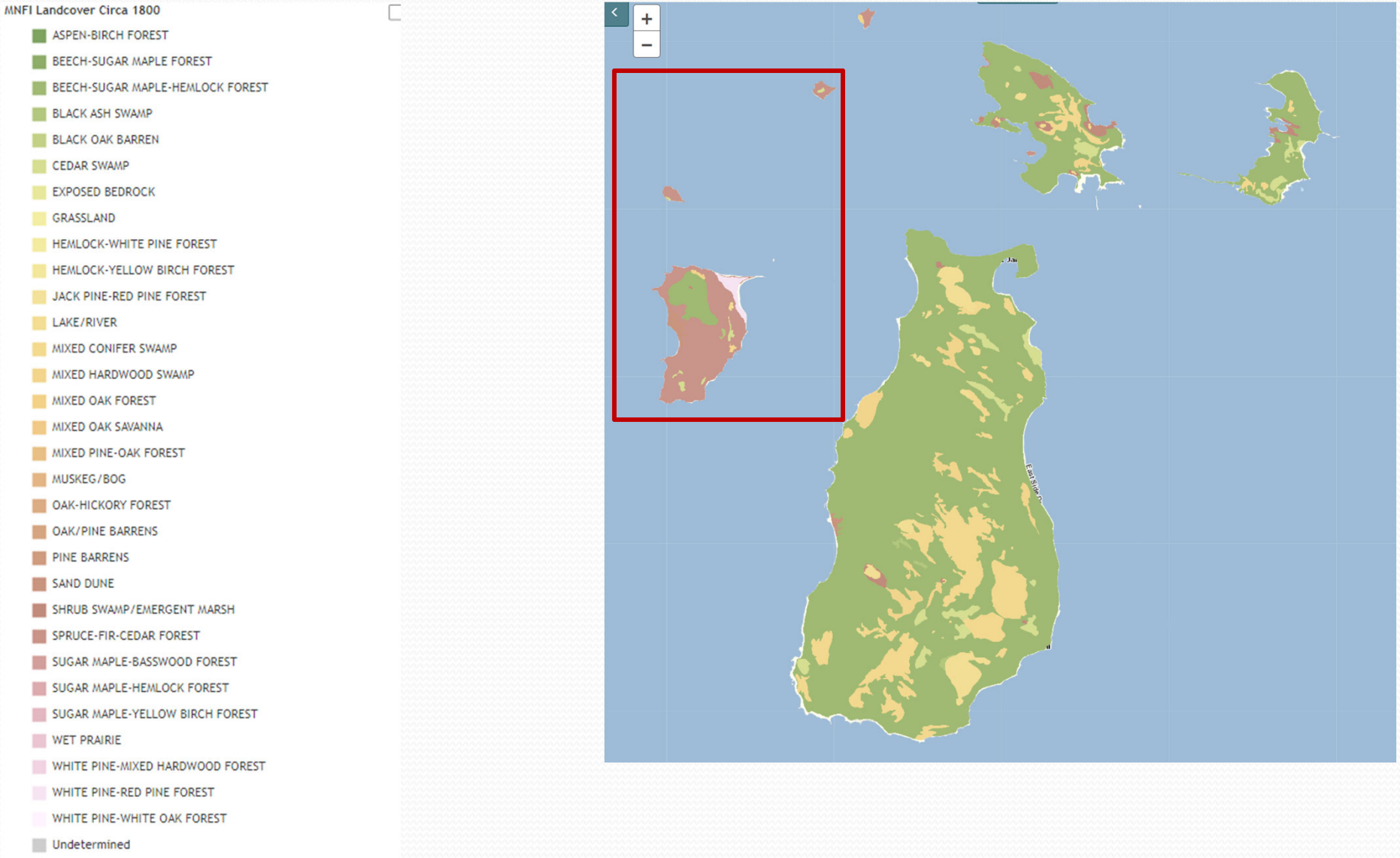
Location	Date	Magnitude
Charlevoix Co.	6/30/1962	1.75
Charlevoix Co.	5/8/1963	1.5
Charlevoix Co.	9/7/1985	1.5
EAST JORDAN	7/8/1996	0.75
BOYNE CITY	9/11/1996	1
CHARLEVOIX	7/2/1997	0.75
CHARLEVOIX	6/24/1998	0.75
CHARLEVOIX	6/24/1998	1
IRONTON	5/12/2000	1
EAST JORDAN	8/8/2000	0.75
IRONTON	4/18/2002	1
EAST JORDAN	8/12/2002	0.75
EAST JORDAN	7/31/2003	0.88
BOYNE FALLS	8/9/2004	0.75
EAST JORDAN	3/26/2007	0.75
CHARLEVOIX	10/18/2007	0.75
BOYNE CITY MUNI ARPT	4/25/2008	0.75
Chandler Township	4/25/2008	0.75
BOYNE FALLS	5/30/2008	1
EAST JORDAN	6/27/2008	0.75
Chandler Township	5/22/2011	1
EAST JORDAN	6/8/2011	0.75
City of Charlevoix	6/8/2011	0.75
EAST JORDAN	6/8/2011	0.75
EAST JORDAN	6/8/2011	1
EAST JORDAN	6/8/2011	1.75
City of Charlevoix	6/8/2011	0.75
BOYNE CITY MUNI ARPT	5/27/2012	0.75
EAST JORDAN ARPT	5/20/2013	1.5
ST JAMES WELKE ARPT	7/22/2014	0.75
EAST JORDAN	**7/8/2016**	**3**
EAST JORDAN	10/17/2016	1.5
BOYNE MTN ARPT	10/17/2016	0.88
EAST JORDAN	9/4/2017	0.88

