Appendix A:

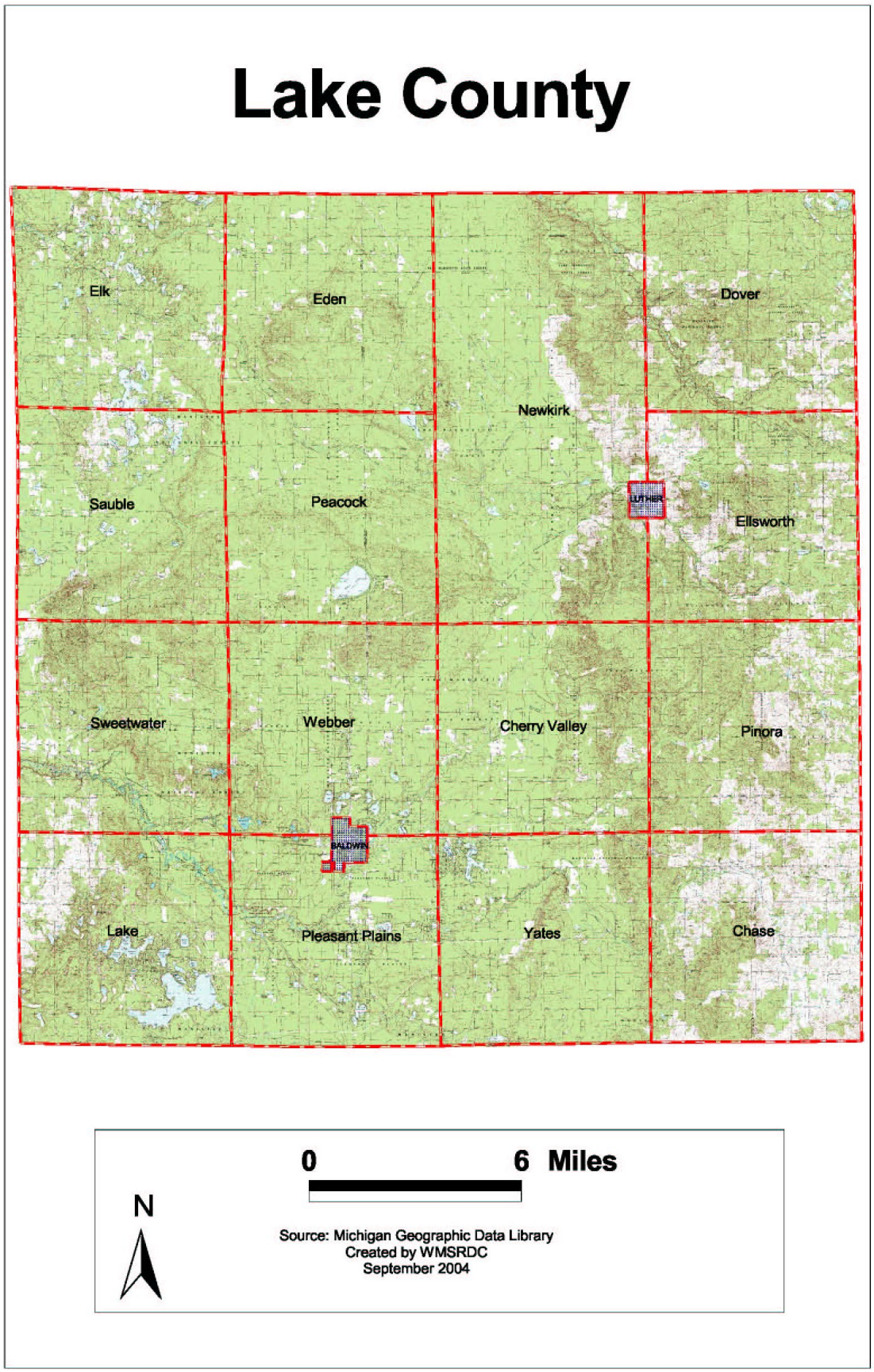
Community Profiles

LAKE COUNTY Community Profile			
1. Physical Features			
Lakes (acres)	Big Star (912), Big Bass (290), Wolf Lake (418)		
Rivers	Pere Marquette, Little Manistee, Pine, Sauble, Baldwin		
Cities	None		
Villages	Baldwin, Luther		
Large public land areas	Huron Manistee National Forest; Pere Marquette State Forest		
2. Land Cover: 2019 National Land Cover Dataset		*Source: Multi Resolution Land Characteristics Consortium*	
% Developed	6.23 %	% Forests	69.5 %
% Agriculture	4.23 %	% Wetland	11.98 %
3. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$33,253,500	Industrial	$1,535,200
Commercial	$63,313,900	Residential	$934,369,600
Total personal	$43,189,550		
4. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	12,248	% with disability	27.5%
+/- change 2010 to 2020*	4.8%	% in poverty	19.4%
Median age	54.2	ALICE households**	38 %
% under 18 years old	16.5%	Avg. daily commute	30.6 minutes
% over 65 years old	30%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
5. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	104	Vacant housing units**	9,201
Campground & RV sites*	990	Peak seasonal population	71,622
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
6. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	13,550	Single units	9,444
Occupied housing units	4,349	Multi-units in structure	282
Vacant housing units	9,201	Mobile homes or other	3,811
7. Public Services			
Fire	- Baldwin Fire Station, 620 Washington St - Lake Township Fire & Rescue, 15580 S Star Lake Rd - Luther Fire Department, 714 State St - Sauble Elk Eden Townships Fire Department, 6711 W 8 Mile Rd - Webber Township Fire Department, 2451 W 36th St - Yates Township Fire Department, 2155 E US 10		
Police	Lake County Sheriff Department, 1153 Michigan Ave		
Wastewater	Village of Baldwin		
Community Water System	- Village of Baldwin - Clean Water Association (Pleasant Plains Township) - Duvernay Park Apartments (Yates Township) - Idlewild Garden Housing (Yates Township)		
Public transportation	Yates Dial-A-Ride 1987 US-10		
Other	- Lake County Jail, 1153 Michigan Ave (Baldwin)		

	- Baldwin Wastewater Treatment Plant (Pleasant Plains Twp) - FiveCAP, Inc., 2476 W 44th St (Pleasant Plains Twp)
8. Critical Infrastructure	
Major roads	US-10, M-37
Railroads	Marquette Railroad
Bridges	- US-10 over Baldwin River (Pleasant Plains/Webber Twp) - M-37 over Little Manistee River, Pere Marquette River, Baldwin River - Marquette Railroad over Pere Marquette River - 8th St Over Baldwin River (Baldwin, closed) - State St over Little Manistee River (Luther) - W 4 Mile Rd over Little Manistee River (Peacock Twp) - Old M-63 over Little Manistee River (Peacock Twp) - Peacock Trail over Little Manistee River (Peacock Twp) - N Irons Rd over Little Manistee River (Eden Twp) - N Granger Rd over Little Manistee River (Elk Twp) - N Bass Lake Rd over Little Manistee River (Elk Twp) - 10 ½ Mile Rd over Little Manistee River (Elk Twp) - W 11 Mile Rd over Little Manistee River (Elk Twp) - E 10 Mile Rd over Pine River (Newkirk Twp) - N State Rd over Pine River (Newkirk/Dover Twp) - E 6 Mile Rd over Pine River (Ellsworth/Dover Twp) - N Skookum Rd over Pine River (Dover Twp) - N Raymond over Pine River (Ellsworth Twp) - James Rd over Pere Marquette River (Pleasant Plains Twp) - W 56th St over Pere Marquette River (Sweetwater Twp) - S Branch Rd over Pere Marquette River (Sweetwater Twp) - S Frank Smith Rd over Pere Marquette River Middle Branch (Chase Twp) - S Baker Rd over Pere Marquette River Middle Branch (Chase Twp) - S Queens Hwy over Pere Marquette River Middle Branch (Yates Twp) - E 24th St over Baldwin River (Cherry Valley Twp)
Airports	Baldwin Municipal Airport, M-37 (Pleasant Plains Twp)
Shelters	- Baldwin Congregational United Church of Christ, 870 Beech St - Baldwin Elementary School, 525 Fourth St - Baldwin Middle/High School, 525 W. Fourth St - Baldwin Village Office Fire Dept, 620 Washington St - Edgetts Wesleyan Church, 3446 N Raymond Rd - St Ann's Senior Center, 690 E 9th St - Yates Township Fire Department, 2155 US-10, Idlewild, MI 49642 - Yates Township Hall, 6437 S Nelson Rd - Baldwin Assembly of God, 10063 M-37 - Faith Fellowship Church, 8889 W 6 Mile Rd - Sauble Elk Eden Townships Fire and Rescue, 6711 W 8 Mile Rd - St Bernard Catholic Church, 5734 W 10 ½ Mile Rd - St Ignatius Catholic Church, 701 N State St - Sweetwater Town Hall, 11265 Stevenson Ave - Webber Township Fire Department, 2286 W. Springtime St
Schools	- Baldwin Community JR/SR High School, 525 W. 4th St - Baldwin Elementary School, 525 W. 4th St - Baldwin Alternative Education, 525 W. 4th St
Community medical facilities, Hospitals	- Baldwin Teen Health Center, 525 W. Forth St. (Baldwin) - Baldwin Family Health Care, 1615 Michigan Ave. (Baldwin) - Loretta Adams-Ashby Health Center, 1101 E. Washington (Baldwin)
Ambulance service	- Life EMS of Lake County, 792 Washington St (Baldwin)

Dams	- Danaher Lake Dam (Pleasant Plains Twp) - Luther Pond Dam (Luther) - Lake Connamara Dam (Yates Twp) - Olga Lake Dam (Dover Twp) - Baldwin Fish Hatchery Dam (Baldwin) - Little Widewaters Flooding Dam (Newkirk Twp) - Big Star Lake Level Control Structure (Lake Twp) - Clear Lake Dam (Lake Twp) - Midget Lake Dam (Elk Twp)
9. Economic Assets	
Major employers	- Lake County Government, 800 10th St Baldwin - Baldwin Family Healthcare, 1615 Michigan Ave, Baldwin - Grand Oaks Nursing Center, 600 Denmark St, Baldwin - US Forest Service Ranger Station, 650 Michigan Ave, Baldwin - Stealthcraft Boats, 6786 S M-37, Pleasant Plains Twp - Lake Osceola State Bank, 790 Michigan Ave, Baldwin - Baldwin Community Schools, 525 4th St, Baldwin - Peacock Industries, 254 S M-37, Webber Twp - Peacock LTD, 276 S M-37, Webber Twp - Chase Creek Smokehouse, 7143 S Depot, Chase Twp
Power generation	- *None identified*
Electric transmission	Consumers Energy (townships of Eden, Elk, Newkirk)
Pipelines	Natural Gas (townships of Cherry Valley, Pinora, Sweetwater, Webber)
Commercial transportation	- *None identified*
10. Other Assets, Infrastructure, etc.	
Community facilities	*Refer to individual community profiles*
Festivals	*Refer to individual community profiles*
Historic Sites	- Brown Trout Informational Designation (historic marker), M-37 (Pleasant Plains) - Idlewild Historic District, Idlewild (Yates Twp) - Idlewild Lot Owners Association, Lake & Glade (Yates Twp) - The Island/Flamingo Club, 1002 Martin Luther King Ave (Yates Twp) - Daniel Hale Williams House, 15712 Lake Dr (Yates Twp) - Herman & Lela Wilson House (6583 Paradise Path (Yates Twp) - John & Katharine Tunkun Podjun Farm, 9581 1-Mile Rd (Ellsworth Twp) - Lake County Courthouse Informational Designation (historic marker) (Baldwin) - Marlborough Historic District, James Rd. (Pleasant Plains Twp) - Shrine of the Pines, M-37 in (Pleasant Plains Twp)

USGS Topographic Map



BALDWIN VILLAGE
Community Profile

1. Physical Features	
Lakes	- *None identified*
Rivers	- Baldwin River - Sanborn Creek
Notable features	- County seat - Pere Marquette State Trail
Land description	Residential neighborhoods, commercial corridor, forested areas

2. Land Value: 2023 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	1,036	% with disability	28.8%
+/- change 2010 to 2020*	-25.3%	% in poverty	40.8%
Median age	45.3	ALICE households**	38 % (county)
% under 18 years old	16.5%	Avg. daily commute	25.4 minutes
% over 65 years old	31.9%		

** US decennial census figures* ***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*

4. Peak Seasonal Population		*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*	
Hotel rooms*	0	Vacant housing units**	73
Campground & RV sites*	0	Peak seasonal population	1,474

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

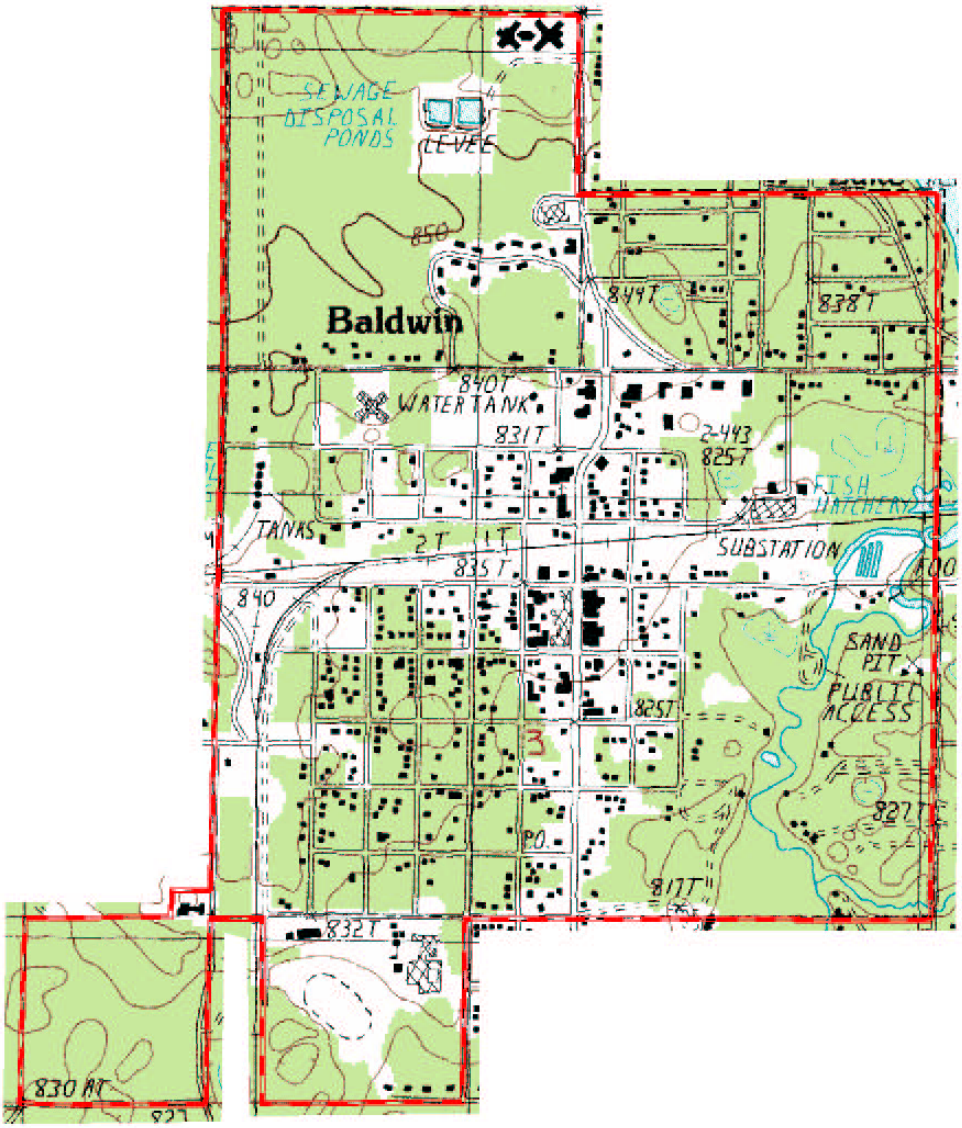
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	475	Single units	273
Occupied housing units	402	Multi-units in structure	198
Vacant housing units	73	Mobile homes or other	4

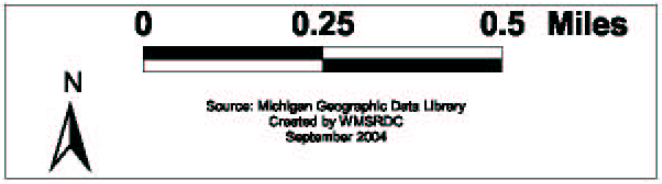
6. Public Services	
Fire	Baldwin Fire Station, 620 Washington St
Police	Lake County Sheriff Department, 1153 N Michigan Ave
Wastewater	- Village of Baldwin - Baldwin Wastewater Treatment Plant (Pleasant Plains Twp)
Community Water System	Village of Baldwin
Public transportation	- *None identified*
Other	- Lake County Jail, 1153 Michigan Ave - Lake County Residential Re-Entry, 5565 S. M-37 (closed)

7. Critical Infrastructure	
Major roads	US-10, M-37
Railroads	Marquette Rail
Bridges	8th St Over Baldwin River (closed)
Airports	- *None identified*
Shelters	- Baldwin Congregational United Church of Christ, 870 Beech St - Baldwin Elementary School, 525 Fourth St - Baldwin Middle/High School, 525 W. Fourth St - Baldwin Village Office Fire Dept, 620 Washington St

	- St Ann's Senior Center, 690 E 9th St - Baldwin Assembly of God, 10063 M-37
Schools	- Baldwin Community JR/SR High School, 525 W. 4th St - Baldwin Elementary School, 525 W. 4th St - Baldwin Alternative Education, 525 W. 4th St
Community medical facilities, Hospitals	- Baldwin Teen Health Center, 525 W. Forth St. - Baldwin Family Health Care, 1615 Michigan Ave. - Loretta Adams-Ashby Health Center, 1101 E. Washington
Ambulance service	Life EMS of Lake County, 792 Washington St
Dams	Baldwin Fish Hatchery Dam
8. Economic Assets	
Major employers	- Lake County Government, 800 10th St Baldwin - Baldwin Family Healthcare, 1615 Michigan Ave, Baldwin - Grand Oaks Nursing Center, 600 Denmark St, Baldwin - US Forest Service Ranger Station, 650 Michigan Ave, Baldwin - Lake Osceola State Bank, 790 Michigan Ave, Baldwin - Baldwin Community Schools, 525 4th St, Baldwin
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Village of Baldwin, 620 Washington St
Festivals:	- Trout-A-Rama (festival), last full weekend of July - Blessing of the Bikes, 3rd weekend of May
Historic Sites:	Lake County Courthouse Informational Designation (historic marker) (Baldwin)

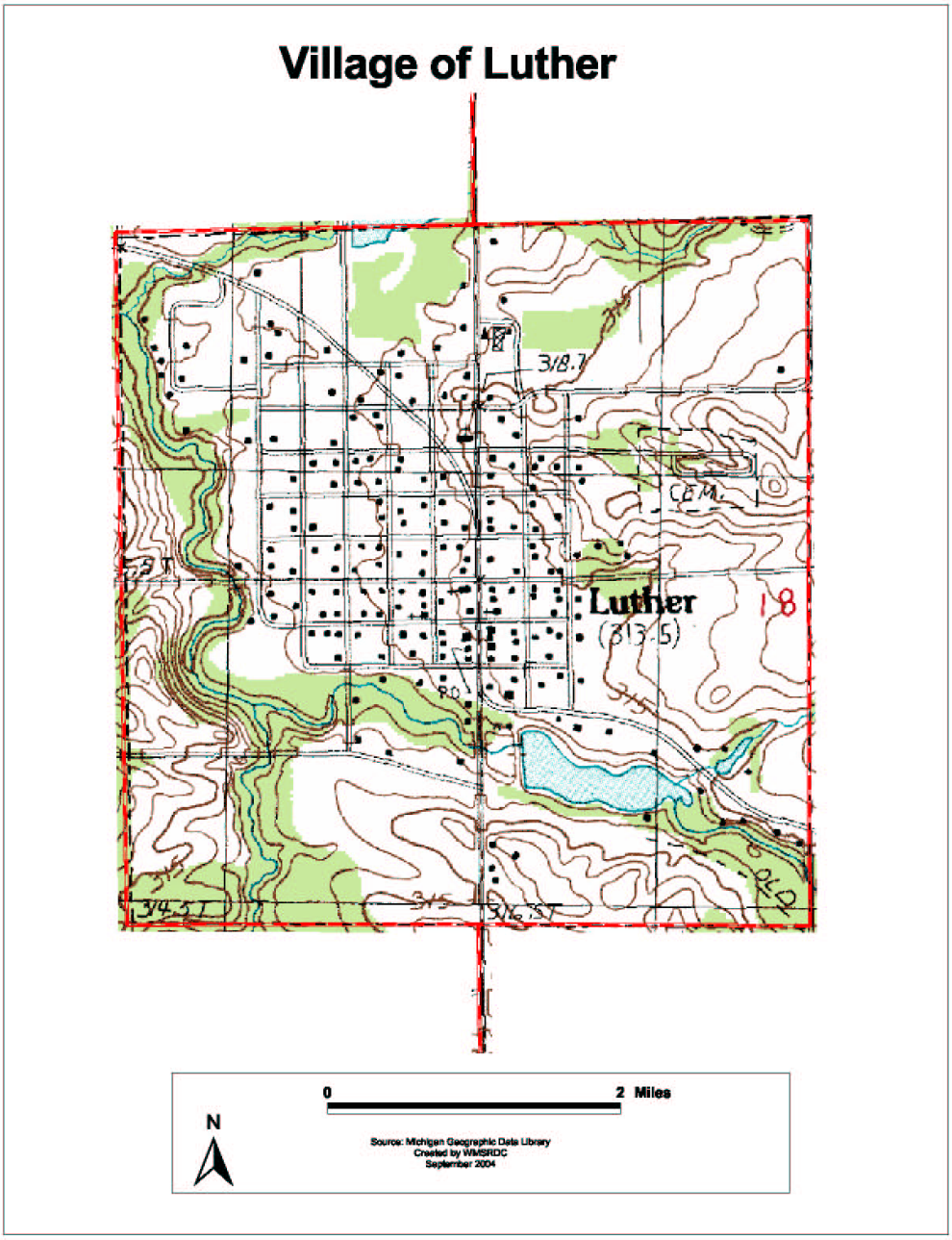
Village of Baldwin





LUTHER VILLAGE Community Profile			
1. Physical Features			
Lakes	Luther Mill Pond		
Rivers	Little Manistee River		
Notable features	Traditional neighborhood street grid with a small downtown core		
Land description	Mainly residential with a commercial along Old M-63/State St and some agriculture to the southern end		
2. Land Value: 2023 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	308	% with disability	31.5%
+/- change 2010 to 2020*	4.4%	% in poverty	29.6%
Median age	39.6	ALICE households**	38 %
% under 18 years old	24.4%	Avg. daily commute	27.6 minutes
% over 65 years old	15.9%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	75
Campground & RV sites*	0	Peak seasonal population	758
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	196	Single units	173
Occupied housing units	121	Multi-units in structure	0
Vacant housing units	75	Mobile homes or other	23
6. Public Services			
Fire	Luther Fire Department, 714 State St.		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	*- None identified*		
Railroads	*- None identified*		
Bridges	State St over Little Manistee River		
Airports	*- None identified*		
Shelters	St Ignatius Catholic Church, 701 N State St		
Schools	*- None identified*		
Community medical facilities, Hospitals	*- None identified*		
Ambulance service	*- None identified*		
Dams	Luther Pond Dam		

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:	- Luther-Newkirk Municipal Hall, 301 State St - Ellsworth Township Hall, 210 N. State St. - Luther Area Public Library, 300 Ash St. - Lake County Road Commission, 103 Garfield St. - United States Post Office - Luther, 207 State St
Festivals:	Luther Logger Days (festival), 4th of July weekend
Historic Sites:	- *None identified*

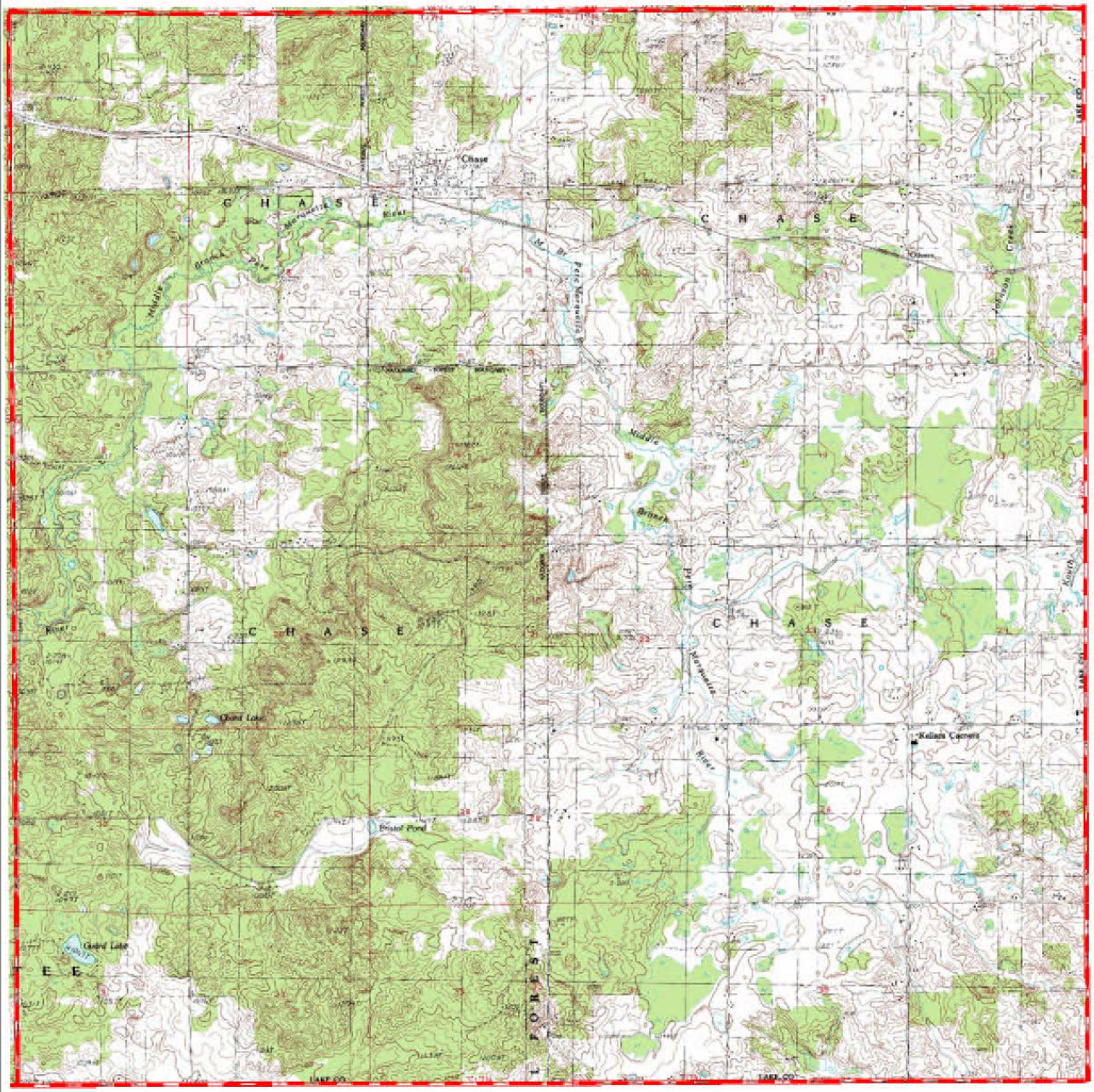


CHASE TOWNSHIP
Community Profile

1. Physical Features			
Lakes	*- None identified*		
Rivers	Middle Branch Pere Marquette River		
Notable features	- Chase (unincorporated) - Manistee National Forest - Pere Marquette State Forest - Pere Marquette State Trail		
Land description	Rural community; mainly forested and agricultural with scattered residential uses. Some housing density and commercial uses in the community of Chase		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$10,611,000	Industrial	$0
Commercial	$2,443,500	Residential	$46,903,100
Total personal	$6,745,600		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	1,310	% with disability	26.3%
+/- change 2010 to 2020*	1.4%	% in poverty	4.7%
Median age	54.8	ALICE households**	38 %
% under 18 years old	20.2%	Avg. daily commute	20.9 minutes
% over 65 years old	31.9%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	O	Vacant housing units**	156
Campground & RV sites*	35	Peak seasonal population	2,386
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	511	Single units	337
Occupied housing units	355	Multi-units in structure	0
Vacant housing units	156	Mobile homes or other	174
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	US-10		
Railroads	*- None identified*		
Bridges	- S Frank Smith Rd over Pere Marquette River Middle Branch - S Baker Rd over Pere Marquette River Middle 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	Chase Creek Smokehouse, 7143 S Depot, Chase Twp
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Chase Township Hall, 8264 US-10 - Chase Public Library, 8400 North St. - United States Post Office - Chase, 6958 S Depot St
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Chase Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

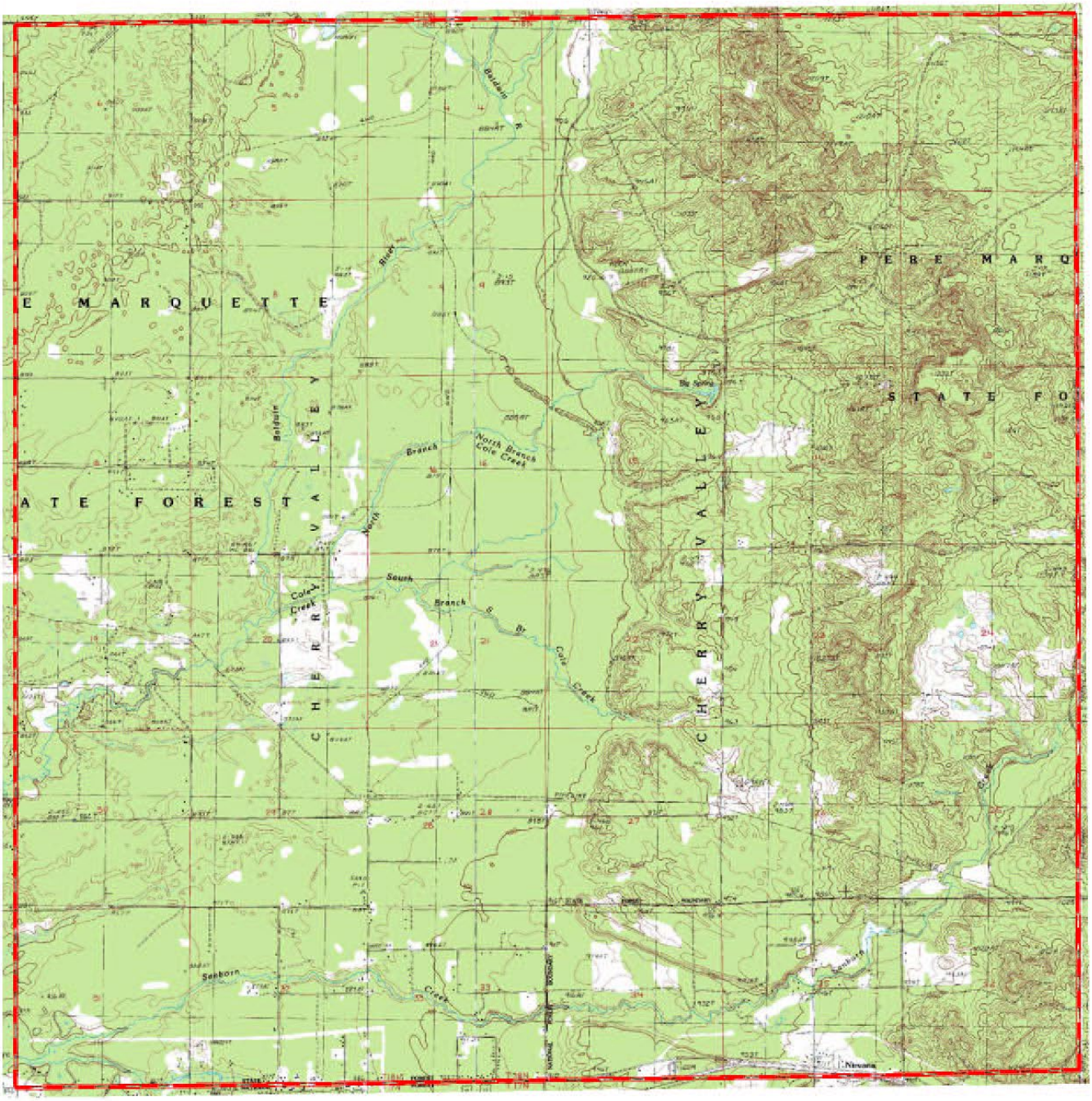
CHERRY VALLEY TOWNSHIP
Community Profile

1. Physical Features			
Lakes	*- None identified*		
Rivers	Baldwin River		
Notable features	- Manistee National Forest - Pere Marquette State Forest - Pere Marquette State Trail		
Land description	Mainly forested with scattered residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$712,300	Industrial	$25,100
Commercial	$0	Residential	$28,175,600
Total personal	$853,250		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	445	% with disability	29.7%
+/- change 2010 to 2020*	6.6%	% in poverty	13.7%
Median age	63.1	ALICE households**	38 %
% under 18 years old	8.3%	Avg. daily commute	30.8 Minutes
% over 65 years old	44.7%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	336
Campground & RV sites*	0	Peak seasonal population	2,461
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	517	Single units	291
Occupied housing units	181	Multi-units in structure	2
Vacant housing units	336	Mobile homes or other	221
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	US-10		
Railroads	*- None identified*		
Bridges	E 24th St over Baldwin 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	*- None identified*
Pipelines	Natural Gas Pipeline
Commercial transportation	*- None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Cherry Valley Township Hall, 5850 S. Kings Highway
Festivals:	*- None identified*
Historic Sites:	*- None identified*

USGS Topographic Map

Cherry Valley Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

DOVER TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Lake Olga		
Rivers	Pine River		
Notable features	- Manistee National Forest - Pere Marquette State Forest		
Land description	Mainly forested with some agriculture and scattered residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$3,796,100	Industrial	$299,400
Commercial	$59,000	Residential	$29,153,900
Total personal	$771,500		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	522	% with disability	18.4%
+/- change 2010 to 2020*	-3%	% in poverty	35%
Median age	49.9	ALICE households**	38 %
% under 18 years old	23%	Avg. daily commute	28.1 minutes
% over 65 years old	21.6%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
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*	0	Peak seasonal population	1,428
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	316	Single units	230
Occupied housing units	165	Multi-units in structure	0
Vacant housing units	151	Mobile homes or other	84
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	*- None identified*		
Railroads	*- None identified*		
Bridges	- N Skookum Rd over Pine River - N State Rd over Pine River - E 6 Mile Rd over Pine River		
Airports	*- None identified*		
Shelters	*- None identified*		
Schools	*- None identified*		
Community medical facilities, Hospitals	*- None identified*		

Ambulance service	*- None identified*
Dams	Olga Lake Dam
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:	Dover Township Hall, 10978 8 Mile Rd
Festivals:	*- None identified*
Historic Sites:	*- None identified*

Dover Township

0 2 Miles

N

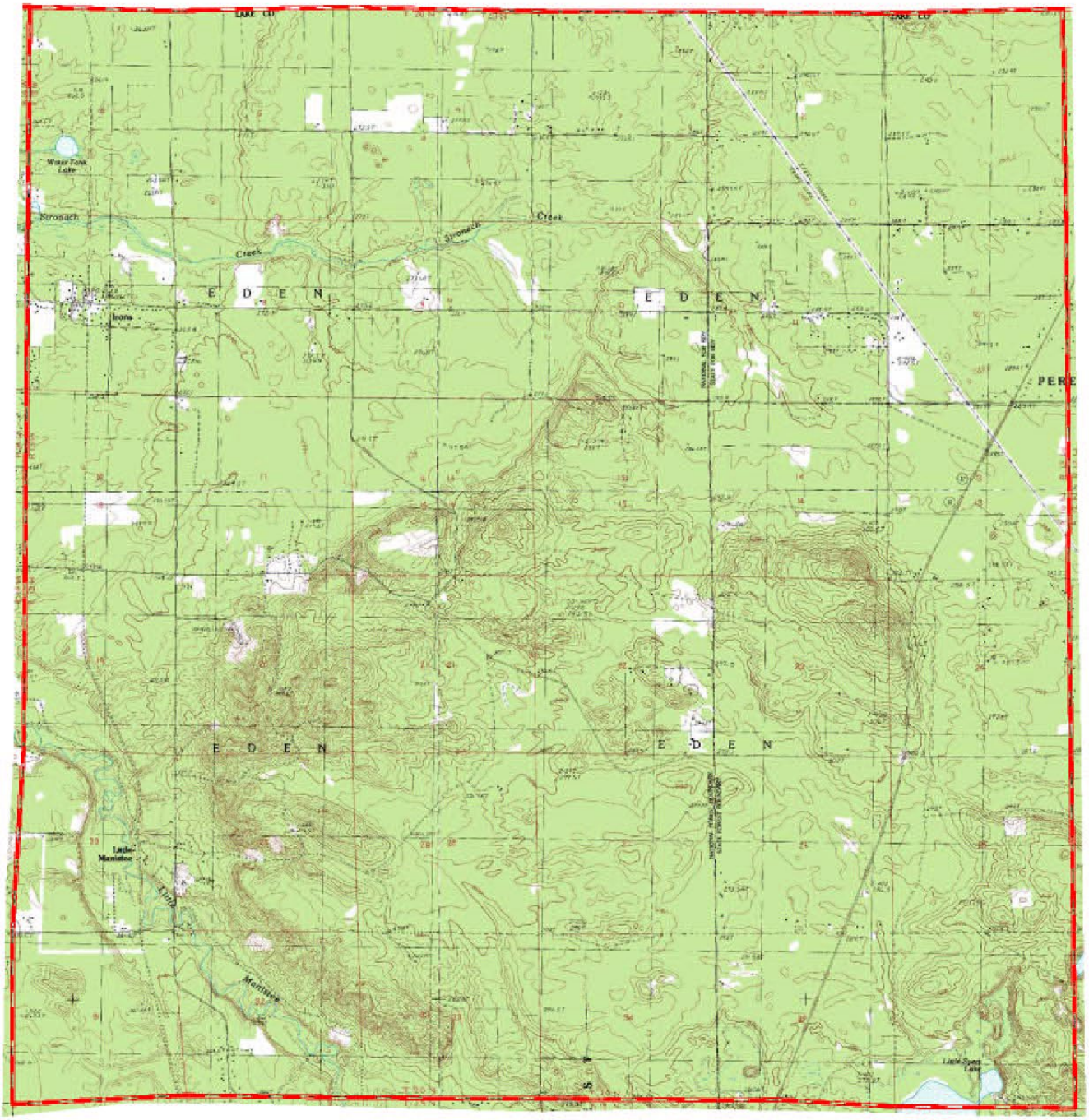
Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

EDEN TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Syers Lake		
Rivers	Little Manistee River		
Notable features	- Irons (unincorporated community) - Manistee National Forest - Pere Marquette State Forest		
Land description	Mainly forested with scattered residential; commercial uses concentrated in Irons		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$65,300
Commercial	$1,539,700	Residential	$37,644,300
Total personal	$1,761,100		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	515	% with disability	18.1%
+/- change 2010 to 2020*	-3.7%	% in poverty	19.8%
Median age	49.4	ALICE households**	38 %
% under 18 years old	10.7%	Avg. daily commute	27.5 minutes
% over 65 years old	24.7%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	512
Campground & RV sites*	155	Peak seasonal population	4,207
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	683	Single units	360
Occupied housing units	171	Multi-units in structure	6
Vacant housing units	512	Mobile homes or other	317
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	M-37		
Railroads	*- None identified*		
Bridges	N Irons Rd over Little Manistee River		
Airports	*- None identified*		
Shelters	St Bernard Catholic Church, 5734 W 10 ½ Mile 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	- *None identified*
Electric transmission	Consumers Energy power line
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Eden Township Hall, 5837 W. 10 ½ Mile Rd. - United States Post Office – Irons, 5574 W 10 1/2 Mile Rd
Festivals:	Irons Flea Roast & Ox Market (June)
Historic Sites:	- *None identified*

