Appendix A:
COMMUNITY PROFILES

OCEANA COUNTY
Community Profile

1. Physical Features	
Lakes (acres)	Silver (690), Pentwater (431), Stony (276), McLaren (271), Hart (240)
Rivers	Pentwater, Pere Marquette, White
Cities	Hart
Villages	Hesperia, New Era, Pentwater, Rothbury, Shelby, Walkerville
Large public land areas	Huron Manistee National Forest; Pentwater State Game Area; Silver Lake State Park; Mears State Park; Hart-Montague Trail State Park
Other features	Lake Michigan shoreline; Coastal dune environment; Freshwater estuary & drowned river mouth (Pentwater River)

2. Land Cover: 2019 National Land Cover Dataset			*Source: Multi Resolution Land Characteristics Consortium*
% Developed	3.42 %	% Forests	16.59 %
% Agriculture	12.56 %	% Wetland	6.22 %

3. Land Value: 2022 Real and Personal Equalized Valuations			*Source: Oceana County Equalization Report 2022*
Agricultural	$194,802,808	Industrial	$41,664,600
Commercial	$103,825,918	Residential	$1,527,235,392
Total personal	$68,214,200		

4. Population Characteristics			*Source: 2021 American Community Survey 5-year Estimates, unless noted*
Population, 2021	26,884	% with disability	16.2 %
% change 2010 to 2020*	+ 0.3 %	% in poverty	13.0 %
Median age	43.5	ALICE households, 2021**	31 %
% under 18 years old	22.4 %	Avg. daily commute	23.4 minutes
% over 65 years old	20.7 %		

** US decennial census figures* ***Asset Limited, Income Constrained, Employed (United Way of Michigan)*

5. Peak Seasonal Population			*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*
Hotel rooms*	536	Vacant housing units**	5,802
Campground & RV sites*	3,552	Peak seasonal population	76,976

** WMSRDC research conducted in 2022* *** 2021 American Community Survey 5-year Estimates*

6. Housing			*Source: 2021 American Community Survey 5-year Estimates*
Housing units	15,591	Single units	12,184
Occupied housing units	9,789	Multi-units in structure	647
Vacant housing units	5,802	Mobile homes	2,749

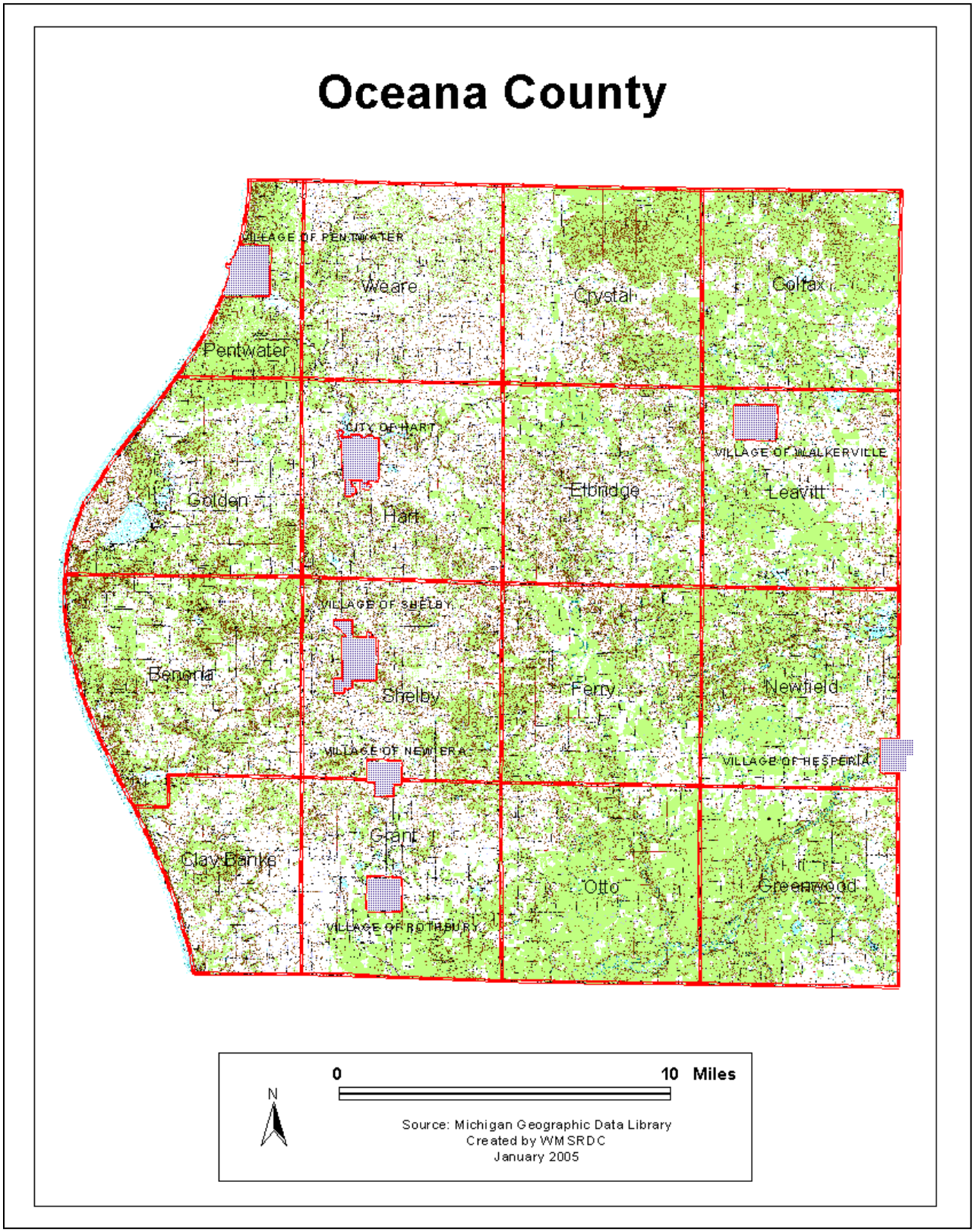
7. Public Services	
Fire	- Crystal Township Fire Department, 1503 E Hammett Rd. - DNR - Oceana Field Office, 1757 E. Hayes Rd. (M-20) - Ferry Township Fire Department, 2140 E. Main St. - Grant Township Fire Department, 7140 S. Oceana Dr. - Hart Fire Department, 808 S. State - Hesperia Area Fire Department, 8320 E. M-20 - Pentwater Fire Department, 486 E. Park - Shelby-Benona Fire Department, 430 Industrial Park Dr. - Walkerville Area Fire/Rescue, 134 S. East St.
Police	- Hart Police Department, 427 State St. - Hesperia Village Police Dept, 33 E. Michigan Ave. (Newaygo County) - Michigan State Police/Hart Post 66, 3720 W. Polk Rd. - Mason-Oceana 911 Central Dispatch, 9160 N. Oceana Drive - New Era Police Department, 2580 Ray St. - Oceana County Sheriff Department, 216 Lincoln St.

	- Pentwater Village Police Department, 326 Hancock St. - Rothbury Police Department, 7752 Michigan Ave. - Shelby Police Department, 189 Maple St. - Walkerville Police Department, 121 S. East St.
Wastewater	- City of Hart - Villages of Hesperia, New Era, Pentwater, Shelby, Walkerville
Community Water Systems	- City of Hart - Villages of Hesperia, Pentwater, Shelby - Greenlawn Mobile Home Court (Rothbury Village) - Oceana Acres (Hart Twp) - Golden Pond Estates (Golden Twp) - Hylander Valley (Weare Twp)
Public transportation	- *None identified*
Other	Oceana County Jail, 216 Lincoln St.
8. Critical Infrastructure	
Major roads	- Oceana Drive - B-15, B-86 - M-20, M-82, M-86, M-120 - US-31
Railroads	- *None identified*
Bridges	- M-20: White River North Branch, White River South Branch, US-31 overpass - US-31: Pentwater River South Branch, Pentwater River North Branch - US-31 Business Route: Bass Lake, Pentwater River North Branch - B-15: Pentwater Lake (Longbridge Rd) - Oceana Drive: Pentwater River North Branch, Hart Lake/Pentwater River South Branch
Airports	Oceana County Airport (Hart-Shelby), 1805 W. Baseline Rd.
Shelters	*Shelters surveyed by Red Cross:* - St. Joseph Catholic Church Hall, 2349 Jackson Rd (Weare Twp) - New Era Christian School, 1901 Oak Ave (New Era Village) - Pentwater Public Schools, 600 E Park St (Pentwater Village) - St. Vincent Catholic Church, 637 E 6th St (Pentwater Village) - Rothbury Community Church, 2440 W Winston Rd (Rothbury Village) - Shelby Middle School, 525 N State St (Shelby Village) - Walkerville Wesleyan Church, 144 S. Hamon (Walkerville Village) *Shelters that need to be surveyed by Red Cross:* - Congregational United Church of Christ, 408 S. State St., Hart, MI 49420 (Hart) - Elbridge Community Church, 2370 N 136th Ave., Hart, MI 49420 (Elbridge Twp) - Elbridge Township Hall, 2266 E. Polk Rd., Hart, MI 49420 (Elbridge Twp) - Golden Township Hall, 5527 W. Fox Rd, Mears, MI 49436 (Golden Twp) - Hart High School, 300 W. Johnson St., Hart, MI 49420 (Hart) - Hart Middle School, 308 W. Johnson St., Hart, MI 49420 (Hart) - Hart United Methodist Church, 308 State St., Hart, MI 49420 (Hart) - Hart VFW, 802 State St., Hart, MI 49420 (Hart) - Hart Wesleyan Church, 3400 Polk Rd., Hart, MI 49420 (Hart) - New Era Christian Reformed Church, 1820 Ray Ave, New Era, MI 49446 (New Era) - New Era Elementary, 2752 Hillcrest, New Era, MI 49446 (New Era) - New Era Reformed Church, 4775 First St., New Era, MI 49446 (New Era) - Pentwater Park Place, 310 Rush St., Pentwater, MI 49449 (Pentwater) - Pentwater VFW Hall, 8440 N. US 31, Pentwater, MI 49449 (Pentwater Twp) - Shelby High School, 641 N. State St., Shelby, MI 49455 (Shelby) - Shelby United Methodist Church, 68 E. Third St., Shelby, MI 49455 (Shelby) - St. Gregory's Church, 316 Peach St., Hart, MI 49420 (Hart) - Walkerville High School, 145 Lathrop, Walkerville, MI 49459 (Walkerville)
Schools	- Hart High School, 300 W. Johnson St. - Hart Middle School, 308 W. Johnson St.

	- Spitler Elementary School (Hart Public Schools), 302 W. Johnson St. - Diman-Wolf Early Childhood Center, 306 W. Johnson St. - New Era Christian Preschool, 1901 Oak Ave. - New Era Elementary (Shelby Public Schools), 2752 Hillcrest Dr. - Oceana Christian School, 3258 N. 72nd Ave. - Pentwater Public School (Elementary, Middle, and High School), 600 E. Park - Shelby High School, 641 N. State St. - Shelby Middle School, 525 N. State St. - Thomas Read Elementary (Shelby Public Schools), 155 6th St. - Shelby Early Childhood Center, 155 6th St. - Walkerville Elementary/Middle/High School, 180 E. Main St.
Community medical facilities, Hospitals	- Hart Family Medical Center, 611 E. Main St. (Hart) - Memorial Family Care Center, 2481 N. 72nd Ave. (Hart) - Trinity Health Shelby Hospital, 72 S. State St. (Shelby) - Northwest Michigan Health Services, 119 S. State St. (Shelby)
Ambulance service	- Emergency Medical Services, 3988 N. Oceana Dr. (Hart Township) - Emergency Medical Services, S. State St (Shelby Village)
Dams	Crystal Valley Dam, Foster Lake Dam, Gales Pond Dam, Hart Lake Dam, Lake Holiday Dam, Pond Dam (Hesperia), Silver Lake Level Control Structure, Upper Silver Lake Dam
9. Economic Assets	
Major employers	- Arbre Farms (Colfax Township) - Burnette Foods (New Era Village) - Big Hart Brewery (Hart City) - County Dairy (Shelby Township) - Double JJ Resort (Grant Township) - GHSP (Hart City) - Great Lakes Packing (Hart City) - Hallack Contracting (Hart City) - Hansen Foods (Hart City) - Hart Area Schools (Hart City) - Hometown Pharmacy (Hart, Shelby, New Era) - Media Technologies (Shelby Village) - Michigan Freeze Pack (Hart City) - Oceana County (Hart City) - Peterson Farms (Hart Township) - Seneca Foods / Gray and Company (Hart City) - Shelby Public Schools (Shelby Village) - Trinity Health Shelby Hospital (Shelby Village)
Power generation	Hart Lake Hydroelectric Dam
Electric transmission	Consumers Energy (townships of Crystal, Elbridge, Ferry, Grant, Greenwood, Hart, Leavitt, Newfield, Weare)
Pipelines	- Natural gas pipeline (townships of Elbridge, Grant, Hart, Leavitt, Shelby, Weare) - Natural gas pipeline & 30,000 gal storage tank, serving Lake Holiday & Upper Silver Lake (Golden Township)
Commercial transportation	- *None identified*
10. Other Assets, Infrastructure, etc.	
Community facilities	*Refer to individual community profiles*
Festivals	*Refer to individual community profiles*
Historic Sites	- Auto Tourist Camps/John Gurney Park, 300 Griswold St (Hart City) - Hart Historic Industrial District, 215-216 Lincoln St. & 109 Union St. (Hart City) - Daniel Weaver House, 84 S. Cook St. (Hesperia, Newago County) - Benona Township Hall, 7169 West Baker Road (Benona Twp) - Little Point Sable Light Station, Little Sable Point (Benona Twp)

	- Jared H Gay Log House, 128th Ave (Crystal Township) - Charles Mears Silver Lake Boardinghouse, SE Corner of Lighthouse & Silver Lake Channel rds. (Golden Twp) - US-31 (Old) Pentwater River Bridge, Oceana Dr. over Pentwater River (Hart Township) - Navigation Structures at Pentwater Harbor (Pentwater) - Veterans Day Storm-Graveyard of Ships Informational Designation, 421 S. Hancock St. (Pentwater) - Dumaw Creek Site (Pentwater Township) - Green Quarry Site (somewhere near Pentwater)

Land Use and Natural Features Map (USGS Quad.)

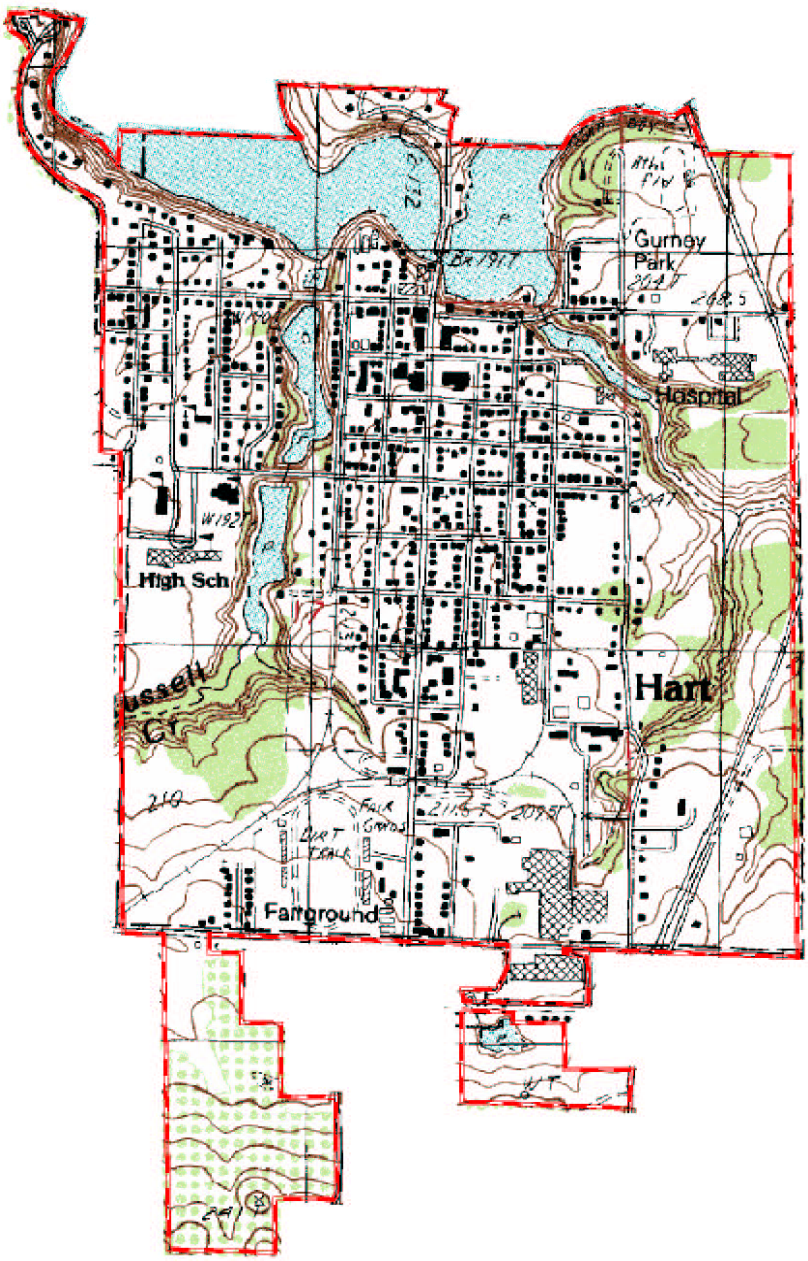


HART CITY
Community Profile

1. Physical Features			
Lakes	Hart (240)		
Rivers	Pentwater		
Notable features	- Hart-Montague Trail State Park - Gurney Park - Oceana County Fairgrounds - Historic downtown layout - County seat		
Land description	Mix of residential, commercial, and industrial uses		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$0	Industrial	$8,134,100
Commercial	$18,011,100	Residential	$32,044,500
Total personal	$3,115,100		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	2,193	% with disability	20.8 %
% change 2010 to 2020*	-3.4 %	% in poverty	18.8 %
Median age	37.3	ALICE households, 2021**	31 % (county)
% under 18 years old	27.0 %	Avg. daily commute	16.2 minutes
% over 65 years old	16.8 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	85	Vacant housing units	71
Campground & RV sites	80	Peak seasonal population	3,109
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	852	Single units	665
Occupied housing units	781	Multi-units in structure	176
Vacant housing units	71	Mobile homes	11
6. Public Services			
Fire	Hart Fire Department, 808 S. State		
Police	- Hart Police Department, 427 State St. - Michigan State Police/Hart Post 66, 3720 W. Polk Rd. - Oceana County Sheriff Department, 216 Lincoln St.		
Wastewater	City of Hart		
Community Water Systems	City of Hart		
Public transportation	- *None identified*		
Other	Oceana County Jail, 216 Lincoln St.		
7. Critical Infrastructure			
Major roads	- Oceana Drive - Polk Road		
Railroads	- *None identified*		
Bridges	- Oceana Drive over Pentwater River/Hart Lake - State Street over Hart Lake		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - None Identified		

	Shelters that need to be surveyed by Red Cross: - Congregational United Church of Christ, 408 S. State St., Hart, MI 49420 - Hart High School, 300 W. Johnson St., Hart, MI 49420 - Hart Middle School, 308 W. Johnson St., Hart, MI 49420 - Hart United Methodist Church, 308 State St., Hart, MI 49420 - Hart VFW, 802 State St., Hart, MI 49420 - Hart Wesleyan Church, 3400 Polk Rd., Hart, MI 49420 - St. Gregory's Church, 316 Peach St., Hart, MI 49420
Schools	- Hart High School, 300 W. Johnson St. - Hart Middle School, 308 W. Johnson St. - Spitler Elementary School, 302 W. Johnson St. - Diman-Wolf Early Childhood Center, 306 W. Johnson St.
Community medical facilities, Hospitals	- Trinity Health Primary Care-Hart, 611 E. Main St. - Oceana County Medical Care Facility, 701 E. Main St.
Ambulance service	- *None identified*
Dams	Hart Lake Dam
8. Economic Assets	
Major employers	- Big Hart Brewery (Hart City) - GHSP (Hart City) - Great Lakes Packing (Hart City) - Hallack Contracting (Hart City) - Hansen Foods (Hart City) - Hart Area Schools (Hart City) - Hometown Pharmacy (Hart, Shelby, New Era) - Michigan Freeze Pack (Hart City) - Oceana County (Hart City) - Seneca Foods / Gray and Company (Hart City)
Power generation	Hart Lake Dam (hydroelectric)
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- City of Hart, 407 State St. - Hart Public Library, 407 S. State St. - Oceana County Building, 100 N. State - County Services Building, 844 S. Griswold St.
Festivals:	- Hart Heritage Days (Labor Day weekend) - National Asparagus Festival (spring) - Oceana County Fair (3rd week in August)
Historic Sites:	- Auto Tourist Camps/John Gurney Park - Hart Downtown & Historic Industrial District

Land Use and Natural Features Map (USGS Quad.)
CITY OF HART



HESPERIA VILLAGE
Community Profile

1. Physical Features			
Lakes	None		
Rivers	White River		
Notable features	- Hesperia straddles the line between Oceana and Newaygo counties - Historic downtown layout - Hesperia dam		
Land description	Mix of residential and commercial uses mainly south of the White River. Much less developed north of White River.		
2. Land Value: 2022 Real and Personal Equalized Valuations		**Not available for village*	
Agricultural	*	Agricultural	*
Commercial	*	Commercial	*
Total personal	*		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	830	% with disability	19.3 %
% change 2010 to 2020*	+8.4 %	% in poverty	19.6 %
Median age	49.4	ALICE households, 2021**	31 % (county)
% under 18 years old	22.7 %	Avg. daily commute	28.8 minutes
% over 65 years old	25.5 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	8	Vacant housing units**	39
Campground & RV sites*	49	Peak seasonal population	1,276
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	407	Single units	313
Occupied housing units	368	Multi-units in structure	91
Vacant housing units	39	Mobile homes	3
6. Public Services			
Fire	- *None identified*		
Police	Hesperia Village Police Department, 33 E. Michigan Ave. (Newaygo County)		
Wastewater	Village of Hesperia		
Community Water Systems	Village of Hesperia		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	M-20, M-120		
Railroads	None identified		
Bridges	M-20: White River North Branch		
Airports	None identified		
Shelters	None identified on the Oceana County side, though Hesperia Community Schools buildings on the Newaygo County side are likely made shelters in an emergency		
Schools	- Hesperia High School, 96 S Division (Newaygo County) - Hesperia Middle School, 96 S Division (Newaygo County) - Patricia St. Clair Elementary, 96 S Division (Newaygo County) - Hesperia Community Education, 232 S Cook St (Newaygo County)		

Community medical facilities, Hospitals	Hesperia Medical Center, 78 N Division (Newaygo County)
Ambulance service	None identified
Dams	Pond Dam (Hesperia)
8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Village of Hesperia, 33 E. Michigan Ave. (Newaygo County) - Hesperia Library & Civic Center, 80 S. Division St. (Newaygo County)
Festivals:	Family Fun Fest (around 4th of July)
Historic Sites:	Daniel Weaver House, 84 S. Cook St. (Hesperia, Newago County)

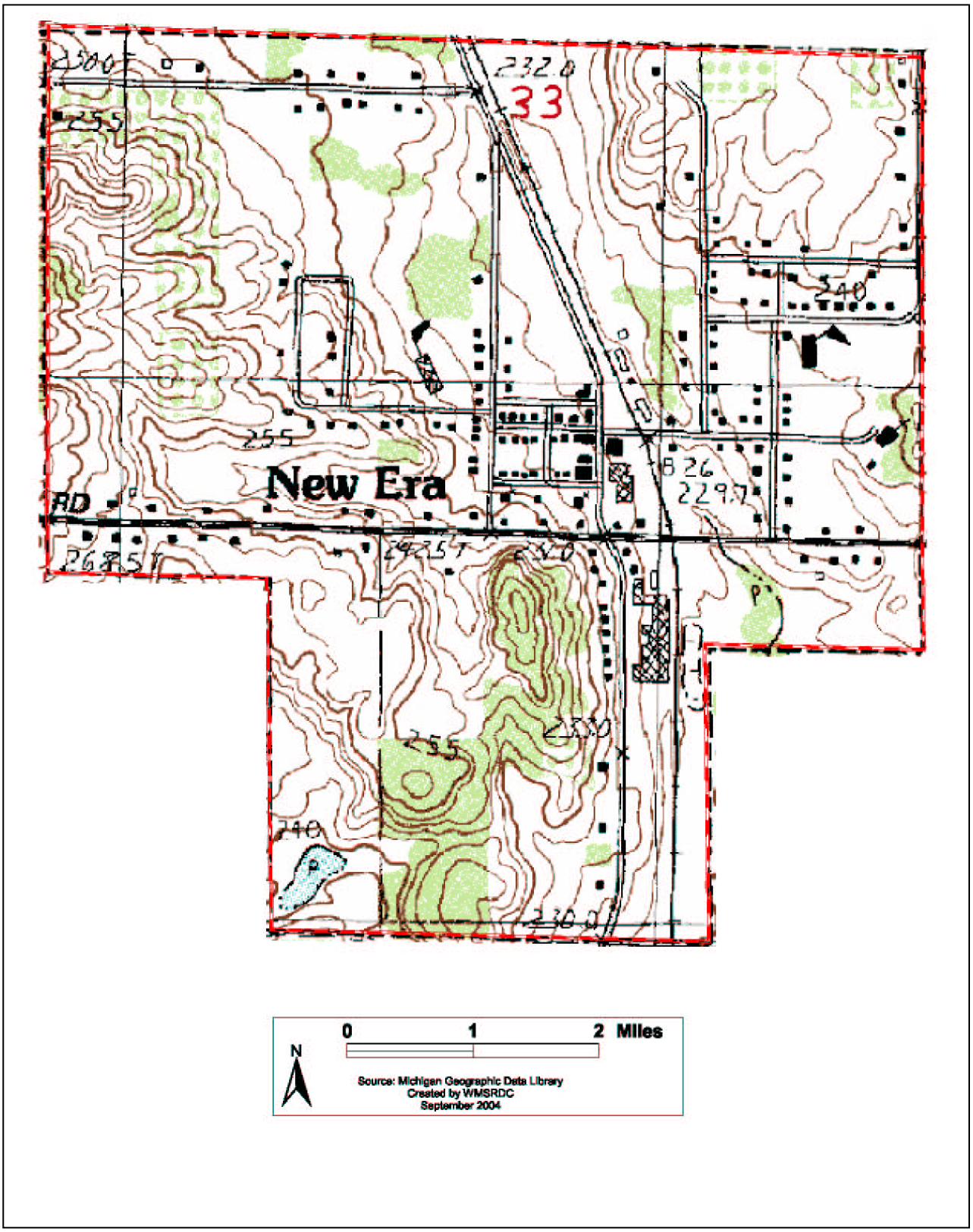
Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF HESPERIA

NEW ERA VILLAGE
Community Profile

1. Physical Features			
Lakes	None		
Rivers	- Carlton Creek headwaters		
Notable features	- Hart-Montague Trail State Park Trailhead - Wellhead protection area - Historic downtown layout		
Land description	Single family residential neighborhoods and a commercial district. Food processing facility at south end of town		
2. Land Value: 2022 Real and Personal Equalized Valuations		**Not available for village*	
Agricultural	*	Agricultural	*
Commercial	*	Commercial	*
Total personal	*		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	397	% with disability	10.6 %
% change 2010 to 2020*	-1.1 %	% in poverty	3.8 %
Median age	53.2	ALICE households, 2021**	31 % (county)
% under 18 years old	15.4 %	Avg. daily commute	22.3 minutes
% over 65 years old	34.5 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	15
Campground & RV sites*	0	Peak seasonal population	487
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	174	Single units	169
Occupied housing units	159	Multi-units in structure	5
Vacant housing units	15	Mobile homes	0
6. Public Services			
Fire	- *None identified*		
Police	New Era Police Department, 2580 Ray St.		
Wastewater	Village of New Era		
Community Water Systems	Village of New Era		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	Oceana Drive (1st St)		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - New Era Christian School, 1901 Oak Ave *Shelters that need to be surveyed by Red Cross:* - New Era Christian Reformed Church, 1820 Ray Ave, New Era, MI 49446 - New Era Elementary, 2752 Hillcrest, New Era, MI 49446 - New Era Reformed Church, 4775 First St., New Era, MI 49446		

Schools	- New Era Christian Preschool, 1901 Oak Ave. - New Era Elementary (Shelby Public Schools), 2752 Hillcrest Dr.
Community medical facilities, Hospitals	- *None identified*
Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	- Burnette Foods (New Era Village) - Hometown Pharmacy (Hart, Shelby, New Era)
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	New Era Village Hall, 2589 Garfield
Festivals:	New Era Fall Street Festival (September)
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF NEW ERA



PENTWATER VILLAGE
Community Profile

1. Physical Features			
Lakes	Lake Michigan, Pentwater (240)		
Rivers	None		
Notable features	- Historic houses and downtown layout - Waterfront community, recreational port - Mears State Park		
Land description	Single family residential neighborhoods and a commercial district		
2. Land Value: 2022 Real and Personal Equalized Valuations		**Not available for village*	
Agricultural	*	Agricultural	*
Commercial	*	Commercial	*
Total personal	*		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	856	% with disability	20.9 %
% change 2010 to 2020*	3.9 %	% in poverty	8.4 %
Median age	65.6	ALICE households, 2021**	31 % (county)
% under 18 years old	7.9 %	Avg. daily commute	21.1 minutes
% over 65 years old	53.2 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	8	Vacant housing units	538
Campground & RV sites	175	Peak seasonal population	4,800
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	956	Single units	811
Occupied housing units	418	Multi-units in structure	113
Vacant housing units	538	Mobile homes	32
6. Public Services			
Fire	Pentwater Fire Department, 486 E. Park		
Police	Pentwater Village Police Department, 326 Hancock St		
Wastewater	Village of Pentwater		
Community Water Systems	Village of Pentwater		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	Business US-31		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - Pentwater Public Schools, 600 E Park St - St. Vincent Catholic Church, 637 E 6th St *Shelters that need to be surveyed by Red Cross:* - Pentwater Park Place, 310 Rush St., Pentwater, MI 49449		
Schools	Pentwater Public Schools (Elementary, Middle, and High School), 600 E. Park		
Community medical facilities,	- *None identified*		

Hospitals	
Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	Pentwater School District
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Pentwater Village Hall, 327 S. Hancock - Pentwater Township Hall, 500 N. Hancock St
Festivals:	Oktoberfest (Fall)
Historic Sites:	- Navigation Structures at Pentwater Harbor - Veterans Day Storm-Graveyard of Ships Informational Designation, 421 S. Hancock St.

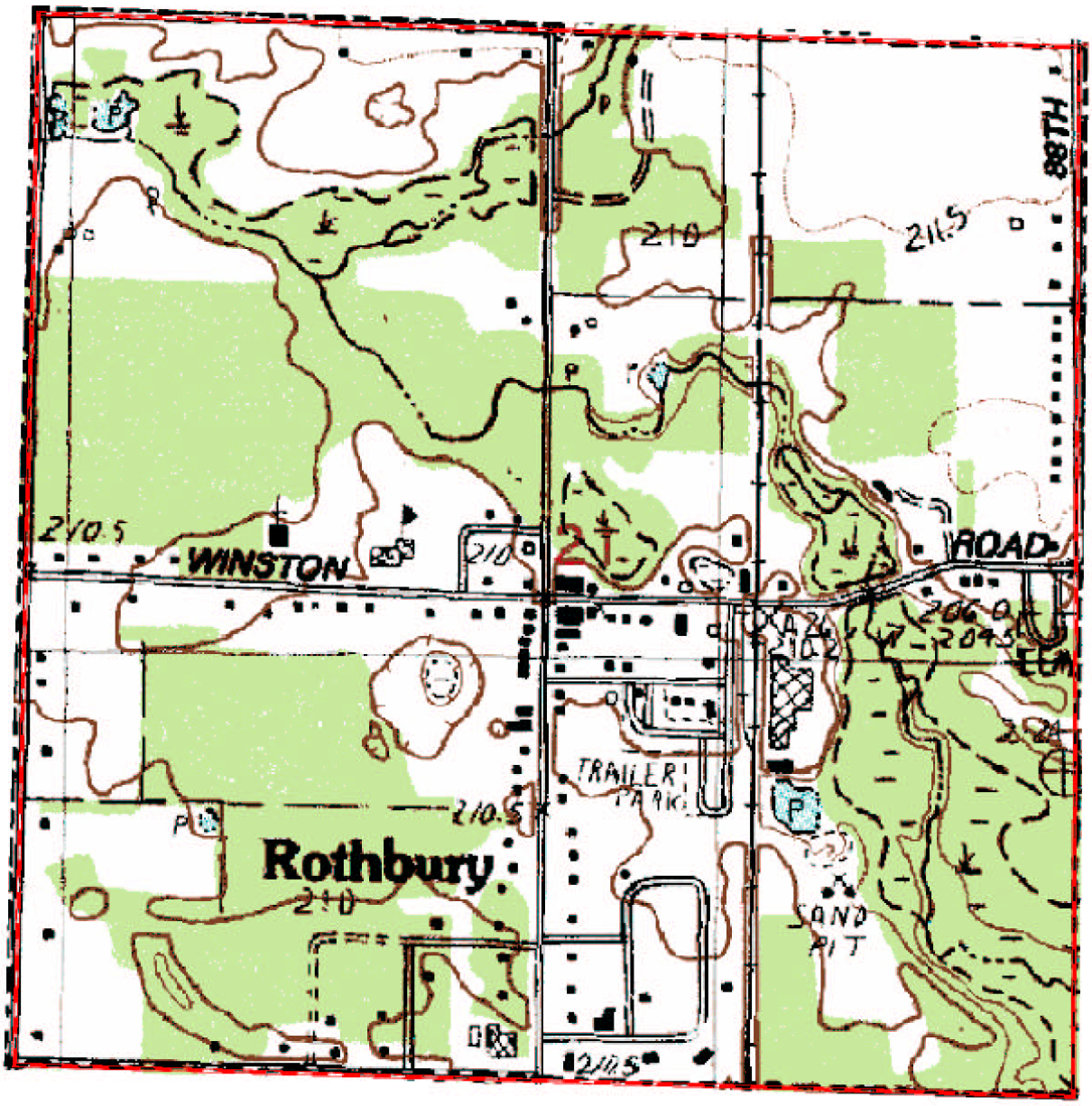
Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF PENTWATER

ROTHBURY VILLAGE
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	- *None identified*		
Notable features	Hart-Montague Trail State Park		
Land description	Mix of residential and commercial		
2. Land Value: 2022 Real and Personal Equalized Valuations		**Not available for village*	
Agricultural	*	Agricultural	*
Commercial	*	Commercial	*
Total personal	*		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	384	% with disability	17.7 %
% change 2010 to 2020*	6.9 %	% in poverty	20.8 %
Median age	35	ALICE households, 2021**	31 % (county)
% under 18 years old	31.0 %	Avg. daily commute	20.3 minutes
% over 65 years old	16.7 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	12
Campground & RV sites	0	Peak seasonal population	456
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	140	Single units	96
Occupied housing units	128	Multi-units in structure	0
Vacant housing units	12	Mobile homes	44
6. Public Services			
Fire	- *None identified*		
Police	Rothbury Police Department, 7752 Michigan Ave.		
Wastewater	- *None identified*		
Water	Greenlawn Mobile Home Court (community water system)		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	Oceana Drive (Michigan Ave)		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - Rothbury Community Church, 2440 W Winston Rd *Shelters that need to be surveyed by Red Cross:* - None		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Village of Rothbury, 7804 S. Michigan Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF ROTHBURY

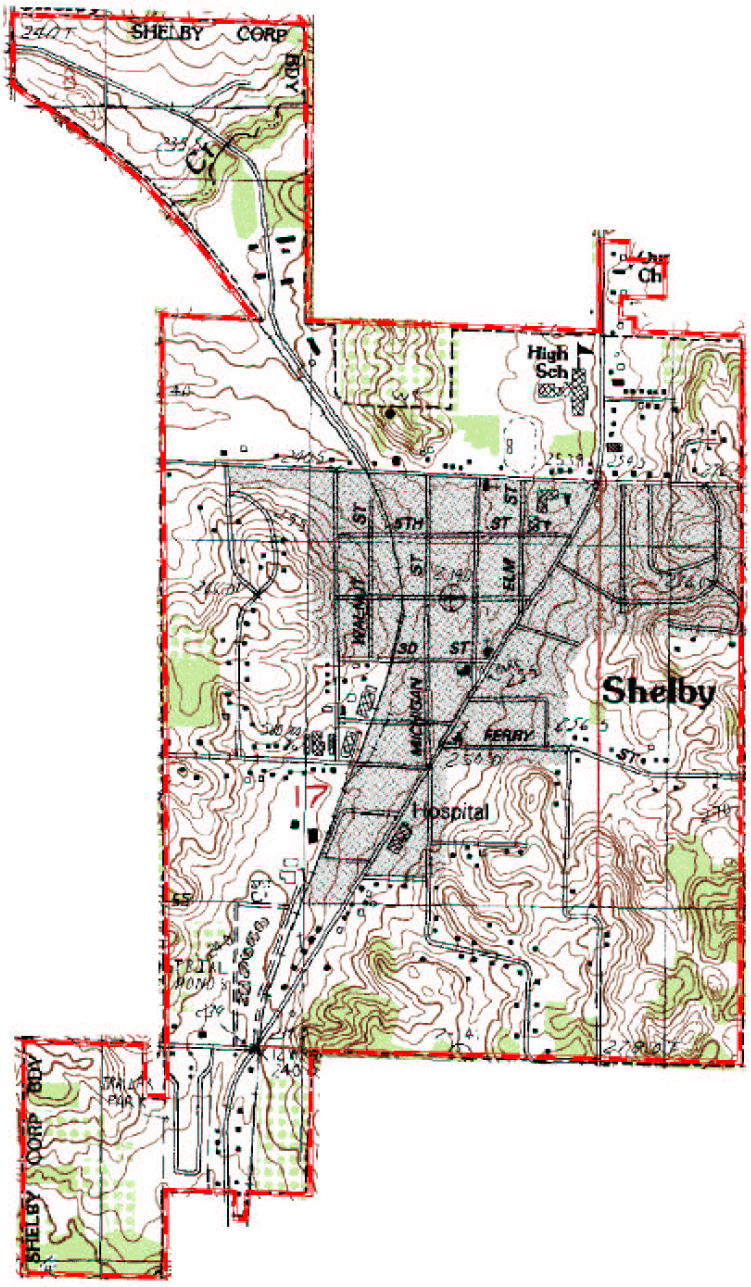


SHELBY VILLAGE
Community Profile

1. Physical Features			
Lakes (acres)	- *None identified*		
Rivers	- *None identified*		
Notable features	- Hart-Montague Trail State Park - Historic downtown layout		
Land description	Mix of residential, commercial, and industrial uses		
2. Land Value: 2022 Real and Personal Equalized Valuations*		*Source: Oceana County Equalization Report 2022*	
Agricultural	*	Industrial	*
Commercial	*	Residential	*
Total personal	*	**Not available for village*	
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	2,627	% with disability	10.3 %
% change 2010 to 2020*	-4.9 %	% in poverty	16.9 %
Median age	28.3	ALICE households, 2021**	31 % (county)
% under 18 years old	34.3 %	Avg. daily commute	17.3 minutes
% over 65 years old	9.9 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	67
Campground & RV sites	0	Peak seasonal population	3,029
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	853	Single units	627
Occupied housing units	786	Multi-units in structure	152
Vacant housing units	67	Mobile homes	74
6. Public Services			
Fire	Shelby-Benona Fire Department, 430 Industrial Park Dr		
Police	Shelby Police Department, 189 Maple St		
Wastewater	Village of Shelby		
Water	Village of Shelby		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	Oceana Drive (State St)		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - Shelby Middle School, 525 N State St *Shelters that need to be surveyed by Red Cross:* - Shelby High School, 641 N. State St., Shelby, MI 49455 - Shelby United Methodist Church, 68 E. Third St., Shelby, MI 49455		
Schools	- Shelby High School, 641 N. State St. - Shelby Middle School, 525 N. State St. - Thomas Read Elementary, 155 6th St.		

	- Shelby Early Childhood Center, 155 6th St.
Community medical facilities, Hospitals	- Trinity Health Shelby Hospital, 72 S. State St. - Northwest Michigan Health Services, 119 S. State St.
Ambulance service	Emergency Medical Services, S. State St
Dams	- *None identified*
8. Economic Assets	
Major employers	- Hometown Pharmacy (Hart, Shelby, New Era) - Media Technologies - Shelby Public Schools - Trinity Health Shelby Hospital
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Village of Shelby, 189 N. Maple St. - Shelby Public Library, 189 N. Maple St.
Festivals:	Shelby Farm to Table Harvest Festival (Fall)
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF SHELBY

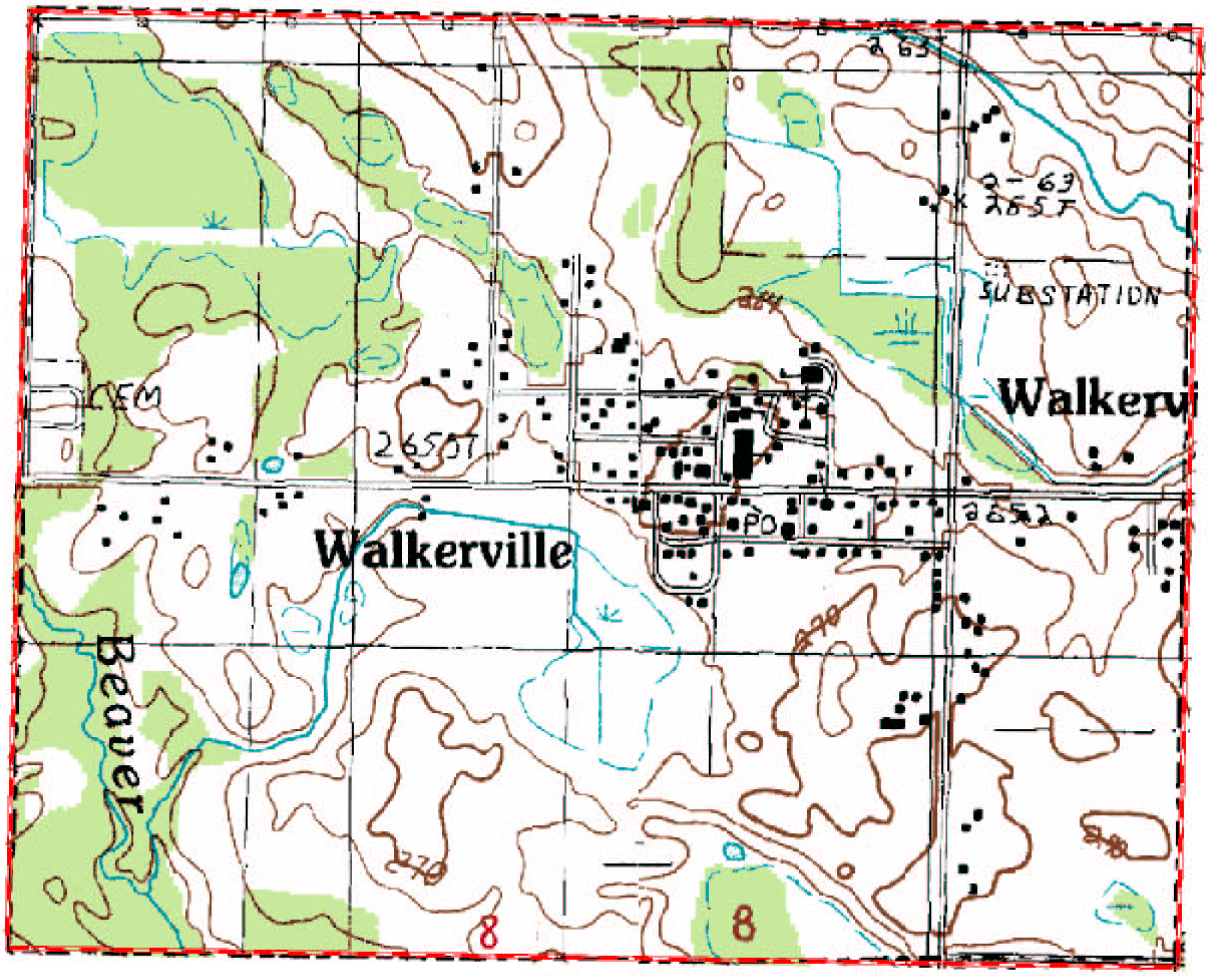


WALKERVILLE VILLAGE
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	- *None identified*		
Notable features	Rural & agricultural community		
Land description	Mix of residential, commercial, and civic uses		
2. Land Value: 2022 Real and Personal Equalized Valuations		**Not available for village*	
Agricultural	*	Agricultural	*
Commercial	*	Commercial	*
Total personal	*		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	243	% with disability	30.0 %
% change 2010 to 2020*	-0.4 %	% in poverty	33.6 %
Median age	35.3	ALICE households, 2021**	31 % (county)
% under 18 years old	35.0 %	Avg. daily commute	27.8 minutes
% over 65 years old	9.9 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units	8
Campground & RV sites*	0	Peak seasonal population	291
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	94	Single units	43
Occupied housing units	86	Multi-units in structure	0
Vacant housing units	8	Mobile homes	51
6. Public Services			
Fire	Walkerville Area Fire/Rescue, 134 S. East St		
Police	Walkerville Police Department, 121 S. East St		
Wastewater	Village of Walkerville		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - Walkerville Wesleyan Church, 144 S. Hamon *Shelters that need to be surveyed by Red Cross:* - Walkerville High School, 145 Lathrop St, Walkerville, MI 49459		
Schools	Walkerville Elementary/Middle/High School, 145 Lathrop St		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- Consumers Energy Transmission Line - Wolverine Power Transmission Line and Substation
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Village of Walkerville, 1215 S. East St
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
VILLAGE OF WALKERVILLE

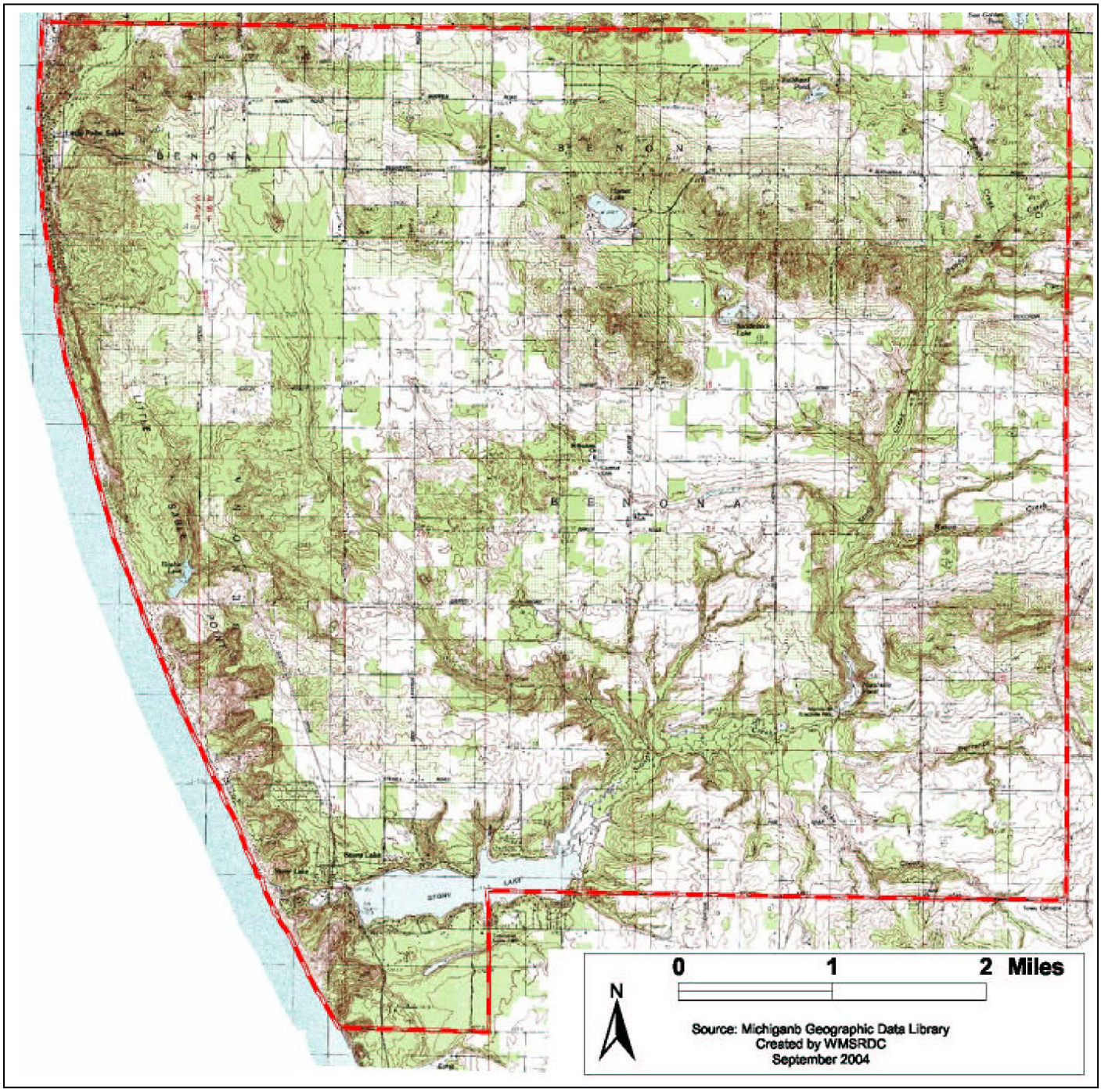


BENONA TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Stony Lake		
Rivers	Stony Creek		
Notable features	- Lake Michigan shoreline and dune environment - Stony Lake (unincorporated community)		
Land description	Mainly rural & agricultural with scattered residential; residential concentrations around Stony Lake and Lake Michigan shoreline		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$17,974,500	Industrial	$24,900
Commercial	$2,703,400	Residential	$234,617,400
Total personal	$3,249,800		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,432	% with disability	20.7 %
% change 2010 to 2020*	-0.8 %	% in poverty	8.4 %
Median age	54.6	ALICE households, 2021**	31 % (county)
% under 18 years old	14.9 %	Avg. daily commute	23.1 minutes
% over 65 years old	30.5 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	752
Campground & RV sites*	70	Peak seasonal population	6,224
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,342	Single units	1,245
Occupied housing units	590	Multi-units in structure	9
Vacant housing units	752	Mobile homes	88
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	B-15 (Scenic Dr)		
Railroads	- *None identified*		
Bridges	B-15 (Scenic Dr) over Stony Creek		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		
8. Economic Assets			

Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Benona Township Hall, 7169 W. Baker Rd
Festivals:	- *None identified*
Historic Sites:	- Benona Township Hall, 7169 West Baker Road - Little Point Sable Light Station, Little Sable Point

Land Use and Natural Features Map (USGS Quad.)
BENONA TOWNSHIP

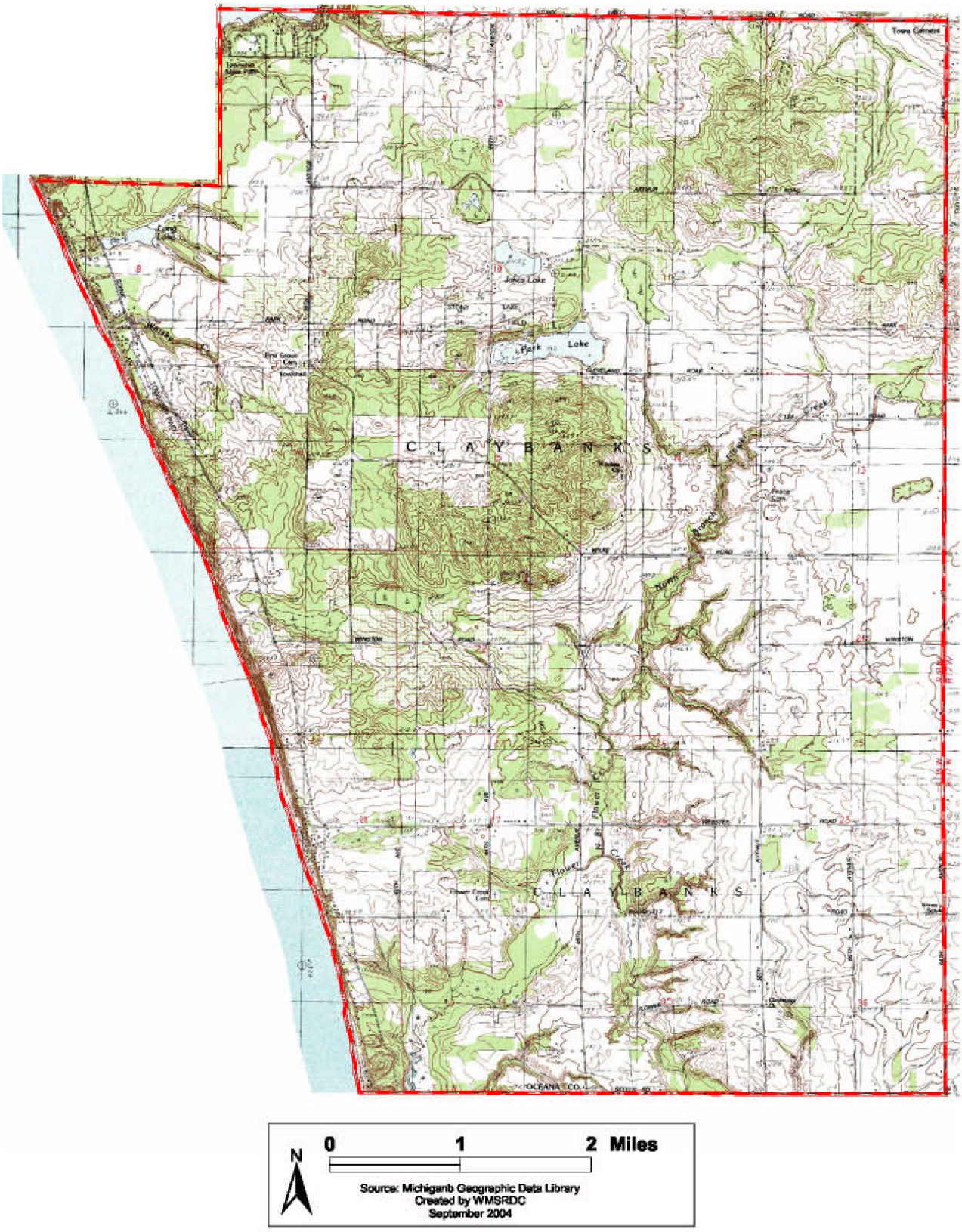


CLAYBANKS TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Stony Lake		
Rivers	- *None identified*		
Notable features	Lake Michigan shoreline and dune environment		
Land description	Mainly undeveloped, rural & agricultural with scattered residential; residential concentrations around Stony Lake and Lake Michigan shoreline		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$18,435,000	Industrial	$31,500
Commercial	$383,100	Residential	$86,430,600
Total personal	$1,614,500		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	882	% with disability	13.0 %
% change 2010 to 2020*	+10.0 %	% in poverty	13.0 %
Median age	51.5	ALICE households, 2021**	31 % (county)
% under 18 years old	18.7 %	Avg. daily commute	25.7 minutes
% over 65 years old	27.3 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	212
Campground & RV sites*	172	Peak seasonal population	2,842
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	555	Single units	488
Occupied housing units	343	Multi-units in structure	0
Vacant housing units	212	Mobile homes	63
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	B-15 (Scenic Dr)		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Claybanks, 7577 W. Cleveland
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
CLAYBANKS TOWNSHIP

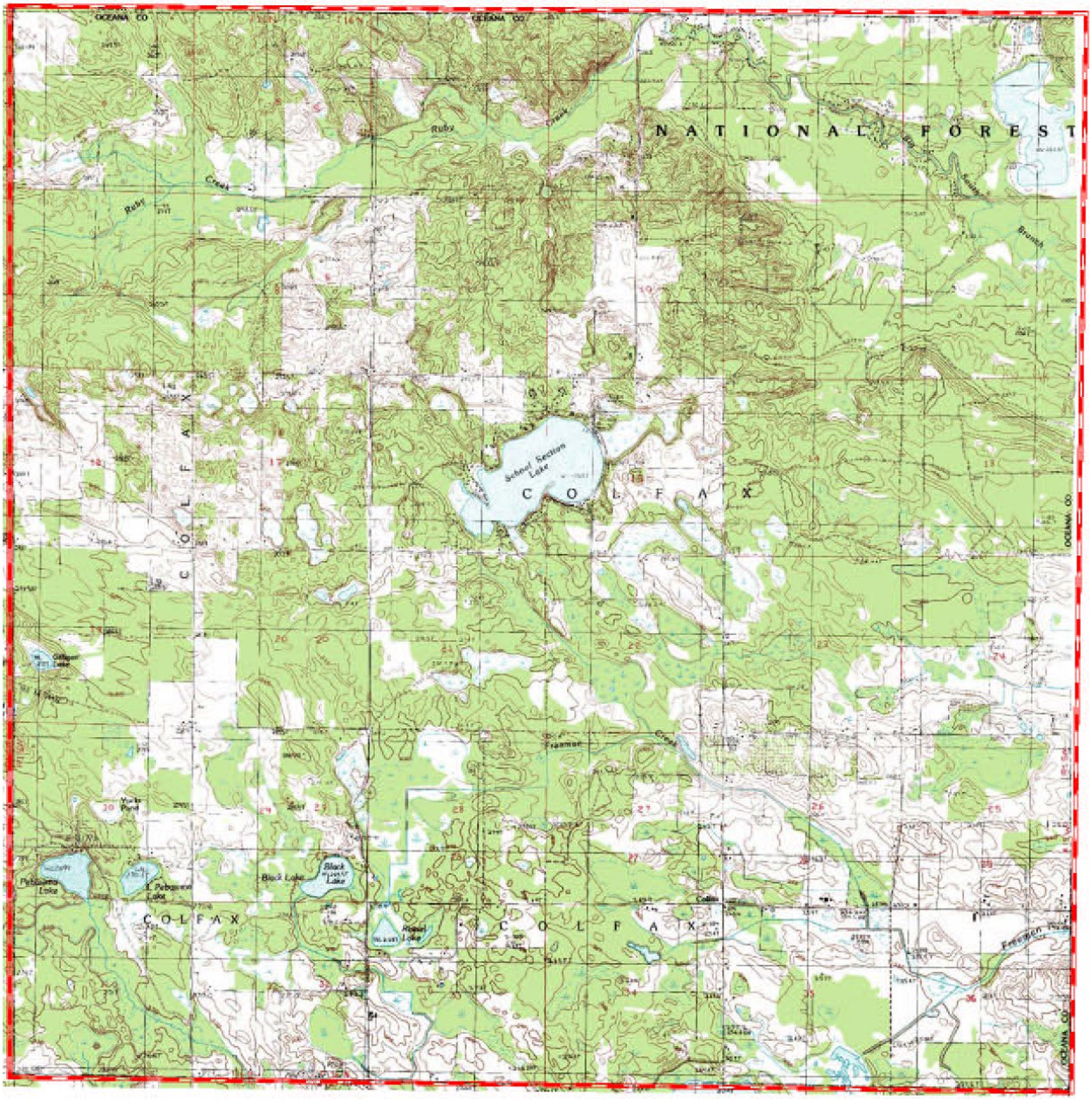


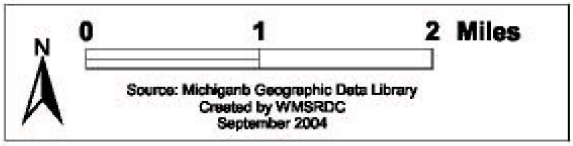
COLFAX TOWNSHIP
Community Profile

1. Physical Features			
Lakes	School Section Lake		
Rivers	South Branch Pere Marquette River		
Notable features	Manistee National Forest		
Land description	Most of the township is forested with agriculture being the most predominant land use		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$8,406,700	Industrial	$7,141,900
Commercial	$252,400	Residential	$31,265,200
Total personal	$2,174,700		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	667	% with disability	14.2 %
% change 2010 to 2020*	-3.5 %	% in poverty	27.0 %
Median age	35.5	ALICE households, 2021**	31 % (county)
% under 18 years old	23.5 %	Avg. daily commute	25.1 minutes
% over 65 years old	11.2 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	337
Campground & RV sites*	122	Peak seasonal population	3,177
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	503	Single units	372
Occupied housing units	166	Multi-units in structure	0
Vacant housing units	337	Mobile homes	131
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	Foster Lake Dam		