- Wildfire
  - None outside of MDNR lands
  - 173 fires on MDNR land, 522.2 acres burned (1981-2018)



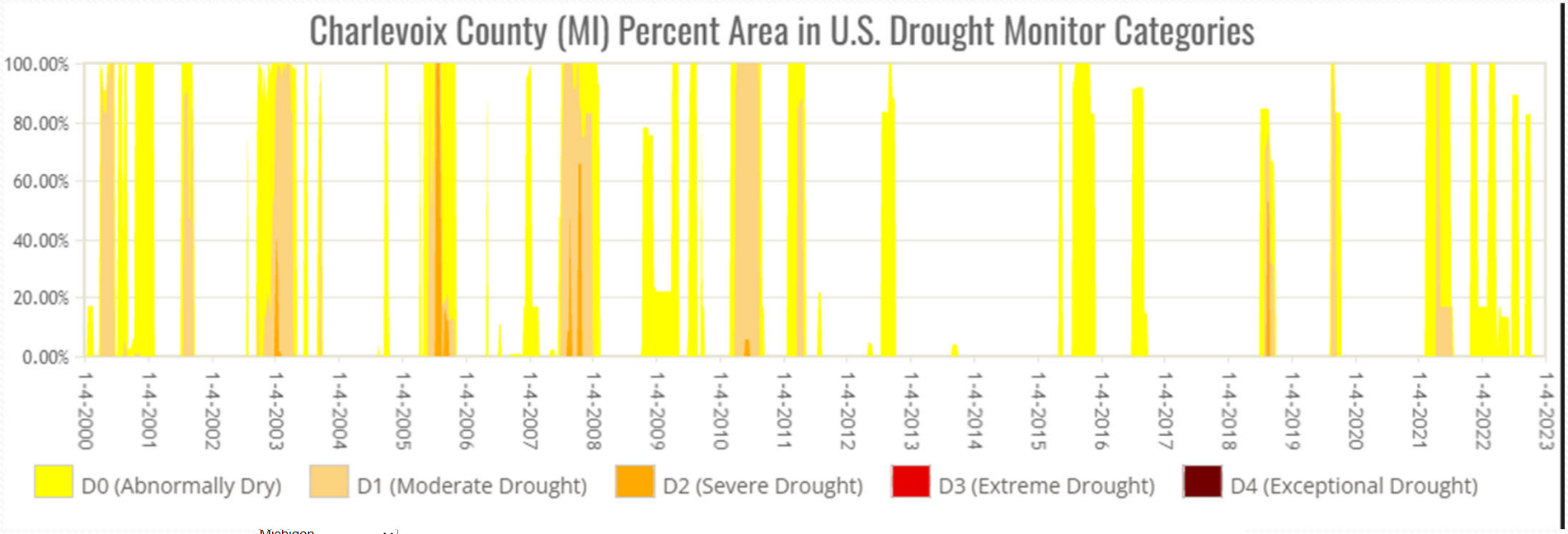
County Forests

County Forests



- 2 Drought Events
  - **9/1/2007** Drought conditions (severe, or D2), which carried over from August, eased thanks to wet weather early in the month. Charlevoix County was removed from severe drought when around an inch of rain fell from the 3rd into the 4th.
  - **08/28/2007** Drought conditions (severe, D2) expanded into the tip of Northern Michigan by the end of August. The was the result of a dry summer in the region. The dryness dated as far back as May, when only 1.09 inches of rain fell in Pellston. June rainfall was 1.92 inches. July rainfall was near normal and brought some respite, but August saw just 1.21 inches of rain at Pellston. A ban on burning was issued for most of the state in mid-August, the first such ban since 1998. Golf courses and farmers complained of very high utility bills, due to the need for near-constant irrigation. Corn and bean crops were severely impacted. Rains in September would partially alleviate drought conditions for a spell.

Drought Risk



Michigan

Category	Historically observed impacts
D0	Grass fires increase
	Lawns are brown; landscape and gardens are watered more frequently
D1	Most crops and vegetation are stressed; farmed Christmas trees are stressed
	Well levels decline
D2	Corn and soybean yields are low
	Mature trees are stressed
	Streamflow is extremely low, potentially too low to irrigate

Source: U.S. Drought Monitor https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx

Extreme Temperatures

- 2 Extreme Heat
  - **6/30/2018** The month of June closed with one of the hottest days in recent memory. Highs were well into the 90s, including 99 at Alpena, and 98 at Traverse City and Gaylord. The National Weather Service office near Gaylord also hit 98; that was (by several degrees) the warmest reading recorded at that location since observations began there in the late 1990s. Heat indices exceeded 105 degrees across most of northern lower Michigan, and some locations exceed 110. The warmest reported heat index on the day was 114 near Indian River. There were estimated to be between 25 and 30 individuals who visited local hospitals due to heat-related illnesses.