Eden Township



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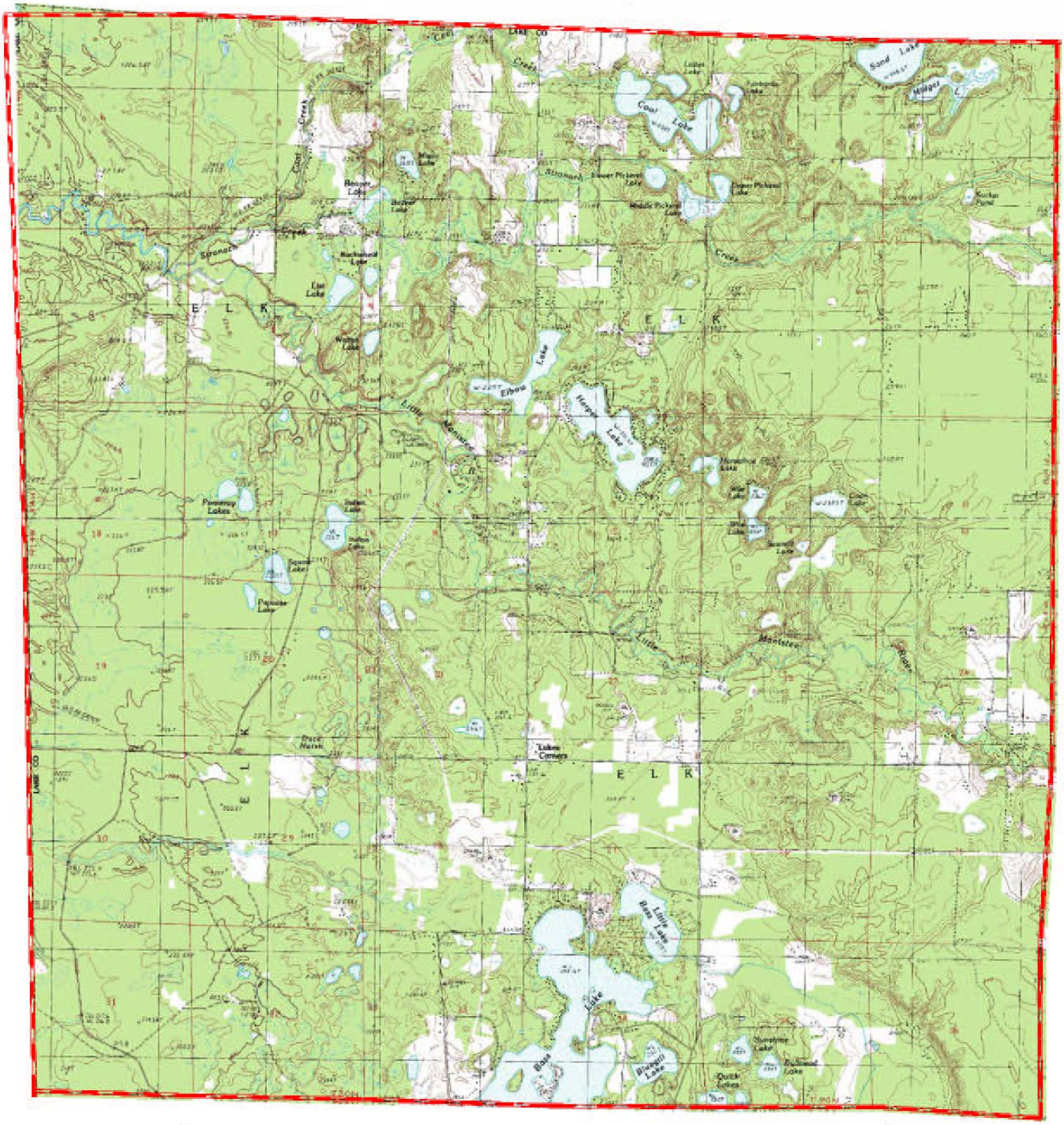
ELK TOWNSHIP Community Profile			
1. Physical Features			
Lakes	Big Bass Lake, Little Bass Lake, Harper Lake, Cool Lake, Sand Lakes		
Rivers	Little Manistee River		
Notable features	- Manistee National Forest - North Country National Scenic Trail		
Land description	Mainly forested; numerous lakes with residential concentrations		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$845,400	Industrial	$202,900
Commercial	$693,400	Residential	$140,846,200
Total personal	$2,381,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	942	% with disability	27.6%
+/- change 2010 to 2020*	-4.6%	% in poverty	14.6%
Median age	61.7	ALICE households**	38 %
% under 18 years old	4%	Avg. daily commute	33.5 minutes
% over 65 years old	42.5%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	1,066
Campground & RV sites*	66	Peak seasonal population	7,602
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,470	Single units	1,192
Occupied housing units	404	Multi-units in structure	0
Vacant housing units	1,066	Mobile homes or other	275
6. Public Services			
Fire	Sauble Elk Eden Townships Fire Department, 6711 W 8 Mile Rd		
Police	- *None identified*		
Wastewater	- *None identified*		
Community Water System	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	- *None identified*		
Railroads	- *None identified*		
Bridges	- N Granger Rd over Little Manistee River - N Bass Lake Rd over Little Manistee River - 10 ½ Mile Rd over Little Manistee River - W 11 Mile Rd over Little Manistee River		
Airports	- *None identified*		
Shelters	- Edgetts Wesleyan Church, 3446 N Raymond Rd - Sauble Elk Eden Townships Fire and Rescue, 6711 W 8 Mile Rd		
Schools	- *None identified*		
Community medical facilities,	- *None identified*		

Hospitals	
Ambulance service	- *None identified*
Dams	Midget Lake Dam
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:	Elk Township Hall, 8966 N. Bass Lake Rd
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Elk Township



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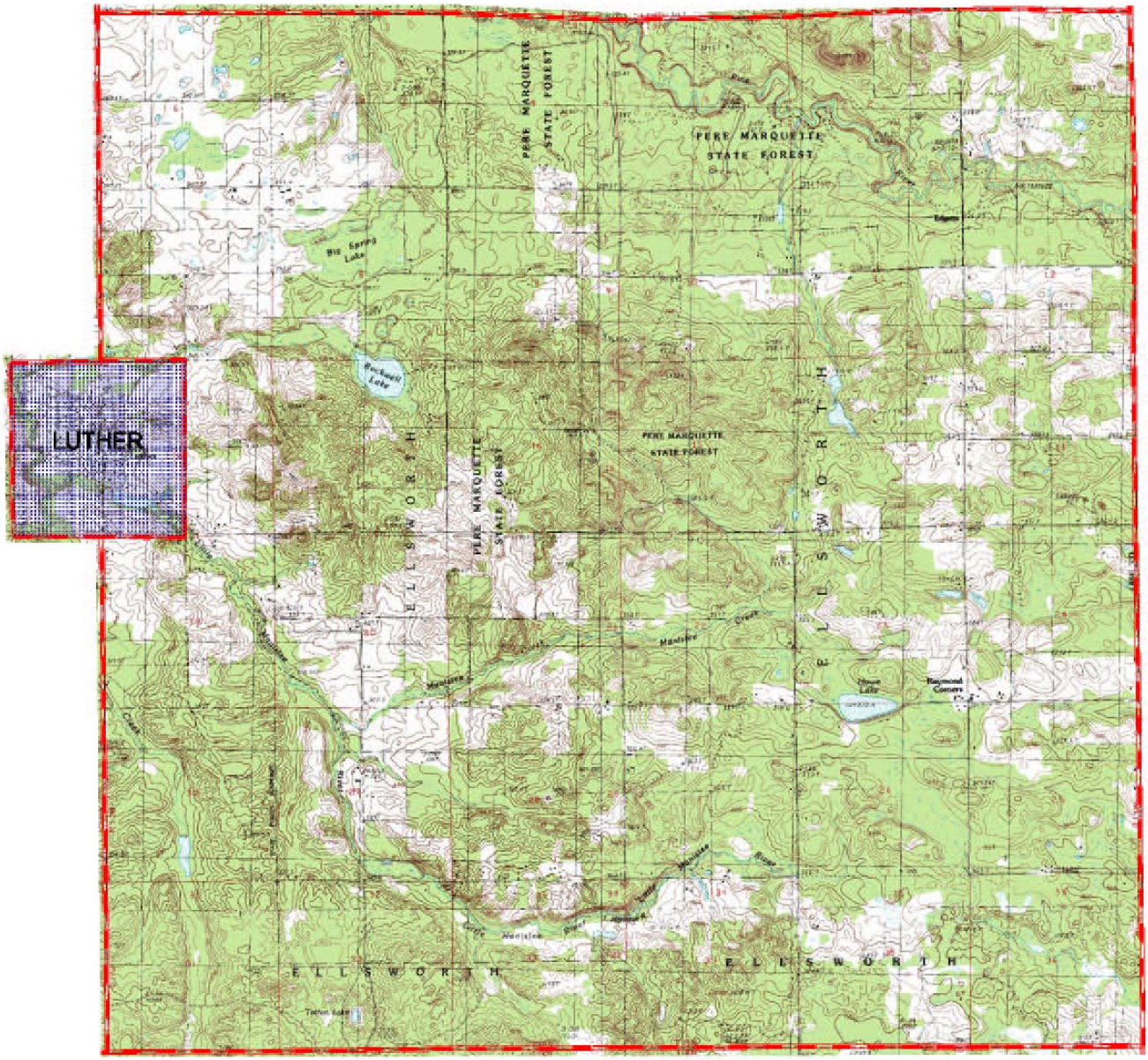
ELLSWORTH TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Howe Lake, Rockwell Lake		
Rivers	Little Manistee, Pine River		
Notable features	- Luther Village (part) - Pere Marquette State Forest		
Land description	Mainly forested with scattered agriculture and residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$4,509,800	Industrial	$0
Commercial	$246,500	Residential	$44,728,000
Total personal	$1,790,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	622	% with disability	30.9%
+/- change 2010 to 2020*	-9.9%	% in poverty	15.2%
Median age	53.2	ALICE households**	38 %
% under 18 years old	19.6%	Avg. daily commute	27.4 minutes
% over 65 years old	26.8%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	10	Vacant housing units**	315
Campground & RV sites*	0	Peak seasonal population	2,532
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	552	Single units	343
Occupied housing units	237	Multi-units in structure	5
Vacant housing units	315	Mobile homes or other	202
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	*- None identified*		
Railroads	*- None identified*		
Bridges	- E 6 Mile Rd over Pine River - N Raymond over Pine 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	*- None identified*
Pipelines	*- None identified*
Commercial transportation	*- None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Ellsworth Township Hall, 210 N State St (Luther)
Festivals:	*- None identified*
Historic Sites:	John & Katharine Tunkun Podjun Farm, 9581 1-Mile Rd (Ellsworth Twp)

USGS Topographic Map

Ellsworth Township



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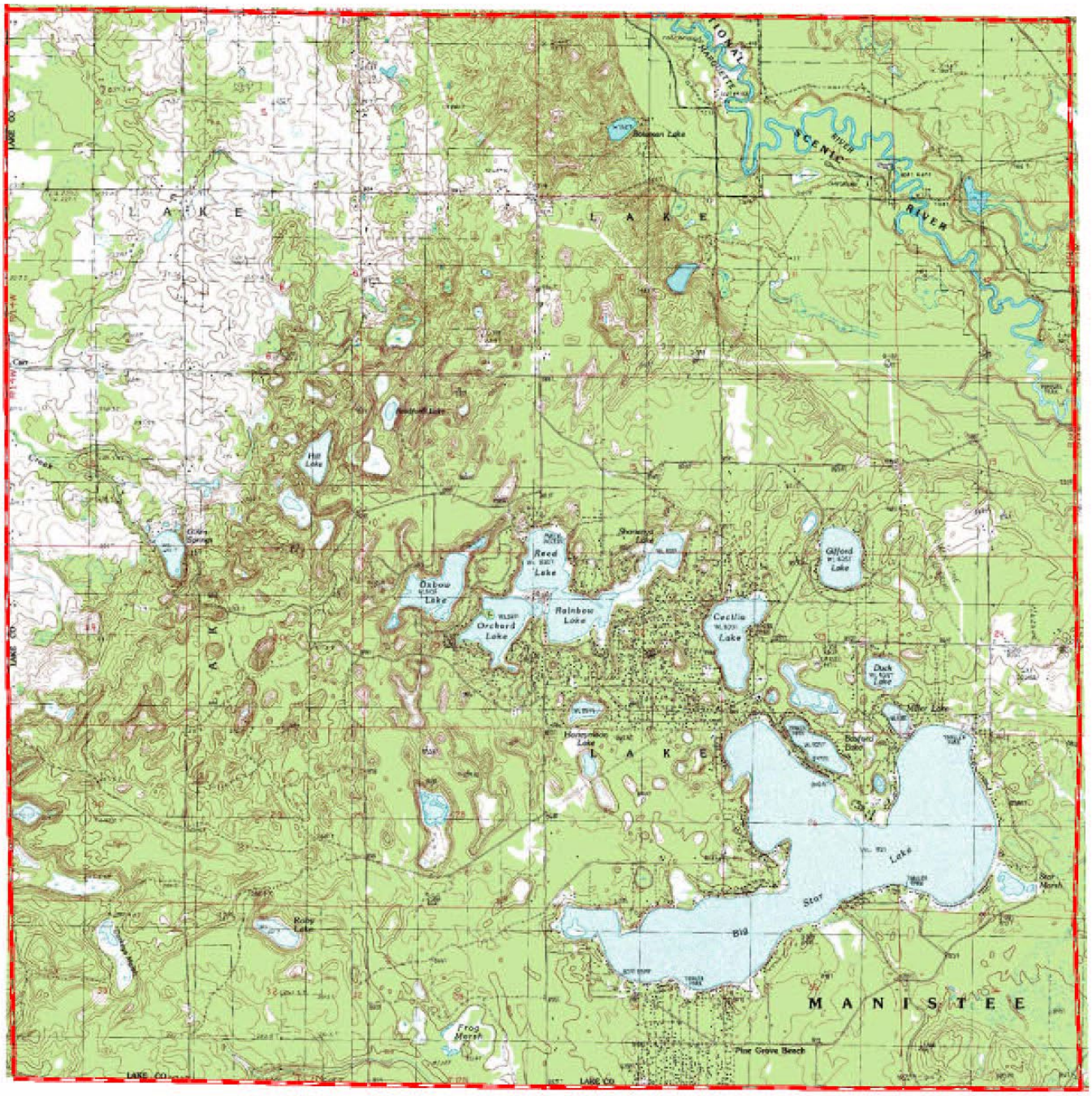
LAKE TOWNSHIP Community Profile			
1. Physical Features			
Lakes	Big Star Lake		
Rivers	Pere Marquette River		
Notable features	- Manistee National Forest - North Country National Scenic Trail - Significant seasonal population increase		
Land description	Forested with some agriculture in the northwest and residential concentrations around Big Star Lake and other nearby smaller lakes		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$3,512,20	Industrial	$0
Commercial	$2,138,900	Residential	$192,451,800
Total personal	$3,175,650		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	701	% with disability	34%
+/- change 2010 to 2020*	-6%	% in poverty	18.8%
Median age	59.5	ALICE households**	38 %
% under 18 years old	10.1%	Avg. daily commute	32.7 minutes
% over 65 years old	34.2%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	1,828
Campground & RV sites*	178	Peak seasonal population	12,381
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	2,139	Single units	1,615
Occupied housing units	311	Multi-units in structure	0
Vacant housing units	1,828	Mobile homes or other	524
6. Public Services			
Fire	Lake Township Fire & Rescue, 15580 S Star Lake Rd		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- 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	- Big Star Lake Level Control Structure - Clear Lake Dam
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:	Lake Township Hall, 15580 Star Lake Dr
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Lake Township



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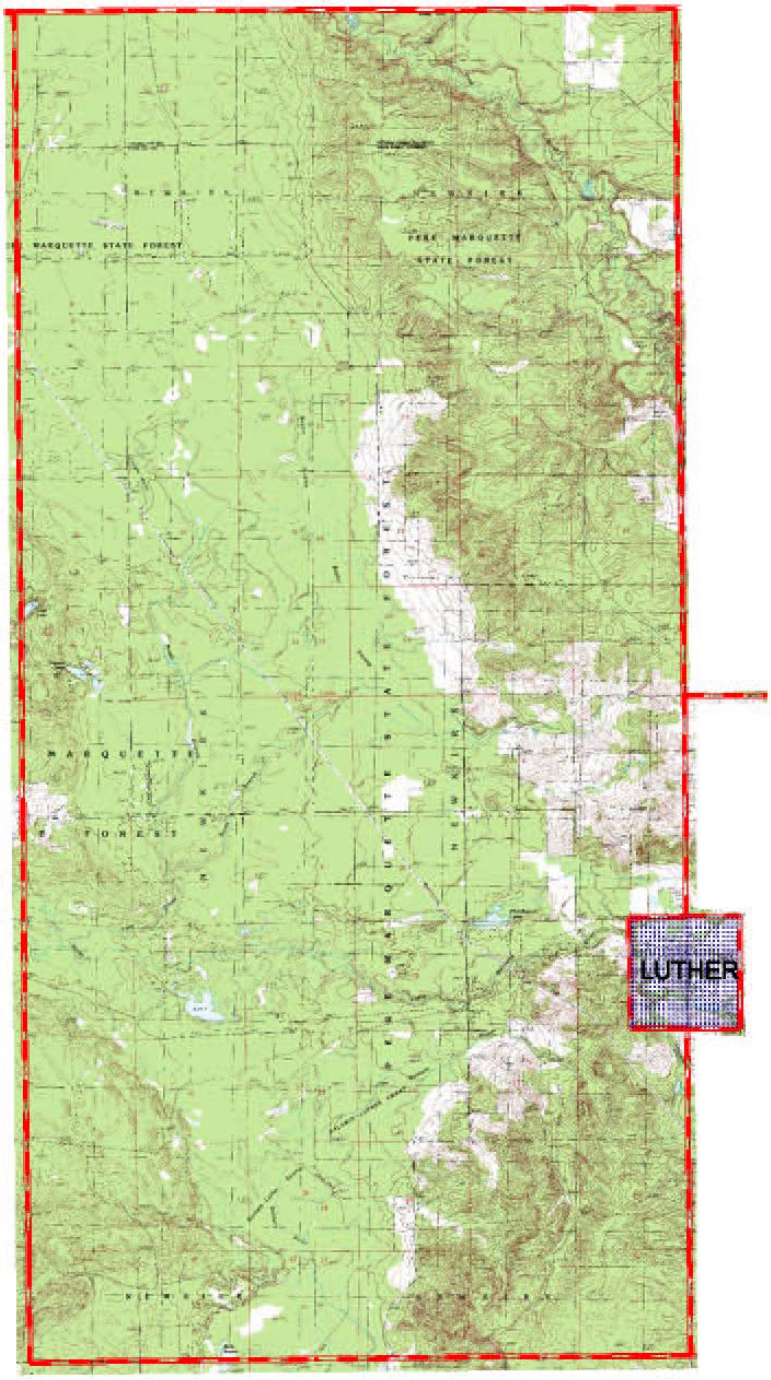
NEWKIRK TOWNSHIP
Community Profile

1. Physical Features			
Lakes	*- None identified*		
Rivers	Little Manistee River, Pine River		
Notable features	- Luther Village (part) - Approximately 12 sq mi area - Pere Marquette State Forest - Little Widewaters Flooding State Wildlife Management Area		
Land description	Mainly forested with some agriculture and scattered residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$6,848,400	Industrial	$0
Commercial	$862,400	Residential	$33,331,900
Total personal	$3,543,000		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	883	% with disability	32.8%
+/- change 2010 to 2020*	3.6%	% in poverty	8.1%
Median age	50	ALICE households**	38 %
% under 18 years old	20.7%	Avg. daily commute	38.6 minutes
% over 65 years old	19.9%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	480
Campground & RV sites*	92	Peak seasonal population	4,131
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	777	Single units	566
Occupied housing units	297	Multi-units in structure	0
Vacant housing units	480	Mobile homes or other	211
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	M-37		
Railroads	*- None identified*		
Bridges	- E 10 Mile Rd over Pine River - N State Rd over Pine River		
Airports	Guy Vander Jagt Airfield (95MI)		
Shelters	*- None identified*		
Schools	*- None identified*		
Community medical facilities, Hospitals	*- None identified*		

Ambulance service	*- None identified*
Dams	Little Widewaters Flooding Dam
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:	Luther-Newkirk Municipal Hall, 301 State St
Festivals:	*- None identified*
Historic Sites:	*- None identified*

Newkirk Township



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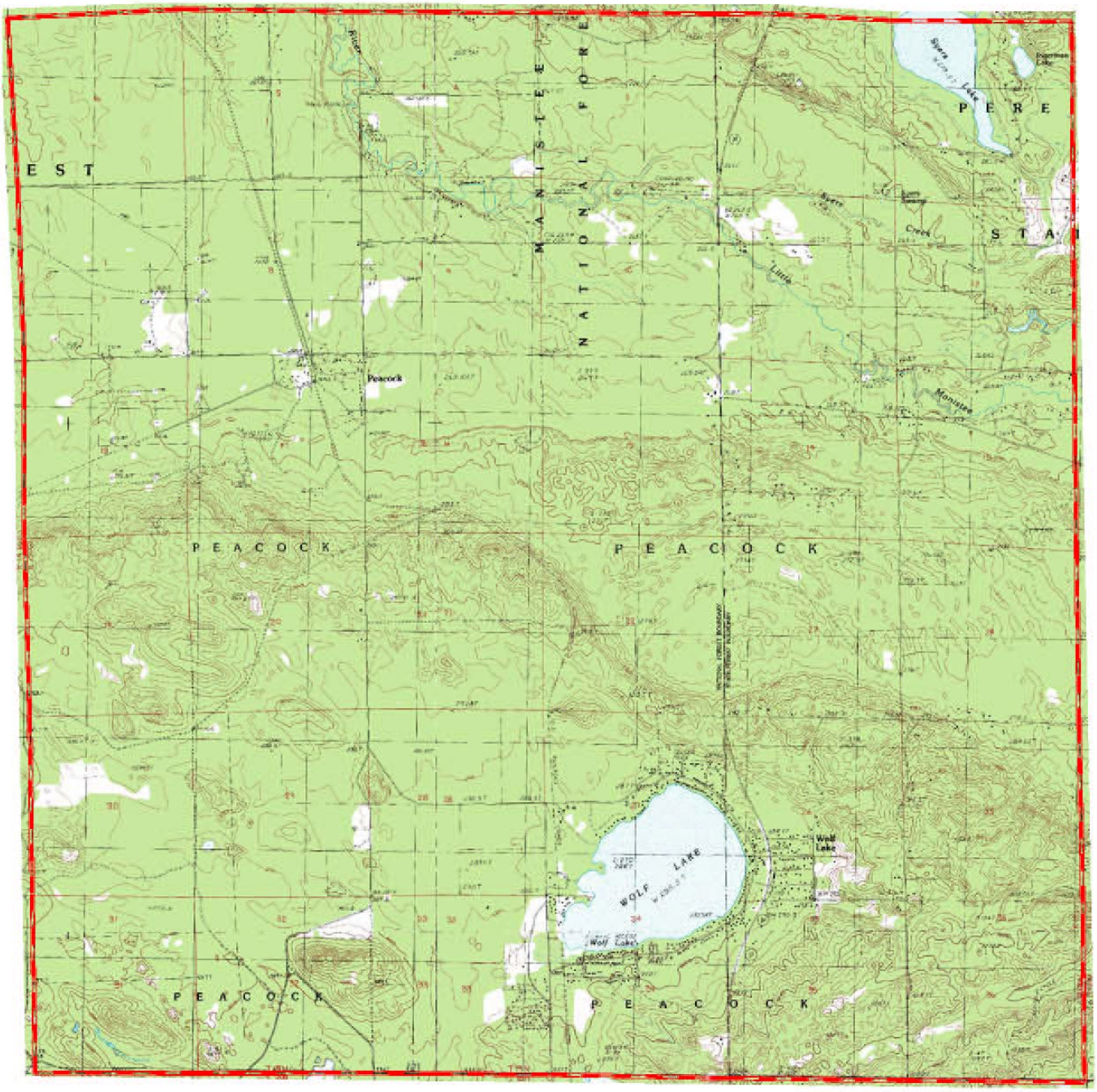
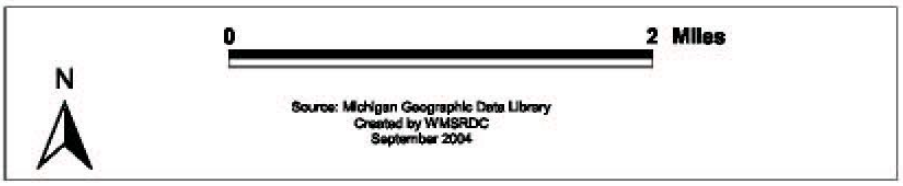
PEACOCK TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Syers Lake, Wolf Lake		
Rivers	Little Manistee River		
Notable features	- Wolf Lake (unincorporated community) - Pere Marquette State Forest - Manistee National Forest - Little O ORV Trail		
Land description	Mainly forested with commercial and residential development concentrated around Wolf Lake		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$0
Commercial	$1,498,800	Residential	$63,820,100
Total personal	$1,048,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	440	% with disability	23.4%
+/- change 2010 to 2020*	-19.1%	% in poverty	12.3%
Median age	64	ALICE households**	38 %
% under 18 years old	5%	Avg. daily commute	43.8 minutes
% over 65 years old	44.3%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population		*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*	
Hotel rooms*	28	Vacant housing units**	814
Campground & RV sites*	20	Peak seasonal population	5,460
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,014	Single units	740
Occupied housing units	200	Multi-units in structure	0
Vacant housing units	814	Mobile homes or other	274
6. Public Services			
Fire	- *None identified*		
Police	- *None identified*		
Wastewater	- *None identified*		
Community Water System	- *None identified*		
Public transportation	- *None identified*		
Other	- *None identified*		
7. Critical Infrastructure			
Major roads	M-37		
Railroads	Marquette Rail		
Bridges	- M-37 over Little Manistee River- W 4 Mile Rd over Little Manistee River - Old M-63 over Little Manistee River - Peacock Trail over Little Manistee River - Marquette Rail over Little Manistee River		
Airports	- *None identified*		
Shelters	- *None identified*		

Schools	*- None identified*
Community medical facilities, Hospitals	*- None identified*
Ambulance service	Life EMS of Lake County, 4 ½ Mile Rd & M-37
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:	- Peacock Township Hall, 4480 W. 4 Mile Rd - NW Lake County Senior Center, 4240 W. 4 Mile Rd
Festivals:	*- None identified*
Historic Sites:	*- None identified*

Peacock Township



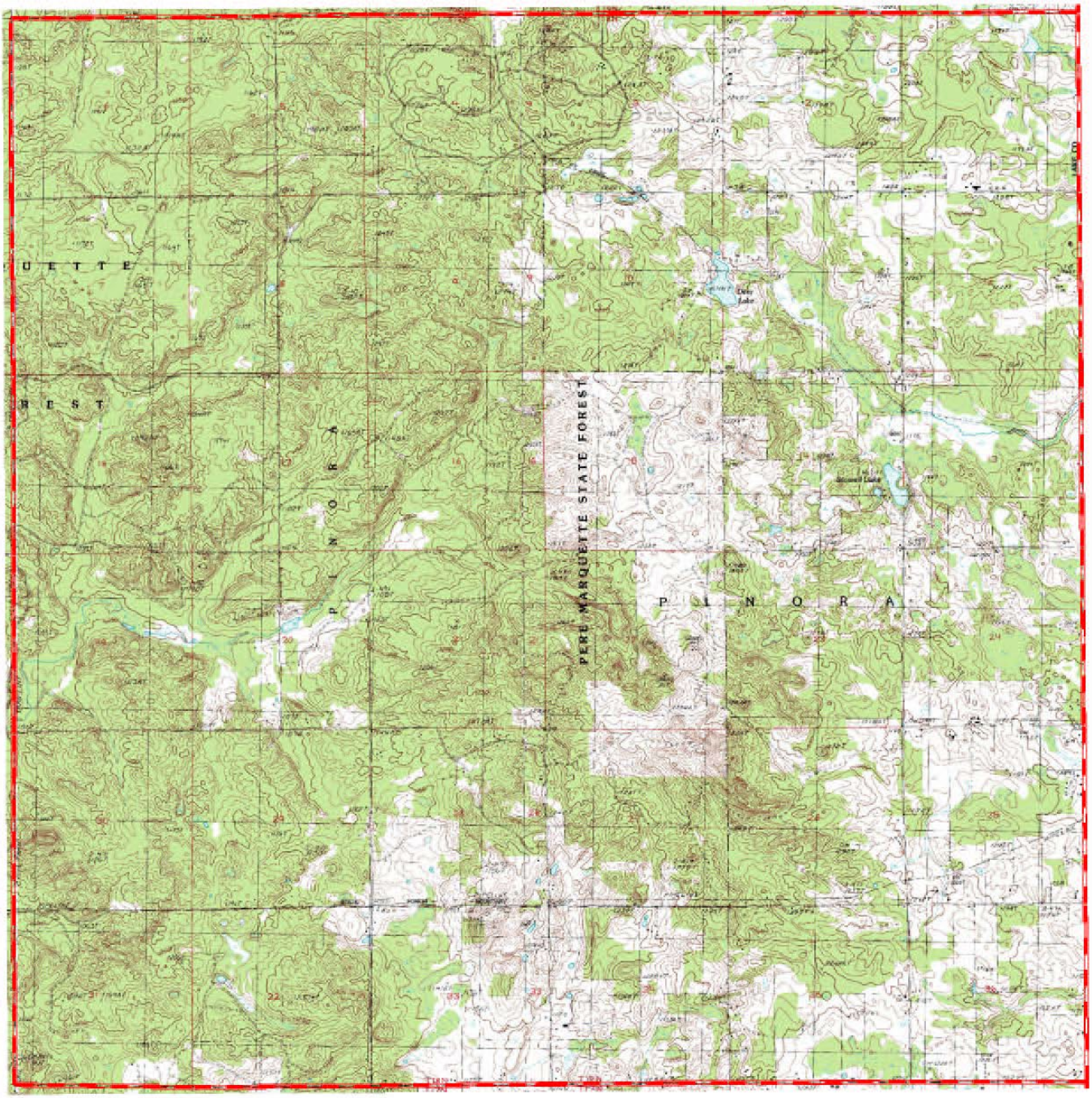


PINORA TOWNSHIP
Community Profile

1. Physical Features			
Lakes	*- None identified*		
Rivers	Black Creek		
Notable features	Pere Marquette State Forest		
Land description	Mainly forested with scattered agriculture and residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$2,310,990	Industrial	$194,600
Commercial	$0	Residential	$35,055,300
Total personal	$2,820,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	903	% with disability	19.2%
+/- change 2010 to 2020*	5.6%	% in poverty	19%
Median age	44.8	ALICE households**	38 %
% under 18 years old	21.2%	Avg. daily commute	26 minutes
% over 65 years old	16.7%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	189
Campground & RV sites*	0	Peak seasonal population	2,037
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	457	Single units	293
Occupied housing units	268	Multi-units in structure	0
Vacant housing units	189	Mobile homes or other	164
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- 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	- *None identified*
Pipelines	Natural gas pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Pinora Township Hall, 4032 S. Deer Lake Rd
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Pinora Township



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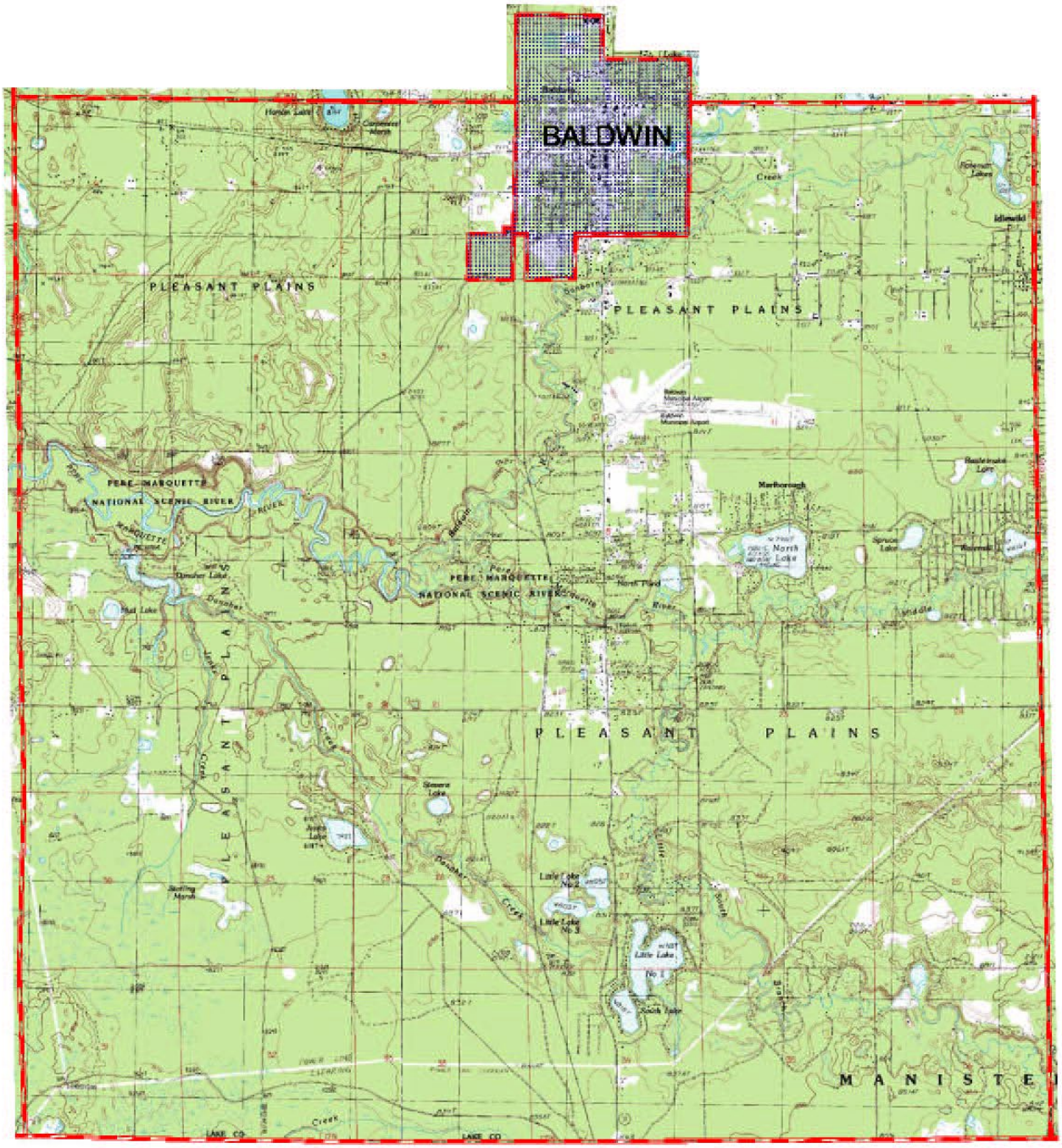
Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

PLEASANT PLAINS TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Little Lakes, North Lake, South Lake, Jenks Lake		
Rivers	Pere Marquette River, Baldwin River		
Notable features	- Baldwin Village (part) - Manistee National Forest - North Country National Scenic Trail		
Land description	Mainly forested, with commercial development along M-37 and residential uses concentrated around numerous lakes		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$107,400
Commercial	$12,200,400	Residential	$86,246,200
Total personal	$5,599,100		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	1,749	% with disability	24.9%
+/- change 2010 to 2020*	1.4%	% in poverty	30.8%
Median age	43.4	ALICE households**	38 %
% under 18 years old	23%	Avg. daily commute	26.3 minutes
% over 65 years old	27.7%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	47	Vacant housing units**	931
Campground & RV sites*	128	Peak seasonal population	7,941
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,532	Single units	1,200
Occupied housing units	601	Multi-units in structure	44
Vacant housing units	931	Mobile homes or other	288
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	Clean Water Association		
Public transportation	*- None identified*		
Other	- Baldwin Wastewater Treatment Plant - FiveCAP, 2476 W 44th St		
7. Critical Infrastructure			
Major roads	US-10, M-37		
Railroads	Marquette Rail		
Bridges	- US-10 over Baldwin River - M-37 over Pere Marquette River and Baldwin River - James Rd over Pere Marquette River		
Airports	Baldwin Municipal Airport		
Shelters	*- None identified*		
Schools	*- None identified*		

Community medical facilities, Hospitals	- *None identified*
Ambulance service	- *None identified*
Dams	Danaher Lake Dam
8. Economic Assets	
Major employers	Stealthcraft Boats, 6786 S M-37
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	- *None identified*
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Pleasant Plains Township Hall, 885 8th St (Baldwin)
Festivals:	- *None identified*
Historic Sites:	- Brown Trout Informational Designation (historic marker), M-37 - Marlborough Historic District, James Rd. - Shrine of the Pines, M-37

Pleasant Plains Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

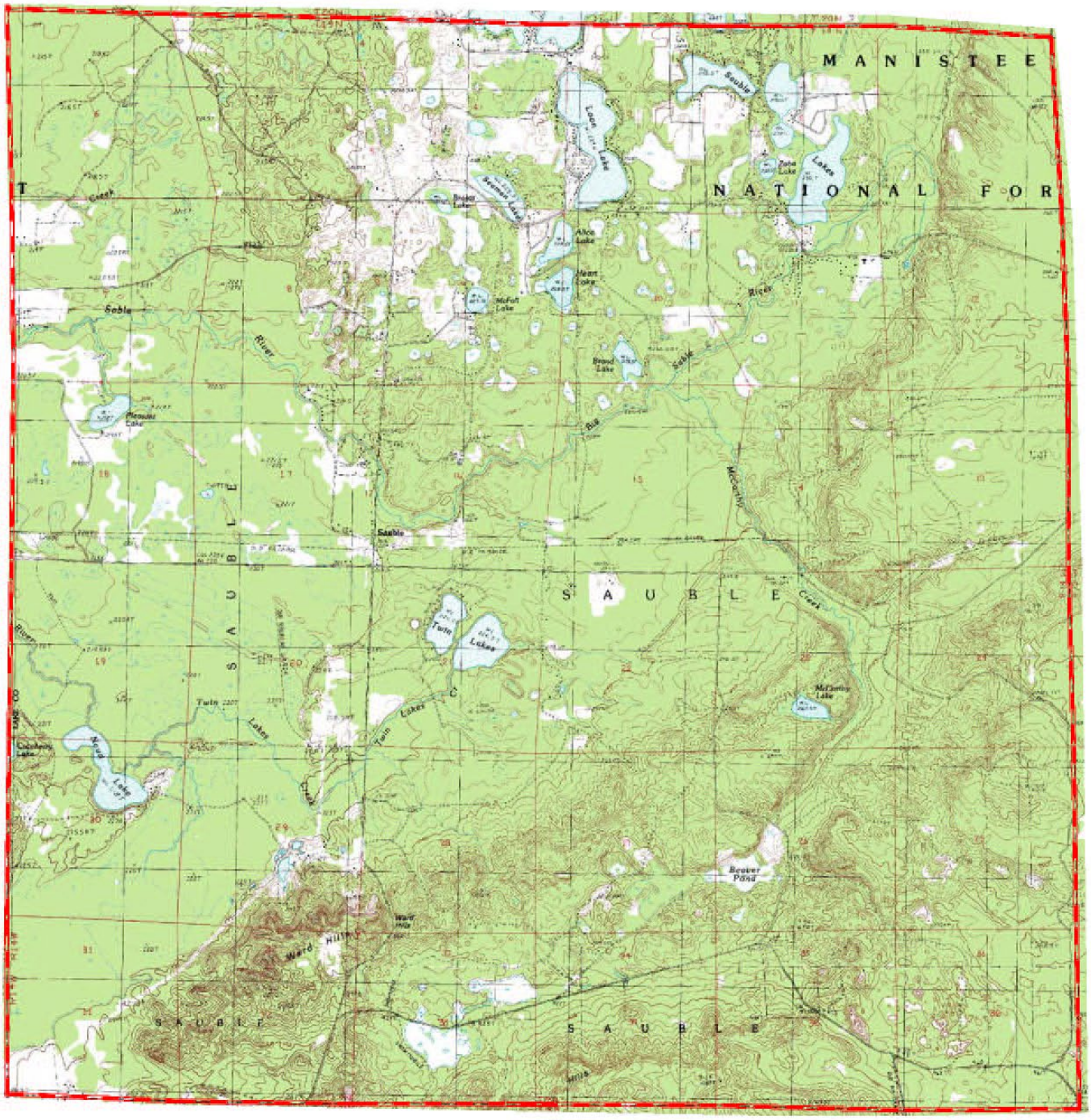
SAUBLE TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Bass Lake, Loon Lake, Sauble Lakes, Twin Lakes, and a number of smaller lakes		
Rivers	Big Sable River		
Notable features	Manistee National Forest		
Land description	Mainly forested with residential development concentrated in the vicinity of lakes in the northern areas		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$0
Commercial	$1,187,100	Residential	$57,679,400
Total personal	$1,111,200		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	393	% with disability	18.1%
+/- change 2010 to 2020*	12%	% in poverty	5.3%
Median age	59.3	ALICE households**	38 %
% under 18 years old	9.2%	Avg. daily commute	37 minutes
% over 65 years old	33.3%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	471
Campground & RV sites*	74	Peak seasonal population	3,515
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	645	Single units	485
Occupied housing units	174	Multi-units in structure	0
Vacant housing units	471	Mobile homes or other	160
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- 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	Faith Fellowship Church, 8889 W 6 Mile 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	*- None identified*
Electric transmission	*- None identified*
Pipelines	*- None identified*
Commercial transportation	*- None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Sauble Township Hall, 8906 W. 6 Mile Rd
Festivals:	*- None identified*
Historic Sites:	*- None identified*