8. Economic Assets	
Major employers	- Arbre Farms - Willow Cold Storage
Power generation	- *None identified*
Electric transmission	Wolverine Power Transmission Line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Colfax, 5594 N. 192nd Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
COLFAX TOWNSHIP



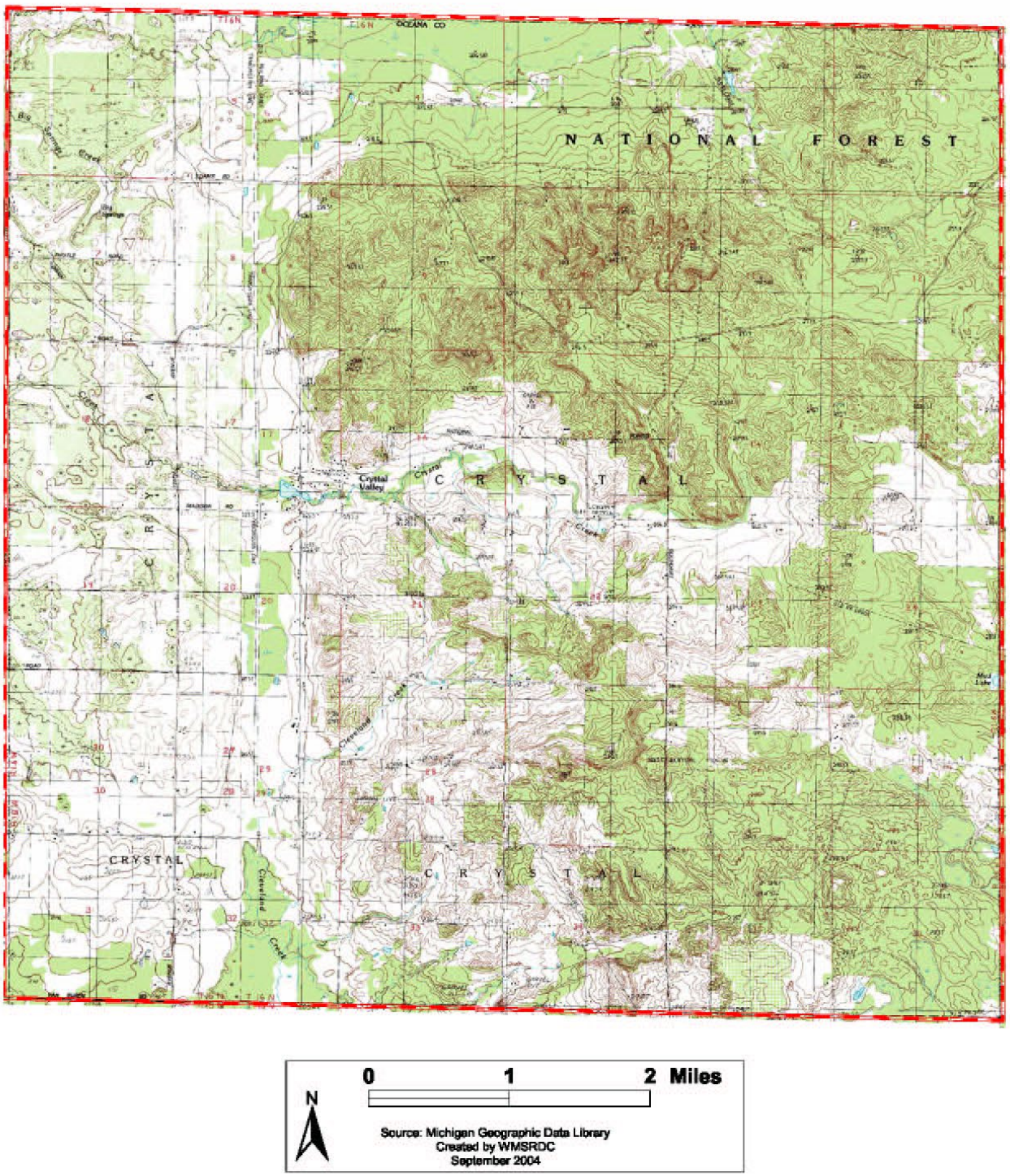


CRYSTAL TOWNSHIP
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	North Branch Pentwater River		
Notable features	Manistee National Forest		
Land description	Much of the township is forested with agriculture being the most predominant land use		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$11,260,608	Industrial	$314,700
Commercial	$117,500	Residential	$21,196,900
Total personal	$2,004,600		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	700	% with disability	15.3 %
% change 2010 to 2020*	-18.7 %	% in poverty	21.4 %
Median age	42.3	ALICE households, 2021**	31 % (county)
% under 18 years old	14.9 %	Avg. daily commute	32.6 minutes
% over 65 years old	16.3 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	110
Campground & RV sites	0	Peak seasonal population	1,360
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	365	Single units	211
Occupied housing units	255	Multi-units in structure	35
Vacant housing units	110	Mobile homes	112
6. Public Services			
Fire	Crystal Township Fire Department, 1503 E. Hammett Rd		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	Crystal Valley Dam		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	Consumers Energy Transmission Line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Crystal, 1499 E. Hammett
Festivals:	- *None identified*
Historic Sites:	Jared H Gay Log House, 128th Ave

Land Use and Natural Features Map (USGS Quad.)
CRYSTAL TOWNSHIP

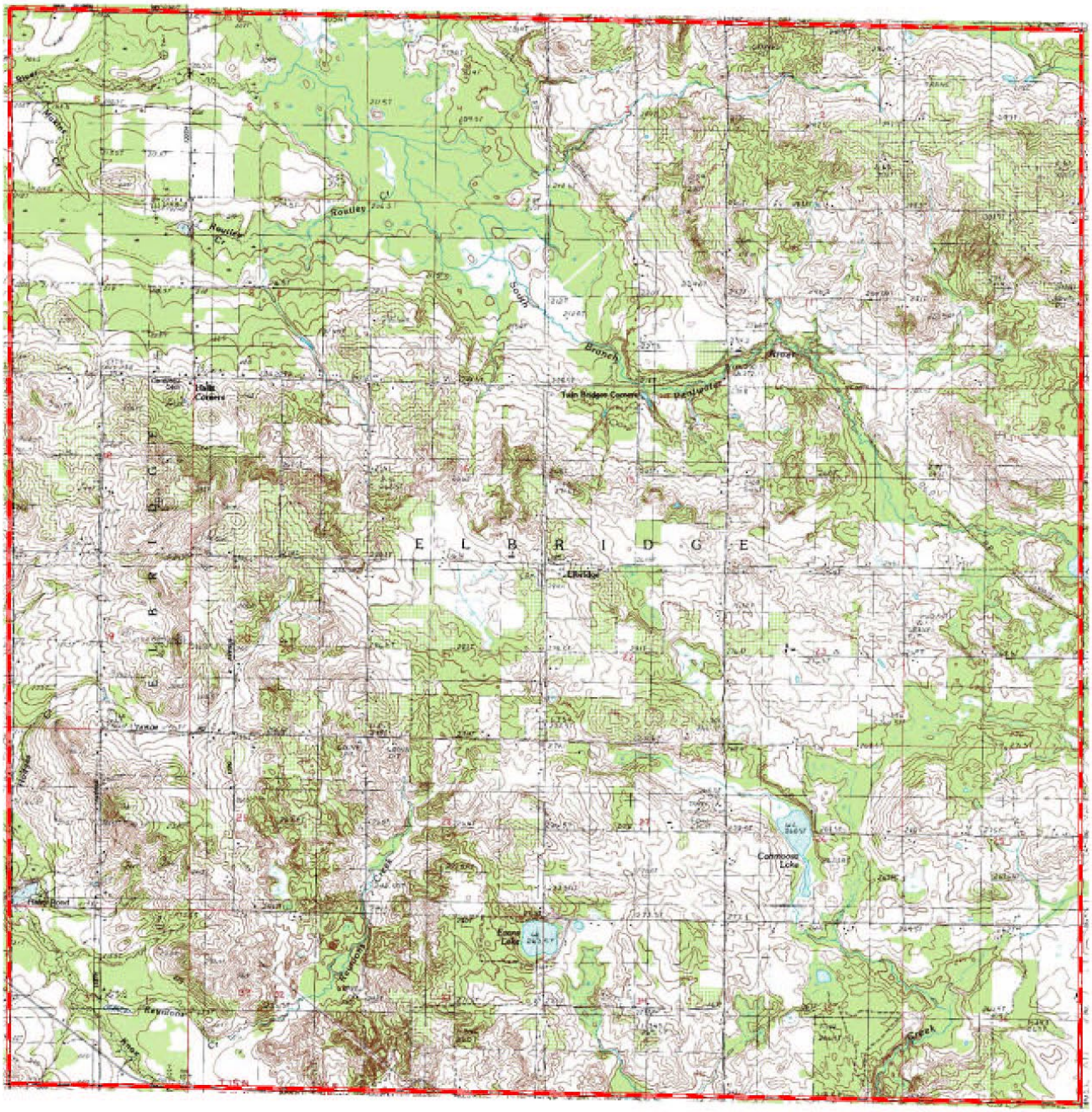


ELBRIDGE TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Cobmoosa, Evans, Mud		
Rivers	South Branch Pentwater River		
Notable features	Manistee National Forest in SE corner of township		
Land description	Mainly rural and agricultural community		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$20,408,800	Industrial	$306,700
Commercial	$152,300	Residential	$27,206,220
Total personal	$2,249,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	857	% with disability	14.7 %
% change 2010 to 2020*	+2.9 %	% in poverty	9.2 %
Median age	45.8	ALICE households, 2021**	31 % (county)
% under 18 years old	25.6 %	Avg. daily commute	18.5 minutes
% over 65 years old	19.4 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	141
Campground & RV sites	0	Peak seasonal population	1,703
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	458	Single units	343
Occupied housing units	317	Multi-units in structure	29
Vacant housing units	141	Mobile homes	86
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - None *Shelters that need to be surveyed by Red Cross:* - Elbridge Community Church, 2370 N 136th Ave., Hart, MI 49420 - Elbridge Township Hall, 2266 E. Polk Rd., Hart, MI 49420		
Schools	Telamon Hart Migrant Head Start, 2354 E Polk Rd, Hart, MI 49420		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		

Dams	Gales Pond Dam
8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- Consumers Energy Transmission Line - Wolverine Power Transmission Line
Pipelines	Gas transmission pipeline (currently shut down)
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Elbridge, 2266 E. Polk Rd
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
ELBRIDGE TOWNSHIP



FERRY TOWNSHIP
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	North Branch White River		
Notable features	- Ferry (unincorporated community) - Manistee National Forest in SW and NE corners of township		
Land description	Mainly forested with scattered agricultural and residential uses		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$8,263,600	Industrial	$541,500
Commercial	$745,200	Residential	$39,912,400
Total personal	$1,604,600		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,073	% with disability	16.6 %
% change 2010 to 2020*	-1.6 %	% in poverty	7.8 %
Median age	51.3	ALICE households, 2021**	31 % (county)
% under 18 years old	15.8 %	Avg. daily commute	31.7 minutes
% over 65 years old	25.9 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	102
Campground & RV sites	68	Peak seasonal population	1,957
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	554	Single units	372
Occupied housing units	452	Multi-units in structure	0
Vacant housing units	102	Mobile homes	182
6. Public Services			
Fire	- Ferry Township Fire Department, 2140 E. Main St. - DNR - Oceana Field Office, 1757 E. Hayes Rd. (M-20)		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	M-20		
Railroads	- *None identified*		
Bridges	M-20 over White River North Branch		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		
8. Economic Assets			

Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	Consumers Energy Power Line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Township of Ferry, 2154 E. Main St. - Oceana County Road Commission, 110 E. M-20 - Oceana County Transfer Station/ Recycling Center, 1600 E Hayes Rd (M-20)
Festivals:	Ferry Ghost Town Day (July)
Historic Sites:	- *None identified*

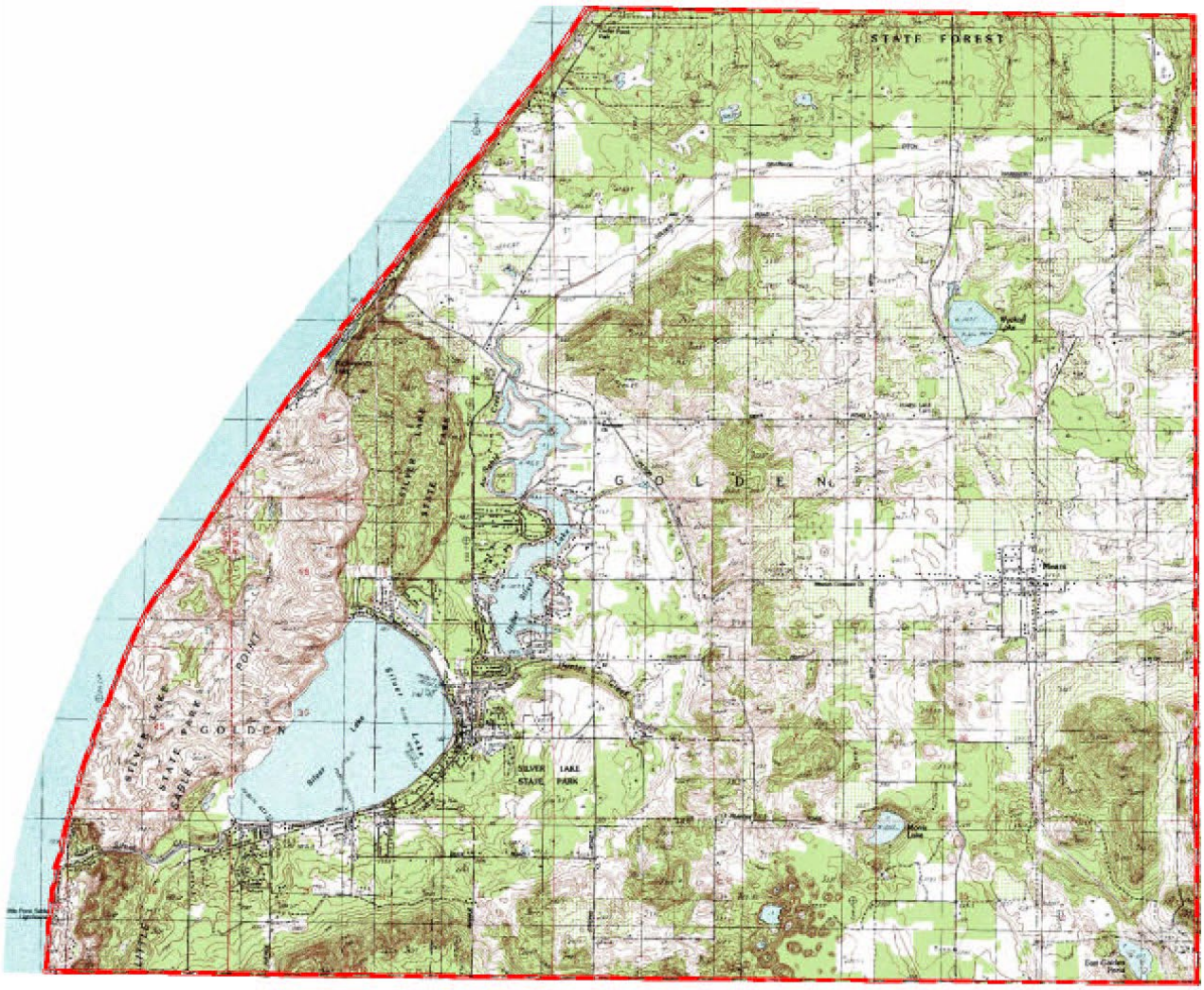
Land Use and Natural Features Map (USGS Quad.)
FERRY TOWNSHIP

GOLDEN TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Lake Holiday, Silver Lake, Upper Silver Lake		
Rivers	Lambricks Creek, Hunter Creek, Silver Creek		
Notable features	- Silver Lake & Mears (unincorporated communities) - Lake Michigan shoreline & dune environment - Little Sable Point - Hart-Montague Trail State Park - Silver Lake State Park - Significant seasonal population increase		
Land description	Agricultural community with residential and commercial land use concentrations in the Silver Lake and Mears areas; heavily forested along the north and south portions		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$10,385,500	Industrial	$42,300
Commercial	$19,997,500	Residential	$270,490,700
Total personal	$4,137,900		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,707	% with disability	14.2 %
% change 2010 to 2020*	-4.7 %	% in poverty	5.6 %
Median age	56.4	ALICE households, 2021**	31 % (county)
% under 18 years old	15.6 %	Avg. daily commute	21.6 minutes
% over 65 years old	30.6 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	156	Vacant housing units	1,625
Campground & RV sites	2,204	Peak seasonal population	20,585
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	2,389	Single units	1,771
Occupied housing units	764	Multi-units in structure	28
Vacant housing units	1,625	Mobile homes	590
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	Golden Pond Estates (community water system)		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	B-15		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - None *Shelters that need to be surveyed by Red Cross:* - Golden Township Hall, 5527 W. Fox Rd, Mears, MI 49436		

Schools	- *None identified*
Community medical facilities, Hospitals	- *None identified*
Ambulance service	- *None identified*
Dams	- Lake Holiday Dam - Silver Lake Level Control Structure - Upper Silver Lake Dam
8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	Natural gas pipeline & 30,000 gal storage tank, serving Lake Holiday & Upper Silver Lake
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Golden Township Hall, 5527 W Fox Rd
Festivals:	- Jeep Invasion (1st weekend June) - Hero on the Dunes (July) - Mears Art Fair (3rd Saturday July) - Silver Lake Sand Dunes Apple & BBQ Festival (September) - Hippie Fest (Fall) -On the Farm (Spring and Fall)
Historic Sites:	Charles Mears Silver Lake Boardinghouse, SE Corner of Lighthouse & Silver Lake Channel roads

Land Use and Natural Features Map (USGS Quad.)
GOLDEN TOWNSHIP

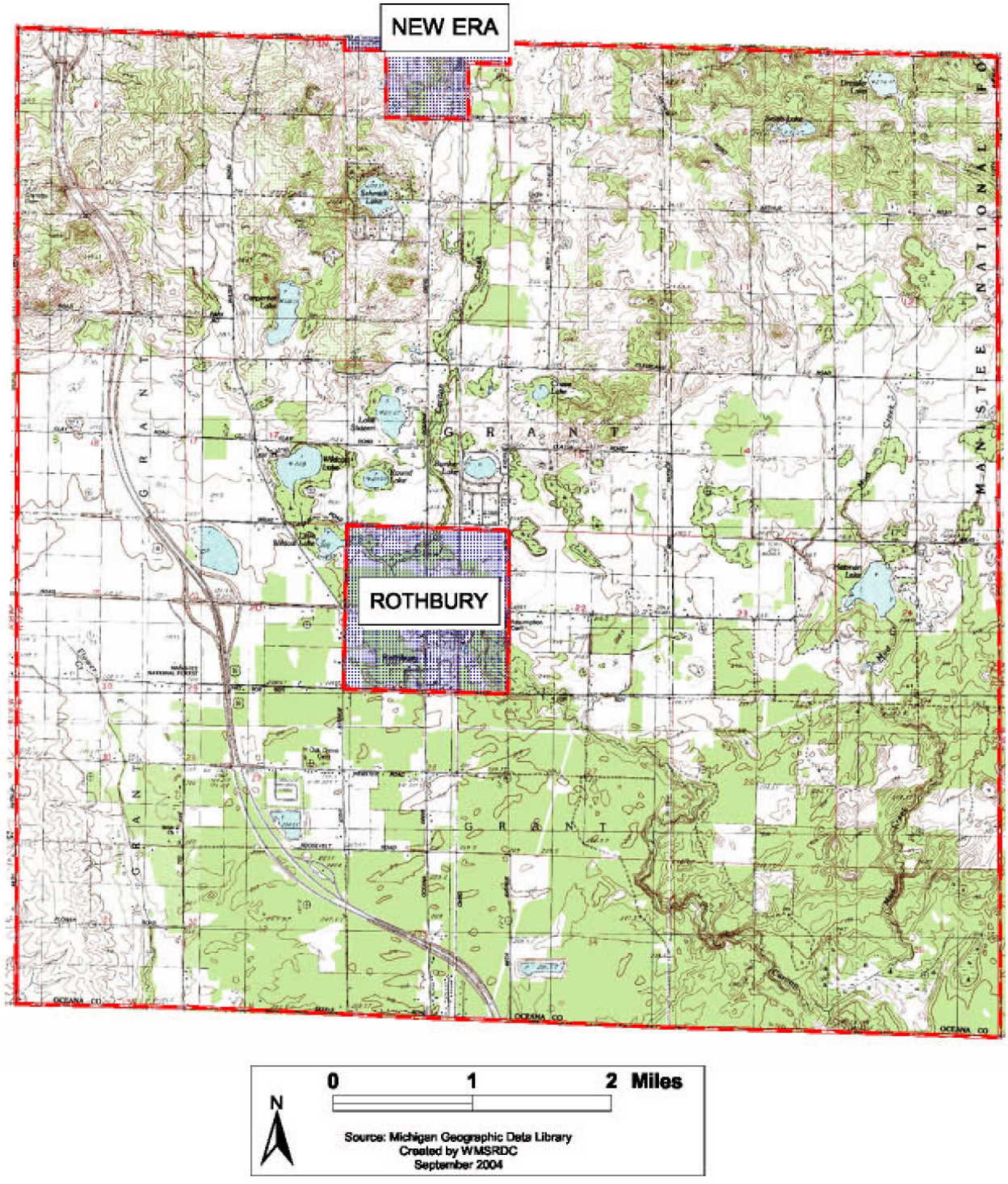


GRANT TOWNSHIP
Community Profile

1. Physical Features			
Lakes	A few small lakes		
Rivers	- *None identified*		
Notable features	- Village of Rothbury and part of Village of New Era - Manistee National Forest - Hart Montague Trail State Park - Double JJ Resort - Electric Forest Festival		
Land description	Rural agricultural community with pockets of residential development and dense forests in the SE corner of the township		
2. Land Value: 2022 Real and Personal Equalized Valuations			*Source: Oceana County Equalization Report 2022*
Agricultural	$10,496,700	Industrial	$2,845,500
Commercial	$8,845,400	Residential	$76,547,500
Total personal	$7,766,500		
3. Population Characteristics			*Source: 2021 American Community Survey 5-year Estimates, unless noted*
Population estimate, 2021	3,000	% with disability	14.9 %
% change 2010 to 2020*	+0.9 %	% in poverty	18.9 %
Median age	38.6	ALICE households, 2021**	31 % (county)
% under 18 years old	27.4 %	Avg. daily commute	21.5 minutes
% over 65 years old	14.2 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	245	Vacant housing units	172
Campground & RV sites	236	Peak seasonal population***	5,466
** WMSRDC research conducted in 2022* *** 2021 American Community Survey 5-year Estimates* ****includes Village of Rothbury and part of Village of New Era; add approximately 40,000 additional people for Electric Forest Festival*			
5. Housing			*Source: 2021 American Community Survey 5-year Estimates*
Housing units	1,176	Single units	827
Occupied housing units	1,004	Multi-units in structure	25
Vacant housing units	172	Mobile homes	324
6. Public Services			
Fire	Grant Township Fire Department, 7140 S. Oceana Dr		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	US-31, M-20		
Railroads	- *None identified*		
Bridges	M-20 over US-31		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		

Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	Double JJ Resort
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	Natural gas pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Grant, 7140 S. Oceana Dr
Festivals:	Electric Forest Music Festival (June)
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
GRANT TOWNSHIP

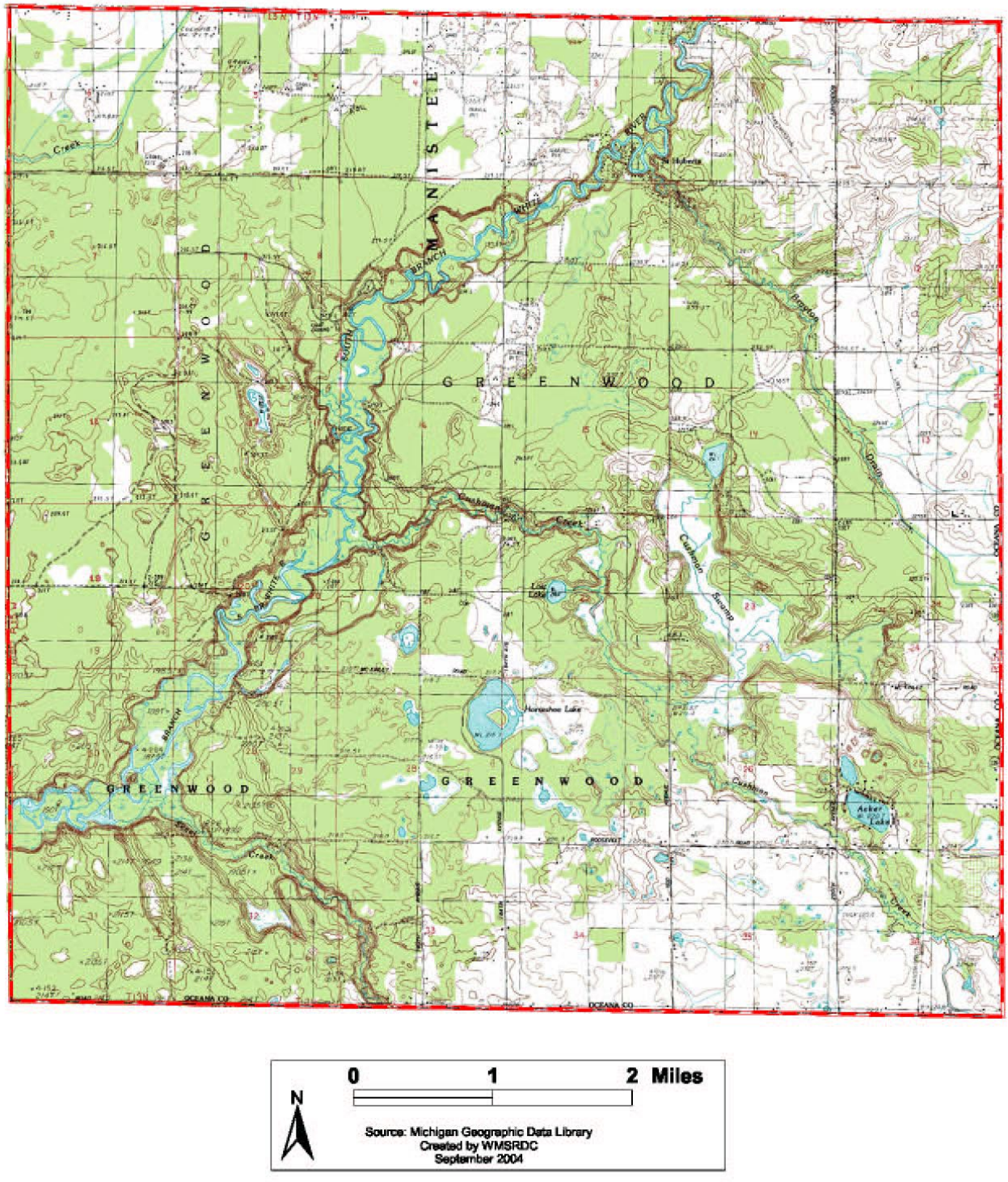


GREENWOOD TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Acker Lake		
Rivers	White River		
Notable features	- Manistee National Forest - Michigan Natural River (White River)		
Land description	Mostly forested with scattered residential and agricultural land uses along the north, east, and south peripheries. Residential pockets around Acker Lake and St. Hubert's subdivision on White River		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$7,660,900	Industrial	$600,800
Commercial	$837,700	Residential	$37,001,500
Total personal	$1,554,800		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,410	% with disability	12.1 %
% change 2010 to 2020*	-2.4 %	% in poverty	18.1 %
Median age	34.8	ALICE households, 2021**	31 % (county)
% under 18 years old	27.9 %	Avg. daily commute	24.7 minutes
% over 65 years old	9.9 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	151
Campground & RV sites	5	Peak seasonal population	2,336
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	601	Single units	462
Occupied housing units	450	Multi-units in structure	3
Vacant housing units	151	Mobile homes	136
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- B86 - M120		
Railroads	- *None identified*		
Bridges	Garfield Rd over White River		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		

Dams	- *None identified*
8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	Consumers Energy Power Line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Greenwood, 5589 S. 200th Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
GREENWOOD TOWNSHIP

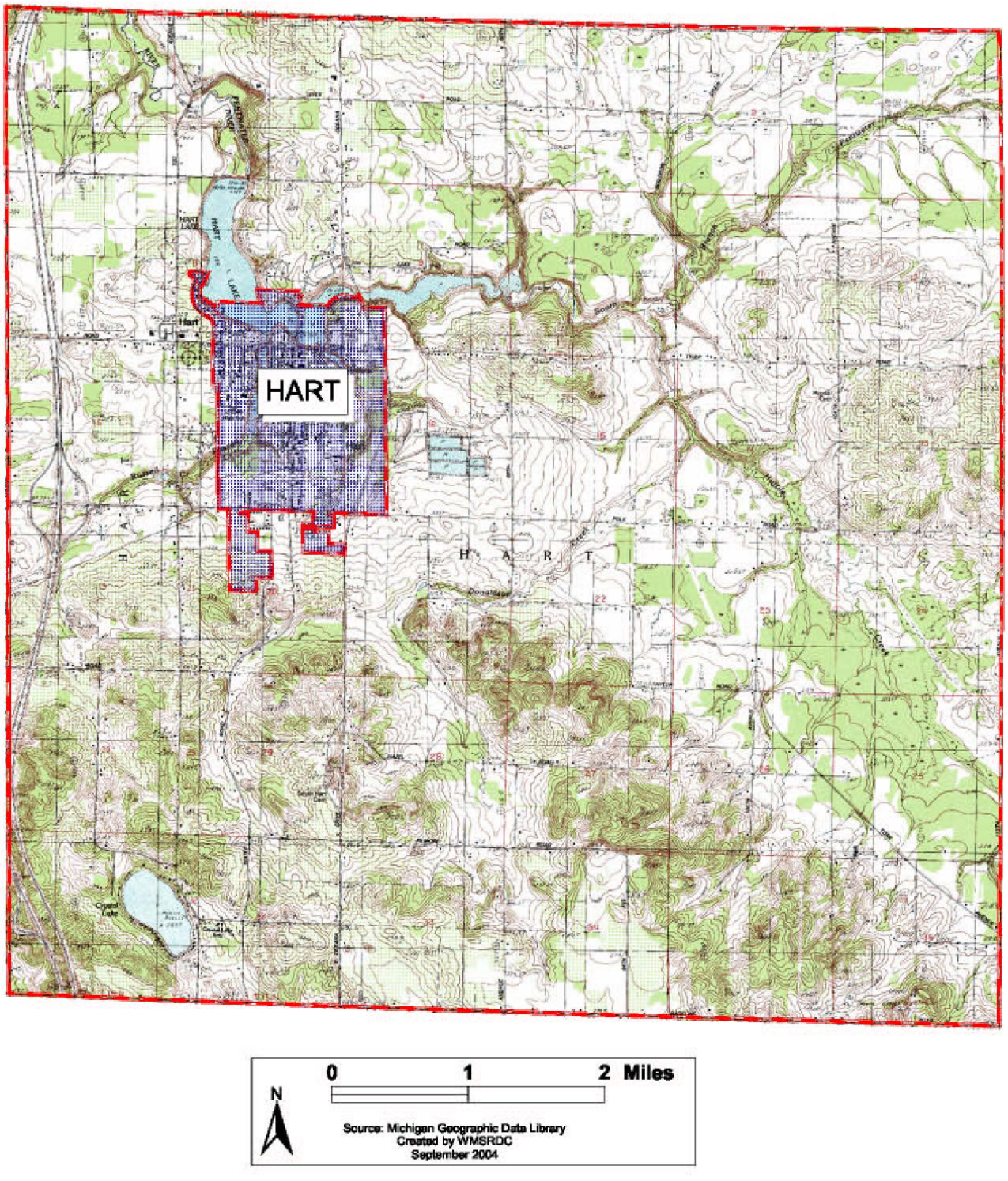


HART TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Crystal Lake, Hart Lake		
Rivers	Pentwater River		
Notable features	- City of Hart - Hart-Montague Trail State Park		
Land description	Agricultural community with residential concentrations along Crystal and Hart lakes and to the west of the City of Hart		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$22,706,600	Industrial	$14,554,100
Commercial	$2,452,000	Residential	$64,768,700
Total personal	$13,497,900		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,633	% with disability	20.8 %
% change 2010 to 2020*	+9.4 %	% in poverty	10 %
Median age	55	ALICE households, 2021**	31 % (county)
% under 18 years old	15.2 %	Avg. daily commute	16.3 minutes
% over 65 years old	27.3 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	17	Vacant housing units	168
Campground & RV sites	0	Peak seasonal population	2,675
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	889	Single units	776
Occupied housing units	721	Multi-units in structure	36
Vacant housing units	168	Mobile homes	87
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	Oceana Acres (community water system)		
Public transportation	- *None identified*		
Other	- District 10 Health Department, 3886 N Oceana Dr - Oceana County Council on Aging, 4250 W Tyler Rd - Oceana County Road Commission, 3501 W. Polk Rd		
7. Critical Infrastructure			
Major roads	US-31, Oceana Drive		
Railroads	- *None identified*		
Bridges	Oceana Drive over Hart Lake		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	Oceana Christian School, 3258 N. 72nd Ave.		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	Emergency Medical Services, 3988 N. Oceana Dr		

Dams	Hart Hydroelectric Dam
8. Economic Assets	
Major employers	Peterson Farms
Power generation	Hart Hydroelectric Dam
Electric transmission	Consumers Energy Power Line
Pipelines	Natural Gas Pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Hart, 3437 W. Polk Rd
Festivals:	- *None identified*
Historic Sites:	US-31 (Old) Pentwater River Bridge, Oceana Dr. over Pentwater River

Land Use and Natural Features Map (USGS Quad.)
HART TOWNSHIP

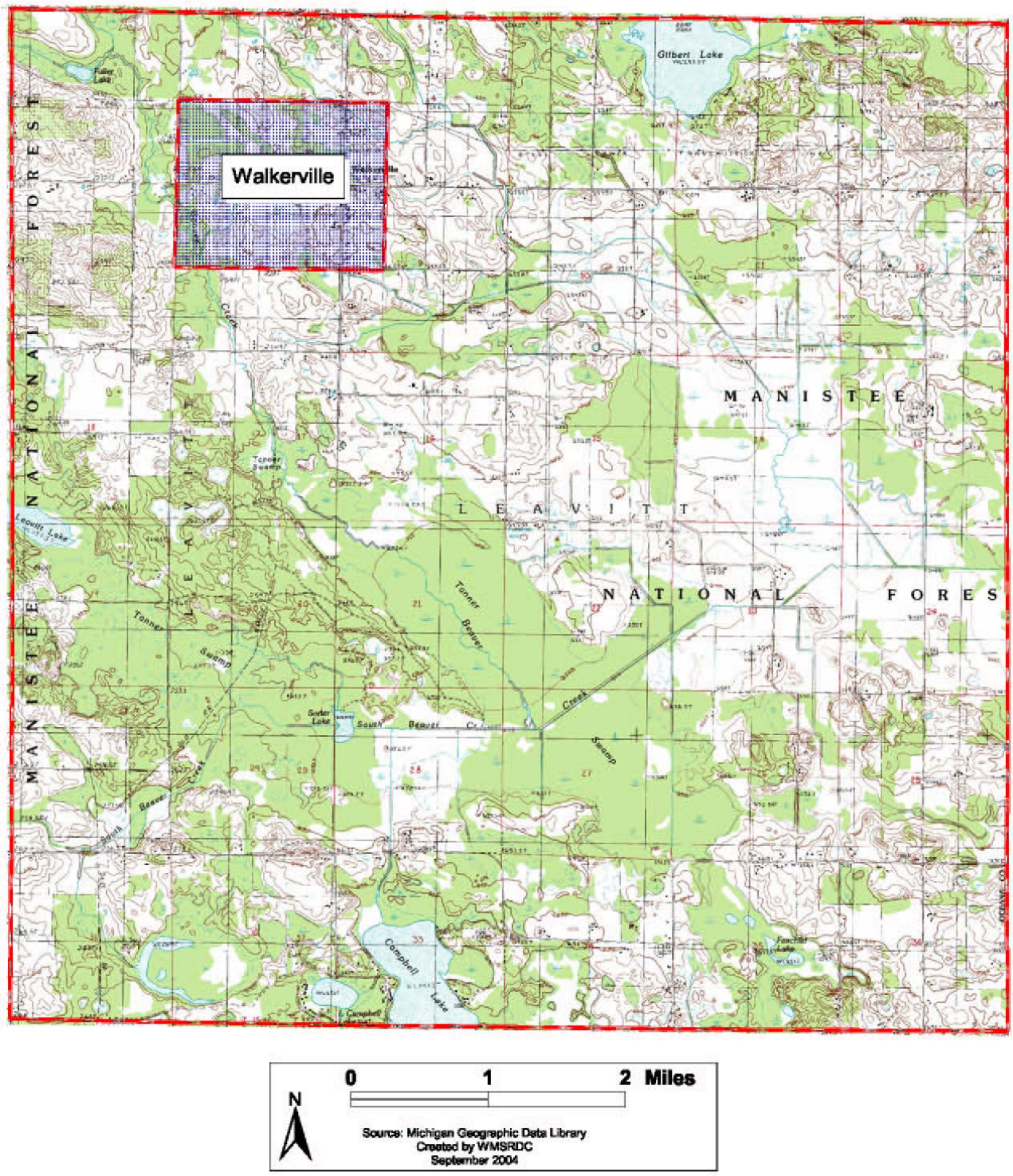


LEAVITT TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Campbell Lake, Little Campbell Lake		
Rivers	- *None identified*		
Notable features	- Walkerville Village - Walkinshaw Wetlands - Manistee National Forest		
Land description	Rural agricultural community with dense forests		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$13,634,200	Industrial	$320,100
Commercial	$1,001,900	Residential	$20, 989,200
Total personal	$2,536,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,039	% with disability	26.7 %
% change 2010 to 2020*	+2.2 %	% in poverty	20.0 %
Median age	35.4	ALICE households, 2021**	31 % (county)
% under 18 years old	29.9 %	Avg. daily commute	28.2 minutes
% over 65 years old	13.9 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	128
Campground & RV sites	0	Peak seasonal population***	1,807
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*	****includes Village of Walkerville*	
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	480	Single units	265
Occupied housing units	352	Multi-units in structure	0
Vacant housing units	128	Mobile homes	215
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- Consumers Energy Transmission Line - Wolverine Power Transmission Line
Pipelines	Natural Gas Pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Leavitt, 2401 N. 184th Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
LEAVITT TOWNSHIP

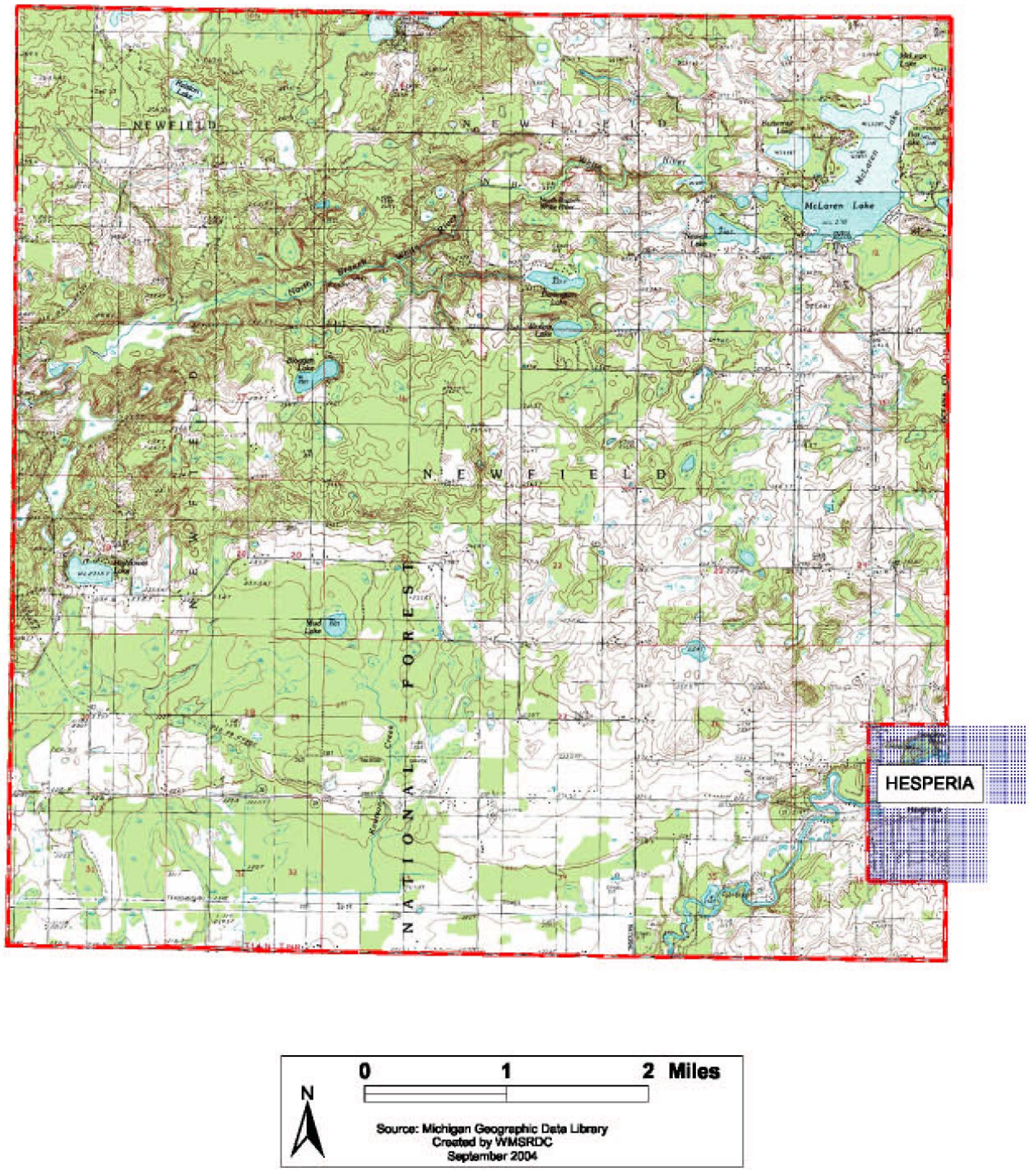


NEWFIELD TOWNSHIP
Community Profile

1. Physical Features			
Lakes	McLaren Lake, Campbell Lake, and a few smaller lakes		
Rivers	White River		
Notable features	- Village of Hesperia (part) - Manistee National Forest - Michigan Natural River (White River)		
Land description	Mainly forest and agriculture, with residential concentrations around many lakes		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$8,465,300	Industrial	$391,300
Commercial	$4,472,700	Residential	$85,954,800
Total personal	$1,896,100		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	2,078	% with disability	20.6 %
% change 2010 to 2020*	-3.0 %	% in poverty	8.7 %
Median age	46.0	ALICE households, 2021**	31 % (county)
% under 18 years old	22.9 %	Avg. daily commute	28.8 minutes
% over 65 years old	20.4 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	8	Vacant housing units	415
Campground & RV sites	49	Peak seasonal population***	4,780
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*	****includes Village of Hesperia*	
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,149	Single units	883
Occupied housing units	734	Multi-units in structure	132
Vacant housing units	415	Mobile homes	234
6. Public Services			
Fire	Hesperia Area Fire Department, 8320 E. M-20		
Police	*- None identified*		
Wastewater	*- None identified*		
Water	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	M-20, M-120		
Railroads	*- None identified*		
Bridges	M-20 over White River		
Airports	*- None identified*		
Shelters	*- None identified*		
Schools	*- None identified*		
Community medical facilities, Hospitals	*- None identified*		
Ambulance service	*- None identified*		
Dams	*- None identified*		

8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	Consumers Energy Power Line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Newfield, 3890 198th Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
NEWFIELD TOWNSHIP

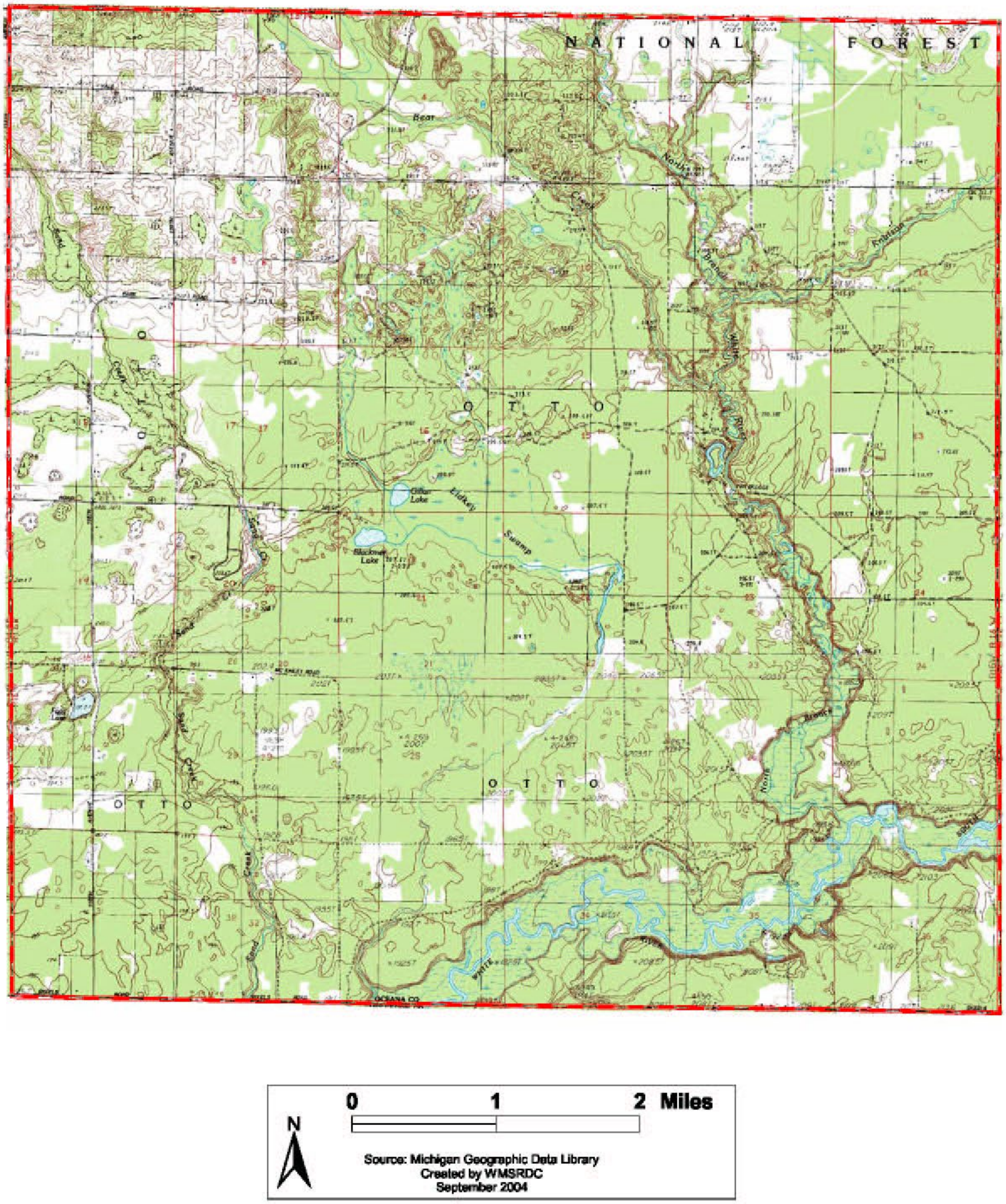


OTTO TOWNSHIP
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	White River		
Notable features	- Manistee National Forest - Michigan Natural River (White River)		
Land description	Mostly forested with some agriculture and scattered residential uses		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$3,545,800	Industrial	$13,900
Commercial	$68,300	Residential	$29,600,800
Total personal	$2,912,100		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	763	% with disability	14.2 %
% change 2010 to 2020*	+3.9 %	% in poverty	14.3 %
Median age	41.4	ALICE households, 2021**	31 % (county)
% under 18 years old	21.0 %	Avg. daily commute	34.3 minutes
% over 65 years old	10.7 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	103
Campground & RV sites	2	Peak seasonal population	1,389
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	368	Single units	240
Occupied housing units	265	Multi-units in structure	0
Vacant housing units	103	Mobile homes	128
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	B-86		
Railroads	- *None identified*		
Bridges	- *None identified*		
Airports	- *None identified*		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		
Ambulance service	- *None identified*		
Dams	- *None identified*		
8. Economic Assets			

Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Otto, 5458 S. 128th Ave
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
OTTO TOWNSHIP

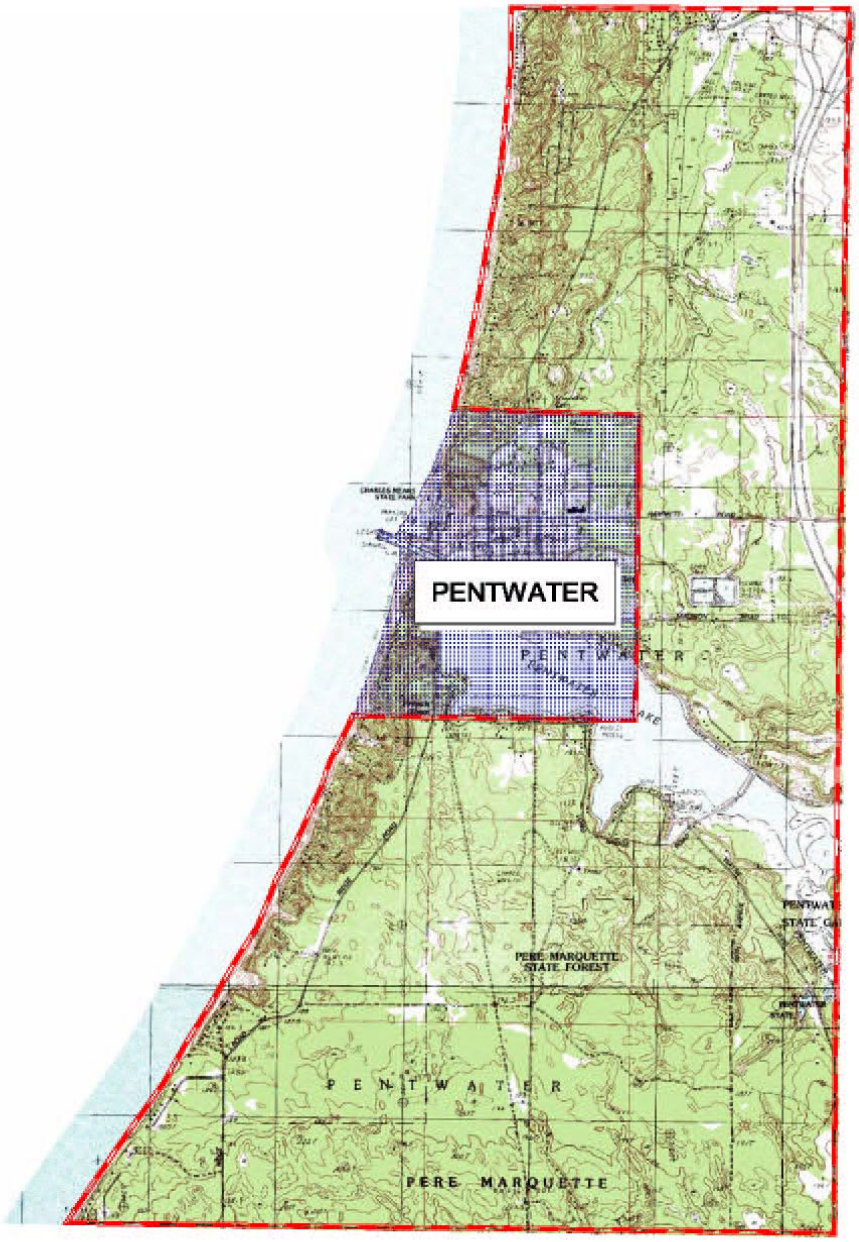


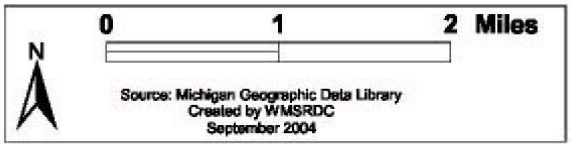
PENTWATER TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Pentwater Lake		
Rivers	Pentwater River		
Notable features	- Village of Pentwater - Lake Michigan shoreline & dune environment - Pentwater River State Game Area		
Land description	Pentwater Lake and to the north: residential and commercial development concentrations around Pentwater Lake, Village of Pentwater, and along Business 31. Elsewhere: Mainly forested with scattered residential uses		
2. Land Value: 2022 Real and Personal Equalized Valuations			*Source: Oceana County Equalization Report 2022*
Agricultural	$0	Industrial	$276,300
Commercial	$12,986,800	Residential	$328,998,100
Total personal	$3,733,100		
3. Population Characteristics			*Source: 2021 American Community Survey 5-year Estimates, unless noted*
Population estimate, 2021	1,704	% with disability	17.8 %
% change 2010 to 2020*	+9.0 %	% in poverty	6.9 %
Median age	64.9	ALICE households, 2021**	31 % (county)
% under 18 years old	11.0 %	Avg. daily commute	23.4 minutes
% over 65 years old	49.7 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	25	Vacant housing units	982
Campground & RV sites	544	Peak seasonal population***	9,822
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*	****includes Village of Pentwater*	
5. Housing			*Source: 2021 American Community Survey 5-year Estimates*
Housing units	1,758	Single units	1,606
Occupied housing units	776	Multi-units in structure	113
Vacant housing units	982	Mobile homes	39
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	US-31, Business US-31, B-15		
Railroads	- *None identified*		
Bridges	Business US-31 over Bass Lake, B-15 (Longbridge Rd) over Pentwater Lake		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - None *Shelters that need to be surveyed by Red Cross:* - Pentwater VFW Hall, 8440 N. US 31, Pentwater, MI 49449		
Schools	- *None identified*		
Community medical facilities,	- *None identified*		

Hospitals	
Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	- *None identified*
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Pentwater Township Office, 500 N. Hancock St (in Village of Pentwater)
Festivals:	- *None identified*
Historic Sites:	- Dumaw Creek Site - Green Quarry Site (somewhere near Pentwater)

Land Use and Natural Features Map (USGS Quad.)
PENTWATER TOWNSHIP





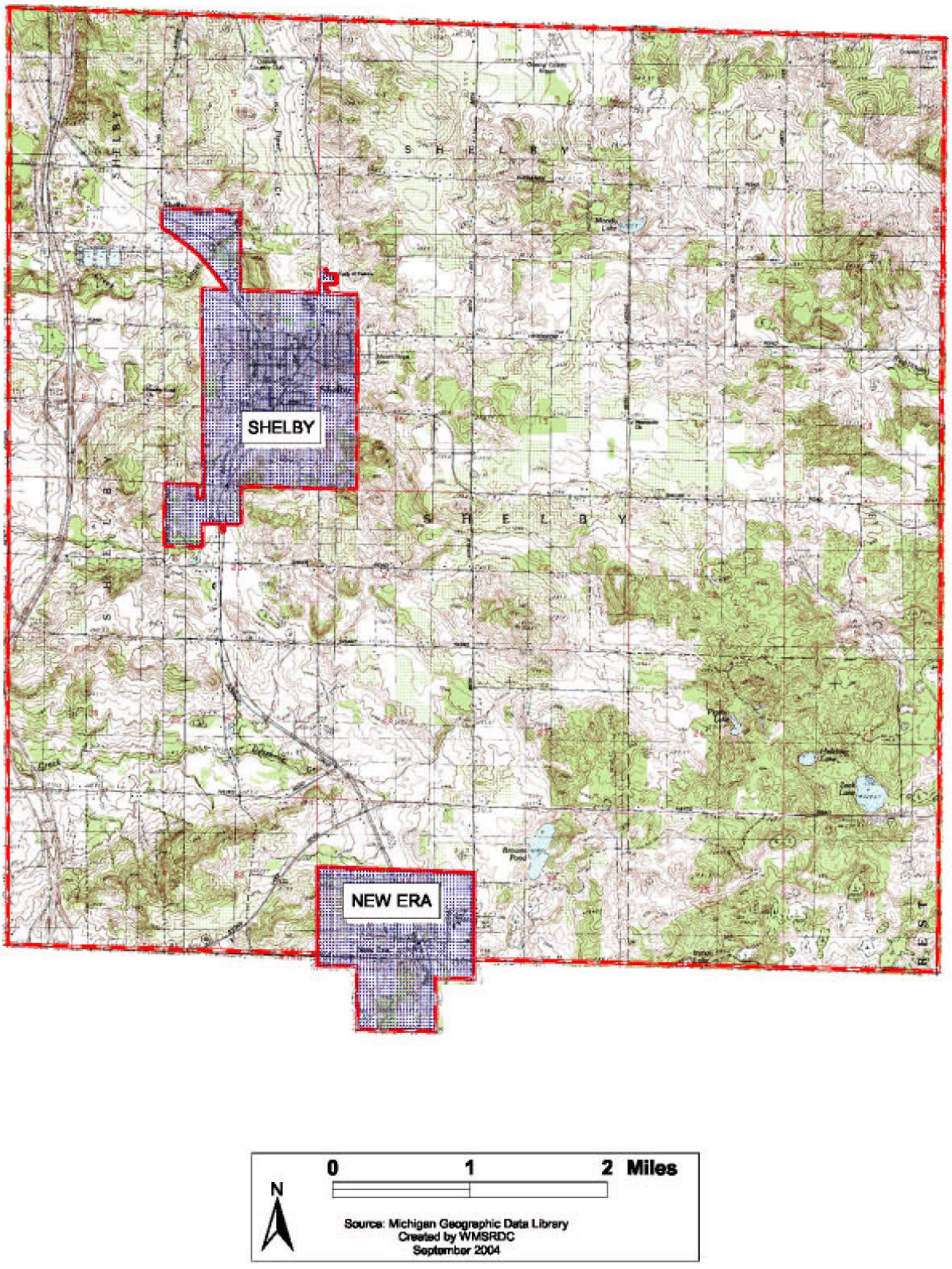
SHELBY TOWNSHIP
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	- *None identified*		
Notable features	- Village of Shelby - Village of New Era (part) - Hart-Montague Trail State Park - Manistee National Forest		
Land description	Primarily rural agricultural community with dense forests to the east and southeast		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$15,597,800	Industrial	$5,706,500
Commercial	$25,681,300	Residential	$90,246,100
Total personal	$8,831,900		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	4,086	% with disability	9.9 %
% change 2010 to 2020*	+1.0 %	% in poverty	11.3 %
Median age	34.1	ALICE households, 2021**	31 % (county)
% under 18 years old	28.6 %	Avg. daily commute	18.6 minutes
% over 65 years old	14.0 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	233
Campground & RV sites	0	Peak seasonal population***	5,484
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
****includes Village of Shelby and part of Village of New Era*			
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,626	Single units	1,300
Occupied housing units	1,393	Multi-units in structure	157
Vacant housing units	233	Mobile homes	169
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Water	- *None identified*		
Public transportation	- *None identified*		
Other	Oceana County Animal Shelter, 2185 Baseline Rd		
7. Critical Infrastructure			
Major roads	US-31, M-20, Oceana Drive		
Railroads	- *None identified*		
Bridges	M-20 over US-31		
Airports	Oceana County Airport (Hart-Shelby), 1805 W. Baseline Rd.		
Shelters	- *None identified*		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		

Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	Peterson Farms
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	Natural Gas Pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Township of Shelby, 198 N. Michigan Ave (in Village of Shelby)
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)

SHELBY TOWNSHIP



WEARE TOWNSHIP
Community Profile

1. Physical Features			
Lakes	- *None identified*		
Rivers	North Branch Pentwater River, South Branch Pentwater River		
Notable features	- Manistee National Forest - Pentwater River State Game Area		
Land description	Rural agricultural community with forested wetlands feeding Pentwater River		
2. Land Value: 2022 Real and Personal Equalized Valuations		*Source: Oceana County Equalization Report 2022*	
Agricultural	$17,560,800	Industrial	$418,500
Commercial	$4,120,000	Residential	$50,124,500
Total personal	$5,335,000		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population estimate, 2021	1,311	% with disability	15.6 %
% change 2010 to 2020*	+1.2 %	% in poverty	13.3 %
Median age	38.3	ALICE households, 2021**	31 % (county)
% under 18 years old	22.8 %	Avg. daily commute	29.8 minutes
% over 65 years old	15.3 %		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms	0	Vacant housing units	100
Campground & RV sites	0	Peak seasonal population	1,911
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	526	Single units	368
Occupied housing units	426	Multi-units in structure	4
Vacant housing units	100	Mobile homes	154
6. Public Services			
Fire	- *None identified*		
Police	Mason-Oceana 911 Central Dispatch, 9160 N. Oceana Drive		
Wastewater	- *None identified*		
Water	Hylander Valley (community water system)		
Public transportation	- *None identified*		
Other	MSU AgBioResearch West Central Michigan Research and Extension Center, 5185 N Oceana Drive		
7. Critical Infrastructure			
Major roads	US-31, Business US-31, Oceana Drive		
Railroads	- *None identified*		
Bridges	- US-31 over Pentwater River North and South branches - Business US-31 (Monroe Rd) over North Branch Pentwater River - Oceana Drive over North Branch Pentwater River - Hammett Rd over North Branch Pentwater River		
Airports	- *None identified*		
Shelters	*Shelters surveyed by Red Cross:* - St. Joseph Catholic Church Hall, 2349 Jackson Rd		
Schools	- *None identified*		
Community medical facilities, Hospitals	- *None identified*		

Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	- *None identified*
Power generation	Consumers Energy Power Line
Electric transmission	- *None identified*
Pipelines	Natural Gas Pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Weare Township Hall, 6506 N. Oceana Drive
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Land Use and Natural Features Map (USGS Quad.)
WEARE TOWNSHIP

Appendix B:
HAZARD IDENTIFICATIONS AND ANALYSES

Hazard Identification Profile

Oceana County

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: (see individual communities) **FIRM Map Date: (see individual communities)**

Flood Insurance Policies In-Force: 65 **Total Flood Insurance Coverage: $12,844,300**

Floodplains and Flood-prone Areas: (see individual communities)

- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:

- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:

- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- July 13, 1938: Seiche/storm surge on Lake Michigan. 3 drowned in Holland, 1 in Muskegon, and 1 near Pentwater.
- April 6, 1997: Beach erosion due to high winds reported at Stony Lake, Benona Twp.
- August 3, 2011: 13-year old girl died in a hospital after being swept away by a rip current near the north pier in Pentwater.
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Oceana County, 1996-2022: 16
- July 13, 2000: 1.75 inch hail. $50k property damage, $25k crop damage, Walkerville Village (Leavitt Twp).
- May 10, 2003: 1.00 inch hail. $20k property damage, $10k crop damage, New Era Village (Grant Twp and Shelby Twp).
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.
- May 23, 2004: 0.75 inch hail. $15k property damage, $15k crop damage, New Era Village (Grant Twp and Shelby Twp).