  - **08/01/2001** Excessive Heat was also a problem the first two weeks in August across all of northern Michigan. Temperatures reach the mid to upper 90s, on average, a few days each year; however, for a 5 day (8/5 - 8/9) stretch overnight low temperatures failed to fall below the lower 70s in most areas. This very humid air mass was unusual for northern Michigan, an area which typically sees cool nighttime temperatures and for this reason has very few homes with air conditioners. No heat related deaths or injuries were reported; however, most outdoor events were modified due to the forecasts of hot and humid conditions. County fairs sent animals home, yet still there were livestock losses at fairs in Otsego and Alcona counties. Attendance at county fairs was well below normal and this was attributed to the heat.

Extreme Temperatures

- 2 Extreme Cold
  - **2/14/2015** A clipper system passing just north and east of Michigan would bring a multitude of weather hazards. Widespread light snow occurred ahead of the system's cold front, but that snow was enhanced by Lake Michigan into northwest lower Michigan. Snowfall totals of 6 to 8 inches were seen, especially west and southwest of Traverse City, with the highest amounts near Wellston. The coldest air of the winter so far surged in behind the cold front, along with gusty northwest winds and lake effect snow. Considerable snowfall, blowing and drifting snow, and low wind chills were realized in northwest lower Michigan. Across the rest of northern Michigan, away from the temperature-mitigating effects of Lake Michigan, wind chills reached warning criteria. Wind chills reached 30 to 40 below zero in northern lower Michigan, and 40 to 50 below zero in eastern upper, bottoming out at -49 in Dafter early in the morning of the 15th.
  - **2/4/2007** Exceptionally cold air surged into Northern Michigan. High temperatures on the 4th (Super Bowl Sunday) were around zero, with low temperatures that night from five to ten below zero. Gusty northwest winds produced hazardous wind chills of 20 to 30 below zero, along with blowing and drifting snow. Many area schools closed on the 5th, due to the extreme cold and poor road conditions.