USGS Topographic Map

Sauble Township



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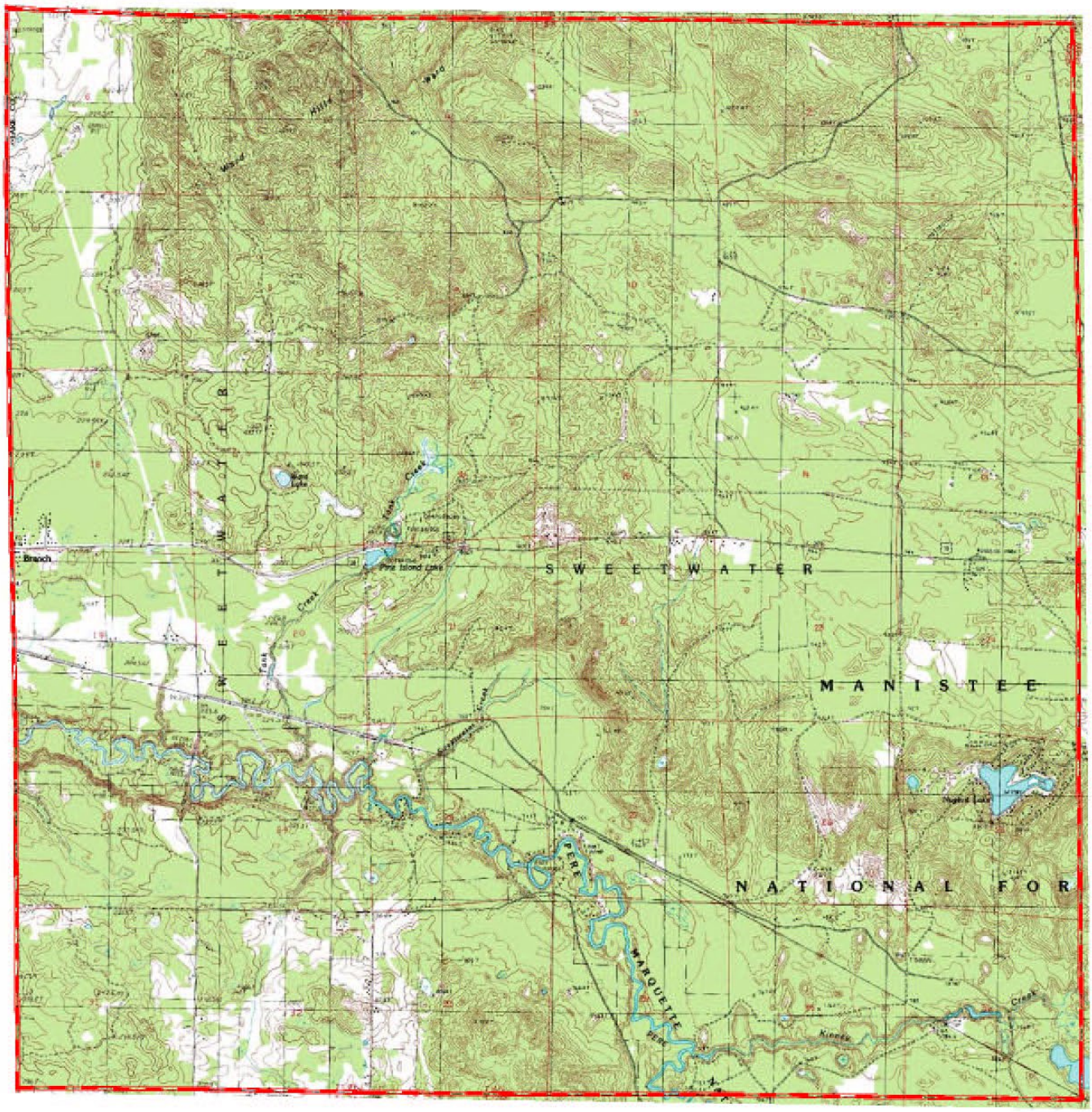
Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

SWEETWATER TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Nugent Lake		
Rivers	Pere Marquette River		
Notable features	- Manistee National Forest - North Country National Scenic Trail		
Land description	Mainly forested with scattered residential uses		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$65,600
Commercial	$317,000	Residential	$21,975,800
Total personal	$3,798,200		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	228	% with disability	20.2%
+/- change 2010 to 2020*	5.3%	% in poverty	21.5%
Median age	61.9	ALICE households**	38 %
% under 18 years old	12.7%	Avg. daily commute	33.7 minutes
% over 65 years old	38.6%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	3	Vacant housing units**	273
Campground & RV sites*	111	Peak seasonal population	2,316
** 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	224
Occupied housing units	95	Multi-units in structure	0
Vacant housing units	273	Mobile homes or other	144
6. Public Services			
Fire	*- None identified*		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	*- None identified*		
7. Critical Infrastructure			
Major roads	US-10		
Railroads	Marquette Rail		
Bridges	- W 56th St over Pere Marquette River - S Branch Rd over Pere Marquette River		
Airports	*- None identified*		
Shelters	Sweetwater Town Hall, 11265 Stevenson Ave		
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	Natural gas pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	- Sweetwater Township Hall, 11265 W. Stevenson Rd. - United States Post Office - Branch Main Office, 11952 W. US Highway 10
Festivals:	- *None identified*
Historic Sites:	- *None identified*

Sweetwater Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

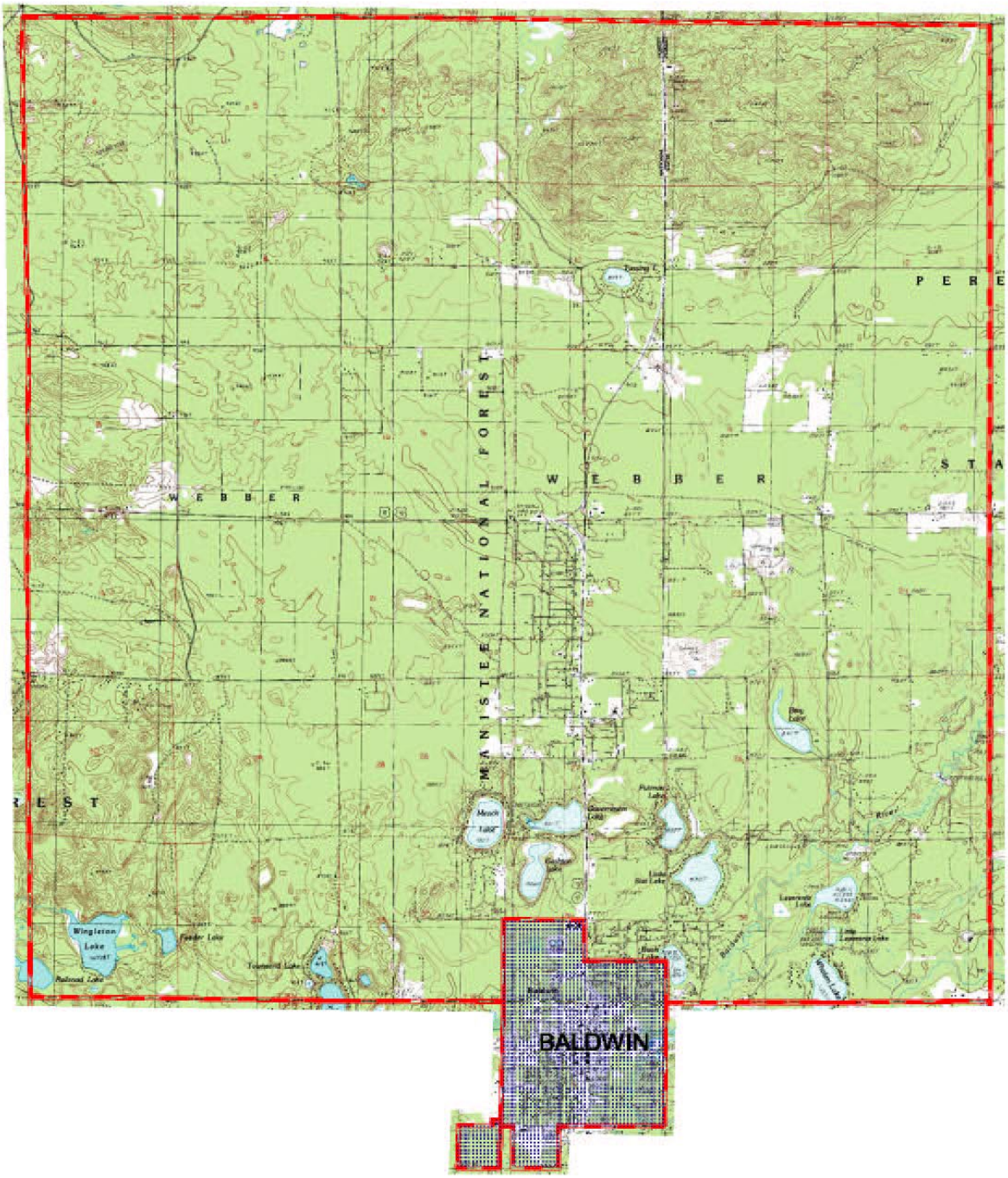
WEBBER TOWNSHIP
Community Profile

1. Physical Features			
Lakes	Various small lakes around Village of Baldwin		
Rivers	Baldwin River		
Notable features	- Village of Baldwin (part) - Manistee National Forest - Pere Marquette State Forest - Little O & Big O trails - GEO Group Northlake Detention (closed prison)		
Land description	Forested with commercial development along M-37 and residential uses mainly concentrated off of M-37 south of US-10		
2. Land Value: 2023 Real and Personal Equalized Valuations		*Source: 2023 Lake County Equalization Report*	
Agricultural	$0	Industrial	$574,900
Commercial	$39,360,900	Residential	$60,890,500
Total personal	$3,972,300		
3. Population Characteristics		*Source: 2021 American Community Survey 5-year Estimates, unless noted*	
Population, 2021	1,885	% with disability	39.3%
+/- change 2010 to 2020*	40.3%	% in poverty	22.7%
Median age	48	ALICE households**	38 %
% under 18 years old	18.1%	Avg. daily commute	36.5 minutes
% over 65 years old	29.9%		
** US decennial census figures*	***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*		
4. Peak Seasonal Population	*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*		
Hotel rooms*	0	Vacant housing units**	799
Campground & RV sites*	127	Peak seasonal population	7,187
** WMSRDC research conducted in 2022*	*** 2021 American Community Survey 5-year Estimates*		
5. Housing		*Source: 2021 American Community Survey 5-year Estimates*	
Housing units	1,393	Single units	817
Occupied housing units	594	Multi-units in structure	159
Vacant housing units	799	Mobile homes or other	415
6. Public Services			
Fire	Webber Township Fire Department, 2286 W. Springtime St		
Police	*- None identified*		
Wastewater	*- None identified*		
Community Water System	*- None identified*		
Public transportation	*- None identified*		
Other	GEO Group Northlake Detention, 1805 W 32nd St (closed)		
7. Critical Infrastructure			
Major roads	US-10, M-37		
Railroads	*- None identified*		
Bridges	US-10 over Baldwin River		
Airports	*- None identified*		
Shelters	Webber Township Fire Department, 2286 W. Springtime St		
Schools	*- None identified*		

Community medical facilities, Hospitals	- *None identified*
Ambulance service	- *None identified*
Dams	- *None identified*
8. Economic Assets	
Major employers	- Peacock Industries, 254 S M-37 - Peacock LTD, 276 S M-37
Power generation	- *None identified*
Electric transmission	- *None identified*
Pipelines	Natural gas pipeline
Commercial transportation	- *None identified*
9. Other Assets, Infrastructure, etc.	
Community facilities:	Webber Township Hall, 2286 W. Springtime St
Festivals:	- *None identified*
Historic Sites:	- *None identified*

USGS Topographic Map

Webber Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

YATES TOWNSHIP
Community Profile

1. Physical Features	
Lakes	Idlewild Lake, Paradise Lake
Rivers	Middle Branch Pere Marquette River
Notable features	- Idlewild (unincorporated community) - Manistee National Forest - Pere Marquette State Trail
Land description	Mainly forested with scattered residential uses and residential concentration in Idlewild area

2. Land Value: 2023 Real and Personal Equalized Valuations			*Source: 2023 Lake County Equalization Report*
Agricultural	$107,400	Industrial	$0
Commercial	$766,300	Residential	$55,467,500
Total personal	$3,818,450		

3. Population Characteristics			*Source: 2021 American Community Survey 5-year Estimates, unless noted*
Population, 2021	710	% with disability	26.3%
+/- change 2010 to 2020*	-0.8%	% in poverty	37.4%
Median age	50	ALICE households**	38 %
% under 18 years old	15.2%	Avg. daily commute	34.4 minutes
% over 65 years old	30.6%		

** US decennial census figures* ***Asset Limited, Income Constrained, Employed (United Way of Michigan, 2021)*

4. Peak Seasonal Population			*Peak seasonal population = population + (hotel rooms x2) + (camp/RV sites x4) + (vacant houses x6)*
Hotel rooms*	16	Vacant housing units**	880
Campground & RV sites*	0	Peak seasonal population	6,022

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

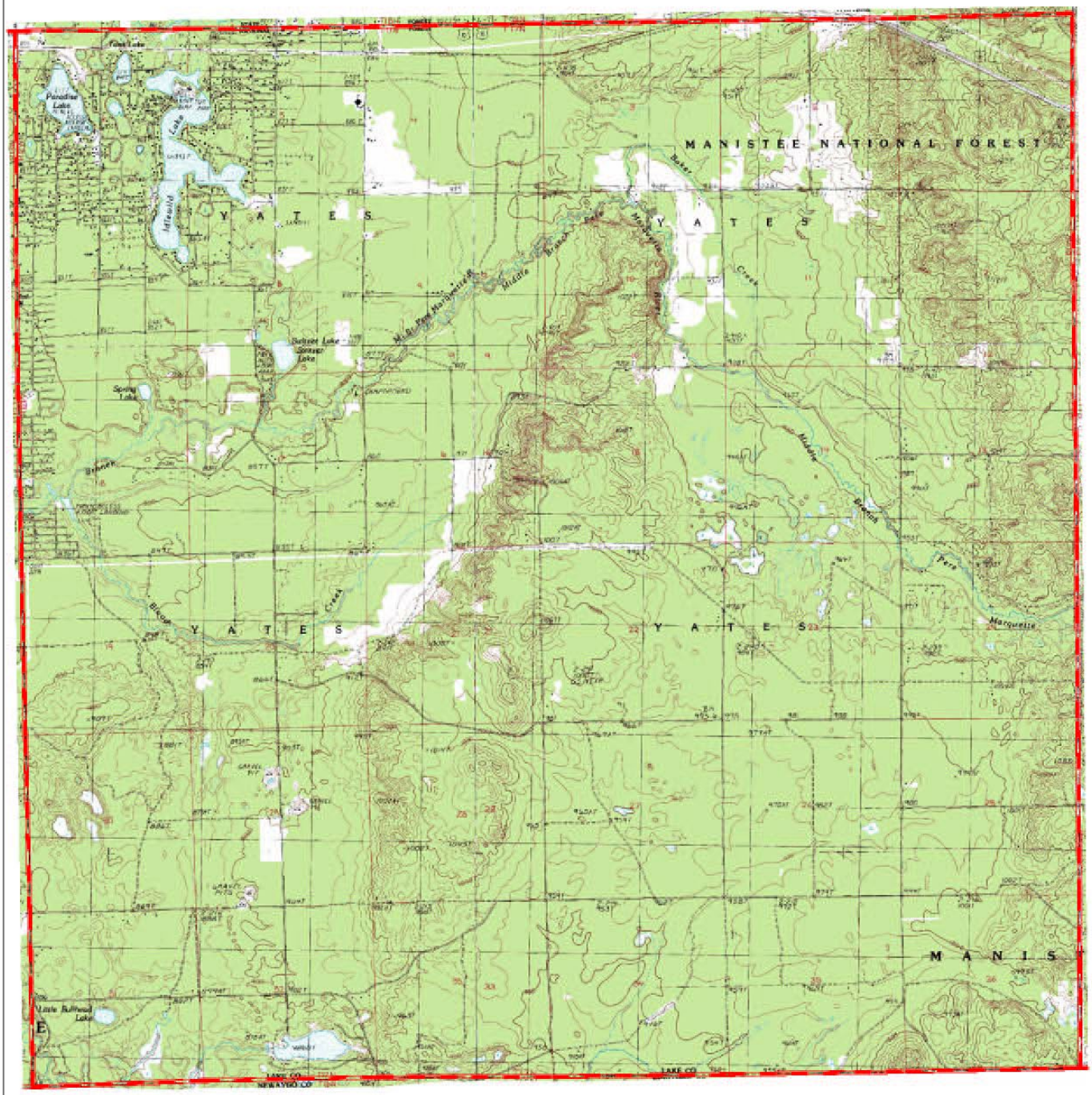
5. Housing			*Source: 2021 American Community Survey 5-year Estimates*
Housing units	1,176	Single units	751
Occupied housing units	296	Multi-units in structure	66
Vacant housing units	880	Mobile homes or other	358

6. Public Services	
Fire	Yates Township Fire Department, 2155 E US 10
Police	- *None identified*
Wastewater	- *None identified*
Community Water System	- Duvernay Park Apartments - Idlewild Garden Housing
Public transportation	Yates Dial-A-Ride 1987 US-10
Other	- *None identified*

7. Critical Infrastructure	
Major roads	US-10
Railroads	- *None identified*
Bridges	- S Queens Hwy over Pere Marquette River Middle Branch
Airports	- *None identified*
Shelters	- Yates Township Fire Department, 2155 US-10, Idlewild, MI 49642 - Yates Township Hall, 6437 S Nelson Rd
Schools	- *None identified*

Community medical facilities, Hospitals	*- None identified*
Ambulance service	*- None identified*
Dams	Lake Connamara Dam
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:	- Yates Township Hall, 639 Lansing Dr. - Yates Township Library, 413 E Baldwin Rd - United States Post Office – Idlewild, 812 Essex Dr
Festivals:	Idlewild Jazz & Blues Festival (August)
Historic Sites:	- Idlewild Historic District, Idlewild - Idlewild Lot Owners Association, Lake & Glade - The Island/Flamingo Club, 1002 Martin Luther King Ave - Daniel Hale Williams House, 15712 Lake Dr - Herman & Lela Wilson House, 6583 Paradise Path

Yates Township



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Source: Michigan Geographic Data Library
Created by WMSRDC
September 2004

Appendix B:

Hazard Identifications and Analyses

Hazard Identification Profile

Lake County

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- February 10-13, 1899: Record cold. Record lows of -36, -49, -48, and -37, Village of Baldwin.
- 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.
- March 2012: Anomalous temperatures. $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: 19 **Total Flood Insurance Coverage: $4,331,000**

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

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- August 6, 1998: Flash flood. $10k property damage, northwest Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- May 8, 2000: 1 inch Hail. $20k property damage, Village of Baldwin.
- August 9, 2000: 1.75 inch hail. $50k property damage, $25k crop damage, Village of Luther.
- May 23, 2001: .75 inch hail. $10k property damage, $10k crop damage, Village of Baldwin.
- May 11, 2003: .88 inch hail. $10k property damage, $10k crop damage, Dover Township.
- June 8, 2003: .75 inch hail. $20k property damage and $20k crop damage, Pleasant Plains Township.
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake County.
- August 30, 2001: Severe thunderstorm winds. $100k property damage, Pleasant Plains and Yates townships.
- 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- September 13, 2005: Severe thunderstorm winds. $20k property damage, Peacock Township.
- April 25, 2005: Severe thunderstorm winds. $20k property damage, northwest Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

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

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.
- July 26, 2005: F1 tornado. $150k property damage and $50k crop damage, Lake Township.
- August 28, 2018: EF0 tornado. $100k property damage, Baldwin Village.
- August 28, 2018: EF1 tornado. $100k property damage, Yates 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.
- 1994: "County Line Fire." 900 acres burned, Pleasant Plains Township.
- 1981-2010: Approximately 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.
- May 9, 2011: "8th St. Fire." 153 acres burned in Newkirk Township.
- May 21, 2021: "James St. Fire." 30 acres burned in Webber Township. 32 homes potentially affected and evacuated, Lake County Animal Shelter evacuated.
- April 11, 2023: Wildfire in Sauble Township started from ashes that exited a burn barrel starting ground debris on fire. Total estimated area burned was in excess of 80 acres.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Floods triggered dam failures at Baldwin's Rearing Pond, Danaher Lake, and Luther Mill Pond.
- May 1993: Luther Dam failed, due to poor reconstruction, as impoundment was being refilled.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09
- July 12, 2022: Fire destroyed 2 businesses and damaged 1, Village of Luther.

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - No accidents identified.

SARA Title III sites in the county in 2023: 9

2.06 Hazard Material Incidents - Transportation:

- July 9, 2018: Gas tanker overturned to avoid collision at northern intersection of US-10 and M-37. Gas spillage and ½ mile radius evacuation, Webber Township.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- August 2, 2011: Road washout at 56th and Queens Highway (flash flood), Yates Township.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

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

477 oil and gas test well surface hole locations within Lake County

- 22 wells "Active" for either: Gas Storage Observation (14), Gas Storage (4), or Brine Disposal (4)
- 16 wells listed with some level of "H2S Concern" in the townships of: C

2.10 Pipeline Accidents:

- June 23, 1999: Broken gas main. Nearby residences evacuated, Pleasant Plains Township.

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.

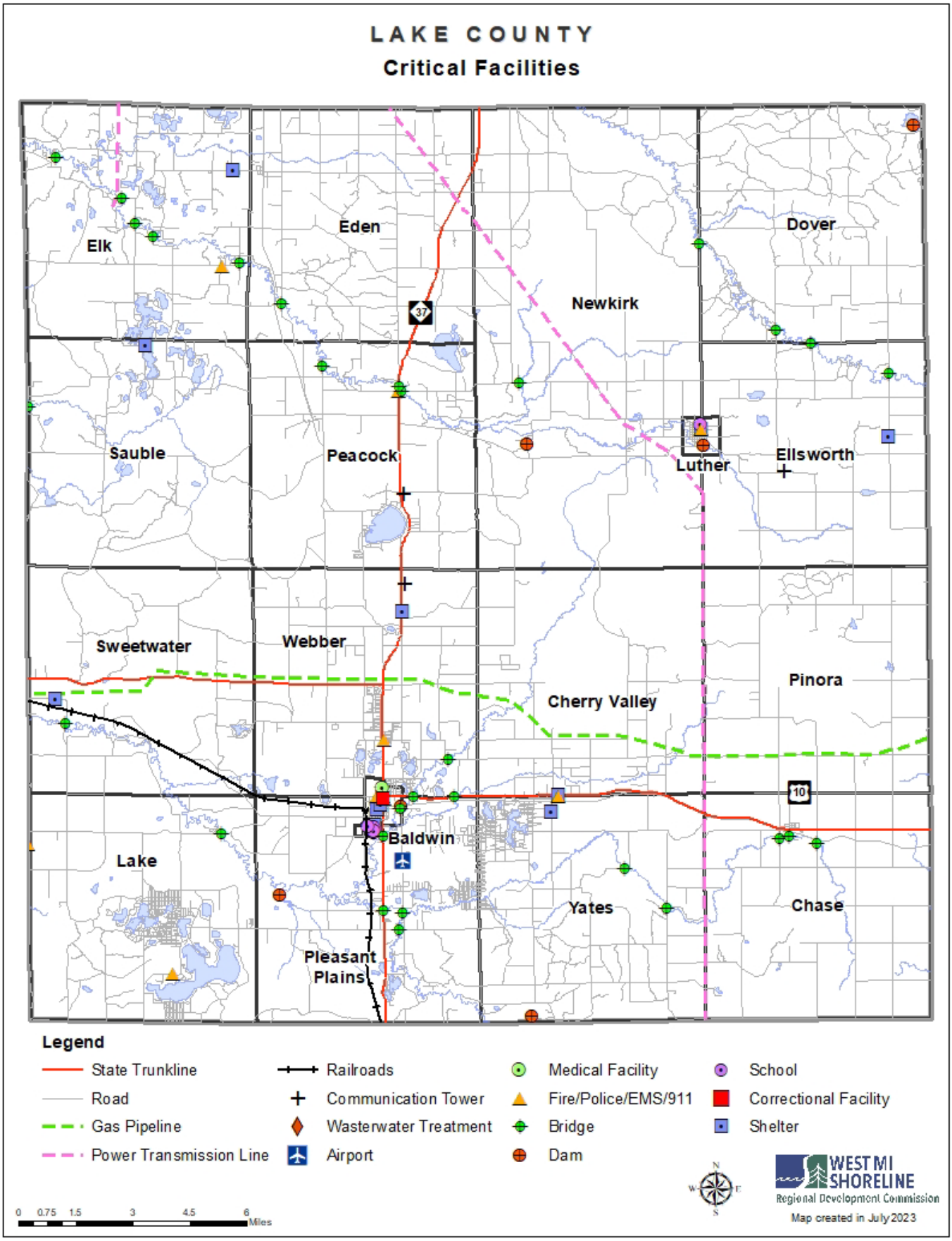
3.04 Public Health Emergencies:

- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

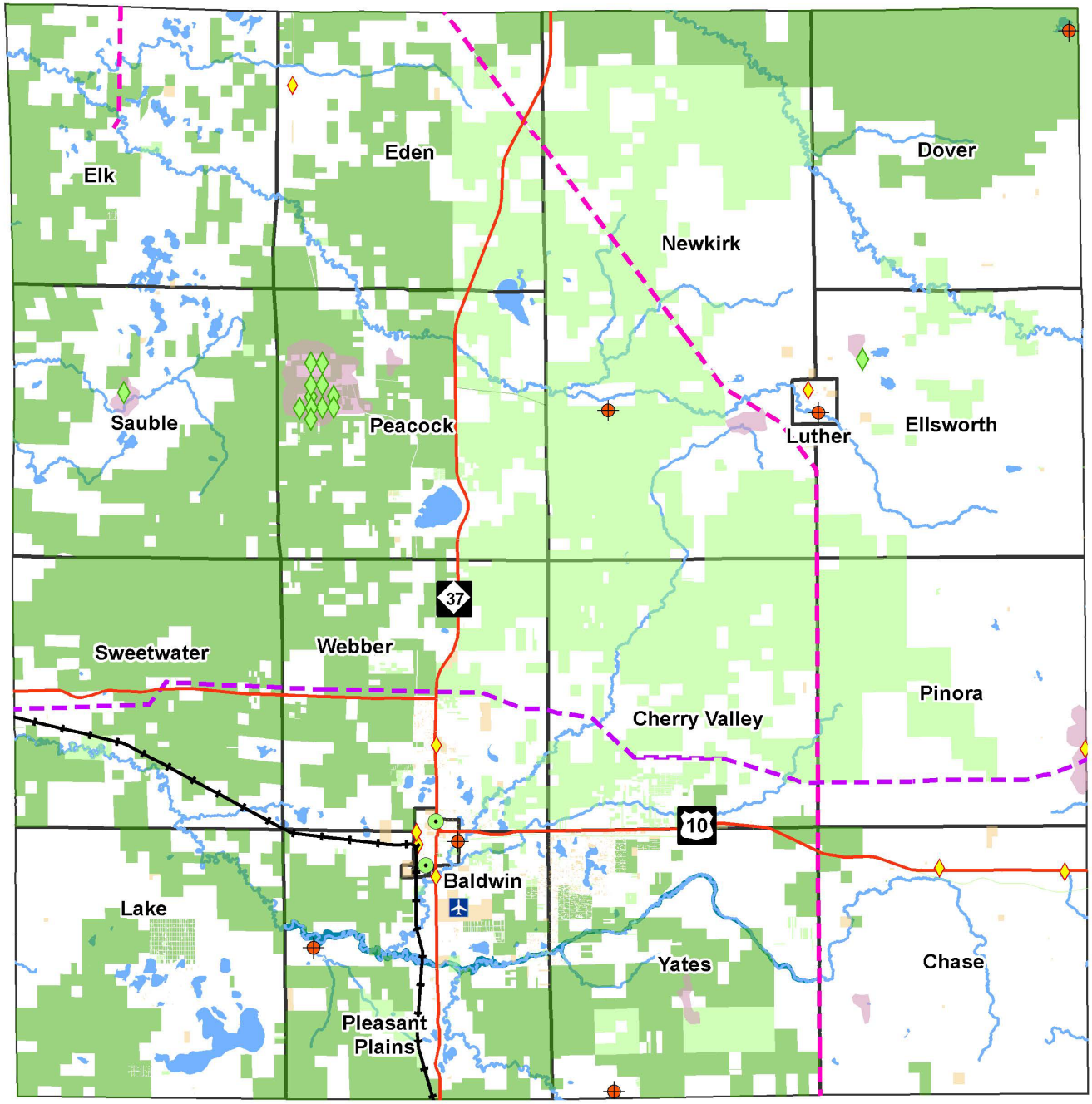
3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Lake County Hazard Ratings	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	2	8	16
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	1	9	27
1.05	Flooding: Riverine/Urban	3	2	2	1	11	33
1.06	Fog	3	1	0	1	4	12
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	3	1	2	1	8	24
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	2	2	12	36
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	1	11	33
1.15	Winter Storms	3	3	2	2	15	45
2.01	Dam failure	2	1	2	2	9	18
2.02	Energy Emergencies	2	2	0	2	8	16
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	2	1	1	1	6	12
2.06	HAZMAT – Transportation	2	1	1	1	6	12
2.07	Infrastructure Failures	3	2	1	2	10	30
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	1	1	1	6	12
2.10	Pipeline Accidents	2	1	1	1	6	12
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Lake County Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		15		45
2	Severe Winds	3		12		36
3	Flooding: Riverine/Urban	3		11		33
3	Wildfire	3		11		33
5	Infrastructure Failures	3		10		30
6	Extreme Temperatures	3		9		27
6	Fire – Structural	3		9		27
8	Hail	3		8		24
8	Lightning	3		8		24
8	Public Health Emergencies	3		8		24
11	Drought	2		10		20
12	Invasive Species	3		6		18
12	Tornadoes	2		9		18
12	Dam failure	2		9		18
12	Catastrophic Incidents	1		18		18
16	Space Weather	2		8		16
16	Energy Emergencies	2		8		16
18	Fog	3		4		12
18	HAZMAT – Fixed Site	2		6		12
18	HAZMAT – Transportation	2		6		12
18	Oil/Natural Gas Well Accidents	2		6		12
18	Pipeline Accidents	2		6		12
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
25	Celestial Impacts	1		8		8
26	Subsidence	1		6		6
26	Fire – Scrap Tires	1		6		6
26	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-


LAKE COUNTY
Critical Facilities
Elk
Eden
Newkirk
Dover
Sauble
Peacock
Luther
Ellsworth
Sweetwater
Webber
Cherry Valley
Pinora
Baldwin
Lake
Yates
Chase
Pleasant Plains
37
10
Legend
State Trunkline
Road
Gas Pipeline
Power Transmission Line
Railroads
Communication Tower
Wasterwater Treatment
Airport
Medical Facility
Fire/Police/EMS/911
Bridge
Dam
School
Correctional Facility
Shelter
0 0.75 1.5 3 4.5 6 Miles
WEST MI SHORELINE
Regional Development Commission
Map created in July 2023

LAKE COUNTY
Potential Hazards



Legend

- State Trunkline
- Railroads
- Gas Pipeline
- Power Transmission Line
- Airport
- Dam
- Floodplain
- Federal Land
- State Land
- Municipal Land
- Oil/Gas Well: Concentration
- Oil/Gas Well: H2S Detected
- SARA Title III Site

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

Baldwin Village

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

1.03 Earthquake: - None Identified.

1.04 Extreme Temperatures:

- February 10-13, 1899: Record cold. Record lows of -36, -49, -48, and -37, Village of Baldwin.
- 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.
- March 2012: Anomalous temperatures. $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: Baldwin River

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

- May 8, 2000: 1 inch Hail. $20k property damage, Village of Baldwin.
- May 23, 2001: .75 inch hail. $10k property damage, $10k crop damage, Village of Baldwin.
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.

- February 11, 1999: Severe thunderstorm winds and high winds. $10k property damage, Baldwin Village.
- June 6, 1999: Severe thunderstorm winds. $10k property damage, Baldwin Village.

- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.
- ***August 28, 2018: EF0 tornado. $100k property damage, Baldwin Village.***

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- ***September 1986: Floods triggered dam failures at Baldwin's Rearing Pond, Danaher Lake, and Luther Mill Pond.***

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- ***August 9, 2001: Power outages, downed power lines and downed trees (thunderstorm winds), Baldwin Village.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan. .
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- ***July 5, 2012: Trees and power lines blown down (thunderstorm winds), Baldwin Village.***
- ***August 27, 2021: Trees and power lines blown down (thunderstorm winds), Baldwin Area.***
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - None 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:

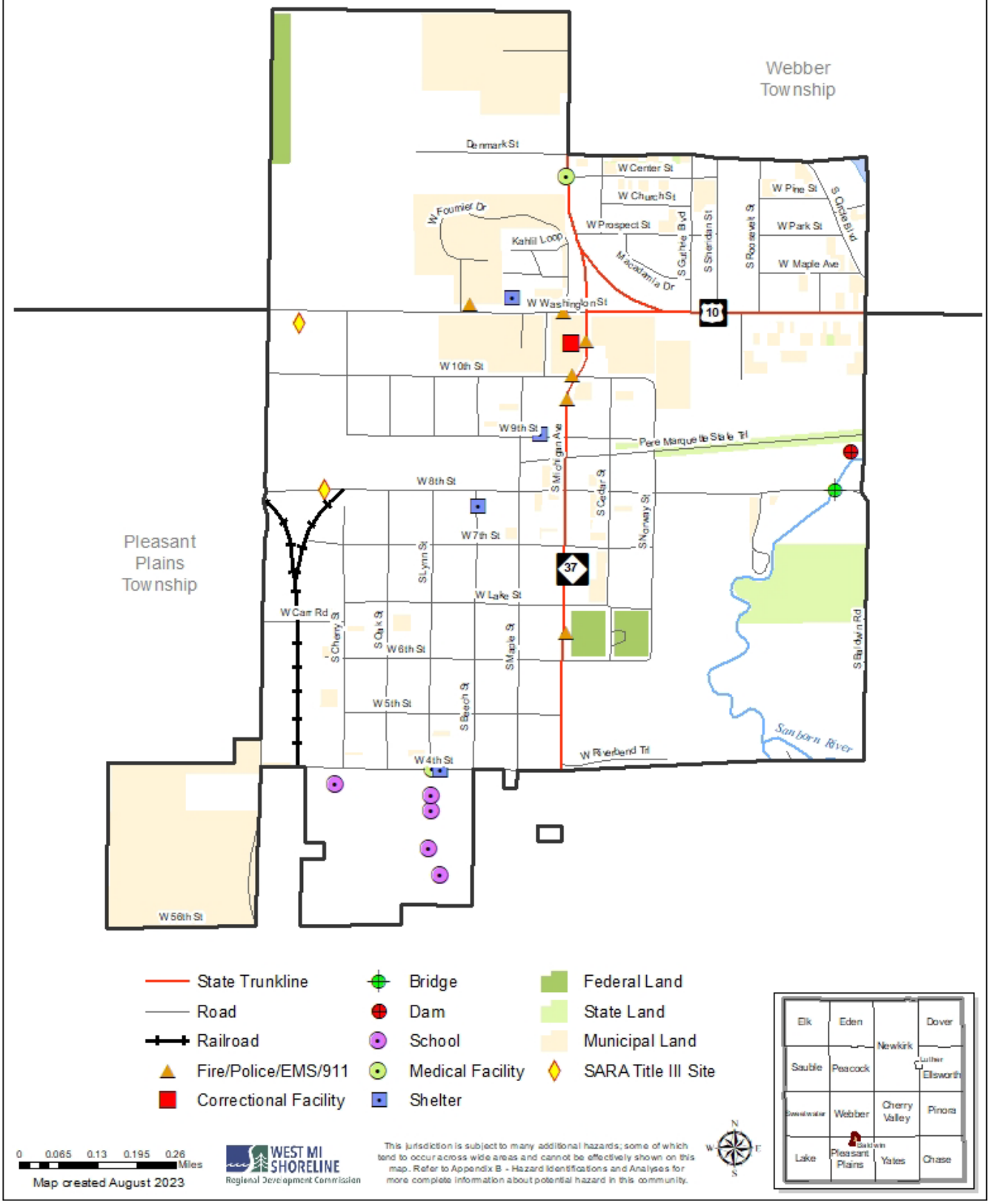
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Baldwin Village Hazard Ratings	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	3	1	2	13	26
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	2	2	1	11	33
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	2	1	2	2	9	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	1	2	7	14
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	2	2	1	2	10	20
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	0	-	-	-	-	-
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	2	1	8	8
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Baldwin Village Hazard Ranking	Probability of Occurrence	X Impacts Total	= Hazard Score
1	Winter Storms	3	16	48
2	Severe Winds	3	14	42
3	Infrastructure Failures	3	13	39
4	Flooding: Riverine/Urban	3	11	33
5	Extreme Temperatures	3	10	30
6	Fire – Structural	3	9	27
7	Drought	2	13	26
8	Lightning	3	8	24
8	Wildfire	2	12	24
8	Public Health Emergencies	3	8	24
11	Hail	2	11	22
12	HAZMAT – Fixed Site	2	10	20
13	Space Weather	2	9	18
13	Invasive Species	2	9	18
13	Energy Emergencies	2	9	18
13	Catastrophic Incidents	1	18	18
17	Tornadoes	1	15	15
18	Dam failure	2	7	14
18	HAZMAT – Transportation	2	7	14
20	Transportation Accidents	2	6	12
20	Terrorism & Similar Criminal Acts	2	6	12
22	Celestial Impacts	1	8	8
22	Fog	2	4	8
22	Civil Disturbances	1	8	8
25	Pipeline Accidents	1	7	7
26	Subsidence	1	6	6
26	Fire – Scrap Tires	1	6	6
	Earthquake	0	-	-
	Great Lakes Shoreline	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-
	Oil/Natural Gas Well Accidents	0	-	-

Village of Baldwin, Lake County
Critical Facilities and Potential Hazards



Hazard Identification Profile

Luther Village

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- ***August 9, 2000: 1.75 inch hail. $50k property damage, $25k crop damage, Village of Luther.***

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- September 1986: Floods triggered dam failures at Baldwin's Rearing Pond, Danaher Lake, and Luther Mill Pond.
- May 1993: Luther Dam failed, due to poor reconstruction, as impoundment was being refilled.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09
- July 12, 2022: Fire destroyed 2 businesses and damaged 1, Village of Luther.