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning:

- July 26, 2023: Lightning strike sparked a fire at the Silver Lake Pizza Factory, forcing it to close down for the season to be gutted and renovated, Golden Township.

1.11 Severe Winds:

- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- July 15, 1995: Severe thunderstorms. $15k property damage, Walkerville Village (Leavitt Twp).
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- May 12, 2000: Severe thunderstorms. $50k property damage, Shelby Twp.
- June 1, 2000: Severe thunderstorms. $50k property damage, Golden Twp.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.

- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 26, 2005: Severe thunderstorms. $15k property damage, Pentwater Village (Pentwater Twp).
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- July 26, 2018: Severe thunderstorms. $20k property damage, Benona Township.
- August 28, 2018: Severe thunderstorms. $20k property damage, Golden Township.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

Number of tornadoes 1950-2022: 5 (0 deaths, 4 injuries)

- July 11, 1967: Tornado (F1). $25k property damage, Ferry Township.
- March 30, 1977: Tornado (F1). $25k property damage, Weare Township.
- August 12, 1978: Tornado (F2). $250k property damage.
- September 14, 1990: Tornado (F1). $25k property damage, Ferry Township.
- May 28, 1991: Tornado (F2). $250k property damage, Hart Township.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).
- April 11, 2005: Wildfire. 17 acres burned, 2 houses/ 16 walkways destroyed, 5 houses damaged. Benona Township.

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Hart Hydro-Electric Dam, Hesperia Dam spillway erosion, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37
- Major fires in the Village of Walkerville: May 1891, 1914, and in the 1940"s.
- June 12, 2012: Fire destroyed historic buildings in downtown Shelby, including apartment units and 4 businesses.
- October 16, 2012: Major fire destroyed a 400 ft barn at a pork farm in Leavitt Township; unknown cause.

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

SARA Title III sites within the county in 2023: 75

- December 12, 2012: Explosion in a pig farm barn in Crystal Township; possibly caused by methane gas buildup.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2022: 36
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds). Power lines downed in Pentwater.
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.

- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

1,624 oil and gas test well surface hole locations within Oceana County.
- 2 wells "Active" for: Gas Injection (1), Brine Disposal (1)
- 118 wells with known detectable levels of hydrogen sulfide in the townships of: Benona (12), Claybanks (33), Colfax (1), Crystal (2), Elbridge (5), Ferry (6), Golden (3), Grant (2), Hart (3), Otto (1), Pentwater (14), Shelby (1), Weare (36)

2.10 Pipeline Accidents:

- March 5, 2010: Damage to residential gas meter causing natural gas leak. Minor neighborhood evacuations and temporary relocation of schoolchildren, Shelby Village.

2.11 Transportation Accidents:

- July 14, 2001: School bus rolled into a ditch. 2 children injured, Hart Township.
- December 1, 2012: Private helicopter crashed into Manistee National Forest. 1 fatality and 1 injury, Leavitt Township.
- July 15, 2022: A private aircraft crashed shortly after takeoff from Oceana County Airport. 2 fatalities, Shelby Township.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

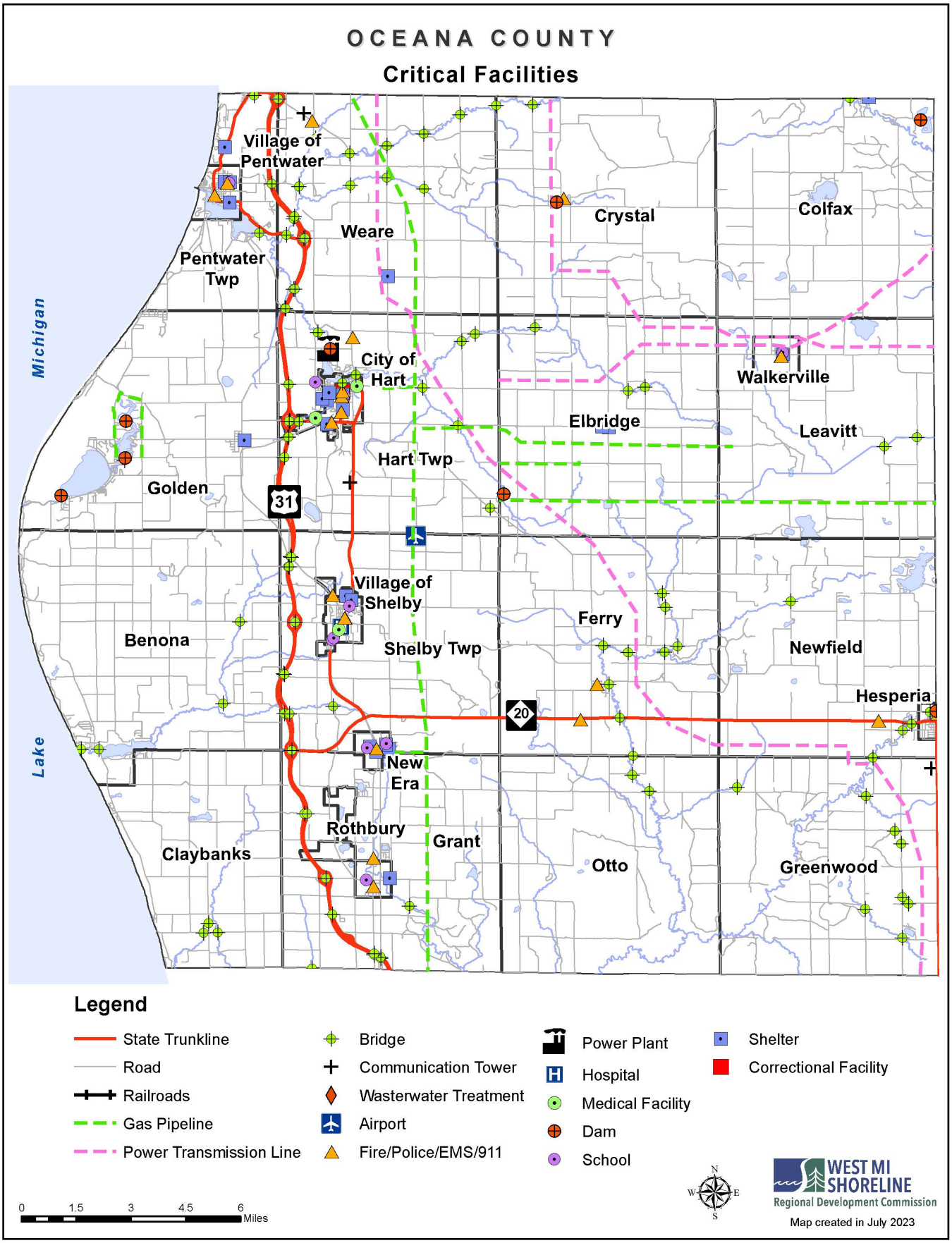
3.05 Terrorism and Similar Criminal Activities: - None Identified.

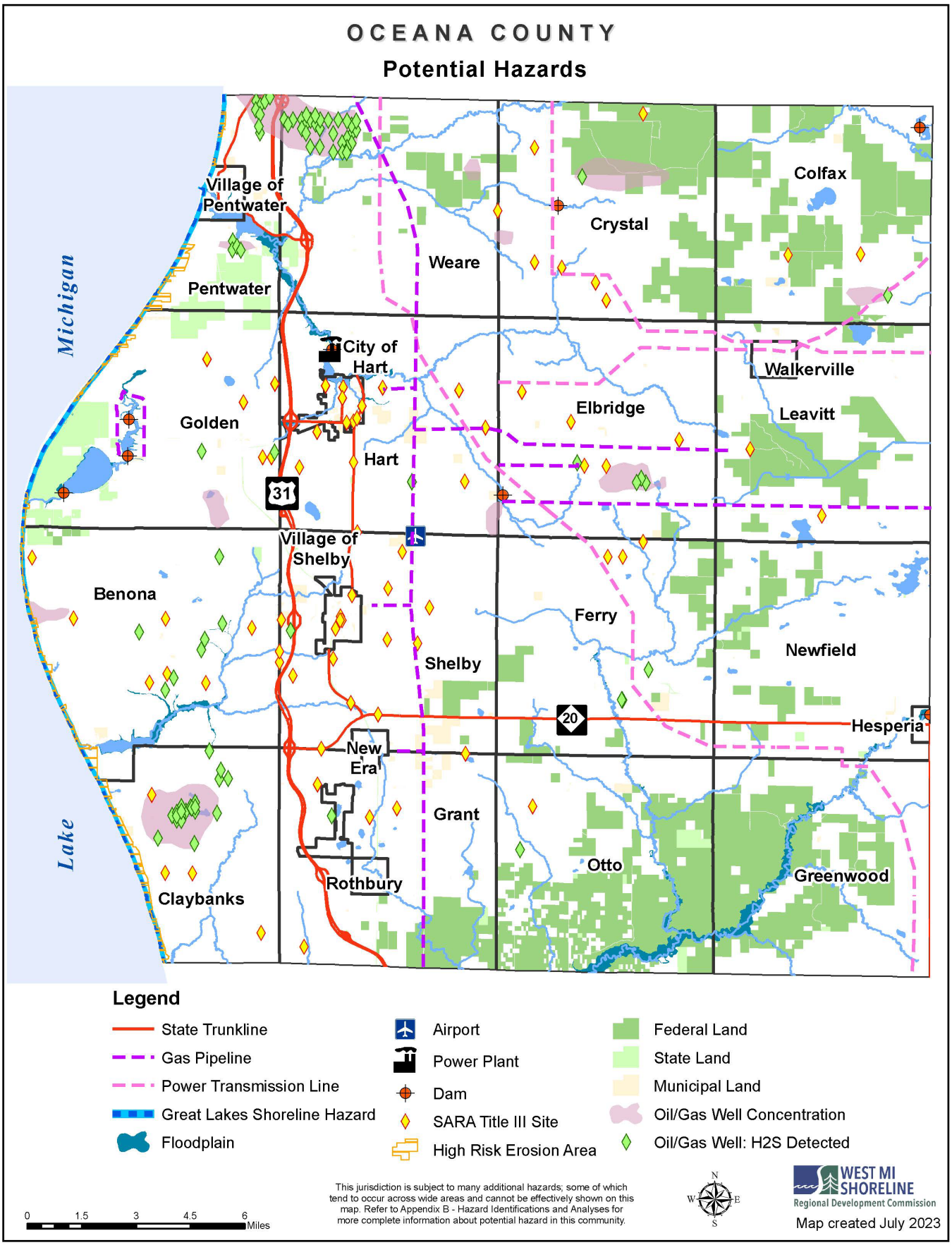
OCEANA COUNTY
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	1
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	1	1	1
2.10 Pipeline Accidents	2	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

OCEANA COUNTY
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Great Lakes Shoreline	3	9	27
7	Drought	2	13	26
8	Wildfire	3	8	24
8	Flooding: Riverine/Urban	3	8	24
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
13	Catastrophic Incidents	1	18	18
13	Dam failure	2	9	18
13	Invasive Species	2	9	18
13	Tornadoes	2	9	18
13	Space Weather	2	9	18
18	Energy Emergencies	2	8	16
19	HAZMAT – Fixed Site	2	7	14
19	HAZMAT – Transportation	2	7	14
19	Pipeline Accidents	2	7	14
22	Fog	3	4	12
22	Oil/Natural Gas Well Accidents	2	6	12
22	Transportation Accidents	2	6	12
25	Celestial Impacts - Space Debris	1	8	8
26	Civil Disturbances	1	6	6
26	Fire – Scrap Tires	1	6	6
26	Subsidence	1	6	6
26	Terrorism & Similar Criminal Acts	1	6	6
	Earthquake	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-


OCEANA COUNTY
Critical Facilities
Village of Pentwater
Pentwater Twp
Weare
Crystal
Colfax
Michigan
City of Hart
Walkerville
Elbridge
Leavitt
Hart Twp
Golden
31
Village of Shelby
Ferry
Benona
Shelby Twp
Newfield
Hesperia
20
Lake
New Era
Rothbury
Grant
Claybanks
Otto
Greenwood
Legend
State Trunkline
Road
Railroads
Gas Pipeline
Power Transmission Line
Bridge
Communication Tower
Wasterwater Treatment
Airport
Fire/Police/EMS/911
Power Plant
Hospital
Medical Facility
Dam
School
Shelter
Correctional Facility
0 1.5 3 4.5 6 Miles
N
W
E
S
WEST MI SHORELINE
Regional Development Commission
Map created in July 2023


OCEANA COUNTY
Potential Hazards
Michigan
Lake
Village of Pentwater
Pentwater
Weare
Crystal
Colfax
City of Hart
Hart
Golden
Elbridge
Walkerville
Leavitt
31
Village of Shelby
Benona
Ferry
Newfield
Shelby
20
Hesperia
New Era
Grant
Otto
Greenwood
Rothbury
Claybanks
Legend
State Trunkline
Gas Pipeline
Power Transmission Line
Great Lakes Shoreline Hazard
Floodplain
Airport
Power Plant
Dam
SARA Title III Site
High Risk Erosion Area
Federal Land
State Land
Municipal Land
Oil/Gas Well Concentration
Oil/Gas Well: H2S Detected
0 1.5 3 4.5 6 Miles
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N W E S
WEST MI SHORELINE
Regional Development Commission
Map created July 2023

Hazard Identification Profile
City of Hart

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: N/A **Total Flood Insurance Coverage: $**N/A

Floodplains and Flood-prone Areas: Chippewa Creek, Russell Creek, Hart Lake shoreline
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- ***August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.***
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Hart Hydro-Electric Dam, Hesperia Pond spillway erosion, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

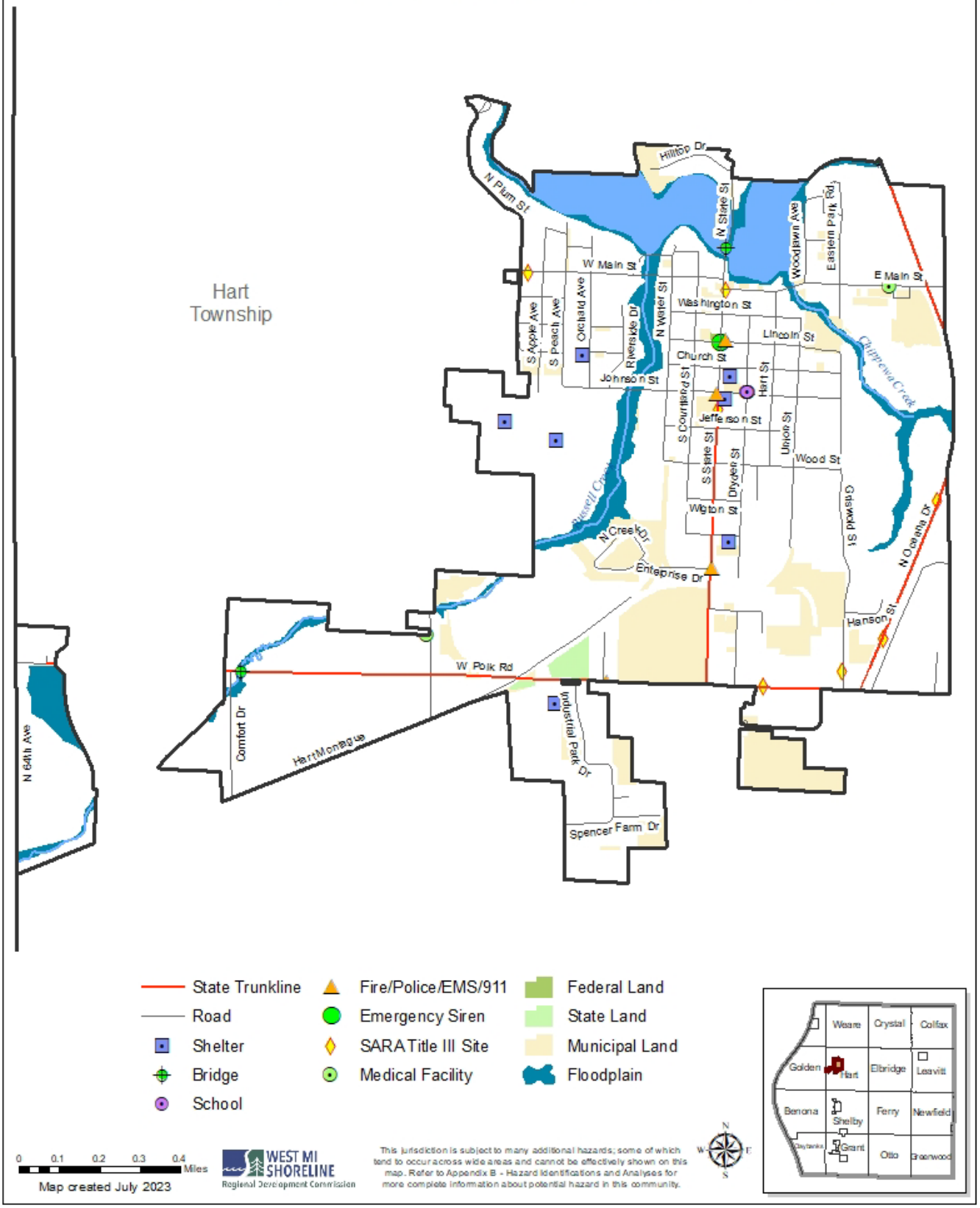
CITY OF HART
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	0	-	-	-
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	2	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

CITY OF HART
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Flooding: Riverine/Urban	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
11	Hail	2	11	22
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Invasive Species	2	9	18
15	Energy Emergencies	2	8	16
16	Tornadoes	1	15	15
17	Dam failure	2	7	14
17	HAZMAT – Fixed Site	2	7	14
17	HAZMAT – Transportation	2	7	14
20	Transportation Accidents	2	6	12
21	Celestial Impacts	1	8	8
21	Civil Disturbances	1	8	8
21	Fog	2	4	8
24	Fire – Scrap Tires	1	6	6
24	Subsidence	1	6	6
24	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Oil/Natural Gas Well Accidents	0	-	-
n/a	Pipeline Accidents	0	-	-

City of Hart, Oceana County
Critical Facilities and Potential Hazards



Hazard Identification Profile
Village of Hesperia

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/04/14
Flood Insurance Policies In-Force: 1 **Total Flood Insurance Coverage:** $38,800
Floodplains and Flood-prone Areas: White River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.

- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Hart Hydro-Electric Dam, ***Hesperia Dam spillway erosion***, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

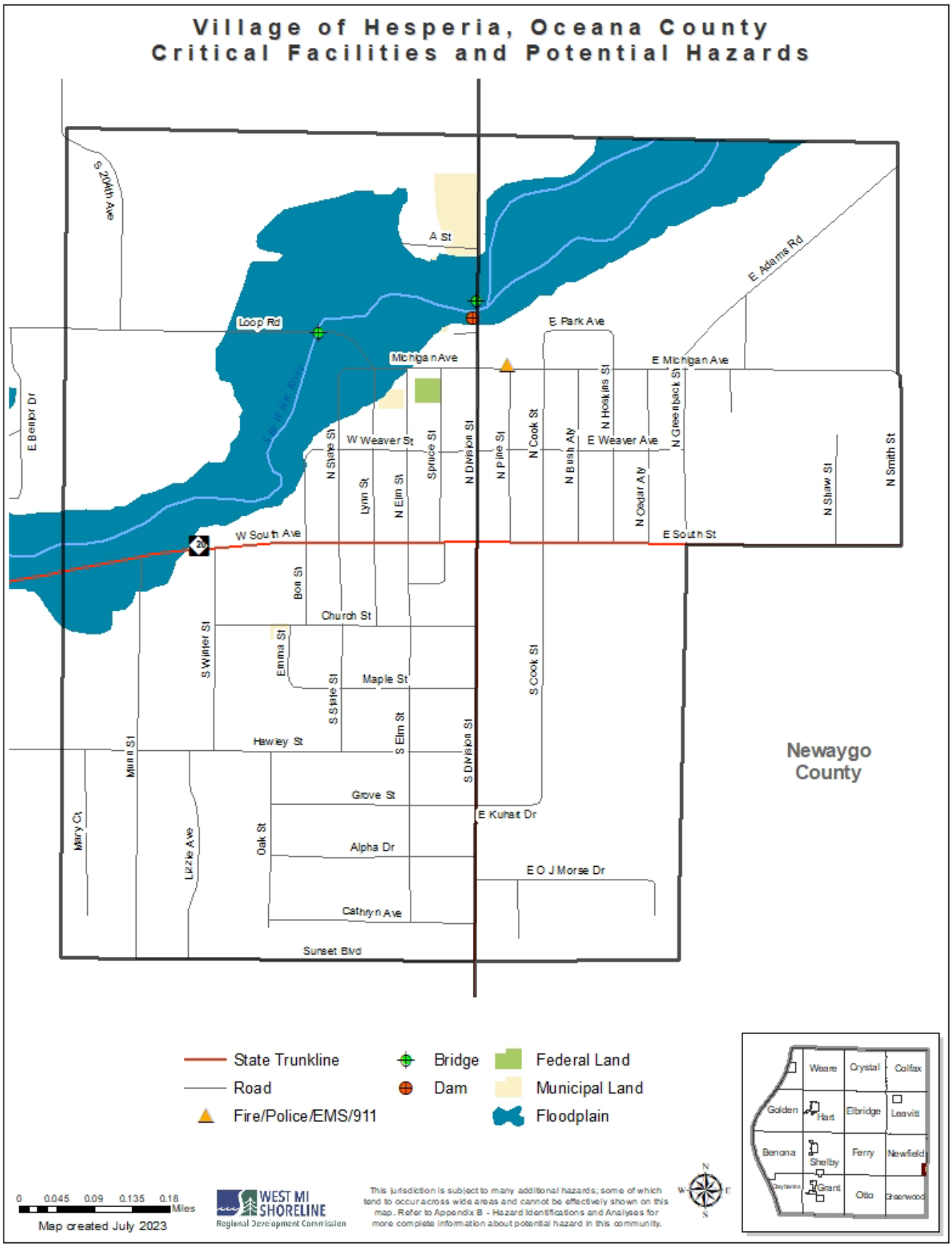
3.05 Terrorism and Similar Criminal Activities: - None Identified.

HESPERIA VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	0	-	-	-
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

HESPERIA VILLAGE
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Flooding: Riverine/Urban	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
11	Hail	2	11	22
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Dam failure	2	9	18
15	Energy Emergencies	2	8	16
16	Tornadoes	1	15	15
17	HAZMAT – Transportation	2	7	14
17	Invasive Species	2	7	14
19	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	HAZMAT – Fixed Site	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Oil/Natural Gas Well Accidents	0	-	-
n/a	Pipeline Accidents	0	-	-


Village of Hesperia, Oceana County
Critical Facilities and Potential Hazards
S 20th Ave
A St
E Adams Rd
Loop Rd
E Park Ave
Michigan Ave
E Michigan Ave
E Benton Dr
White River
W Weaver St
E Weaver Ave
N State St
Lynn St
N Elm St
Spruce St
N Division St
N Pine St
N Cook St
N Bush Aly
N Hoskins St
N Cedar Aly
N Greenback St
N Shaw St
N Smith St
W South Ave
E South St
Bon St
Church St
S Winter St
Emma St
Maple St
S State St
S Elm St
S Division St
S Cook St
Hawley St
Munn St
Grove St
E Kuhnle Dr
Mary Ct
Lizzie Ave
Oak St
Alpha Dr
E O J Morse Dr
Cathryn Ave
Sunset Blvd
Newaygo County
State Trunkline
Road
Fire/Police/EMS/911
Bridge
Dam
Federal Land
Municipal Land
Floodplain
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.045 0.09 0.135 0.18 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile

Village of New Era

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A

- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:

- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- ***May 10, 2003: 1.00 inch hail. $20k property damage, $10k crop damage, New Era Village (Grant and Shelby Twps).***
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.
- ***May 23, 2004: 0.75 inch hail. $15k property damage, $15k crop damage, New Era Village (Grant and Shelby Twps).***

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

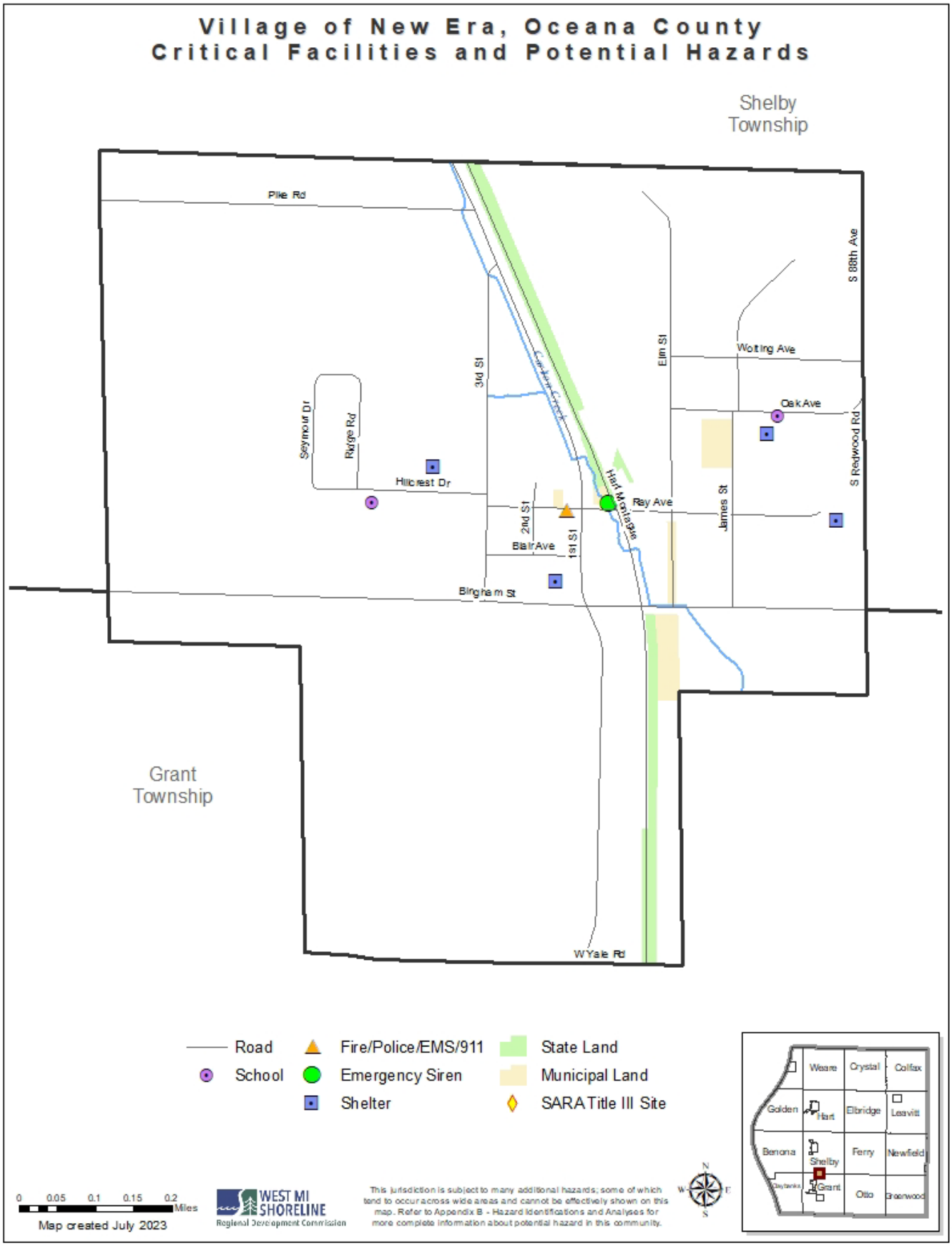
3.05 Terrorism and Similar Criminal Activities: - None Identified.

NEW ERA VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	0	-	-	-
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

NEW ERA VILLAGE
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
10	Hail	2	11	22
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
13	Energy Emergencies	2	8	16
14	Tornadoes	1	15	15
15	HAZMAT – Transportation	2	7	14
15	Invasive Species	2	7	14
17	Flooding: Riverine/Urban	2	6	12
17	HAZMAT – Fixed Site	2	6	12
17	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Oil/Natural Gas Well Accidents	0	-	-
n/a	Pipeline Accidents	0	-	-


Village of New Era, Oceana County
Critical Facilities and Potential Hazards
Shelby Township
Grant Township
Pike Rd
S 88th Ave
Elm St
Wolting Ave
Oak Ave
S Redwood Rd
3rd St
Seymour Dr
Ridge Rd
Hillcrest Dr
Hart Montague
Ray Ave
James St
2nd St
1st St
Blair Ave
Bingham St
W Yale Rd
Road
School
Fire/Police/EMS/911
Emergency Siren
Shelter
State Land
Municipal Land
SARA Title III Site
0 0.05 0.1 0.15 0.2 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood

Hazard Identification Profile
Village of Pentwater

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 26 **Total Flood Insurance Coverage:** $3,811,500

Floodplains and Flood-prone Areas: Lake Michigan shoreline, Pentwater Lake shoreline, Pentwater Lake tributary
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:
- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- ***July 13, 1938: Seiche/storm surge on Lake Michigan. 3 drowned in Holland, 1 in Muskegon, and 1 near Pentwater.***
- ***August 3, 2011: 13-year old girl died after being swept away by a rip current near the north pier in Pentwater.***
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- ***July 26, 2005: Severe thunderstorms. $15k property damage, Pentwater Village (Pentwater Twp).***
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- ***August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.***
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- ***May 29, 1998:*** 90,000 without power statewide (thunderstorm winds). ***Power lines downed in Pentwater.***
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

PENTWATER VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	1	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	0	-	-	-
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

PENTWATER VILLAGE
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Great Lakes Shoreline	3	9	27
7	Drought	2	13	26
8	Flooding: Riverine/Urban	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
8	Wildfire	2	12	24
12	Hail	2	11	22
13	Catastrophic Incidents	1	18	18
13	Space Weather	2	9	18
13	Dam failure	2	9	18
16	Energy Emergencies	2	8	16
17	Tornadoes	1	15	15
18	Fog	3	4	12
18	Invasive Species	2	6	12
18	Transportation Accidents	2	6	12
21	Celestial Impacts	1	8	8
22	HAZMAT – Transportation	1	7	7
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	HAZMAT – Fixed Site	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Oil/Natural Gas Well Accidents	0	-	-
n/a	Pipeline Accidents	0	-	-


Village of Pentwater, Oceana County
Critical Facilities and Potential Hazards
Lake Michigan
Pentwater Lake
Sands St
E Hanover St
Park St
E Concord St
E Lowell St
1st St
Green St
2nd St
3rd Rd
4th St
5th St
6th St
E Lake Rd
Old State Rd
W Monroe Rd
Longbridge Rd
Suffolk St
Tamarest St
Orange St
Garrison
Pine
Salem
Chester St
Channel Ln
Bridge
Dover St
Plymouth
Mears
Mears SP Campground
Beach
Campbell Park Rd
N Hancock St
N Wythe St
N Rush St
N Morris St
N Ellery St
S Ellery St
S Rush St
S Wythe St
S Rutledge St
Carroll St
S Clymer St
S Morris St
Victoria Blvd
Maple Ln
N 56th Ave
Branch St
Oceana Dr
Bean
Pratt
Russell
Center
State Trunkline
Road
Shelter
Great Lakes Shoreline Hazard
High Risk Erosion Area
Fire/Police/EMS/911
State Land
Municipal Land
Floodplain
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.07 0.14 0.21 0.28 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards, some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile

Village of Rothbury

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A

- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:

- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

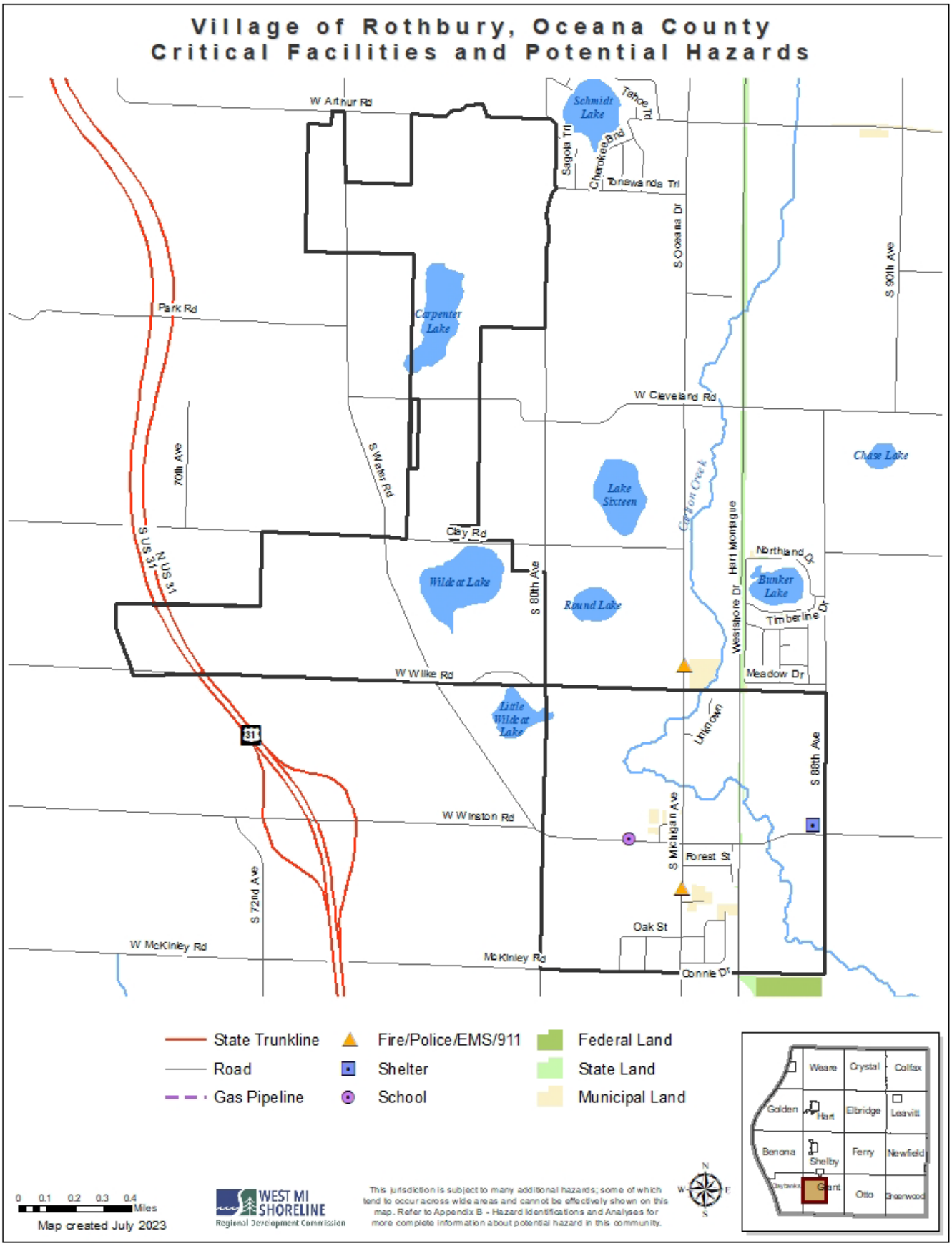
3.05 Terrorism and Similar Criminal Activities: - None Identified.

ROTHBURY VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

ROTHBURY VILLAGE
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
10	Hail	2	11	22
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
13	Energy Emergencies	2	8	16
14	Tornadoes	1	15	15
15	HAZMAT – Transportation	2	7	14
16	Flooding: Riverine/Urban	2	6	12
16	HAZMAT – Fixed Site	2	6	12
16	Invasive Species	2	6	12
16	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-


Village of Rothbury, Oceana County
Critical Facilities and Potential Hazards
W Arthur Rd
Schmidt Lake
Tehde Trl
Sagola Trl
Cherokee Blvd
Tonawanda Trl
S Oceana Dr
S 90th Ave
Park Rd
Carpenter Lake
W Cleveland Rd
Chase Lake
70th Ave
S Wales Rd
Lake Sixteen
Clay Rd
S US 31
N US 31
Wildcat Lake
S 80th Ave
Round Lake
Hart Montague
Northland Ct
Bunker Lake
Timberline Dr
Meadow Dr
W Wilke Rd
Little Wildcat Lake
31
S 88th Ave
W Winston Rd
S Michigan Ave
Forest St
S 72nd Ave
Oak St
W McKinley Rd
McKinley Rd
Connie Dr
State Trunkline
Road
Gas Pipeline
Fire/Police/EMS/911
Shelter
School
Federal Land
State Land
Municipal Land
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Otto
Greenwood
0 0.1 0.2 0.3 0.4 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Village of Shelby

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:
- September 1986: Hart Hydro-Electric Dam, Hesperia Pond Dam spillway, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37
- ***June 12, 2012: Fire destroyed historic buildings in downtown Shelby, including apartment units and businesses.***

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents:
- ***March 5, 2010: Damage to residential gas meter causing natural gas leak. Minor neighborhood evacuations and temporary relocation of schoolchildren, Shelby Village.***

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

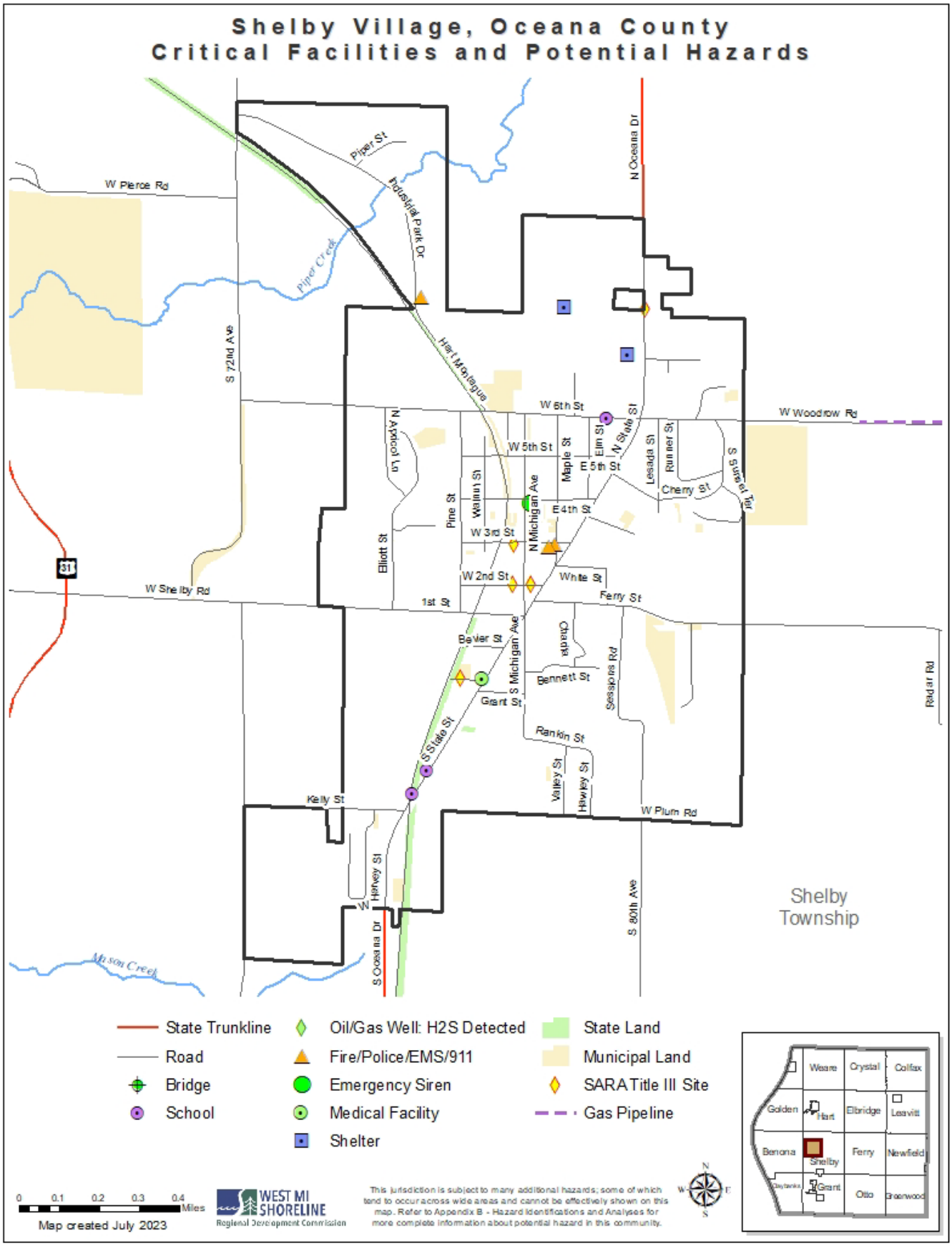
3.05 Terrorism and Similar Criminal Activities: - None Identified.

SHELBY VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

SHELBY VILLAGE
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
10	Hail	2	11	22
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
13	Energy Emergencies	2	8	16
14	Tornadoes	1	15	15
15	HAZMAT – Transportation	2	7	14
16	Flooding: Riverine/Urban	2	6	12
16	HAZMAT – Fixed Site	2	6	12
16	Invasive Species	2	6	12
16	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-


Shelby Village, Oceana County
Critical Facilities and Potential Hazards
W Pierce Rd
Piper St
Industrial Park Dr
Piper Creek
N Oceana Dr
S 72nd Ave
Hart Montague
W 6th St
W Woodrow Rd
N Stiles St
W 5th St
Maple St
Elm St
E 5th St
Lesada St
Runner St
Cherry St
S Stiles Ter
N Apricot Ln
Walnut St
Pine St
N Michigan Ave
E 4th St
W 3rd St
Elliott St
31
W Shelby Rd
W 2nd St
White St
1st St
Ferry St
Bevier St
Bennett St
Grant St
S Michigan Ave
Cheda
Sessions Rd
Radar Rd
S State St
Rankin St
Valley St
Hawley St
Kelly St
W Plum Rd
Hervey St
S Oceana Dr
S 80th Ave
Mason Creek
Shelby Township
State Trunkline
Road
Bridge
School
Oil/Gas Well: H2S Detected
Fire/Police/EMS/911
Emergency Siren
Medical Facility
Shelter
State Land
Municipal Land
SARA Title III Site
Gas Pipeline
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.1 0.2 0.3 0.4 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile
Village of Walkerville

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- ***July 13, 2000: 1.75 inch hail. $50k property damage, $25k crop damage, Walkerville Village (Leavitt Twp).***
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- ***July 15, 1995: Severe thunderstorms. $15k property damage, Walkerville Village (Leavitt Twp).***
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37
- ***Major fires in the Village of Walkerville: May 1891, 1914, and in the 1940"s.***

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

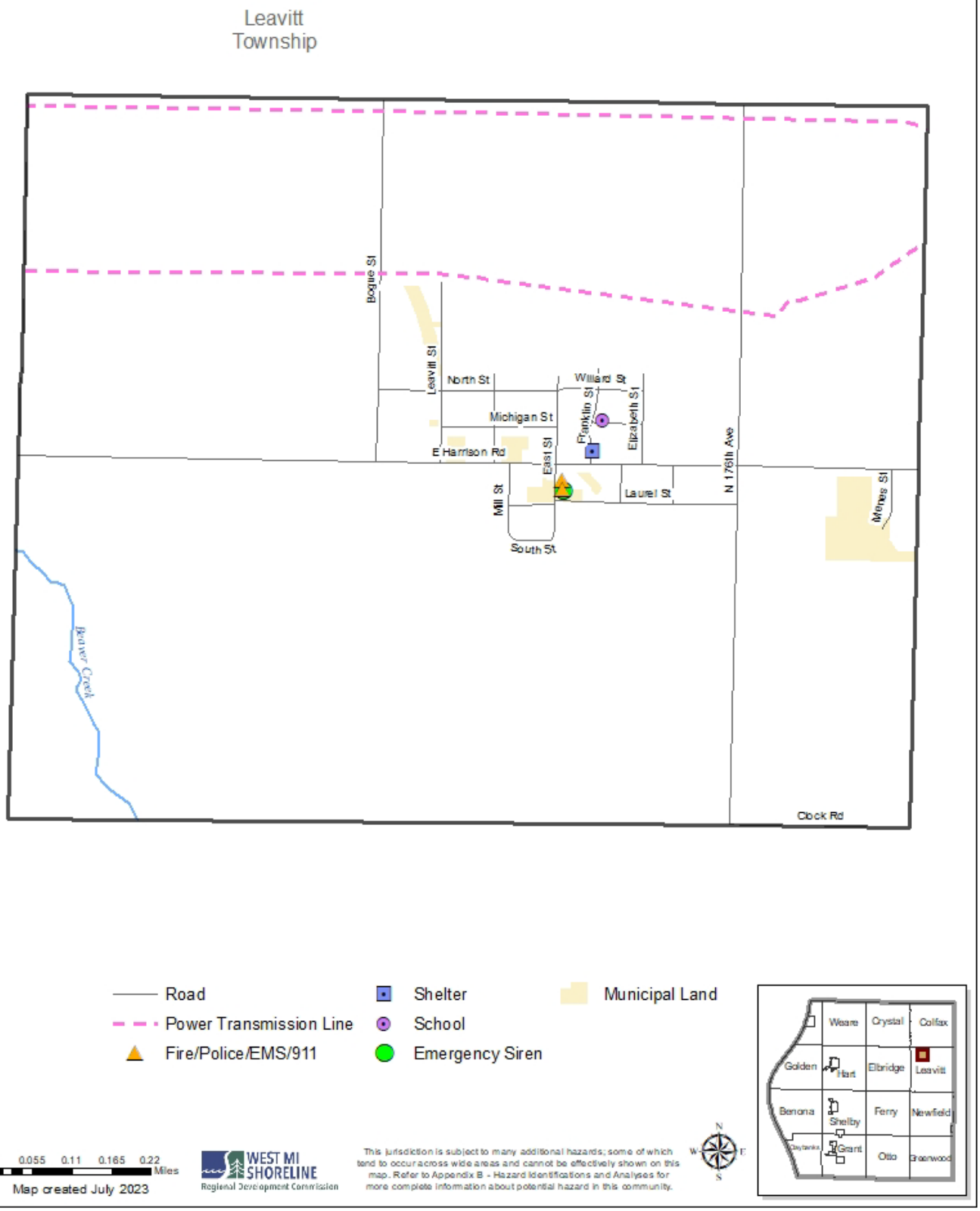
WALKERVILLE VILLAGE
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	2	2	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	1	3	2	2
1.14 Wildfire	2	2	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

WALKERVILLE VILLAGE
Hazard Vulnerability Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
6	Drought	2	13	26
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
7	Wildfire	2	12	24
10	Hail	2	11	22
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
13	Energy Emergencies	2	8	16
14	Tornadoes	1	15	15
15	HAZMAT – Transportation	2	7	14
15	Invasive Species	2	7	14
17	Flooding: Riverine/Urban	2	6	12
17	Transportation Accidents	2	6	12
19	Celestial Impacts	1	8	8
19	Fog	2	4	8
21	Civil Disturbances	1	6	6
21	Fire – Scrap Tires	1	6	6
21	HAZMAT – Fixed Site	1	6	6
21	Oil/Natural Gas Well Accidents	1	6	6
21	Subsidence	1	6	6
21	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Village of Walkerville, Oceana County
Critical Facilities and Potential Hazards



Hazard Identification Profile
Benona Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 7 **Total Flood Insurance Coverage:** $2,170,000

Floodplains and Flood-prone Areas: Lake Michigan shoreline, Stony Lake shoreline, Stony Creek and tributaries
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:
- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- ***April 6, 1997: Beach erosion due to high winds reported at Stony Lake, Benona Twp.***
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- ***July 26, 2018: Severe thunderstorms. $20k property damage, Benona Township.***
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).
- ***April 11, 2005: Wildfire. 17 acres burned, 2 houses/ 16 walkways destroyed, 5 houses damaged. Benona Twp.***

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- ***Oil and gas test wells in Benona Township in 2023: 155***
- ***12 wells with known detectable levels of hydrogen sulfide in Benona Township***

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

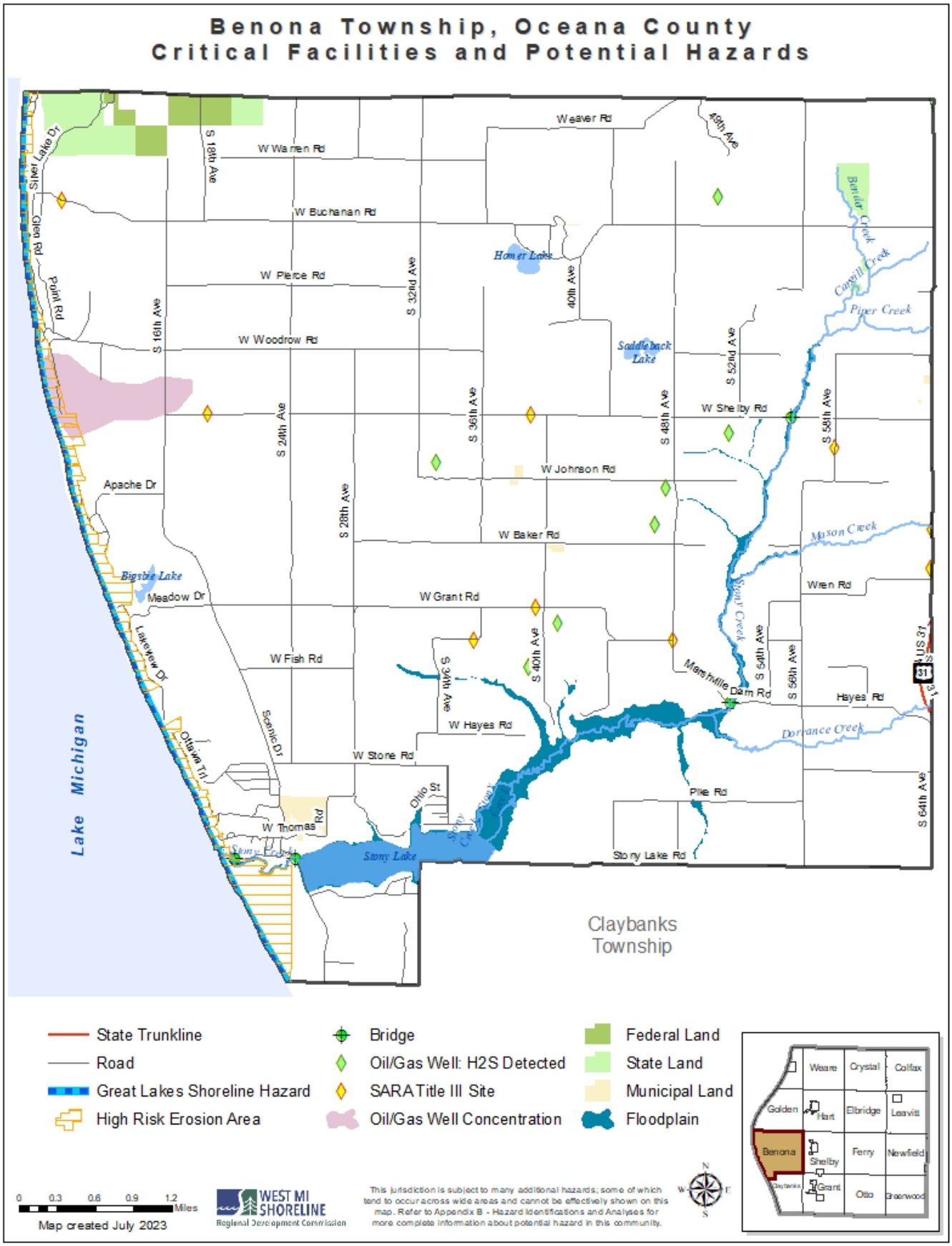
3.05 Terrorism and Similar Criminal Activities: - None Identified.