- 1 Flood/Flash Flood event

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.**

Charlevoix County Dams –

Listed on the National Inventory of Dams

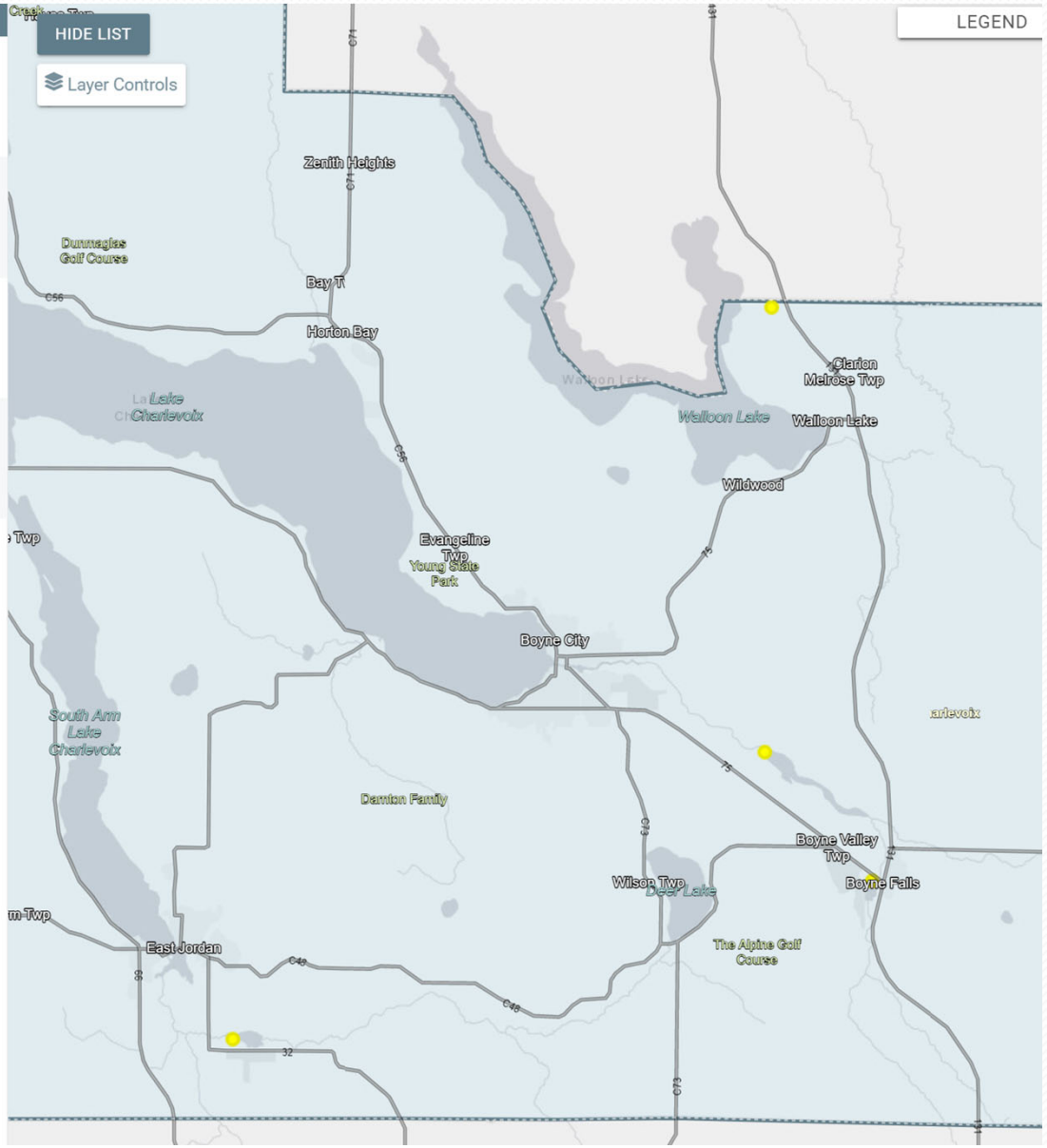
4 Dam(s) Found

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