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents: - None 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:

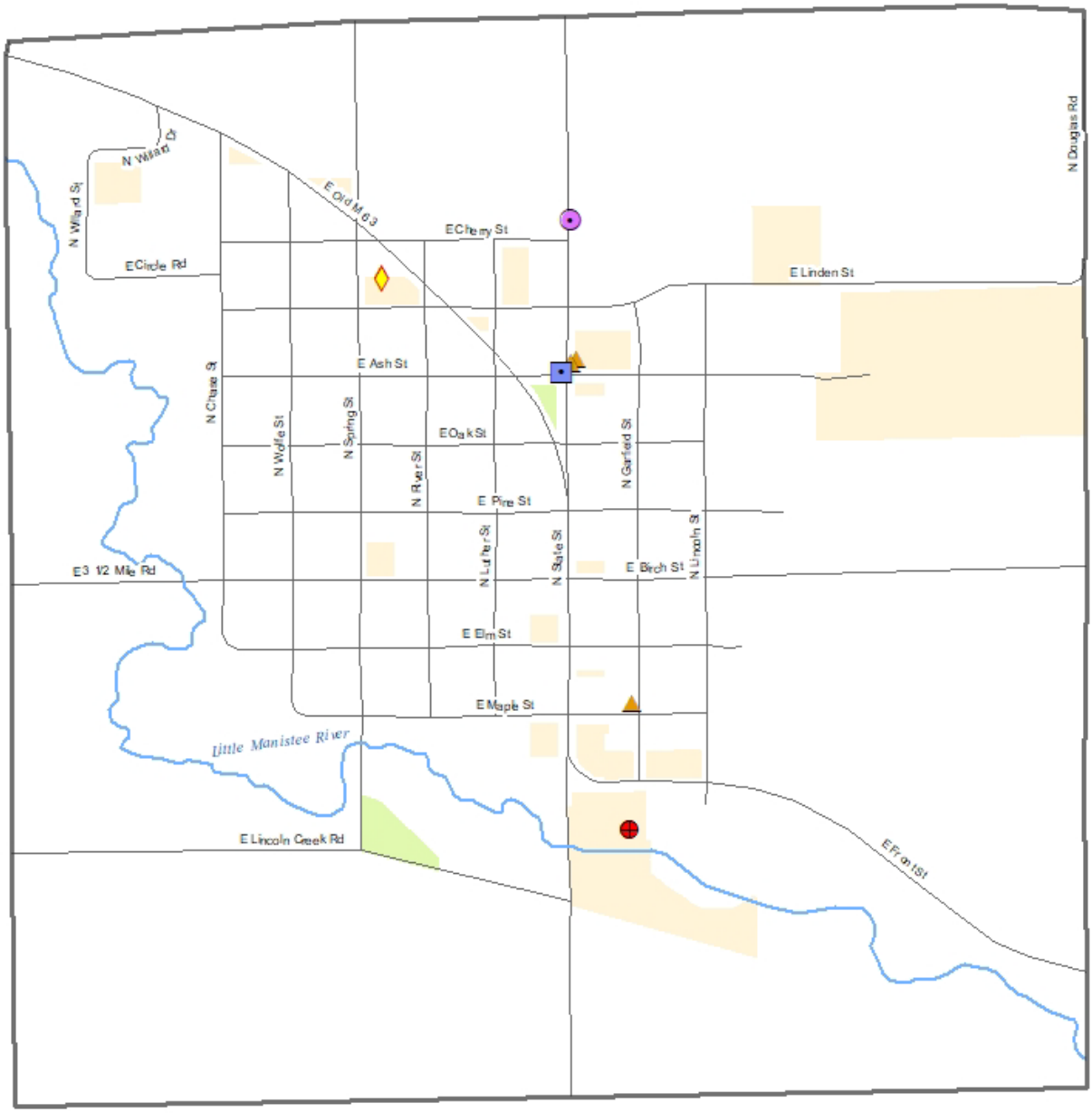
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Luther Village Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	2	1	8	24
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	2	1	2	2	9	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	2	2	9	18
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	0	-	-	-	-	-
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Luther Village Hazard Ranking	Probability of Occurrence	X Impacts Total	= Hazard Score
1	Winter Storms	3	16	48
2	Severe Winds	3	14	42
3	Infrastructure Failures	3	13	39
4	Extreme Temperatures	3	10	30
5	Fire – Structural	3	9	27
6	Flooding: Riverine/Urban	3	8	24
6	Lightning	3	8	24
6	Wildfire	2	12	24
6	Public Health Emergencies	3	8	24
10	Hail	2	11	22
11	Drought	2	10	20
12	Space Weather	2	9	18
12	Invasive Species	2	9	18
12	Dam failure	2	9	18
12	Energy Emergencies	2	9	18
12	Catastrophic Incidents	1	18	18
17	Tornadoes	1	15	15
18	HAZMAT – Transportation	2	7	14
19	Transportation Accidents	2	6	12
19	Terrorism & Similar Criminal Acts	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Pipeline Accidents	1	7	7
24	Subsidence	1	6	6
24	Fire – Scrap Tires	1	6	6
24	Civil Disturbances	1	6	6
	Earthquake	0	-	-
	Great Lakes Shoreline	0	-	-
	HAZMAT – Fixed Site	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-
	Oil/Natural Gas Well Accidents	0	-	-

Village of Luther, Lake County
Critical Facilities and Potential Hazards



Road
Dam
Shelter
Fire/Police/EMS/911
State Land
Municipal Land
SARA Title III Site
Oil/Gas Well Concentration

0 0.045 0.09 0.135 0.18 Miles

Map created August 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

Chase Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- ***August 2, 2004: Severe thunderstorm winds. $10k property damage, Chase and Pleasant Plains townships.***
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 19 oil and gas wells within Chase Township, 3 of which are "active" or "producing."

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:

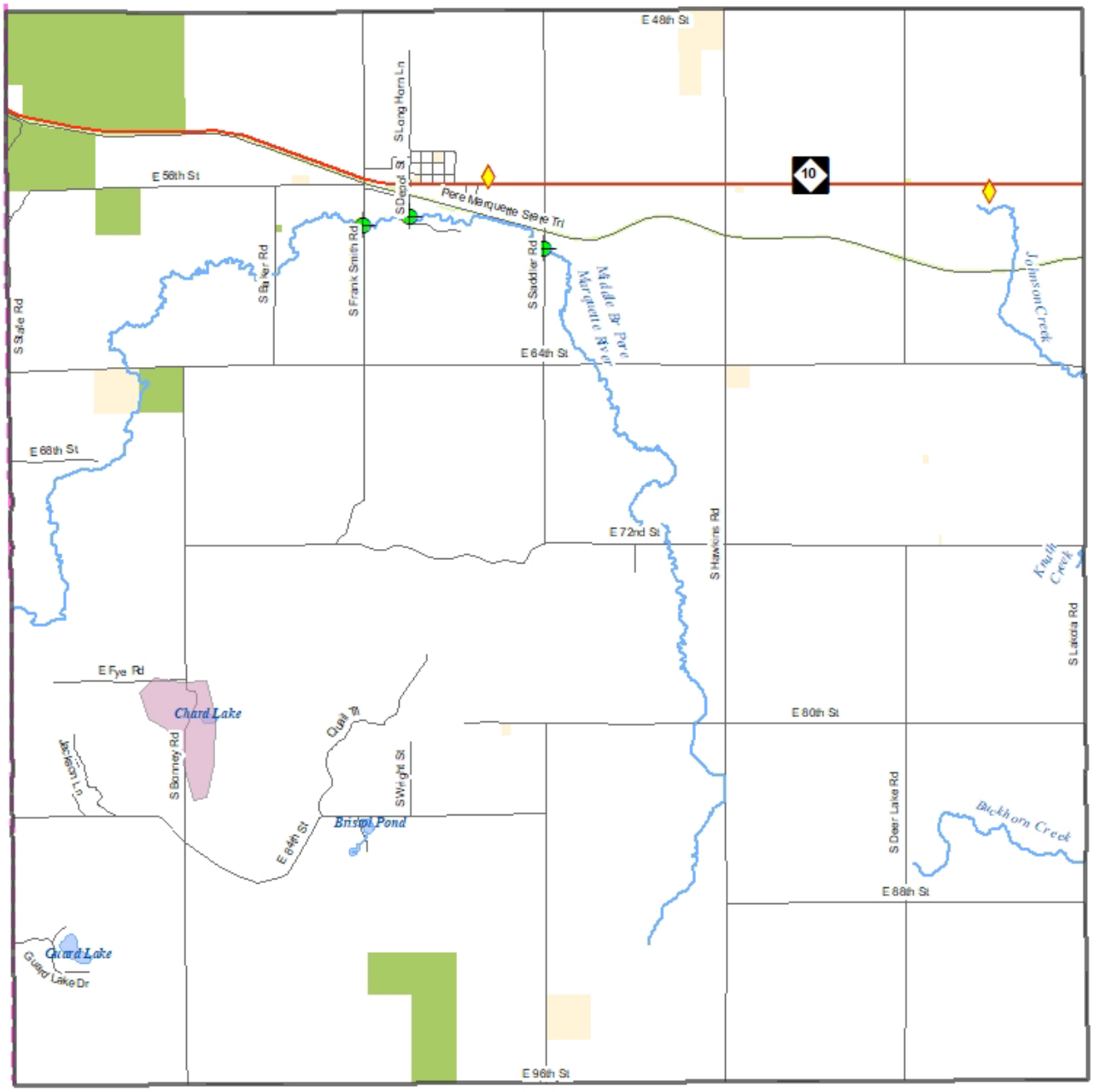
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

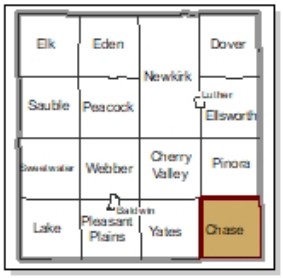
	Chase Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	2	2	12	24
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	2	1	1	1	6	12
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	0	-	-	-	-	-
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Chase Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Extreme Temperatures	3		10		30
5	Fire – Structural	3		9		27
6	Drought	2		12		24
6	Lightning	3		8		24
6	Wildfire	2		12		24
6	Public Health Emergencies	3		8		24
10	Hail	2		11		22
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
16	Tornadoes	1		15		15
17	HAZMAT – Transportation	2		7		14
18	HAZMAT – Fixed Site	2		6		12
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
21	Celestial Impacts	1		8		8
21	Fog	2		4		8
23	Pipeline Accidents	1		7		7
24	Subsidence	1		6		6
24	Fire – Scrap Tires	1		6		6
24	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Oil/Natural Gas Well Accidents	0		-		-

Chase Township, Lake County
Critical Facilities and Potential Hazards



Road
State Trunkline
Power Transmission Line
Oil/Gas Well Concentration
Bridge
SARA Title III Site
Federal Land
State Land
Municipal Land



0 0.25 0.5 0.75 1 Miles

Map created August 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

Cherry Valley Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating in NFIP **FIRM Map Date:** No Special Flood Hazard Areas (NSFHA)
Flood Insurance Policies In-Force: 1 **Total Flood Insurance Coverage:** $210,000
Floodplains and Flood-prone Areas: Baldwin River

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 20 oil and gas wells within Cherry Valley Township, none of which are "active" or "producing."

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. 37 confirmed deaths in Lake County as of July 11, 2023.

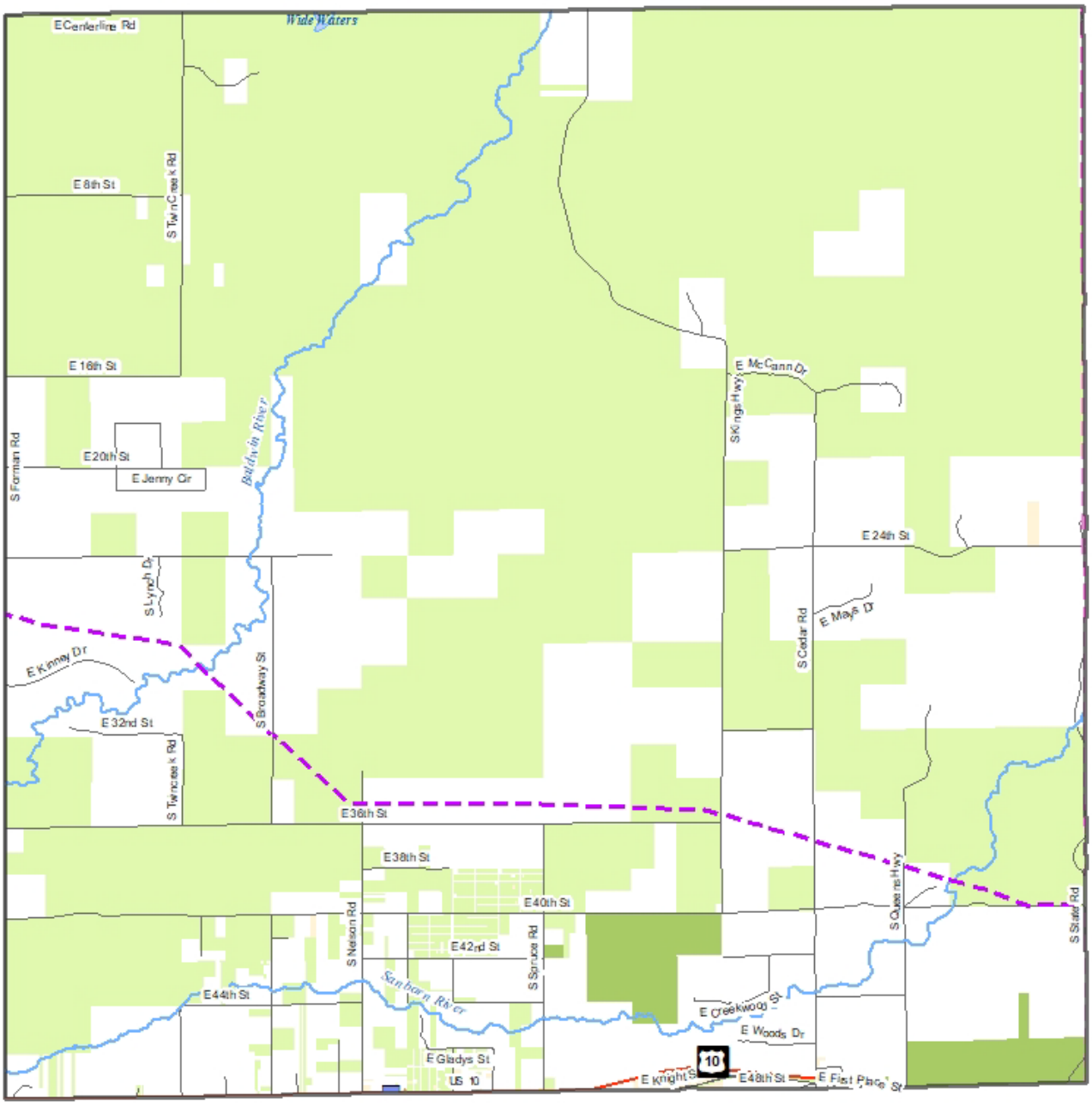
3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Cherry Valley Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	3	1	0	1	4	12
1.07	Great Lakes Shoreline	3	1	2	1	8	24
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	2	2	9	18
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	1	1	1	2	7	7
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	0	-	-	-	-	-
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

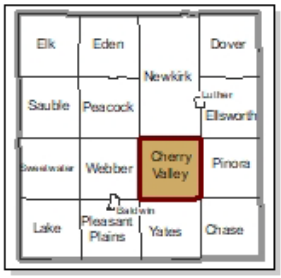
Cherry Valley Township Hazard Ranking

		Probability of Occurrence	X Impacts Total	= Hazard Score
1	Winter Storms	3	16	48
2	Severe Winds	3	14	42
3	Infrastructure Failures	3	13	39
4	Extreme Temperatures	3	10	30
5	Fire – Structural	3	9	27
6	Great Lakes Shoreline	3	8	24
7	Lightning	3	8	24
7	Wildfire	2	12	24
7	Public Health Emergencies	3	8	24
7	Hail	2	11	22
11	Drought	2	10	20
12	Space Weather	2	9	18
12	Flooding: Riverine/Urban	3	6	18
12	Invasive Species	3	6	18
12	Dam failure	2	9	18
16	Energy Emergencies	2	9	18
17	Catastrophic Incidents	1	18	18
17	Tornadoes	1	15	15
17	Fog	3	4	12
20	Transportation Accidents	2	6	12
21	Terrorism & Similar Criminal Acts	2	6	12
21	Celestial Impacts	1	8	8
21	HAZMAT – Transportation	1	7	7
24	Pipeline Accidents	1	7	7
24	Subsidence	1	6	6
24	Fire – Scrap Tires	1	6	6
24	Civil Disturbances	1	6	6
	Earthquake	0	-	-
	HAZMAT – Fixed Site	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-
	Oil/Natural Gas Well Accidents	0	-	-

Cherry Valley Township, Lake County
Critical Facilities and Potential Hazards



Road
State Trunkline
Shelter
Gas Pipeline
Power Transmission Line
Federal Land
State Land
Municipal Land



0 0.25 0.5 0.75 1 Miles

Map created August 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

Dover Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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: Pine River

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- ***May 11, 2003: .88 inch hail. $10k property damage, $10k crop damage, Bristol (Dover Township).***

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 11 oil and gas wells within Dover Township, none of which are "active" or "producing."

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:

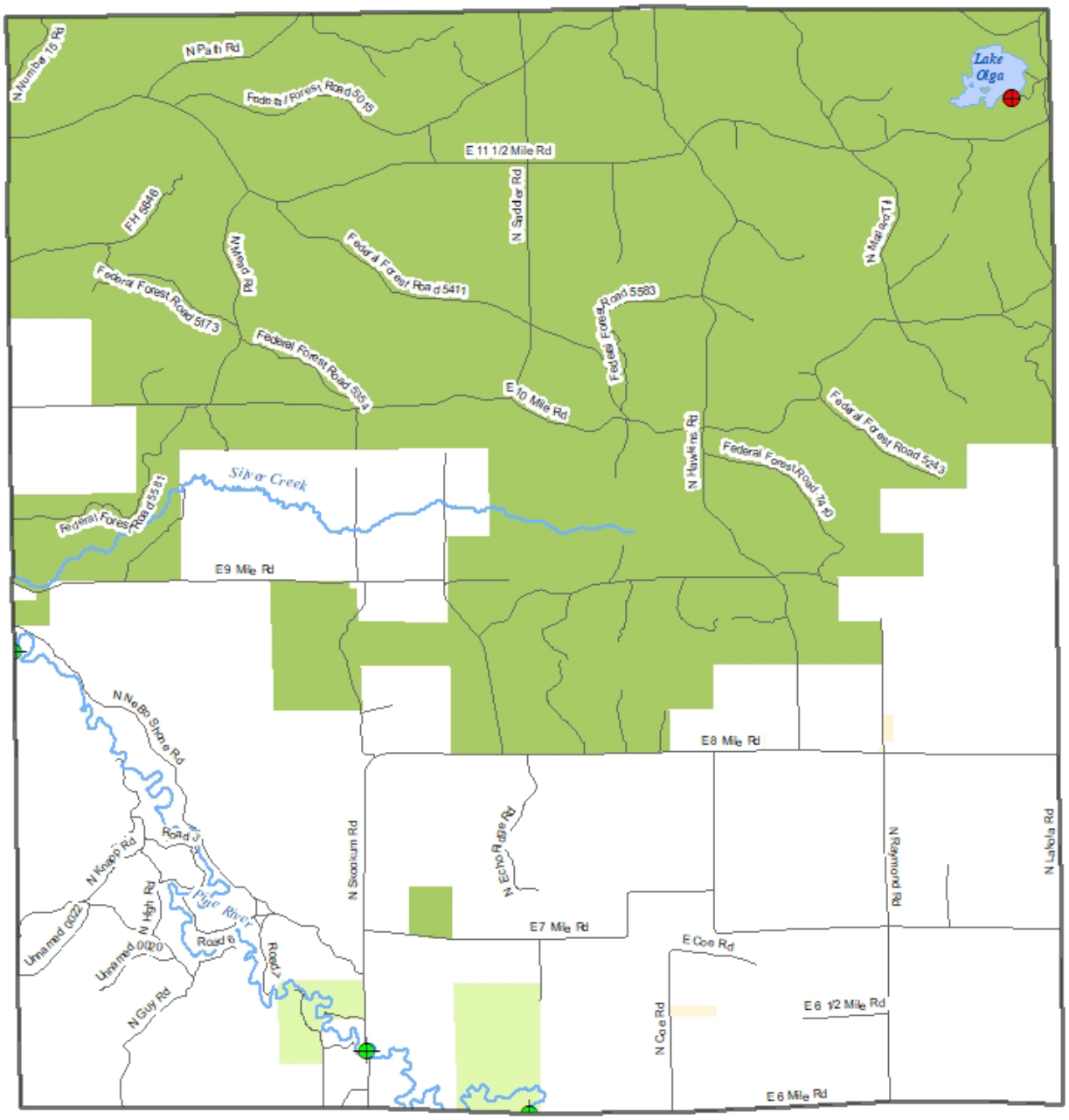
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

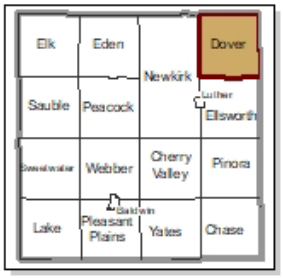
	Dover Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	1	1	1	1	6	6
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Dover Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Extreme Temperatures	3		10		30
5	Fire – Structural	3		9		27
6	Lightning	3		8		24
6	Wildfire	2		12		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
16	Tornadoes	1		15		15
17	HAZMAT – Transportation	2		7		14
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
20	Celestial Impacts	1		8		8
20	Fog	2		4		8
22	Pipeline Accidents	1		7		7
23	Subsidence	1		6		6
23	Fire – Scrap Tires	1		6		6
23	Oil/Natural Gas Well Accidents	1		6		6
23	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Dover Township, Lake County
Critical Facilities and Potential Hazards



Road
Bridge
Dam
Federal Land
State Land
Municipal Land



0 0.25 0.5 0.75 1 Miles

Map created August 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

Eden Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- ***August 6, 1998: Flash flood. $10k property damage, northwest Lake County.***
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- ***May 29, 1998: Severe thunderstorm winds. $10k property damage, Irons.***
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- ***July 23, 1999: Severe thunderstorm winds. $10k property damage, Irons.***
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake County.
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- ***July 13, 2004: Severe thunderstorm winds. $10k property damage, Irons and Big Bass Lake areas.***
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- ***April 25, 2005: Severe thunderstorm winds. $20k property damage, northwest Lake County.***
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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: Downed power lines and trees (thunderstorm winds), Irons.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- ***July 13, 2004: Several trees and wires blown down (thunderstorm winds), Irons and Bass Lake areas.***
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 2 oil and gas wells within Eden Township, none of which are "active" or "producing."

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:

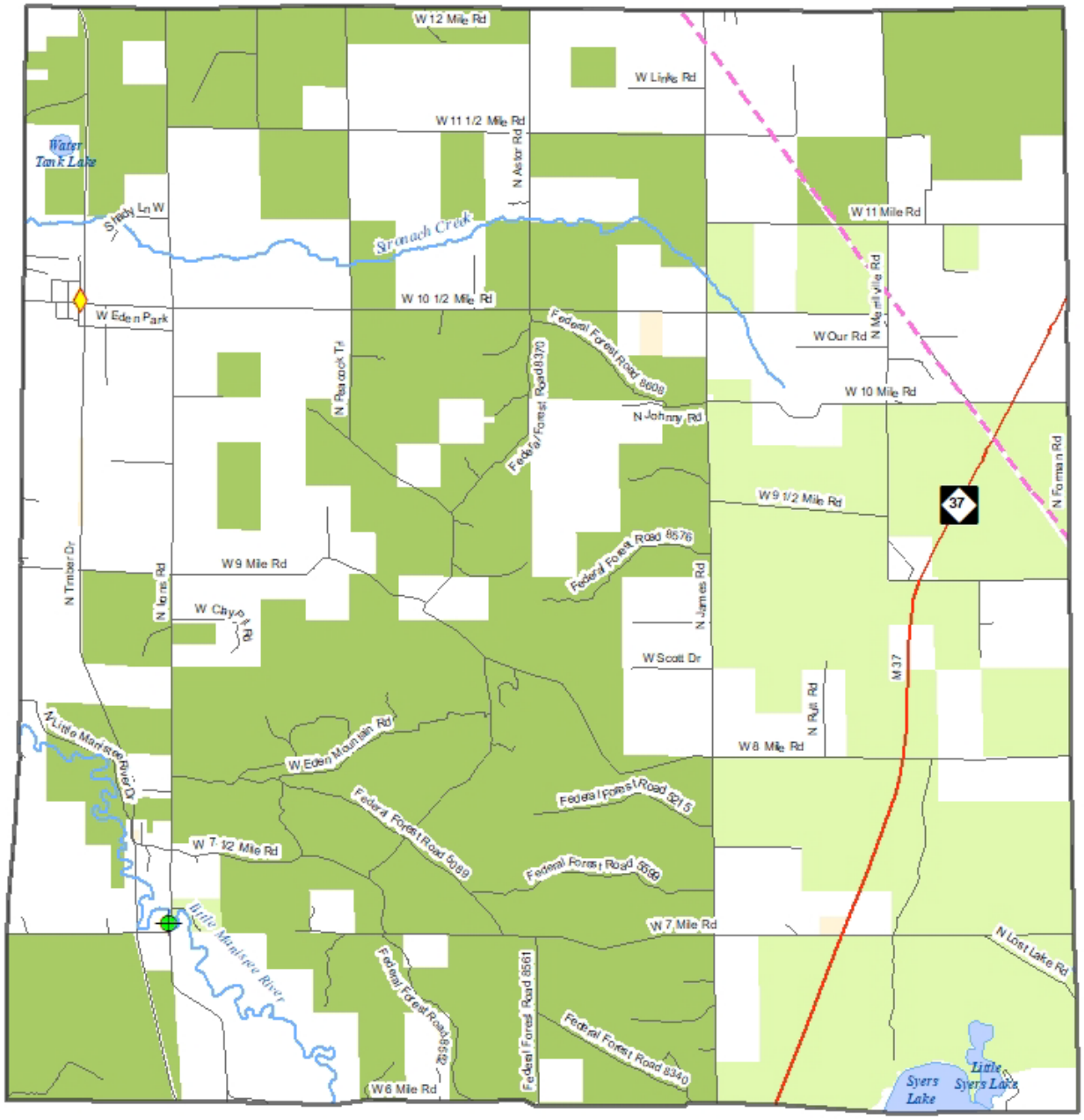
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

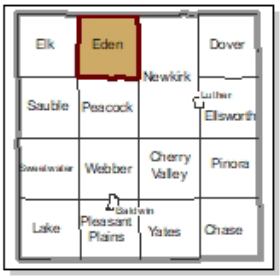
	Eden Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	1	1	1	2	7	7
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	0	-	-	-	-	-
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Eden Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Extreme Temperatures	3		10		30
5	Fire – Structural	3		9		27
6	Lightning	3		8		24
6	Wildfire	2		12		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
16	Tornadoes	1		15		15
17	HAZMAT – Transportation	2		7		14
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
20	Celestial Impacts	1		8		8
20	Fog	2		4		8
22	HAZMAT – Fixed Site	1		7		7
22	Pipeline Accidents	1		7		7
24	Subsidence	1		6		6
24	Fire – Scrap Tires	1		6		6
24	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Oil/Natural Gas Well Accidents	0		-		-

Eden Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Power Transmission Line
Bridge
SARA Title III Site
Federal Land
State Land
Municipal Land



0 0.25 0.5 0.75 1 Miles

Map created August 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

Elk Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- ***August 6, 1998: Flash flood. $10k property damage, northwest Lake County.***
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- ***April 25, 2005: Severe thunderstorm winds. $20k property damage, northwest Lake County.***
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- ***July 13, 2004: Several trees and wires blown down (thunderstorm winds), Irons and Bass Lake areas.***
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 8 oil and gas wells within Elk Township, none of which are "active" or "producing."

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:

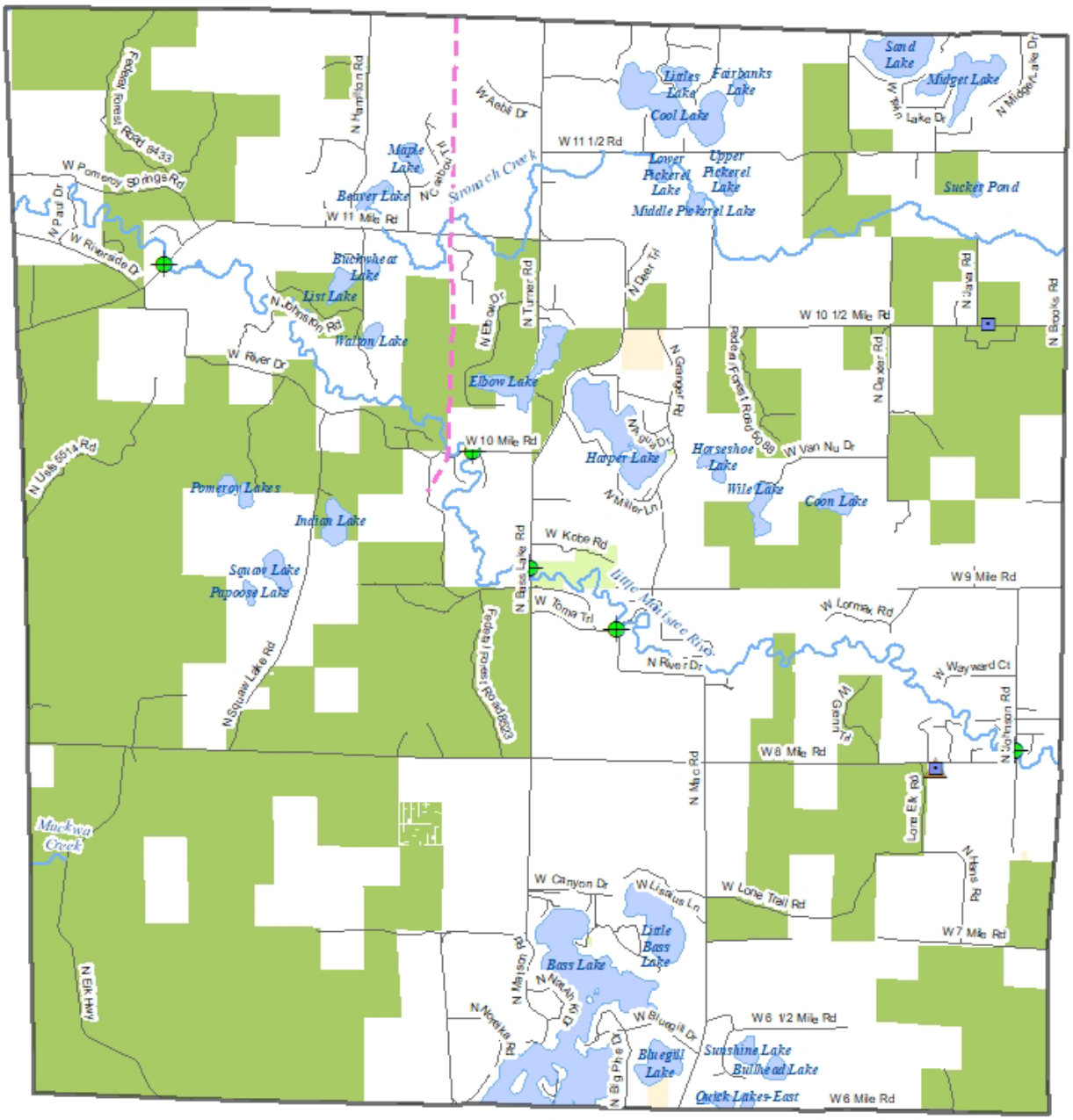
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Elk Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	1	3	2	2	15	15
1.14	Wildfire	2	2	2	2	12	24
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	1	1	1	1	6	6
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Elk Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Extreme Temperatures	3		10		30
5	Fire – Structural	3		9		27
6	Lightning	3		8		24
6	Wildfire	2		12		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
16	Tornadoes	1		15		15
17	HAZMAT – Transportation	2		7		14
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
20	Celestial Impacts	1		8		8
20	Fog	2		4		8
22	Subsidence	1		6		6
22	Fire – Scrap Tires	1		6		6
22	Oil/Natural Gas Well Accidents	1		6		6
22	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Pipeline Accidents	0		-		-

Elk Township, Lake County
Critical Facilities and Potential Hazards



Road
Gas Pipeline
Power Transmission Line
Bridge
Shelter
Fire/Police/EMS/911
Federal Land
State Land
Municipal Land

0 0.25 0.5 0.75 1 Miles

Map created August 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

Ellsworth Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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: Pine River

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 18 oil and gas wells within Ellsworth Township, 8 of which are "active" or "producing."

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:

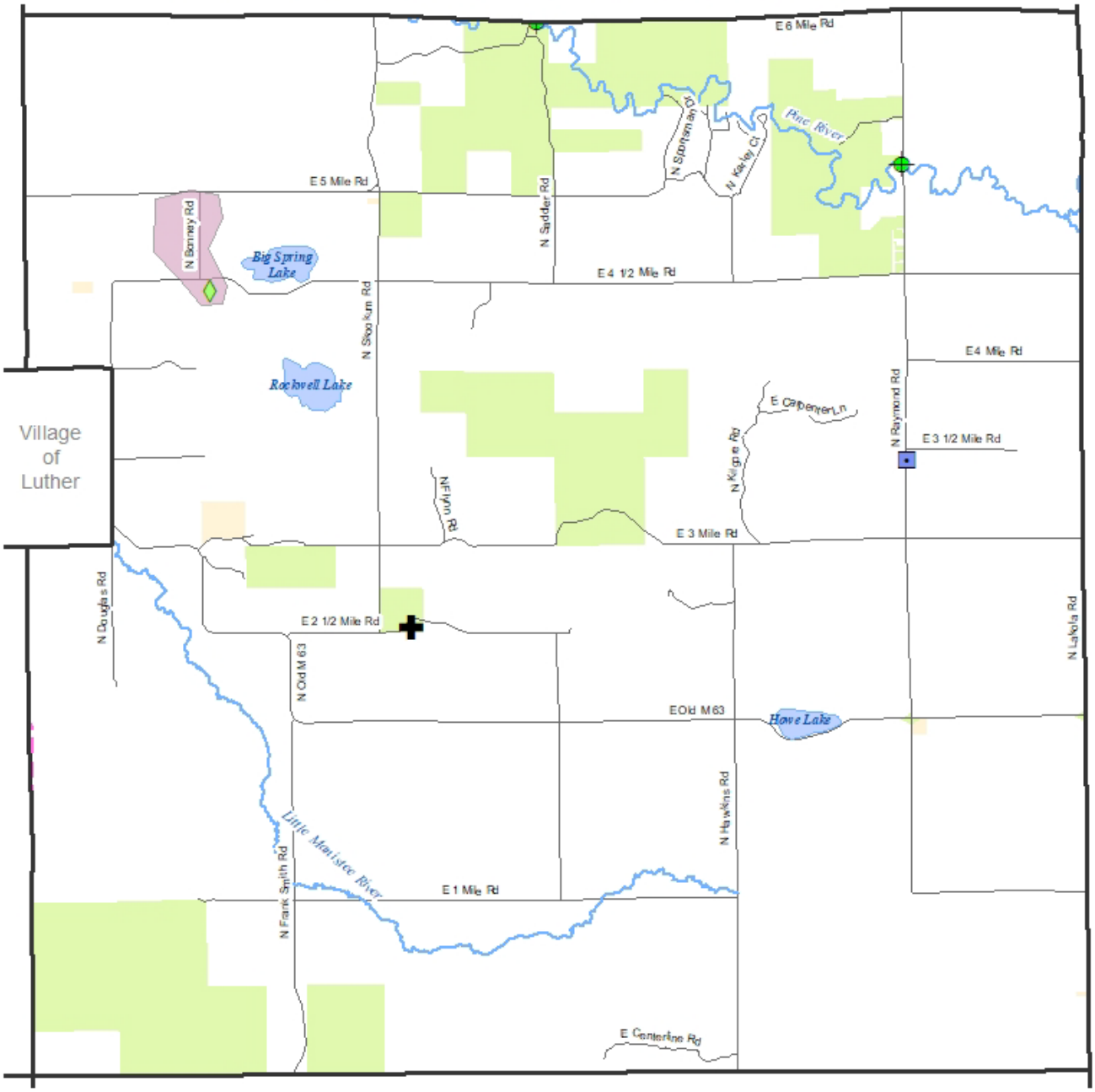
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Ellsworth Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	2	2	12	24
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	3	1	0	1	4	12
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Ellsworth Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Drought	2		12		24
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Fire – Structural	3		7		21
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Energy Emergencies	2		9		18
11	Oil/Natural Gas Well Accidents	2		9		18
11	Catastrophic Incidents	1		18		18
18	HAZMAT – Transportation	2		7		14
19	Fog	3		4		12
19	Transportation Accidents	2		6		12
19	Terrorism & Similar Criminal Acts	2		6		12
22	Celestial Impacts	1		8		8
23	Subsidence	1		6		6
23	Fire – Scrap Tires	1		6		6
23	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Pipeline Accidents	0		-		-

Ellsworth Township, Lake County
Critical Facilities and Potential Hazards



Road
Power Transmission Line
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Communication Tower
Bridge
Shelter
State Land
Municipal Land

0 0.25 0.5 0.75 1 Miles

Map created August 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

Lake Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating **FIRM Map Date:** No Special Flood Hazard Areas (NSFHA)
Flood Insurance Policies In-Force: 1 **Total Flood Insurance Coverage:** $109,000
Floodplains and Flood-prone Areas: N/A

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.
- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.
- ***July 26, 2005: F1 tornado. $150k property damage and $50k crop damage, Lake 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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2012: 18
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- August 27, 2021: Trees and power lines blown down (thunderstorm winds), Baldwin Area.
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 1 oil or gas well within Lake Township, which is neither "active" nor "producing."

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:

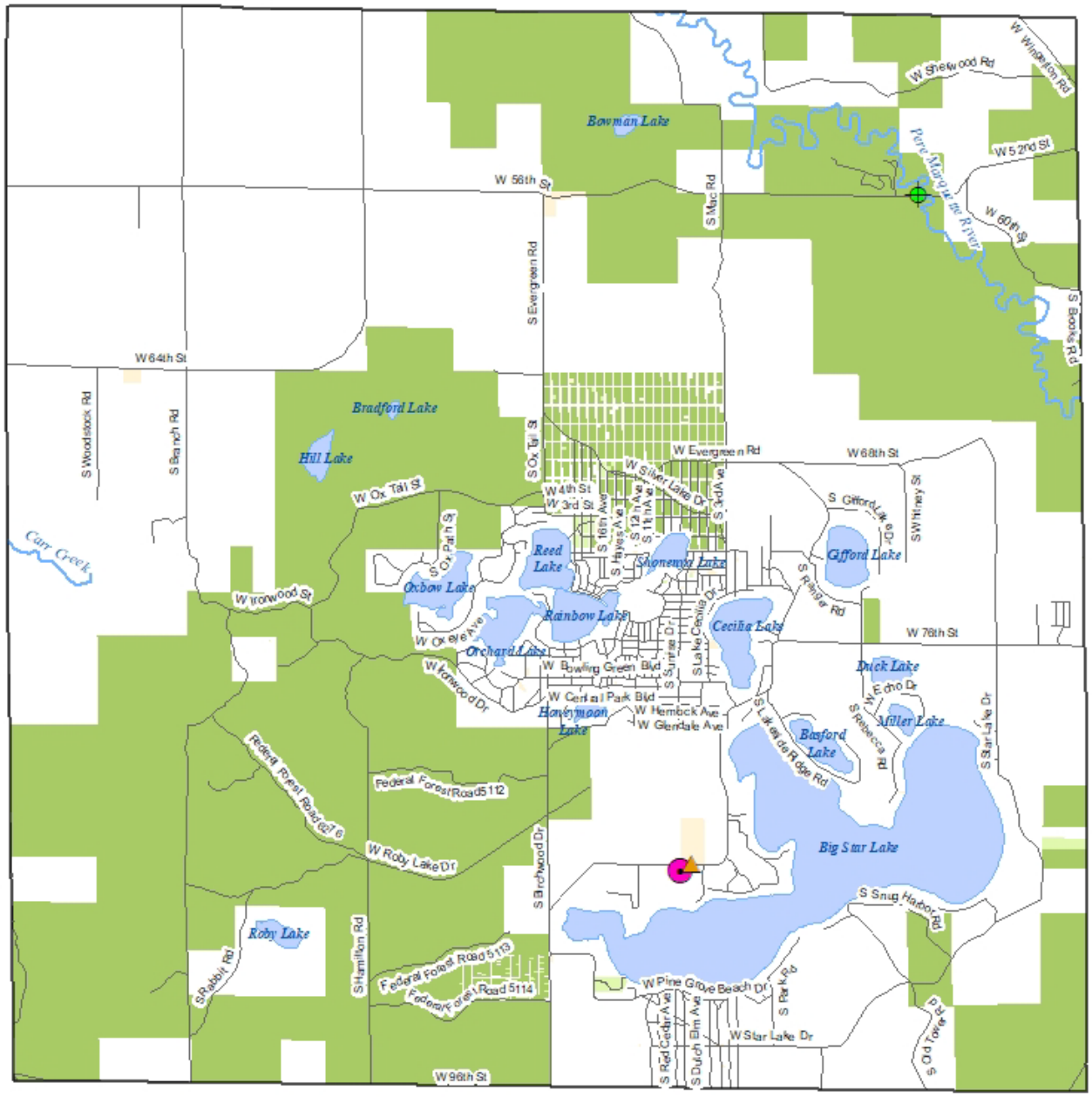
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Lake Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	2	2	12	24
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	3	1	0	1	4	12
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	1	1	1	1	6	6
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Lake Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Drought	2		12		24
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Fire – Structural	3		7		21
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Energy Emergencies	2		9		18
11	Oil/Natural Gas Well Accidents	2		9		18
17	Catastrophic Incidents	1		18		18
18	HAZMAT – Transportation	2		7		14
19	Fog	3		4		12
19	Terrorism & Similar Criminal Acts	2		6		12
21	Celestial Impacts	1		8		8
22	Subsidence	1		6		6
22	Fire – Scrap Tires	1		6		6
22	Transportation Accidents	1		6		6
22	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Pipeline Accidents	0		-		-

Lake Township, Lake County
Critical Facilities and Potential Hazards



Hazard Identification Profile

Newkirk Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.
- ***May 9, 2011: "8th St. Fire." 153 acres burned in Newkirk Township.***

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 21 oil and gas wells within Newkirk Township, none of which are "active" or "producing."