BENONA TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

BENONA TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Great Lakes Shoreline	3	9	27
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
7	Drought	2	13	26
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
11	Fire – Structural	3	7	21
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Invasive Species	2	9	18
12	Oil/Natural Gas Well Accidents	2	9	18
12	Tornadoes	2	9	18
17	Energy Emergencies	2	8	16
17	Flooding: Riverine/Urban	2	8	16
19	HAZMAT – Transportation	2	7	14
20	Fog	3	4	12
20	HAZMAT – Fixed Site	2	6	12
20	Transportation Accidents	2	6	12
23	Celestial Impacts	1	8	8
24	Civil Disturbances	1	6	6
24	Fire – Scrap Tires	1	6	6
24	Subsidence	1	6	6
24	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-


Benona Township, Oceana County
Critical Facilities and Potential Hazards
Lake Michigan
Claybanks Township
Weaver Rd
W Warren Rd
W Buchanan Rd
W Pierce Rd
W Woodrow Rd
W Johnson Rd
W Baker Rd
W Grant Rd
W Fish Rd
W Hayes Rd
W Stone Rd
W Thomas Rd
W Shelby Rd
Pike Rd
Stony Lake Rd
Wren Rd
Hayes Rd
Meadow Dr
Apache Dr
Lakeview Dr
Ottawa Trl
Scenic Dr
Ohio St
S 16th Ave
S 18th Ave
S 24th Ave
S 28th Ave
S 32nd Ave
S 34th Ave
S 36th Ave
S 40th Ave
40th Ave
S 48th Ave
S 52nd Ave
S 54th Ave
S 56th Ave
S 58th Ave
S 64th Ave
49th Ave
Silver Lake Dr
Clear Rd
Point Rd
Bigsbie Lake
Homer Lake
Saddleback Lake
Stony Lake
Marshville Dam Rd
US 31
Bender Creek
Carvill Creek
Piper Creek
Mason Creek
Stony Creek
Dorrance Creek
State Trunkline
Road
Great Lakes Shoreline Hazard
High Risk Erosion Area
Bridge
Oil/Gas Well: H2S Detected
SARA Title III Site
Oil/Gas Well Concentration
Federal Land
State Land
Municipal Land
Floodplain
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Claybanks
Grant
Otto
Greenwood
0 0.3 0.6 0.9 1.2 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile

Claybanks Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: N/A **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: Lake Michigan shoreline, Stony Lake shoreline, Flower Creek

- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:

- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:

- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Claybanks Township in 2023: 172

- 33 wells with known detectable levels of hydrogen sulfide in Claybanks Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

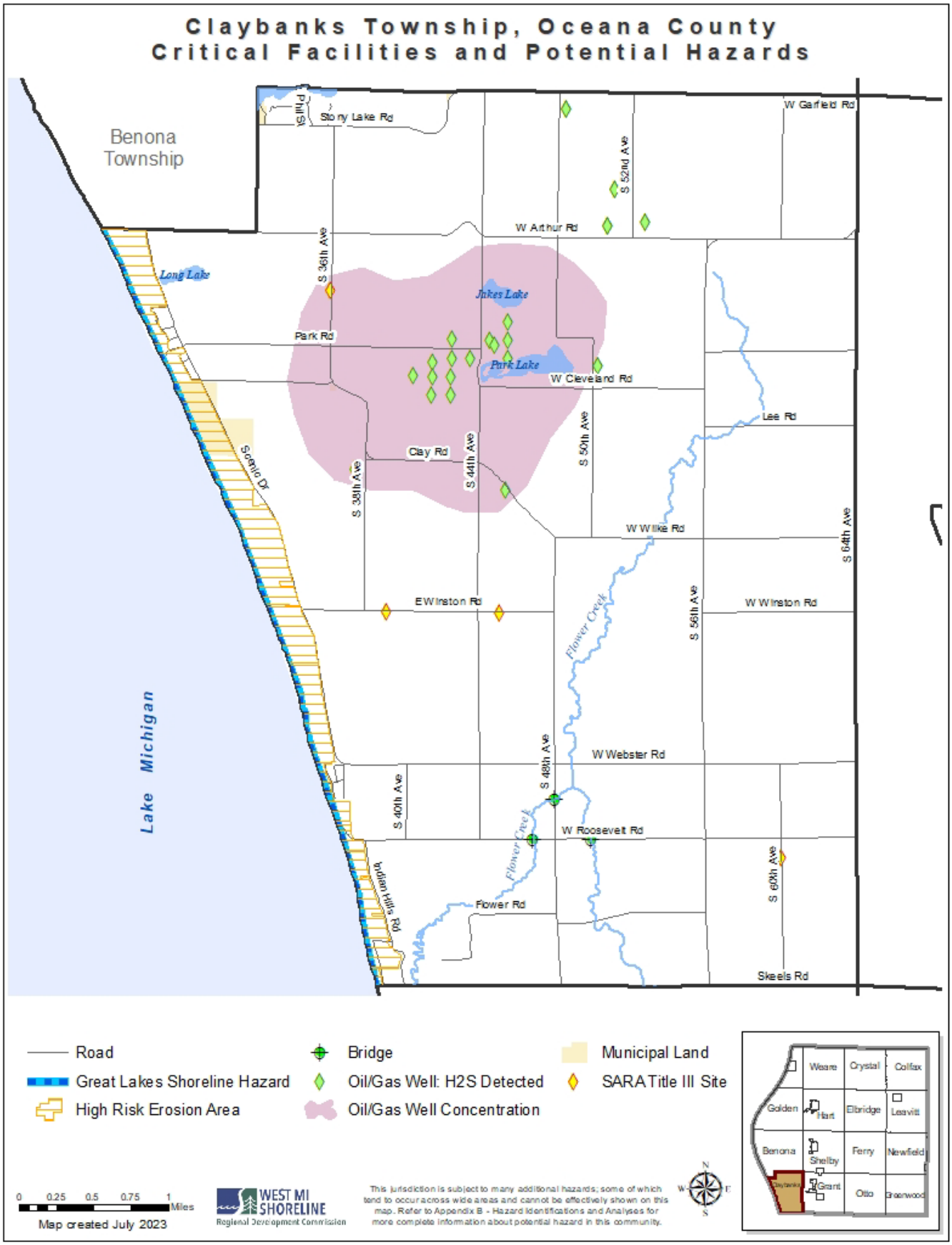
3.05 Terrorism and Similar Criminal Activities: - None Identified.

CLAYBANKS TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	1	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

CLAYBANKS TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Great Lakes Shoreline	3	9	27
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
7	Drought	2	13	26
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
11	Fire – Structural	3	7	21
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Invasive Species	2	9	18
12	Oil/Natural Gas Well Accidents	2	9	18
12	Tornadoes	2	9	18
17	Energy Emergencies	2	8	16
17	Flooding: Riverine/Urban	2	8	16
19	HAZMAT – Transportation	2	7	14
20	Fog	3	4	12
20	HAZMAT – Fixed Site	2	6	12
22	Celestial Impacts	1	8	8
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
23	Transportation Accidents	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-


Claybanks Township, Oceana County
Critical Facilities and Potential Hazards
Benona Township
Lake Michigan
Long Lake
Jakes Lake
Park Lake
Flower Creek
Stony Lake Rd
W Garfield Rd
W Arthur Rd
Park Rd
W Cleveland Rd
Clay Rd
Lee Rd
W Wilke Rd
E Winston Rd
W Winston Rd
W Webster Rd
W Roosevelt Rd
Flower Rd
Skeels Rd
Scenic Dr
Indian Hills Rd
S 36th Ave
S 38th Ave
S 40th Ave
S 44th Ave
S 48th Ave
S 50th Ave
S 52nd Ave
S 56th Ave
S 60th Ave
S 64th Ave
Road
Great Lakes Shoreline Hazard
High Risk Erosion Area
Bridge
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Municipal Land
SARA Title III Site
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Claybanks
Grant
Otto
Greenwood

Hazard Identification Profile
Colfax Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: South Branch Pere Marquette River, Ruby Creek
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Colfax Township in 2023: 98
- 1 well with known detectable levels of hydrogen sulfide in Colfax Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

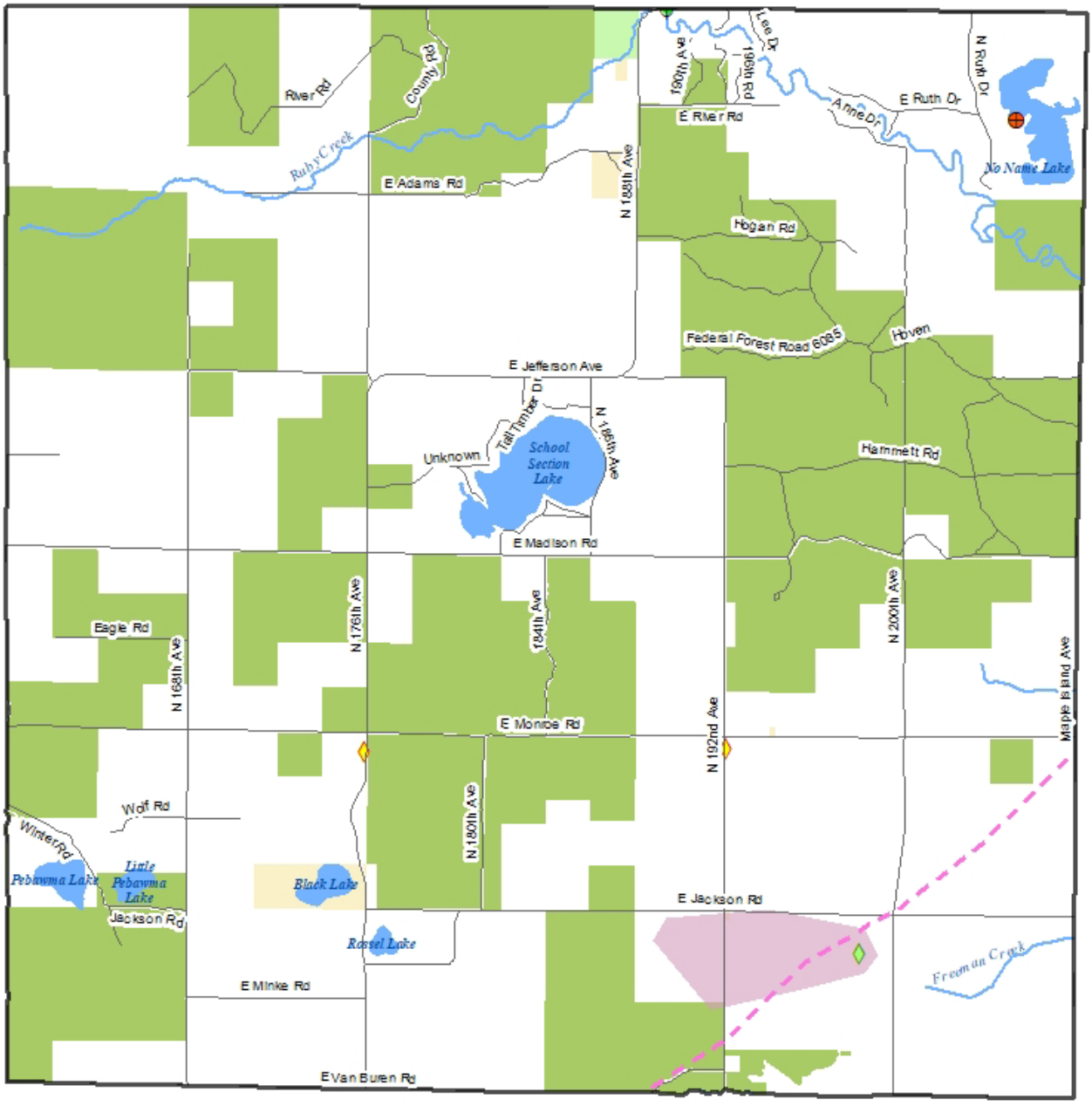
COLFAX TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	1	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

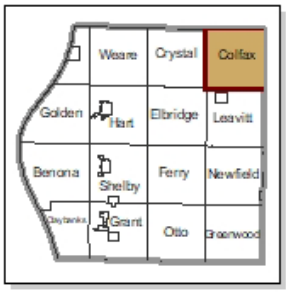
COLFAX TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6]	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Dam failure	2	9	18
11	Invasive Species	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Tornadoes	2	9	18
17	Energy Emergencies	2	8	16
18	HAZMAT – Fixed Site	2	7	14
18	HAZMAT – Transportation	2	7	14
20	Flooding: Riverine/Urban	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
23	Transportation Accidents	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Colfax Township, Oceana County
Critical Facilities and Potential Hazards



Road
Power Transmission Line
SARA Title III Site
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Federal Land
State Land
Municipal Land
Bridge
Dam



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Crystal Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:
- September 1986: Hart Hydro-Electric Dam, Hesperia Dam spillway erosion, ***Crystal Valley Dam spillway erosion***.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- SARA Title III sites within the county in 2023: 75
- December 12, 2012: Explosion in a pig farm barn in Crystal Township; possibly caused by methane gas buildup.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Crystal Township in 2023: 137
- 2 wells with known detectable levels of hydrogen sulfide in Crystal Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

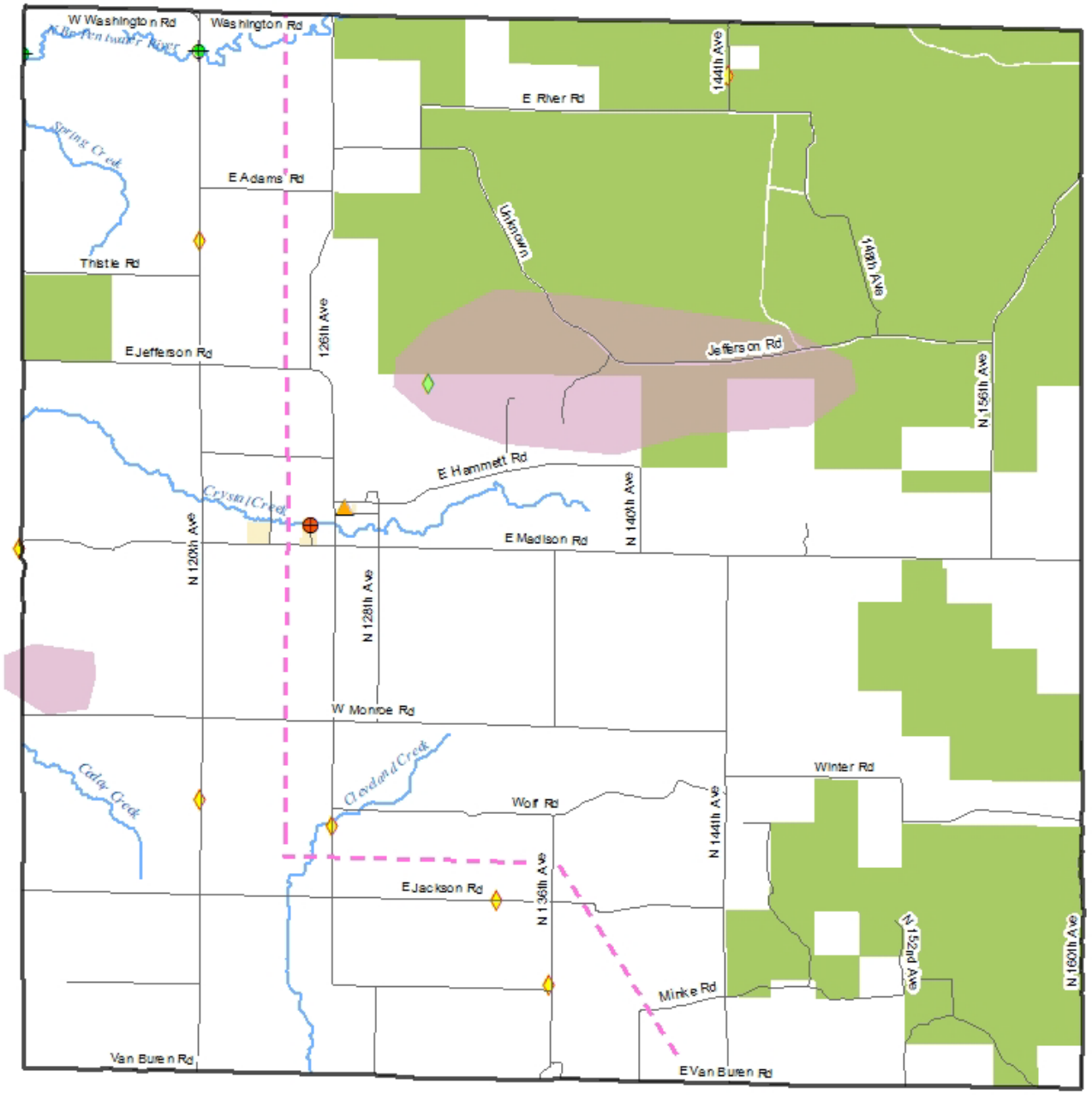
CRYSTAL TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	1
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	1	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

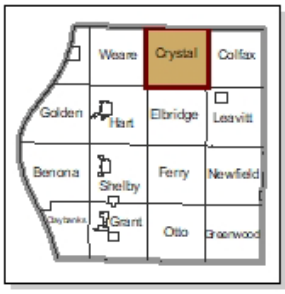
CRYSTAL TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Tornadoes	2	9	18
16	Energy Emergencies	2	8	16
17	HAZMAT – Transportation	2	7	14
18	Dam failure	2	6	12
18	Flooding: Riverine/Urban	2	6	12
18	HAZMAT – Fixed Site	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
23	Transportation Accidents	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Crystal Township, Oceana County
Critical Facilities and Potential Hazards



Road
Power Transmission Line
SARA Title III Site
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Bridge
Dam
Fire/Police/EMS/911
Federal Land
Municipal Land



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Elbridge Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.

- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Elbridge Township in 2023: 111
- 5 wells with known detectable levels of hydrogen sulfide in Elbridge Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

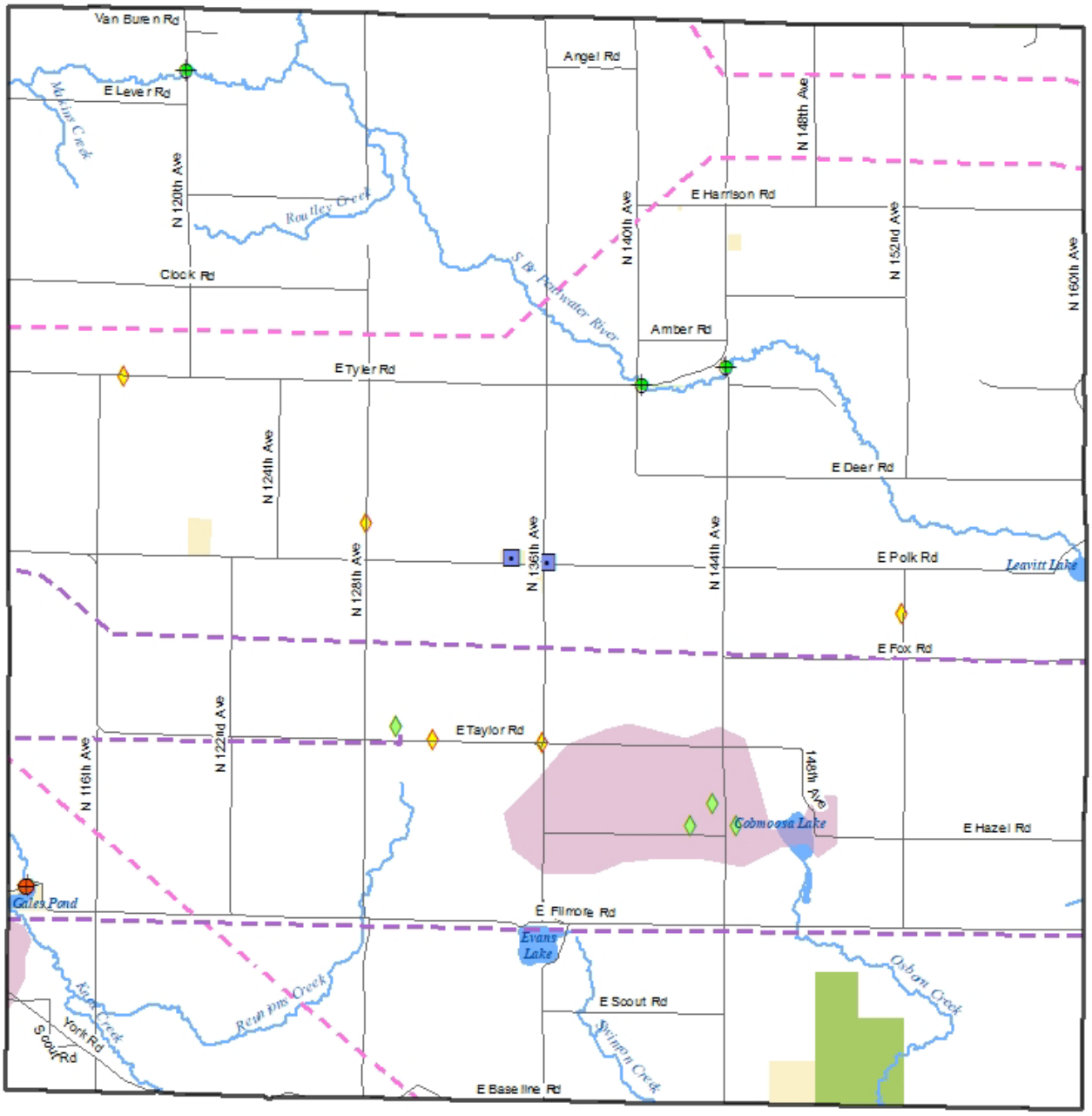
ELBRIDGE TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	1
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	1	1	1	1
2.11 Transportation Accidents	1	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

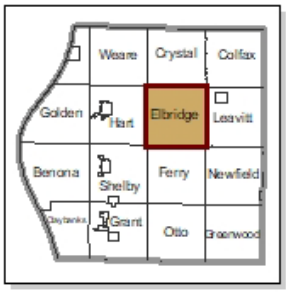
ELBRIDGE TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Tornadoes	2	9	18
16	Energy Emergencies	2	8	16
17	HAZMAT – Transportation	2	7	14
18	Dam failure	2	6	12
18	Flooding: Riverine/Urban	2	6	12
18	HAZMAT – Fixed Site	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Pipeline Accidents	1	7	7
24	Civil Disturbances	1	6	6
24	Fire – Scrap Tires	1	6	6
24	Subsidence	1	6	6
24	Terrorism & Similar Criminal Acts	1	6	6
24	Transportation Accidents	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-

Elbridge Township, Oceana County
Critical Facilities and Potential Hazards



Road
Power Transmission Line
Gas Pipeline
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Shelter
Bridge
Dam
Federal Land
State Land
Municipal Land
SARA Title III Site



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Ferry Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/04/14

Flood Insurance Policies In-Force: 2 **Total Flood Insurance Coverage:** $411,000

Floodplains and Flood-prone Areas: North Branch White River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:
- ***July 11, 1967: Tornado (F1). $25k property damage, Ferry Township.***
- ***September 14, 1990: Tornado (F1). $25k property damage, Ferry Township.***

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.

- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Ferry Township in 2023: 106

- 6 wells with known detectable levels of hydrogen sulfide in Ferry Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

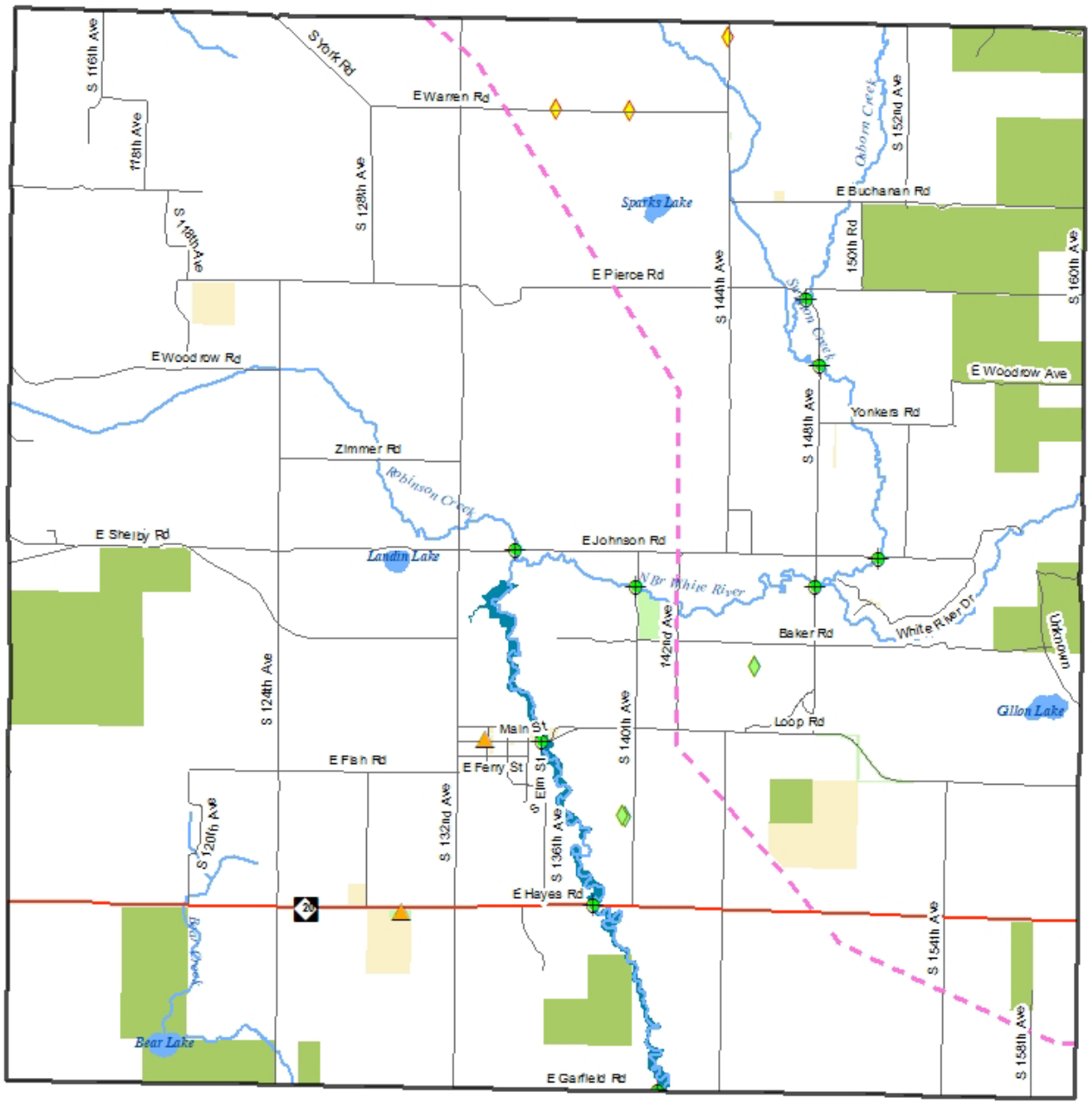
FERRY TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

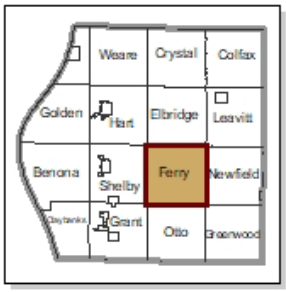
FERRY TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
16	HAZMAT – Transportation	2	7	14
16	Invasive Species	2	7	14
18	Flooding: Riverine/Urban	2	6	12
18	HAZMAT – Fixed Site	2	6	12
18	Transportation Accidents	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Ferry Township, Oceana County
Critical Facilities and Potential Hazards



State Trunkline
Road
Power Transmission Line
Oil/Gas Well: H2S Detected
Fire/Police/EMS/911
Bridge
Floodplain
Federal Land
State Land
Municipal Land
SARA Title III Site



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Golden Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 5 **Total Flood Insurance Coverage:** $1,400,000

Floodplains and Flood-prone Areas: Lake Michigan shoreline, Silver Lake shoreline, Upper Silver Lake shoreline, Holiday Lake shoreline, Au Sable Creek, Hunter Creek, Lambrick Creek, Silver Creek

- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:

- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:

- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning:

- July 26, 2023: Lightning strike sparked a fire at the Silver Lake Pizza Factory, forcing it to close down for the season to be gutted and renovated, Golden Township.

1.11 Severe Winds:

- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.

- June 1, 2000: Severe thunderstorms. $50k property damage, Golden Twp.

- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.

- August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.

- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.

- August 28, 2018: Severe thunderstorms. $20k property damage, Golden Township.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Golden Township in 2023: 102
- 3 wells with known detectable levels of hydrogen sulfide in Golden Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

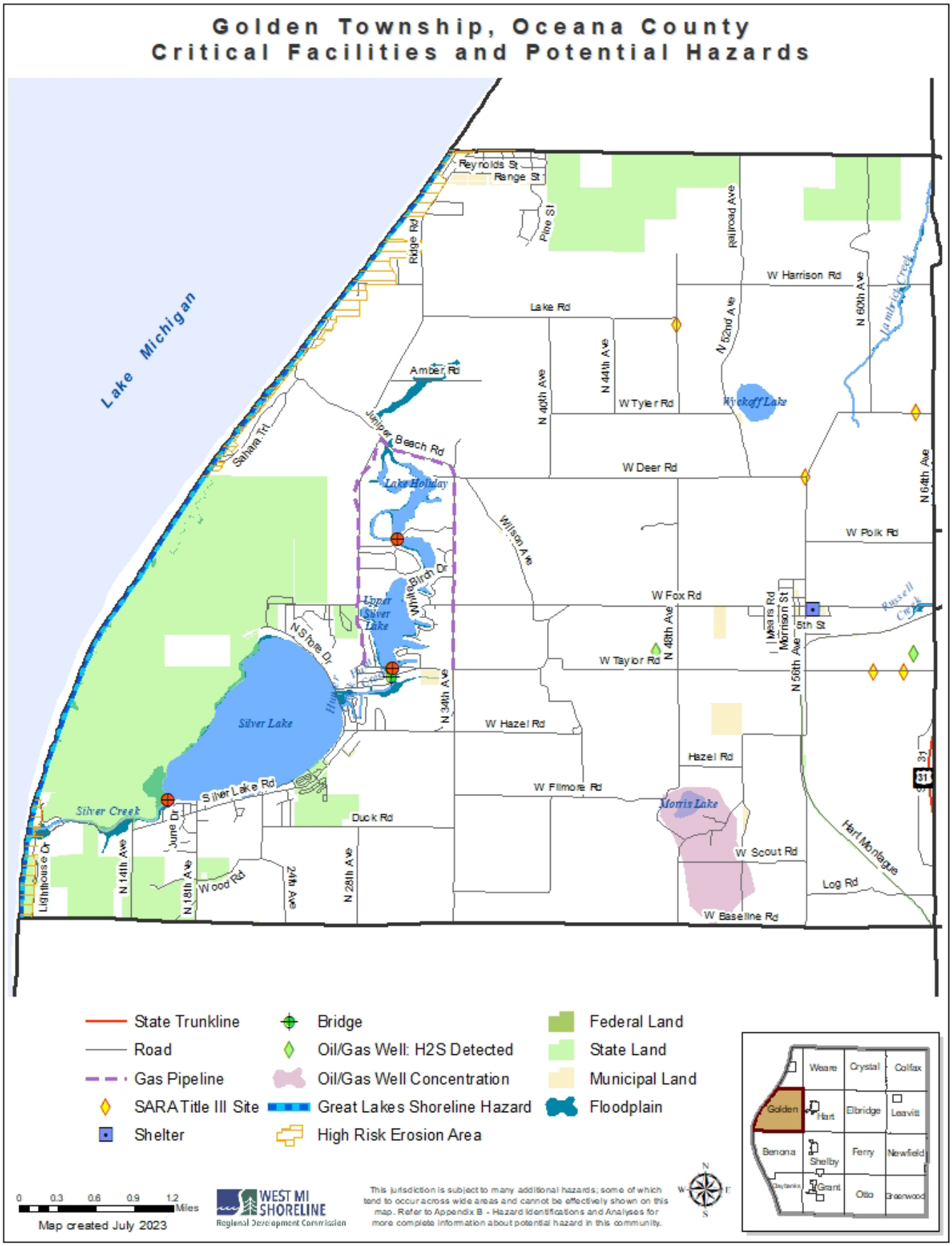
3.05 Terrorism and Similar Criminal Activities: - None Identified.

GOLDEN TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	2	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	1	2	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

GOLDEN TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Great Lakes Shoreline	3	9	27
5	Wildfire	3	9	27
8	Drought	2	13	26
9	Dam failure	2	12	24
9	Flooding: Riverine/Urban	3	8	24
9	Hail	3	8	24
9	Lightning	3	8	24
9	Public Health Emergencies	3	8	24
14	Catastrophic Incidents	1	18	18
14	Space Weather	2	9	18
14	Oil/Natural Gas Well Accidents	2	9	18
14	Tornadoes	2	9	18
18	Energy Emergencies	2	8	16
18	Invasive Species	2	8	16
20	HAZMAT – Fixed Site	2	7	14
20	HAZMAT – Transportation	2	7	14
22	Fog	3	4	12
22	Transportation Accidents	2	6	12
24	Pipeline Accidents	1	10	10
25	Celestial Impacts	1	8	8
26	Civil Disturbances	1	6	6
26	Fire – Scrap Tires	1	6	6
26	Subsidence	1	6	6
26	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-


Golden Township, Oceana County
Critical Facilities and Potential Hazards
Lake Michigan
Reynolds St
Range St
Pine St
Ridge Rd
Railroad Ave
W Harrison Rd
Lake Rd
N 62nd Ave
N 60th Ave
Amber Rd
N 44th Ave
N 40th Ave
W Tyler Rd
Kirkoff Lake
Juniper Beach Rd
Sahara Trl
Lake Holiday
W Deer Rd
N 64th Ave
Wilson Ave
W Polk Rd
Upper Silver Lake
Whitaker Dr
W Fox Rd
Morris Rd
Morrison St
5th St
Russell Creek
N Shore Dr
W Taylor Rd
N 48th Ave
N 56th Ave
Silver Lake
N 34th Ave
W Hazel Rd
Hazel Rd
W Fillmore Rd
Silver Lake Rd
Silver Creek
Morris Lake
Duck Rd
June Dr
Lighthouse Dr
N 14th Ave
N 18th Ave
Wood Rd
24th Ave
N 28th Ave
W Scout Rd
Log Rd
W Baseline Rd
Hart Montague
31
State Trunkline
Road
Gas Pipeline
SARA Title III Site
Shelter
Bridge
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Great Lakes Shoreline Hazard
High Risk Erosion Area
Federal Land
State Land
Municipal Land
Floodplain
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Otto
Greenwood
0 0.3 0.6 0.9 1.2 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile
Grant Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- ***May 10, 2003: 1.00 inch hail. $20k property damage, $10k crop damage, New Era Village (Grant and Shelby Twps).***
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.
- ***May 23, 2004: 0.75 inch hail. $15k property damage, $15k crop damage, New Era Village (Grant and Shelby Twps).***

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Grant Township in 2023: 64

- 2 wells with known detectable levels of hydrogen sulfide in Grant Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

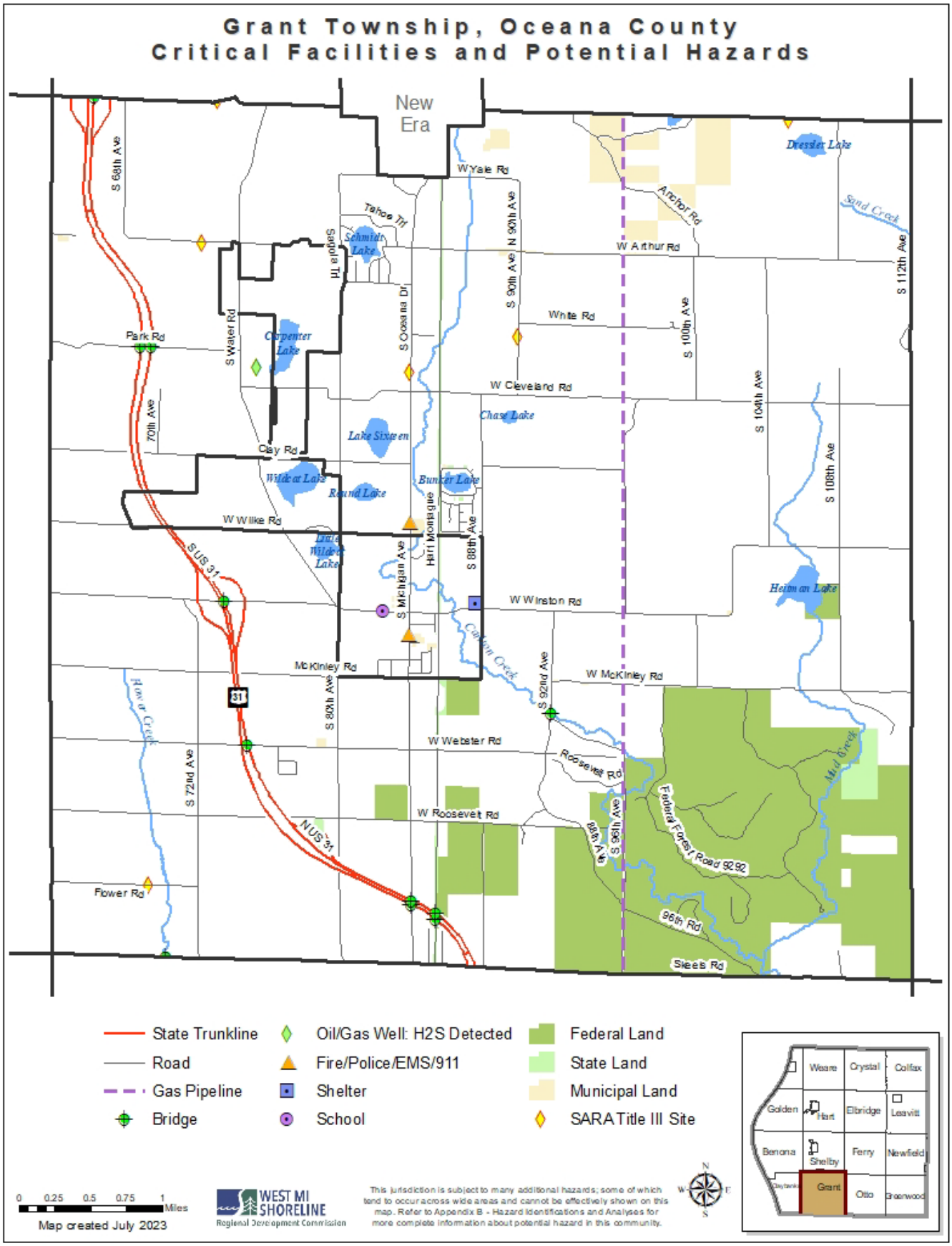
3.05 Terrorism and Similar Criminal Activities: - None Identified.

GRANT TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	1	1	1
2.10 Pipeline Accidents	1	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

GRANT TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Wildfire	3	9	27
7	Drought	2	13	26
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
16	HAZMAT – Transportation	2	7	14
17	Flooding: Riverine/Urban	2	6	12
17	HAZMAT – Fixed Site	2	6	12
17	Oil/Natural Gas Well Accidents	2	6	12
17	Transportation Accidents	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Pipeline Accidents	1	7	7
24	Civil Disturbances	1	6	6
24	Fire – Scrap Tires	1	6	6
24	Subsidence	1	6	6
24	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-


Grant Township, Oceana County
Critical Facilities and Potential Hazards
New Era
W Yale Rd
Tahoe Trl
Schmidt Lake
Sequoia Trl
S Oceana Dr
N 90th Ave
S 90th Ave
Dressel Lake
Anchor Rd
Sand Creek
S 112th Ave
W Arthur Rd
White Rd
S 100th Ave
S 104th Ave
S 108th Ave
Park Rd
S Water Rd
Carpenter Lake
W Cleveland Rd
Chase Lake
70th Ave
Clay Rd
Lake Sixteen
Wildcat Lake
Round Lake
Bunker Lake
Hart Montague
W Wilke Rd
Little Wilcox Lake
S 88th Ave
S Michigan Ave
S US 31
W Winston Rd
Heiman Lake
Cedar Creek
McKinley Rd
W McKinley Rd
S 92nd Ave
S 80th Ave
31
Howe Creek
W Webster Rd
Roosevelt Rd
Mud Creek
S 72nd Ave
W Roosevelt Rd
S 96th Ave
Federal Forest Road 9292
96th Rd
Flower Rd
Sleels Rd
State Trunkline
Road
Gas Pipeline
Bridge
Oil/Gas Well: H2S Detected
Fire/Police/EMS/911
Shelter
School
Federal Land
State Land
Municipal Land
SARA Title III Site
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile
Greenwood Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Not Participating in NFIP **FIRM Map Date:** 08/04/14

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** $0

Floodplains and Flood-prone Areas: White River, Skeels Creek
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Greenwood Township in 2023: 52

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

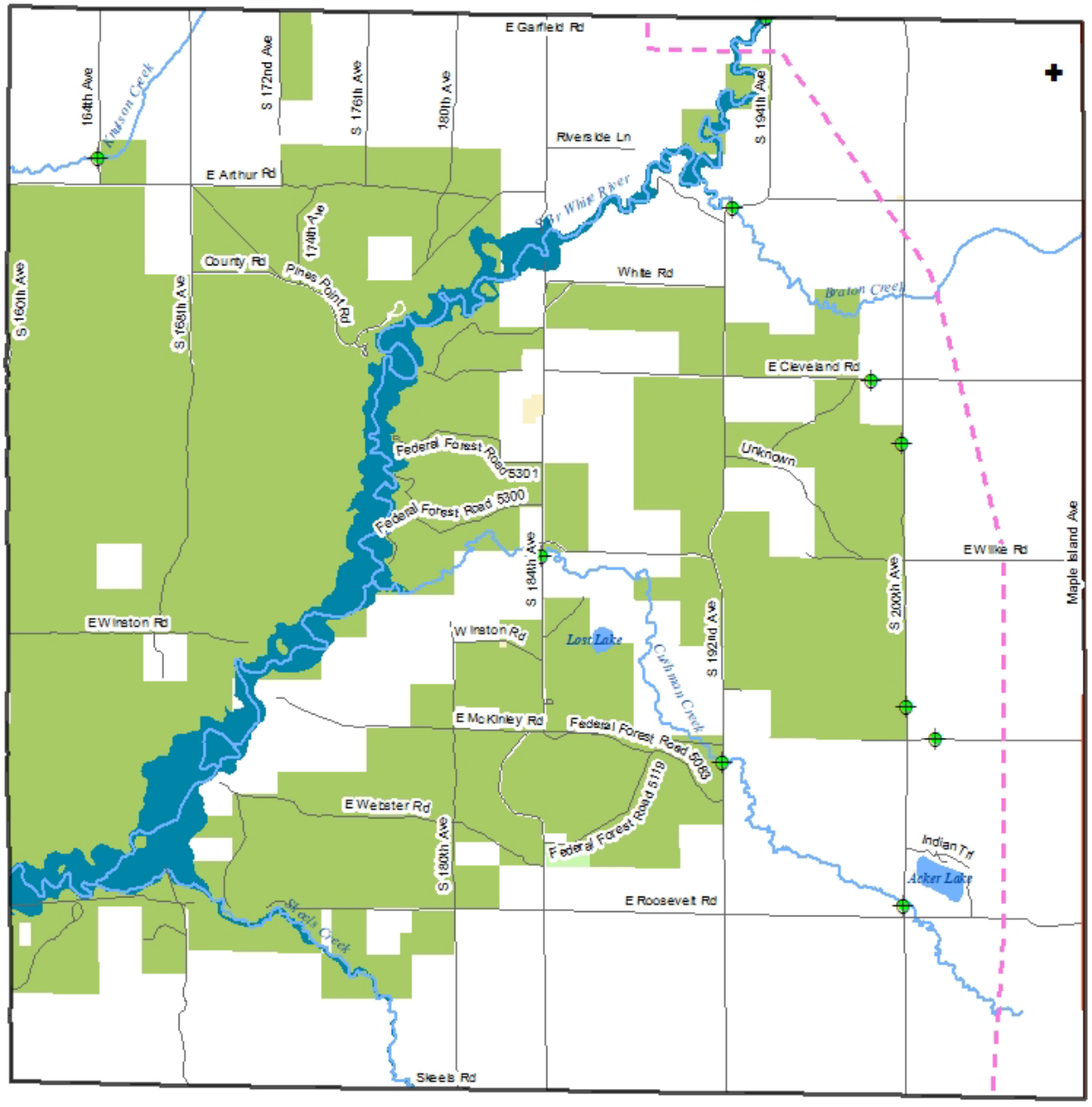
GREENWOOD TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

GREENWOOD TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Wildfire	3	9	27
6	Drought	2	13	26
7	Flooding: Riverine/Urban	3	8	24
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
11	Fire – Structural	3	7	21
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Dam failure	2	9	18
12	Tornadoes	2	9	18
16	Energy Emergencies	2	8	16
17	HAZMAT – Transportation	2	7	14
17	Invasive Species	2	7	14
19	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	HAZMAT – Fixed Site	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Greenwood Township, Oceana County
Critical Facilities and Potential Hazards



State Trunkline
Road
Power Transmission Line
Communication Tower
Bridge
Shelter
School
SARA Title III Site
Federal Land
State Land
Municipal Land
Floodplain

0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Hart Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Not Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** $0

Floodplains and Flood-prone Areas: Hart Lake shoreline, Pentwater River, Chippewa Creek, Russell Creek
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- ***August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.***
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:
- ***May 28, 1991: Tornado (F2). $250k property damage, Hart Township.***

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Hart Hydro-Electric Dam, Hesperia Dam spillway erosion, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Hart Township in 2023: 89

- 3 wells with known detectable levels of hydrogen sulfide in Hart Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents:

- July 14, 2001: School bus rolled into a ditch. 2 children injured, Hart Township.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

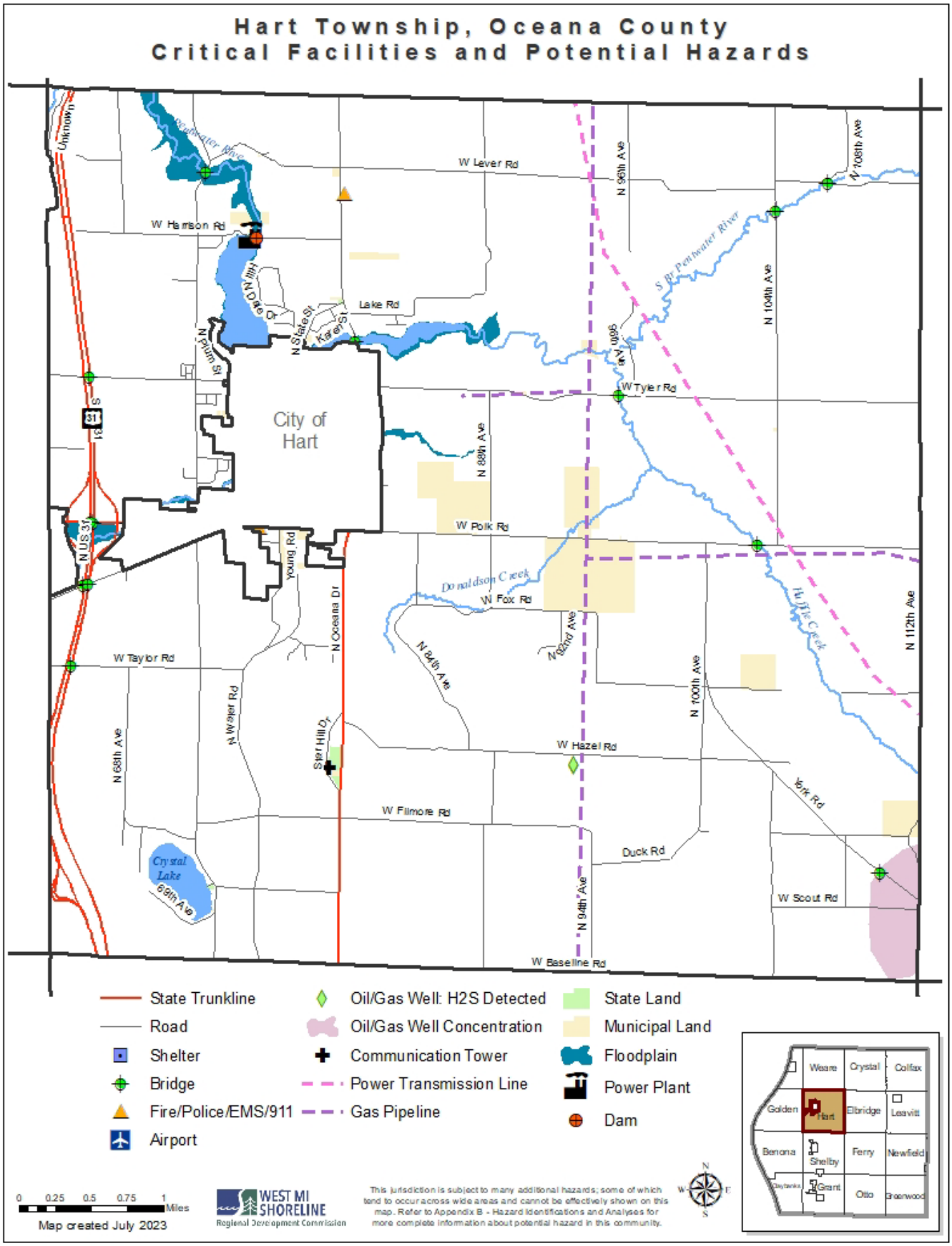
3.05 Terrorism and Similar Criminal Activities: - None Identified.

HART TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	1
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	1	1	1
2.10 Pipeline Accidents	1	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

HART TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
15	Flooding: Riverine/Urban	2	8	16
17	HAZMAT – Fixed Site	2	7	14
17	HAZMAT – Transportation	2	7	14
19	Dam failure	2	6	12
19	Oil/Natural Gas Well Accidents	2	6	12
19	Transportation Accidents	2	6	12
22	Celestial Impacts	1	8	8
22	Fog	2	4	8
24	Pipeline Accidents	1	7	7
25	Civil Disturbances	1	6	6
25	Fire – Scrap Tires	1	6	6
25	Subsidence	1	6	6
25	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-


Hart Township, Oceana County
Critical Facilities and Potential Hazards
Unknown
Pentwater River
W Lever Rd
W Harrison Rd
N Oak Dr
N State St
Karen St
Lake Rd
N Main St
S
31
City of
Hart
N US 31
Young Rd
N Oceana Dr
W Taylor Rd
N 68th Ave
N Water Rd
Star Hill Dr
W Fillmore Rd
Crystal
Lake
69th Ave
N 96th Ave
S Br Pentwater River
N 104th Ave
N 108th Ave
W Tyler Rd
N 88th Ave
W Polk Rd
Donaldson Creek
W Fox Rd
N 92nd Ave
N 84th Ave
Hull Pit Creek
N 100th Ave
N 112th Ave
W Hazel Rd
York Rd
Duck Rd
N 94th Ave
W Scout Rd
W Baseline Rd
State Trunkline
Road
Shelter
Bridge
Fire/Police/EMS/911
Airport
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Communication Tower
Power Transmission Line
Gas Pipeline
State Land
Municipal Land
Floodplain
Power Plant
Dam
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood

Hazard Identification Profile
Leavitt Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- ***July 13, 2000: 1.75 inch hail. $50k property damage, $25k crop damage, Walkerville Village (Leavitt Twp).***
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- ***July 15, 1995: Severe thunderstorms. $15k property damage, Walkerville Village (Leavitt Twp).***
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37
- October 16, 2012: Major fire destroyed a 400 ft barn at a pork farm in Leavitt Township; unknown cause.

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide..

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Leavitt Township in 2023: 88

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents:

- December 1, 2012: Private helicopter crashed into Manistee National Forest. 1 fatality and 1 injury, Leavitt Twp.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

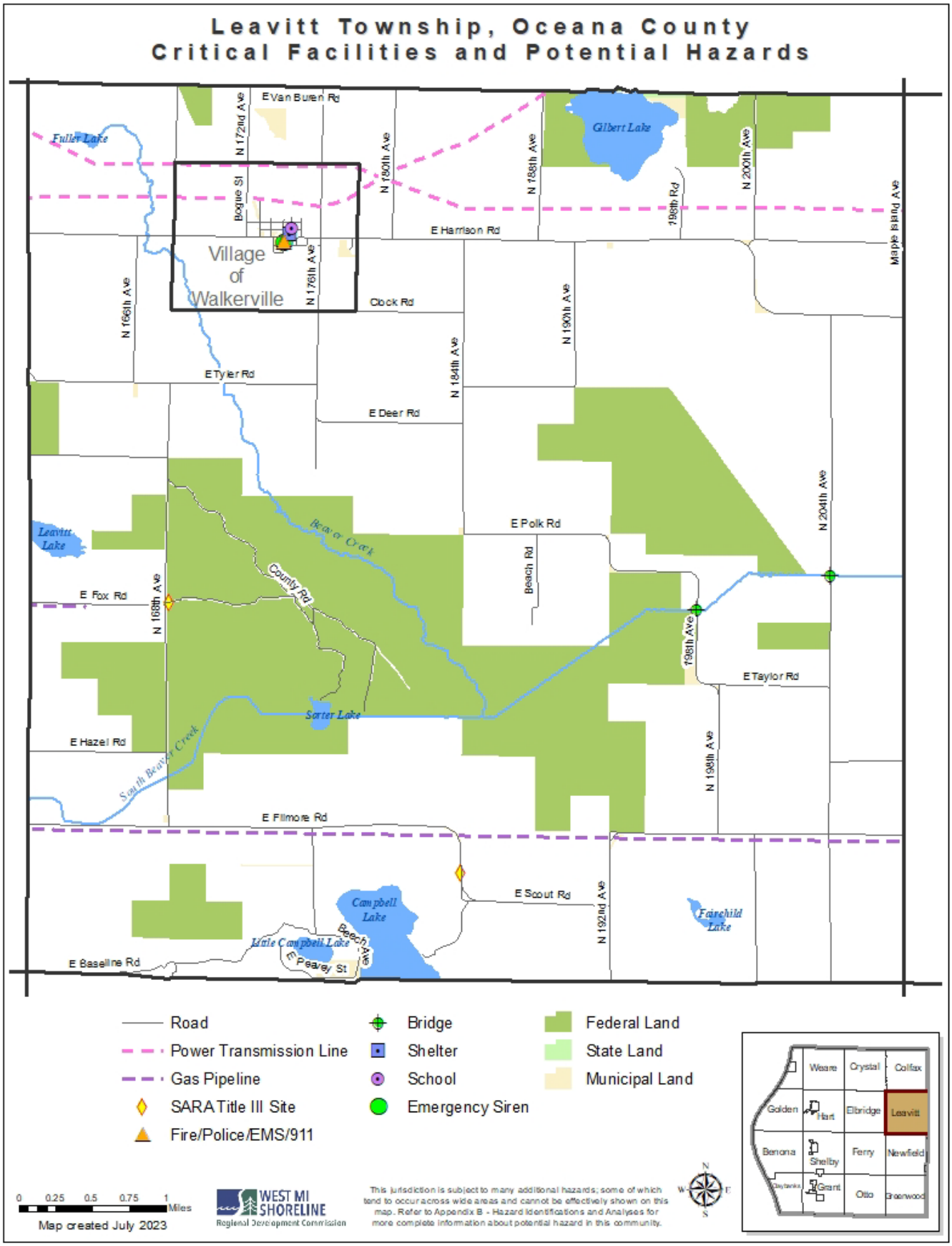
3.05 Terrorism and Similar Criminal Activities: - None Identified.

LEAVITT TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	1	1	1
2.10 Pipeline Accidents	1	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

LEAVITT TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
16	HAZMAT – Transportation	2	7	14
17	Flooding: Riverine/Urban	2	6	12
17	Oil/Natural Gas Well Accidents	2	6	12
17	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Pipeline Accidents	1	7	7
23	Civil Disturbances	1	6	6
23	Fire – Scrap Tires	1	6	6
23	HAZMAT – Fixed Site	1	6	6
23	Subsidence	1	6	6
23	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-


Leavitt Township, Oceana County
Critical Facilities and Potential Hazards
E Van Buren Rd
N 172nd Ave
Fuller Lake
Bogue St
N 180th Ave
N 188th Ave
Gilbert Lake
N 200th Ave
198th Rd
Maple Island Ave
E Harrison Rd
Village of Walkerville
N 176th Ave
N 166th Ave
Clock Rd
N 190th Ave
N 184th Ave
E Tyler Rd
E Deer Rd
N 204th Ave
Leavitt Lake
Beaver Creek
E Polk Rd
Beach Rd
County Rd
E Fox Rd
N 168th Ave
198th Ave
E Taylor Rd
Sorter Lake
E Hazel Rd
South Beaver Creek
N 196th Ave
E Fillmore Rd
E Scout Rd
N 192nd Ave
Campbell Lake
Fairchild Lake
Little Campbell Lake
Beech Ave
E Pearey St
E Baseline Rd
Road
Power Transmission Line
Gas Pipeline
SARA Title III Site
Fire/Police/EMS/911
Bridge
Shelter
School
Emergency Siren
Federal Land
State Land
Municipal Land
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile
Newfield Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/04/14

Flood Insurance Policies In-Force: 12 **Total Flood Insurance Coverage:** $1,741,000

Floodplains and Flood-prone Areas: White River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Hart Hydro-Electric Dam, ***Hesperia Dam spillway erosion***, Crystal Valley Dam spillway erosion.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Newfield Township in 2023: 27

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

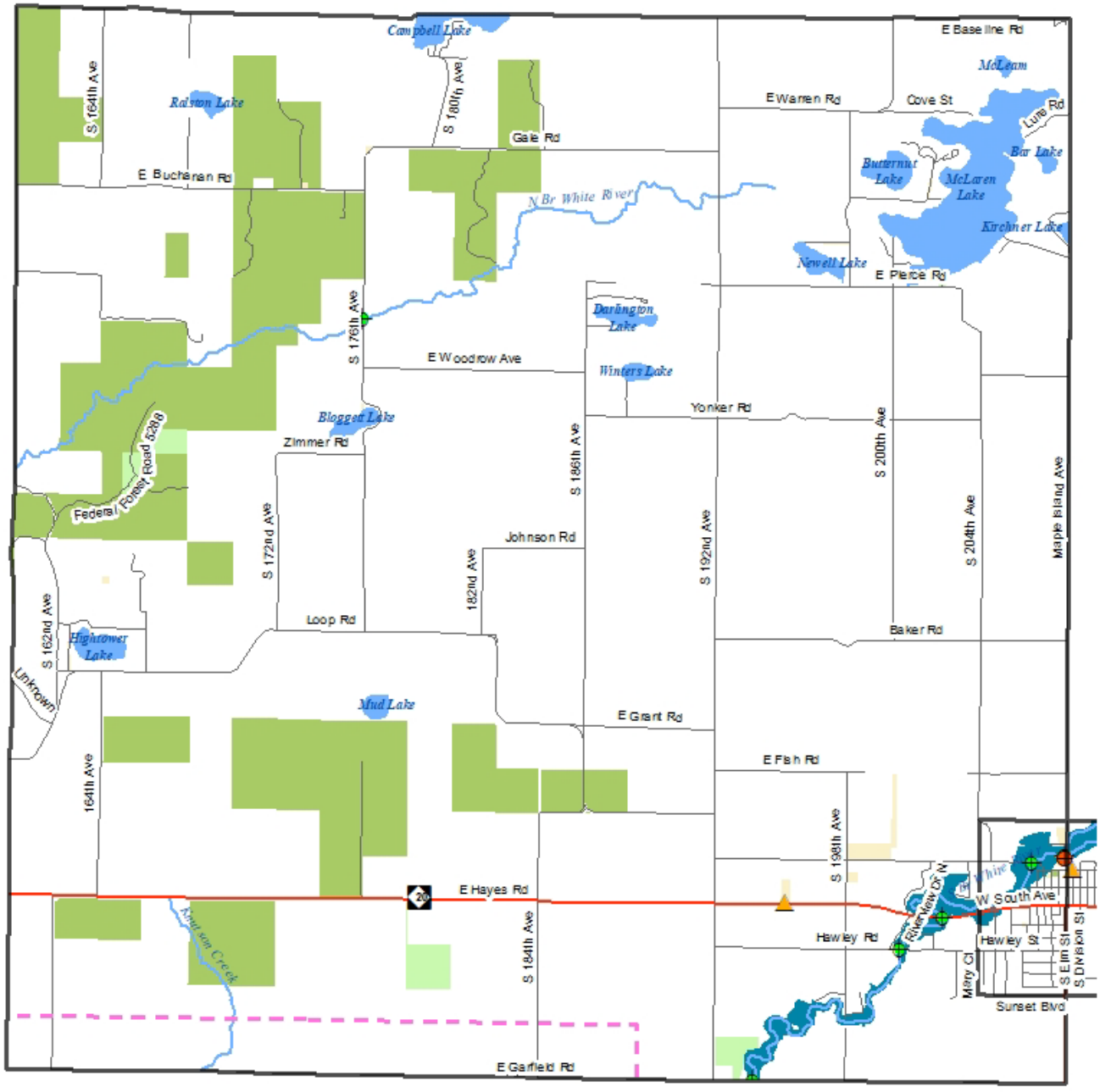
NEWFIELD TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	1	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

NEWFIELD TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Wildfire	3	9	27
7	Drought	2	13	26
8	Flooding: Riverine/Urban	3	8	24
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
12	Catastrophic Incidents	1	18	18
12	Space Weather	2	9	18
12	Dam failure	2	9	18
12	Tornadoes	2	9	18
16	Energy Emergencies	2	8	16
17	HAZMAT – Transportation	2	7	14
18	Invasive Species	2	6	12
18	Transportation Accidents	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	HAZMAT – Fixed Site	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

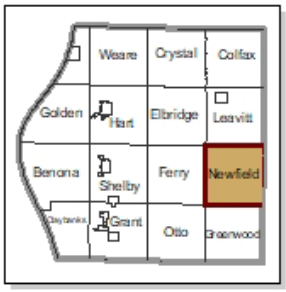
Newfield Township & Village of Hesperia, Oceana County
Critical Facilities and Potential Hazards



State Trunkline
Road
Power Transmission Line
SARA Title III Site
Fire/Police/EMS/911

Bridge
Dam
Shelter
School

Federal Land
State Land
Municipal Land
Floodplain



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Otto Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Not participating in NFIP **FIRM Map Date:** 08/04/14

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** $0

Floodplains and Flood-prone Areas: White River, North Branch White River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:
- March 2-7, 1976: Ice storms. Declaration of major disaster by President.

- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:
- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):
- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:
- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.
- Oil and gas test wells in Otto Township in 2023: 50
- 1 well with known detectable levels of hydrogen sulfide in Otto Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

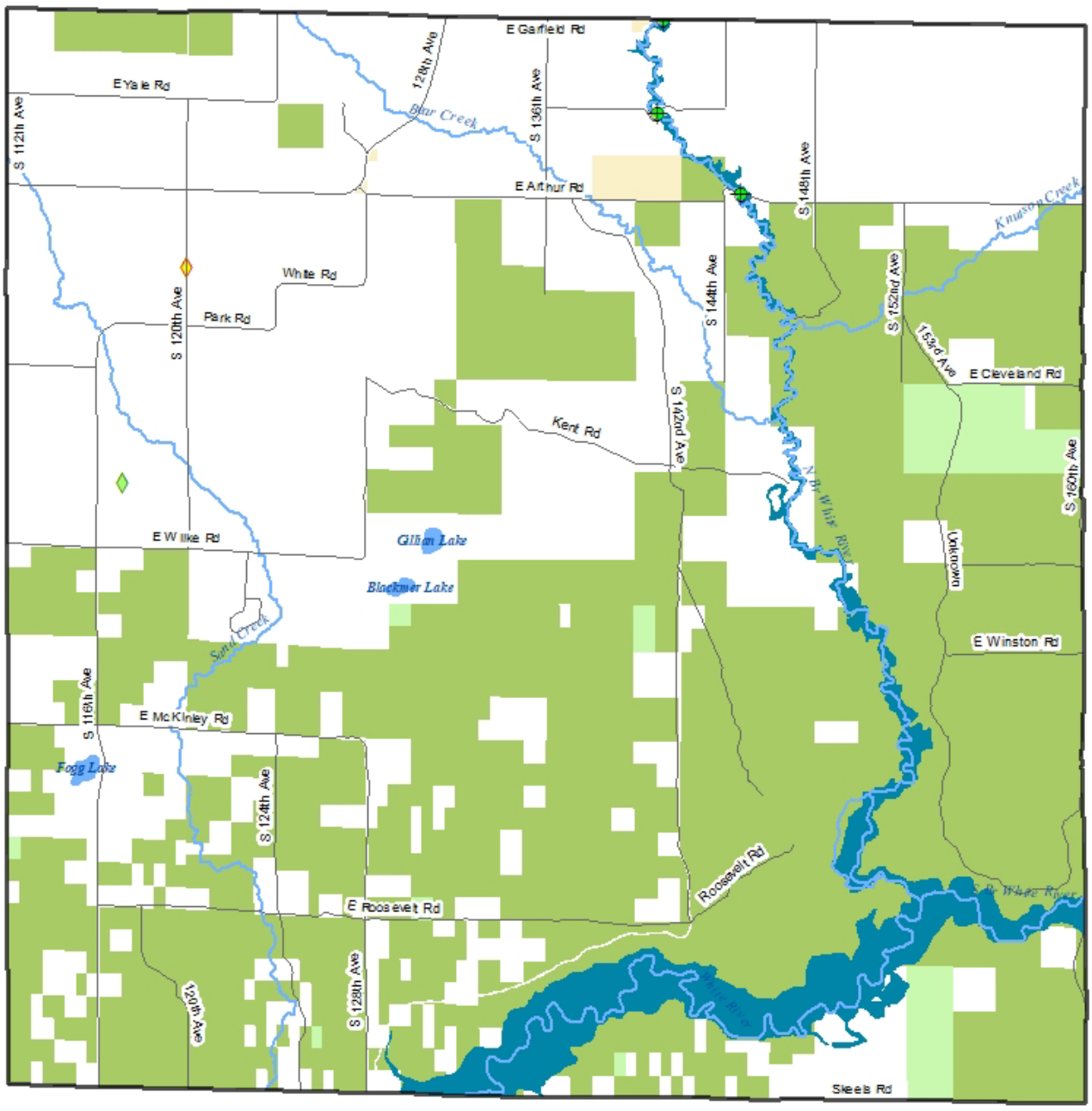
OTTO TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	1	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	1
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	1
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	1	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

OTTO TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
4	Infrastructure Failures	3	9	27
4	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Flooding: Riverine/Urban	3	6	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
16	HAZMAT – Transportation	2	7	14
16	Invasive Species	2	7	14
18	Dam failure	2	6	12
18	HAZMAT – Fixed Site	2	6	12
20	Celestial Impacts	1	8	8
20	Fog	2	4	8
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
22	Transportation Accidents	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-

Otto Township, Oceana County
Critical Facilities and Potential Hazards



Road
Bridge
Shelter
School
Oil/Gas Well: H2S Detected
SARA Title III Site
Floodplain
Federal Land
State Land
Municipal Land

0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Hazard Identification Profile
Pentwater Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 2 **Total Flood Insurance Coverage:** $700,000

Floodplains and Flood-prone Areas: Lake Michigan shoreline, Pentwater Lake shoreline, South Branch Pentwater River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards:
- June 1986: Record high water level on Lake Michigan.
- Extreme high water levels in the Great Lakes: 1929, 1952, 1973, 1986, and 1997.
- 2013: Record low water level on Lake Michigan.
- Extreme low water levels in the Great Lakes: 1926, 1934, 1964, 2003, and 2013.
- Rip current incidents on Lake Michigan, 2002-2012: 77 fatalities, 230 rescues.
- ***July 13, 1938: Seiche/storm surge on Lake Michigan. 3 drowned in Holland, 1 in Muskegon, and 1 near Pentwater.***
- ***August 3, 2011: 13-year old girl died after being swept away by a rip current near the north pier in Pentwater.***
- 2019-21: Lengthy high water event on Lake Michigan. High water record in 2020. Extensive shoreline erosion and property damage along Lake Michigan shoreline.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- ***July 26, 2005: Severe thunderstorms. $15k property damage, Pentwater Village (Pentwater Twp).***
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- ***August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.***
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.

- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:

- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- ***May 29, 1998:*** 90,000 without power statewide (thunderstorm winds). ***Power lines downed in Pentwater.***
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Pentwater Township in 2023: 67

- 14 wells with known detectable levels of hydrogen sulfide in Pentwater Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

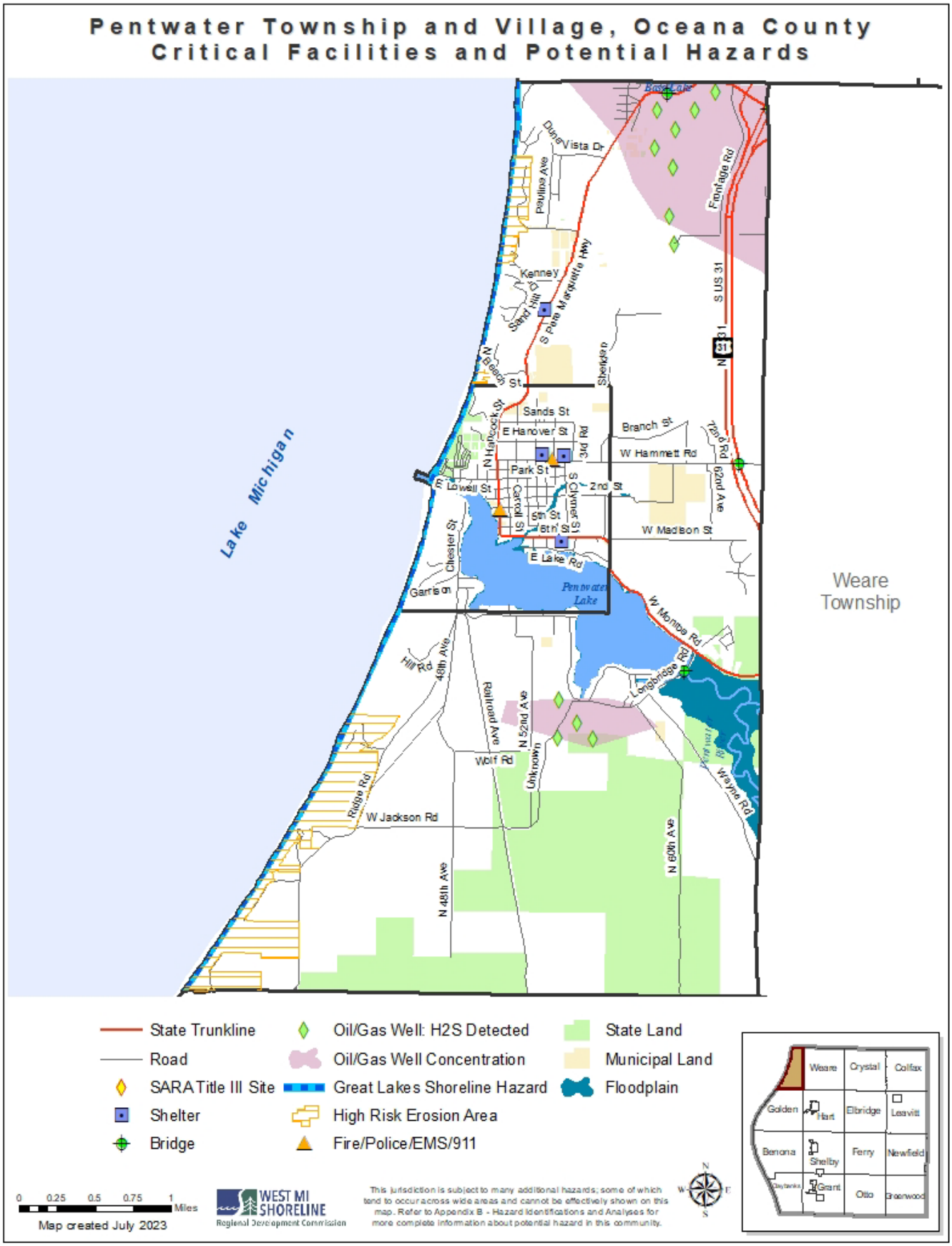
3.05 Terrorism and Similar Criminal Activities: - None Identified.

PENTWATER TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	3	1	2	1
1.06 Fog	3	1	0	1
1.07 Great Lakes Shoreline	3	1	2	2
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	1	1
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	2	2
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	1	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	0	-	-	-
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

PENTWATER TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Great Lakes Shoreline	3	9	27
5	Wildfire	3	9	27
8	Drought	2	13	26
9	Flooding: Riverine/Urban	3	8	24
9	Hail	3	8	24
9	Lightning	3	8	24
9	Public Health Emergencies	3	8	24
13	Catastrophic Incidents	1	18	18
13	Space Weather	2	9	18
13	Dam failure	2	9	18
13	Oil/Natural Gas Well Accidents	2	9	18
13	Tornadoes	2	9	18
18	Energy Emergencies	2	8	16
19	HAZMAT – Transportation	2	7	14
20	Fog	3	4	12
20	Invasive Species	2	6	12
20	Transportation Accidents	2	6	12
23	Celestial Impacts	1	8	8
24	Civil Disturbances	1	6	6
24	Fire – Scrap Tires	1	6	6
24	HAZMAT – Fixed Site	1	6	6
24	Subsidence	1	6	6
24	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-
n/a	Pipeline Accidents	0	-	-


Pentwater Township and Village, Oceana County
Critical Facilities and Potential Hazards
Lake Michigan
Weare Township
Dune Vista Dr
Pauline Ave
Kenney
Sand Hill Dr
S Pere Marquette Hwy
Frontage Rd
S US 31
N 31
N Beach St
Sheridan
Sands St
E Hanover St
N Hancock St
3rd St
Branch St
W Hammett Rd
62nd Ave
Park St
W Lowell St
Carroll St
S Chrisler St
2nd St
5th St
8th St
W Madison St
E Lake Rd
Chester St
Garrison
Pentwater Lake
W Monroe Rd
Longbridge Rd
Hill Rd
48th Ave
Railroad Ave
N 52nd Ave
Unknown
Wolf Rd
Ridge Rd
W Jackson Rd
N 48th Ave
N 60th Ave
Wayne Rd
State Trunkline
Road
SARA Title III Site
Shelter
Bridge
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Great Lakes Shoreline Hazard
High Risk Erosion Area
Fire/Police/EMS/911
State Land
Municipal Land
Floodplain
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
N
W
E
S

Hazard Identification Profile
Shelby Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: N/A **FIRM Map Date:** N/A

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** N/A

Floodplains and Flood-prone Areas: N/A
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- ***May 10, 2003: 1.00 inch hail. $20k property damage, $10k crop damage, New Era Village (Grant and Shelby Twps).***
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.
- ***May 23, 2004: 0.75 inch hail. $15k property damage, $15k crop damage, New Era Village (Grant and Shelby Twps).***

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- ***May 12, 2000: Severe thunderstorms. $50k property damage, Shelby Twp.***
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes: - None Identified.

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.

- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Shelby Township in 2023: 64

- 1 well with known detectable levels of hydrogen sulfide in Shelby Township

2.10 Pipeline Accidents:

- March 5, 2010: Damage to residential gas meter causing natural gas leak. Minor neighborhood evacuations and temporary relocation of schoolchildren, Shelby Village.

2.11 Transportation Accidents:

- July 15, 2022: A private aircraft crashed shortly after takeoff from Oceana County Airport. 2 fatalities, Shelby Township.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

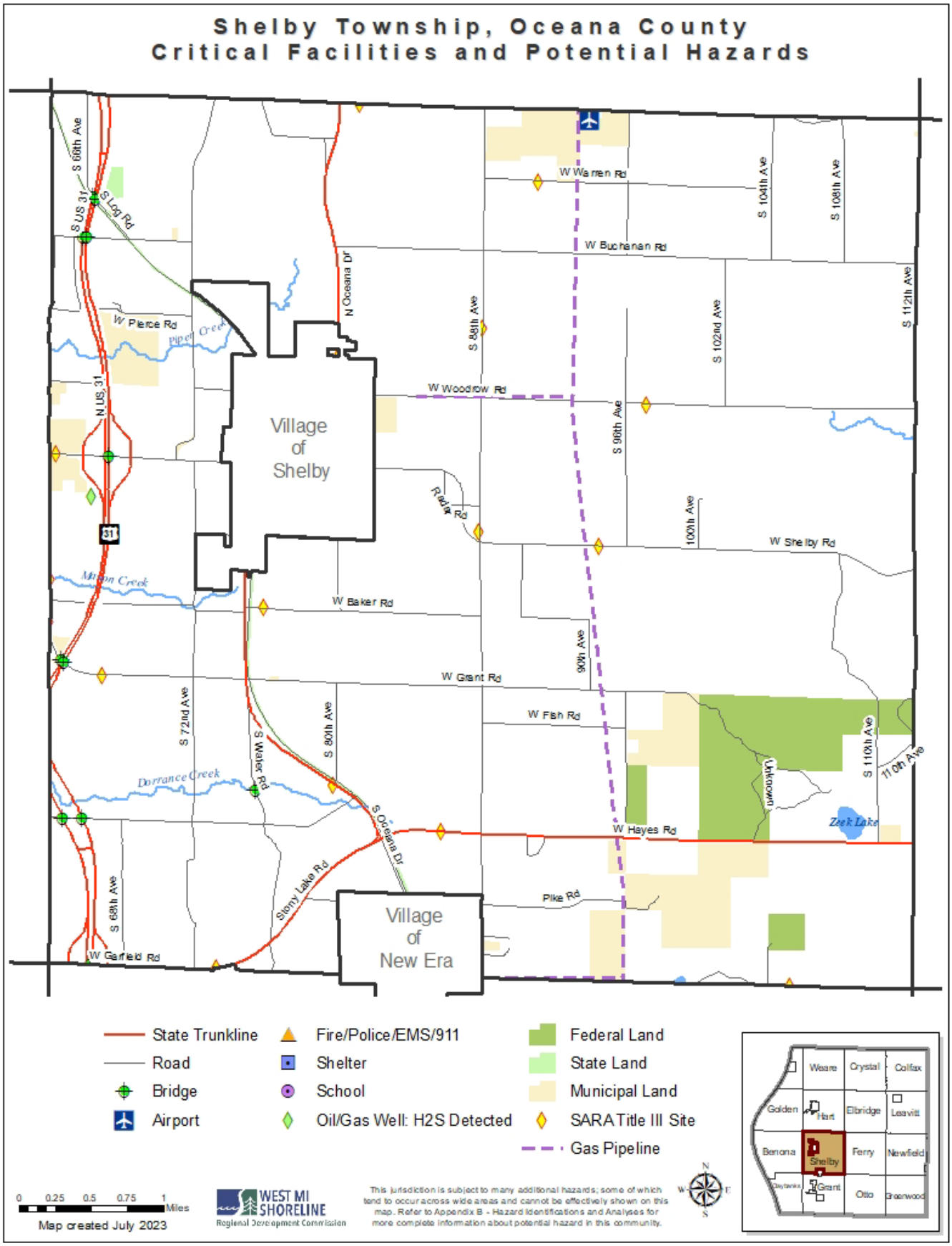
3.05 Terrorism and Similar Criminal Activities: - None Identified.

SHELBY TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	1	1	1	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	0	-	-	-
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	2	2
2.05 HAZMAT – Fixed Site	2	1	1	2
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	1	1	1	1
2.10 Pipeline Accidents	1	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

SHELBY TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Fire – Structural	3	9	27
5	Wildfire	3	9	27
7	Drought	2	13	26
8	Hail	3	8	24
8	Lightning	3	8	24
8	Public Health Emergencies	3	8	24
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Tornadoes	2	9	18
15	Energy Emergencies	2	8	16
16	HAZMAT – Fixed Site	2	7	14
16	HAZMAT – Transportation	2	7	14
18	Transportation Accidents	2	6	12
19	Celestial Impacts	1	8	8
19	Fog	2	4	8
21	Pipeline Accidents	1	7	7
22	Civil Disturbances	1	6	6
22	Fire – Scrap Tires	1	6	6
22	Flooding: Riverine/Urban	1	6	6
22	Oil/Natural Gas Well Accidents	1	6	6
22	Subsidence	1	6	6
22	Terrorism & Similar Criminal Acts	1	6	6
n/a	Dam failure	0	-	-
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-


Shelby Township, Oceana County
Critical Facilities and Potential Hazards
Village of Shelby
Village of New Era
W Warren Rd
W Buchanan Rd
W Pierce Rd
W Woodrow Rd
W Shelby Rd
W Baker Rd
W Grant Rd
W Fish Rd
W Hayes Rd
Pike Rd
W Garfield Rd
S US 31
N US 31
S Log Rd
N Oceana Dr
S Oceana Dr
S Water Rd
Stony Lake Rd
Pipe Creek
Mill Creek
Dorrance Creek
Zeek Lake
Unknown
S 66th Ave
S 68th Ave
S 72nd Ave
S 80th Ave
S 88th Ave
S 90th Ave
S 96th Ave
S 100th Ave
S 102nd Ave
S 104th Ave
S 108th Ave
S 110th Ave
S 112th Ave
State Trunkline
Road
Bridge
Airport
Fire/Police/EMS/911
Shelter
School
Oil/Gas Well: H2S Detected
Federal Land
State Land
Municipal Land
SARA Title III Site
Gas Pipeline
0 0.25 0.5 0.75 1 Miles
Map created July 2023
WEST MI SHORELINE
Regional Development Commission
This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.
Weare
Crystal
Colfax
Golden
Hart
Elbridge
Leavitt
Benona
Shelby
Ferry
Newfield
Grant
Otto
Greenwood

Hazard Identification Profile
Weare Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896, 1899-1900, 1901-1902, 1909-1911, 1925-1926, 1930-1931, 1956-1957, 1962-1963, 1971-1972, 1976-1977, and 2002-2003.
- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 2013: Record "low" Lake Michigan water levels.

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:
- July 1936: Heatwave. 570 deaths statewide, 364 in Detroit.
- Summer, 1988: 39 days with temperatures over 90 degrees, statewide.
- January 20, 1994: Record cold. $50m property damage across Michigan.
- May 16, 1997: Record cold temperatures. $2m crop damage, Oceana County.
- March 2012: Record warm temperatures triggered early growing season. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Not Participating in NFIP **FIRM Map Date:** 08/24/21

Flood Insurance Policies In-Force: 0 **Total Flood Insurance Coverage:** $0

Floodplains and Flood-prone Areas: South Branch Pentwater River, Lambrick Creek, North Branch Pentwater River
- September 10-19, 1986: Flooding. Declaration of major disaster by President.
- October 28, 1986: Flooding & heavy rain. Declaration of disaster by Governor.
- April 19, 1993: Flooding. $5m property damage across southern Lower Michigan.
- February 9-10, 2001: Flooding. $100k property damage, Oceana County.
- February 24-28, 2001: Flooding. $190k property damage across West Michigan.
- May 15-16, 2001: Flash flooding from severe thunderstorms. $550k property damage, $250k crop damage, Oceana Co.
- May 21-23, 2004: Flooding. $25m property damage and $4.6m crop damage across 23 counties in Lower Michigan.
- April 17-23, 2013: Flooding. $3m property damage, Oceana County.

1.06 Fog:
- January 11-13, 1995: Dense Fog. 4 traffic accident fatalities, school closures, and flight delays across Lower Michigan.

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:
- Severe hail events (1" or greater) recorded in Oceana County, 1996-2012: 11
- May 6, 2004: 0.88 inch hail. $20k property damage, $20k crop damage, Oceana County.

1.09 Invasive Species: - Invasive species exist in Oceana County; No significant events identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:
- August 20 - September 6, 1975: Rainstorms, high winds. Declaration of major disaster by President.
- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorms. Local, Gubernatorial, and Presidential disaster declarations. $4.m public damage, 37 injuries, 26 homes and 6 businesses destroyed, 1415 homes and 109 businesses damaged in Oceana Co.
- July 8, 1999: Severe thunderstorms. $20k property damage across Oceana County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 17, 2006: Severe thunderstorms. $250k property damage, $50k crop damage, across Oceana County.
- ***August 1, 2006: Severe thunderstorms. $20k property damage across northwest Oceana County.***
- November 17, 2013: High wind. $75k property damage and power outages across Oceana County.
- March 8, 2017: High wind. $10m Property damage across Oceana County.
- February 24, 2019: High wind. $1m property damage across Oceana County.
- November 10, 2020: Severe thunderstorms. $100k property damage across Oceana County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:
- ***March 30, 1977: Tornado (F1). $25k property damage, Weare Township.***

1.14 Wildfire:
- October 1871: Wildfires. 1.2m acres burned, 200 fatalities, Lower Peninsula.
- May-September, 1891: Uncontrollable wildfires across Michigan during the drought of 1891.
- 1981-2010: Approximately 12 wildfires and 60 acres burned per year on county lands under MDNR jurisdiction (346 total wildfires, 1,766.0 total acres burned).

1.15 Winter Storms:

- March 2-7, 1976: Ice storms. Declaration of major disaster by President.
- January 26-31, 1977: Blizzard, snowstorm. Declaration of emergency by President.
- January 26-27, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- January 12-21, 1994: Heavy lake effect snow. $500k property damage across western Lower Michigan.
- January 27, 1994: Heavy snow and freezing rain. $5m property damage across region.
- March 9, 1998: Winter storm. $100k property damage across region.
- January 2-15, 1999: Blizzard, snowstorm. Declaration of emergency by President.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- February 16, 2006: Ice storm. $1m property damage across Lower Michigan.
- April 14, 2018: Winter storm. $100k property damage across Oceana County.
- February 5, 2019: Ice storm. $1m property damage across Oceana County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified; Approximate scrap tire inventory in Oceana County in 2012: 11,000.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 6.37

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents):

- No incidents identified; SARA Title III sites within the county in 2023: 75

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC with mention of downed power lines or power outages in Oceana County, 1993-2012: 32
- January 20, 1994: Frozen sewer/water lines and downed power lines (extreme cold), statewide.
- April 6-7,1997: 180,000-200,000 without power; 70,000 on second day (high wind event), statewide.
- March 9, 1998: 1,900 power outages (blizzard conditions), Lake, Clare, Oceana and Muskegon counties.
- May 29, 1998: 90,000 without power statewide (thunderstorm winds).
- May 31, 1998: over 861,000 without power (thunderstorm winds), statewide.
- November 10, 1998: 167,000 power outages (high wind), West Michigan.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- December 28, 2008: Hundreds of thousands lose power (high wind), statewide.
- March 8, 2017: Over 1 million without power (high wind), statewide.
- April 14, 2018: 450,000 without power (winter storm), statewide.
- February 5, 2019: 150,000 without power (ice storm), Central Lower Michigan.
- February 24, 2019: 1 million without power (high wind), statewide.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - No accidents identified.

- Oil and gas test wells in Weare Township in 2023: 242

- 36 wells with known detectable levels of hydrogen sulfide in Weare Township

2.10 Pipeline Accidents: - None Identified.

2.11 Transportation Accidents: - None Identified.

3. HUMAN -RELATED HAZARDS

3.01 Catastrophic Incidents (National Emergencies): - None Identified.

3.02 Civil Disturbances: - None Identified.

3.03 Nuclear Attack: - None Identified.

3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 97 confirmed deaths in Oceana County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

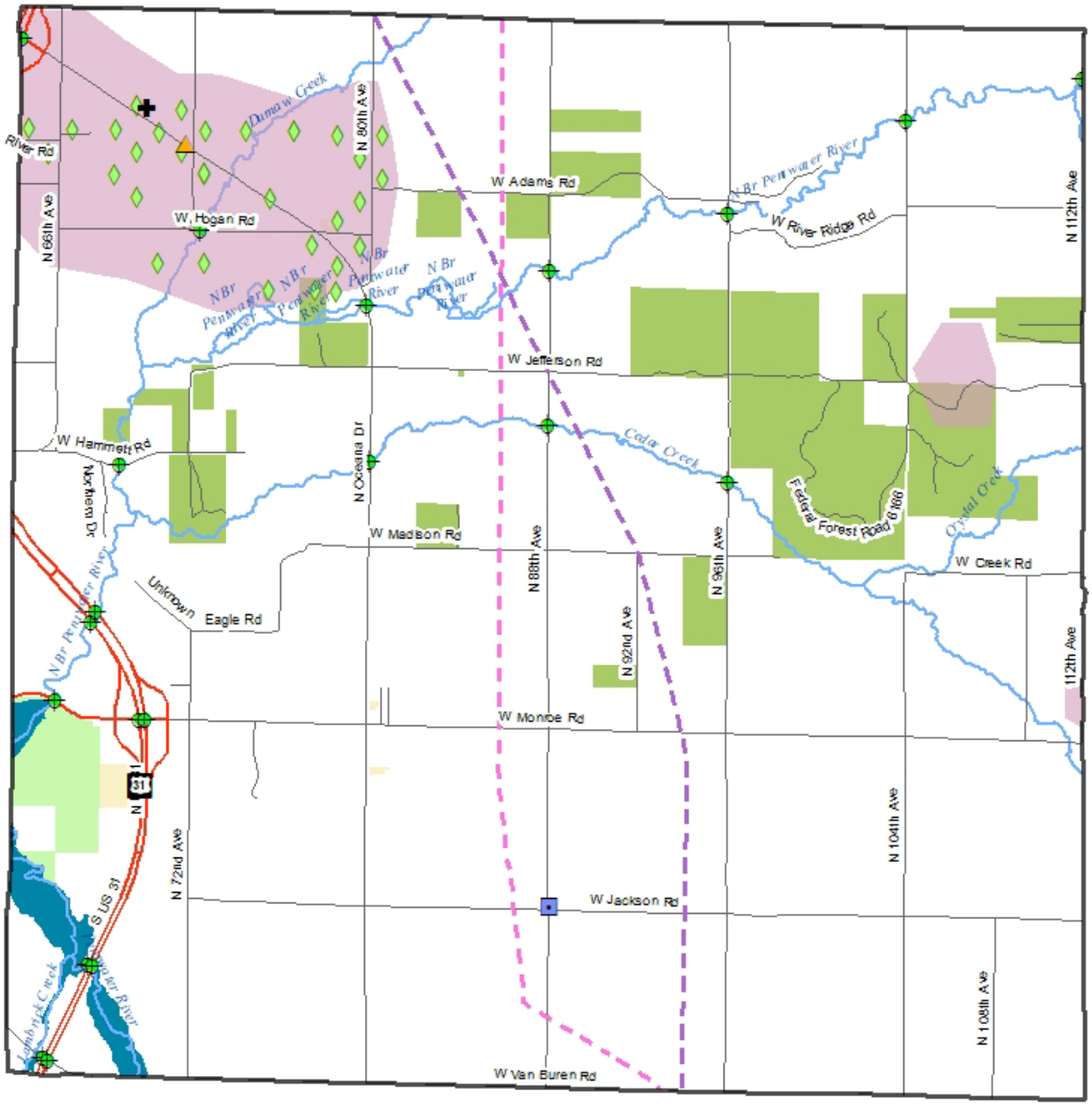
WEARE TOWNSHIP
Hazard Assessment
Ratings

Natural Hazards	Probability of Occurrence	Population Affected	Property Damaged	Economic Impacts
1.01a Space Weather	2	2	0	3
1.01b Celestial Impacts	1	2	0	2
1.02 Drought	2	2	2	3
1.03 Earthquake	0	-	-	-
1.04 Extreme Temperatures	3	2	1	2
1.05 Flooding: Riverine/Urban	2	1	2	1
1.06 Fog	2	1	0	1
1.07 Great Lakes Shoreline	0	-	-	-
1.08 Hail	3	1	2	1
1.09 Invasive Species	2	1	2	2
1.10 Lightning	3	1	2	1
1.11 Severe Winds	3	2	2	2
1.12 Subsidence	1	1	1	1
1.13 Tornadoes	2	1	2	2
1.14 Wildfire	3	1	2	2
1.15 Winter Storms	3	3	2	2
Technological Hazards				
2.01 Dam Failure	2	1	1	1
2.02 Energy Emergencies	2	2	0	2
2.03 Fire – Scrap Tires	1	1	1	1
2.04 Fire – Structural	3	1	1	2
2.05 HAZMAT – Fixed Site	2	1	1	1
2.06 HAZMAT – Transportation	2	1	1	2
2.07 Infrastructure Failures	3	2	1	2
2.08 Nuclear Power Emergencies	0	-	-	-
2.09 Oil/Natural Gas Well Accidents	2	2	1	1
2.10 Pipeline Accidents	1	1	1	2
2.11 Transportation Accidents	2	1	1	1
Human-Related Hazards				
3.01 Catastrophic Incidents (National Emergencies)	1	3	3	3
3.02 Civil Disturbances	1	1	1	1
3.03 Nuclear Attack	0	-	-	-
3.04 Public Health Emergencies	3	2	0	2
3.05 Terrorism & Similar Criminal Acts	1	1	1	1

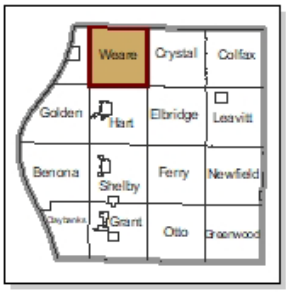
WEARE TOWNSHIP
Hazard Vulnerability
Rankings

Ranking	Hazard	Probability of Occurrence	X Weighted Impacts	= Hazard Score
1	Winter Storms	3	15	45
2	Severe Winds	3	12	36
3	Extreme Temperatures	3	10	30
3	Infrastructure Failures	3	10	30
5	Wildfire	3	9	27
6	Drought	2	13	26
7	Hail	3	8	24
7	Lightning	3	8	24
7	Public Health Emergencies	3	8	24
10	Fire – Structural	3	7	21
11	Catastrophic Incidents	1	18	18
11	Space Weather	2	9	18
11	Invasive Species	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Tornadoes	2	9	18
16	Energy Emergencies	2	8	16
16	Flooding: Riverine/Urban	2	8	16
18	HAZMAT – Transportation	2	7	14
19	Dam failure	2	6	12
19	HAZMAT – Fixed Site	2	6	12
19	Transportation Accidents	2	6	12
22	Celestial Impacts	1	8	8
22	Fog	2	4	8
24	Pipeline Accidents	1	7	7
25	Civil Disturbances	1	6	6
25	Fire – Scrap Tires	1	6	6
25	Subsidence	1	6	6
25	Terrorism & Similar Criminal Acts	1	6	6
n/a	Earthquake	0	-	-
n/a	Great Lakes Shoreline	0	-	-
n/a	Nuclear Attack	0	-	-
n/a	Nuclear Power Emergencies	0	-	-

Weare Township, Oceana County
Critical Facilities and Potential Hazards



State Trunkline
Road
Shelter
Bridge
Fire/Police/EMS/911
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Communication Tower
Power Transmission Line
Gas Pipeline
Federal Land
State Land
Municipal Land
Floodplain



0 0.25 0.5 0.75 1 Miles

Map created July 2023

WEST MI SHORELINE Regional Development Commission

This jurisdiction is subject to many additional hazards; some of which tend to occur across wide areas and cannot be effectively shown on this map. Refer to Appendix B - Hazard Identifications and Analyses for more complete information about potential hazard in this community.

Appendix C:

HAZARD IDENTIFICATION DATA AND MAPS

National Climatic Data Center: Storm Events

157 events reported in Oceana County between 01/01/1950 and 03/31/2005

The NCDC Database contains data from the following sources:
- All Weather Events from 1993 - 1995, as entered into Storm Data. (Except 6/93 - 7/93, which is missing Latitude/Longitude)
- All Weather Events from 1996 - Current, as entered into Storm Data. (Including Latitude/Longitude)
- Storm Prediction Center data including: Tornadoes 1950-1992, Thunderstorm Winds 1955-1992, and Hail 1955-1992.

COUNTY	DATE	TIME	TYPE	MAGNITUDE	DEATHS	INJURIES	PROP DMG	CROP DMG
1 OCEANA	9/1/60	1130	Tstm Wind	0 kts.	0	0	0	0
2 OCEANA	9/9/65	1843	Tstm Wind	0 kts.	0	0	0	0
3 OCEANA	8/15/66	1750	Tstm Wind	0 kts.	0	0	0	0
4 OCEANA	4/6/67	0035	Tstm Wind	0 kts.	0	0	0	0
5 OCEANA	7/11/67	1530	Tornado	F1	0	0	25K	0
6 OCEANA	5/14/68	1920	Hail	1.75 in.	0	0	0	0
7 OCEANA	3/30/77	1630	Tornado	F1	0	3	25K	0
8 OCEANA	7/26/78	1115	Tstm Wind	0 kts.	0	0	0	0
9 OCEANA	8/15/78	2305	Tornado	F2	0	12	50K	0
10 OCEANA	6/20/79	1800	Hail	1.75 in.	0	0	0	0
11 OCEANA	6/20/79	1810	Tstm Wind	0 kts.	0	0	0	0
12 OCEANA	4/4/81	235	Tstm Wind	0 kts.	0	0	0	0
13 OCEANA	8/3/82	2020	Tstm Wind	0 kts.	0	0	0	0
14 OCEANA	7/21/83	1715	Tstm Wind	0 kts.	0	0	0	0
15 OCEANA	7/28/83	215	Tstm Wind	0 kts.	0	0	0	0
16 OCEANA	7/29/83	145	Tstm Wind	0 kts.	0	0	0	0
17 OCEANA	7/29/83	230	Tstm Wind	0 kts.	0	0	0	0
18 OCEANA	7/31/83	1615	Hail	0.75 in.	0	0	0	0
19 OCEANA	7/31/83	1700	Hail	0.75 in.	0	0	0	0
20 OCEANA	5/6/86	1550	Hail	0.75 in.	0	0	0	0
21 OCEANA	4/5/88	2220	Hail	0.75 in.	0	0	0	0
22 OCEANA	8/4/89	2300	Tstm Wind	0 kts.	0	0	0	0
23 OCEANA	9/14/90	635	Tornado	F1	0	0	25K	0
24 OCEANA	5/28/91	1805	Tornado	F2	0	0	250K	0
25 OCEANA	6/14/91	1610	Tstm Wind	0 kts.	0	0	0	0
26 OCEANA	7/3/91	1630	Tstm Wind	0 kts.	0	0	0	0
27 OCEANA	9/9/91	1830	Tstm Wind	0 kts.	0	0	0	0
28 OCEANA	9/9/91	1840	Hail	0.75 in.	0	0	0	0
29 OCEANA	6/17/92	1310	Tstm Wind	0 kts.	0	0	0	0
30 MIZ004	1/12/93	2300	Heavy Snow	N/A	0	0	50K	0
31 MIZ001	1/21/93	0	Ice Storm	N/A	0	0	0	0
32 MIZ004	3/23/93	300	Freezing Rain	N/A	0	0	0	0
33 Lower MI	4/1/93	0	Heavy Snow	N/A	0	0	50K	0
34 MIZ001	4/19/93	1200	Flood	N/A	0	0	5.0M	0
35 MIZ001	12/23/93	1400	Heavy Snow	N/A	0	0	0	0
36 Near L	1/12/94	0	Heavy Snow	N/A	0	0	500K	0
37 Miz000	1/13/94	0	Record Cold	N/A	0	0	50.0M	0
38 All	1/27/94	0	Hvy Snw/frzing Rain	N/A	0	0	5.0M	0
39 W. Lower MI	2/2/94	0	Heavy Snow	N/A	0	0	0	0
40 Central	2/22/94	1900	Heavy Snow	N/A	0	0	0	0
41 Hart	7/4/94	2230	Tstm Winds	N/A	0	0	0	0
42 New Era	7/20/94	335	Thunderstorm Winds	N/A	0	0	0	0
43 S. Lower	12/6/94	1800	Heavy Snow	N/A	0	0	0	0
44 N. Lower	12/16/94	1900	Heavy Snow	N/A	0	0	0	0
45 Lower MI	1/11/95	1800	Dense Fog	N/A	0	0	0	0
46 UP & S. Lower	1/20/95	0	Heavy Snow	N/A	0	0	0	0
47 UP & W. Lower	2/7/95	0	Heavy Lake Snow	N/A	0	0	0	0
48 S. Lower	2/25/95	1500	Heavy Snow	N/A	0	0	0	0
49 S. Lower	2/27/95	100	Ice Storm	N/A	0	0	0	0
50 Lower MI	3/6/95	0	Ice Storm	N/A	0	0	0	0
51 UP & NW Lower	3/6/95	0	Heavy Snow	N/A	0	0	0	0
52 Lower MI	3/28/95	1500	Heavy Snow	N/A	0	0	0	0
53 New Era	4/18/95	1851	Tstm Winds	N/A	0	0	0	0
54 Walkerville	7/15/95	1400	Tstm Winds	N/A	0	0	15K	0
55 Rothbury	8/13/95	1805	Tstm Winds	50 kts	0	0	0	0
56 W. Lower	11/27/95	700	Heavy Snow	N/A	0	0	0	0
57 Shelby	4/12/96	12:00PM	Hail	1.75 in.	0	0	0	0
58 MIZ037	11/10/96	01:00AM	Heavy Snow	N/A	0	0	0	0
59 MIZ037	12/25/96	07:00PM	Heavy Snow	N/A	0	0	0	0
60 MIZ043	1/10/97	02:00AM	Heavy Snow	N/A	0	0	0	0
61 MIZ039	1/15/97	11:00PM	Heavy Snow	N/A	0	0	0	0
62 MIZ043	1/25/97	03:00AM	Heavy Snow	N/A	0	0	0	0
63 Rothbury	2/21/97	08:00AM	Flash Flood	N/A	0	0	0	0
64 Lower MI	4/6/97	4:00PM	High Wind	N/A	0	0	5.0M	0

65 Stony Lake	4/6/97	4:20 PM	High Wind	61 kts.	0	0	0	0
66 MIZ043	5/16/97	12:00AM	Extreme Cold	N/A	0	0	0	2.0M
67 MIZ037	11/11/97	9:00 PM	Lake Snow	N/A	0	0	0	0
68 MIZ037	12/4/97	7:00 PM	Lake Snow	N/A	0	0	0	0
69 MIZ043	12/24/97	4:00 PM	Winter Storm	N/A	0	0	0	0
70 MIZ037	12/30/97	7:00 AM	Lake Snow	N/A	0	0	0	0
71 MIZ037	1/4/98	12:00 AM	Freezing Rain	N/A	0	0	0	0
72 MIZ037	1/7/98	5:00 PM	Winter Storm	N/A	0	0	0	0
73 MIZ037	1/22/98	7:00 PM	Winter Storm	N/A	0	0	0	0
74 MIZ037	3/9/98	7:00 AM	Blizzard	N/A	0	0	0	0
75 MIZ037	3/10/98	1:00 AM	Lake Snow	N/A	0	0	0	0
76 MIZ037	3/13/98	3:00 PM	Heavy Snow	N/A	0	0	0	0
77 Pentwater	5/29/98	12:10 AM	Tstm Wind	0 kts.	0	0	10K	0
78 Oceana Co.	5/31/98	3:50 AM	Tstm Wind	N/A	0	37	4.0M	0
79 Pentwater	5/31/98	3:53 AM	Tstm Wind	52 kts	0	0	0	0
80 Mears	6/25/98	9:40 PM	Tstm Wind	70 kts.	0	0	0	0
81 Hart	8/4/98	6:40 AM	Flash Flood	N/A	0	0	0	0
82 MIZ037	11/10/98	10:00 AM	High Wind	87 kts.	1	0	0	0
83 MIZ037	12/21/98	1:00 PM	Lake Snow	N/A	0	0	0	0
84 W. Lower MI	12/29/98	7:00 PM	Lake Effect Snow	N/A	0	0	0	0
85 MIZ037	1/2/99	7:00 AM	Blizzard	N/A	0	0	0	0
86 MIZ037	1/3/99	12:00 AM	Heavy Snow	N/A	0	0	0	0
87 W. Lower MI	1/4/99	12:00 AM	Snow	N/A	0	0	0	0
88 MIZ037	1/5/99	9:00 PM	Lake Snow	N/A	0	0	0	0
89 MIZ037	1/8/99	8:00 AM	Lake Snow	N/A	0	0	0	0
90 MIZ037	1/10/99	4:00 AM	Winter Storm	N/A	0	0	0	0
91 MIZ037	1/11/99	4:00 AM	Snow	N/A	0	0	0	0
92 MIZ037	2/5/99	7:00 PM	Freezing Rain	N/A	0	0	0	0
93 MIZ043	2/12/99	11:00 AM	Lake Snow	N/A	0	0	0	0
94 MIZ037	3/2/99	2:00 PM	Snow	N/A	0	0	0	0
95 MIZ037	3/4/99	10:00 PM	Snow	N/A	0	0	0	0
96 MIZ037	3/8/99	10:00 PM	Snow	N/A	0	0	0	0
97 Countywide	7/8/99	10:45 PM	Tstm Wind	53 kts.	0	0	20K	0
98 MIZ043	12/28/99	7:00 AM	Heavy Snow	N/A	0	0	0	0
99 MIZ037	1/3/00	3:00 PM	Winter Storm	N/A	0	0	0	0
100 MIZ037	1/12/00	12:00 PM	Winter Storm	N/A	0	0	0	0
101 MIZ037	1/19/00	4:00 PM	Winter Storm	N/A	0	0	0	0
102 MIZ037	1/25/00	10:00 AM	Winter Storm	N/A	0	0	0	0
103 Rothbury	3/8/00	9:20 PM	Hail	0.75 in.	0	0	10K	0
104 Hart	3/8/00	9:30 PM	Hail	0.75 in.	0	0	10K	0
105 MIZ037	4/7/00	12:00 PM	Winter Storm	N/A	0	0	0	0
106 Shelby	5/12/00	1:15 AM	Tstm Wind	53 kts.	0	0	50K	0
107 Hart	6/1/00	8:35 PM	Tstm Wind	53 kts.	0	0	50K	0
108 Walkerville	7/13/00	9:30 PM	Hail	1.75 in.	0	0	50K	25K
109 MIZ037	11/19/00	6:00 PM	Winter Storm	N/A	0	0	0	0
110 MIZ037	12/5/00	7:00 PM	Heavy Snow	N/A	0	0	0	0
111 MIZ037	12/11/00	6:00 AM	Winter Storm	N/A	0	0	0	0
112 W. Lower MI	12/19/00	7:00 AM	Heavy Snow	N/A	0	0	0	0
113 MIZ037	12/20/00	7:00 PM	Heavy Snow	N/A	0	0	0	0
114 MIZ037	12/23/00	7:00 AM	Heavy Snow	N/A	0	0	0	0
115 MIZ037	2/7/01	10:00 PM	Winter Storm	N/A	0	0	0	0
116 Countywide	2/9/01	9:00 AM	Flood	N/A	0	0	100K	0
117 MIZ043	2/24/01	9:00 PM	Flood	N/A	0	0	190K	0
118 Countywide	5/15/01	8:00 AM	Flood	N/A	0	0	25K	25K
119 Countywide	5/15/01	12:40 AM	Flash Flood	N/A	0	0	500K	200K
120 Countywide	5/16/01	1:00 AM	Flash Flood	N/A	0	0	25K	25K
121 Ferry	9/7/01	11:16 PM	Tstm Wind	53 kts	0	0	5K	0
122 Hart	9/7/01	10:56 PM	Tstm Wind	53 kts.	0	0	5K	0
123 MIZ037	12/23/01	3:00 PM	Winter Storm	N/A	0	0	0	0
124 MIZ037	1/16/02	10:00 AM	Winter Storm	N/A	0	0	0	0
125 MIZ037	2/25/02	7:00 PM	Winter Storm	N/A	0	0	0	0
126 MIZ037	3/2/02	1:00 AM	Winter Storm	N/A	0	0	0	0
127 MIZ037	3/9/02	12:54 PM	High Wind	62 kts.	0	0	485K	0
128 Pentwater	4/18/02	7:35 PM	Hail	1.00 in.	0	0	10K	10K
129 Hesperia	4/18/02	8:15 PM	Tstm Wind	53 kts.	0	0	5K	0
130 Hesperia	4/18/02	11:40 PM	Tstm Wind	53 kts	0	0	5K	0
131 Mears	5/6/02	9:10 PM	Hail	1.00 in.	0	0	5K	5K
132 Shelby	5/6/02	9:18 PM	Hail	1.00 in.	0	0	5K	5K
133 Hart	7/8/02	7:11 PM	Tstm Wind	53 kts.	0	0	10K	0
134 New Era	8/1/02	7:50 PM	Hail	0.75 in.	0	0	10K	5K
135 MIZ037	1/18/03	10:00 AM	Heavy Snow	N/A	0	0	0	0
136 W. Lower MI	2/10/03	4:00 AM	Heavy Snow	N/A	0	0	0	0
137 MIZ037	2/11/03	10:00 AM	Heavy Snow	N/A	0	0	0	0
138 MIZ037	3/4/03	6:00 PM	Heavy Snow	N/A	0	0	0	0
139 MIZ037	4/3/03	10:00 AM	Ice Storm	N/A	0	0	4.9M	0

140 New Era	5/10/03	11:30 PM	Hail	1.00 in.	0	0	20K	10K
141 Countywide	8/1/03	8:28 PM	Tstm Wind	52 kts.	0	0	10K	0
142 Countywide	8/2/03	12:15 PM	Tstm Wind	52 kts.	0	0	10K	0
143 Crystal Vly	8/21/03	3:45 AM	Tstm Wind	52 kts.	0	0	15K	0
144 MIZ037	1/14/04	4:00 AM	Heavy Snow	N/A	0	0	0	0
145 MIZ037	1/18/04	7:00 AM	Heavy Snow	N/A	0	0	0	0
146 MIZ037	1/27/04	7:00 AM	Winter Storm	N/A	0	0	0	0
147 Shelby	3/1/04	09:51 PM	Hail	0.75 in.	0	0	5K	0
148 Pentwater	5/6/04	09:40 AM	Hail	0.88 in.	0	0	20K	20K
149 MIZ037	5/21/04	11:32 PM	Flood	N/A	0	0	25.0M	4.6M
150 New Era	5/23/04	07:32 PM	Hail	0.75 in.	0	0	15K	15K
151 Rothbury	8/27/04	03:45 AM	Tstm Wind	53 kts.	0	0	10K	0
152 MIZ037	10/30/04	11:00 AM	High Wind	59 kts.	0	0	1.2M	0
153 MIZ037	12/20/04	07:00 AM	Heavy Snow	N/A	0	0	0	0
154 MIZ037	1/18/05	11:00 AM	Heavy Snow	N/A	0	0	0	0
155 MIZ037	2/20/05	05:00 AM	Heavy Snow	N/A	0	0	0	0
156 MIZ037	2/27/05	07:00 PM	Heavy Snow	N/A	0	0	0	0
157 Hart	3/30/05	08:10 PM	Tstm Wind	50 kts.	0	0	10K	0

National Climatic Data Center: Storm Events

04/01/2005 through 03/31/2014 ♦ 78 events reported for Oceana County

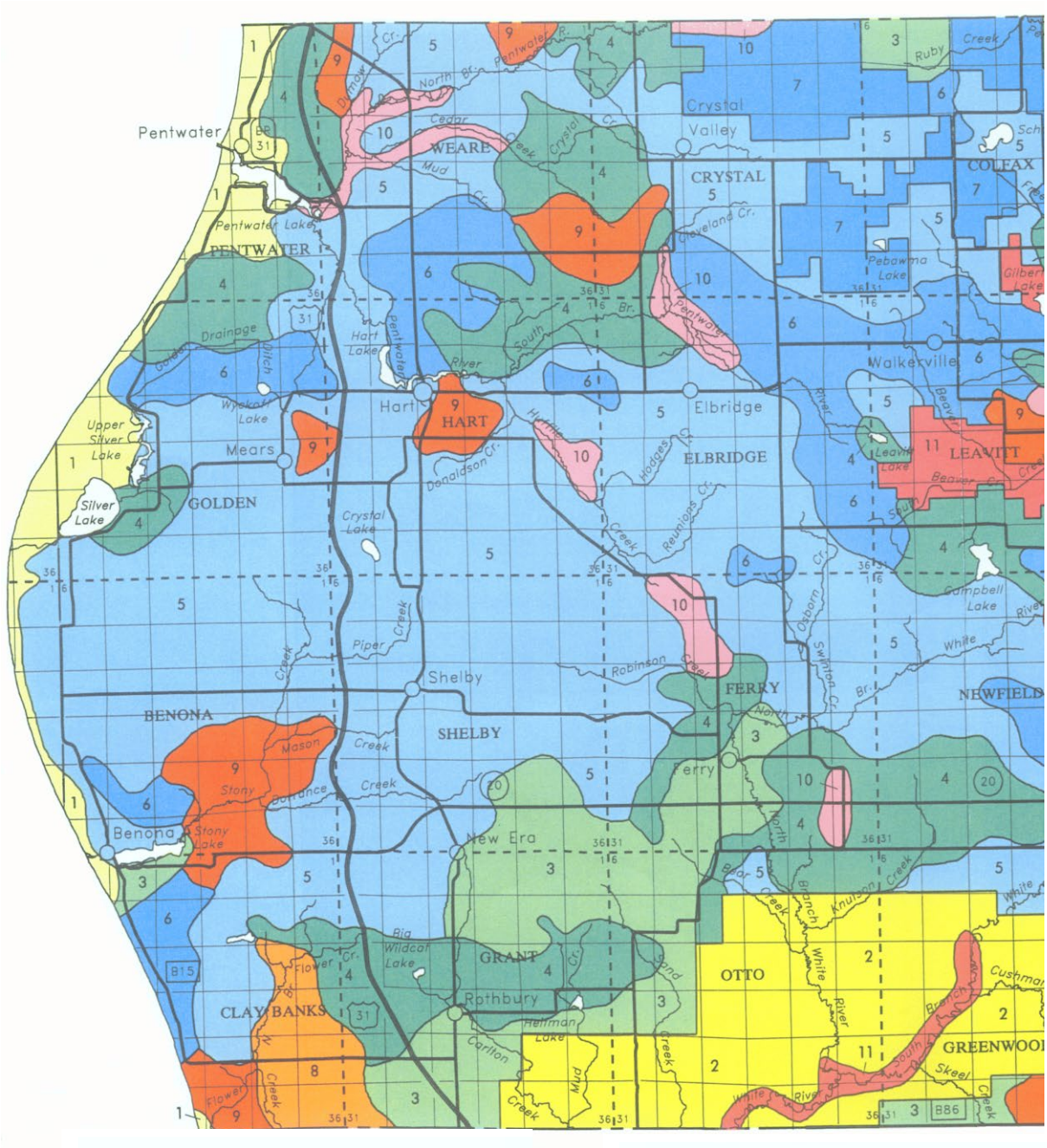
Location or Zone (zone indicates multiple counties)	Date	Duration	Type	Magnitude	Death	Injury	Damage ($)		Notes
							property	crop	
Hart	7/26/05	<1 day	Thunderstorm Wind	61 mph	0	0	10k	0	Downed trees and powerlines across area
Pentwater	7/26/05	<1 day	Thunderstorm Wind	61 mph	0	0	15k	0	Downed trees and powerlines across area
Walkerville	8/4/05	<1 day	Thunderstorm Wind	61 mph	0	0	5k	0	2 mi. W of Walkerville in Elbridge T.
Oceana Co. (zone)	1/20/06	1 day	Heavy Snow	6-10” snow	0	0	0	0	6-10” snow
Oceana Co. (zone)	2/16/06	1 day	Ice Storm	N/A	0	0	1m	0	Downed trees and powerlines across area
Ferry	6/26/06	<1 day	Hail	1”	0	0	10k	5k	Hail covered ground
Walkerville	7/9/06	<1 day	Hail	1”	0	0	5k	5k	3 mi. S of Walkerville in Leavitt T.
Shelby	7/17/06	<1 day	Hail	.75”	0	0	10k	5k	
Shelby	7/17/06	<1 day	Hail	.75”	0	0	15k	5k	
Countywide	7/17/06	<1 day	Thunderstorm Wind	69 mph	0	0	250k	50k	Hundreds of trees down across county
Mears	8/1/06	<1 day	Thunderstorm Wind	60 mph	0	0	20k	0	Downed trees and powerlines across Golden & Pentwater townships
Shelby (2 mi. E)	10/2/06	<1 day	Hail	.88”	0	0	10k	10k	2 mi. W of Shelby in Benona T.
Ferry Township	10/2/06	<1 day	Hail	.75”	0	0	10k	10k	
Walkerville (2 mi. NW)	10/2/06	<1 day	Hail	.88”	0	0	10k	10k	2 mi. NW of Walkerville in Colfax T.
Walkerville (2 mi. NW)	10/2/06	<1 day	Hail	.75”	0	0	10k	10k	2 mi. NW of Walkerville in Colfax T.
Walkerville (4mi. NNW)	10/3/06	<1 day	Hail	.75”	0	0	10k	10k	4 mi. NNW of Walkerville in Colfax T.
Walkerville (4mi. NNW)	10/4/06	<1 day	Hail	.75”	0	0	10k	10k	4 mi. NNW of Walkerville in Colfax T.
Oceana Co. (zone)	12/1/06	1 day	Heavy Snow	8-10” snow	0	0	0	0	
Oceana Co. (zone)	12/4/06	1 day	Lake Effect Snow	6-8” snow	0	0	0	0	
Oceana Co. (zone)	12/6/06	1 day	Lake Effect Snow	6-10” snow	0	0	0	0	
Oceana Co. (zone)	1/29/07	1 day	Lake Effect Snow	9” snow	0	0	0	0	
Oceana Co. (zone)	2/2/07	2 days	Blizzard	up to10” snow, 40 mph wind	0	0	0	0	Blizzard conditions caused road closures, power outages, and car accidents
Oceana Co. (zone)	3/2/07	2 days	Lake Effect Snow	up to 11” snow	0	0	0	0	
Little Sable Point	11/27/07	<1 day	High Wind	58 mph	0	0	0	0	Non-thunderstorm wind at Little Sable Point in Benona and Golden townships.
Oceana Co. (zone)	12/1/07	2 days	Winter Storm	Snow, sleet, and freezing rain	0	0	0	0	Numerous traffic accidents on snowy to icy roads
Oceana Co. (zone)	12/23/07	1 day	Winter Storm	6-8” snow	0	0	0	0	High winds produced near-blizzard conditions
Oceana Co. (zone)	12/28/07	1 day	Heavy Snow	6-8” snow	0	0	0	0	
Oceana Co. (zone)	1/10/08	1 day	Winter Storm	6-7” snow	0	0	0	0	
Oceana Co. (zone)	1/23/08	1 day	Winter Storm	6-10” snow	0	0	0	0	
Oceana Co. (zone)	1/29/08	1 day	Blizzard	4-7” snow	0	0	0	0	
Oceana Co. (zone)	2/6/08	1 day	Winter Storm	up to12” snow	0	0	0	0	
Oceana Co. (zone)	2/14/08	1 day	Winter Storm	up to12” snow	0	0	0	0	
Oceana Co. (zone)	2/18/08	2 days	Lake Effect Snow	10-15” snow	0	0	0	0	
Rothbury	6/8/08	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	Several trees downed around Rothbury
Mears	6/14/08	<1 day	Hail	1”	0	0	0	0	
Oceana Co. (zone)	11/20/08	1 day	Lake Effect Snow	8.6” snow	0	0	0	0	
Oceana Co. (zone)	12/6/08	1 day	Winter Storm	8-14” snow	0	0	0	0	
Oceana Co. (zone)	12/8/08	1 day	Winter Storm	10-12” snow	0	0	0	0	