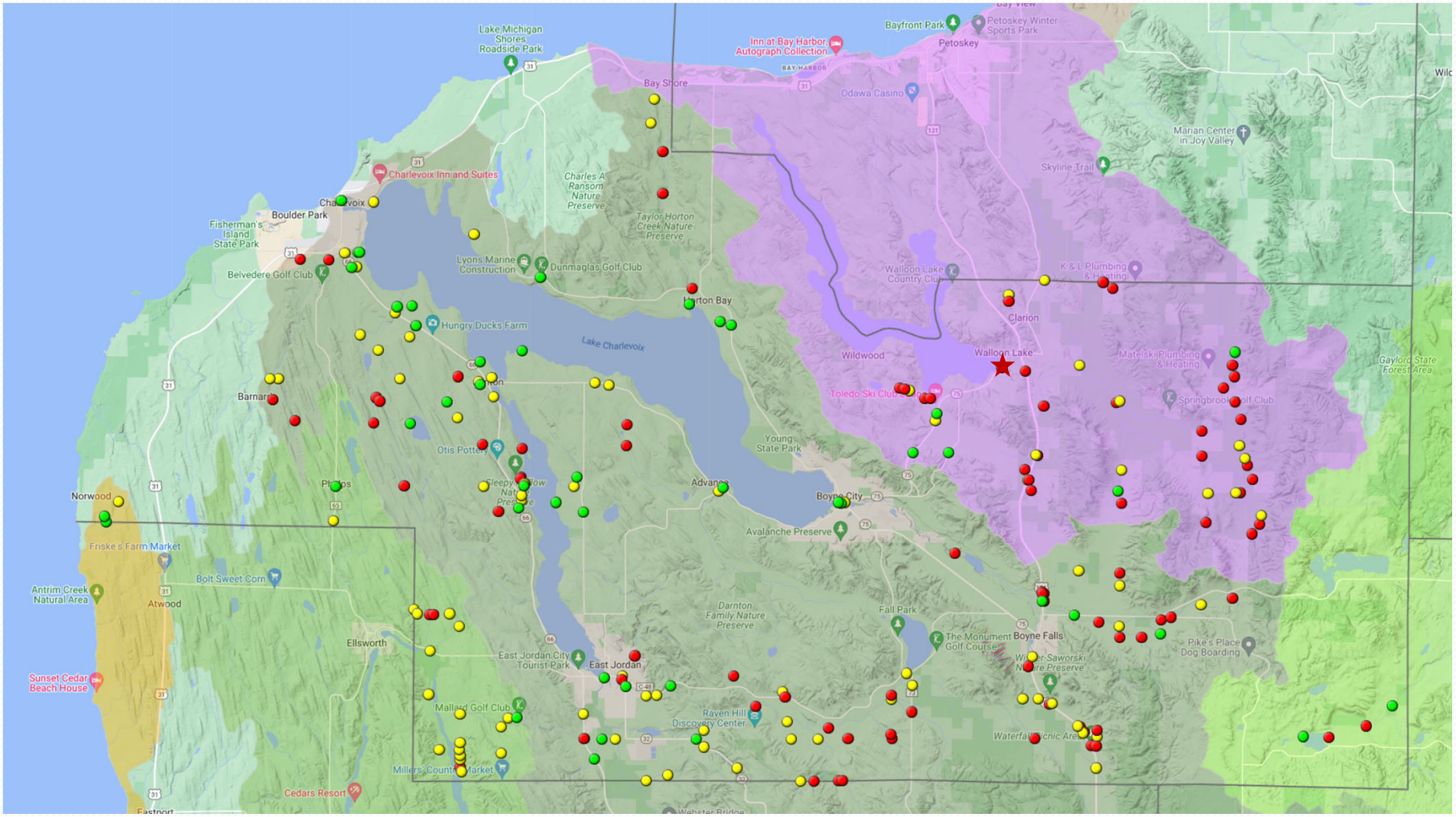
Walloon Lake Cc Dam #14
Hazard Potential Classification: Significant
Emergency Action Plan: Not Required
Owner Name: Walloon Lake Country Club
Primary Purpose: Recreation