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:

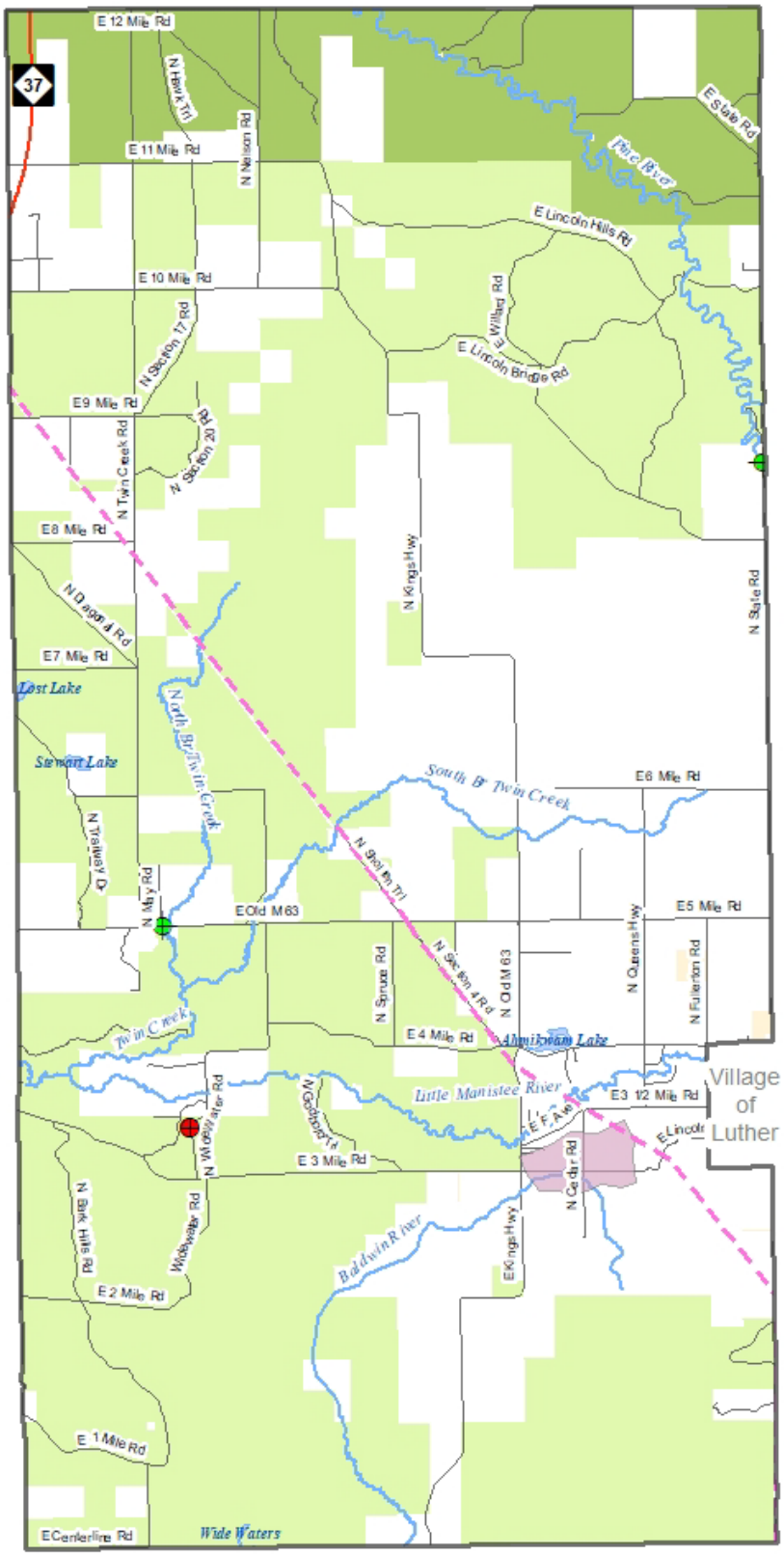
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

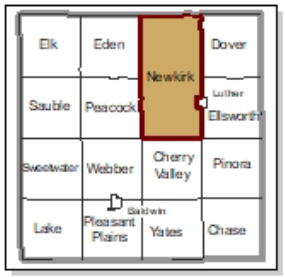
	Newkirk Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	2	2	12	24
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	2	2	9	18
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	1	1	1	1	6	6
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Newkirk Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Drought	2		12		24
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Fire – Structural	3		7		21
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Dam failure	2		9		18
11	Energy Emergencies	2		9		18
11	Oil/Natural Gas Well Accidents	2		9		18
11	Catastrophic Incidents	1		18		18
19	HAZMAT – Transportation	2		7		14
20	Terrorism & Similar Criminal Acts	2		6		12
21	Celestial Impacts	1		8		8
21	Fog	2		4		8
23	Subsidence	1		6		6
23	Fire – Scrap Tires	1		6		6
23	Transportation Accidents	1		6		6
23	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-
	Pipeline Accidents	0		-		-

Newkirk Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Power Transmission Line
Bridge
Dam
Federal Land
State Land
Municipal Land
Oil/Gas Well Concentration



0 0.4 0.8 1.2 1.6 Miles

Map created August 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

Peacock Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- ***August 6, 1998: Flash flood. $10k property damage, northwest Lake County.***
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- ***September 13, 2005: Severe thunderstorm winds. $20k property damage, Peacock Township.***
- ***April 25, 2005: Severe thunderstorm winds. $20k property damage, northwest Lake County.***
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- ***September 13, 2005: Numerous trees and power lines blown down (thunderstorm winds), Peacock Township.***
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 56 oil and gas wells within Peacock Township, 1 of which is either "active" or "producing."
- ***11 wells known to have detectable levels of hydrogen sulfide in Peacock 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:

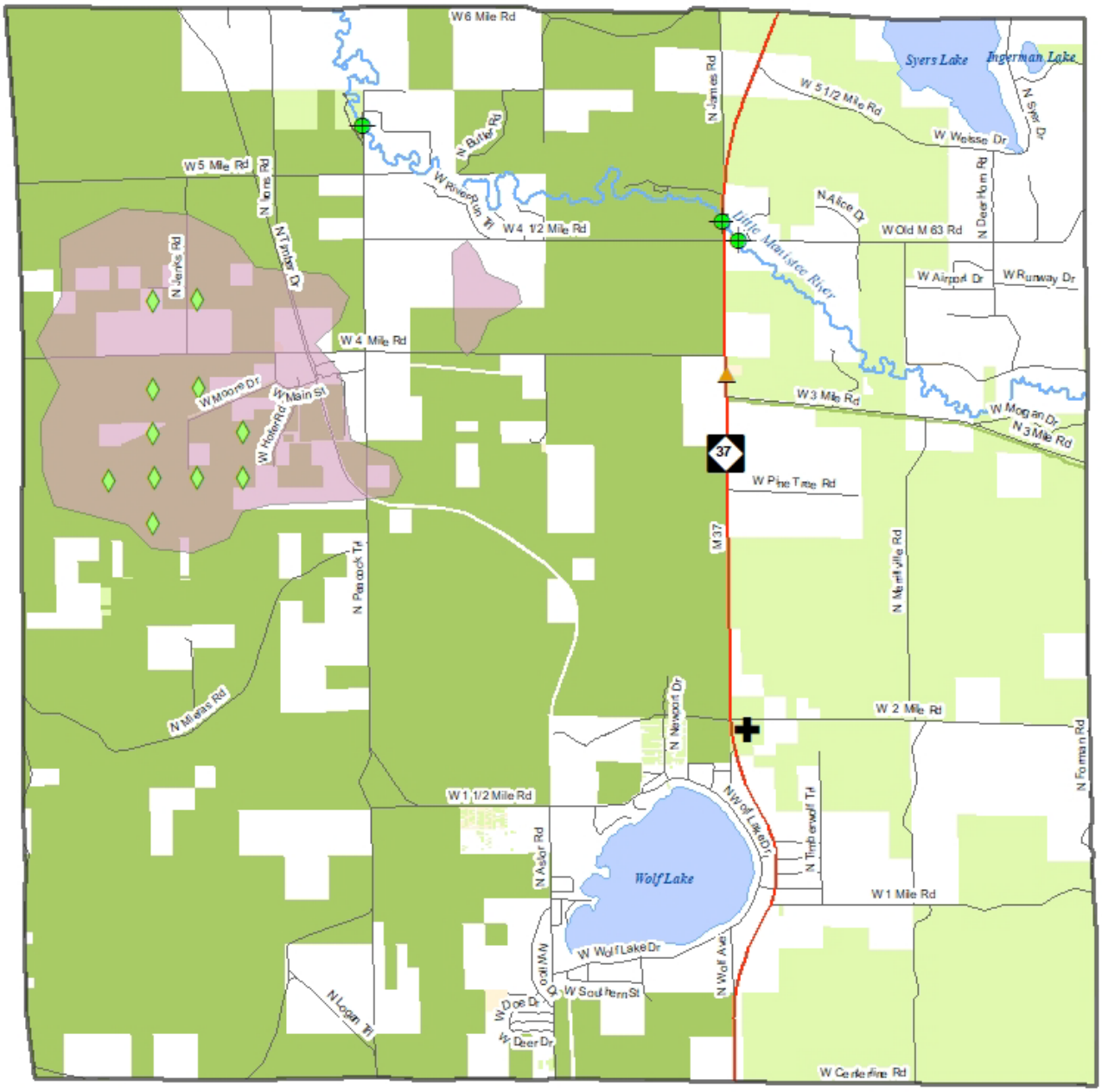
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

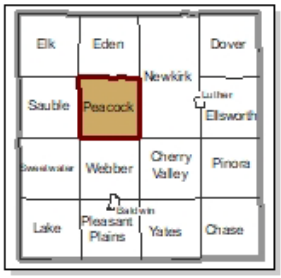
	Peacock Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	1	1	6	12
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	1	1	1	1	6	6
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Peacock Township Hazard Ranking	Probability of Occurrence	X Impacts Total	= Hazard Score
1	Winter Storms	3	16	48
2	Severe Winds	3	14	42
3	Infrastructure Failures	3	13	39
4	Wildfire	3	12	36
5	Extreme Temperatures	3	10	30
6	Lightning	3	8	24
6	Public Health Emergencies	3	8	24
8	Hail	2	11	22
9	Fire – Structural	3	7	21
10	Drought	2	10	20
11	Space Weather	2	9	18
11	Flooding: Riverine/Urban	3	6	18
11	Invasive Species	3	6	18
11	Tornadoes	2	9	18
11	Energy Emergencies	2	9	18
11	Oil/Natural Gas Well Accidents	2	9	18
11	Catastrophic Incidents	1	18	18
18	HAZMAT – Transportation	2	7	14
19	Dam failure	2	6	12
19	Terrorism & Similar Criminal Acts	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Subsidence	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Transportation Accidents	1	6	6
23	Civil Disturbances	1	6	6
	Earthquake	0	-	-
	Great Lakes Shoreline	0	-	-
	HAZMAT – Fixed Site	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-
	Pipeline Accidents	0	-	-

Peacock Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Railroad
Bridge
Fire/Police/EMS/911
Communication Tower
Oil/Gas Well: H2S Detected
Oil/Gas Well Concentration
Federal Land
State Land
Municipal Land
SARA Title III Site



0 0.25 0.5 0.75 1 Miles

Map created August 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

Pinora Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 45 oil and gas wells within Pinora Township, 26 of which are "active" or "producing."

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:

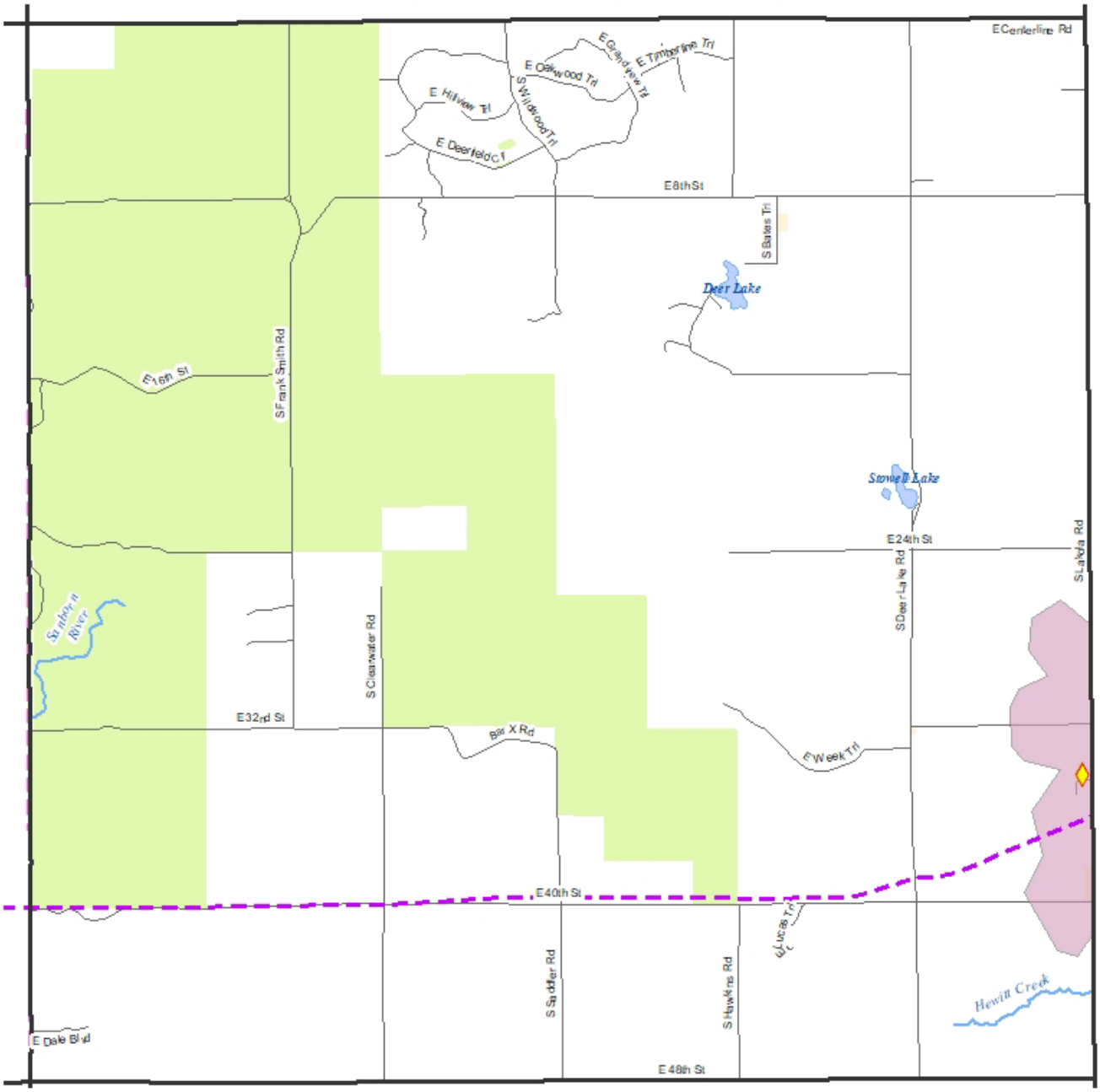
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

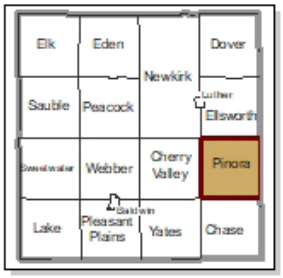
	Pinora Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	2	1	1	1	6	12
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	1	1	6	12
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	1	1	1	1	6	6
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	1	2	1	2	10	10
2.11	Transportation Accidents	1	1	1	1	6	6
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Pinora Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
8	Hail	2		11		22
9	Fire – Structural	3		7		21
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Energy Emergencies	2		9		18
11	Oil/Natural Gas Well Accidents	2		9		18
11	Catastrophic Incidents	1		18		18
17	HAZMAT – Transportation	2		7		14
18	Flooding: Riverine/Urban	2		6		12
18	Dam failure	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
21	Pipeline Accidents	1		10		10
22	Celestial Impacts	1		8		8
22	Fog	2		4		8
24	Subsidence	1		6		6
24	Fire – Scrap Tires	1		6		6
24	HAZMAT – Fixed Site	1		6		6
24	Transportation Accidents	1		6		6
24	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Pinora Township, Lake County
Critical Facilities and Potential Hazards



Road
Gas Pipeline
Power Transmission Line
Oil/Gas Well Concentration
Federal Land
State Land
Municipal Land
SARA Title III Site



0 0.25 0.5 0.75 1 Miles

Map created August 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

Pleasant Plains Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating **FIRM Map Date:** 09/01/86

Flood Insurance Policies In-Force: 14 **Total Flood Insurance Coverage:** $3,502,000

Floodplains and Flood-prone Areas: Pere Marquette River, Baldwin River/Sandborn Creek

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- ***June 8, 2003: .75 inch hail. $20k property damage and $20k crop damage, Pleasant Plains Township.***
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake County.
- ***August 30, 2001: Severe thunderstorm winds. $100k property damage, Pleasant Plains and Yates Townships.***
- March 9, 2002: High wind. $485k property damage across southwest Lower Michigan.
- ***August 2, 2004: Severe thunderstorm winds. $10k property damage, Chase and Pleasant Plains townships.***
- October 30, 2004: High wind. $1.15m property damage across southwest Lower Michigan.
- July 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.
- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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.
- ***1994: "County Line Fire." 900 acres burned, Pleasant Plains Township.***
- 1981-2010: Approximately 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure:

- ***September 1986: Floods triggered dam failures at Baldwin's Rearing Pond, Danaher Lake, and Luther Mill Pond.***

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan. .
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- August 27, 2021: Trees and power lines blown down (thunderstorm winds), Baldwin Area.
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 2 oil and gas wells within Pleasant Plains Township, none of which are "active" or "producing."

2.10 Pipeline Accidents:

- ***June 23, 1999: Broken gas main. Nearby residences evacuated, Pleasant Plains Township.***

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. 37 confirmed deaths in Lake County as of July 11, 2023.

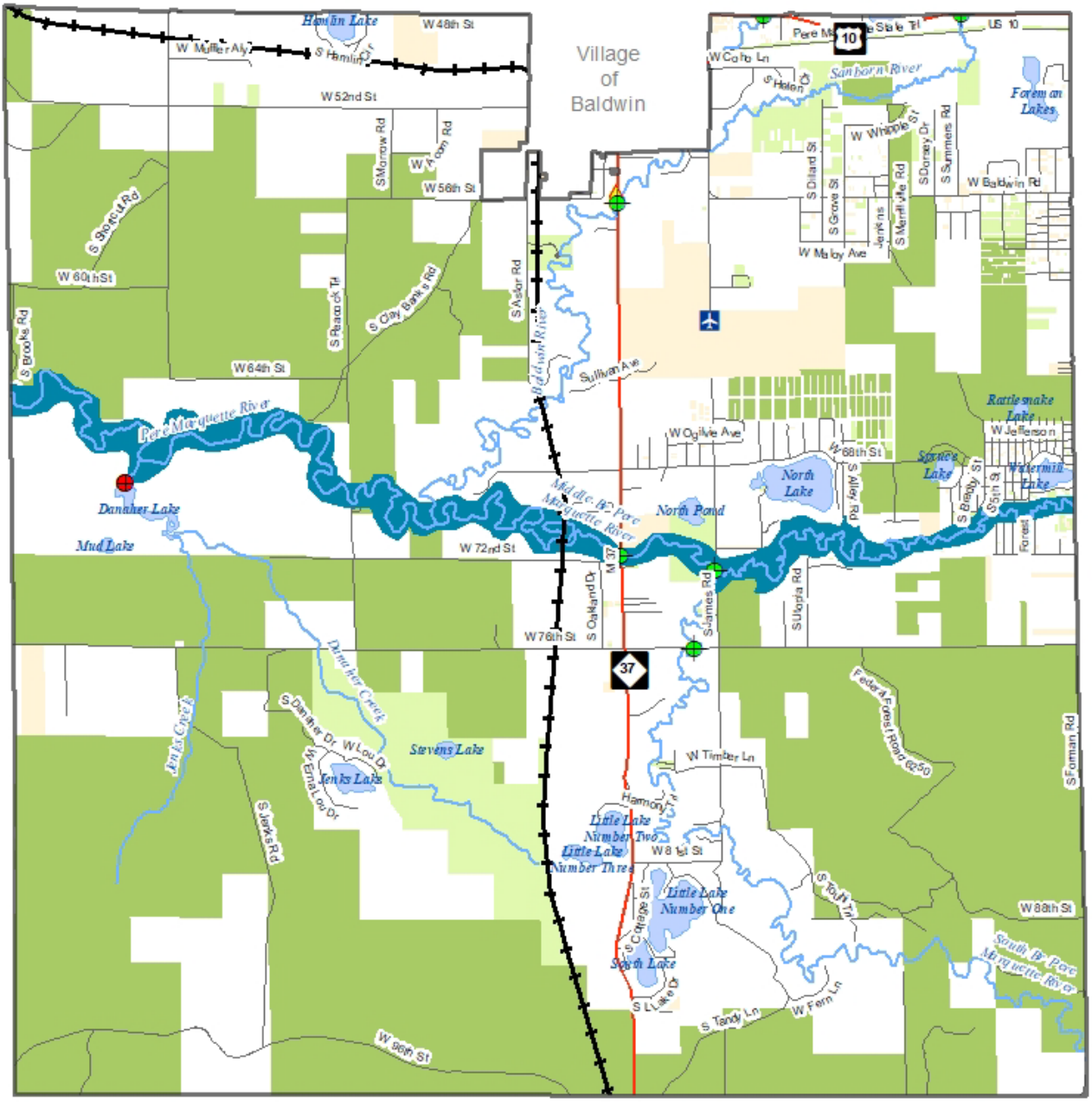
3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Pleasant Plains Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	2	1	8	24
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	0	-	-	-	-	-
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

Pleasant Plains Township Hazard Ranking

		Probability of Occurrence	X Impacts Total	= Hazard Score
1	Winter Storms	3	16	48
2	Severe Winds	3	14	42
3	Infrastructure Failures	3	13	39
4	Wildfire	3	12	36
5	Extreme Temperatures	3	10	30
6	Flooding: Riverine/Urban	3	8	24
6	Lightning	3	8	24
6	Public Health Emergencies	3	8	24
9	Hail	2	11	22
10	Fire – Structural	3	7	21
11	Drought	2	10	20
12	Space Weather	2	9	18
12	Invasive Species	3	6	18
12	Tornadoes	2	9	18
12	Energy Emergencies	2	9	18
12	Oil/Natural Gas Well Accidents	2	9	18
12	Catastrophic Incidents	1	18	18
18	HAZMAT – Transportation	2	7	14
19	Transportation Accidents	2	6	12
19	Terrorism & Similar Criminal Acts	2	6	12
21	Celestial Impacts	1	8	8
21	Fog	2	4	8
23	Subsidence	1	6	6
23	Fire – Scrap Tires	1	6	6
23	Civil Disturbances	1	6	6
	Dam failure	0	-	-
	Earthquake	0	-	-
	Great Lakes Shoreline	0	-	-
	HAZMAT – Fixed Site	0	-	-
	Nuclear Attack	0	-	-
	Nuclear Power Emergencies	0	-	-
	Pipeline Accidents	0	-	-

Pleasant Plains Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Railroad
SARA Title III Site
Bridge
Airport
Fire/Police/EMS/911
Dam
Federal Land
State Land
Municipal Land
Floodplain

0 0.25 0.5 0.75 1 Miles

Map created August 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

Sauble Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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 disaster by Governor, Presidential disaster declaration, Lake County.
- ***August 6, 1998: Flash flood. $10k property damage, northwest Lake County.***
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- ***April 25, 2005: Severe thunderstorm winds. $20k property damage, northwest Lake County.***
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.
- ***April 11, 2023: Wildfire in Sauble Township started from ashes that exited a burn barrel starting ground debris on fire. Total estimated area burned was in excess of 80 acres.***

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 27 oil and gas wells within Sauble Township, none of which are "active" or "producing."
- ***1 well known to have detectable levels of hydrogen sulfide, Sauble 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:

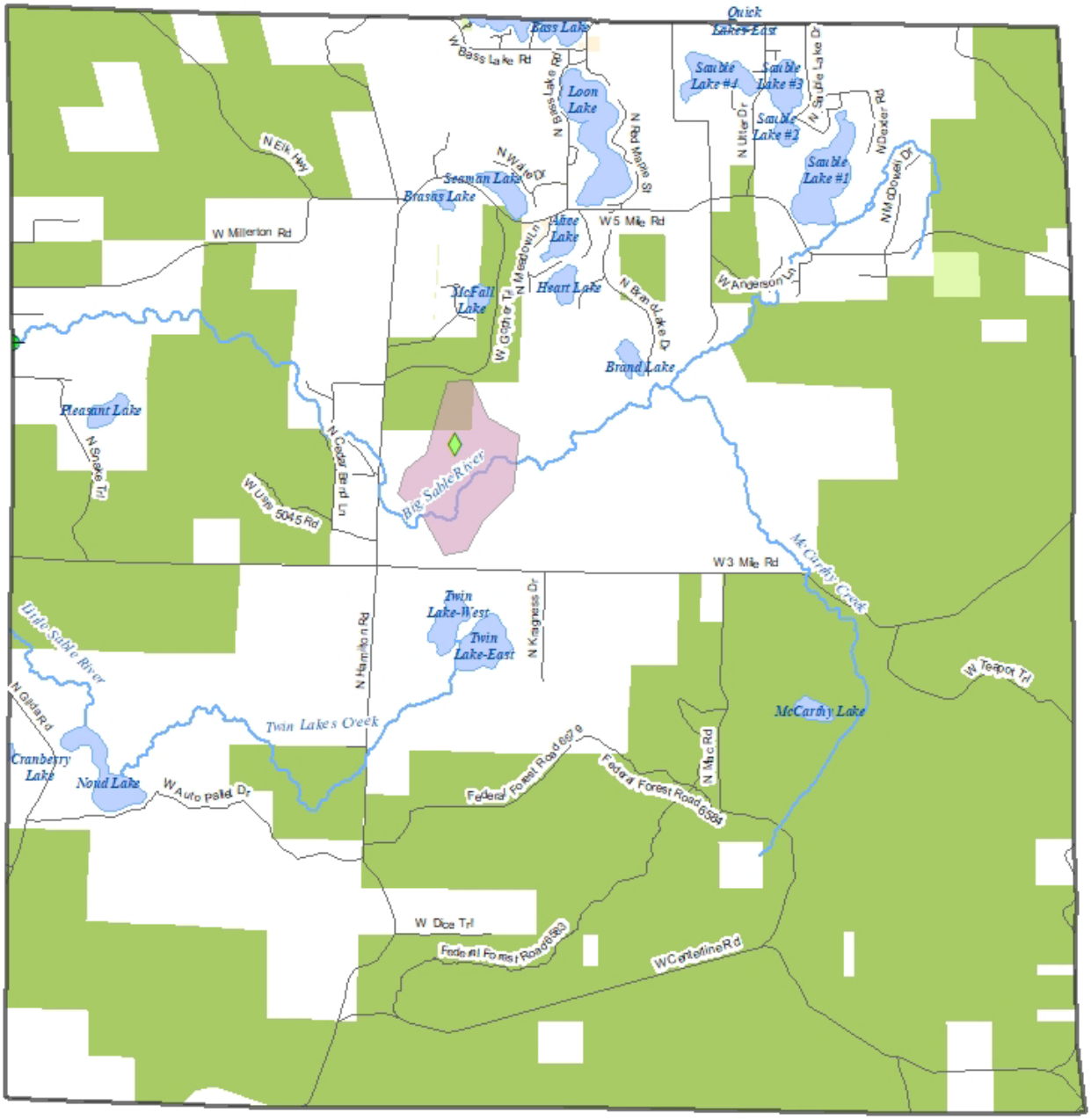
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

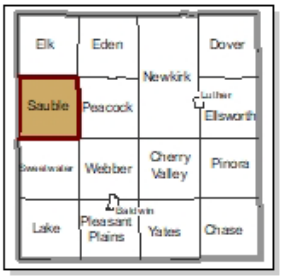
	Sauble Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	3	1	0	1	4	12
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	2	2	2	12	24
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	2	1	1	9	18
2.10	Pipeline Accidents	1	2	1	2	10	10
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Sauble Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Fire – Structural	3		9		27
7	Lightning	3		8		24
7	Dam failure	2		12		24
7	Public Health Emergencies	3		8		24
10	Hail	2		11		22
11	Drought	2		10		20
12	Space Weather	2		9		18
12	Flooding: Riverine/Urban	3		6		18
12	Invasive Species	3		6		18
12	Tornadoes	2		9		18
12	Energy Emergencies	2		9		18
12	Oil/Natural Gas Well Accidents	2		9		18
12	Catastrophic Incidents	1		18		18
19	HAZMAT – Transportation	2		7		14
20	Fog	3		4		12
20	Transportation Accidents	2		6		12
20	Terrorism & Similar Criminal Acts	2		6		12
23	Pipeline Accidents	1		10		10
24	Celestial Impacts	1		8		8
25	Subsidence	1		6		6
25	Fire – Scrap Tires	1		6		6
25	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Sauble Township, Lake County
Critical Facilities and Potential Hazards



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



0 0.25 0.5 0.75 1 Miles

Map created August 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

Sweetwater Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $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:

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).

- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation: - None Identified.

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***July 13, 2000: Downed power lines (thunderstorm winds), Sweetwater Township.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan.
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 7 oil and gas wells within SweetwaterTownship, none of which are "active" or "producing."

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:

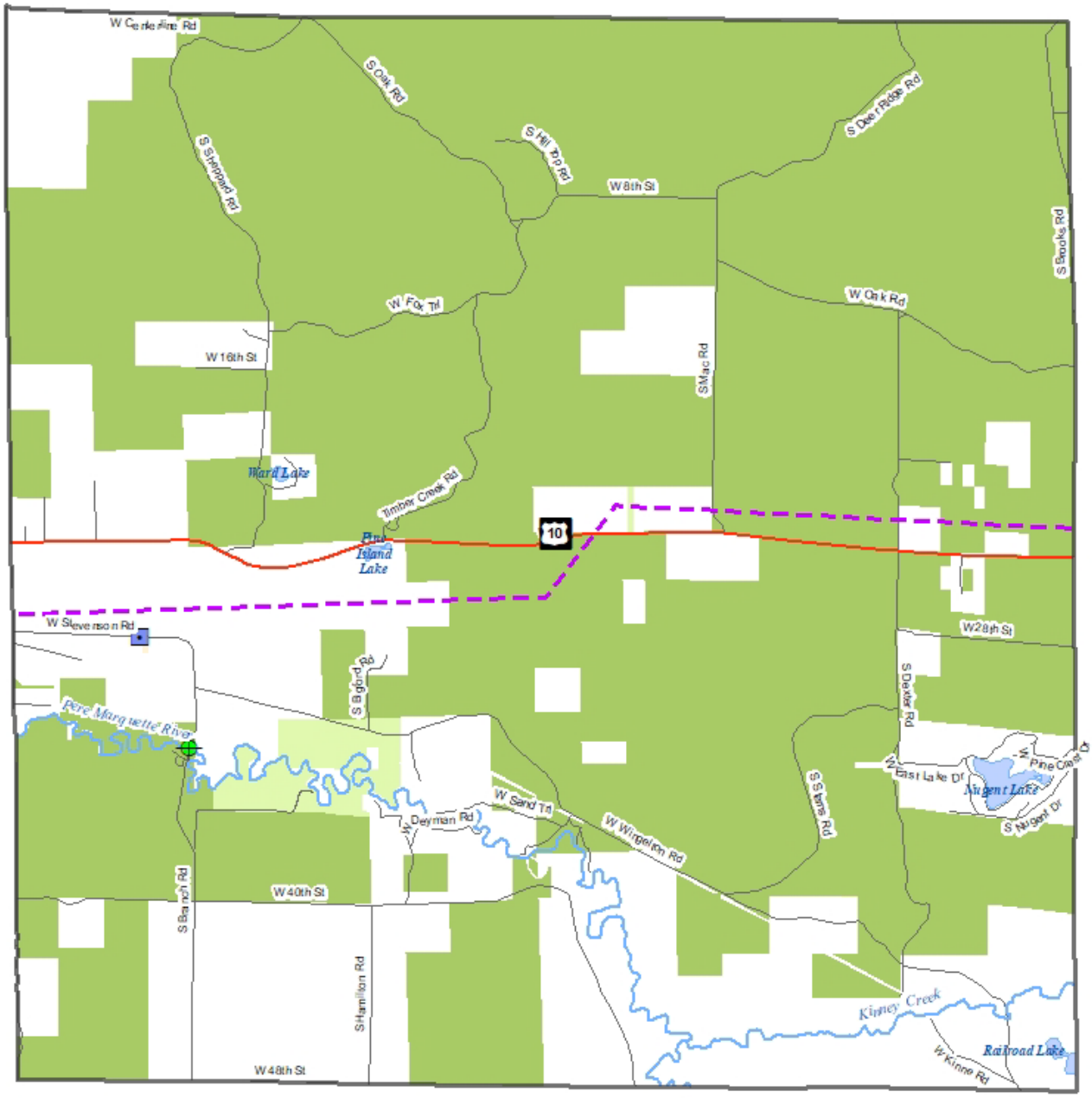
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Sweetwater Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	0	-	-	-	-	-
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	2	2	9	27
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	1	1	1	6	12
2.10	Pipeline Accidents	1	2	1	2	10	10
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Sweetwater Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Fire – Structural	3		9		27
7	Lightning	3		8		24
7	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
17	HAZMAT – Transportation	2		7		14
18	Oil/Natural Gas Well Accidents	2		6		12
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
21	Pipeline Accidents	1		10		10
22	Celestial Impacts	1		8		8
22	Fog	2		4		8
24	Subsidence	1		6		6
24	Fire – Scrap Tires	1		6		6
24	Civil Disturbances	1		6		6
	Dam failure	0		-		-
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Sweetwater Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Gas Pipeline
Bridge
Shelter
Federal Land
State Land
Municipal Land

0 0.25 0.5 0.75 1 Miles

Map created August 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

Webber Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating **FIRM Map Date:** No Special Flood Hazard Areas (NSFHA)
Flood Insurance Policies In-Force: 2 **Total Flood Insurance Coverage:** $350,000
Floodplains and Flood-prone Areas: Baldwin River

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.
- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.

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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.
- ***May 21, 2021: "James St. Fire." 30 acres burned in Webber Township. 32 homes potentially affected and evacuated, Lake County Animal Shelter evacuated.***

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation:

- ***July 9, 2018: Gas tanker overturned to avoid collision at northern intersection of US-10 and M-37. Gas spillage and ½ mile radius evacuation, Webber Township.***

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
- ***February 9-10, 2001: Portions of M-37 closed (flooding), Lake County.***
- April 3, 2003: Hundreds of thousands lose power (ice storm), Lower Michigan. .
- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- August 27, 2021: Trees and power lines blown down (thunderstorm winds), Baldwin Area.
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 2 oil and gas wells within Webber Township, none of which are "active" or "producing."

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:

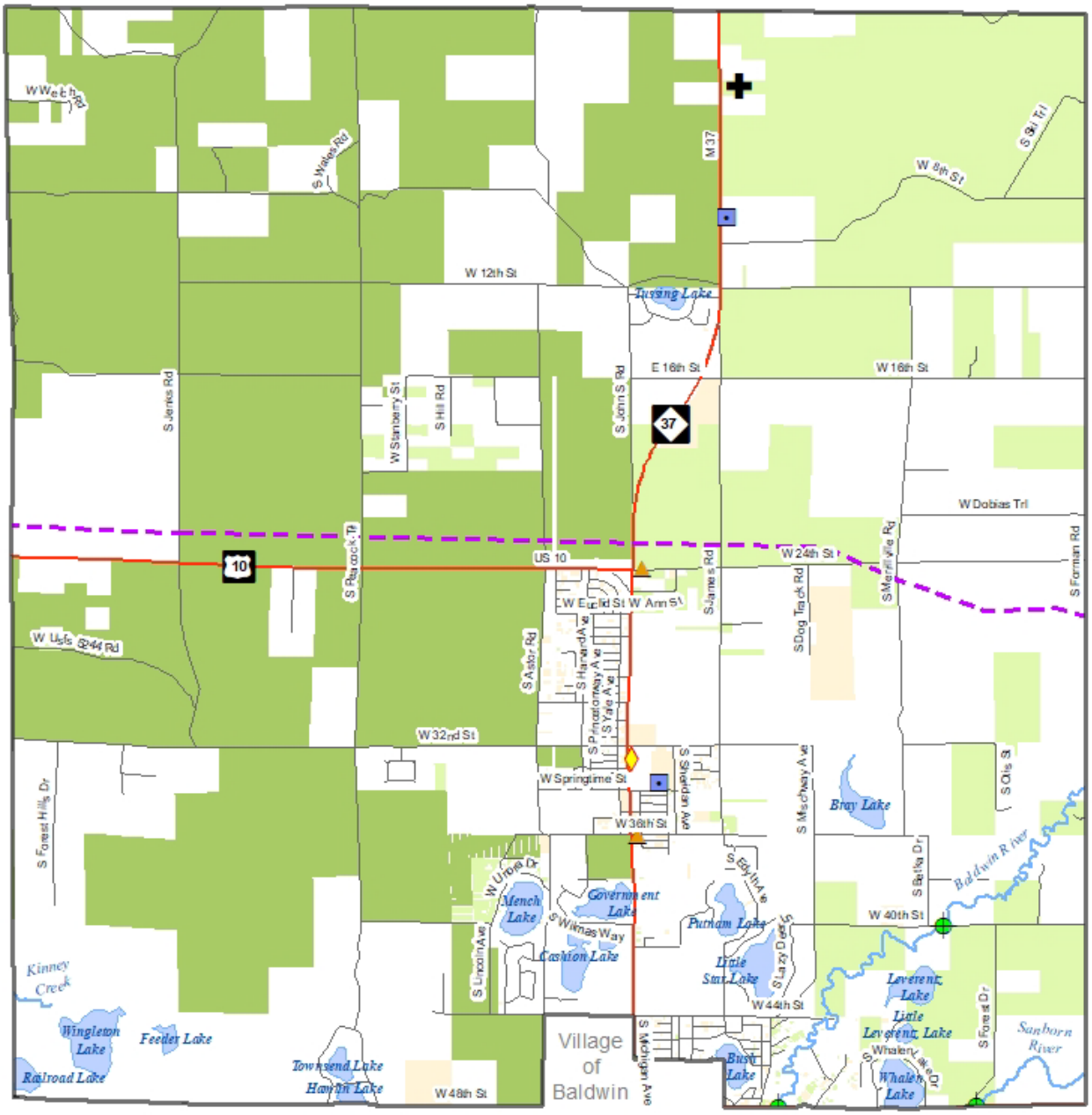
- 2020 to current: Covid-19 Pandemic. Nearly 7 million confirmed deaths worldwide. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

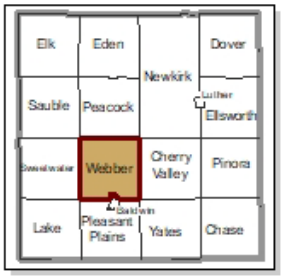
	Webber Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
1.01a	Celestial Impacts	1	2	0	2	8	8
1.01b	Space Weather	2	2	0	3	9	18
1.02	Drought	2	2	1	2	10	20
1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
1.05	Flooding: Riverine/Urban	3	1	1	1	6	18
1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
1.09	Invasive Species	3	1	1	1	6	18
1.10	Lightning	3	1	2	1	8	24
1.11	Severe Winds	3	2	3	2	14	42
1.12	Subsidence	1	1	1	1	6	6
1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	2	2	9	18
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	1	1	1	1	6	6
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	1	1	1	1	6	6
2.10	Pipeline Accidents	1	1	1	2	7	7
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

	Webber Township Hazard Ranking	Probability of Occurrence	X	Impacts Total	=	Hazard Score
1	Winter Storms	3		16		48
2	Severe Winds	3		14		42
3	Infrastructure Failures	3		13		39
4	Wildfire	3		12		36
5	Extreme Temperatures	3		10		30
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
8	Hail	2		11		22
9	Fire – Structural	3		7		21
10	Drought	2		10		20
11	Space Weather	2		9		18
11	Flooding: Riverine/Urban	3		6		18
11	Invasive Species	3		6		18
11	Tornadoes	2		9		18
11	Dam failure	2		9		18
11	Energy Emergencies	2		9		18
11	Catastrophic Incidents	1		18		18
18	HAZMAT – Transportation	2		7		14
19	Transportation Accidents	2		6		12
19	Terrorism & Similar Criminal Acts	2		6		12
20	Celestial Impacts	1		8		8
20	Fog	2		4		8
22	Pipeline Accidents	1		7		7
23	Subsidence	1		6		6
23	Fire – Scrap Tires	1		6		6
23	HAZMAT – Fixed Site	1		6		6
23	Oil/Natural Gas Well Accidents	1		6		6
23	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Webber Township, Lake County
Critical Facilities and Potential Hazards



State Trunkline
Road
Railroad
Gas Pipeline
Bridge
Medical Facility
Shelter
Fire/Police/EMS/911
Communication Tower
Federal Land
State Land
Municipal Land
SARA Title III Site



0 0.25 0.5 0.75 1 Miles

Map created August 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

Yates Township

1. NATURAL HAZARDS

1.01 Celestial Impacts: - None Identified.

1.02 Drought:

- Summer 1871: Prolonged drought over much of the Great Lakes region.
- May-September, 1891: Drought devastated Michigan's lumber industry.
- 12 recorded drought events in the area (including Lake, Mason, Muskegon, Newaygo, and Oceana counties) lasting eight months or greater: 1895-1896 (15 months), 1899-1900 (11 months), 1901-1902 (10 months), 1909-1911 (24 months), 1925-1926 (11 months), 1930-1931 (18 months), 1956-1957 (8 months), 1962-1963 (9 months), 1971-1972 (12 months), 1976-1977 (13 months), and 2002-2003 (12 months).