Oceana Co. (zone)	12/19/08	1 day	Winter Storm	8-12” snow	0	0	0	0	
Oceana Co. (zone)	12/20/08	2 days	Blizzard	8-12” snow, 45 mph wind	0	0	0	0	Blizzard conditions caused several highway closures and traffic accidents
Oceana Co. (zone)	12/23/08	1 day	Winter Storm	6-10” snow	0	0	0	0	
Oceana Co.	12/28/08	<1 day	High Wind	60 mph	0	0	0	0	Hundreds of thousands lost power across Michigan
Oceana Co. (zone)	1/17/09	2 days	Winter Storm	up to 15” snow	0	0	0	0	
Oceana Co. (zone)	2/21/09	1 day	Winter Storm	8” snow	0	0	0	0	
Oceana Co. (zone)	12/7/09	1 day	Lake Effect Snow	5-7” snow	0	0	0	0	
Oceana Co. (zone)	12/8/09	1 day	Winter Storm	6-10” snow	0	0	0	0	
Oceana Co. (zone)	12/24/09	1 day	Winter Weather	.1-.25” ice	0	0	0	0	A wintery mix resulted in several traffic accidents
Oceana Co. (zone)	12/26/09	1 day	Lake Effect Snow	up to 8” snow	0	0	0	0	
Oceana Co. (zone)	1/1/10	2 days	Lake Effect Snow	12-16” snow	0	0	0	0	
Oceana Co. (zone)	2/15/10	1 day	Lake Effect Snow	7-8.6” snow	0	0	0	0	
Oceana Co. (zone)	2/23/10	1 day	Lake Effect Snow	9” snow	0	0	0	0	
Oceana Co. (zone)	12/5/10	3 days	Lake Effect Snow	up to 24” snow	0	0	0	0	
Oceana Co. (zone)	1/3/11	1 day	Winter Weather	3.4” snow	0	0	0	0	
Oceana Co. (zone)	1/6/11	3 days	Lake Effect Snow	10-12” snow	0	0	0	0	
Oceana Co. (zone)	2/1/11	1 day	Winter Storm	6-12” snow, up to 50 mph wind	0	0	0	0	Near blizzard conditions
Oceana Co. (zone)	2/20/11	1 day	Winter Storm	6-10” snow	0	0	0	0	Numerous traffic accidents across the area
Oceana Co. (zone)	3/4/11	1 day	Winter Weather	.1” ice	0	0	0	0	Numerous traffic accidents across the area
Oceana Co. (zone)	3/22/11	1 day	Winter Storm	.25-.5” ice	0	0	0	0	Winter weather resulted in school closings and scattered power outages
Shelby	6/8/11	<1 day	Hail	1.75”	0	0	0	0	
Hart	7/11/11	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	Trees and powerlines downed in Hart
Hart	7/31/11	<1 day	Hail	.88”	0	0	0	0	
Oceana Co. (zone)	1/12/12	2 days	Winter Storm	8-12” snow	0	0	0	0	
Countywide	5/3/12	<1 day	Hail	1”	0	0	0	0	1” hail reported near Hart and near Shelby
Pentwater	5/15/12	<1 day	Hail	.88”	0	0	0	0	
Walkerville	7/5/12	<1 day	Thunderstorm Wind	61 mph	0	0	0	0	
Hart	7/17/12	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	Numerous trees and powerlines blown down just east of Hart
Hart	7/17/12	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	Several trees and large limbs blown down near Hart
Shelby	7/25/12	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	Powerline blown down in Shelby
Walkerville	7/30/12	<1 day	Thunderstorm Wind	60 mph	0	0	0	0	
Oceana Co. (zone)	10/30/12	<1 day	High Wind	60 mph	0	0	0	0	Trees downed near coastline.
Oceana Co. (zone)	12/21/12	1 day	Winter Storm	6-8” snow, up to 65 mph wind	0	0	0	0	Scattered power outages
Oceana Co. (zone)	1/21/13	1 day	Lake Effect Snow	Up to 12” snow, up to 65 mph wind	0	0	0	0	Downed trees and power lines prior to snowfall
Oceana Co. (zone)	2/15/13	1 day	Lake Effect Snow	10-16” snow	0	0	0	0	
Oceana Co. (zone)	4/17/13	6 days	Flood	Heavy rain	0	0	3m	0	
Benona Township	6/17/13	<1 day	Thunderstorm Wind	60 mph	0	0	2k	0	Tree limbs downed over Stony Lake Road
Oceana Co. (zone)	11/17/13	1 day	High Wind	60-70 mph	0	0	75k	0	Numerous power outages
Oceana Co. (zone)	1/22/14	1 day	Heavy Snow	8” snow	0	0	0	0	
Oceana Co. (zone)	2/17/14	1 day	Heavy Snow	9” snow	0	0	0	0	

National Climatic Data Center: Storm Events
04/1/14 through 02/28/23 * 33 events reported for Oceana County

LOCATION or ZONE (zone implies multiple counties)	DATE	DUR-ATION	TYPE	MAG-NITUDE	DEATHS	INJURY	DAMAGE ($)		NOTES
							property	crop	
Ferry Twp	5/7/2014	1 day	Hail	1 in	0	0	0	0	
New Era	6/18/2014	1 day	Hail	1 in	0	0	0	0	
OCEANA (ZONE)	11/17/2014	5 days	Lake-Effect Snow		0	0	0	0	Up to 24 inches of snow across southeast Oceana County
OCEANA (ZONE)	1/8/2015	2 days	Heavy Snow		0	0	0	0	10-12 inches of snow across northwestern Oceana County
OCEANA (ZONE)	2/13/2015	3 days	Winter Storm		0	0	0	0	8-10 inches of snow, drifted roads
Grant Twp	8/2/2015	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Trees downed along Arthur Rd
OCEANA (ZONE)	12/29/2015	1 day	Sleet		0	0	0	0	2 inches of sleet
OCEANA (ZONE)	1/9/2016	5 days	Lake-Effect Snow		0	0	0	0	12-18 inches of snow across
OCEANA (ZONE)	3/23/2016	2 days	Winter Storm		0	0	0	0	Ice and snow
OCEANA (ZONE)	12/8/2016	3 days	Lake-Effect Snow		0	0	0	0	6-10 inches of snow
OCEANA (ZONE)	3/8/2017	1 day	High Wind	60 mph	0	0	10m	0	wind gusts up to 60 mph, numerous downed trees and limbs and power lines and widespread power outages
Near Shelby	4/10/2017	1 day	Hail	1.75 in	0	0	0	0	
Near Pentwater	4/20/2017	1 day	Thunderstorm Wind	59 mph	0	0	0	0	
OCEANA (ZONE)	12/28/2017	3 days	Heavy Snow		0	0	0	0	12-18 inches of snow across western Oceana County
OCEANA (ZONE)	4/14/2018	1 day	Winter Storm		0	0	100k	0	Heavy sleet and strong winds caused power outages
Benona Twp	7/26/2018	1 day	Thunderstorm Wind	60 mph	0	0	20k	0	Roof blown off of a garage near Shelby
Golden Twp	8/28/2018	1 day	Thunderstorm Wind	60 mph	0	0	20k	0	Trees uprooted or snapped
OCEANA (ZONE)	1/28/2019	1 day	Winter Storm		0	0	0	0	12-16 inches of snow
OCEANA (ZONE)	1/29/2019	3 days	Winter Storm		0	0	0	0	6-12 inches of snow with -20 to -40 degree wind chills
OCEANA (ZONE)	2/5/2019	3 days	Ice Storm	.25-.5 in	0	0	1m	0	Numerous downed trees, limbs, power lines and widespread power outages
OCEANA (ZONE)	2/24/2019	2 days	High Wind	60 mph	0	0	1m	0	Downed tree limbs and power lines and resulted in widespread power outages
OCEANA (ZONE)	4/14/2019	2 days	Heavy Snow		0	0	0	0	Over 6 inches of snow
Claybanks Twp	8/7/2019	1 day	Thunderstorm Wind	60 mph	0	0	3k	0	Tree uprooted, a fence blown down and a camper top was blown off 30 feet
OCEANA (ZONE)	11/11/2019	2 days	Lake-Effect Snow		0	0	0	0	8-12 inches of snow
Hart	6/2/2020	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Downed trees
OCEANA CO.	11/10/2020	1 day	Thunderstorm Wind	60 mph	0	0	100k	0	Downed trees
Weare Twp	8/10/2021	1 day	Thunderstorm Wind	66 mph	0	0	0	0	66 mph was measured at the Mason Oceana 911 call center
OCEANA CO.	9/12/2021	1 day	Hail	1 in	0	0	0	0	
Pentwater	12/16/2021	1 days	High Wind	71 mph	0	0	0	0	
OCEANA (ZONE)	1/5/2022	3 days	Winter Storm		0	0	0	0	8-12 inches of snow
Grant Twp	5/11/2022	1 days	Hail	1 in	0	0	0	0	
OCEANA (ZONE)	11/17/2022	4 days	Winter Storm		0	0	0	0	6-8 inches of snow
OCEANA (ZONE)	12/22/2022	3 days	Blizzard		0	0	0	0	8 inches of snow and blizzard conditions

GENERAL SOILS MAP



SOIL LEGEND*

AREAS OF NEARLY LEVEL TO VERY STEEP, MODERATELY WELL DRAINED TO EXCESSIVELY DRAINED SOILS AND AREAS OF DUNE LAND

1 Epworth–Dune land–Nordhouse Association

2 Typic Udipsamments–Entic Haplorthods, sandy Association

AREAS OF NEARLY LEVEL TO VERY STEEP, EXCESSIVELY DRAINED, MODERATELY WELL DRAINED, AND POORLY DRAINED SOILS

3 Plainfield–Coloma–Grattan Association

4 Grattan–Covert–Granby Association

AREAS OF NEARLY LEVEL TO VERY STEEP, EXCESSIVELY DRAINED AND WELL DRAINED SOILS

5 Benona–Spinks–Grattan Association

6 Spinks–Remus–Fern Association

7 Entic Haplorthods, sandy–Alfic Haplorthods, sandy Association

AREAS OF NEARLY LEVEL TO STEEP, WELL DRAINED, SOMEWHAT POORLY DRAINED, AND VERY POORLY DRAINED SOILS

8 Claybanks–Nappanee–Hoytville Association

9 Perrinton–Gowdy–Ithaca Association

AREAS OF NEARLY LEVEL, VERY POORLY DRAINED AND POORLY DRAINED SOIL

10 Houghton–Kerston–Carlisle Association

11 Medisaprists, euic–Typic Haplaquolls, sandy over loamy–Mollic Psammaquents Association

Source: USDA/Mich.Dept.Agr.(issued September, 1995)

Oceana County Dams

The National Inventory of Dams (NID) identifies eight dams within Oceana County. Two of the dams are classified "high" hazard potential, two "significant," and four "low." FEMA dam hazard potential classes are defined as the following:

LOW HAZARD POTENTIAL

Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

SIGNIFICANT HAZARD POTENTIAL

Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.

HIGH HAZARD POTENTIAL

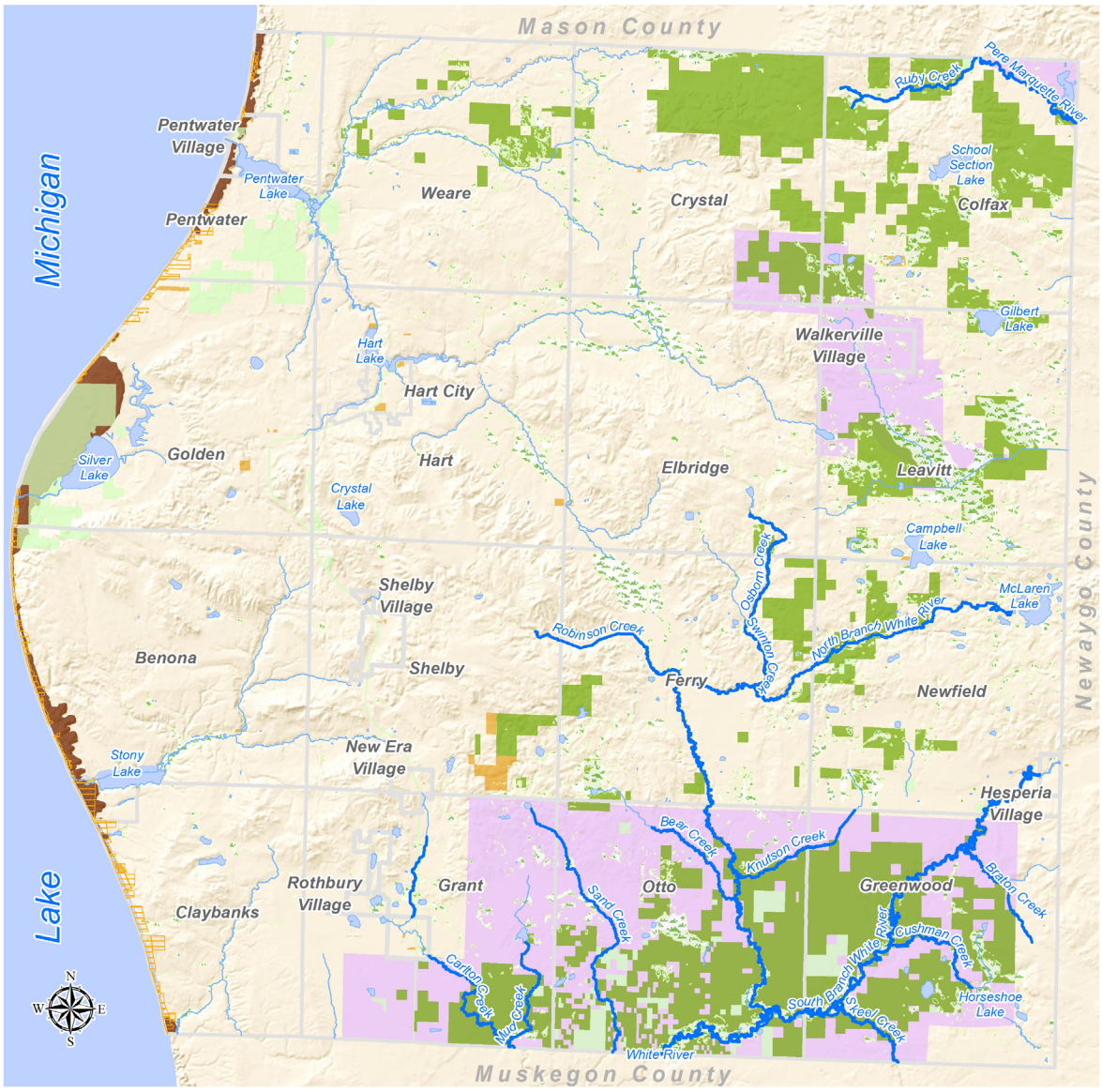
Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

NAME	LOCATION	HAZARD POTENTIAL
Hart Lake Dam	Hart Township	Low
Gales Pond Dam	Elbridge Township	
Silver Lake Level Control Structure	Golden Township	
Crystal Valley Dam	Crystal Township	
Foster Lake Dam	Colfax Township	Significant
Hesperia Pond Dam	Hesperia Village	
Holiday Lake Dam	Golden Township	High
Upper Silver Lake Dam	Golden Township	

Source: National Inventory of Dams, US Army Corps of Engineers, https://nid.sec.usace.army.mil/# October 2, 2023

In addition to the dams listed above, the Michigan Dam Inventory lists 16 additional low hazard potential dams scattered throughout the county that are worthy of mention. Locations and details are readily viewable at: https://gis-egle.hub.arcgis.com/datasets/c0033d45400e484a9a9bfc83f9a60ce8/explore

Oceana County
Significant Landscape Map

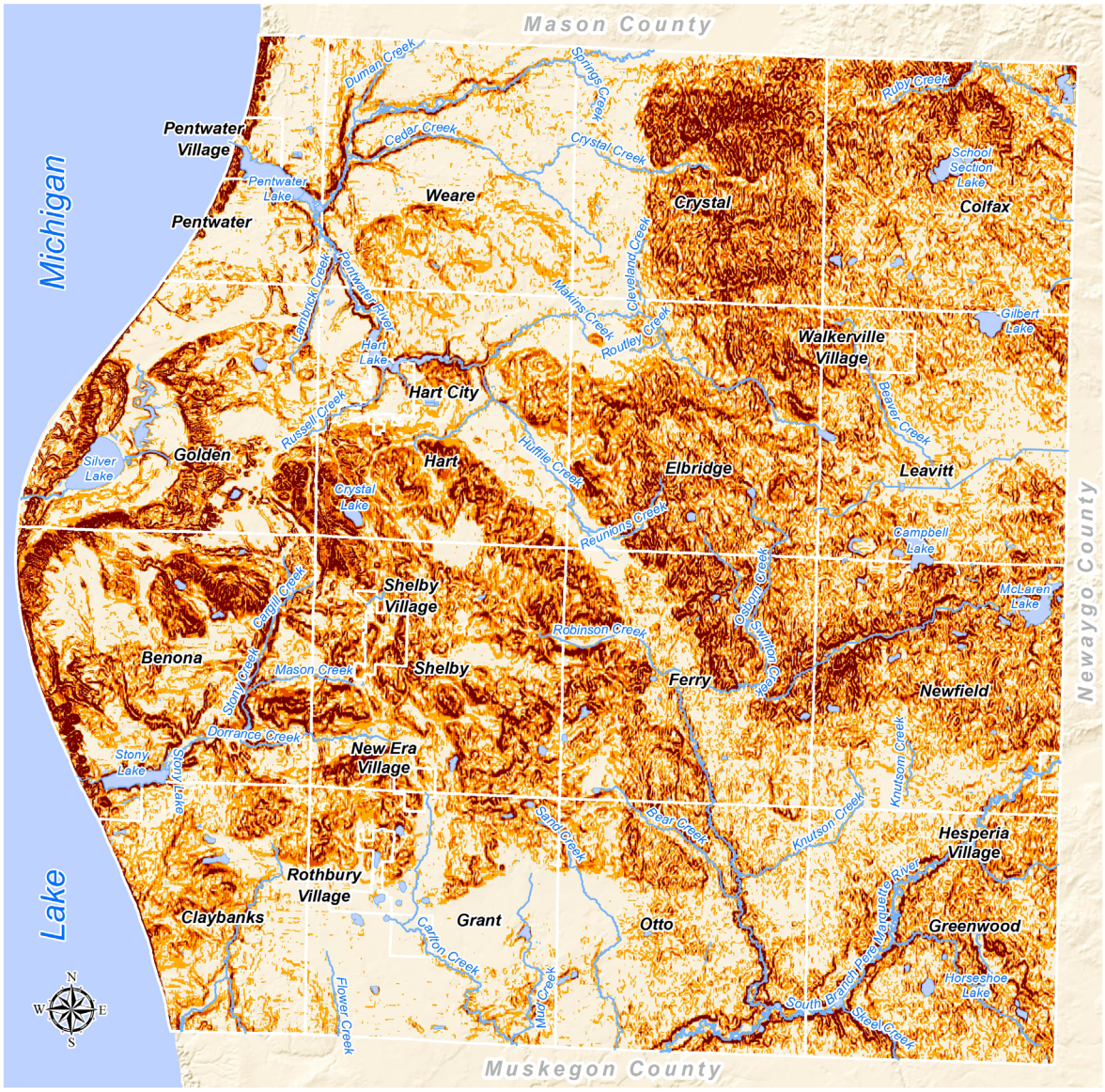


Karner Blue Butterfly Management Area
USFS Land
DNR Parks/ Land
Municipal Parks/ Land
Michigan Natural Rivers
Swamps & Marshes
High Risk Erosion Area
Critical Dunes

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created 2014 Source: USGS TNM, USFS, MIDNR, MI Geographic Framework V12

Oceana County
County Slopes Map



Percentage Slope

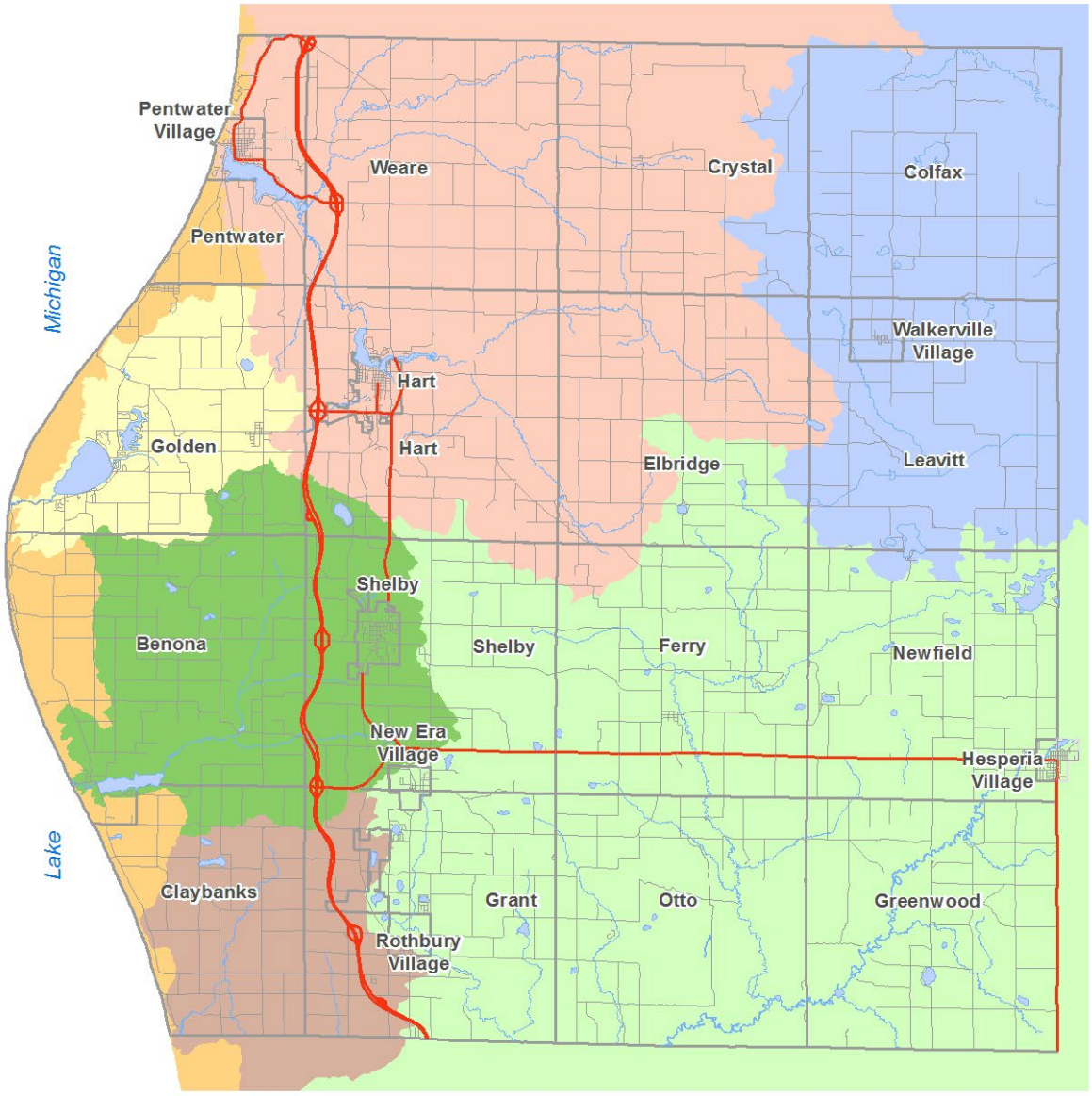
- 11 - 20% Moderate
- 21 - 30% Significant
- 31% + Severe

- Lake
- River/Stream

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

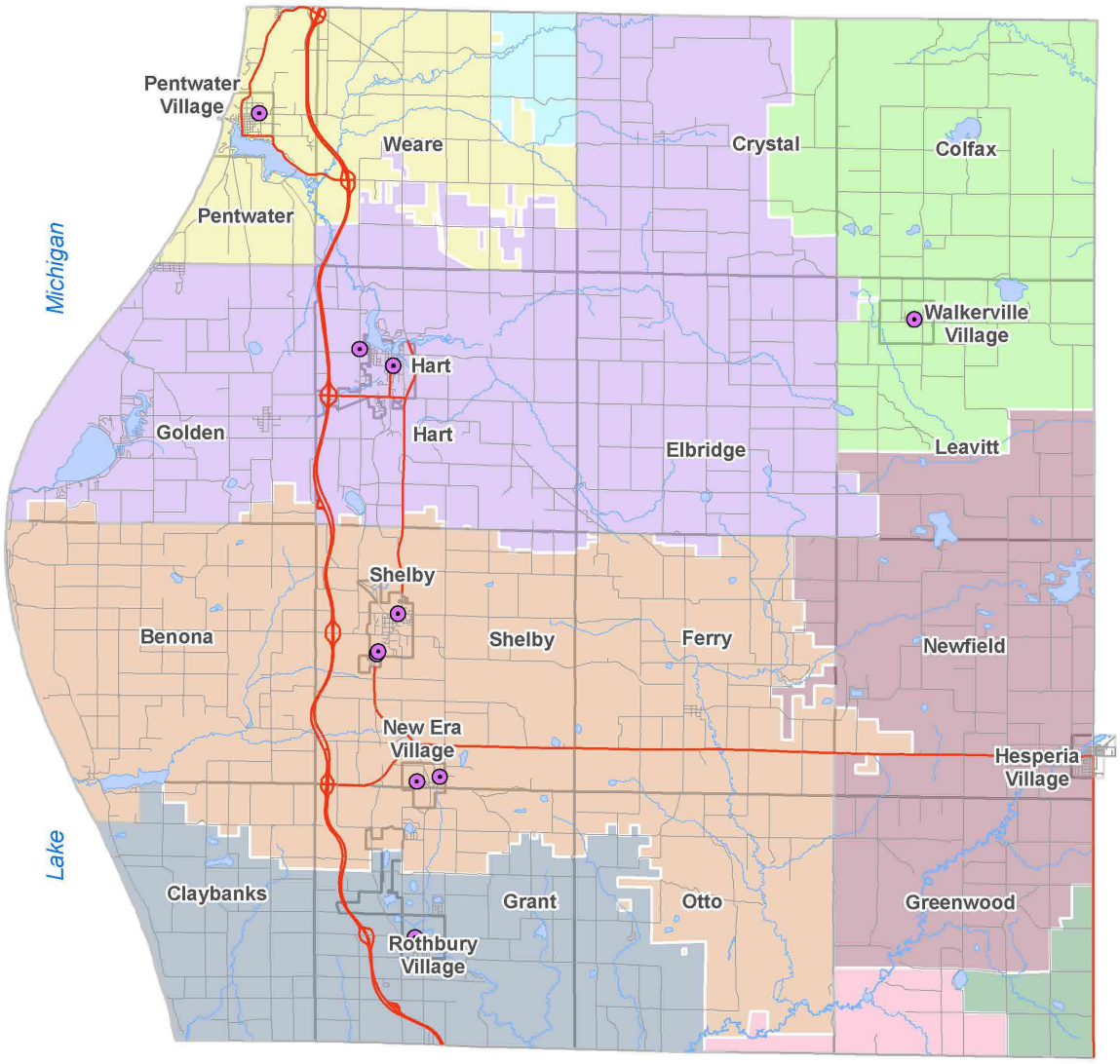
Map Created May 2014 Source: USGS TNM
MIDNR, MI Geographic Framework V12

OCEANA COUNTY
Watersheds



Source: Michigan Geographic Data Library
United States Geological Survey, Oceana Co. Hazard Mitigation Update 2014

OCEANA COUNTY
School Districts

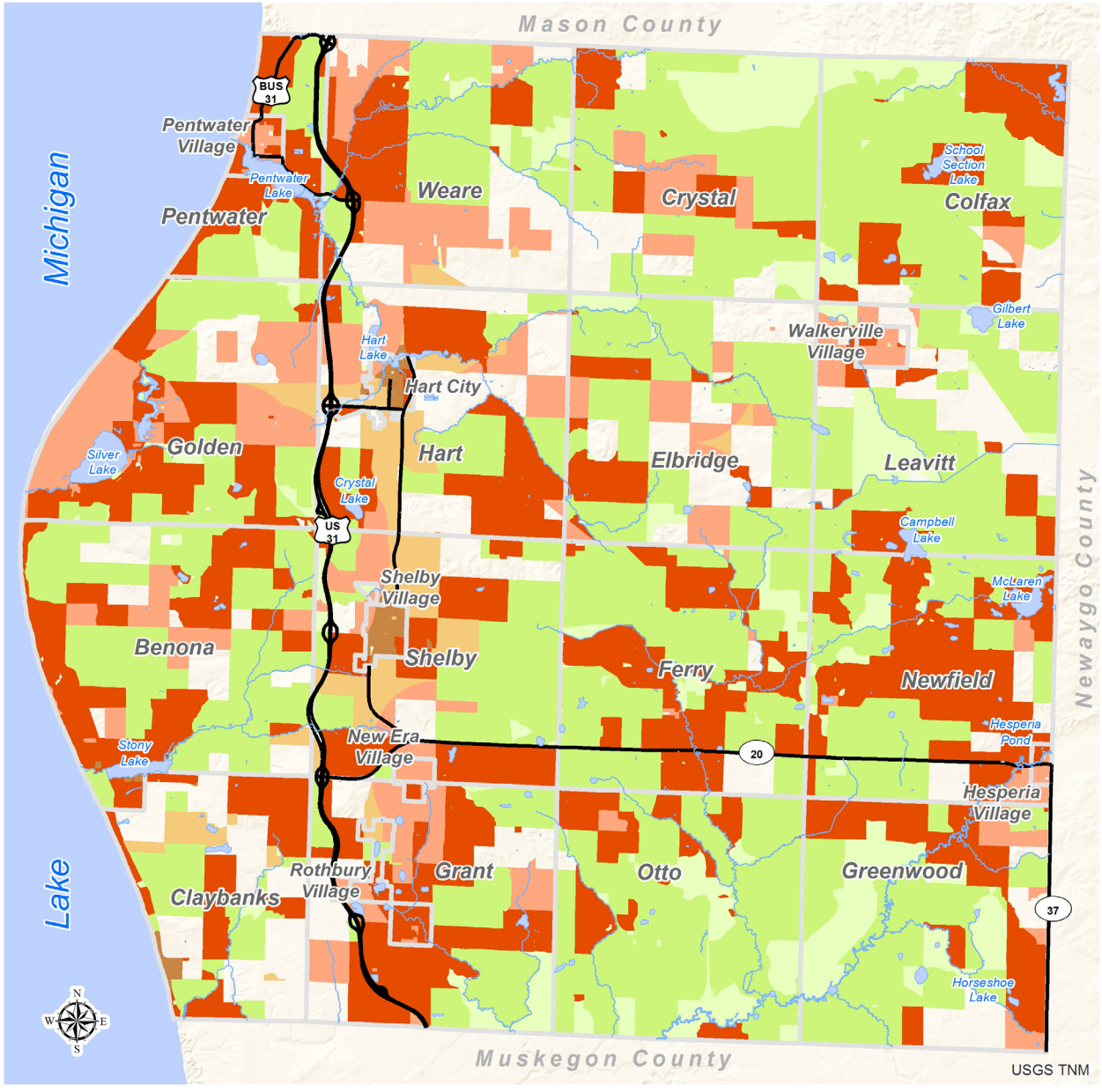


- School
- Fremont Public School District
- Hart Public School District
- Hesperia Community Schools
- Holton Public Schools
- Mason County Central Schools
- Montague Area Public Schools
- Pentwater Public School District
- Shelby Public Schools
- Walkerville Public Schools

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Source: Michigan Geographic Data Library
United States Geological Survey, Oceana Co. Hazard Mitigation Update 2014

Oceana County
Wildland-Urban Interface Map



WUI
- Intermix
- Interface

Non-WUI Vegetated
- Low Density Vegetated
- Uninhabited Vegetated

Non-Vegetated Housing Density
- High and Medium Density
- Low Density

Inermix- area where structures are scattered throughout a wildland area with no clear line of demarcation.
Interface- area where structures directly abut wildland fuels with a clear line of demarcation between residental, business, public structures, and wildland fuels.

WMSRDC West Michigan Shoreline Regional Development Commission

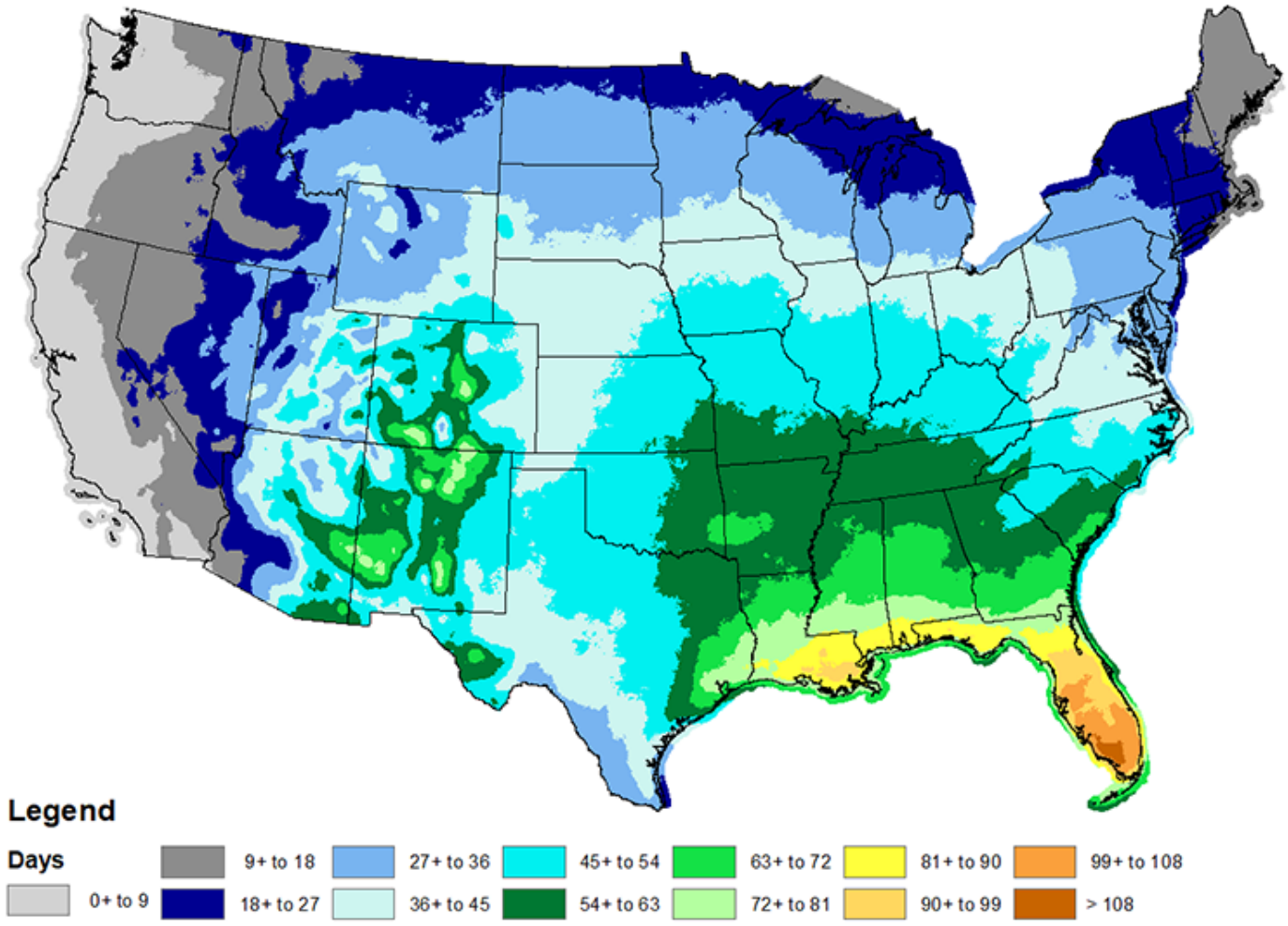
Map Created March 2014Source: USFS, USDA Forest Service
North Central Research Station, Universtiy of Wisconsin-MadisonMI Geographic Framwork V12

Source: Oceana County Community Wildfire Protection Plan (2014)

Number of Wildfires and Acres Burned, by County: 1981-2018 (MDNR jurisdiction only) Source: MDNR/FRD

County	*Number of Fires*	*Number of Wildfires/Year*	*Number of Acres Burned*	*Acres Burned/Year*
Alcona	257	6.8	1,567.6	41.3
Alger	64	1.7	201.2	5.3
Allegan	125	3.3	594.6	15.6
Alpena	281	7.4	441.6	11.6
Antrim	256	6.7	285.3	7.5
Arenac	183	4.8	703.7	18.5
Baraga	74	1.9	1,936.6	51.0
Barry	125	3.3	613.1	16.1
Bay	24	0.6	180.7	4.8
Benzie	184	4.8	396.8	10.4
Berrien	12	0.3	25.9	0.7
Branch	9	0.2	173.9	4.6
Calhoun	11	0.3	45.3	1.2
Cass	3	0.1	27.0	0.7
Charlevoix	173	4.6	522.2	13.7
Cheboygan	828	21.8	1,571.4	41.4
Chippewa	474	12.5	5,916.4	155.7
Clare	1,019	26.8	2,647.8	69.7
Clinton	29	0.8	142.7	3.8
Crawford	1,291	34.0	32,506.0	855.4
Delta	620	16.3	3,393.7	89.3
Dickinson	560	14.7	2,547.6	67.0
Eaton	3	0.1	0.3	0.0
Emmet	377	9.9	649.6	17.1
Genesee	1	0.0	0.1	0.0
Gladwin	587	15.4	2,161.3	56.9
Gogebic	120	3.2	254.9	6.7
Grand Traverse	435	11.4	1,484.2	39.1
Gratiot	3	0.1	42.7	1.1
Hillsdale	2	0.1	23.0	0.6
Houghton	192	5.1	1,211.9	31.9
Huron	30	0.8	982.5	25.9
Ingham	18	0.5	479.0	12.6
Ionia	35	0.9	765.8	20.2
Iosco	144	3.8	1782.8	46.9
Iron	324	8.5	2,041.2	53.7
Isabella	144	3.8	1,782.8	46.9
Jackson	38	1.0	562.0	14.8
Kalamazoo	19	0.5	125.3	3.3
Kalkaska	627	16.5	3,200.4	84.2
Kent	28	0.7	213.5	5.6
Keweenaw	63	1.7	381.9	10.1
Lake	355	9.3	1,541.8	40.6
Lapeer	67	1.8	629.4	16.6
Leelanau	60	1.6	267.6	7.0
Lenawee	30	0.8	224.2	5.9
Livingston	93	2.4	812.1	21.4
Luce	254	6.7	39,821.3	1,047.9
Mackinac	226	5.9	1,695.9	44.6
Macomb	7	0.2	15.4	0.4
Manistee	54	1.4	1,070.7	28.2
Marquette	1,018	26.8	16,607.2	437.0
Mason	38	1.0	206.2	5.4
Mecosta	227	6.0	1,039.7	27.4
Menominee	745	19.6	2,615.8	68.8
Midland	560	14.7	1,596.3	42.0
Missaukee	406	10.7	1,884.9	49.6
Monroe	7	0.2	658.4	17.3
Montcalm	40	1.1	640.2	16.8
Montmorency	645	17.0	1,371.7	36.1
Muskegon	299	7.9	2,944.9	77.5
Newaygo	74	1.9	548.9	14.4
Oakland	57	1.5	399.9	10.5
Oceana	427	11.2	1,983.6	52.2
Ogemaw	646	17.0	9,480.1	249.5
Ontonagon	100	2.6	1,509.0	39.7
Osceola	466	12.3	1,192.4	31.4
Oscoda	309	8.1	8,872.9	233.5
Otsego	1,110	29.2	2,123.2	55.9
Ottawa	152	4.0	494.3	13.0
Presque Isle	378	9.9	968.6	25.5
Roscommon	691	18.2	4,667.4	122.8
Saginaw	21	0.6	478.6	12.6
Sanilac	49	1.3	453.7	11,9
Schoolcraft	390	10.3	6,770.9	178.2
Shiawassee	82	2.2	618.5	16.3
St. Clair	114	3.0	1,758.1	46.3
St. Joseph	4	0.1	20.3	0.5
Tuscola	126	3.3	1,355.0	35.7
Van Buren	42	1.1	259.4	6.8
Washtenaw	20	0.5	249.1	6.6
Wayne	2	0.1	42.2	1.1
Wexford	467	12.3	1,199.1	31.6

Annual Mean Thunderstorm Days (1993-2018)

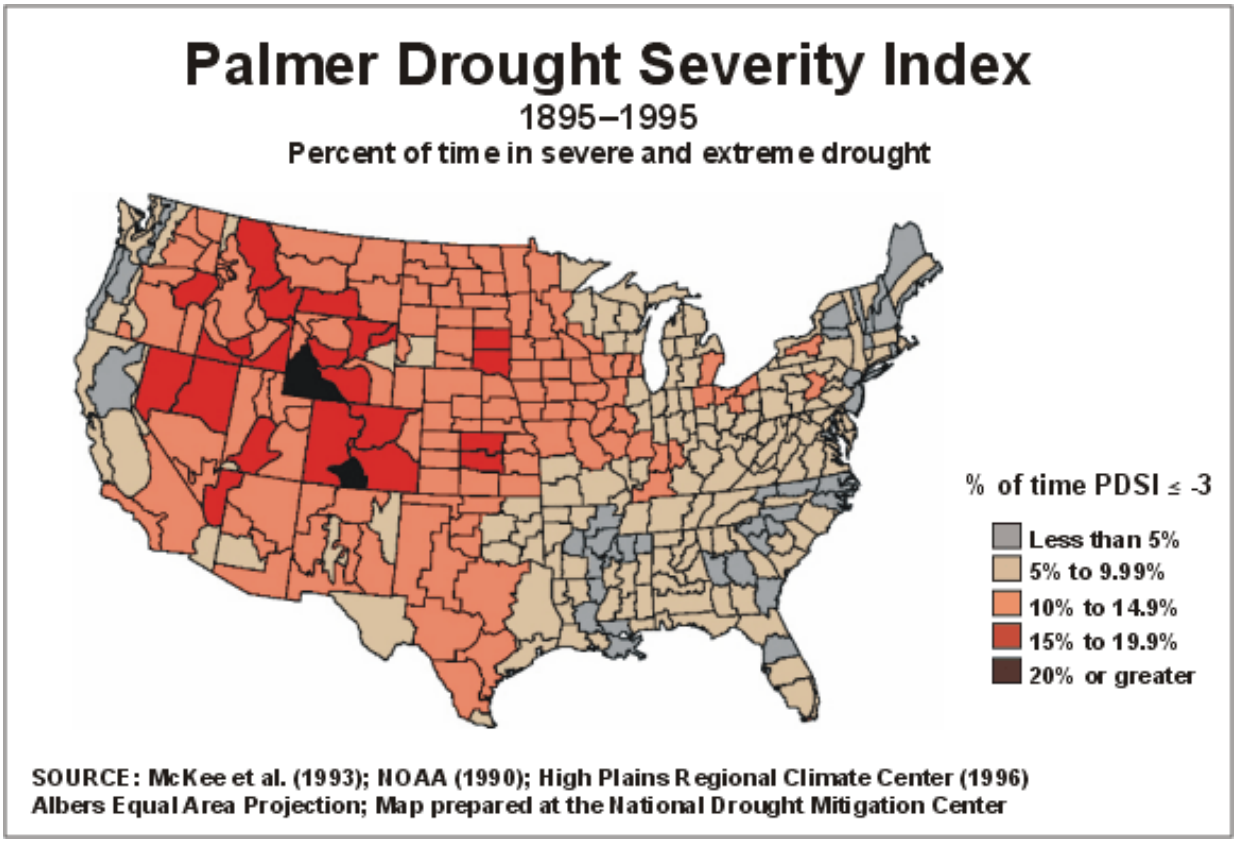


Thunderstorm Hazards

*** Contours represent the average number of thunderstorm days per year**

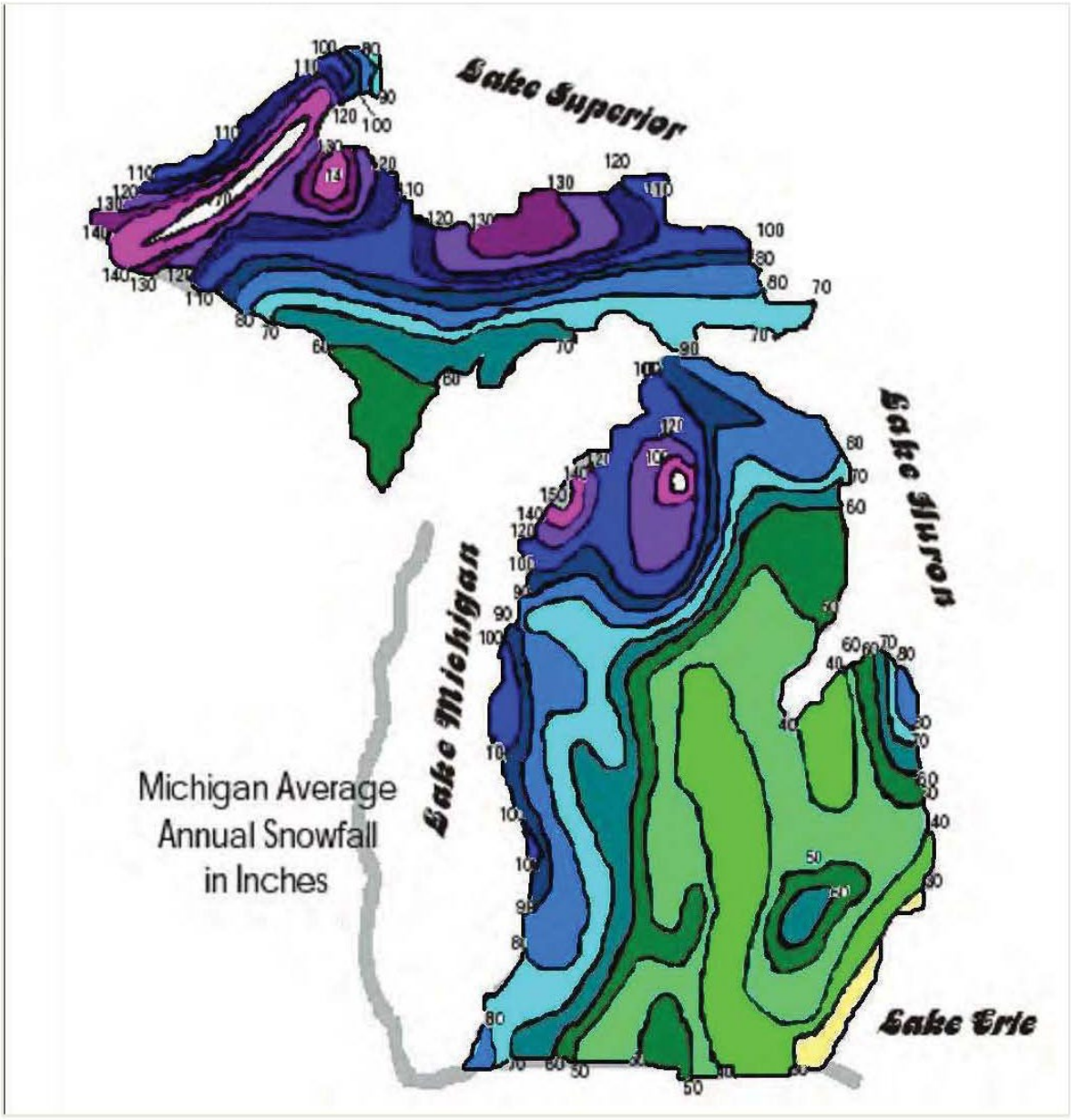
Produced by:
Michigan State Police
Emergency Management and Homeland Security Division
January 2011

Figure I2 Wind zones in the United States


Palmer Drought Severity Index
1895–1995
Percent of time in severe and extreme drought
% of time PDSI ≤ -3
Less than 5%
5% to 9.99%
10% to 14.9%
15% to 19.9%
20% or greater
SOURCE: McKee et al. (1993); NOAA (1990); High Plains Regional Climate Center (1996)
Albers Equal Area Projection; Map prepared at the National Drought Mitigation Center

Michigan Average Annual Snowfall

Source: Michigan Committee for Severe Weather Awareness



MICHIGAN FATAL FIRE STATISTICS

State of Michigan FY2022

111 TOTAL DEATHS

95 TOTAL FIRES

GENDER

66% MALE

33% FEMALE

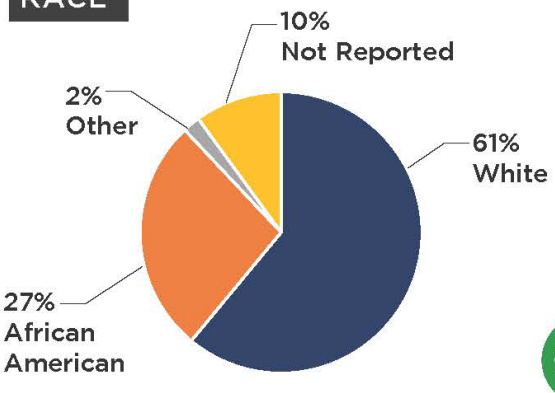
1% not reported

AGES

68% OF VICTIMS were **between the ages of 50 and 89**

17% OF VICTIMS were **between the ages of 0 and 19**

RACE



THE TOP AGE GROUPS OF VICTIMS WERE **60-69** | **70-79**

25% of victims were reported as **disabled**

10% of victims were on oxygen

TIME

6pm - 6am **62%**

6am - 6pm **38%**

DAYS

Most fatal fires occurred on

Monday	Tuesday	Wednesday
24%	17%	15%

TOP FATAL FIRE CAUSES

SMOKING	ELECTRICAL	COOKING
46%	13%	11%

TOP AREAS OF ORIGIN

LIVING ROOM	BEDROOM
40%	19%

ALARM STATUS IN HOME

YES 23%

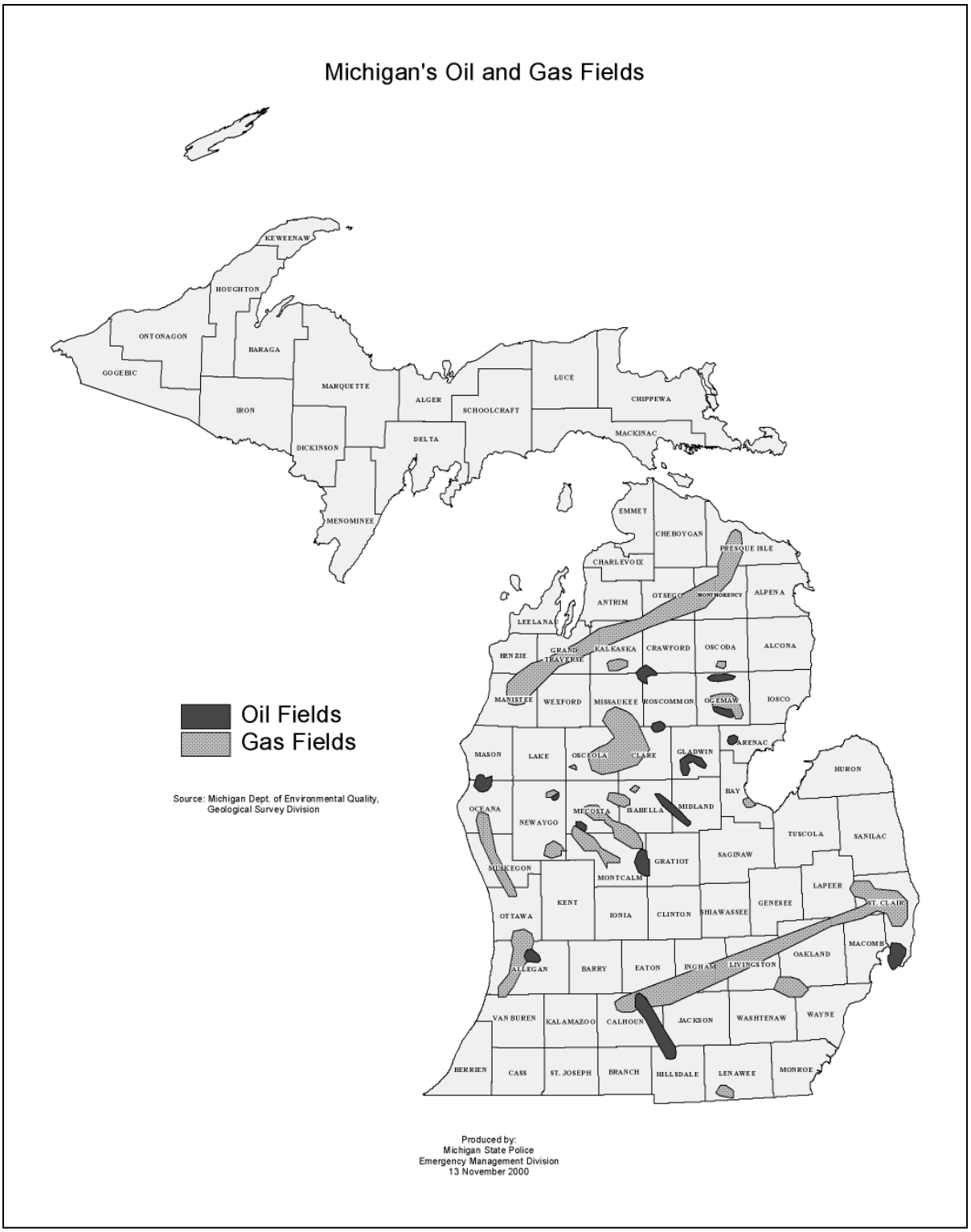
NO 39%

UNKNOWN 38%

MICHIGAN FIRE INSPECTORS SOCIETY FOUNDATION

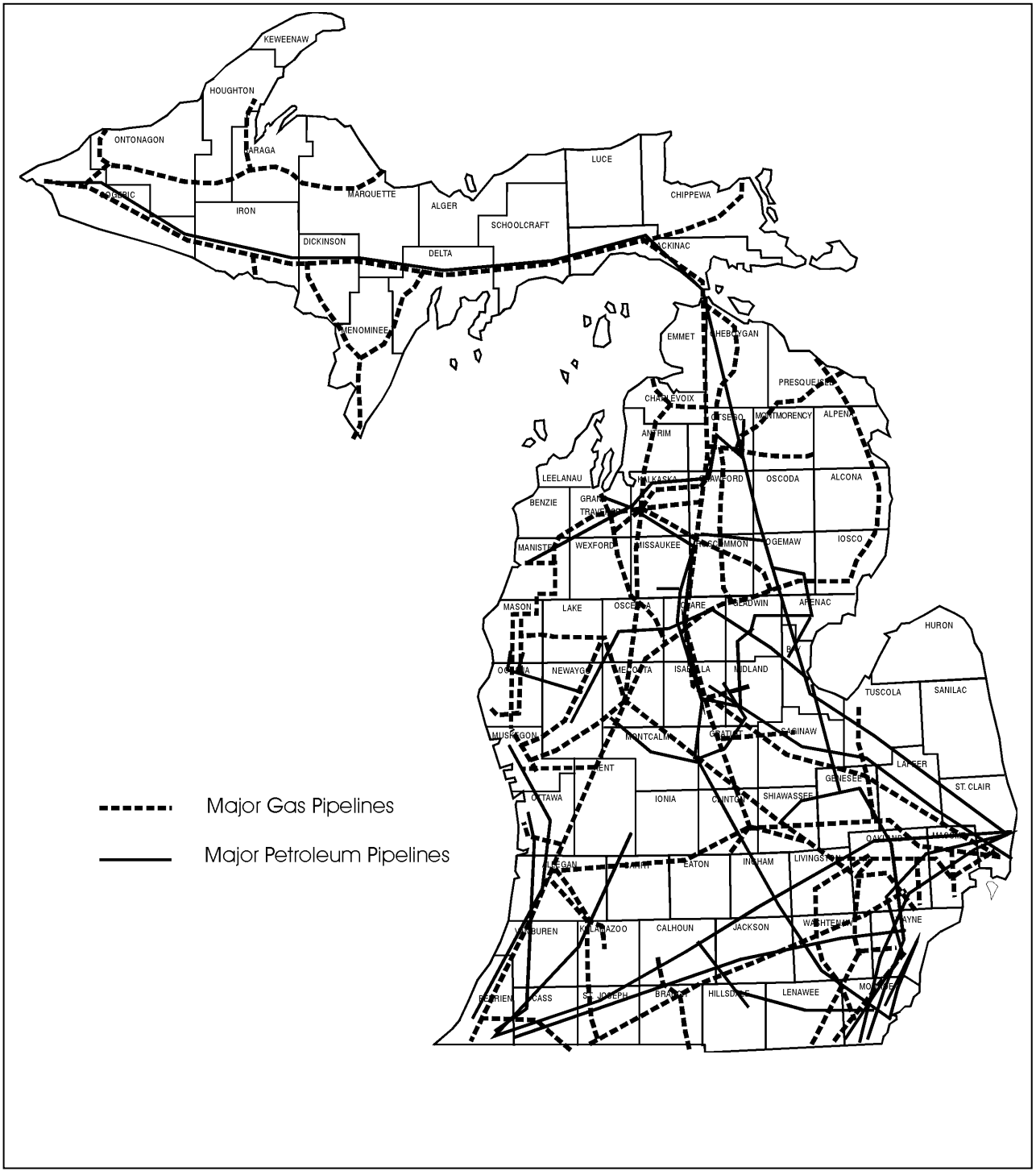
MI PREVENTION COMMUNITY · RISK · REDUCTION

MFISfoundation.org

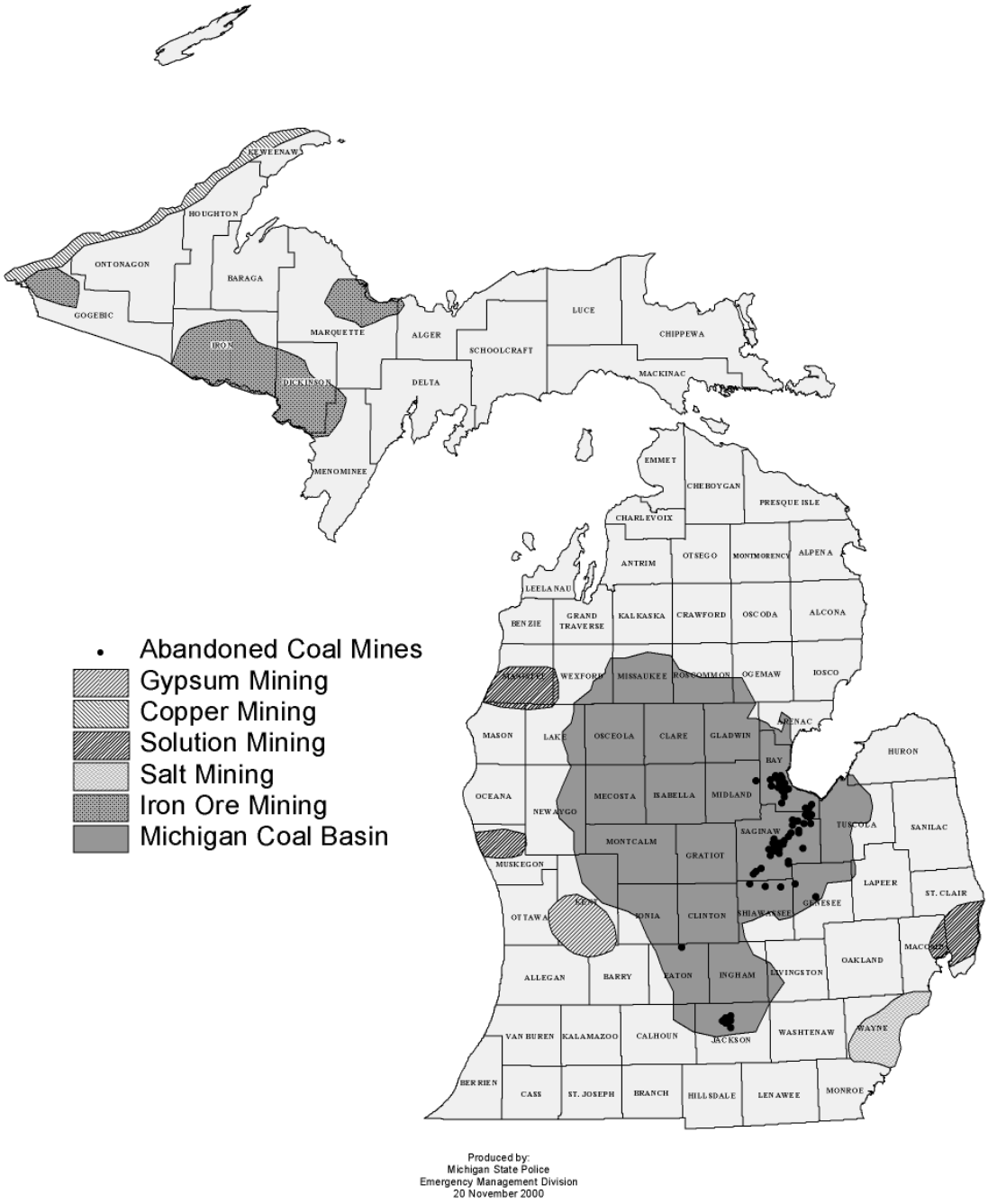

Michigan's Oil and Gas Fields
KEWEENAW
HOUGHTON
ONTONAGON
BARAGA
GOGEBIC
MARQUETTE
IRON
ALGER
SCHOOLCRAFT
LUCE
CHIPPEWA
MACKINAC
DELTA
DICKINSON
MENOMINEE
EMMET
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
GRAND TRAVERSE
KALKASKA
CRAWFORD
OSCODA
ALCONA
MANISTEE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
ARENAC
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
HURON
BAY
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
SAGINAW
MUSKEGON
MONTCALM
GRATIOT
LAPEER
KENT
IONIA
CLINTON
SHIAWASSEE
GENESEE
ST. CLAIR
OTTAWA
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
BERRIEN
CASS
ST. JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
Oil Fields
Gas Fields
Source: Michigan Dept. of Environmental Quality,
Geological Survey Division
Produced by:
Michigan State Police
Emergency Management Division
13 November 2000

Major Petroleum and Natural Gas Pipelines in Michigan

Source: Michigan Public Service Commission; pipeline company maps



Potential Subsidence Hazards



Produced by:
Michigan State Police
Emergency Management Division
20 November 2000

DISADVANTAGED AREAS

In January of 2021, President Biden issued Executive Order 14008. The order directed the Council on Environmental Quality (CEQ) to develop a new tool. This tool is called the Climate and Economic Justice Screening Tool. The tool has an interactive map and uses datasets that are indicators of burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The tool uses this information to identify communities that are experiencing these burdens. These are the communities that are disadvantaged because they are overburdened and underserved.