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



Road Stream Crossings

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



Road Stream Crossings

Bear River at Walloon Lake and M-75 – Melrose Township, LTB-212, Rated Severe

County Wetlands

Map View | Search Tools | Share

Map Legend | Base Maps | About

Map Legend

Change what items you see on the map by using the checkboxes

Wetland Data

- Wetland (Hydric) Soils ☐
- National Wetlands Inventory 2005 ☐

Potential Wetland Restoration ☐

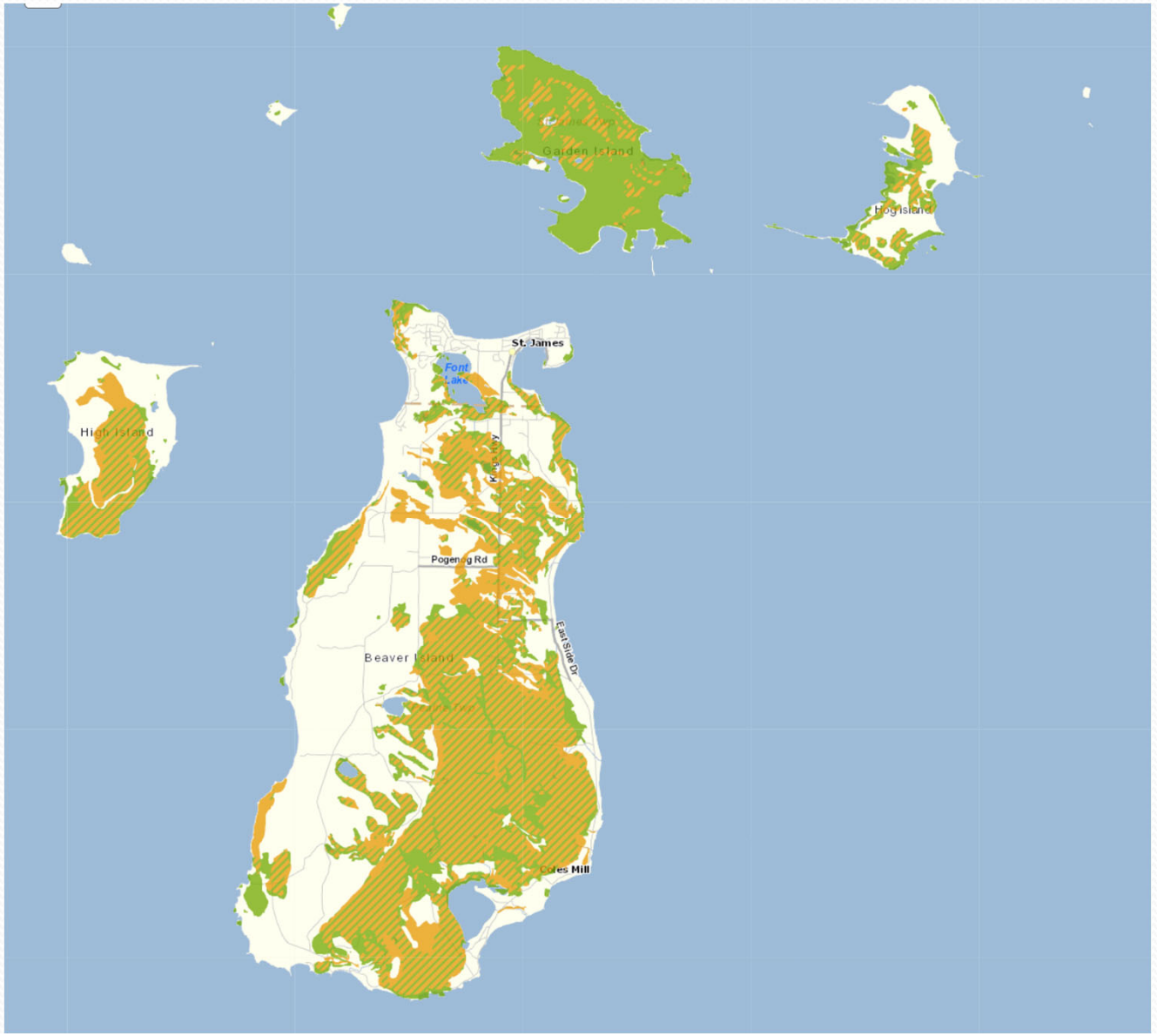
- Highest Potential - Hydric and Presettlement Wetland Overlay
- High Potential - Hydric Soils Only
- Moderate Potential - Presettlement Wetlands Only

Part 303 Final Wetlands Inventory ☑

- Wetlands as identified on NWI and MIRIS maps
- Soil areas which include wetland soils
- Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils

Stream Data

County Wetlands



NFIP & CRS Participating Communities

- The National Flood Insurance Program
- The NFIP provides flood insurance to property owners, renters and businesses, and having this coverage helps them recover faster when floodwaters recede. The NFIP works with communities required to adopt and enforce floodplain management regulations that help mitigate flooding effects.