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.
- March 2012: Anomalous temperatures. $209.8m crop damage across Michigan.

1.05 Flooding - Riverine/ Urban:

NFIP Participation: Participating **FIRM Map Date:** 09/01/86

Flood Insurance Policies In-Force: 1 **Total Flood Insurance Coverage:** $160,000

Floodplains and Flood-prone Areas: Pere Marquette River, Blood Creek

- September 10-19, 1986: Flooding. Declaration of disaster by Governor, Presidential disaster declaration, Lake County.
- February 10, 2001: Flooding. $100k property damage, western Michigan.
- May 21-23, 2004: Flooding. $25m property damage, $4.6m crop damage, western Lower Michigan.
- June 13, 2008: Flash flood. $2m property damage, $500k crop damage, Presidential disaster declaration, Lake County.
- May 3, 2012: Flash flood. $70k property damage, Lake County.
- April 17-23, 2013: Flood. $3m property damage, Lake County.
- April 2014: Flood. Local state of emergency declared, Lake County.
- July 20, 2019: Flood. $800k property damage, Lake County.

1.06 Fog:

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

1.07 Great Lakes Shoreline Hazards: - None Identified.

1.08 Hail:

- Severe hail events (1" or greater) recorded in Lake County since 1996: 9
- September 7, 2021: 2.5 inch hail. $25k property damage (likely much greater), Baldwin area.

1.09 Invasive Species:

- Invasive species exist in Lake County, however no significant events have been identified.

1.10 Lightning: - None Identified.

1.11 Severe Winds:

- April 6, 1997: High wind. $5m property damage across southwest Lower Michigan.
- May 31, 1998: Severe thunderstorm winds. Declaration of local of emergency and $1.1m property damage, Lake County.
- June 1, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- July 13, 2000: Severe thunderstorm winds. $25k property damage, Lake County.
- June 18, 2001: High wind. $100k property damage across central Lower Michigan.
- August 9, 2001: Severe thunderstorm winds. $25k property damage, Lake County.
- ***August 30, 2001: Severe thunderstorm winds. $100k property damage, Pleasant Plains and Yates Townships.***
- 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 24, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- July 26, 2005: Severe thunderstorm winds. $25k property damage, Lake County.
- May 3, 2012: Severe thunderstorm winds. $500k property damage, Lake County.
- August 7, 2013: Severe thunderstorm winds. $100k property damage, Lake County.
- November 17, 2013: High wind. $75k property damage, Lake County.
- March 8, 2017: High wind. $5m property damage, Lake County.
- July 19, 2019: Severe thunderstorm winds. $250k property damage, Lake County.
- November 10, 2020: Severe thunderstorm winds. $50k property damage, Baldwin area.
- August 27, 2021: Severe thunderstorm winds. $50k property damage, Baldwin area.

1.12 Subsidence: - None Identified.

1.13 Tornadoes:

- June 8, 1985: F1 tornado. No documented damages, unknown location in Lake County.
- ***August 28, 2018: EF1 tornado. $100k property damage, Yates 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 11 wildfires and 43 acres burned per year on county lands under MDNR jurisdiction (315 total wildfires, 1,283.5 total acres burned).
- 2011-2023: MDNR responded to 60 requests for assistance in Lake County, and USFS responded to an annual average of 30 fires.

1.15 Winter Storms:

- January 26, 1978: Blizzard, snowstorm. Declaration of statewide emergency by President, disaster by Governor.
- January 12, 1993: Heavy snow. $50k property damage, northern Lower Michigan.
- April 1, 1993: Heavy snow. $50k property damage, 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 2-25, 1999: Blizzard, lake effect snow. "Blizzard of '99". southern Lower Michigan.
- April 3, 2003: Ice storm. $4.9m property damage throughout West Michigan.
- December 11-12, 2010: Winter storm. $250k property damage, west-central Lower Michigan.
- March 2-3, 2012: Heavy snow. $100k property damage, power outages, and shelters opened in Lake County.
- April 14, 2018: Winter storm. $100k property damage across Lake County.
- December 1, 2019: Winter storm. $50k property damage across Lake County.

2. TECHNOLOGICAL HAZARDS

2.01 Dam Failure: - None Identified.

2.02 Energy Emergencies: - None Identified.

2.03 Fire - Scrap Tire: - None Identified.

2.04 Fire - Structural:

- County fire rate per 1,000 population in 1998: 3.09

2.05 Hazard Material Incidents - Fixed Site (including industrial accidents): - None Identified.

2.06 Hazard Material Incidents - Transportation:

2.07 Infrastructure Failure:

- Number of NCDC events showing downed power lines or power outages in Lake County, 1997-2022: 25
- 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.
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- October 10, 2004: 100,000 without power (high wind), statewide.
- June 13, 2008: Numerous roads washed out (flash flood), Lake County.
- June 28, 2008: Three-quarters of Lake County without power (thunderstorm winds), Lake County.
- ***August 2, 2011: Road washout at 56th and Queens Highway (flash flood), Yates Township.***
- May 3, 2012: Several roads flooded or washed out (flash flood), Lake County.
- August 27, 2021: Trees and power lines blown down (thunderstorm winds), Baldwin Area.
- July 20, 2019: Several roads flooded or washed out, Lake County.

2.08 Nuclear Power Plant Emergencies: - None Identified.

2.09 Oil and Natural Gas Well Accidents:

- 29 oil and gas wells within Yates Township, none of which are "active" or "producing."

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. 37 confirmed deaths in Lake County as of July 11, 2023.

3.05 Terrorism and Similar Criminal Activities: - None Identified.

	Yates Township Hazard Rating	Probability of Occurrence	Impact on People	Impact on Property	Impact on Economy	Impacts Total	Hazard Score
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1.01b	Space Weather	2	2	0	3	9	18
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1.03	Earthquake	0	-	-	-	-	-
1.04	Extreme Temperatures	3	2	1	2	10	30
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1.06	Fog	2	1	0	1	4	8
1.07	Great Lakes Shoreline	0	-	-	-	-	-
1.08	Hail	2	2	2	1	11	22
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1.13	Tornadoes	2	1	2	2	9	18
1.14	Wildfire	3	2	2	2	12	36
1.15	Winter Storms	3	3	2	3	16	48
2.01	Dam failure	2	1	1	1	6	12
2.02	Energy Emergencies	2	2	0	3	9	18
2.03	Fire – Scrap Tires	1	1	1	1	6	6
2.04	Fire – Structural	3	1	1	2	7	21
2.05	HAZMAT – Fixed Site	0	-	-	-	-	-
2.06	HAZMAT – Transportation	2	1	1	2	7	14
2.07	Infrastructure Failures	3	3	1	2	13	39
2.08	Nuclear Power Emergencies	0	-	-	-	-	-
2.09	Oil/Natural Gas Well Accidents	2	1	1	1	6	12
2.10	Pipeline Accidents	1	2	1	2	10	10
2.11	Transportation Accidents	2	1	1	1	6	12
3.01	Catastrophic Incidents	1	3	3	3	18	18
3.02	Civil Disturbances	1	1	1	1	6	6
3.03	Nuclear Attack	0	-	-	-	-	-
3.04	Public Health Emergencies	3	2	0	2	8	24
3.05	Terrorism & Similar Criminal Acts	2	1	1	1	6	12

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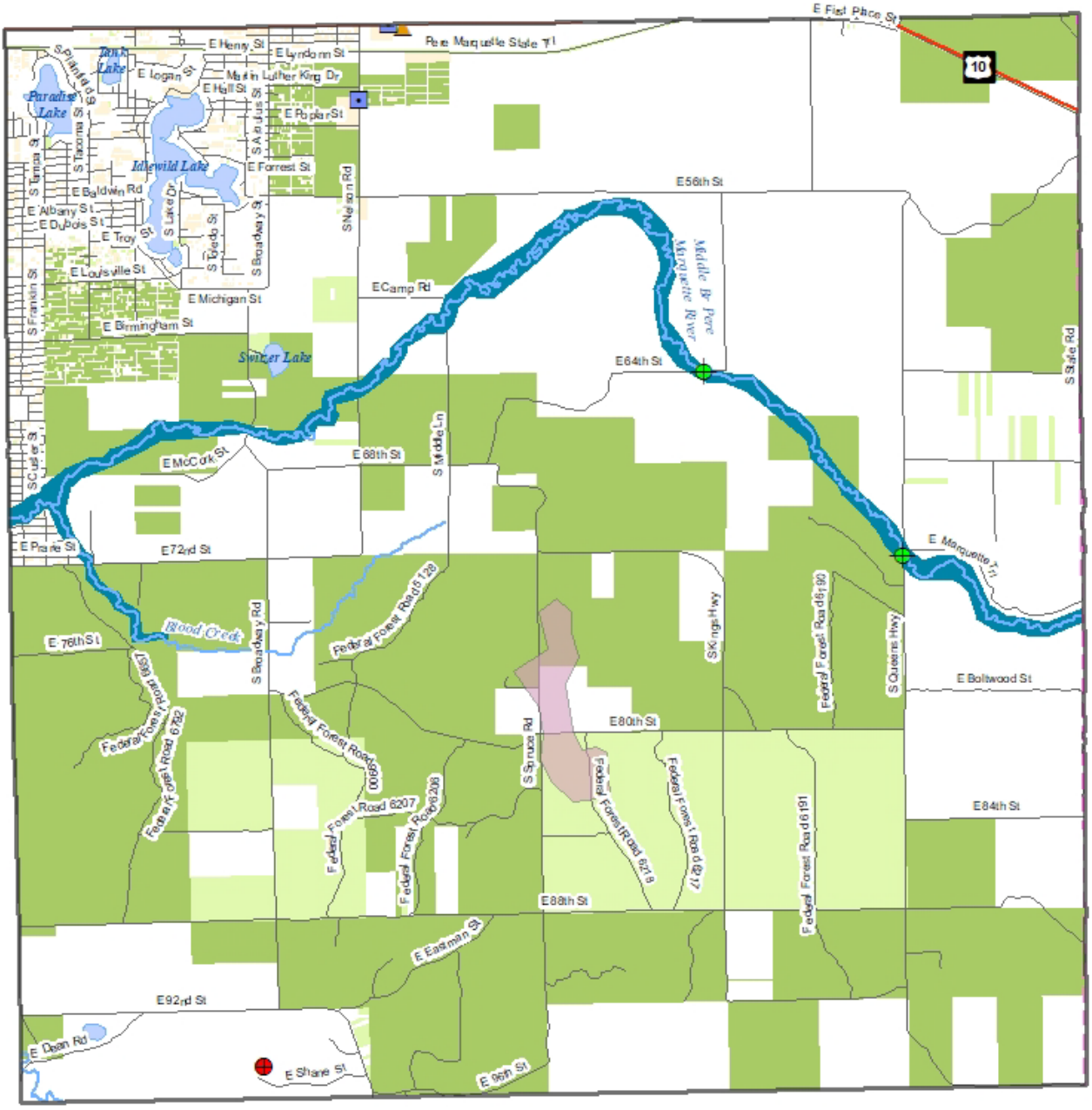
6	Lightning	3		8		24
6	Public Health Emergencies	3		8		24
9	Hail	2		11		22
10	Fire – Structural	3		7		21
11	Drought	2		10		20
12	Space Weather	2		9		18
12	Invasive Species	3		6		18
12	Tornadoes	2		9		18
12	Energy Emergencies	2		9		18
12	Catastrophic Incidents	1		18		18
17	HAZMAT – Transportation	2		7		14
18	Dam failure	2		6		12
18	Oil/Natural Gas Well Accidents	2		6		12
18	Transportation Accidents	2		6		12
18	Terrorism & Similar Criminal Acts	2		6		12
22	Pipeline Accidents	1		10		10
23	Celestial Impacts	1		8		8
23	Fog	2		4		8
25	Subsidence	1		6		6
25	Fire – Scrap Tires	1		6		6
25	Civil Disturbances	1		6		6
	Earthquake	0		-		-
	Great Lakes Shoreline	0		-		-
	HAZMAT – Fixed Site	0		-		-
	Nuclear Attack	0		-		-
	Nuclear Power Emergencies	0		-		-

Yates Township, Lake County
Critical Facilities and Potential Hazards



Road
State Trunkline
Power Transmission Line
Oil/Gas Well Concentration
Bridge
Fire/Police/EMS/911
Dam
Shelter
Federal Land
State Land
Municipal Land
Floodplain

0 0.25 0.5 0.75 1 Miles

Map created August 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

Appendix C:

Hazard Identification Data and Maps

National Climatic Data Center: Storm Events

(92 events involving Lake County between 01/01/1950 and 04/31/2004)

Location or County	Date	Time	Type	Magnitude	Death	Injury	Damage ($)	
							property	crop
1 LAKE	8/15/61	1200	Hail	0.75 in.	0	0	0	0
2 LAKE	8/31/76	1830	Tstm Wind	0 kts.	0	0	0	0
3 LAKE	7/26/78	1050	Tstm Wind	0 kts.	0	0	0	0
4 LAKE	8/15/78	2305	Hail	1.25 in.	0	0	0	0
5 LAKE	6/8/85	2240	Tornado	F1	0	0	0	0
6 LAKE	6/8/85	2300	Tstm Wind	0 kts.	0	0	0	0
7 LAKE	8/17/88	1720	Tstm Wind	0 kts.	0	0	0	0
8 LAKE	9/14/90	715	Tstm Wind	0 kts.	0	0	0	0
9 LAKE	6/17/92	1429	Tstm Wind	0 kts.	0	0	0	0
10 LAKE	6/17/92	1441	Tstm Wind	0 kts.	0	0	0	0
11 S Lower MI	1/3/93	2300	Flooding	N/A	0	0	5K	0
12 MIZ004	1/12/93	2300	Heavy Snow	N/A	0	0	50K	0
13 MIZ001	1/21/93	0	Ice Storm	N/A	0	0	0	0
14 MIZ004	3/23/93	300	Freezing Rain	N/A	0	0	0	0
15 MIZ011	4/1/93	0	Heavy Snow	N/A	0	0	50K	0
16 MIZ001	4/19/93	1200	Flood	N/A	0	0	5.0M	0
17 Upper and W MI	12/20/93	1000	Heavy Snow	N/A	0	0	0	0
19 Upper and W MI	12/25/93	700	Heavy Snow	N/A	0	0	0	0
20 Upper and W MI	12/29/93	0	Heavy Snow	N/A	0	0	0	0
21 Upper MI	1/12/94	0	Heavy Lake Snow	N/A	0	0	500K	0
22 Miz000	1/13/94	0	Record Cold	N/A	0	0	50.0M	0
23 Lower MI	1/27/94	0	Heavy Snow/freezing Rain	N/A	0	0	5.0M	0
24 W Lower MI	2/2/94	0	Heavy Snow	N/A	0	0	0	0
25 Central Upper MI	2/22/94	1900	Heavy Snow	N/A	0	0	0	0
26 N Lower MI	12/16/94	1900	Heavy Snow	N/A	0	0	0	0
27 Lower MI	1/11/95	1800	Dense Fog	N/A	0	0	0	0
28 MIZ001	2/3/95	1800	Heavy Lake Snow	N/A	0	0	0	0
29 MIZ001	2/11/95	0	Heavy Lake Snow	N/A	0	0	0	0
30 S Lower MI	2/27/95	100	Ice Storm	N/A	0	0	0	0
31 MIZ001	3/6/95	0	Heavy Snow	N/A	0	0	0	0
32 MIZ037	1/29/96	7:00 AM	Winter Storm	N/A	0	0	0	0
33 Baldwin	5/18/96	8:48 AM	Hail	1.75 in.	0	0	0	0
34 Luther	5/18/96	8:50 AM	Hail	0.75 in.	0	0	0	0
35 MIZ037	11/10/96	1:00 AM	Heavy Snow	N/A	0	0	0	0
36 Baldwin	2/21/97	10:15 AM	Flash Flood	N/A	0	0	0	0
37 MIZ037	4/6/97	4:00 PM	High Wind	0 kts.	0	0	5.0M	0
38 Baldwin	5/5/97	4:56 PM	Hail	0.88 in.	0	0	0	0
39 Idlewild	5/5/97	4:58 PM	Hail	0.75 in.	0	0	0	0
40 Chase	6/30/97	4:55 PM	Hail	0.75 in.	0	0	0	0
41 MIZ037	11/11/97	9:00 PM	Lake Effect Snow	N/A	0	0	0	0
42 MIZ037	12/4/97	7:00 PM	Lake Effect Snow	N/A	0	0	0	0
43 MIZ037	12/30/97	7:00 AM	Lake Effect Snow	N/A	0	0	0	0
44 MIZ037	1/4/98	12:00 AM	Freezing Rain	N/A	0	0	0	0
45 MIZ037	1/7/98	5:00 PM	Winter Storm	N/A	0	0	0	0
46 MIZ037	3/9/98	7:00 AM	Blizzard	N/A	0	0	0	0
47 MIZ037	3/13/98	3:00 PM	Heavy Snow	N/A	0	0	0	0

48 Baldwin	3/30/98	2:05 PM	Hail	1.00 in.	0	0	0	0
49 Baldwin	3/30/98	3:00 PM	Hail	1.75 in.	0	0	0	0
50 Baldwin	5/29/98	12:30 AM	Tstm Wind	0 kts.	0	0	1K	0
51 Irons	5/29/98	12:30 AM	Tstm Wind	0 kts.	0	0	10K	0
52 Countywide	5/31/98	4:05 AM	Tstm Wind	0 kts.	0	0	1.1M	0
53 NW MI	8/6/98	5:00 PM	Flash Flood	N/A	0	0	10K	0
54 Wolf Lake	9/26/98	4:20 AM	Hail	1.00 in.	0	0	0	0
55 Irons	9/26/98	7:50 AM	Tstm Wind/hail	60 kts.	0	0	0	0
56 MIZ037	11/10/98	10:00 AM	High Wind	87 kts.	1	0	0	0
57 MIZ037	12/21/98	1:00 PM	Lake Effect Snow	N/A	0	0	0	0
58 MIZ037	1/2/99	7:00 AM	Blizzard	N/A	0	0	0	0
59 MIZ037	1/4/99	12:00 AM	Snow	N/A	0	0	0	0
60 MIZ037	1/5/99	9:00 PM	Lake Effect Snow	N/A	0	0	0	0
61 MIZ037	2/5/99	7:00 PM	Freezing Rain	N/A	0	0	0	0
62 Baldwin	2/11/99	6:00 PM	Tstm Wind	0 kts.	0	0	10K	0
63 MIZ037	3/2/99	2:00 PM	Snow	N/A	0	0	0	0
64 Baldwin	6/6/99	9:42 PM	Tstm Wind	0 kts.	0	0	10K	0
65 Irons	7/23/99	10:45 AM	Tstm Wind	53 kts.	0	0	10K	0
66 Baldwin	10/13/99	2:41 AM	Hail	1.75 in.	0	0	10K	0
67 MIZ037	1/3/00	3:00 PM	Winter Storm	N/A	0	0	0	0
68 MIZ037	1/12/00	12:00 PM	Winter Storm	N/A	0	0	0	0
69 MIZ038	2/10/00	5:00 AM	Winter Storm	N/A	0	0	0	0
70 MIZ037	4/7/00	12:00 PM	Winter Storm	N/A	0	0	0	0
71 Baldwin	5/8/00	5:35 PM	Hail	1.00 in.	0	0	20K	0
72 Baldwin	6/1/00	9:05 PM	Tstm Wind	53 kts.	0	0	25K	0
73 Countywide	7/13/00	9:50 PM	Tstm Wind	53 kts.	0	0	25K	0
74 Luther	8/9/00	4:30 AM	Hail	1.75 in.	0	0	50K	25K
75 MIZ037	12/11/00	6:00 AM	Winter Storm	N/A	0	0	0	0
76 Countywide	2/9/01	9:00 AM	Flood	N/A	0	0	100K	0
77 Baldwin	5/23/01	6:15 PM	Hail	0.75 in.	0	0	10K	10K
78 MIZ038	6/18/01	8:13 PM	High Wind	62 kts.	0	0	100K	0
79 Baldwin	8/9/01	4:50 PM	Tstm Wind	53 kts.	0	0	25K	0
80 Baldwin	8/30/01	8:15 PM	Tstm Wind	60 kts.	0	0	100K	0
81 MIZ037	12/23/01	3:00 PM	Winter Storm	N/A	0	0	0	0
82 MIZ037	2/25/02	7:00 PM	Winter Storm	N/A	0	0	0	0
83 MIZ037	3/2/02	1:00 AM	Winter Storm	N/A	0	0	0	0
84 MIZ037	3/9/02	12:54 PM	High Wind	62 kts.	0	0	485K	0
85 Nirvana	4/18/02	7:50 PM	Tstm Wind	53 kts.	0	0	1K	0
86 MIZ037	12/1/02	10:00 AM	Heavy Snow	N/A	0	0	0	0
87 MIZ037	2/10/03	4:00 AM	Heavy Snow	N/A	0	0	0	0
88 MIZ037	4/3/03	10:00 AM	Ice Storm	N/A	0	0	4.9M	0
89 Bristol	5/11/03	12:05 AM	Hail	0.88 in.	0	0	10K	10K
90 Baldwin	6/8/03	4:35 PM	Hail	0.75 in.	0	0	20K	20K
91 MIZ037	1/14/04	4:00 AM	Heavy Snow	N/A	0	0	0	0
92 MIZ037	1/27/04	7:00 AM	Winter Storm	N/A	0	0	0	0

National Climatic Data Center: Storm Events

05/01/2004 through 02/28/2014 ♦ 61 events reported in Lake County

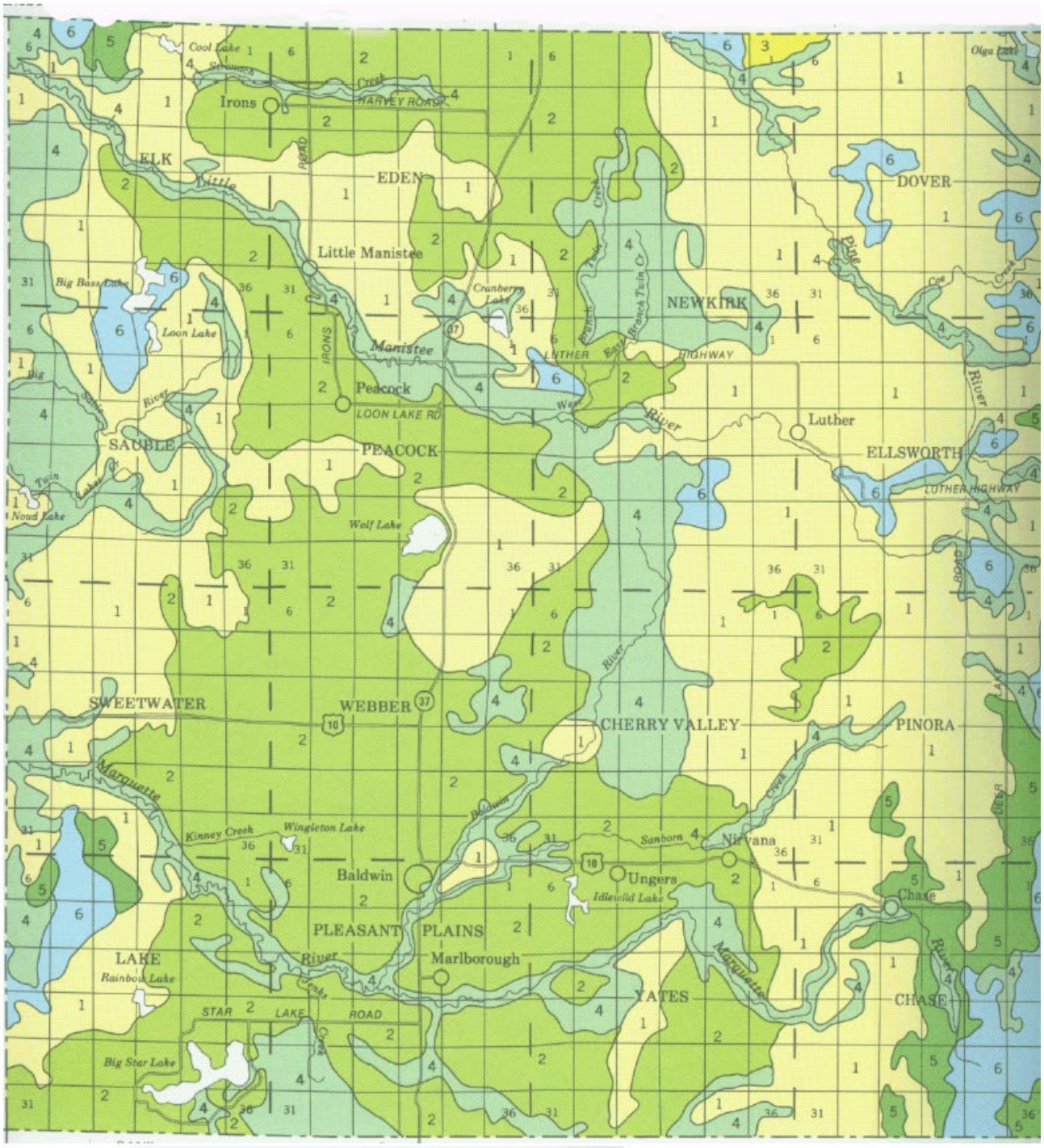
Location or Zone	Date	Duration	Type	Magnitude	Death	Injury	Damage ($)	
							property	crop
Lake Co. (Zone)	5/21/04	3 days	Flood	N/A	0	0	25M	4.6M
Irons	7/13/04	<1 day	Tstm Wind	61 mph	0	0	10K	0
Chase	8/02/04	<1 day	Tstm Wind	61 mph	0	0	10K	0
Lake Co. (Zone)	10/30/04	<1 day	High Wind	58-60 mph	0	0	1.15M	0
Lake Co. (Zone)	1/04/05	1 day	Heavy Snow	6-9” snow	0	0	0	0
Lake Co. (Zone)	1/18/05	1 day	Heavy Snow	6-7” snow	0	0	0	0
Lake Co. (Zone)	2/20/05	1 day	Heavy Snow	6-12” snow	0	0	0	0
Lake Co. (Zone)	2/27/50	1 day	Heavy Snow	6-11” snow	0	0	0	0
Baldwin	7/24/05	<1 day	Tstm Wind	61 mph	0	0	25K	0
Baldwin	7/26/05	4 miles	Tornado	EF-1	0	0	150K	50K
Baldwin	7/26/05	<1 day	Tstm Wind	61 mph	0	0	25K	0
Luther	8/18/05	<1 day	Tstm Wind	61 mph	0	0	4K	0
Peacock	9/13/05	<1 day	Tstm Wind	61 mph	0	0	20K	0
Lake Co. (Zone)	1/20/06	1 day	Heavy Snow	6-10” snow	0	0	0	0
Lake Co. (Zone)	2/16/06	1 day	Heavy Snow	6-8” snow	0	0	0	0
Lake Co. (Zone)	12/01/06	1 day	Heavy Snow	6-9” snow	0	0	0	0
Lake Co. (Zone)	12/04/06	1 day	Lake-Effect Snow	6-8” snow	0	0	0	0
Lake Co. (Zone)	12/06/06	1 day	Lake-Effect Snow	8-12” snow	0	0	0	0
Lake Co. (Zone)	2/02/07	2 days	Winter Storm	6” snow	0	0	0	0
Lake Co. (Zone)	2/24/07	2 days	Heavy Snow	10“ snow	0	0	0	0
Lake Co. (Zone)	3/01/07	1 day	Winter Storm	5” snow, .4” ice	0	0	25K	0
Chase	6/20/07	<1 day	Tstm Wind	58 mph	0	0	3K	0
Lake Co. (Zone)	12/01/07	1 day	Winter Storm	7” snow	0	0	0	0
Lake Co. (Zone)	12/28/07	1 day	Heavy Snow	6-8” snow	0	0	0	0
Lake Co. (Zone)	1/10/08	1 day	Winter Storm	6-7” snow	0	0	0	0
Lake Co. (Zone)	2/06/08	1 day	Winter Storm	12” snow	0	0	0	0
Lake Co. (Zone)	2/14/08	1 day	Winter Storm	12” snow	0	0	0	0
Irons	4/25/08	<1 day	Tstm Wind	60 mph	0	0	20K	0
Baldwin Muni. Arpt.	5/17/08	<1 day	Tstm Wind	60 mph	0	0	5K	0
Peacock	6/13/08	6-8 hr.	Flash Flood	5-11” rain	0	0	2M	500K
Idlewild	6/28/08	<1 day	Tstm Wind	60-70 mph	0	0	0	0
Baldwin	7/16/08	<1 day	Hail	1.00”	0	0	0	0
Lake Co. (Zone)	12/08/08	1 day	Winter Storm	10-16” snow	0	0	0	0
Lake Co. (Zone)	12/19/08	1 day	Winter Storm	6-9” snow	0	0	0	0
Lake Co. (Zone)	12/20/08	1 day	Winter Storm	4-8” snow	0	0	0	0
Lake Co. (Zone)	12/28/08	1 day	High Wind	60 mph	0	0	0	0
Lake Co. (Zone)	2/21/09	1 day	Winter Storm	7” snow	0	0	0	0
Lake Co. (Zone)	12/08/09	1 day	Winter Storm	8-10” snow	0	0	0	0
Lake Co. (Zone)	12/24/09	1 day	Winter Weather	.1-.25” ice	0	0	0	0
Lake Co. (Zone)	12/05/10	3 days	Lake-Effect Snow	15” snow	0	0	0	0
Lake Co. (Zone)	12/11/10	1 day	Winter Storm	6-12” snow	0	0	250K	0
Lake Co. (Zone)	1/03/11	1 day	Winter Weather	4.2” snow	0	0	0	0
Lake Co. (Zone)	1/06/11	3 days	Lake-Effect Snow	4-18” snow	0	0	0	0
Lake Co. (Zone)	1/22/11	1 day	Winter Weather	3-6” snow	0	0	0	0

Lake Co. (Zone)	2/01/11	1 day	Winter Storm	6-10” snow	0	0	0	0
Lake Co. (Zone)	2/20/11	1 day	Winter Storm	6-8” snow	0	0	0	0
Lake Co. (Zone)	3/04/11	<1 day	Winter Weather	.1-.125” ice	0	0	0	0
Lake Co. (Zone)	3/22/11	1 day	Winter Storm	6-10” snow	0	0	0	0
Wolf Lake	4/10/11	<1 day	Hail	1.00”	0	0	0	0
Lake Co. (Zone)	6/08/11	<1 day	Tstm Wind	60 mph, .88” hail	0	0	0	0
Nirvana	8/02/11	<1 day	Flash Flood	N/A	0	0	10K	0
Lake Co. (Zone)	1/01/12	2 days	Lake-Effect Snow	8” snow	0	0	0	0
Lake Co. (Zone)	1/12/12	2 days	Winter Storm	6-10” snow	0	0	0	0
Lake Co. (Zone)	3/02/12	1 day	Heavy Snow	6-10” snow	0	0	100K	0
Lake Co. (Zone)	5/03/12	<1 day	Strong Wind	52 mph	0	0	500K	0
Branch	5/03/12	<1 day	Flash Flood	5-7” rain	0	0	70K	0
Baldwin	7/0512	<1 day	Tstm Wind	60 mph	0	0	0	0
Lake Co. (Zone)	12/20/12	2 days	Heavy Snow	10-15” snow	0	0	0	0
Irons	4/17/13	6 days	Flood	70 mph	0	0	3M	0
Lake County	8/07/13	<1 day	Tstm Wind	70 mph	0	0	100K	0
Lake Co. (Zone)	11/17/13	<1 day	High Wind	70 mph	0	0	75K	0

National Climatic Data Center: Storm Events
03/1/14 through 02/28/23 * 29 events reported for Lake County

LOCATION or ZONE (zone implies multiple counties)	DATE	DUR-ATION	TYPE	MAG-NITUDE	DEATHS	INJURY	DAMAGE ($)		NOTES
							property	crop	
Elk Twp	6/17/2014	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Downed trees
Pleasant Plains Twp	6/30/2014	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Downed trees and power lines
LAKE (ZONE)	11/17/2014	5 days	Lake-Effect Snow		0	0	0	0	Up to 16-20 inches of snow
LAKE (ZONE)	1/8/2015	2 days	Heavy Snow		0	0	0	0	10-12 inches of snow
LAKE (ZONE)	2/13/2015	2 days	Winter Storm		0	0	0	0	10-12 inches of snow
LAKE (ZONE)	12/29/2015	1 day	Sleet		0	0	0	0	3-4 inches of sleet and snow
LAKE (ZONE)	3/23/2016	2 days	Winter Storm		0	0	0	0	5 to 6 inches of heavy wet snow and light freezing rain
Elk Twp	7/27/2016	1 day	Thunderstorm Wind	60 mph	0	0	4k	0	Trees downed
LAKE (ZONE)	12/8/2016	3 days	Lake-Effect Snow		0	0	0	0	6-10 inches of snow
LAKE (ZONE)	3/8/2017	1 day	High Wind	58 mph	0	0	5m	0	Downed trees and power lines, widespread power outages
Eden Twp	7/13/2017	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Trees downed
LAKE (ZONE)	4/14/2018	2 days	Winter Storm		0	0	100k	0	Heavy sleet, wind caused power outages
Baldwin	7/1/2018	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Downed trees
Baldwin	8/28/2018	1 day	Tornado	EF0	0	0	100k	0	EF-0 tornado with est max 85 mph winds caused tree and property damage. A few buildings had collapsed walls, damage to siding, or loss of roofing material.
Yates Twp	8/28/2018	1 day	Tornado	EF1	0	0	100k	0	An EF-1 tornado with max 100 mph winds caused tree and property damage. Tree damage was immense with trunks snapped in a narrow zone.
LAKE (ZONE)	1/28/2019	1 day	Winter Storm		0	0	0	0	12-16 inches of snow
LAKE (ZONE)	1/29/2019	3 days	Lake-Effect Snow		0	0	0	0	4-8 inches of lake effect snow
LAKE (ZONE)	2/24/2019	2 days	Blizzard		0	0	0	0	Blizzard conditions with wind gusts near 50 mph
Lake County	7/19/2019	1 days	Thunderstorm Wind	70 mph	0	0	250k	0	Tree downed across Lake County
Lake County	7/20/2019	1 days	Flood		0	0	800k	0	6-10 inches of rain with local reports of up to 12 inches. At least 48 homes across Lake county affected by floodwaters
LAKE (ZONE)	12/1/2019	1 day	Winter Storm		0	0	50k	0	10-12 inches of snow caused numerous power outages
Yates Twp	5/26/2020	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Limbs downed
Yates Twp	6/2/2020	1 day	Thunderstorm Wind	60 mph	0	0	10k	0	Power outages and trees downed
Baldwin Area	11/10/2020	1 day	Thunderstorm Wind	60 mph	0	0	50k	0	Trees and power lines were blown down in and near Baldwin
Baldwin Area	8/27/2021	1 day	Thunderstorm Wind	70 mph	0	0	50k	0	Trees and power lines were blown down in and near Baldwin
Baldwin Area	9/7/2021	1 day	Hail	2.5 in	0	0	25k	0	Widespread hail damage in and near Baldwin
LAKE (ZONE)	1/5/2022	1 day	Winter Storm		0	0	0	0	6-8 inches of snow
LAKE (ZONE)	11/17/2022	4 days	Winter Storm		0	0	0	0	6-8 inches of snow
LAKE (ZONE)	12/22/2022	3 days	Blizzard		0	0	0	0	8-16 inches of snow fell across most of Lake county. Strong winds gusting around 50 mph resulted in blizzard conditions

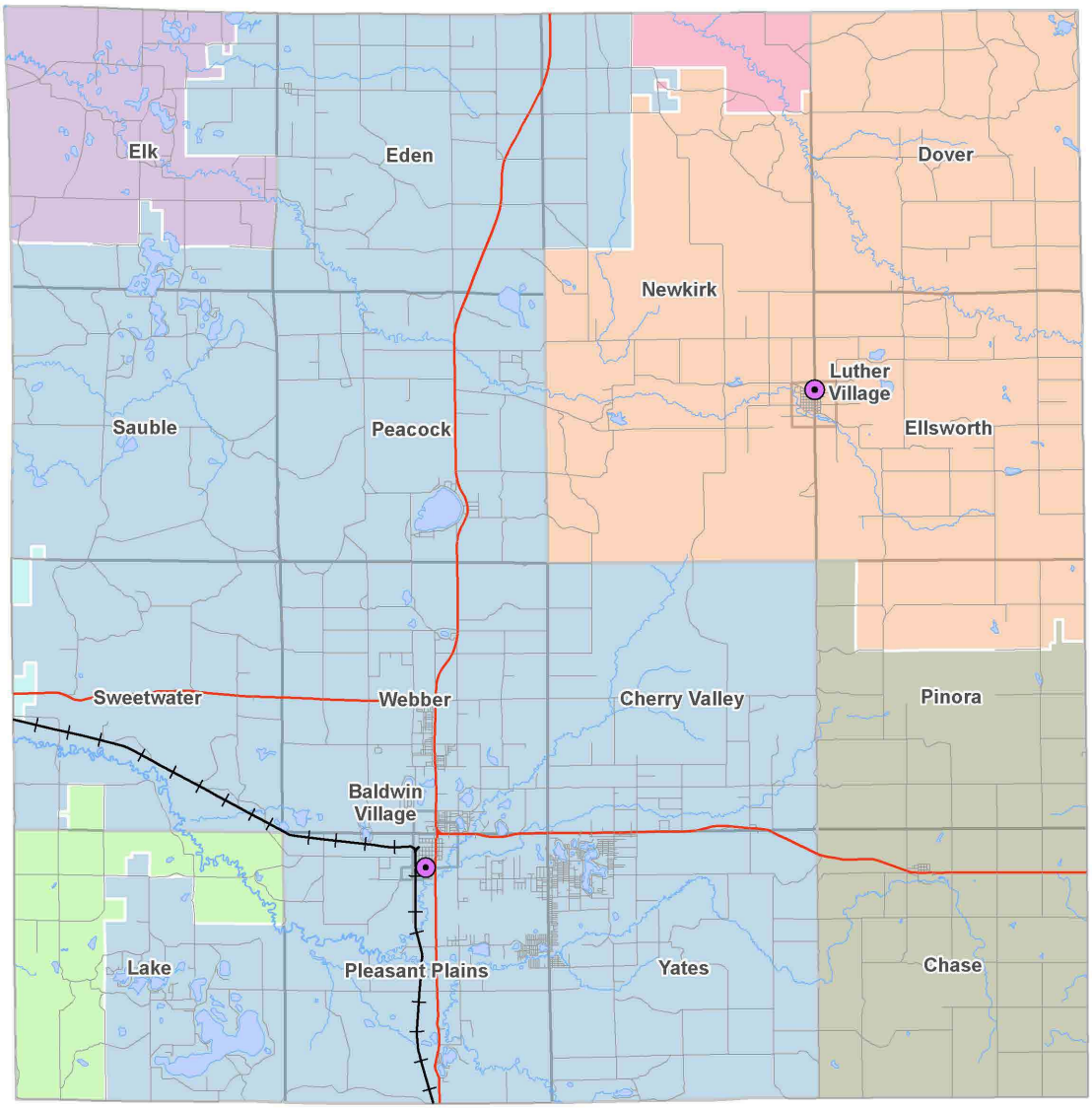
GENERAL SOILS MAP
Lake County



1	RUBICON-MONTCALM-GRAYCALM: Nearly level to steep, somewhat excessively drained and well drained sandy soils on moraines, till plains, and outwash plains
2	GRAYLING-GRAYCALM: Nearly level to moderately steep, excessively drained and somewhat excessively drained sandy soils on outwash plains, till plains, and low moraines
3	KALKASKA: Nearly level to steep, somewhat excessively drained and well drained sandy soils on outwash plains, till plains, and moraines
4	TAWAS-CROSWELL-LUPTON: Nearly level and undulating, very poorly drained and moderately well drained mucky and sandy soils in bogs, depressions, and drainageways and on low flats and benches
5	EMMET-MONTCALM: Nearly level to steep, well drained loamy and sandy soils on till plains and moraines
6	NESTER-KAWKAWLIN-MANISTEE: Nearly level to steep, well drained and somewhat poorly drained loamy and sandy soils on till plains and moraines

Source: USDA/Mich.Dept.Agr.(issued Aug., 1985)

LAKE COUNTY
School Districts



- School
- Baldwin Community Schools
- Cadillac Area Public Schools
- Kaleva Norman Dickson S/D
- Mason County Central Schools
- Mason County Eastern Schools
- Pine River Area Schools
- Reed City Area Public Schools

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Source: Michigan Geographic Data Library V 12b, United States Geological Survey, Lake Co. Hazard Mitigation Update 2014

LAKE COUNTY DAMS

The National Inventory of Dams (NID) identifies nine dams within Lake County. Two of the dams are classified "significant" hazard potential and the remaining seven are "low" hazard potential. 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
Big Star Lake Level Control	Lake Township	Low
Clear Lake Dam	Lake Township	
Danaher Lake Dam	Pleasant Plains Township	
Lake Connamara Dam	Yates Township	
Little Widewaters Flooding Dam	Newkirk Township	
Midget Lake Dam	Elk Township	
Olga Lake Dam	Dover Township	
Luther Pond Dam	Luther Village	Significant
Baldwin Fish Hatchery	Baldwin Village	
None	N/A	High

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 27 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

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
CADILLAC DISTRICT OFFICE

JOHN ENGLER
GOVERNOR

RUSSELL J. HARDING
DIRECTOR

April 10, 2002

Tony Gagliardo
Lake County Building Inspector
Lake County Courthouse
Baldwin, MI 49304

Dear Mr. Gagliardo:

SUBJECT: Floodplain Information for Lake County

As discussed in my meeting with the Lake County Commissioners on February 20, 2002, I have gathered together some information from MDEQ files relative to 100-year (1% chance) flood elevations used by the National Flood Insurance Program, the State's Floodplain Regulatory Authority as found in Part 31 Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and by the building codes as the basis for regulatory authority.