Federal agencies will use the tool to help identify disadvantaged communities that will benefit from programs included in the Justice40 Initiative. The Justice40 Initiative seeks to deliver 40% of the overall benefits of investments in climate, clean energy, and related areas to disadvantaged communities. Go to https://screeningtool.geoplatform.gov/en/ to access the Climate and Economic Justice Screening Tool.

Oceana County Summary

According to the screening tool, roughly the eastern two-thirds of Oceana County is considered "disadvantaged." These determinations are based on census blocks and do not always align with municipal boundaries. These tracts are considered disadvantaged because they meet more than 1 burden threshold **AND** the associated socioeconomic threshold (low income).

Disadvantaged Areas		
General Location	*Jurisdictions (all or part)*	*Burdens*
Northeast quarter of Oceana County	Townships of Colfax, Crystal, Elbridge, Leavitt Village of Walkerville	Low Income Energy (energy cost) Health (heart disease) Transportation (transportation barriers)
Southeast quarter of Oceana County	Townships of Ferry, Greenwood, Newfield, Otto Village of Hesperia	Low Income Energy (energy cost) Transportation (transportation barriers)
Hart	City of Hart, Hart Township	Low Income Energy (energy cost) Legacy Pollution (proximity to risk management plan facilities)
Oceana Drive corridor, south of Hart	Townships of Grant, Shelby Villages of New Era, Rothbury, Shelby	Low Income Legacy Pollution (formerly used defense sites)

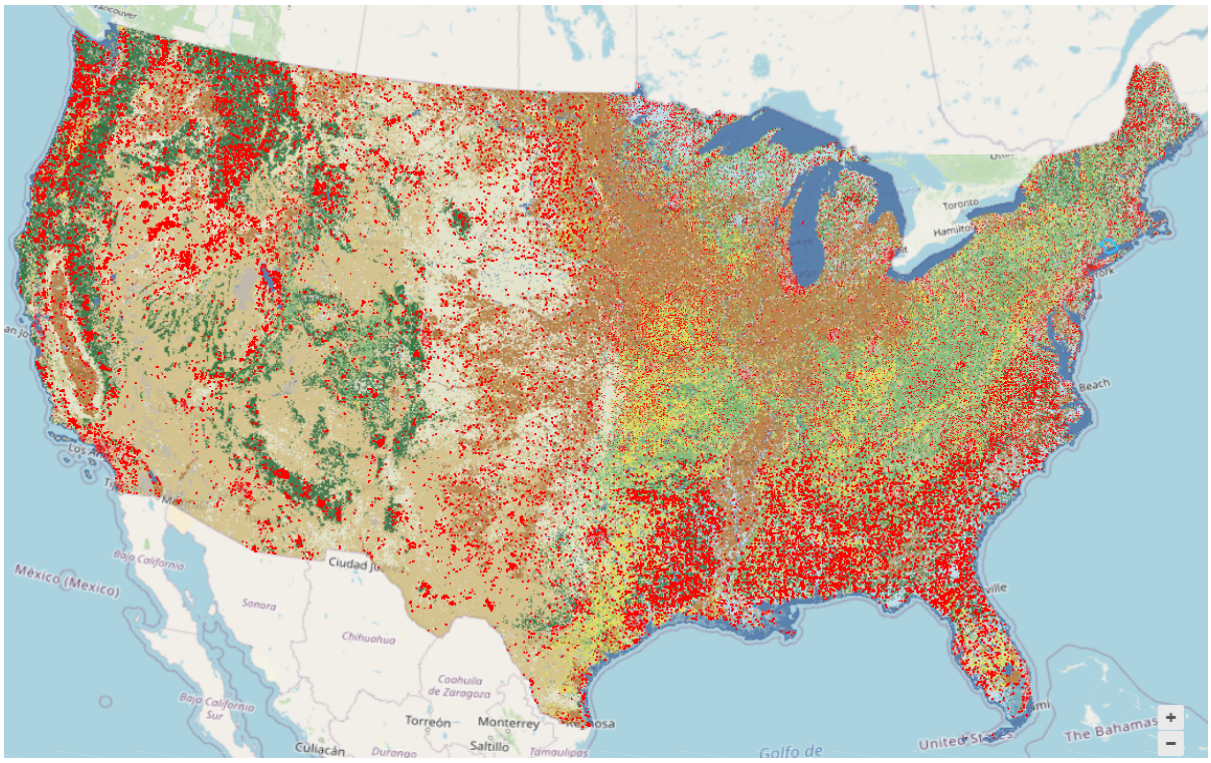
Oceana County, Michigan

2019 Land Cover

Having an accurate picture of an area's landscape and understanding how that landscape is changing is important information for any planning effort. Land cover data can help provide that big-picture view.

The data seen in the map below was derived through the Multi Resolution Land characteristics Consortium (MRLC). The MRLC produces the National Landcover Database (NLCD), a nationally standardized land cover and land change information product for the United States Multiple dates of satellite imagery are used to document changes in various types of land cover. The 2019 land cover for Oceana County can be seen below.

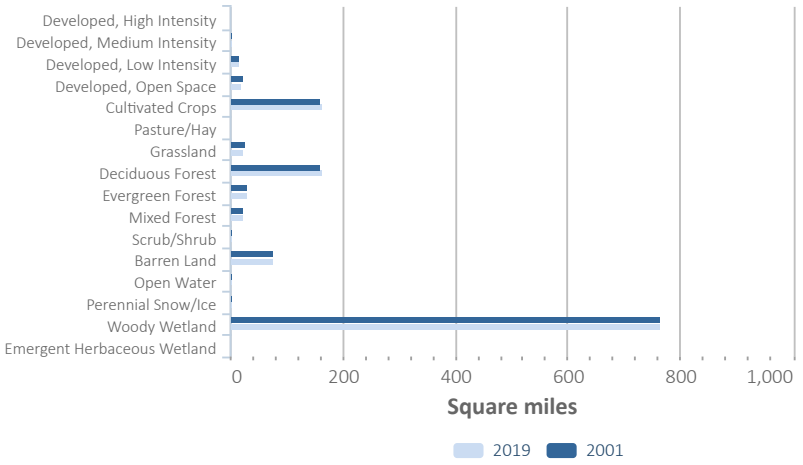
These summary sheets provide an easy way to understand some of the important information derived from these data for Oceana County.



Land Cover Overview
Oceana County, Michigan
Land Cover Data: 2001 to 2019

Land Cover Basics

1.19 percent or 15.55 square miles of this County changed.



Communities comparing data from one year to the next can evaluate how their land use management efforts are working, and can also use information on trends to aid future planning initiatives. In this bar chart, showing each land cover class, the difference between the two bars represents the net difference in the area for that category. This data represents a beginning to end year comparison,and does not quantify cumulative change between years. For instance, an evergreen forest that was harvested after the beginning year and re-grew to Evergreen forest before the end year would not be represented in the statistics. Additional GIS analysis is needed for this type of cumulative change. Other data sources available through the MRLC consortium include developed impervious surface, percent forest canopy cover, and nine discrete rangeland components for the Western United States. All of these additional components provide increased and complementary detail for analysis across the United States.

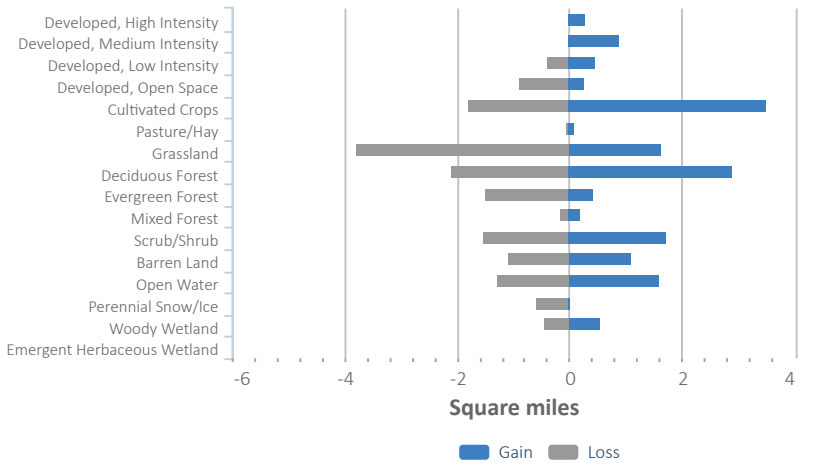
Land Cover Categories	Area 2001	Area Lost	Area Gained	Area 2019	Net Change	Percent Change
Developed, High Intensity	0.64	0.00	0.30	0.93	0.30	46.30%
Developed, Medium Intensity	3.70	-0.02	0.89	4.58	0.87	23.52%
Developed, Low Intensity	17.88	-0.37	0.45	17.96	0.08	0.44%
Developed, Open Space	21.82	-0.88	0.24	21.18	-0.64	-2.94%
Cultivated Crops	160.84	-1.79	3.51	162.56	1.72	1.07%
Pasture/Hay	1.46	-0.04	0.08	1.50	0.04	2.45%
Grassland	27.05	-3.80	1.63	24.88	-2.17	-8.04%
Deciduous Forest	161.88	-2.09	2.90	162.68	0.81	0.50%
Evergreen Forest	30.74	-1.50	0.43	29.67	-1.07	-3.49%
Mixed Forest	24.40	-0.16	0.19	24.44	0.03	0.14%
Scrub/Shrub	4.79	-1.51	1.71	4.99	0.20	4.25%
Woody Wetland	76.97	-1.08	1.10	76.99	0.02	0.02%
Emergent Herbaceous Wetland	3.94	-1.28	1.59	4.25	0.31	7.91%
Barren Land	4.75	-0.59	0.02	4.18	-0.57	-12.00%
Open Water	765.87	-0.46	0.54	765.95	0.08	0.01%
Perennial Snow/Ice	0.00	0.00	0.00	0.00	0.00	0.00%

*All numbers expressed in square miles

Land Cover Overview
Oceana County, Michigan
Land Cover Data: 2001 to 2019

Area Gained - Area Lost = Net change

Net change numbers can be deceiving; forests may be lost on one side of the County, while another area may experience an increase. The net change might be minimal, yet the total area of change could be substantial, and the quality of new growth areas may be different than those lost. It is important to look at these offsetting losses and gains, in addition to the overall net difference.



Development

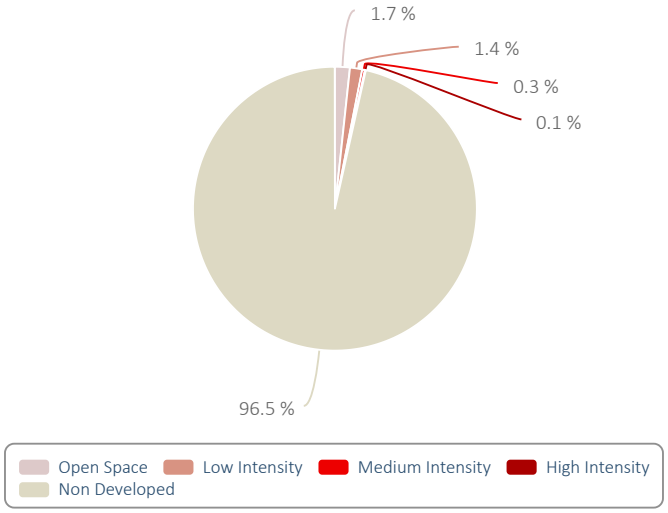
Oceana County, Michigan

Land Cover Data: 2001 to 2019

Development and Impervious Surfaces (2019)

3.42% of Oceana County is developed and 0.82% is impervious.

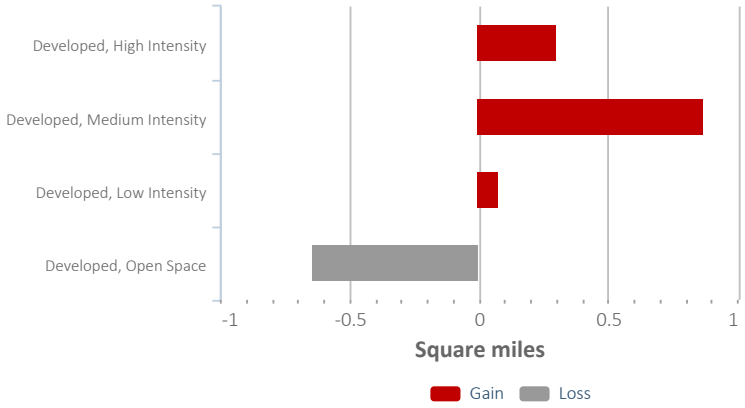
More development means more impervious surfaces, which translates into a greater risk for increased flooding and decreased water quality. Areas with impervious surface rates approaching or exceeding 12 percent to 15 percent will likely experience negative impacts to water quality. Severe degradation can be expected when rates reach 25 percent. This chart highlights the percentage of the County developed in 2019.



Development Change

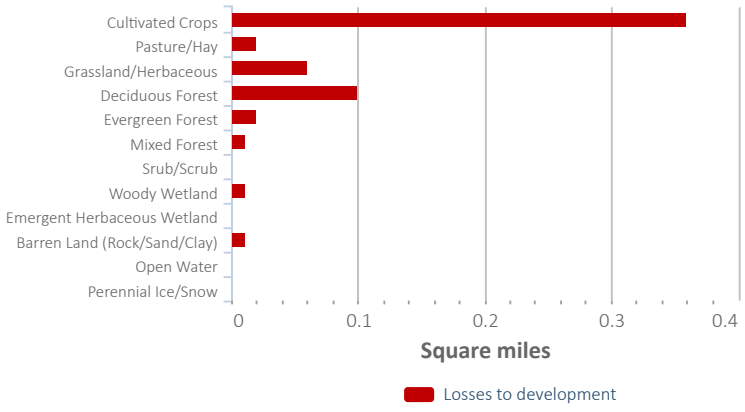
0.60 square miles of development and 0.72 square miles of impervious surfaces were gained between 2001 and 2019.

Low density and open space development can impact water quality negatively, though usually to a lesser degree than with higher density development. This graph shows how each type of development changed between 2001 and 2019.



What's Being Lost

Unlike natural land cover changes, land lost to development tends to be permanent. This graph shows the types of lands that changed to developed between 2001 and 2019. It does not show any potential losses of previously developed areas, as this is a rare occurrence.



Forests

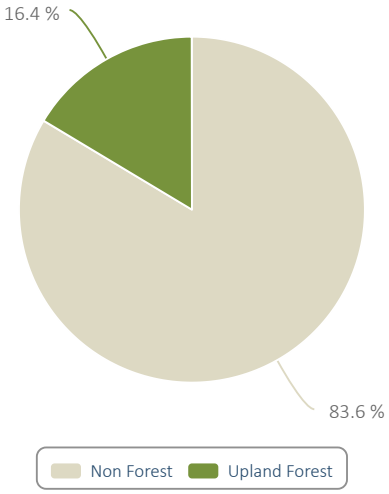
Oceana County, Michigan

Land Cover Data: 2001 to 2019

Current State of Forests (2019)

16.59% of Oceana County is forest.

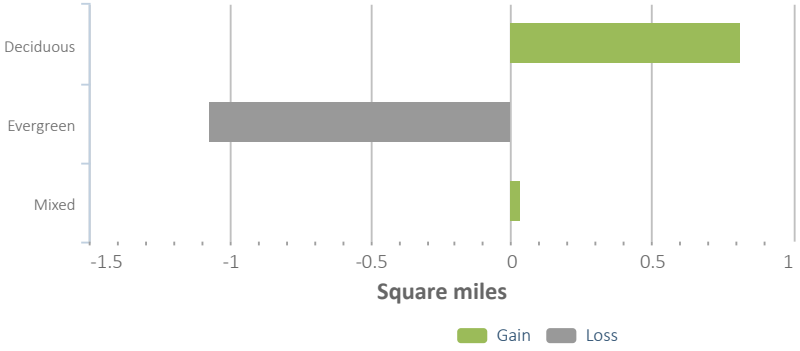
Healthy forests are a vital part of a healthy ecosystem, but it is important to understand the types of forest that are present. This chart shows the percentage of the County that is forested as well as the percentage in uplands and wetlands.



Forest Change

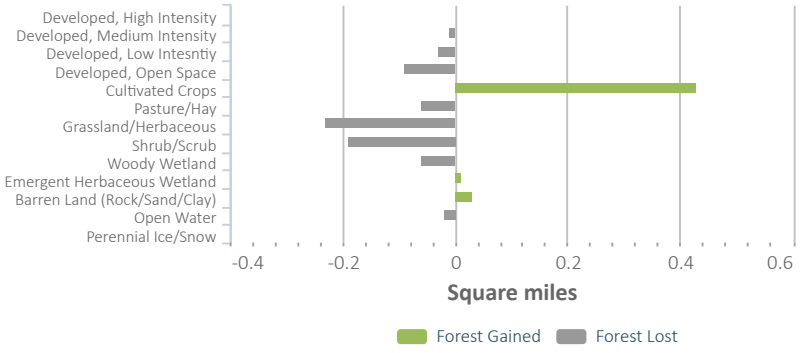
0.23 square miles of the forest was lost between 2001 and 2019.

Knowing which types of forests are being lost or gained can be as important as knowing about changes in the total forest area. Different forest types can differ in ecosystem value. This graph highlights changes in each forest type over a specific time frame.



What is Changing

A forest can go through a transitional period after a fire, other natural disaster, or logging operation, but typically can be expected to recover. Some losses, such as forests converted to development, tend to be permanent. This graph highlights the transformation of forestlands into different land cover types. It also highlights the origin of any forest gains.



Wetlands

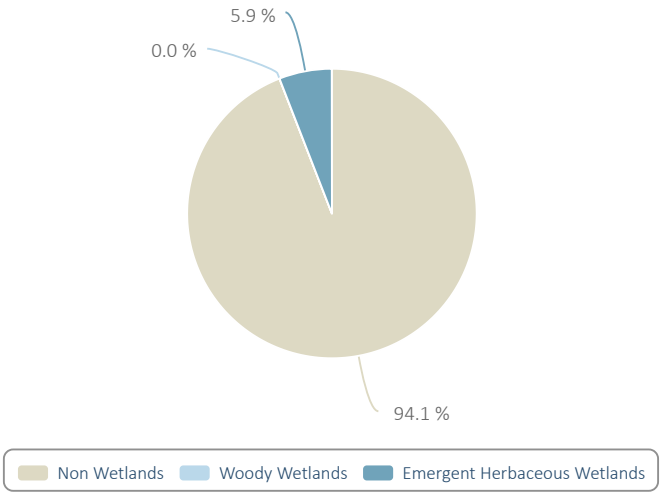
Oceana County, Michigan

Land Cover Data: 2001 to 2019

Current State of Wetlands (2019)

6.22% of Oceana County is wetland.

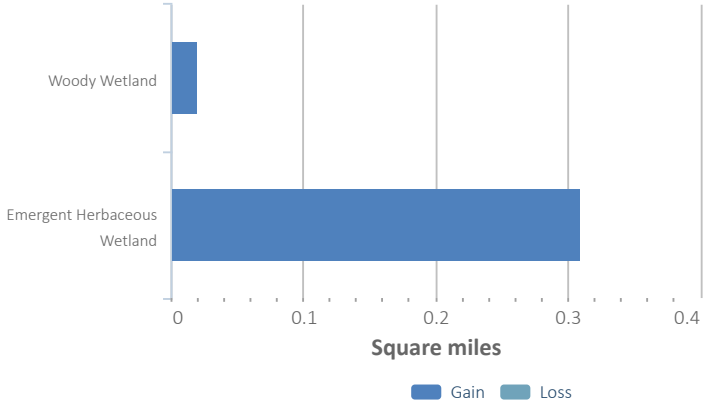
Wetlands are among the most productive environments on Earth. Wetlands provide habitat and food, buffer the impacts of storm surge and flooding, and help control erosion. Wetlands also absorb, store, and filter urban and agricultural runoff to maintain water quality. This chart highlights how much of the County is covered by wetlands.



Wetland Change

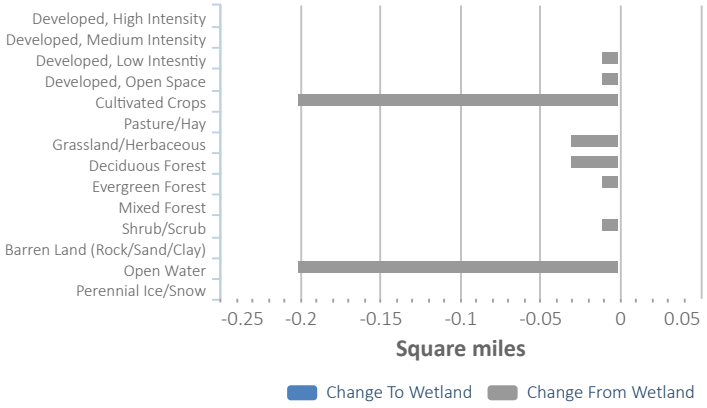
0.33 square miles of wetlands were gained between 2001 and 2019.

When a wetland area or type undergoes change, the benefits of the wetland will change as well. Understanding which type of wetland is changing, and how, can help in determining the eventual impacts of the change. This graph highlights the change or changes in each type of wetland.



What Is Changing

Understanding wetland changes can help communities identify potential management actions to reverse or mitigate the trend. This graph highlights the transformation of lost wetlands into different land cover types. It also highlights the origin of any wetland gains.



Agriculture

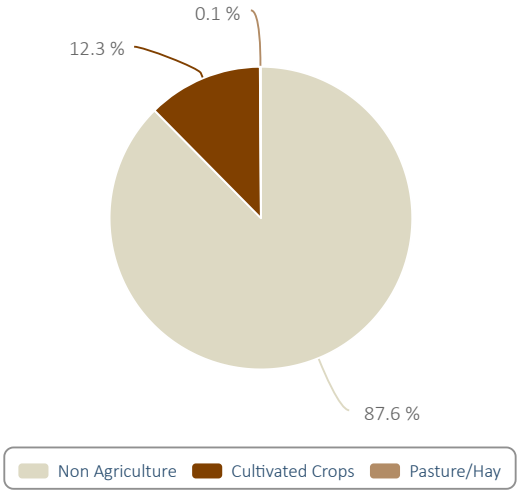
Oceana County, Michigan

Land Cover Data: 2001 to 2019

Current State of Agriculture (2019)

12.56% of Oceana County is agriculture.

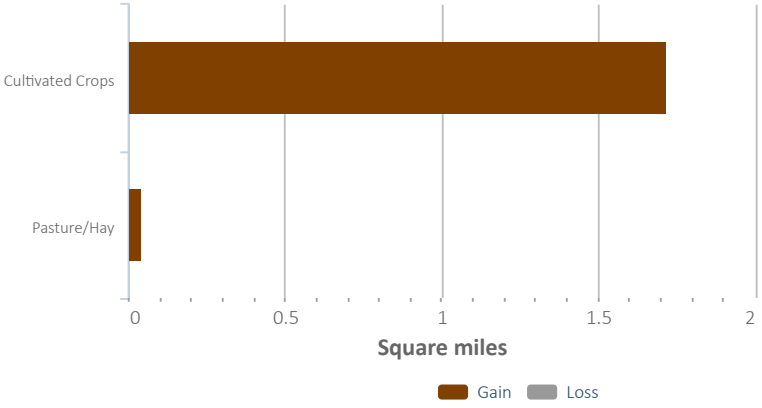
NLCD Agriculture classes include land used for production of annual crops as well as areas intensively managed for livestock production. Agricultural areas are managed in in a variety of ways including tillage, fertilization, and other man-made interventions that make the area more productive than it would be naturally.



Agriculture Change

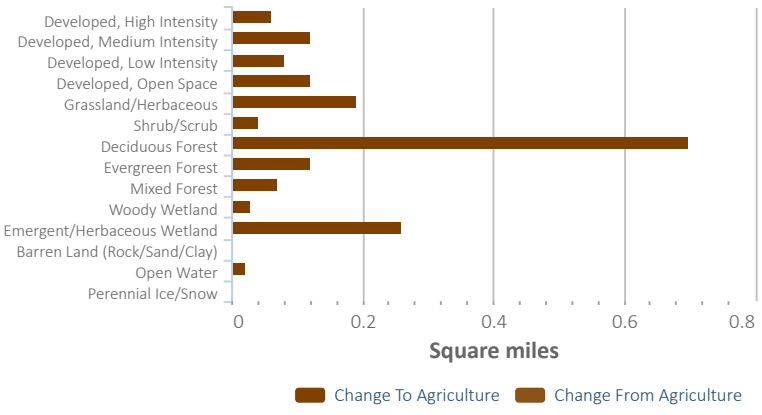
1.76 square miles of agriculture were between 2001 and 2019.

Agricultural lands can have a high impact on surrounding areas. This can be for a variety of reasons including runoff, pesticide application, fertilizer application, etc. This can also show conversion of natural areas to more highly managed areas which relate to overall increases for local impacts. This can also include areas of hay pasture, which generally have lower impacts on the landscape, to higher production cultivated crops. Decreasing agricultural land can show habitat restoration, increased urbanization, decreasing water availability, and a host of other factors important for resource managers and local communities.



What Is Changing

As agricultural lands increase or decrease, a variety of impacts can happen. Increasing agricultural lands can sometimes identify increased water usage as well as loss of natural habitat. Decreasing agricultural lands can highlight droughts, long-term water shortages, habitat restoration, etc. etc. Understanding how these changes are occurring and to what extent help to identify usage and potential risks for producers and the community.



Digging Deeper

Understanding how your County's land cover has changed over the years is an excellent way to document trends, understand the effects of past land use decisions, and consider future land use planning needs. This report, which covers 2001 and 2019, provides a solid foundation.

Communities adding additional data and analysis are able to generate findings designed to meet their specific needs. There are additional tools developed by NOAA's Digital Coast. This provides data and information useful for this purpose in coastal areas. Visit the website at coast.noaa.gov/digitalcoast. Some examples are listed below.

Land Cover Resources

Interested in more information related to land cover, or in taking this analysis one step further? Start with the following tools that use land cover to analyze specific issues.

- **Nonpoint - Source Pollution and Erosion Comparison Tool -** Investigates potential water quality impacts from development, and other change. coast.noaa.gov/nspect
- **Coastal County Snapshots**- Provides local officials with easy-to-understand graphics and analysis that cover a county's demographics, infrastructure, and environment. https://coast.noaa.gov/snapshots
- **Sea Level Rise Impacts Viewer**- Displays maps of potential impacts of sea level rise along the coast and provides related information and data for community officials. https://coast.noaa.gov/slr
- **Coastal Flood Exposure Mapper**- Supports communities that are assessing their coastal hazard risks and vulnerabilities. The tool creates a collection of user-defined maps that show the people, places, and natural resources exposed to coastal flooding. https://coast.noaa.gov/floodexposure

About the Source Data

The data seen in the map below was derived through the MRLC(Multi Resolution Land characteristics Consortium). The MRLC produces the National Landcover Database (NLCD), a nationally standardized land cover and land change information product for the United States. Multiple dates of satellite imagery are used to document changes in various types of land cover.

- **Notes and Limitations** While efforts have been made to ensure that data are accurate and reliable within the limits of current technology, NLCD data sets were made for analysis at a regional and national scale. These data are intended for use in identifying regional landscape patterns and major functional habitats. NLCD is a national and regional data set that should be used only as a screening tool for very local or site-specific management decisions. Small features and changes should be verified with a higher resolution data source. Additional resources on accuracy and methodology can be found on the MRLC publications page Publications | Multi-Resolution Land Characteristics (MRLC) Consortium (https://www.mrlc.gov/publications)

Appendix D:
HAZARD MITIGATION PLAN UPDATE SURVEY

Survey Distribution Letter:

This letter was mailed in Spring of 2022 to local units of government, elected officials, county departments, and other stakeholders in Oceana County.

WEST MI SHORELINE
Regional Development Commission

Community Hazards Survey Available

The West Michigan Shoreline Regional Development Commission (WMSRDC), in partnership with local emergency management leaders, is working to update Hazard Mitigation plans for the West Michigan counties of Lake, Mason, and Oceana.

Hazard mitigation is any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. Mitigation planning breaks the cycle of disaster damage, reconstruction, and repeated damage. Hazard mitigation includes long-term solutions that reduce the impact of disasters in the future. Once Hazard Mitigation plans are approved by FEMA and adopted locally, communities become eligible to apply for pre-disaster and post-disaster mitigation funding.

Public input is essential to identifying and planning for local hazards. An online survey has been created to collect comments from community members, leaders, and stakeholders and is available at:
https://app.surveymethods.com/EndUser.aspx?E1C5A9B6E3A0B2BAE4.

The survey may also be accessed through the WMSRDC website:
https://wmsrdc.org/project/hazard-mitigation-plan-updates/

The survey will be open through the summer, though participants are encouraged to complete the survey as soon as possible. In addition, public hearings will be held in Lake, Mason, and Oceana counties to provide additional opportunities for public input later in 2022. Once dates are identified, public notices will be published in local newspapers and noted on social media and the WMSRDC website.

For additional information please visit wmsrdc.org or contact Stephen Carlson at scarlson@wmsrdc.org.

316 Morris Avenue, Suite 340, Muskegon, MI 49440
Telephone: (231) 722-7878 / www.wmsrdc.org

Press Release:

Oceana County Emergency Management distributed this press release to local media, and it was posted on the WMSRDC Facebook page.

FOR IMMEDIATE RELEASE

WEST MI SHORELINE
Regional Development Commission

Community Hazards Survey Available

June 8, 2022

The West Michigan Shoreline Regional Development Commission (WMSRDC), in partnership with local emergency management leaders, is working to update Hazard Mitigation plans for the West Michigan counties of Lake, Mason, and Oceana.

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In addition, public hearings will be held in Lake, Mason, and Oceana counties to provide additional opportunities for public input later in 2022. Once dates are identified, public notices will be published in local newspapers and noted on social media and the WMSRDC website.

For additional information please go to https://wmsrdc.org/project/hazard-mitigation-plan-updates/.

###

Online Survey Form:

Community Hazards Survey

1. **Select a county for the purpose of this survey.**
   - ❍ Lake County
   - ❍ Mason County
   - ❍ Oceana County
   - ❍ All three counties (regional perspective)
   - ❍ If other, please specify

     _____

2. **In what city, village, or township of this area do you primarily live, own land, or serve?**

   _____

   _____

   _____

   _____

3. **Select all that apply to you.**
   - ❑ Local official (elected or appointed)
   - ❑ Public employee
   - ❑ Local resident
   - ❑ Land owner
   - ❑ If other, please specify

     _____

Page 2 - Land Use

4. **Land use planning is often cited as a primary tool for reducing or preventing property damage and loss of life. Does your community have a master plan?**
   - ❍ Yes
   - ❍ No
   - ❍ I don't know

5. **If possible, please share the date the master plan was adopted.**

   _____

   _____

   _____

   _____

6. **Does your community have a zoning ordinance?**
   - ❍ Yes
   - ❍ No
   - ❍ I don't know

7. **Describe any significant land use changes you have observed over the <u>past 10</u> years in your area.**

   _____

   _____

   _____

   _____

8. **Describe any significant land use changes you anticipate to happen over the <u>next 10</u> years in your area.**

   _____

   _____

   _____

   _____

9. **Rate your level of concern for changes in weather patterns to impact your community.**
   - ❍ Very concerned
   - ❍ Somewhat concerned
   - ❍ Neutral
   - ❍ Not concerned

   Additional Comments

10. **Rate your level of concern regarding the condition of infrastructure in your community. (roads, bridges, culverts, water/sewer, utilities, etc)**

- ❍ Very concerned
- ❍ Somewhat concerned
- ❍ Neutral
- ❍ Not concerned

Additional Comments

_____

_____

11. **What hazards do you feel pose the greatest threat to <u>people</u> in your area. (select up to 5)**

- ❑ Civil Disturbance
- ❑ Dam Failure
- ❑ Drought
- ❑ Erosion
- ❑ Extreme Temperatures
- ❑ Great Lakes Shoreline Hazards
- ❑ Hazardous Materials Accident
- ❑ Infrastructure Failure
- ❑ Invasive Species
- ❑ Oil & Gas Well Accident
- ❑ Petroleum and Natural Gas Pipeline Accident
- ❑ Public Health Emergency
- ❑ Riverine/Runoff Flooding
- ❑ Severe Winter Weather (snow, ice, & sleet)
- ❑ Structural Fire
- ❑ Sustained Wind Events
- ❑ Terrorism and Criminal Activity
- ❑ Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)
- ❑ Wildfire
- ❑ If other, please specify

_____

12. **What hazards do you feel pose the greatest threat to <u>property</u> in your area. (select up to 5)**

- ❑ Civil Disturbance
- ❑ Dam Failure
- ❑ Drought
- ❑ Erosion
- ❑ Extreme Temperatures
- ❑ Great Lakes Shoreline Hazards
- ❑ Hazardous Materials Accident
- ❑ Infrastructure Failure
- ❑ Invasive Species
- ❑ Oil & Gas Well Accident
- ❑ Petroleum and Natural Gas Pipeline Accident
- ❑ Public Health Emergency
- ❑ Riverine/Runoff Flooding
- ❑ Severe Winter Weather (snow, ice, & sleet)
- ❑ Structural Fire
- ❑ Sustained Wind Events
- ❑ Terrorism and Criminal Activity
- ❑ Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)
- ❑ Wildfire
- ❑ If other, please specify

_____

13. **What hazards do you feel pose the greatest threat to the economy in your area.**

- ❑ Civil Disturbance
- ❑ Dam Failure
- ❑ Drought
- ❑ Erosion
- ❑ Extreme Temperatures
- ❑ Great Lakes Shoreline Hazards
- ❑ Hazardous Materials Accident
- ❑ Infrastructure Failure
- ❑ Invasive Species
- ❑ Oil & Gas Well Accident
- ❑ Petroleum and Natural Gas Pipeline Accident
- ❑ Public Health Emergency
- ❑ Riverine/Runoff Flooding
- ❑ Severe Winter Weather (snow, ice, & sleet)
- ❑ Structural Fire
- ❑ Sustained Wind Events
- ❑ Terrorism and Criminal Activity
- ❑ Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)
- ❑ Wildfire
- ❑ If other, please specify

_____

14. **Are there any areas in your community that are frequently affected by hazards? Please describe the location(s) and hazard(s). This information will be helpful for identifying potential mitigation projects.**

_____

_____

_____

_____

15. **Note your concerns for hazards or complicating factors that may compromise the safety of people and property in your community.**

_____

_____

_____

_____

16. **Enter your email address to receive notification of future opportunities to provide input and to be notified when the draft hazard mitigation plan is available for public review and comment. (This step is optional)**

_____

Summary of Survey Results:

Hazard Mitigation Survey Results
Oceana County

SURVEYS COMPLETED BY OCEANA COUNTY				
City/village/township where you primarily live, own land or serve	**Local official (elected or appointed)**	**Public employee**	**Local resident**	**Land owner**
Leavitt Township	1		1	1
Village of Shelby	1		2	1
Village of Pentwater	6	2	6	6
New Era	2		3	
Claybanks Township	1			
Mears	1			
Benona Township	1		1	
Elbridge	1			1
Logan	1		1	
Walkerville		1	1	
City of Hart	1		1	
Weare Township		1	1	1
Newfield Township				1

DOES YOUR COMMUNITY HAVE A MASTER PLAN?			
City/village/township where you primarily live, own land or serve	**Yes**	**No**	**I Don't Know**
Leavitt Township		1	
Village of Shelby	1		1
Village of Pentwater	3	3	1
New Era	2		2
Claybanks Township	1		
Mears	1		
Benona Township	1		
Elbridge	1	1	
Logan	1		
Walkerville	1		
City of Hart	1		
Weare Township	1		
Newfield Township			1

Hazard Mitigation Survey Results
Oceana County

DOES YOUR COMMUNITY HAVE A ZONING ORDINANCE?			
City/village/township where you primarily live, own land or serve	**Yes**	**No**	**I don't know**
Leavitt Township		1	
Village of Shelby	2		
Village of Pentwater	7		
New Era	2		2
Claybanks Township	1		
Mears	1		
Benona Township	1		
Elbridge	1	1	
Logan	1		
Walkerville	1		
City of Hart	1		
Weare Township	1		
Newfield Township	1		

- OBSERVED Significant land use changes in the PAST 10 years:
  - More run down mobile homes. No blight
  - Fewer stick built homes. More manufactured housing
  - Marijuana industry facilities
  - Fewer small farms or locally grown food
  - Growth in CAFOs, especially hogs
  - Monoculture farming – corn
  - Exploration for natural gas - fracking
  - Our Industrial Park is at full capacity and Village annexation may be required to find adequate space for business development and growth.
  - We also need to pursue annexation or an Intergovernmental Agreement in order to make suitable land and space available for mor single family and multi-family housing and to deliver services such as fire, police, water, and sewer.
  - Continual building in the Township especially in the areas near Pentwater Lake and Lake Michigan. Efforts to improve park areas within the township.
  - The intersection of M-20 and Oceana Drive will have a gas station and a large corporate office by the end of this year.
  - More housing on agricultural ground
  - Increased resort accommodations
  - Renter rules
  - More people moving in
  - Pig farms
  - In the Shelby area, there is a new housing development that is going up. Unfortunately, the downtown business situation is grim.

Hazard Mitigation Survey Results
Oceana County

- ANTICIPATED significant land use changed in the NEXT 10 years:
  - More identification of PFAS in area
  - Issues with water supply as aquifers are overused by industrial farming.
  - WISH LIST: Small farmers growing and selling local foods.
  - WISH LIST: Mobile homes replaced by "tiny homes"
  - Annexation of property now zoned as agricultural or residential in Shelby Township by the Village of Shelby in order to ensure that land is available for more housing and commercial/industrial growth and development.
  - Proposal to complete the Pentwater Hart Trail should occur in the next 3 years. Continued building in outlying areas and in areas where businesses have closed and land is available for alternate uses.
  - In Shelby Township there will likely be a housing development and a new township park. The new Brownfield Authority will provide potential opportunities.
  - Continued increase in resort attractions.
  - Changing building lot sizes to 10 acres
  - Windmills
  - Anticipating a significant amount of housing taking up land that was once used for farming.
  - Increase in housing development and additional commercial property.
  - Anticipate expanded housing projects within the Township.
  - Continued expansion into the township and along the shoreline.
  - Continued building in the Township. Perhaps additional building along Lake Michigan. With the Village – several properties will be developed.
  - Vacant and forestry land lost to agricultural and housing.
  - In lakeshore communities I see the rental property trend continuing, leaving an even greater increase in lack of affordable housing for young families and retirees.

Hazard Mitigation Survey Results
Oceana County

RATE YOUR LEVEL OF CONCERN FOR CHANGES IN WEATHER PATTERNS TO IMPACT YOUR COMMUNITY:	Very Concerned	Somewhat Concerned	Not Concerned	Neutral
Comments about the level of concern for changes in weather patterns that will impact your community:	5	4	6	9

- These changes are real and happening worldwide but so many have made the climate change discussion political that little real progress is being made in dealing with the issue.
- Water levels in Pentwater Lake, etwater Channel, the Marsh and rivers and in Lake Michigan.
- Dramatic weather changes – more severe weather events.
- Precipitation is near freezing point rather than colder.

RATE YOUR LEVEL OF CONCERN REGARDING THE CONDITION OF INFRASTRUCTURE AND PUBLIC FACILITIES IN YOUR COMMUNITY (roads, bridges, culverts, dams, water/sewer, utilities, etc.):	Very Concerned	Somewhat Concerned	Not Concerned	Neutral
Comments about the level of concern regarding the condition of infrastructure and public facilities in your community	12	10	1	1

- Even a small drainage waterway is too expensive for repair, according to road commission. Two bridges in the area seem to be closed permanently for no reason other than funding. Impact on the lives of residents is ignored. Municipalities without the ability to fund water/sewer for their area are left out of monies for housing projects.
- We have a number of outdated roads. The culverts are not maintained to an adequate level due to the lack of funding in the Drain Commissioner's office. The dams are also past their expected life and need to be replaced or removed. We are getting TruStream in our county as we speak which will be very positive. Although, unfortunately, that doesn't cover all areas.
- Roads are the largest concern. Failure to use tax money in a responsible manner is a secondary related concern.
- There has been progress made but there is still aged infrastructure especially in the more rural areas.
- The roads in the Walkerville townships are in desperate need of attention.
- Growing communities address their infrastructure. The City of Hart is probably one of the few communities that have continued to address their infrastructure. The townships have done a very poor job being progressive about infrastructure improvement. Water, sewer, electric, high speed internet, roads are critical in the progress of a community.

Hazard Mitigation Survey Results
Oceana County

Your opinion on hazards and the threats they pose. Of the hazards listed, which do you feel pose the great threat in your area to:	PEOPLE
Severe Winter Weather (snow, ice & sleet)	14
Public Health Emergency	10
Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)	10
Great Lakes Shoreline Hazards	8
Sustained Wind Events	8
Civil Disturbance	6
Terrorism and Criminal Activity	5
Invasive Species	4
Hazardous Materials Accident	4
Wildfire	4
Erosion	3
Infrastructure Failure	2
Petroleum and Natural Gas Pipeline Accident	1
Oil & Gas Well Accident	1
Structural Fire	1
Specify – Drug Usage	1

Your opinion on hazards and the threats they pose. Of the hazards listed, which do you feel pose the great threat in your area to:	PROPERTY
Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)	12
Severe Winter Weather (snow, ice & sleet)	10
Erosion	9
Great Lakes Shoreline Hazards	8
Invasive Species	6
Sustained Wind Events	6
Wildfire	5
Drought	4
Infrastructure Failure	4
Civil Disturbance	3
Structural Fire	3
Terrorism and Criminal Activity	3
Hazardous Materials Accident	2
Oil & Gas Well Accident	2
Extreme Temperatures	1

Petroleum and Natural Gas Pipeline Accident	1
Public Health Emergency	1
Your opinion on hazards and the threats they pose. Of the hazards listed, which do you feel pose the great threat in your area to:	ECONOMY
Public Health Emergency	8
Great Lakes Shoreline Hazards	8
Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)	7
Severe Winter Weather (snow, ice & sleet)	6
Sustained Wind Events	6
Drought	5
Hazardous Materials Accident	5
Infrastructure Failure	5
Civil Disturbance	4
Erosion	4
Extreme Temperatures	3
Wildfire	3
Invasive Species	2
Terrorism and Criminal Activity	2

- Areas in your community that are frequently affected by hazards?
  - High poverty areas are at risk with populations not educated in potential hazards and with the lack of preparation at the local level. Fire Departments in rural areas are struggling to keep members because of the amount of training required. Rural firefighters must complete same training as large urban areas. Does it make sense that small, rural departments are required to be trained in high rise fires events? NO.
  - Windstorms and thunderstorm hazards pose the greatest threat to crops in Oceana County. Anywhere in the County,
  - Shoreline along Lake Michigan. Shoreline of Pentwater Lake Straight-line winds in the area.
  - If the water levels rise again, flooding can be a significant problem.
  - Lake Michigan shoreline erosion
  - summer wind storm or winter snow storms are most common hazard.
  - Lakeshore erosion
  - Farms with hazardous chemicals

- Note your concerns for hazards or complicating factors that might compromise the safety of people and property in your community.
  - Lack of planning and support at County level. Lack of collaboration with services, education, training. Lack of support from state and federal government to rural areas.
  - Windstorms and thunderstorm hazards pose the greatest threat to crops in Oceana County. Anywhere in the County,
  - The fire department is small and volunteers respond to fires. Township does not have its own DPW or police department. It takes time for emergency people to respond to any type of incident.
  - Drug usage, particularly meth, is a particular concern of mine. I know of two homes that were broken into by someone high on meth not to steal or do any personal harm, I presume, but simply because they were high. Even though their intentions are likely not to hurt anyone, they still have the capability to hurt or kill someone and do significant property damage.
  - Any disaster could effect the community
  - power outage for at risk/elderly or limited access in or out during storms and clean up
  - Lack of funding and staffing of local EMS
  - Chemical cloud
  - Mostly from the government
  - Not sure how this fits with this topic but soil quality is a concern. Again, low or high water levels are a concern.

Appendix E:
ACKNOWLEDGMENTS & DOCUMENTATION

Oceana County LEPC
2023 MEMBERSHIP ROSTER

Name	Group Representing
Troy Maloney	Emergency Management - EM
Jim Colman	Michigan State Police-Post Commander
Tracy Byard	County Administrator
David Nobles	Oceana Co. CERT / MRC
Craig Mast	Sheriff's Office - Sheriff
David Robertson	RACES / AUXCOMM
Brad Fritcher	Co. Fire Rep.
Mike Schiller	City of Hart - Hydo Superintendent
Juan Salazar	Local Law Enforcement
Dan Yost	Co. Fire Rep.
Mark Timmer	Oceana County Road Commission
John Cavanagh	Print Media
Robert Simonson	Broadcast Media
Jeff Stockhill	Life EMS Ambulance Service
Michelle Martin	Oceana County Drain Commissioner
Ray Hasil	Mason-Oceana 911 Director
Todd Goodrich	Michigan State Police - Community Trooper
Bret Haner	District #10 Health Department - EP
Ray Cole	Michigan DNR - Fire Officer
William "Luke" Aurner	Region 6 Healthcare Coalition
Lynda Herremans	Oceana Co. Soil Conservation District
Danielle Roberts	Oceana County Medical Care Facility - EC
Linda Doerr	DHHS - Family Services
Jeffrey Nawrot	American Red Cross Rep.
Lt. Orville Theaker	MSP/EMHSD
Robert Walker	County Board of Commissioners - Board Chairperson
Zack Vanderwall	West Michigan Community Mental Health
Connie Fergson	Gray & Company
Dave Wierzbicki	EGLE

PARTICIPATING LOCAL OFFICIALS

Jurisdiction	Name/Title	Method of Participation/Date(s)
Benona Twp	Mr. Flemming, Supervisor N/A (elected or appointed official)	Email 10/23/23 Survey response 7/18/22
Claybanks Twp	Mr. Lombard, Supervisor	Survey response 6/22/22
Colfax Twp	Mr. Leonard, Supervisor	Phone interview 11/6/23
Crystal Twp	Mr. Hyslop, Supervisor	Email 11/6/23
Elbridge Twp	Ms. Van Sickle, Clerk	Email 10/24/23 Survey response 7/26/22
Ferry Twp	Mr. Schmieding, Supervisor	Phone interview 10/26/23
Golden Twp	Rachel Iteen, Clerk N/A (elected or appointed official)	Emails 10/25/23 Survey response 6/22/22
Grant Twp	Mr. Schmidt, Supervisor	Phone interview 11/2/23
Greenwood Twp	Mr. Hunt, Supervisor	Phone interview 11/8/23
Hart City	Mr. Splane, City Manager N/A (elected or appointed official)	Phone interview 10/25/23 Survey response 8/24/22
Hart Twp	Mr. McGhan, Supervisor	Phone interview 10/26/23
Hesperia Village		
Leavitt Twp	Ms. Kerwin, Supervisor N/A (elected or appointed official)	Phone interview 10/6/23 Survey response 6/10/22
New Era Village	Mr. Fessenden, President N/A (elected or appointed official)	Phone interview 11/8/23 Survey response 8/22/22
Newfield Twp	Ms. David, Supervisor	Phone interview 11/15/23
Otto Twp	Mr. Brimmer, Supervisor	Email 11/07/23
Pentwater Village	N/A (elected or appointed official)	Survey response 8/11/22
Pentwater Twp	Ms. Cavazos, Supervisor	Phone interview, Emails 10/25/23 Survey response 8/27/22
Rothbury Village	Ms. Williams, Clerk	Phone interview, 10/16/23
Shelby Village	Mr. Selner, Village Manager Mr. Inglis, Village President	Phone interview 10/18/23 Survey response 6/11/22
Shelby Twp	Mr. Raffaelli, Supervisor	Phone interview 8/28/23, Emails
Walkerville Village	Mr. Metts, President	Phone interview 11/17/23
Weare Twp	Mr. Doran, Supervisor	Phone interview 11/9/23

MEETINGS

Meetings attended for the purpose of updating the Oceana County Hazard Mitigation Plan; including lists of attendees and synopses of relevant comments and discussion.

August 24, 2021: Oceana County LEPC Meeting

Attendees:

JAMES C. DURAM	OCEANA COUNTY EMERGENCY MANAGEMENT – EMERGENCY MANAGER
ROBERT WALKER	OCEANA COUNTY BOARD OF COMMISSIONERS – CHAIR
DAVID NOBLES	OCEANA COUNTY CERT/MRC – COORDINATOR
ZACK VANDERWALL	WEST MICHIGAN COMMUNITY MENTAL HEALTH
ORVILLE THEAKER	MSP/EMHSD
ARLENE KOLBE	MERCY HEALTH PARTNERS LAKESHORE CAMPUS - INFECTION CONTROL
BRANDI WALDMAN	SENIOR RESOURCES
LOGAN LEAVITT	AMERICAN RED CROSS
MATT BOYLES	ARBRE FARMS
STEPHEN CARLSON	WMSRDC
CRAIG MAST	OCEANA COUNTY SHERIFF

Synopsis:

Introduction of Hazard Mitigation planning and a presentation of the anticipated planning process. Also discussed establishment of the Hazard Mitigation Advisory Team.

APRIL 24, 2021: Oceana County LEPC Meeting

Attendees:

SIGN-IN SHEET

OCEANA COUNTY LEPC MEETING

Date: 04/26/2022 Time: 11:00 A.M.

Location: Oceana County Services Building – Classroom

	NAME	AGENCY	E-MAIL
1	David A. Nobles	Oceana MRC/CERT	Sailor 616@ msn.com
2	Brad Fritcher	FTFD / Oceana Fire Depts.	fritcherbr@oceanashertwp
3	Orville Theaker	MSP EMHSD	
4	Troy Maloney	OCEANA CO EM	tmaloney@oceana.mi.us
5	Bob Walke	" "	
6	Connie Ferguson	Gray & Company	cferguson@senecafoods.com
7	Danielle Roberts	OCMCF	danellr@oceanamcf.org
8	Eric Strait	OCMCF	erics@oceanamcf.org
9	Lianna Doerr	DHHS	doerrL@michigan.gov
10	Jim Hellema	Life EMS	Jhellema@lifeems.com
11	Arlene Kolbe	Shelby Hospital	
12	Lynda Herreman	Oceana C.D	lynda.herremans@macd.org
13	Stephen Carlson	WMSRDC	scarlson@wmsrdc.org
14	Craig Mast	Sheriff	MastC@oceanasheriff.org
15	DAVid Robertson	ARES/AUXCOMM	drobertson1950@gmail.com

Synopsis:

Facilitated discussion regarding frequent community hazards, land use trends, and other hazards/concerning. Also reviewed opportunities for public input and the plan update timeline.

August 23, 2022: Oceana County LEPC Meeting & Public Input Opportunity

Attendees:

TROY MALONEY	OCEANA COUNTY EM
CRAIG MAST	OCEANA COUNTY SHERIFF
TODD GOODRIDT	MSP
STEVE WALTZ	SHELBY PD
BETTY CARTER	FAMILY COURT
JEN SILL	FAMILY COURT
BRAD LAMBRIX	PROBATE JUDGE
ARLENE KOLBE	LAKESHOR HOSPITAL
DANIELLE ROBERTS	OCMCF
LIANNA DOERR	DHHS
ROBERT WALKER	OCEANA COUNTY BOARD OF COMMISSIONERS
ZACH VANDERWALL	WM COMMUNITY MENTAL HEALTH
STEPHEN CARLSON	WMSRC
ERIC STRAIT	OCMCF
RAY HASIL	MASON-OCEANA 911
CONNIE FERGSON	GRAY & COMPANY
DAVE WIERZBICKI	EGLE
DAVID NOBLES	OCEANA COUNTY CERT
JUAN SALAZAR	HART PD
LYNDA HERREMANNS	OCEANA CONSERVATION DISTRICT
RYAN SCHILLER	OCEANA COUNTY SO
JIM HARREMA	LIFE EMS
GARY MCKEEN	OCEANA PLANNING COMMISSION
RON CHRISTIANS	OCEANA COUNTY BOARD OF COMMISSIONERS

Synopsis:

An advertised opportunity for public input and engagement. Communications regarding this opportunity also promoted the Community Hazards online survey. No members of the public were in attendance. Discussion included the following topics:

- summary of hazard mitigation "what" and "why"
- review of survey results, to-date
- review of hazard rating and ranking system
- discussion of community locations/areas that experience natural hazards
- vulnerable populations

August 24, 2021: Oceana County LEPC Meeting

Attendees:

TROY MALONEY	OCEANA COUNTY EMERGENCY MANAGEMENT – EMERGENCY MANAGER
ARLENE KOLBE	LAKESHORE HOSPITAL
LIANNA DOERR	DHHS
STEPHEN CARLSON	WMSRDC
CONNIE FERGUSON	GRAY & COMPANY
LYNDA HERREMANS	OCEANA CONSERVATION DISTRICT
JIM HARREMA	LIFE EMS
MICHELLE MARTIN	OCEANA COUNTY DRAIN COMMISSION
BRET HANER	DISTRICT HEALTH DISTRICT #10

Synopsis:

Review and discussion of updated hazard ratings and rankings.

April 25, 2023: Oceana County LEPC Meeting

Attendees:

TROY MALONEY	OCEANA COUNTY EM
DANIELLE ROBERTS	OCEANA COUNTY MEDICL CARE FACILITY
LIANNA DOERR	DHHS
JIM HARREMA	LIFE EMS
LINDA HERREMANS	OCEANA COUNTY CONSERVATION DISTRICT
BRET HANER	DISTRICT HEALTH DISTRICT #10
RYAN SCHILLER	OCEANA COUNTY SHERIFF'S OFFICE
DAVID NOBLES	OCEANA COUNTY CERT/MRC/AUXCOMM
DAVID ROBERTSON	OCEANA COUNTY AUXCOMM
RAY HASIL	MASON-OCEANA 911
DIRK WILSON	GRAY & COMPANY
STEPHEN CARLSON	WMSRDC
ZACK VANDERWALL	WM COMMUNITY MENTAL HEALTH

Synopsis:

Review and discussion of updated hazard ratings and rankings.

July 25, 2023: Oceana County LEPC Meeting

Attendees:

TROY MALONEY	OCEANA COUNTY EM
JIM HARREMA	LIFE EMS
STEPHEN CARLSON	WMSRDC

Synopsis:

Due to a miscommunication, the regularly scheduled LEPC meeting was not well attended. Regardless, those in attendance held a productive conversation regarding hazards and potential mitigation actions.