- The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the NFIP

NFIP & CRS Participating Communities

CID	Community Name	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date	Program	Participating Community
260796A	BAY, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
260056A	BOYNE CITY, CITY OF	03/29/74	07/19/82	05/16/19	07/19/82	Regular	YES
260057A	CHARLEVOIX, CITY OF	06/02/74	02/11/83	05/16/19	02/11/83	Regular	YES
260790A	CHARLEVOIX, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
260372A	EAST JORDAN, CITY OF	07/11/75	07/19/82	05/16/19	07/19/82	Regular	YES
260800A	EVANGELINE, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
260773A	EVELINE, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
260778A	HAYES, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
261295A	MELROSE, TOWNSHIP OF		05/16/19	05/16/19(M)	08/28/19	Regular	YES
260769A	NORWOOD, TOWNSHIP OF		05/16/19	05/16/19	09/18/87	Regular	YES
261296A	PEAINE, TOWNSHIP OF		05/16/19	05/16/19	11/1/2019	Regular	YES
260761A	SOUTH ARM, TOWNSHIP OF		05/16/19	05/16/19	03/18/87	Regular	YES
261297A	ST. JAMES, TOWNSHIP OF		05/16/19	05/16/19	08/28/19	Regular	YES
261298A	WILSON, TOWNSHIP OF		05/16/19	(NSFHA)	11/18/2019	Regular	YES
261292A	**BOYNE VALLEY, TOWNSHIP OF**		**05/16/19**	**05/16/19**	**05/16/20**		**NO**
260808A	**MARION, TOWNSHIP OF**		**05/16/19**	**05/16/19**	**05/16/19(S)**	**Regular**	**NO**

- 3 Shoreline Flooding events

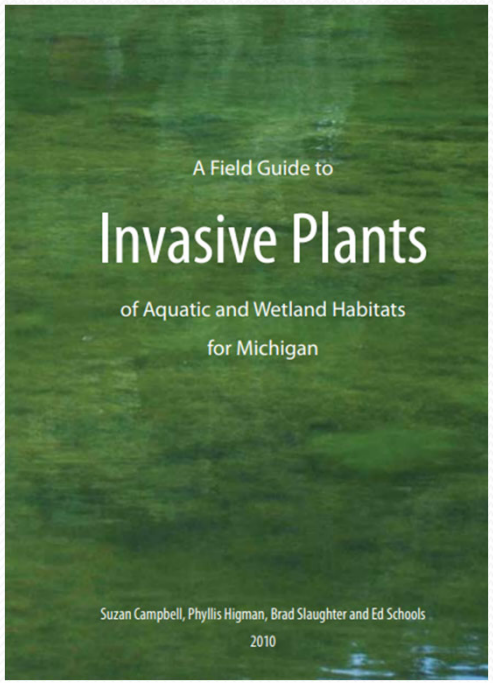
Date	Location	Episode Narrative	Event Narrative
October 21, 2019	Countywide /Regional	**Strong northerly to easterly winds resulted in another round of substantial coastal flooding and beach erosion, this time on both Lake Michigan and Lake Huron, for the 21st into the 22nd.**	**Just west of Bayshore, 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.**