In general, the watercourses within Lake County are estimated to rise as indicated in the table below during the 100-year flood. I recommend that you use this table as general information on flood rises rather than site specific information when disseminating information to the public. There are variables, such as specific location on the river or the configuration of the river channel at a specific spot on a stretch of river, which may affect the amount of flood rise.

Watercourse	Location	Estimated 100-year rise from normal summer water surface levels (NSW)
Baldwin River	Downstream of Sanborn Creek	9' above NSW
	Upstream of Sanborn Creek	5' above NSW, 6' above bottom
Big Sable	Entire reach within Lake Co.	6' above channel bottom
Coe Creek	Entire reach within Lake Co.	6' above NSW
Little Manistee	Upstream of Elk Township	5' above NSW
	Elk Township	6' above NSW
Little So. Branch Pere Marquette	Entire reach within Lake Co.	5' above NSW 8' above channel bottom
Middle Branch Pere Marquette	Chase Township	5' above NSW
	Downstream of Chase Township	6' above NSW
McCarthy Creek	Entire reach within Lake Co.	5' above NSW
Pere Marquette	Entire reach within Lake Co.	7' above NSW
Pine River	Entire reach within Lake Co.	7' above NSW 10' above channel bottom

If a proposed construction site is at or near the flood rises given in the table above, the only accurate way of determining if the site is located within the 100-year floodplain is by a site specific elevation survey. If it can be shown by an elevation survey that the ground elevation of

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the site footprint is higher than the 100-year flood elevation, a floodplain permit would not be required from the MDEQ. If a site is at or lower than the flood rises given in the table below, more specific information should then be used, such as information on past projects in the area or possibly a hydraulic analysis. The attached flood hazard determination request form can be filled out and submitted to our office for site specific flood rise information requests.

Any occupation or alteration within the 100-year floodplain of any watercourse will require a permit from the Department of Environmental Quality under the State's Floodplain Regulatory Authority, found in Water Resources Protection, Part 31, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

In general, construction and fill may be permitted in the portions of the floodplain that are not floodway, provided local ordinance and building standards are met. Floodways are the channel of a river or stream and those portions of the floodplain adjoining the channel which are reasonably required to carry and discharge the 100-year flood. These are areas of moving water during times of flood. New residential construction is specifically prohibited in the floodway. Nonresidential construction may be permitted within the floodway, although a hydraulic analysis may be required which demonstrates that the proposed development will not harmfully increase flood stages. A floodway determination would be done on site during the permitting process.

The Michigan Residential Building Code enforced within Lake County requires that any residential construction within the 100-year floodplain have the lowest floor be elevated at least one foot above the design flood elevation. Basement floors that are below grade on all four sides shall be elevated to or above the design flood elevation. Enclosed space below the 100-year floodplain elevation, such as a crawl space, must be designed to automatically equalize hydrostatic forces on exterior walls.

Within Lake County, Cherry Valley, Lake, Pleasant Plains, Yates, and Webber Townships participate in the National Flood Insurance Program (NFIP). Proper enforcement of the building code standards is a prerequisite of the community's participation in the NFIP. In the NFIP communities, flood insurance must be purchased as a condition of obtaining a federally insured mortgage in federally identified 100-year floodplain areas. Insurance rates can be very high for new construction if the lowest floor elevation standards are not met.

During the February 20, 2002 County Commission meeting, inquiries were made on how a community could join the National Flood Insurance Program (NFIP). In order to join the NFIP, a community needs to complete an application form, pass a resolution for applying to the NFIP and pass a Floodplain Management Resolution. If you know of a community that is interested in joining the NFIP, please have them contact Mr. George Hosek, the state NFIP coordinator at 517-335-3182 or myself.

The Pere Marquette River is a designated natural river and has building and development setback requirements. Please contact Mr. Dan Pearson of the Department of Natural Resources, telephone number 989-335-3441, for information on the Natural Rivers Program.

Wetlands may exist on streamside or riverside sites. If there is a question as to whether or not wetlands are present, a wetland assessment form may be used to request that MDEQ staff determine whether wetlands are present which may fall under the authority of Wetland

Protection, Part 303, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. A permit would be required prior to any filling, dredging, or construction activities within a regulated area. Should you have any questions on wetland requirements, please contact Mr. Barry Peterman in Cadillac at 231-775-3960 ext. 6361.

If you have any questions regarding floodplains, please feel free to contact me.

Sincerely,

Susan A. Rundhaug
Cadillac District Floodplain Programs
Land and Water Management Division
231-775-3960, ext. 6363

Lake County Flood Insurance Map Meeting
September 23, 2023

Communities that currently have Flood Insurance Maps:

- Pleasant Plains Township – Joined 1986
  - Paper flood maps
  - 14 Flood policies in effect
  - $3,550,000 in coverage
  - 37 paid losses for $777,217
  - 4 substantial damage claims

Communities in NFIP – no maps

- Webber Township – Joined 1987
  - 2 Flood Policies in force
  - $374,000 in coverage
  - 5 paid losses for $151,390
  - 1 substantial damage

- Yates Township – Joined in 1986
  - 1 policy in force
  - $160,000 in coverage

- Cherry Valley – joined in 1987
  - 1 Flood policy
  - $210,000 in coverage
  - 6 paid losses for $257,014
  - 1 substantial damage claim

- Lake Township – Joined 1988
  - No flood policies

Building Code administration:

The County does the building code enforcement for all the townships in Lake County. Floodplain management for township done through State Building code enforcement.

Benefits of being in the NFIP?

- Floods are the most common and most costly natural disaster in the USA.
- If a community is enrolled in the NFIP, the residents within that community can purchase flood insurance to protect their structures from the cost of flood damage.
- Makes a community eligible for certain disaster grants if a federal disaster declaration occurs.

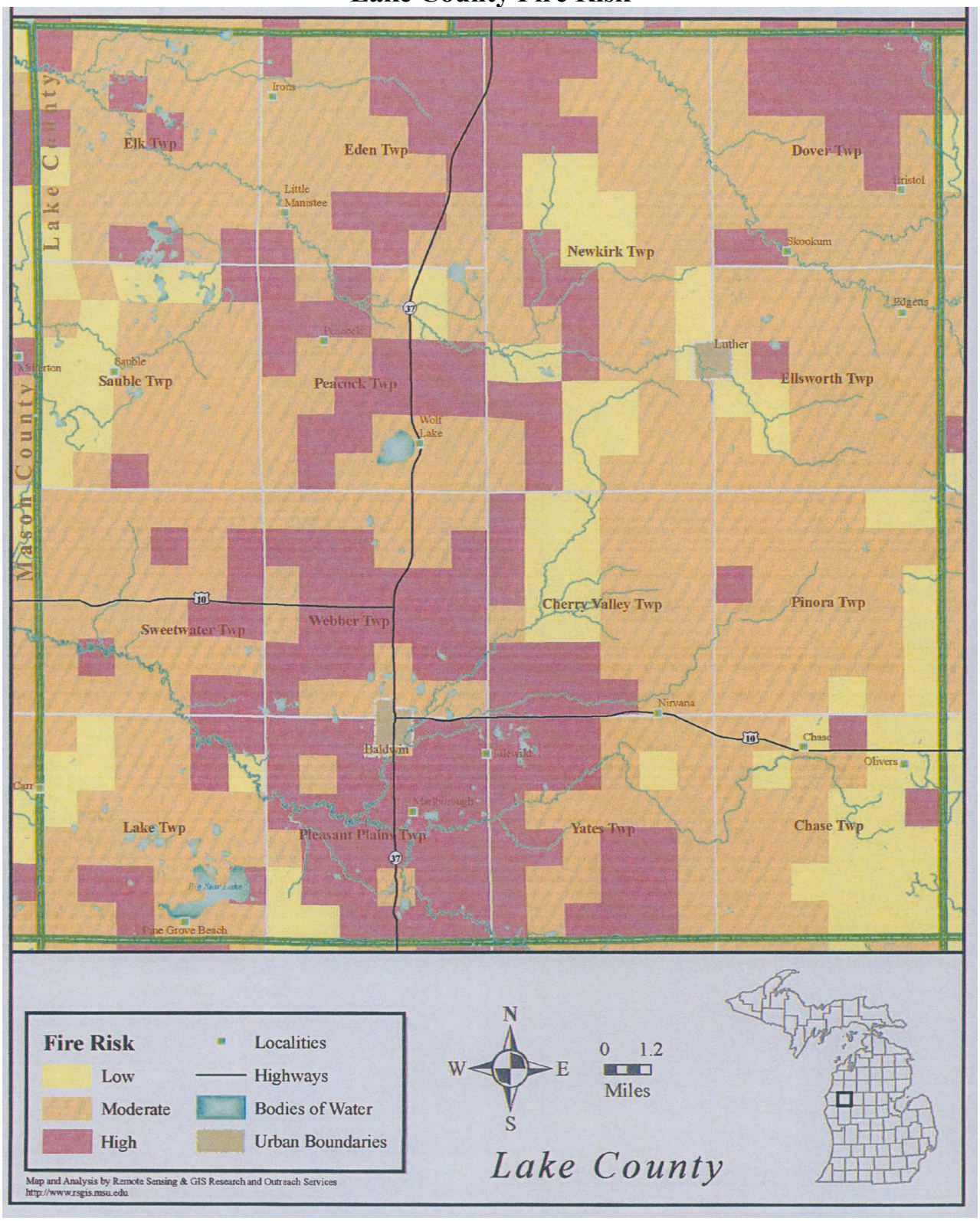
When is Lake County getting new maps

Lake County is on FEMA's long range plan to get maps 5+ years out.

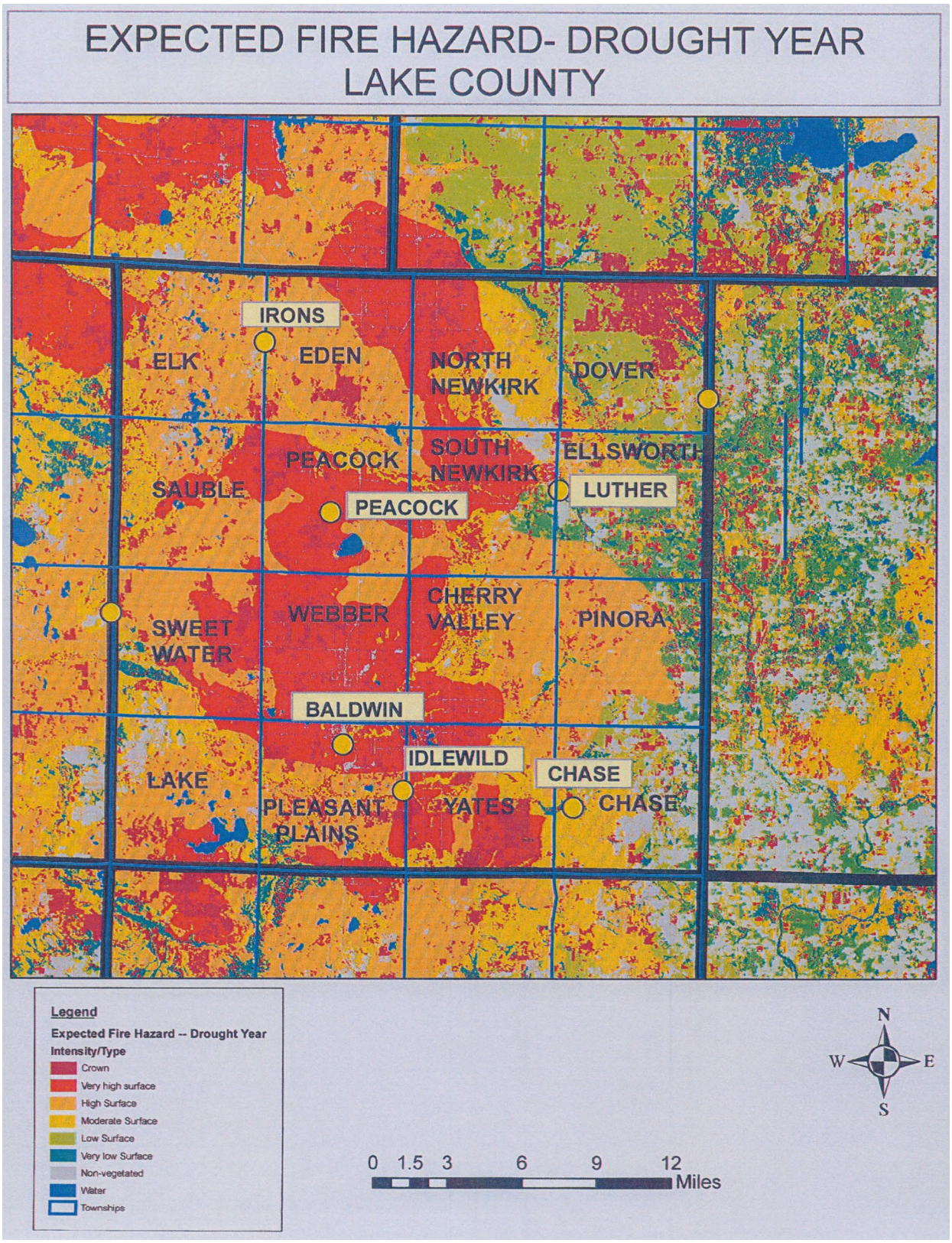
Number of Wildfires and Acres Burned, by County: 1981-2018 (MDNR jurisdiction only) Source: MDNR/FRD

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

Lake County Fire Risk

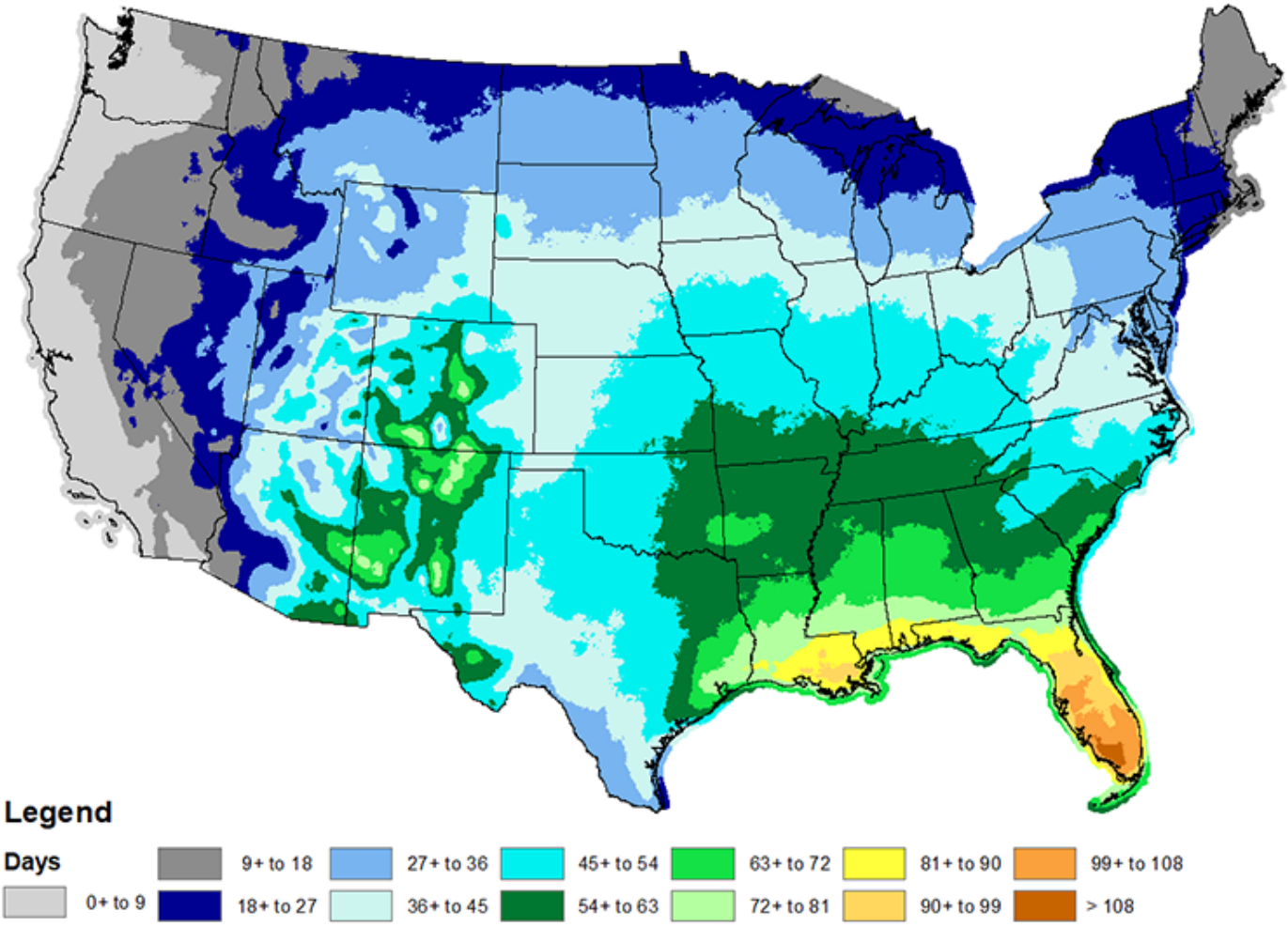


Source: Lake County Community Wildfire Protection Plan, 2011



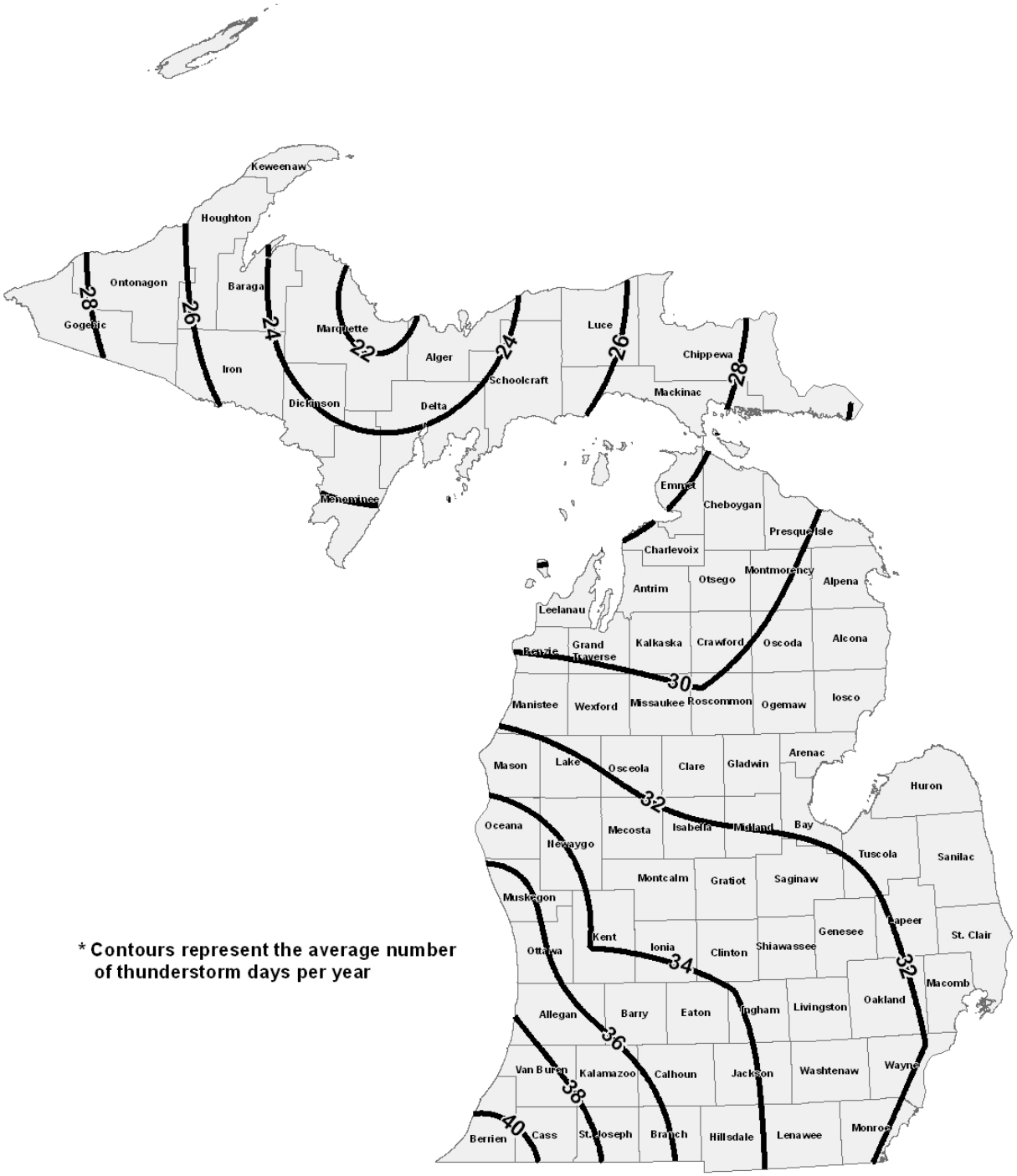
Source: Lake County Community Wildfire Protection Plan, 2011

Annual Mean Thunderstorm Days (1993-2018)



Source: NOAA National Weather Service

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

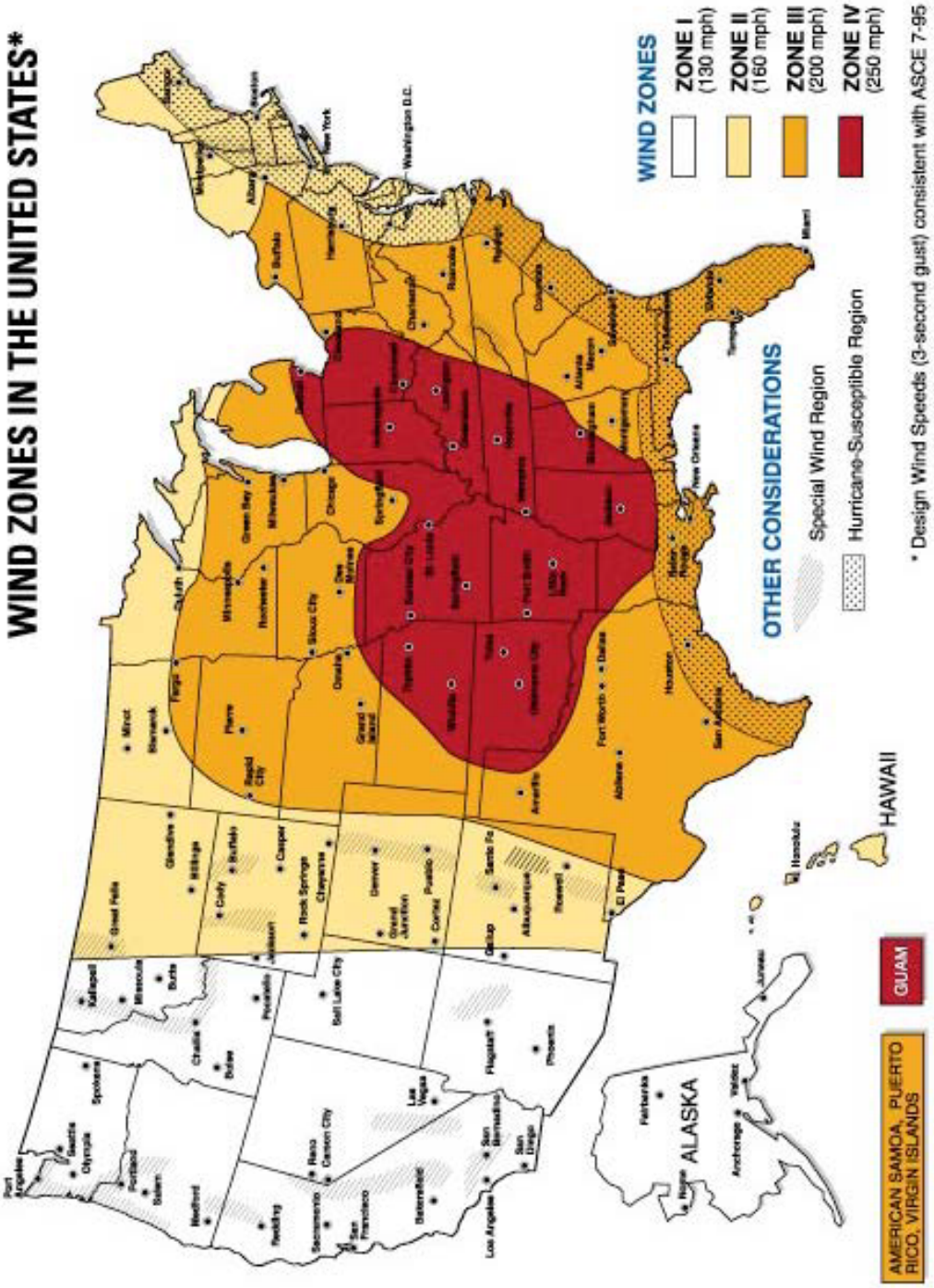
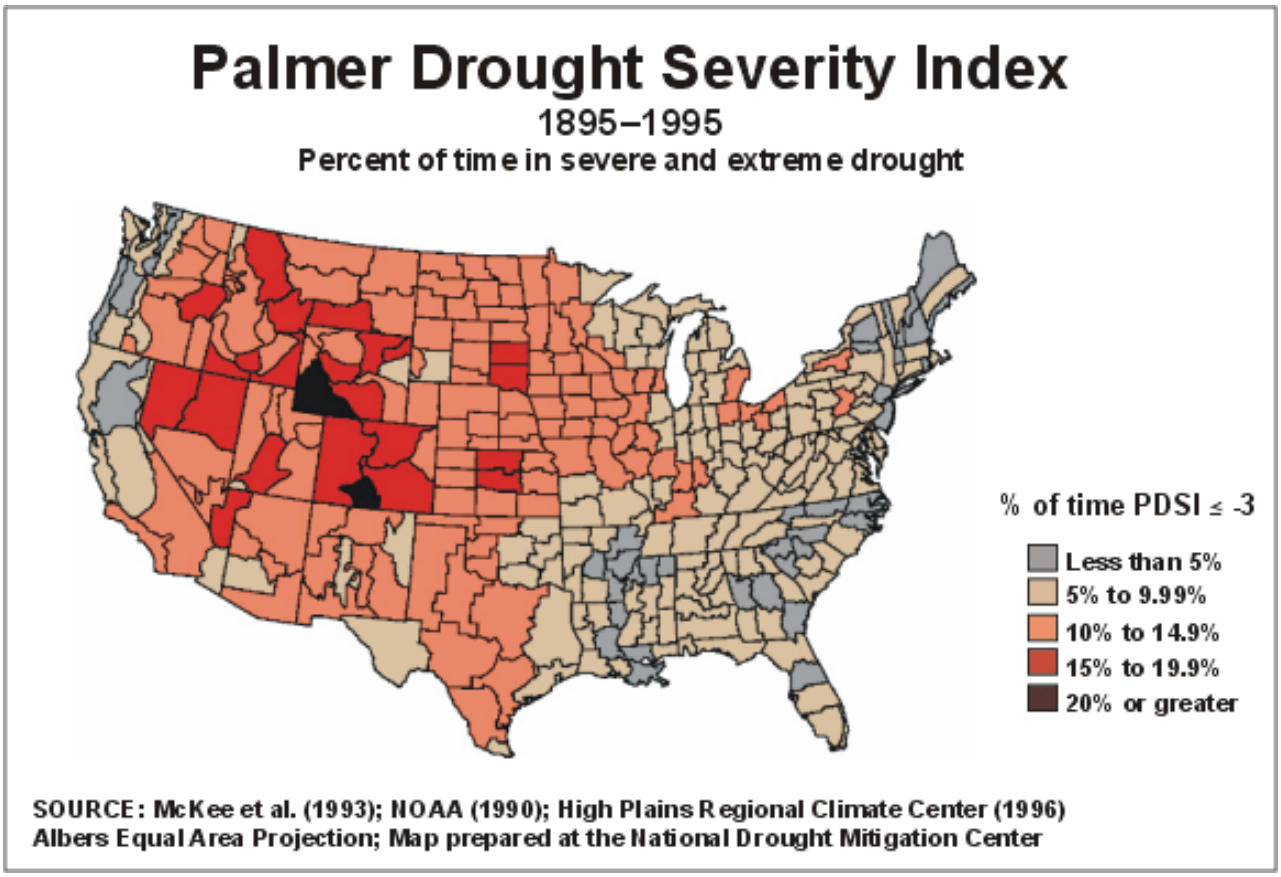
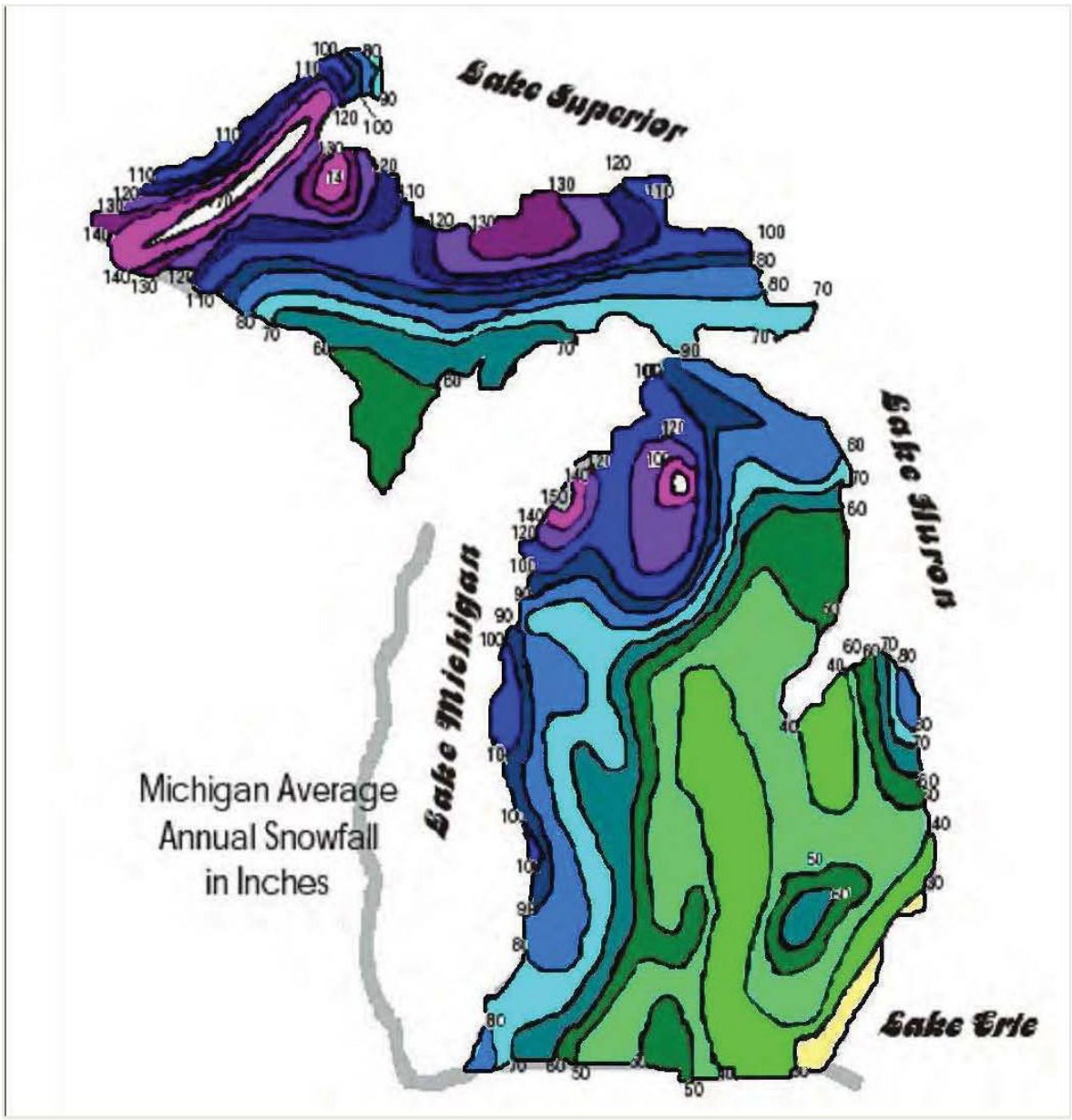


Figure I2 Wind zones in the United States


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

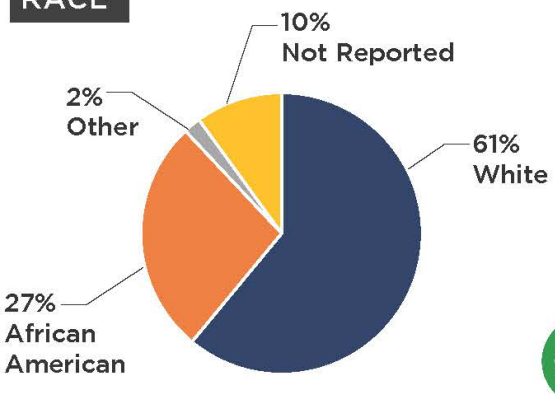
AGES

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

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

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

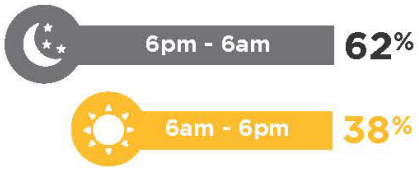
RACE



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

10% of victims were on oxygen

TIME



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%

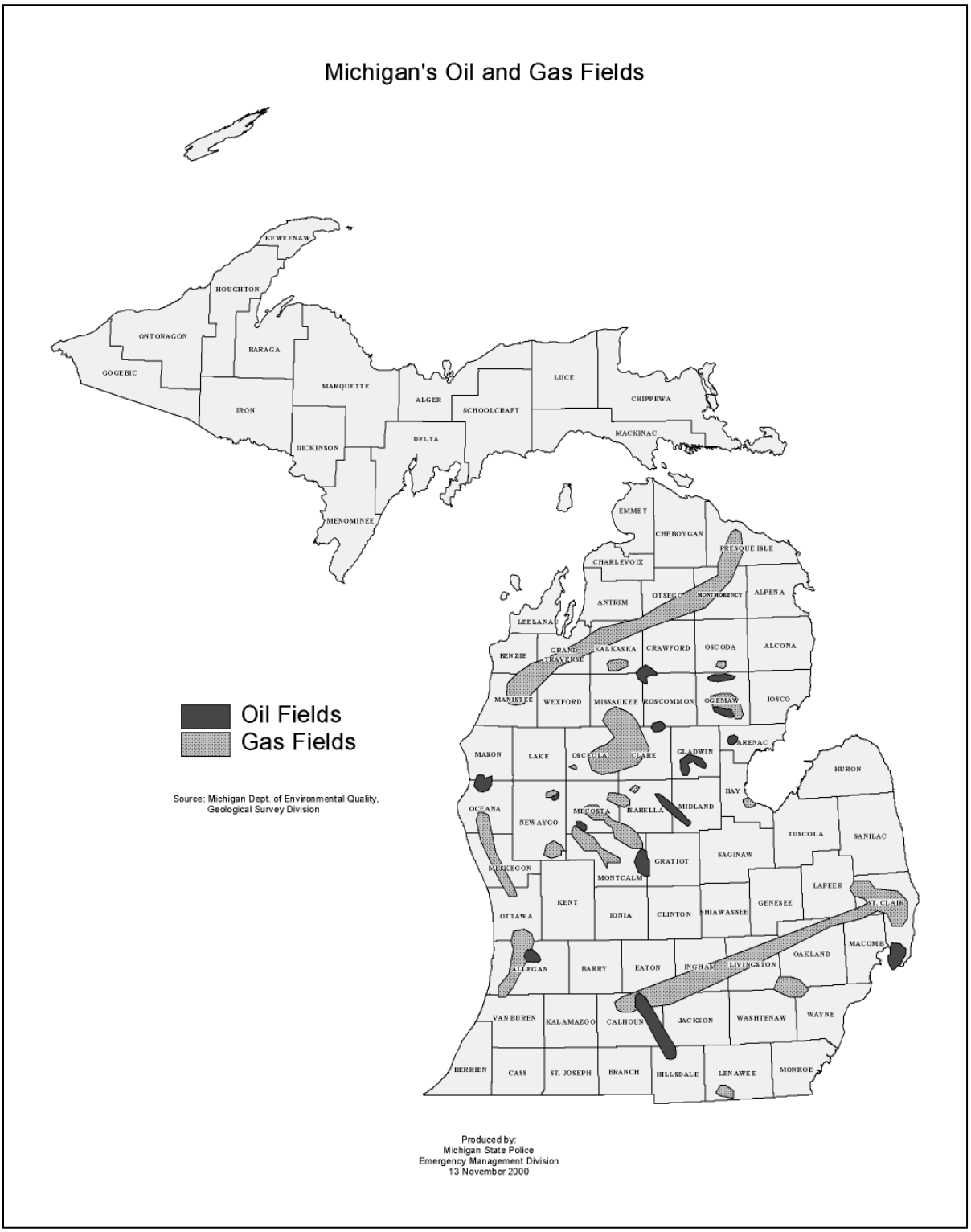
NO 39%

UNKNOWN 38%

MICHIGAN FIRE INSPECTORS SOCIETY FOUNDATION

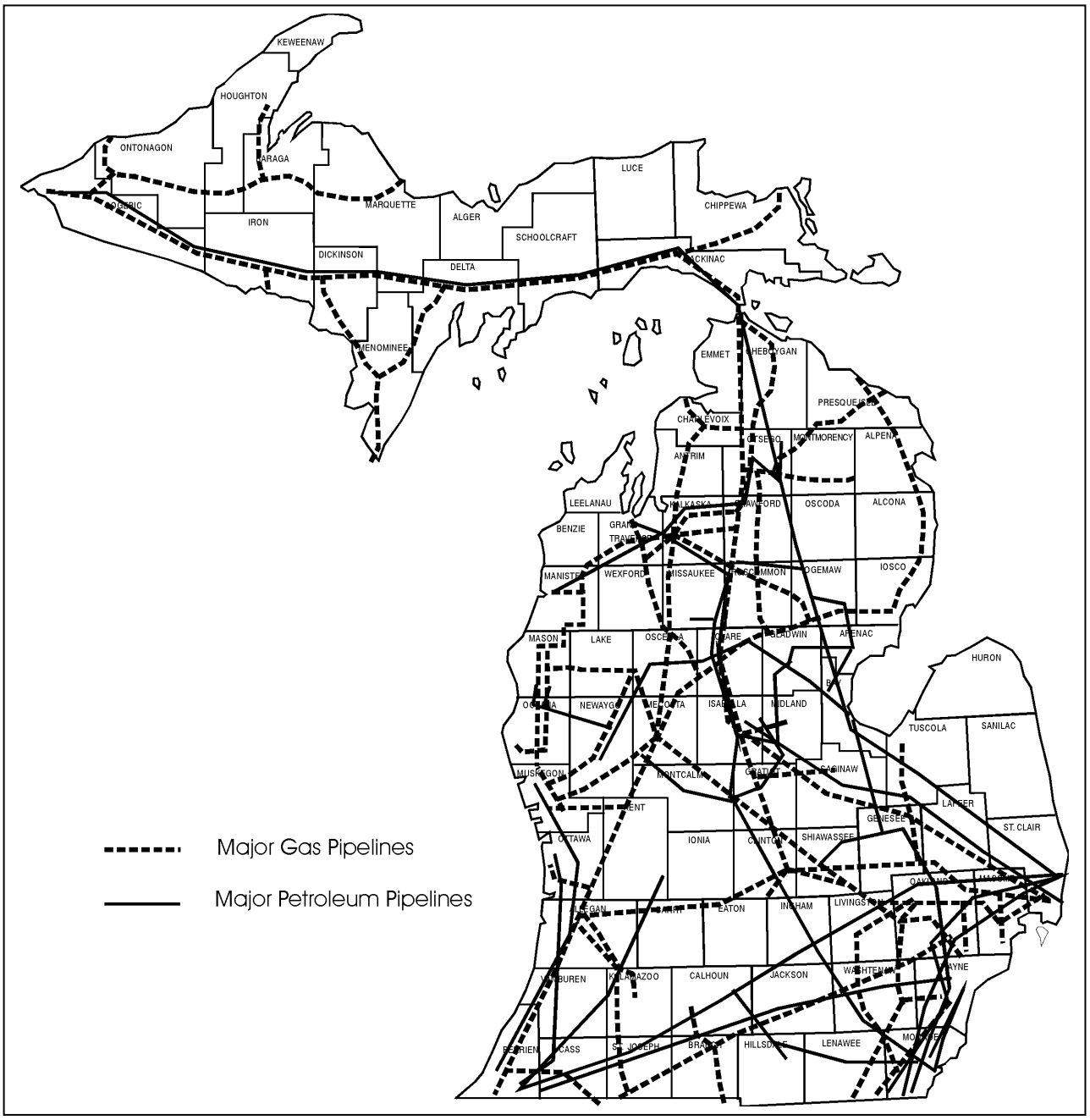
MI PREVENTION COMMUNITY · RISK · REDUCTION