September 28, 2023: Oceana County Board of Commissioners Meeting & Public Comment Opportunity

Attendees:

TROY MALONEY	OCEANA COUNTY EMERGENCY MANAGEMENT
STEPHEN CARLSON	WMSRDC
TRACY BYARD	OCEANA COUNTY ADINISTRATOR
ROBERT WALKER	OCEANA COUNTY COMMISSIONER, BOARD OF COMMISSIONERS CHAIRPERSON
PHIL MORSE	OCEANA COUNTY COMMISSIONER
PAUL ERICKSON	OCEANA COUNTY COMMISSIONER
CRAIG HARDY	OCEANA COUNTY COMMISSIONER
TIM BEGGS	OCEANA COUNTY COMMISSIONER

Synopsis:

An advertised opportunity for public input and engagement. No members of the public were in attendance. Communications to promote this opportunity invited review and comment of draft sections of this plan that were posted to the WMSRDC website https://wmsrdc.org/program/hazard-mitigation/. WMSRDC staff provided the Oceana County Board of Commissioners with information regarding the hazard mitigation plan and held a useful conversation about mitigating hazards in Oceana County.

RESOURCES

Many resources, documents, and websites were researched and referenced during the development of this plan. The following were most helpful during this process:

Michigan Hazard Mitigation Plan (2019)

Michigan Hazard Analysis (2019) and Supplemental (2020)

Michigan Historical Markers https://www.michigan.gov/mhc/historical-markers

Michigan Department of Environment Great Lakes and Energy (EGLE) (water/wastewater, GIS data)

Michigan Department of Natural Resources https://www.michigan.gov/invasives

Michigan GIS Open Data https://gis-michigan.opendata.arcgis.com/

Michigan Transportation Asset Management Council
https://www.mcgi.state.mi.us/mitrp/tamcDashboards/reports/pavement

National Register of historic places https://www.nps.gov/subjects/nationalregister/index.htm

US Census: American Community Survey & Decennial Census

US Drought Monitor https://droughtmonitor.unl.edu/

NOAA National Centers for Environmental Information (NCEI a.k.a. NCDC) Storm Events Database

National Weather Service – Beach Hazards https://www.weather.gov/greatlakes/beachhazards_stats

NFIP Community Status Book https://www.fema.gov/flood-insurance/work-with-nfip/community-status-book

NFIP Policy Information https://nfipservices.floodsmart.gov/reports-flood-insurance-data

FEMA Comprehensive Economic Development Strategy and Hazard Mitigation Plan Alignment Guide

US Department of Agriculture Census of Agriculture County Profile (2017)

NFIP Flood Insurance Rate Maps

USGS topographic maps

USDA Oceana County Soil Survey (1996)

Climate and Economic Justice Screening Tool https://screeningtool.geoplatform.gov/en/

American Red Cross (shelters)

National Inventory of Dams https://nid.sec.usace.army.mil/#/

Multi-Resolution Land Characteristics Consortium Land Cover Data Sheet www.mrlc.gov/data

Michigan Fire Inspectors Society Foundation

United Way of Michigan (ALICE statistics)

Michigan Sea Grant https://www.michiganseagrant.org/

Oceana County Master Plan (2023 update draft)

Oceana County Hazard Analysis (2000)

Oceana County Community Wildfire Protection Plan (2014)

Oceana County Equalization Report (2022)

Ludington Area Shoreline Land Use and Resiliency Plan (2020)

MLive (news) https://www.mlive.com/

WZZM 13 (news) https://www.wzzm13.com/

Shoreline Media (news) www.shorelinemedia.net

ARTICLES & PUBLIC NOTICES

Articles and public notices published during the Oceana County Hazard Mitigation Plan Update planning process.

June / July 2021 – WMSRDC print newsletter

LOCAL GOVERNMENT AND SPECIAL PROJECTS

Hazard Mitigation Grant Awarded

According to the Federal Emergency Management Agency (FEMA), hazard mitigation is any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. Mitigation planning breaks the cycle of disaster damage, reconstruction, and repeated damage.

WMSRDC has experience working with local communities on hazard mitigation dating back to the early 2000's. This planning tradition is set to continue, thanks to a grant from FEMA accepted by WMSRDC in June. Over the next two years, WMSRDC will work within the counties of Lake, Mason, and Oceana to update existing county-wide hazard mitigation plans. Each county will be armed with an advisory team to help guide the process by helping to identify and assess hazards and prioritize potential mitigation measures.

This effort will help communities within Lake, Mason and Oceana mitigate hazards (including natural, man-made, and other hazards) by identifying potential hazards and mitigation strategies, as well as help communities be eligible to access various sources of federal assistance, such as the Building Resilient Infrastructure and Communities (BRIC) program.

The WMSRDC office is open. Staff is currently working a hybrid of in-person and remotely.

Coastal Zone Reforestation Grant Closes Successfully

Thanks to a Great Lakes Restoration Initiative (GLRI) grant through the United States Forest Service (USFS), WMSRDC has facilitated the planting of over 290 trees and 4,300 tree seedlings. This will allow for the interception of up to 286,622 gallons of runoff annually. That is more than twice the obligation of the grant requirement.

Stormwater reduction is an important ecological service that trees provide but one that is seldom considered. The water those trees absorb does not end up creating flash flows that cause erosion, flooding, or damage to infrastructure, and the presence of trees provide many benefits. The benefits include shade, screening of viewsheds, aesthetic quality, cooling of urban landscapes, pollution mitigation, habitat for wildlife along with the targeted runoff reduction of this grant.

WMSRDC worked with private, state, and municipal partners to meet the region's goal. WMSRDC partnered with five state parks (Ludington, Charles Mears, Silver Lake, Muskegon, and Hoffmaster) as well as, the Muskegon Conservation District and the City of Muskegon to achieve the results. WMSRDC is grateful to the USFS and the GLRI grant program for the opportunity to successfully provide these services.

April / May 2022 – WMSRDC print newsletter

LOCAL GOV'T SERVICES & SPECIAL PROJECTS

Hazard Mitigation Planning Update

Efforts to update the hazard mitigation plans for Lake, Mason, and Oceana counties continue. In March, WMSRDC staff coordinated with each county's emergency manager to send letters to all local units of government. The letters served to notify local units of the plan updates over the next 12 to 16 months and to seek their participation in the process.

The plans will enable counties, and local municipalities that participate in the planning process, to apply for funding to lessen or prevent the effects of natural hazards. The Federal Emergency Management Agency (FEMA) requires these plans to be updated every five years.

Feedback from each community within the county is critical to the quality of this effort. Opportunities for input will be made available through the WMSRDC website. Communities that choose to participate will be notified when opportunities arise. There is no cost or obligation associated with participation. However, failure to participate may jeopardize a community's eligibility for hazard mitigation funding or projects in the future.

If your community wishes to participate, and has not yet responded to the aforementioned letter, please appoint a point of contact for your community by sending a name and email address to scarlson@wmsrdc.org. Questions and concerns regarding the hazard mitigation plan updates may also be sent to that address, or directed to your county's emergency manager.

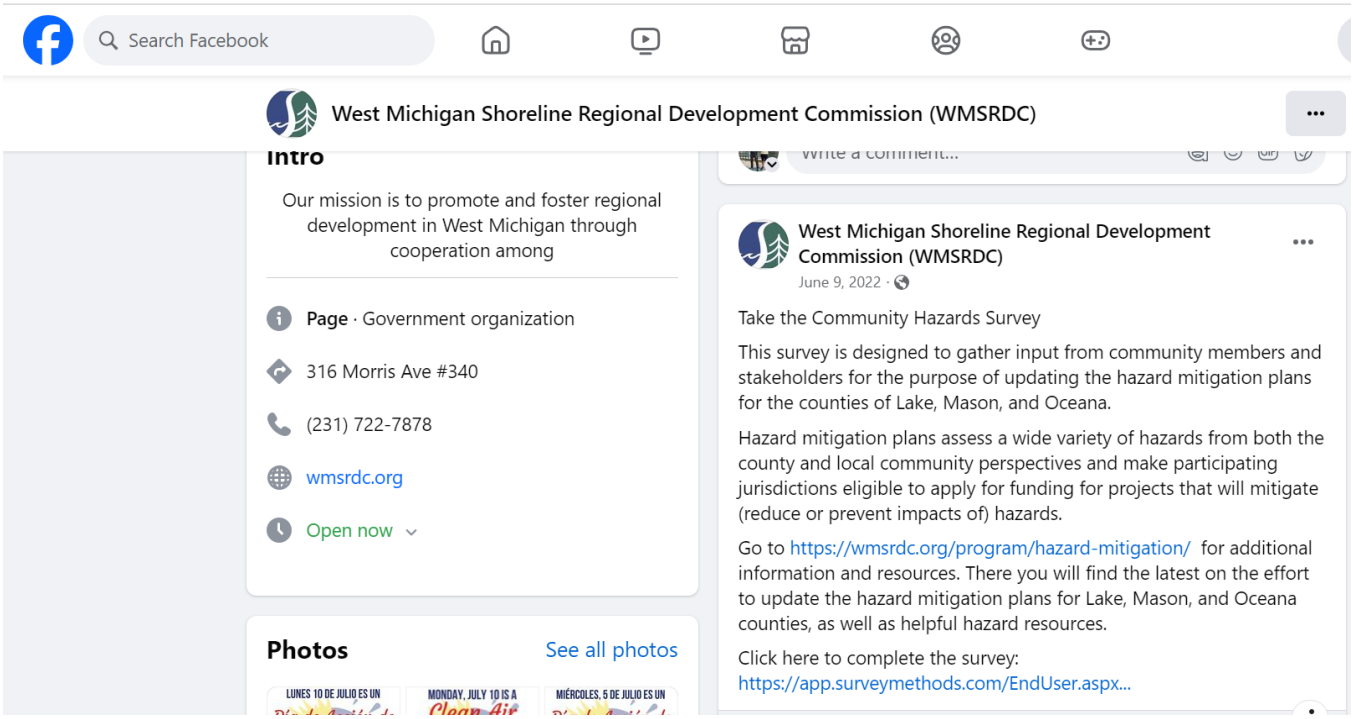
Local Planning Clearinghouse

As a regional planning and development organization, WMSRDC serves a wide variety of roles. One perhaps lesser-known role is to provide a clearinghouse for local planning efforts. In Michigan, local governments that are creating or updating master planning and recreation planning must notify the local regional planning agency when they are engaging in the activity, and they must provide a copy of the plan to the regional planning agency when it is complete. This may be in the form of a paper copy, a digital copy sent via email, or a link to the plan online.

In the coming months, WMSRDC will step up its "clearinghouse game." A project page will appear on the WMSRDC website to provide information about the status of community master and recreation plans within the region, links to those plans (if available), and instructions on how to submit plans to WMSRDC. This public-facing clearinghouse will facilitate awareness for planning and be a resource for communities and interested individuals.

"...a lesser-known role of WMSRDC is to provide a clearinghouse for local planning efforts."

June 2022 – WMSRDC Facebook posting



LOCAL GOV'T SERVICES & SPECIAL PROJECTS

Community Hazards Surveys Available

WMSRDC, in partnership with local emergency management leaders, is working to update hazard mitigation plans for the West Michigan counties of Lake, Mason, and Oceana.

Hazard mitigation is any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. Mitigation planning breaks the cycle of disaster damage, reconstruction, and repeated damage. Hazard mitigation includes long-term solutions that reduce the impact of disasters in the future. Once hazard mitigation plans are approved by the Federal Emergency Management Administration and adopted locally, communities become eligible to apply for pre-disaster and post-disaster mitigation funding.

Public input is essential to identifying and planning for local hazards. An online survey has been created to collect comments from community members, leaders, and stakeholders. The survey may be accessed through the WMSRDC website: https://wmsrdc.org/project/hazard-mitigation-plan-updates/

The survey will be open through the summer, though participants are encouraged to complete the survey as soon as possible. In addition, public hearings will be held in Lake, Mason, and Oceana counties to provide additional opportunities for public input later in 2022. Once dates are identified, public notices will be published in local newspapers and noted on social media and the WMSRDC website.

Erosion at a residence on the Lake Michigan Shoreline in the City of Norton Shores, Muskegon County.

Muskegon River Watershed Tree Plantings

WMSRDC is wrapping up the most recent tree planting grant within the Muskegon River Watershed. A total of 265 trees have been planted in the cities of Muskegon and Roosevelt Park, and the townships of Cedar Creek and Dalton in Muskegon County, as well as the City of Fremont in Newaygo County. The grant is provided by the U.S. Forest Service in partnership with the Muskegon River Watershed Assembly.

Earlier this summer final monitoring of the tree plantings was completed and of the 265 trees planted only 17 did not survive. The trees that did not survive will be replaced later this fall with funds provided by this grant. Native Michigan type trees such as maple, oak, tulip tree, eastern redbud, serviceberry, dogwood, sycamore, arborvitae, linden, river birch and poplars were planted within parks in Muskegon County including Beegle Field, Campbell Field, Marsh Field, Margaret Elliot Drake Park, Padley Park, and Sheldon Field. Trees were also planted at Cedar Creek Township Hall and

See Trees continued on page 7

Public Meeting Notice #1 – Published August 18, 2022

AFFIDAVIT OF PUBLICATION

State of Michigan

In the Matter of Mitigation

COUNTY OF OCEANA ss.

Mike Hrycko being first duly sworn, says that he is the Publisher of Oceana's Herald-Journal, a newspaper published in the English language for the dissemination of local or transmitted news and intelligence of a general character and legal news, which is a duly qualified newspaper, and that annexed hereto is a copy of a certain order taken from said newspaper, in which the order was published on the following dates:

August 18, 2022

Subscribed and sworn to before me this 3rd day of November, 2023.

Michelle J. Piotrowski, Notary Public, Mason County, Michigan
Acting in Oceana County.

My commission expires 12/18, 2026

NOTICE OF PUBLIC HEARING
REGARDING HAZARD MITIGATION

Are you concerned about natural hazards? The West Michigan Shoreline Regional Development Commission (WMSRDC), in cooperation with Oceana County Emergency Management, has begun the process of updating the Oceana County Hazard Mitigation Plan. Public input is requested regarding hazards that pose a threat to people and property in Oceana County. A public hearing to discuss Hazard Mitigation and receive input from community members will take place at 11:00 AM on August 23, 2022 at the County Services Building located at 844 S. Griswold Street, Hart, MI 49420. In addition, an online "Community Hazards Survey" and information about the Hazard Mitigation plan update are available at www.wmsrdc.org. Questions? Please contact Stephen Carlson at scarlson@wmsrdc.org.

April - June 2023 – WMSRDC print newsletter

Economic Development: EDA Projects in the Region

A core component of the WMSRDC economic development program is to provide technical assistance to local communities within the counties of Lake, Mason, Muskegon, Newaygo, and Oceana. This includes helping communities navigate the U.S. Department of Commerce, Economic Development Administration (EDA) grant application process; from vetting ideas, to crafting applications, to accepting and managing grants. Over the past year, WMSRDC assisted numerous communities in applying for and receiving EDA funding assistance. These are the current EDA-funded projects within the WMSRDC region:

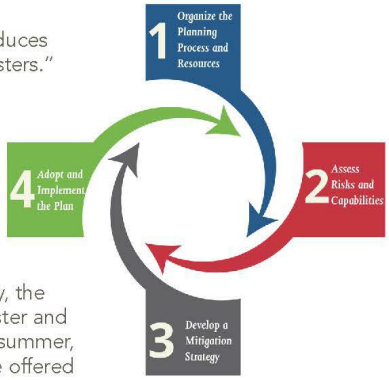
- **City of Muskegon Heights**
  - Industrial Parks Master Plan
- **Oceana County**
  - Workforce & Economic Diversification Study
- **City of Hart**
  - Wastewater System Improvements
- **Lake County**
  - Economic Diversification Initiative

Orchard in Oceana County that will be impacted by the multiple EDA grants currently ongoing in the county

EDA offers many funding opportunities, which may be researched at https://www.eda.gov/funding/funding-opportunities. Please contact WMSRDC early and often to discuss your community's economic development ideas, find the right funding program, and make your application to EDA a success!

Local Government Services: Hazard Mitigation Update

The definition of hazard mitigation is "any sustainable action that reduces or eliminates long-term risk to people and property from future disasters." Mitigation planning seeks to break the cycle of disaster damage, reconstruction, and repeated damage and includes long-term solutions that reduce the impact of disasters in the future.



WMSRDC is currently helping the counties of Lake, Mason, and Oceana update their respective countywide hazard mitigation plans. Each plan and planning process is designed to be "multi-jurisdictional," meaning those local communities participate in the planning process. Once the plan is approved by the Federal Emergency Management Administration (FEMA) and adopted locally, the countywide plan will become eligible to apply to FEMA for pre-disaster and post-disaster hazard mitigation funding. Throughout the spring and summer, communities within the counties of Lake, Mason, and Oceana will be offered opportunities to participate in the hazard mitigation planning process.

In addition, there will be an announced review period near the end of the summer to offer the public an opportunity to review the proposed draft hazard mitigation plans. The plans are anticipated to be completed and adopted by each county before the end of calendar year 2023.

Public Meeting Notice #2 – September 2023

AFFIDAVIT OF PUBLICATION

State of Michigan

In the Matter of Hazard Mitigation Meeting

COUNTY OF OCEANA ss.

Mike Hrycko being first duly sworn, says that he is the Publisher of Oceana's Herald-Journal, a newspaper published in the English language for the dissemination of local or transmitted news and intelligence of a general character and legal news, which is a duly qualified newspaper, and that annexed hereto is a copy of a certain order taken from said newspaper, in which the order was published on the following dates:

September 21, 2023 _____, 2023

_____, 2023 _____, 2023

_____, 2023 _____, 2023

Subscribed and sworn to before me this 21st day of Sept., 2023.

Michelle J. Piotrowski, Notary Public, Mason County, Michigan
Acting in Oceana County.

My commission expires 12/18, 2026

HAZARD MITIGATION PUBLIC MEETING

Public input is requested for the Oceana County Hazard Mitigation Plan, which is being updated by Oceana County Emergency Management with assistance from the West Michigan Shoreline Regional Development Commission (WMSRDC). Draft sections of the plan are available for public review at https://wmsrdc.org/program/hazard-mitigation/overview/. The public is invited to comment on these sections at the Board of Commissioners regular meeting on September 28th at 11:30 A.M. in the boardroom of the Oceana County Building located at 100 S. State Street, Hart, Michigan 49420. Written comments may also be emailed to scarlson@wmsrdc.org prior to the meeting. Please direct any questions to Stephen Carlson at (231) 722-7878 ext 110.

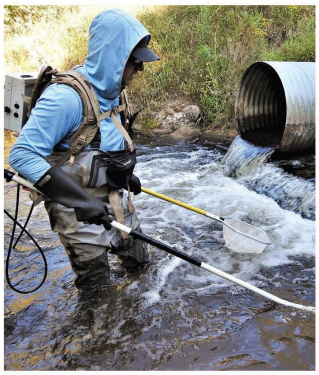
RECEIVED
SEP 25 2023
WMSRDC

July-September 2023 – WMSRDC print newsletter

Environmental: NOAA Regional Partnership Update

In 2020, WMSRDC entered the Lake Michigan Rivers and Coastal Wetlands Regional Partnership with the National Oceanic and Atmospheric Administration (NOAA). Since then, the Little Cedar Creek, Stony Creek, and White River projects were selected for funding. All projects have completed design plans and are at differing stages in the implementation process. At Little Cedar Creek, the 500 feet of instream habitat restoration and the culvert replacement at Sweeter Road stream crossing have been completed. The additional culvert replacement at Michillinda Road crossing began construction at the beginning of September. The White River project will replace three road stream crossings in Swinton Creek and one in Cushman Creek and restore 1,080 feet of instream habitat in Swinton Creek. This work is set to begin this fall. The Stony Creek project at Marshville Dam Park includes dam remnant removal, removal of two old bridges and three culverts, a bridge replacement, and 500 feet of instream habitat replacement. This work is anticipated to begin in the spring of 2024.

Sweeter Road and Little Cedar Creek crossing during pre-restoration monitoring and after construction.



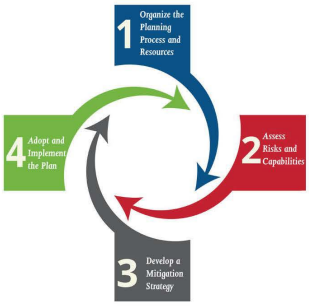
To complete all anticipated construction activities and post-monitoring efforts, WMSRDC has collaborated with NOAA to extend the project deadline through September 2024. Project partners for the three projects include Muskegon County Road Commission, Oceana County Road Commission, Grand Valley State University Annis Water Resources Institute, Conservation Resource Alliance, Oceana County Parks, watershed groups, and private landowners.

Local Government Services: Hazard Mitigation

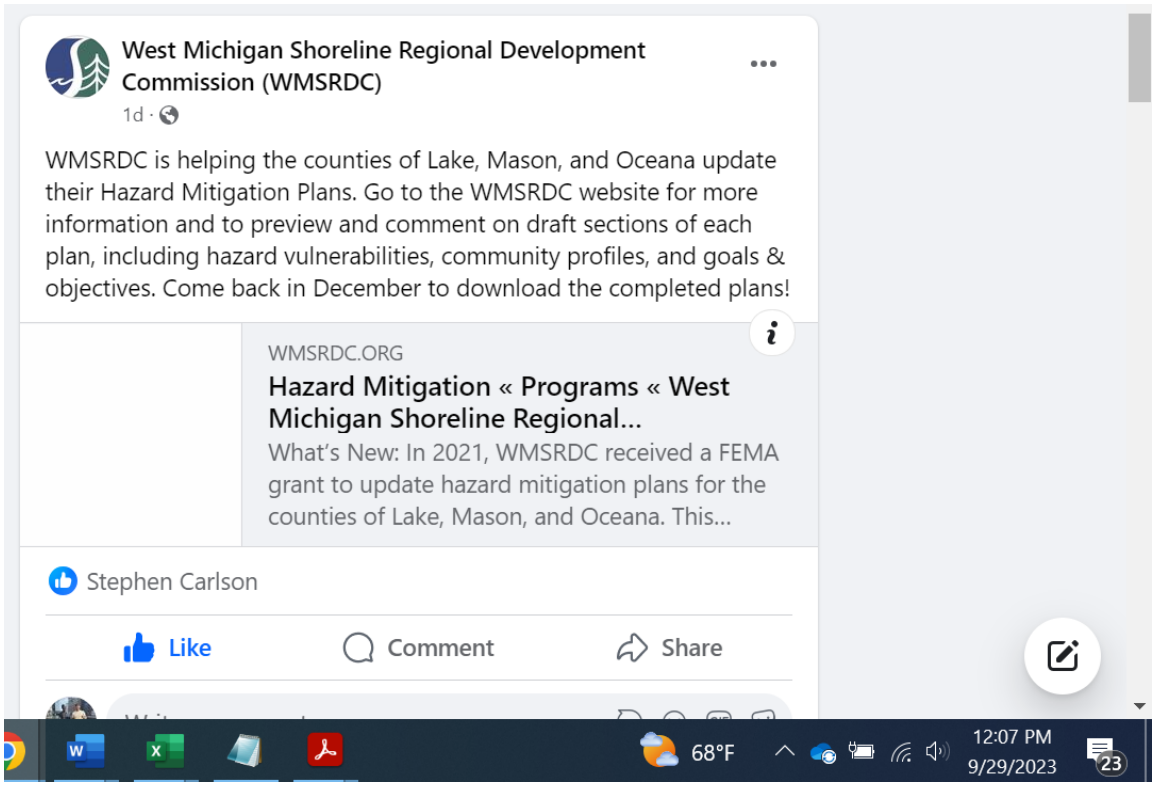
WMSRDC is nearing completion of a project to update Hazard Mitigation Plans for the counties of Lake, Mason, and Oceana. With FEMA-approved plans in place, each county and each local community that participated in the planning process will be eligible to adopt the county plan and become eligible to apply for federal pre-disaster and post-disaster funding.

The WMSRDC website wmsrdc.org/program/hazard-mitigation/ currently hosts draft sections for public review. Local officials in the counties of Lake, Mason, and Oceana are especially encouraged to review and provide input on these materials to ensure their community will at least have the option to become eligible for mitigation funding.

Hazard mitigation is any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. Mitigation planning seeks to break the cycle of disaster damage, reconstruction, and repeated damage. Hazard mitigation includes long-term solutions that reduce the impact of disasters in the future.



September 2023 – WMSRDC Facebook posting



Appendix F:

Potential Hazard Mitigation Funding Sources

This Appendix provides a compendium of federal, state, and private sector funding sources for hazard mitigation projects, and is intended to serve as a tool for local communities to use in developing funding "packages" to implement hazard mitigation projects in support of their hazard mitigation plan. It is NOT the “be-all, end-all” information source for hazard mitigation project funding. Rather, it is intended to serve as a roadmap to other, more detailed information sources such as the Federal Assistance Listing, federal and state-agency web sites, and private philanthropic organization web sites. Information in this section was compiled by personnel in the MSP/EMHSD and included in the 2019 Michigan Hazard Mitigation Plan.

Funding sources open to local governments or that directly or indirectly benefit local governments, are listed in this compendium. Those programs that benefit a designated group only (i.e., Indian Tribes) are not included, nor are those programs for which a State Agency is the only eligible applicant. (However, it is possible that projects could be funded under a partnership arrangement with a State Agency. Such requests would have to be directed in writing to that agency.) The mere availability of funding for mitigation projects does not guarantee success. "Grantsmanship"—the ability to formulate projects, determine probable costs, identify probable funding sources, coordinate with project "partners", and write successful project proposals—is an essential skill for today's emergency management professionals. Someone in the community has to have the "vision" to identify potential projects, handle the mechanics of obtaining funding, and then see the project through to fruition. Grantsmanship is both an art and science. There are definite right and wrong ways to prepare project proposals. That is the science part of the equation. However, it is the "art" involved—the ability to see what others might not and then have the wherewithal to make something happen—that makes some communities successful and others not. Fortunately, technical assistance in proposal development and grant writing is available from a variety of sources. Many local communities may have their own Grants Coordinator on staff or under contract to assist local agencies in grant-related activities. Guidance on developing and writing grant proposals is also included within this section.

Two types of problems frequently appear when mitigation efforts are being considered. The first is when a planner or emergency manager doesn't even consider many mitigation possibilities because an area's hazards may seem too large-scale, expensive, or technically demanding for the resources of his or her community to address. On the other hand, you may have dared to "dream big" and produced a lengthy "wish list" of excellent hazard mitigation ideas for your community, but now you need to determine whether any of these solutions are realistically achievable within the technical and financial limits of your community's emergency management program. This section is intended to encourage planners to dare to "think big" in creating their ideas for hazard mitigation projects, and then to be able to realistically assess the feasibility of implementing these projects. This section hopes to enable you to explore a wider range of possibilities for gaining the technical and financial capabilities needed to implement your project ideas. Before you give up a great idea that you were bold enough to envision, you should read through this section to see if, just maybe, there is a way to assemble all the funding and technical requirements that will make it work. There may be cases where a proposal is rejected as almost but not quite feasible, because it lacks that last bit of funding or technical expertise that would ensure its viability for the community, and everyone wonders if there weren't some source of funding or expertise that could have provided the project with the last little "push" it needed to get rolling. Hopefully, the reader will gain more ideas and capability to implement his or her mitigation ideas as a result of this section.

"Start at Home"
(Local Sources of Funding and Technical Assistance for Hazard Mitigation Projects)

The hierarchy of emergency management functions in the United States is arranged so that assistance from higher levels of the hierarchy serves to supplement local resources when they would otherwise be exhausted. It is therefore important to ensure that local resources really are being fully utilized before appealing to state or federal government for assistance. It is also at the local level that the clearest picture is seen of what types of projects are needed, and for what purposes. Frequently, a great amount can be accomplished at the local level alone, as emergency managers learn to build partnerships and find creative ways to accomplish mitigation-oriented tasks in coordination with other types of community improvement projects.

It is good to assess what capabilities your community currently possesses with which to carry out your mitigation project ideas, and what resources will be needed from other sources. It is essential to consider the nature of the mitigation project and its scope. Who will it affect in the community? Who will benefit the most from it? Answering these questions will

often point to local people and organizations who can be asked to assist or participate in implementing the mitigation project.

Some mitigation strategies involve local ordinances or construction and safety codes. This sort of project would call for the mobilization of political and popular support to achieve the mitigation objective. Some strategies may entail a public education or awareness campaign that would involve local schools, community centers, or newspapers. Other projects may be physical construction or renovation projects that require engineering expertise and lots of funding to implement. The building of local partnerships and community awareness and support often is required for all these types of projects, and so this section will present many ideas emergency managers will want to explore from the outset. It is frequently the case that the amount of assistance available locally is far greater than that which is available from outside the community.

Building Community Awareness and Support through Volunteer Resources and Organizations

It is important to have community members aware of hazards so that they are less likely themselves to act in ways that increase risks to themselves or others, or to the community's property and environment. Community awareness and support has not only an educational and political component to it, however. Every community contains people with a wide variety of skills and knowledge, and a willingness to help out in circumstances where they see a need for it. Advice, technical expertise, labor, and even funds might be available through the donations of community members who have come to believe in the importance of the mitigation objective that has been proposed. Individuals may be able to volunteer their knowledge and skills, labor, power, and money to support a good project. Local businesses may be willing to donate labor, materials, or funds for projects that benefit them. Many wealthy persons have been known to contribute generously to causes they believe in-especially if it benefits the community in which they live and work. More information on this aspect of fundraising can be found at http://staff.lib.msu.edu/harris23/grants/index.htm.

Contributions and volunteerism need not occur individually but can be achieved through local community organizations that are able to inform their members about the need for the project and coordinate their members' efforts to promote the project's success. Many local organizations will be glad to participate in worthy local causes, and such participation helps strengthen their cohesion and sense of community as well. Local organizations are often experienced at fundraising, and frequently have members of local political importance who can be vital to the success of a mitigation project. Emergency managers should consider what kinds of local organizations are present in the community and how to involve them or their members in support of the proposed mitigation project.

The Use of Public/Private Partnerships

Emergency managers should also identify who the most important for-profit institutions are in the local community. Major employers, financial institutions, and insurance companies may all have an interest in supporting a mitigation project that benefits the community. (Such support is often needed to gain state or federal support for the project as well.) Often, large companies already have a corporate giving program or an associated foundation that will provide assistance. Utilities and transportation service providers should similarly be investigated to see if they can assist. A large number of insurance organizations can be found listed at http://www.aiadc.org/.

Assistance Through Creative Coordination with Other Projects and Local Government Functions

Many mitigation projects have elements of overlap with other projects or coincide in some way with established goals of the community, some of its residents, or one of its governmental agencies. Emergency managers who have an ability to identify common elements that his/her mitigation project shares with other community or organizational activities will often be able to find ways to coordinate his/her mitigation efforts with those of the related activities. In some cases, the process may be very formal, as when a mitigation project is being linked in with some ongoing government function or project. In other cases, there may merely be some small alteration of an existing project to include mitigation goals (or to avoid interference with such goals). A local government has many types of activities that often affect hazard mitigation prospects in the community, such as capital improvement projects, and initiatives for community and economic development. It may be that, after examining each other's projects, the emergency manager and some other local official will find that the two are mutually beneficial, and some degree of coordination can help everyone's resources go farther. In some cases where all that is needed is some staff time or technical advice, it may be very easy for mutual assistance to occur.

Sometimes, an important mitigation project may deserve some sort of distinct local government support mechanism. This could involve the use of government bonds to support the project, the formation of a benefit assessment district, or the adjustment of the municipal budget to provide funding for the project. In such cases, the emergency manager will benefit greatly from whatever popular and political support were gained through the building of community awareness. More information on government bonds can be found through the Michigan Municipal Bond Authority. Please see the website at https://www.michigan.gov/documents/dleg/016077-121-1753_37602_37604---001_220892_7.html.

Nonprofit Organizations and Foundations

Foundations can be investigated through the Council of Michigan Foundations (www.cmif.org) or The Foundation Center (http://fdncenter.org). There are more web sites on foundations at http://staff.lib.msu.edu/harris23/grants/privcomm.htm. Some foundations are private and some are company sponsored. The National Science Foundation has an Earthquake Hazards Mitigation Program and a Natural and Technological Hazards Mitigation Program. In addition, Michigan has a number of community foundations, a list of which can be found at the website listed above. If there is no such foundation for your area, perhaps one can be organized.

Not-for-profit organizations (and grant making public charities) may also be interested in helping, and at the very least tend to be excellent sources of information, advice, and favorable publicity that almost any project can benefit from. By talking with a variety of professionals, the local emergency manager will be able to assemble a lengthy list of professional organizations pertinent to local mitigation projects. Here are some examples:

- Advocates for Highway and Auto Safety
- American Institute of Architects
- American Planning Association
- American Public Works Association, Emergency Management Committee
- American Society for Civil Engineers
- Association of Contingency Planners
- Association of State Dam Safety Officials
- Association of State Floodplain Managers
- Building Officials and Code Administrators International (BOCA) – International Code Council (ICC)
- Building Seismic Safety Council
- Business and Industry Council for Emergency Planning and Preparedness
- Earthquake Engineering Research Institute
- Engineers Without Borders USA
- Institute for Business and Home Safety
- Insurance Institute for Highway Safety
- Insurance Services Office – Verisk Analytics, Inc.
- International Assn of Emergency Managers (IAEM)
- International City/County Management Association
- Michigan Assn of County Drain Commissioners
- Michigan Fire Chiefs Association
- Michigan State Firemen's Association
- Michigan Stormwater-Floodplain Association
- Multidisciplinary Center for Earthquake Engineering Research (MCEER)
- National Association of State Foresters
- National Emergency Mgmt Association (NEMA)
- National Conference of States on Building Codes and Standards
- National Fire Protection Association
- National Lightning Safety Institute (NLSI)
- National Assn of Abandoned Mine Land Programs
- State and Local Emergency Management Data Users Group (FEMA: HAZUS User Groups)
- U.S. Fire Administration

In the local section of this funding overview, local volunteer assistance was mentioned. It may also be possible to involve state or national volunteer groups as well. A good place to start is by contacting Michigan Voluntary Organizations Active in Disaster (MIVOAD). The National American Red Cross, religiously affiliated organizations (such as the Salvation Army or Southern Baptists Disaster Relief Services), or charitable organizations such as the United Way may also be of assistance in some cases.

Governmental Assistance

Much of the information collected here on state and federal sources of assistance can be found on the Internet. The simplest way to access information on federal government assistance is through the Federal Assistance Listing. Its web address is http://www.beta.SAM.gov. The program listings included in this document are organized by the reference numbers used by the Federal Assistance Listing, to make it easy for anyone to locate the program in the federal catalog.

Unfortunately, the State of Michigan has no such catalog of assistance programs, making it necessary to search through information from many state agencies' web sites to come up with a list of programs. A good place to start such a general

search is the Michigan Government Home Page at http://www.michigan.gov/. Click on the State Departments tab and then go to the specific agency desired.

For this document, searches were narrowed by focusing on activities that had a clear emphasis on, or applications toward, hazard mitigation and emergency management. However, it is possible that extra assistance may be obtained through programs not included here. As described in the section on local funding, it is sometimes possible to find areas where mitigation concerns overlap with other subjects, and to coordinate both concerns in existing projects funded from other sources. Consider the special features of your community that might be affected by hazards. Programs dealing with housing, farms, fisheries, natural resources, parks and wildlife, for example, may in some way be applicable to a hazard mitigation goal in your community. There are many state and federal programs and projects dealing with pollution, the environment, conservation, and economic development. Upon discussion, their administrators might approve some mitigation components in these programs/projects, or at least ensure that hazards are not worsened by program/project implementation.

Consider also the special assistance that may be available because of the presence of particular institutions or government-owned resources. The presence of a university or military installation often means many more resources that a community can use. Such institutions are often willing, able, and eager to also provide assistance on technical matters involving hazard mitigation projects which benefit their surrounding communities whenever the chance arises. Many universities have "extension" programs whose purpose is to find and provide such beneficial services. Many technical and engineering projects can be assisted by special research grants gained through partnering with colleges and universities, or by requesting the expertise of an organization such as the U. S. Army Corps of Engineers.

Projects dealing with school (and college) improvements may have mitigation components included in them. Other institutional facilities such as prisons, nursing homes, and health care providers should also have an interest in supporting mitigation projects that affect them. Additional funding may be available in some cases when a project involves the protection of designated historic districts or other areas of cultural or economic significance. Hazards that threaten businesses and tourism might merit funding from programs whose goal is economic development (or business attraction and retention).

In addition, areas of the community that have concentrations of persons from particular ethnic groups may provide an opportunity for organizations serving that group to become involved in mitigation projects that help maintain or improve its inhabitants' quality of life. There are a number of federal programs that make assistance available to Indian tribes, for example. Consultation with any such groups in your area might reveal useful means of facilitating or promoting mitigation projects.

More Information

There are many books and documents that give more advice on ways to collect funding information, write grant proposals, and so on. The Foundation Center has a number of libraries throughout Michigan that have extensive grants and funding information. Below is a list of the general locations, with web sites. A complete list with address, phone and contact information can be found at http://staff.lib.msu.edu/harris23/grants/michigan.htm.

Using Environmental and Economic Development Programs in Commercial Flood Acquisition, Relocation, and Infrastructure-Oriented Hazard Mitigation Projects*

*NOTE: A number of federal or state administered environmental and economic development programs could possibly be used in concert with other funding sources to develop a funding "package" for implementing hazard mitigation projects. Such a project would undoubtedly be multi-objective in nature. That is, the purpose of the project would include not only hazard vulnerability reduction, but also enhancement of the environment or the community's economic development posture. When assembling such a funding "package", it is important to be flexible and creative. Projects that achieve more than one objective are almost always more desirable and beneficial than are projects that simply achieve a reduction in the community's hazard vulnerability. Although they are more difficult and take longer to implement, multi-objective projects and partnerships can help build lasting bridges between governmental agencies and between government and the private sector. Those bridges, in turn, can lead to enhanced coordination and cooperation in future community endeavors, and better integration of hazard mitigation principles and practices in day-to-day public and private sector activities.

Examples of possible commercial flood acquisition/relocation or infrastructure mitigation projects might include:

- Strengthening infrastructure that services commercial and industrial areas to prevent failure and loss of critical services.
- Creating new business sites so that existing businesses in the floodplain can be more easily relocated to less hazardous areas within the community.
- Cleaning up "brownfields" and making them into productive business sites so that businesses in the floodplain or other hazardous areas can relocate to them.
- Floodproofing or elevating existing businesses to prevent flood-related damage and negative economic impacts for the community.
- Stabilizing river and stream banks and road crossings to prevent sedimentation, reduce flood potential, and prevent the loss of roadway or other community infrastructure due to collapse from flooding.
- Constructing wetlands and retention and detention basins to manage stormwater and create wildlife habitat and environmental conservation areas.
- Stabilizing the Great Lakes shoreline property to prevent erosion, sedimentation, and possible physical damage to commercial and residential structures.
- Acquiring and demolishing waterfront structures and then using the site for other, more appropriate uses such as park and recreation land or less vulnerable commercial activities.

(See the MDEQ Clean Michigan Initiative web site for a listing of implemented multi-objective projects that have a mitigation component: https://www.michigan.gov/deq/0,4561,7-135-3307_3515-314499--,00.html.)

STATE AGENCY HAZARD MITIGATION FUNDING PROGRAMS

The following page presents a table that summarizes Michigan programs potentially available to support hazard mitigation activities.

STATE AGENCY HAZARD MITIGATION FUNDING PROGRAMS

Funding Sources for Hazard-Specific Measures

	Drought	Earthquake	Extreme Temperatures	Wildfire	Dam Failure	Riverine Flooding	Great Lakes Shoreline Flooding and Erosion	Subsidence	Hail	Lightning	Severe Wind	Tornadoes	Ice and Sleet Storms	Snowstorms	FINANCIAL ASSISTANCE	TECHNICAL ASSISTANCE
MICHIGAN DEPARTMENT OF AGRICULTURE																
Conservation Reserve Enhancement Program (CREP)						X	X				X				X	X
Intercounty Drain Program (Available to drain commissioners only)					X	X										X
MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY																
Coastal Management Program							X								X	X
Michigan Great Lakes Protection Fund							X								X	
State Revolving Fund (Loan)						X									X	
Wetland Program Development (USEPA) (see CFDA 66.461)						X	X								X	
MICHIGAN DEPT. OF NATURAL RESOURCES																
Land & Water Conservation Fund						X	X								X	
Michigan Habitat Improvement Fund Project Grants						X									X	
Michigan Natural Resources Trust Fund				X		X									X	
Michigan Volunteer Fire Assistance				X											X	
Snowmobile and ORV Trail Improvement Program						X	X								X	
Outdoor Recreation and Legacy Partnership Program						X	X			X	X	X			X	
Land and Water Conservation Fund						X	X			X	X	X				
Community Forestry Program											X	X	X		X	X
MICHIGAN DEPARTMENT OF STATE POLICE																
Emergency Management Performance Grants (see CFDA 97.042)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Flood Mitigation Assistance (see CFDA 97.029)						X	X								X	
Hazard Mitigation Grant Program (see CFDA 97.039)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Federal Disaster Assistance to Individuals and Households in Presidential Declared Disaster Areas (see CFDA 97.048)		X		X		X	X	X			X	X			X	
Presidential Declared Disaster Assistance - Disaster Housing Operations For Individuals And Households (CFDA 97.049)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Presidential Declared Disaster Assistance To Individuals And Households - Other Needs (see CFDA 97.050)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Disaster Grants-Public Assistance (Presidentially Declared Disasters) (see CFDA 97.036)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Pre-Disaster Mitigation (see CFDA 97.047)			X	X		X	X				X	X			X	
Severe Loss Repetitive Program (see CFDA 97.110)						X	X								X	
Repetitive Flood Claims (see CFDA 97.092)						X	X								X	
MICHIGAN DEPARTMENT OF TRANSPORTATION																
Transportation Economic Development Fund						X	X								X	
MICHIGAN ECONOMIC DEVELOPMENT CORP																
Community Development Block Grant Program (also see 14.218 and 14.228 in CFDA) Some are Disaster Resilience (DR) grants.						X	X								X	
Urban Land Assembly						X	X								X	
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY																
CDBG Housing Resource Fund (Inc HOME) (CFDA 14.239)						X	X		X		X	X			X	
Home/Property Improvement Loans						X	X		X		X	X			X	
MICHIGAN DEPARTMENT OF TREASURY																
Michigan Finance Authority-Local Gov't Loan Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Michigan Finance Authority-State Aid Note Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

FEDERAL AGENCY HAZARD MITIGATION FUNDING PROGRAMS

(FROM THE FEDERAL ASSISTANCE LISTING)

Federal Assistance Listing: Index of Agencies

Agency Code	Agency
10	U.S. Department of Agriculture
11	U.S. Department of Commerce
12	U.S. Department of Defense
14	U.S. Department of Housing and Urban Development
15	U.S. Department of the Interior
47	National Science Foundation
59	Small Business Administration
66	U.S. Environmental Protection Agency
81	U.S. Department of Energy
97	Department of Homeland Security

FEDERAL HAZARD MITIGATION FUNDING SOURCES **Funding Sources for Hazard-Specific Measures**	Drought	Earthquake	Extreme Temperatures	Wildfire	Dam Failure	Riverine Flooding	Gt Lakes Shoreline Flooding / Erosion	Subsidence	Hail	Lightning	Severe Wind	Tornadoes	Ice and Sleet Storms	Snowstorms	FINANCIAL ASSISTANCE	TECHNICAL ASSISTANCE
10.054 Emergency Conservation Program	X					X					X	X			X	
10.069 Conservation Reserve Program						X					X	X			X	X
10.202 Cooperative Forestry Research				X							X	X			X	
10.410 Very Low to Moderate Income Housing Loans			X	X		X	X	X	X	X	X	X			X	
10.417 Very Low Income Housing Repair Loans/Grants			X	X		X	X	X	X	X	X	X			X	
10.652 Forestry Research						X	X				X	X			X	
10.664 Cooperative Forestry Assistance				X											X	
10.760 Water & Waste Disposal Sys. for Rural Comm.						X	X								X	
10.763 Emergency Community Water Assistance Grants	X					X	X								X	
10.766 Community Facilities Loans & Grants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10.768 Business and Industry Loans	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10.770 Water/Waste Disposal Loans/Grants						X	X								X	
10.773 Rural Business Opportunity Grants						X	X								X	
10.850 Rural Electrification Loans and Loan Guarantees										X	X	X	X	X	X	
10.902 Soil and Water Conservation	X	X	X	X		X	X									X
10.904 Watershed Protection and Flood Prevention					X	X	X								X	X
11.300 Investments for Public Works and Economic Development Facilities					X	X	X								X	
11.303 Economic Development Technical Assistance						X	X								X	X
11.307 Economic Adjustment Assistance					X	X	X				X	X			X	
11.419 Coastal Zone Mgmt. Administration Awards							X									X
11.462 Hydrologic Research	X				X	X	X								X	
11.463 Habitat Conservation							X								X	
11.478 Center for Sponsored Coastal Ocean Research Coastal Ocean Program							X								X	
12.101 Beach Erosion Control Projects							X								X	

FEDERAL HAZARD MITIGATION FUNDING SOURCES **Funding Sources for Hazard-Specific Measures**	**Drought**	**Earthquake**	**Extreme Temperatures**	**Wildfire**	**Dam Failure**	**Riverine Flooding**	**Gt Lakes Shoreline Flooding / Erosion**	**Subsidence**	**Hail**	**Lightning**	**Severe Wind**	**Tornadoes**	**Ice and Sleet Storms**	**Snowstorms**	FINANCIAL ASSISTANCE	TECHNICAL ASSISTANCE
12.102 Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works					X	X	X								X	
12.103 Emergency Operations Flood Response & Post-Flood Response					X	X	X								X	
12.104 Flood Plain Management Services					X	X	X									X
12.105 Protection of Essential Highways, Highway Bridge Approaches, and Public Works					X	X	X								X	
12.106 Flood Control Projects					X	X	X								X	
12.108 Snagging and Clearing for Flood Control					X	X	X								X	
12.109 Protection, Clearing and Straightening Channels						X	X								X	
12.111 Emergency Advance Measures for Flood Protection					X	X	X								X	
14.218 Community Development Block Grants/Entitlement Grants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14.228 Community Development Block Grants-State's Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14.239 HOME Investment Partnerships Program						X	X		X	X	X	X			X	
15.623 North American Wetlands Conservation Fund						X	X								X	
15.904 Historic Preservation Fund Grants-In-Aid						X	X	X	X	X	X	X	X	X		X
15.916 Outdoor Recreation-Acquisition, Development and Planning (Land and Water Conservation Fund Grants)						X	X								X	
15.918 Disposal of Federal Surplus Real Property for Parks, Recreation, and Historic Monuments						X	X									
15.921 Rivers, Trails, and Conservation Assistance						X	X									X
47.041 Engineering Grants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
59.008 Disaster Assistance Loans		X		X		X	X	X	X	X	X	X	X	X	X	
66.461 Regional Wetlands Program Development Grants						X	X								X	

FEDERAL HAZARD MITIGATION FUNDING SOURCES **Funding Sources for Hazard-Specific Measures**	Drought	Earthquake	Extreme Temperatures	Wildfire	Dam Failure	Riverine Flooding	Gt Lakes Shoreline Flooding / Erosion	Subsidence	Hail	Lightning	Severe Wind	Tornadoes	Ice and Sleet Storms	Snowstorms	FINANCIAL ASSISTANCE	TECHNICAL ASSISTANCE
66.469 Great Lakes Program							X								X	
81.042 Weatherization Assistance for Low-Income Persons			X												X	
97.018 National Fire Academy Training Assistance				X												X
97.022 Flood Insurance						X	X									X
97.023 Community Assistance Program - State Support Services Element (NFIP)						X	X									X
97.024 Emergency Food and Shelter National Board Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.026 Emergency Management Institute-Training Assistance	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
97.028 Emergency Mgmt Institute-Resident Education Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
97.029 Flood Mitigation Assistance						X	X								X	
97.030 Community Disaster Loans	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.036 Disaster Grants - Public Assistance (Presidentially Declared Disasters)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.039 Hazard Mitigation Grant Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.041 National Dam Safety Program					X											X
97.042 Emergency Management Performance Grants	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.044 Assistance to Firefighters Grant				X											X	
97.045 Cooperating Technical Partners						X	X								X	
97.046 Fire Management Assistance Grant				X											X	
97.047 Pre-Disaster Mitigation		X		X		X	X	X			X	X			X	
97.048 Federal Disaster Assistance to Individuals and Households in Presidential Declared Disaster Areas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.050 Presidential Declared Disaster Assistance to Individual and Households - Other Needs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
97.092 Repetitive Flood Claims						X	X								X	
97.110 Severe Repetitive Loss Program						X	X								X	

Key FEMA programs dedicated specifically to hazard mitigation projects

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) was created by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (PL 93-288, as amended). The HMGP provides funding for states and local communities to implement long-term hazard mitigation measures that reduce or eliminate risk to people and property from natural hazards and their effects. Funding for Michigan's HMGP is made available following a federal Major Disaster Declaration in the state. The amount available to the State for HMGP projects is based on 15% of the federal funds expended on the Public and Individual Assistance programs for the disaster, with an option to increase that amount to 20% with an approved "enhanced" state mitigation plan in place. The objective of the HMGP is to protect lives and property and significantly reduce or eliminate future disaster expenditures.

HMGP grants can be awarded to eligible applicants throughout the state, regardless of the boundaries of the disaster declaration. Eligible applicants include state agencies, local governments, certain private non-profit organizations, and Indian Tribes or authorized tribal organizations. Federal funds are available for up to 75% of eligible project costs ONLY for those applicants that have in place or are covered under an approved hazard mitigation plan that meets the requirements of the federal Disaster Mitigation Act (DMA) of 2000. The remainder of the cost for the project is the responsibility of the applicant.

The HMGP can be used to fund projects to protect either public or private property. Examples of the types of projects that can be funded by the HMGP include, but are not limited to:

- Voluntary acquisition or elevation of flood-prone structures
- Stormwater management projects that reduce flood risk
- Protective measures for utility infrastructure
- Vegetation management for dune restoration or wildfire prevention
- Construction of safe rooms
- Retrofitting structures for wind protection
- Development of community hazard mitigation plans (or the update of an existing hazard mitigation plan)

Applicants must apply for the HMGP through the MSP/EMHSD. The MCCERCC will set priorities for the HMGP following a disaster declaration. Based on those priorities, notification of available funding will be made to appropriate entities and organizations. The MCCERCC will review and prioritize eligible applications. Selected formal project applications will then be submitted by the MSP/EMHSD to FEMA for final funding approval. Following a disaster declaration, prospective applicants, if not notified of available HMGP funds, may want to contact their local office of emergency management to see if HMGP funds are available. For additional information about the HMGP contact Matt Schnepp, State Hazard Mitigation Officer, by phone at (517) 284-3950 or by e-mail at schneppm1@michigan.gov.

Flood Mitigation Assistance Program

On September 23, 1994, the National Flood Insurance Reform Act (NFIRA) was signed into law. The purpose of the NFIRA is to improve the financial condition of the National Flood Insurance Program (NFIP) and to reduce the federal expenditures for federal disaster assistance to flood damaged properties. With the passage of the NFIRA, Congress authorized the establishment of a federal grant program to provide financial assistance to states and local communities for flood mitigation planning and activities. (Note: Flood mitigation is defined as any action taken before, during or after a flood to permanently eliminate or reduce the long-term risk to human life and property.) FEMA has designated this as the Flood Mitigation Assistance Program (FMAP). Under the FMAP, FEMA provides assistance to states and local communities for activities that will reduce the risk of flood damage to structures insurable under the NFIP.

The FMAP is a state administered, cost-sharing program through which the States and communities can receive grants for flood mitigation activities. FEMA encourages the State to assist the local community in prioritizing mitigation activities outlined in their hazard mitigation plan and to fund projects that will greatly reduce the risk of flood damage to buildings, manufactured homes and other NFIP-insurable structures. Mitigation of substantially damaged and repetitive loss structures is a high priority.

Mitigation measures under the FMAP are funded on a 75% federal / 25% non–federal basis. (Note: Unless by special appropriation of the Michigan Legislature, no state funding will be used for the 25% match. Contributions of other state agencies may be used as an in-kind contribution toward the 25% match.)

Applications for FMAP grants are made via the federal E-Grants system. The MCCERCC reviews all of the applications received and prioritizes applications. FEMA makes final project selections and approvals. For additional information about the FMAP contact Matt Schnepp, State Hazard Mitigation Officer, by phone at (517) 284-3950, facsimile at (517) 333-4987, or e-mail at schneppm1@michigan.gov.

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDMP) provides funding to states and local communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property. The PDMP was authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Section 102 of the Disaster Mitigation Act of 2000. The PDMP is an annually appropriated, nationally competitive grant program.

States, local communities, and Indian Tribes can receive grants for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural hazards. FEMA will set priorities for each appropriation of the PDMP. Eligible activities for the PDMP may include:

- Voluntary acquisition or elevation of flood-prone structures
- Stormwater management projects that reduce flood risk
- Protective measures for utility infrastructure
- Vegetation management for dune restoration or wildfire prevention
- Construction of safe rooms
- Retrofitting structures for wind protection
- Development of community hazard mitigation plans (or the update of an existing hazard mitigation plan)

Mitigation measures under the PDMP are funded on a 75% federal / 25% non–federal basis. (Note: Unless by special appropriation of the Michigan Legislature, no state funding will be used for the 25% match. Contributions of other state agencies may be used as an in-kind contribution toward the 25% match.) Grants to small and impoverished communities may receive a federal cost share of up to 90% of the total cost to implement eligible PDMP activities.

Applications for PDMP grants are made via the federal E-Grants system. The MCCERCC reviews all of the applications received and prioritizes applications. The MCCERCC priority order is a factor in the national competitive grant review and scoring process. FEMA makes final project selections and approvals. For additional information about the PDMP contact Matt Schnepp, State Hazard Mitigation Officer, by phone at (517) 284-3950 or by e-mail at schneppm1@michigan.gov.

Building Resilient Infrastructure and Communities

The Building Resilient Infrastructure and Communities (Bric) program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. Examples of BRIC projects are ones that demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design.

For example, an innovative project may bring multiple funding sources or in-kind resources from a range of private and public sector partners. Or an innovative project may offer multiple benefits to a community in addition to the benefit of risk reduction.

Through BRIC, FEMA continues to invest in a variety of mitigation activities with an added focus on infrastructure projects benefitting disadvantaged communities, nature-based solutions, climate resilience and adaption, and adopting hazard resistant building codes.

Project Prioritization Criteria

A project will be evaluated based on the following criteria:

- The project demonstrates sound hazard mitigation techniques.
- The project is listed in the applicable local hazard mitigation plan.
- The project supports the Michigan Hazard Mitigation Plan.
- The project meets the required eligibility criteria.
- The project is suitable for funding under the HMGP, FMAP, or PDMP rather than other funding programs.
- The project is consistent with the MCCERCC approved strategy for the federally declared disaster (if applicable).
- The project completely or substantially solves the problem.
- The project provides a permanent or long-term solution.
- The project is likely to be cost-effective based on physical damages prevented. (NOTE: structures that were officially designated as "repetitive loss properties" or "severe repetitive loss properties" have already been identified from an NFIP perspective as meriting flood mitigation activities, and Michigan has tended to agree with and actively support such classifications and efforts, as described earlier in this appendix under the subsection called "Repetitive Losses.")
- The project will not create negative environmental effects.
- The project is consistent with other projects, initiatives, and state agency priorities.
- Communities with the highest risk.
- Communities with the greatest number of repetitive loss properties.
- Communities with the greatest number of NFIP insured structures.
- Communities with the most intense development pressures.
- Communities with the largest increases in population and/or physical development.
- Communities that have the ability to successfully implement hazard mitigation projects within the required timeframes.
- Communities that have expressed interest in hazard mitigation activities.

Project Eligibility Criteria

FEMA considers a project eligible for HMGP, FMAP, or PDMP funding only if the project:

- Conforms to the State Hazard Mitigation Plan.
- Conforms to environmental laws and regulations.
- Is cost-effective.
- Solves a problem independently or constitutes a functional portion of a solution.
- Cannot be funded by another program.
- The applicant community is a member, in good standing, of the NFIP (flood related projects only).

*Note – technical study type projects may be eligible for funding if they are accompanied by a second project (phase II) for construction measures that are developed and determined eligible by the study project (phase I).

Eligible Project Types

Following is a list of potentially eligible project types as outlined in federal guidance (this list is not all inclusive):

- **Acquisition of real property** in a hazard area; **physical relocation of structures** from a hazard area.
- **Elevation of structures** in compliance with federal, state and local ordinances.
- **Retrofit of structures** – wet or dry floodproofing (according to local code and building standards, compliant with NFIP standards); high wind bracing; seismic strengthening of structures or their non-structural components; application of wildfire resistant materials; and structural fire safety measures.
- **Minor structural flood risk reduction measures** – debris basins; stormwater detention basins or infiltration wells; culvert upgrades; diversions; flapgates or floodgates; localized flood risk reduction system to protect critical facilities.
- **Vegetation management** – natural windbreaks; living snow fences; shoreline stabilization; natural stabilization; wildfire defensible space, etc.
- **Phase I or II design, engineering or feasibility study** for complex mitigation projects that are reasonably expected to be funded and implemented.

Explanation: Complete Solution
Approved projects should either completely solve a site-specific problem or be an element of a larger solution where there is assurance of project completion.

Explanation: Long-term Solution
Mitigation measures funded under the HMGP, FMAP, and PDMP are intended to provide a long-term or permanent solution. Ideally, the measure would be effective for the life of the property being protected. (For example, erecting an emergency berm on a beach to prevent wave damage to structures is a short-term solution, as opposed to a long- term solution such as elevation or relocation of the structures.)

Explanation: Cost Effective
For a project to be considered cost effective, the benefits gained by completing the project must be greater than the cost of the project. Cost effectiveness should take into account the following:

- The cost to complete the project.
- The life of the project.
- Past damages that have resulted from the situation that will be mitigated as a result of the project.
- The frequency and extent of damage that is likely to occur if the project is not completed.
- Annual costs of maintaining the project.

Explanation: Environmental Effects
All HMGP, FMAP, and PDMP projects must be in conformance with applicable environmental laws and regulations, including but not limited to:

- The National Environmental Policy Act.
- The National Historic Preservation Act.
- The Endangered Species Act.
- Executive Order 11988, Floodplain Management.
- Executive Order 11990, Protection of Wetlands.
- Executive Order 12898, Environmental Justice.

(Note: a project should not create an environmental problem or shift a hazard to a new location.)

Explanation: Consistent with Other Initiatives
HMGP, FMAP, and PDMP projects should be complementary to other mitigation projects, initiatives, and state agency priorities. At a minimum, projects should not undermine other identified mitigation priorities and activities.