Northwest Lower Michigan Coastal Resilience Atlas

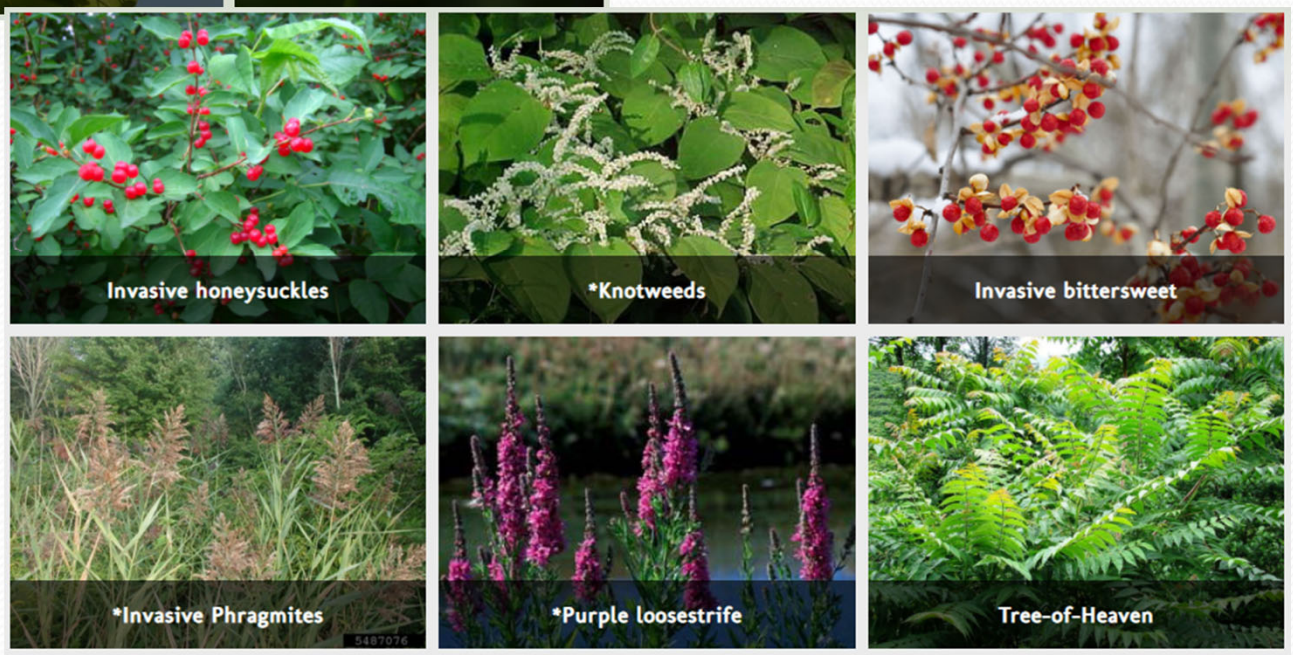
- Data provided by Land Information Access Association
- http://www.resilientmichigan.org/nw_atlas.asp
- Ten-county region
- Covers coastal hazards:
  - **Flooding**
  - **Coastal Recession / Erosion**
  - **Heat Vulnerability**
  - Local Zoning

Invasive Species

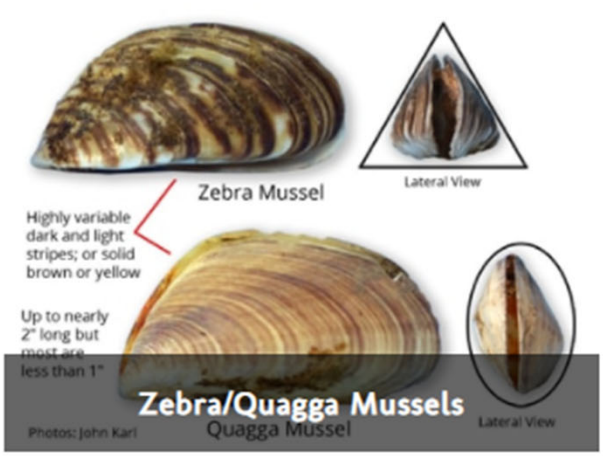
- Only a small fraction of non-native plants are invasive
- Invasives is a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm
- Lake-moderated climates along Lake Michigan, Lake Erie, Saginaw Bay, Thumb, and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



Invasive Species



Invasive Species



Zebra/Quagga Mussels


Round goby


Rusty crayfish


Eurasian Ruffe


Sea Lamprey

Asian Carp

Public Health Emergency – Pandemic

- Data provided by Michigan.gov
- https://www.michigan.gov/coronavirus/stats
- Covid-19 Cases by County
- As of November 15, 2022
- 5,721 Cases, 65 Deaths
- 20 of the 65 Deaths were persons aged 80+

- Other challenges that occurred because of the pandemic? Opportunities to improve?

Community Survey Responses

As of November 14, 2022, we have 30 responses so far. We have at least one response from all communities **except**:

- Chandler Township
- Charlevoix Township
- Eveline Township
- Hayes Township
- Hudson Township
- Marion Township

Next Steps

- Hazard mapping
- Review 2016 prioritized hazards
- Prepare hazard analysis
- Next group meeting