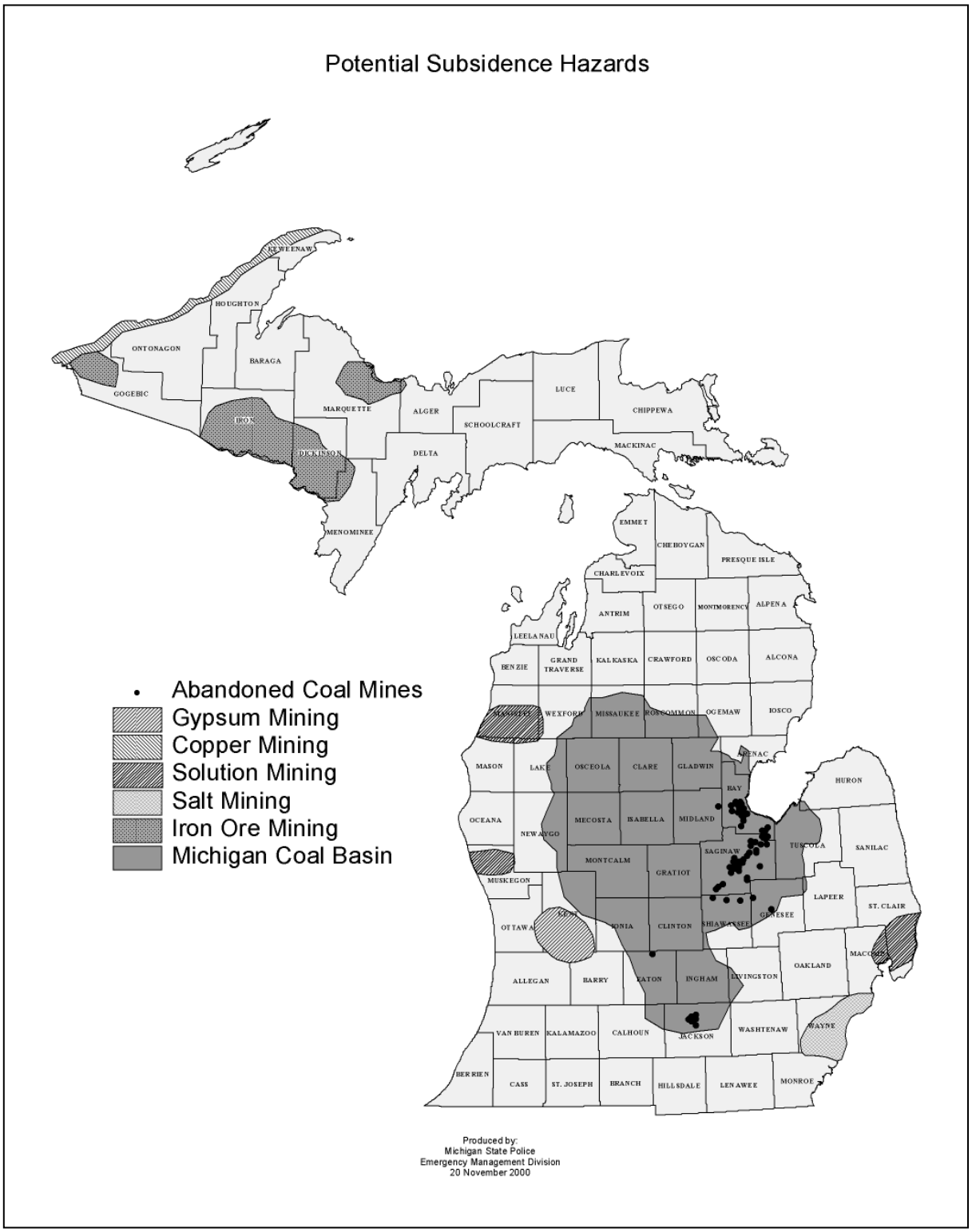
MFISfoundation.org


Michigan's Oil and Gas Fields
KEWEENAW
HOUGHTON
ONTONAGON
BARAGA
GOGEBIC
MARQUETTE
ALGER
LUCE
CHIPPEWA
IRON
SCHOOLCRAFT
DICKINSON
DELTA
MACKINAC
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
GRATIOT
MONTCALM
LAPEER
KENT
GENESEE
ST. CLAIR
OTTAWA
IONIA
CLINTON
SHIAWASSEE
MACOMB
OAKLAND
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
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
KEWEENAW
HOUGHTON
ONTONAGON
BARAGA
GOGEBIC
MARQUETTE
ALGER
LUCE
CHIPPEWA
SCHOOLCRAFT
IRON
DICKINSON
DELTA
MACKINAC
MENOMINEE
EMMET
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
GRAND TRAVERSE
KALKASKA
CRAWFORD
OSCODA
ALCONA
MANISTEE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
ALCONAC
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
BAY
HURON
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
SAGINAW
MONTCALM
GRATIOT
MUSKEGON
LAPEER
ST. CLAIR
OTTAWA
KENT
IONIA
CLINTON
SHIAWASSEE
GENESEE
MACOMB
OAKLAND
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
BERRIEN
CASS
ST. JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
Abandoned Coal Mines
Gypsum Mining
Copper Mining
Solution Mining
Salt Mining
Iron Ore Mining
Michigan Coal Basin
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.

Lake County Summary

According to the screening tool, all of Lake County is considered "disadvantaged." This determination is based on census blocks which do not always align with municipal boundaries. The four tracts in the county are considered disadvantaged because they meet more than 1 burden threshold **AND** the associated socioeconomic threshold.

Disadvantaged Areas		
General Location	*Jurisdictions (all or part)*	*Burdens*
Lake County north of US-10 and east of M-37	Townships of Cherry Valley, Dover, Eden, Ellsworth, Newkirk, Peacock, Pinora, Webber Village of Luther	Low Income Energy (energy cost) Health (asthma, diabetes, heart disease) Transportation (transportation barriers)
Lake County north of US-10 and west of M-37	Townships of Eden, Elk, Peacock, Sauble, Sweetwater, Webber	Low Income Energy (energy cost) Health (diabetes, heart disease) Transportation (transportation barriers)
Lake County south of US-10 and east of M-37	Townships of Chase, Cherry Valley, Pleasant Plains, Pinora, Webber, Yates Village of Baldwin	Low Income Energy (energy cost) Health (asthma, diabetes, heart disease) Transportation (transportation barriers)
Lake County south of US-10 and west of M-37	Townships of Lake, Pleasant Plains, Sweetwater, Webber Village of Baldwin	High School Education Energy (energy cost) Health (asthma, diabetes, heart disease) Transportation (transportation barriers) Low median income Workforce Development (high school education)

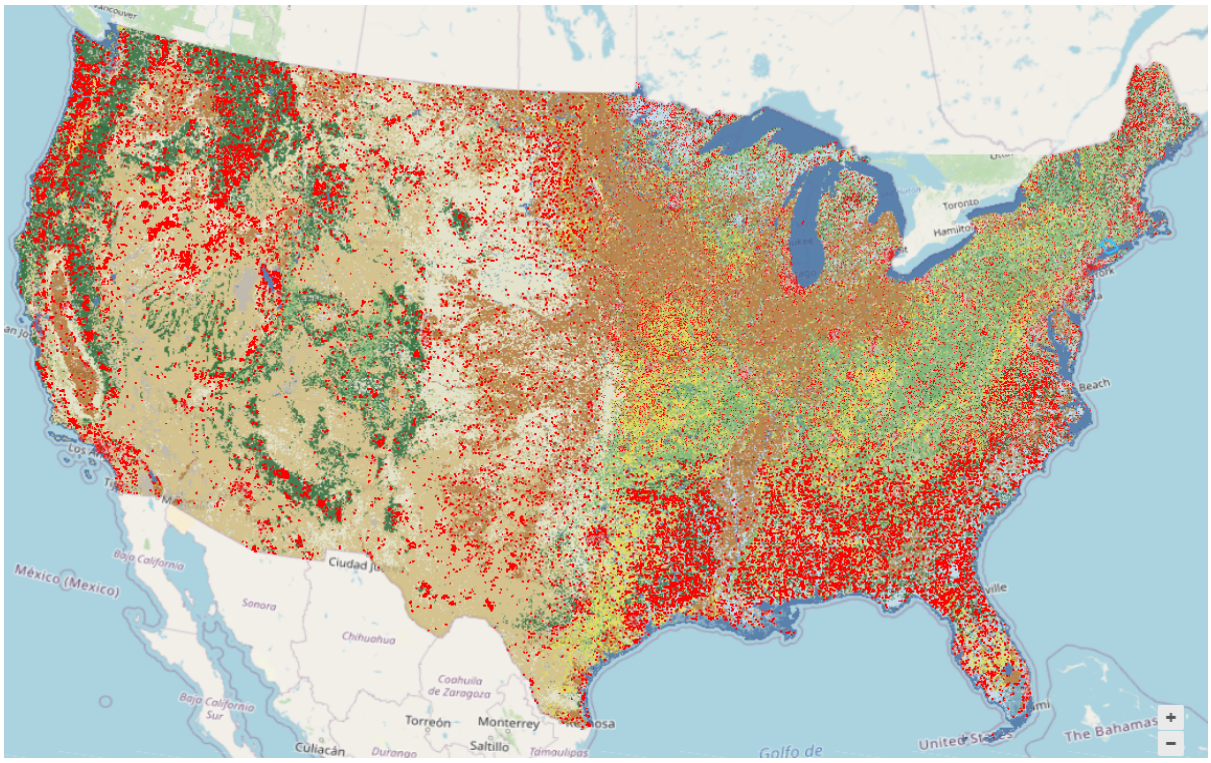
Lake County, Michigan

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 Lake County can be seen below.

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



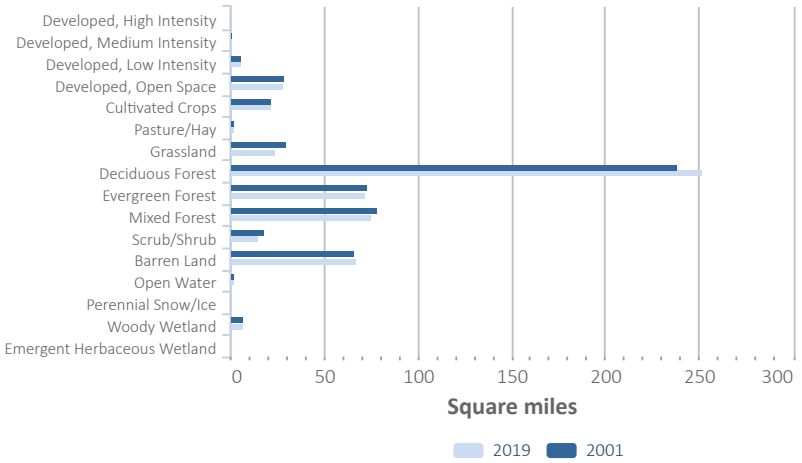
Land Cover Overview

Lake County, Michigan

Land Cover Data: 2001 to 2019

Land Cover Basics

7.02 percent or 40.31 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	0.21	0.00	0.22	0.43	0.22	102.45%
Developed, Medium Intensity	0.94	0.00	0.38	1.32	0.38	40.67%
Developed, Low Intensity	5.67	-0.10	0.26	5.83	0.16	2.82%
Developed, Open Space	28.66	-0.63	0.18	28.20	-0.45	-1.58%
Cultivated Crops	21.61	-0.64	1.44	22.41	0.80	3.70%
Pasture/Hay	1.88	-0.07	0.09	1.90	0.02	1.13%
Grassland	30.56	-8.53	1.87	23.90	-6.66	-21.79%
Deciduous Forest	239.12	-4.15	16.53	251.50	12.38	5.18%
Evergreen Forest	73.62	-5.22	3.80	72.20	-1.42	-1.93%
Mixed Forest	78.70	-5.67	2.33	75.36	-3.34	-4.24%
Scrub/Shrub	17.78	-13.40	11.14	15.51	-2.26	-12.73%
Woody Wetland	66.24	-0.44	0.95	66.75	0.51	0.77%
Emergent Herbaceous Wetland	1.89	-0.82	0.94	2.01	0.12	6.42%
Barren Land	0.29	-0.04	0.03	0.28	-0.01	-3.73%
Open Water	7.00	-0.59	0.15	6.56	-0.44	-6.28%
Perennial Snow/Ice	0.00	0.00	0.00	0.00	0.00	0.00%

*All numbers expressed in square miles

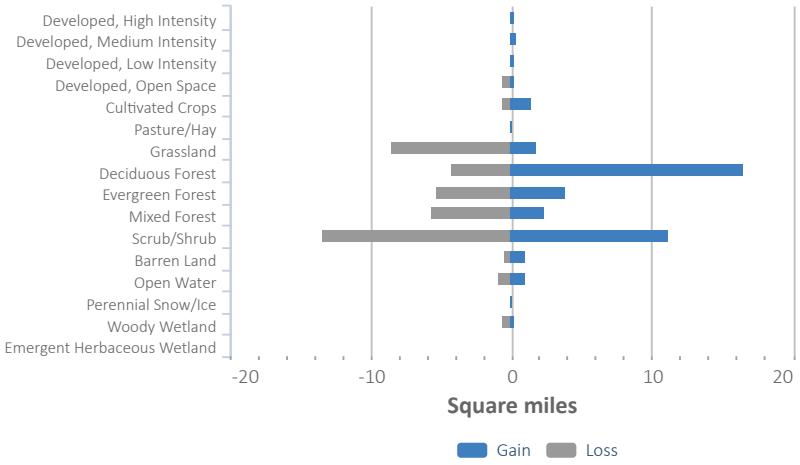
Land Cover Overview

Lake 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

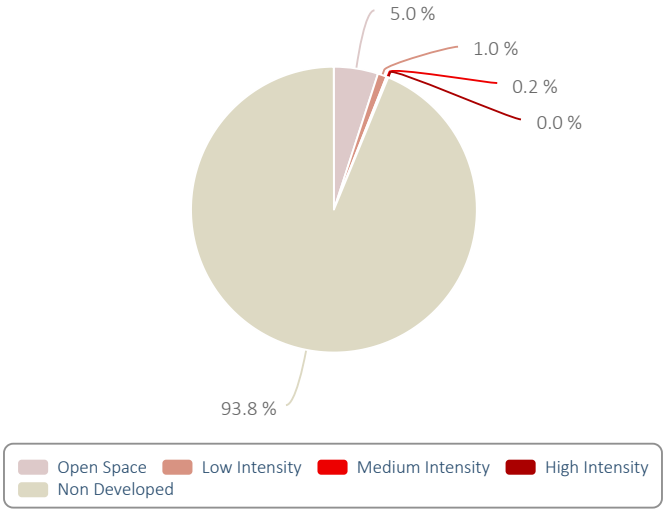
Lake County, Michigan

Land Cover Data: 2001 to 2019

Development and Impervious Surfaces (2019)

6.23% of Lake County is developed and 0.96% is impervious.

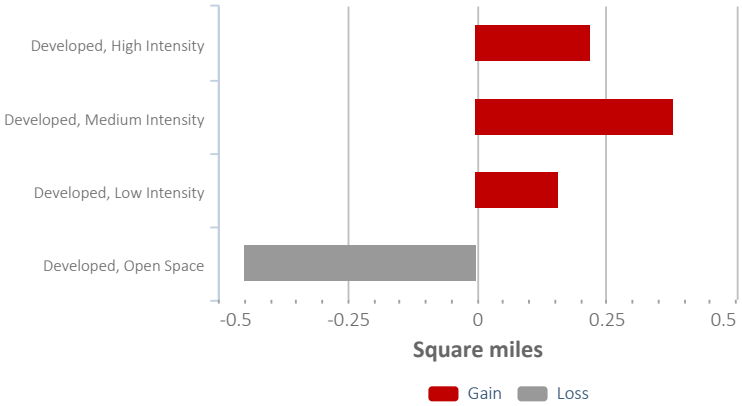
More development means more impervious surfaces, which translates into a greater risk for increased flooding and decreased water quality. Areas with impervious surface rates approaching or exceeding 12 percent to 15 percent will likely experience negative impacts to water quality. Severe degradation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



Development Change

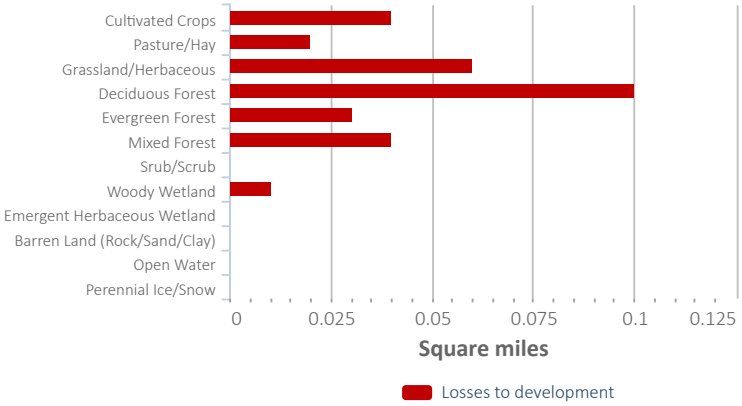
0.30 square miles of development and 0.41 square miles of impervious surfaces were gained between 2001 and 2019.

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

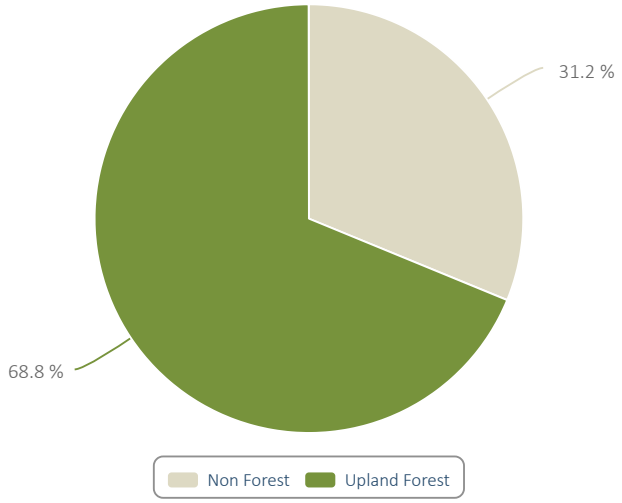
Lake County, Michigan

Land Cover Data: 2001 to 2019

Current State of Forests (2019)

69.50% of Lake County is forest.

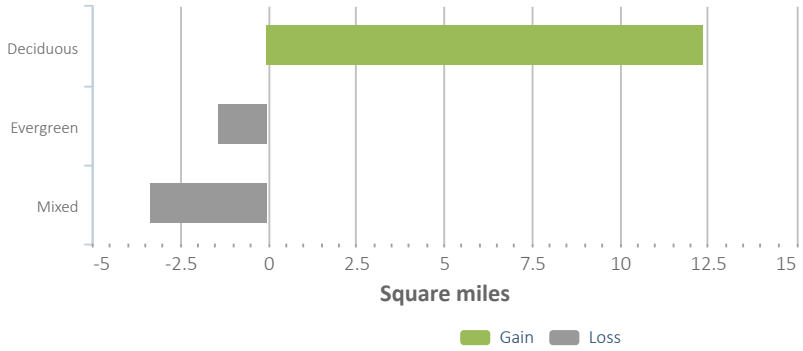
Healthy forests are a vital part of a healthy ecosystem, but it is important to understand the types of forest that are present. This chart shows the percentage of the County that is forested as well as the percentage in uplands and wetlands.



Forest Change

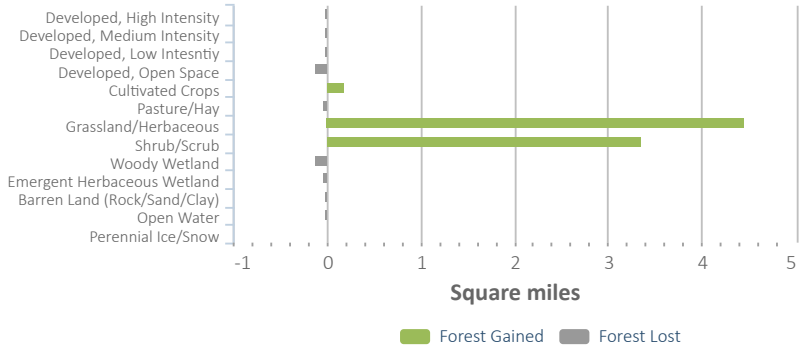
7.62 square miles of the forest was gained between 2001 and 2019.

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

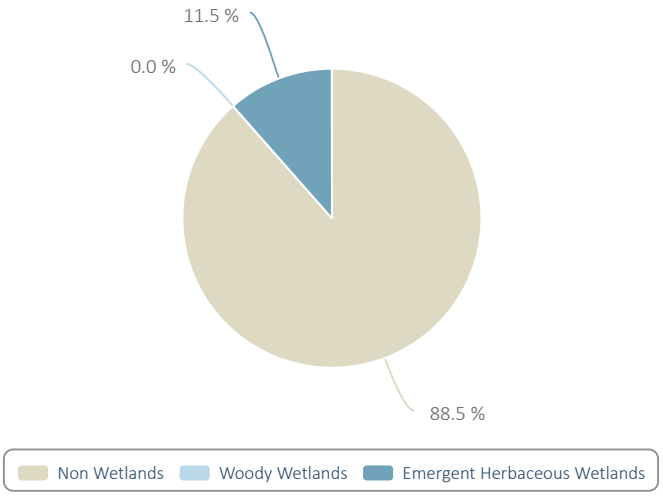
Lake County, Michigan

Land Cover Data: 2001 to 2019

Current State of Wetlands (2019)

11.98% of Lake County is wetland.

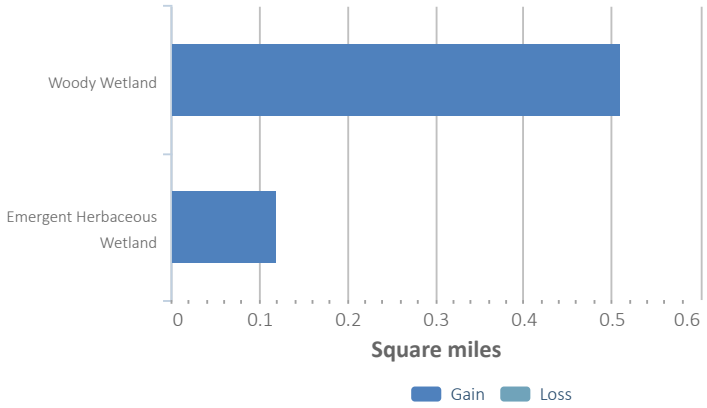
Wetlands are among the most productive environments on Earth. Wetlands provide habitat and food, buffer the impacts of storm surge and flooding, and help control erosion. Wetlands also absorb, store, and filter urban and agricultural runoff to maintain water quality. This chart highlights how much of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



Wetland Change

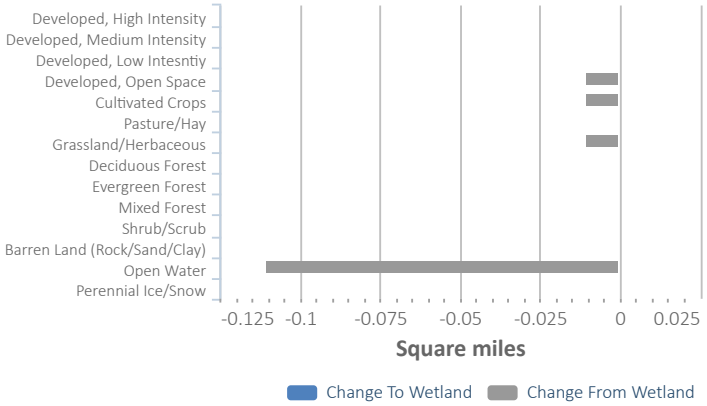
0.63 square miles of wetlands were gained between 2001 and 2019.

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

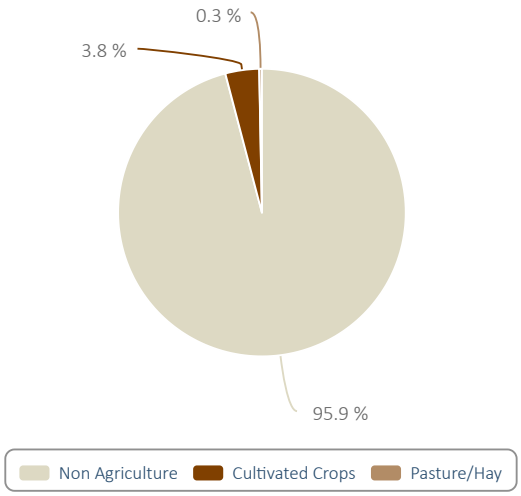
Lake County, Michigan

Land Cover Data: 2001 to 2019

Current State of Agriculture (2019)

4.23% of Lake County is agriculture.

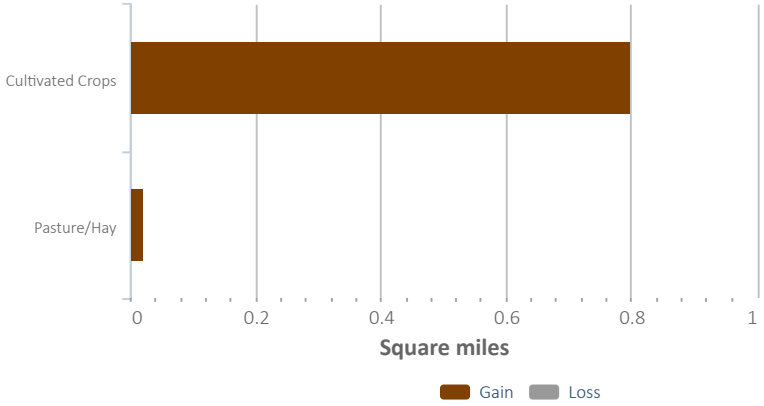
NLCD Agriculture classes include land used for production of annual crops as well as areas intensively managed for livestock production. Agricultural areas are managed in in a variety of ways including tillage, fertilization, and other man-made interventions that make the area more productive than it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



Agriculture Change

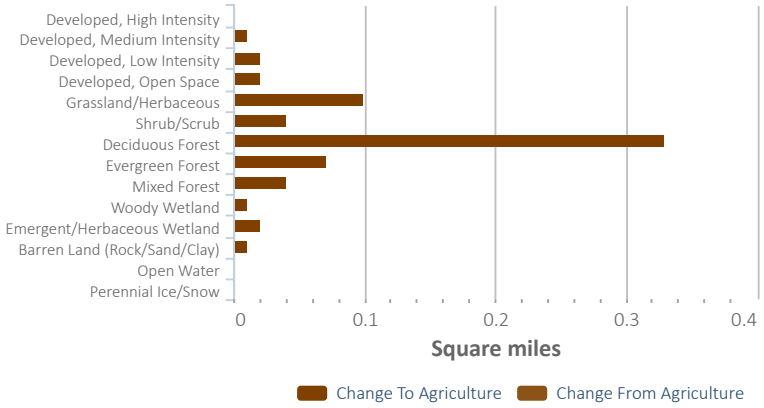
0.82 square miles of agriculture were between 2001 and 2019.

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 Lake 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:

Lake 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

    _____

    _____

Page 3 - Hazards

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.**

_____

_____

_____

_____

Page 4 - Optional Information

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
Lake County

SURVEYS COMPLETED BY LAKE COUNTY					
City/village/township where you primarily live, own land or serve	**Local official (elected or appointed)**	**Public employee**	**Local resident**	**Landowner**	**Other**
Sauble Township	2	1	3	3	
Irons (eden)	2	2	3	3	
Newkirk	2	2	2	2	
Elk	2		2	2	
Village of Baldwin	3	11	5	4	1 - Contract Worker 1 - Seasonal
Webber		2	2	2	
Lake Township	2	1	1	1	
Cherry Valley Township		1	1	1	
Ellsworth		1	1	1	
Pleasant Plains Township	3	2	4	2	'1 - Director
Yates		2	1	1	
Eden	1	1	1		
Peacock Township	1		1	1	
Lake County	3	4	2	2	
N/A	2				

DOES YOUR COMMUNITY HAVE A MASTER PLAN?				
City/village/township where you primarily live, own land or serve	**Yes**	**No**	**I Don't Know**	**Blank**
Sauble Township	1			2
Irons	2		1	
Newkirk	1	2		
Elk		1	1	
Village of Baldwin	4	1	11	1
Webber			2	
Lake Township	1		1	
Cherry Valley Township			1	
Ellsworth			1	
Pleasant Plains Township	2		2	
Yates		1	1	
Eden			1	
Peacock Township	1			
Lake County	3		1	2
N/A			2	

Hazard Mitigation Survey Results
Lake 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**	**Blank**
Sauble Township	1		1	2
Irons	2	1		
Newkirk		3		
Elk		2		
Village of Baldwin	9		7	1
Webber	1			1
Lake Township	1			
Cherry Valley Township	1			
Ellsworth		1		
Pleasant Plains Township	4			
Yates	2			
Eden		1		
Peacock Township	1			
Lake County	4		2	2
N/A				

OBSERVED Significant land use changes in the PAST 10 years:

- More requests to build garages, pole barns on vacant parcels. Current Zoning doesn't allow without a principle structure.
- Some townships are zoned, others are not
- Deforestation / clear cuts of State lands
- Getting smaller
- New blight ordinances, lot / property use and camper requirements
- More ATV riders on the public lands
- I have only lived here 4 years so really haven't noticed a lot of changes in our township
- Two properties south of Baldwin on M-27 between US-10 and 76th Street seem to have many damaged cars in storage or in for repairs. I wonder if they pose a hazard to the nearby Pere Marquette or to aquifer(s) in the area
- Property rezoned

ANTICIPATED significant land use changed in the NEXT 10 years:

- Allow garages and pole barns to be built on vacant lands. Make zoning appropriate to our area.
- Housing getting smaller
- Better trails
- Camping
- Perhaps more commercial start-ups. Hopefully some new restaurants to replace those that closed recently
- Commercial and industrial land use
- Commercial zone increase

Hazard Mitigation Survey Results
Lake 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:	7	10	4	17

- The Village of Baldwin has been devastated by tornadoes, flooding, rains/storms in the past 4 years. Heavy damage to homes, trees, structures, streets
- We have had sewer issues in the past. Significant amounts of rain or storms are also concerning as Baldwin is a rural area.
- We have many trees and multiple cable lines. Hazard weather seems to most always cause damage or destruction due to downed lines and/or trees in our area.
- Tornado 2018/Flood 2019
- Today I saw mention in the paper that Michigan is warming faster than other states, because of the Great Lakes, and that winters will be increasingly warmer. I have seen maps illustrating this earlier. We have been losing a lot of trees in big storms and I wonder about the trout streams getting warmer for loss of shade. The dying trees not down yet, are a big fir hazard as well. I saw healthy salmon this year, but not as many.

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	16	15	3	4

- Roads are always a concern. Always need improvements, but cost is too high. We do have a road milage but it doesn't go very far in addressing issues.
- Our connecting bridge on Eighth Street has been closed for 3 years due to severe flooding damage, street damage and storm drain overflows.
- Several bridges have not been replaced/repaired over the past decade. Airport needs new runways and supporting pavement.
- I'm always concerned since we have had damage and floods in the area over the past ten years.
- Roads are needing repair, internet is horrible at best, dam on Wolf Lake needs upgrading.
- One bridge washed away in Baldwin (8th Street) when the dam that used to provide electricity to the village (years ago) washed away in a big storm. It is only now that construction to rebuild it has begun. We do have a project ongoing behind stores on the west side of M-37, comprehensive electrical, sewer, paving, etc.

Hazard Mitigation Survey Results
Lake 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)	22
Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)	20
Wildfire	17
Sustained Wind Events	12
Public Health Emergency	10
Invasive Species	9
Structural Fire	9
Terrorism and Criminal Activity	9
Civil Disturbance	8
Riverine / Runoff Flooding	7
Infrastructure Failure	6
Extreme Temperatures	5
Dam Failure	4
Hazardous Materials Accident	4
Drought	3
Erosion	2
Oil & Gas Well Accident	2
Please specify – Poor roads	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)	23
Wildfire	19
Severe Winter Weather (snow, ice & sleet)	14
Sustained Wind Events	12
Riverine/Runoff Flooding	10
Invasive Species	8
Structural Fire	7
Public Health Emergency	7
Terrorism and Criminal Activity	5
Dam Failure	5
Infrastructure Failure	5
Civil Disturbance	4
Drought	4
Erosion	3
Extreme Temperatures	2
Oil & Gas Well Accident	2
Hazardous Materials Accident	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	
Wildfire	14
Thunderstorm Hazards (Hail, Lightning, Severe Wind, & Tornados)	13
Public Health Emergency	13
Severe Winter Weather (snow, ice & sleet)	11
Infrastructure Failure	10
Terrorism and Criminal Activity	8
Sustained Wind Events	8
Civil Disturbance	7
Drought	7
Invasive Species	5
Riverine / Runoff Flooding	4
Extreme Temperatures	3
Dam Failure	2
Great Lakes Shoreline Hazards	1
Hazardous Materials Accident	1
Specify Other – Lack of Snow	1

Hazard Mitigation Survey Results
Lake County

Areas in your community that are frequently affected by hazards?
▪ The Baldwin River, south of town (bridge, MDOT highway M-37), Eighth Street bridge, East of North end of town, surrounding properties, extreme flooding hazards ▪ Yes, most of our community is in the Manistee National Forest surrounded by trees that cause damage during summer/winter storms and high winds. This can result in damage to houses-buildings and loss of electricity, etc. We are also prone to flooding events around the river areas that are throughout the county. ▪ If the wind blow in Luther, Michigan, the power goes out. ▪ Infrastructure failure – power outages county-wide ▪ Trees on roadways, secondary roads, all of Idlewild, and Cherry Valley area. Baldwin Road, Form Road, Tamarack, and Grand Avenue off US-10. ▪ Hazardous weather can affect the entire community. Wildfires can affect the entire state. ▪ Lots of forests in the area surrounding Baldwin so fire potential is always a concern. ▪ Storms have been getting worse, with the poor forest management, allowed wild fire is an increasing concern for Lake County ▪ Entire town can lose power (Baldwin)

Note your concerns for hazards or complicating factors that might compromise the safety of people and property in your community.
▪ Uncertain ▪ We have finally been recognized by the state as "critical bridge" recipient. It has taken far too long to replace that bridge. This has caused ten-twenty minutes extra travel time for emergency vehicles to reach residents on the east side of that bridge. ▪ Damage to houses/buildings and road throughout the area and loss of power/supplies. ▪ Down trees ▪ Limited healthcare facilities, appointments only. Nearest hospital is in Reed City 18 miles from downtown Baldwin. ▪ Downed lines during high winds and storms can compromise the safety of homes, businesses, and working community people in these areas. Trucks, buses, and other vehicles that are fenced in for safety but may also be compromised by hazardous conditions. ▪ Wildfire poses a large direct threat to persons and property in our area. ▪ Lack of volunteer firefighters, limited law enforcement personnel. Lack of emergency services funding. ▪ Communications to all in case of emergency? ▪ Lack of a warning system and also the remote living for people up this way, we don't have a good internet provider for all residents and most can't afford to pay for the cost of the service. ▪ No hospital or walk-in medical center

Appendix E:

Acknowledgments & Documentation

Lake County LEPC
2023 MEMBERSHIP ROSTER

Direction & Control-
*Chairman Lake County Board of Commissioners, Howard Lodholtz **(231)250-7770**
Commissioner, Christine Balulis **(231)250-4935**
Commissioner, Robert Sanders **(231)233-7897**
Commissioner, Kristine Raymond **(231)250-0977**
Commissioner, Don Arquette **(231)266-8914**
Commissioner, Dawn Martin **(269)760-1446**
Commissioner, Clyde Welford **(231)408-4802**
Lake County Administrator, Tobi Lake **(231)745-6231, (616)414-0059**
Emergency Manager, Patrick Maddox II **(757)777-7921**

Public Information-
*Lake County Administrator, Tobi Lake **(231)745-6231, (616)414-0059**
(Alternate) Emergency Manager, Patrick Maddox II **(757)777-7921**

Warning / Communications-
*Lake County 911 Director, Donald Divis **(231)239-0997**
R.A.C.E.S. Radio Amateur Civil Emergency Service Officer, Mike Cameron **(231)750-8241**

Damage Assessment-
*Lake County Equalization Director, Casey Guthrie **(231)745-2723, (231)350-9123**
*Lake County Building Director, David Wright **(231)745-2722, (231)287-1223, (231)689-1250**
American Red Cross, Jeff Nawrot **(**616)723-0917, (616)278-7872

Law Enforcement-
*Lake County Sheriff, Richard Martin **(231)250-0519**
Michigan State Police, Lt. John Forner **(616)312-5127**

Fire Services-
*Lake County Fire Chiefs Association Chairman, Greg Bombich **(231)233-3996**
(Alternate) Sauble-Elk-Eden Fire Department Deputy Chief, Joel Boyer- **(616)813-5402**

Public Works-
*Lake County Road Commission Leroy Williams, **(231)233-2197**

Emergency Medical Services-
Life EMS, Jim Herrema **(231)843-2110 or (231)690-2618**
Life EMS, Jeff Stockhill **(616)318-3633**

Public Health-
*District 10 Public Health Department, Bret Haner **(231)250-5765**
(Alternate) District 10 Public Health Department, Kevin Hughes **(231)878-0684**
*West Michigan Community Mental Health- Marc Bryant, **(231)907-1322**

Human Services-
*Michigan DHHS- Kael Meyer **(231)745-2725, (231)266-5099**
*American Red Cross, Jeff Nawrot **(**616)723-0917, (616)278-7872

Schools & Transportation-
Yates Dial-a-Ride, Josh Bova (231)660-3084
(Alternate)Yates Dial-a-Ride, Howard Perry **(231)580-4322**
*Baldwin Community Schools Superintendent, David Forrester **(231)745-1210**

Region 6 Incident Management Team-
*Mac Mcclellan, Lake County Team Member **(231)250-2551**

PARTICIPATING LOCAL OFFICIALS

Jurisdiction	Name/Title	Method of Participation/Date(s)
Baldwin Village	Mr. Truxton, President Ms. Lamb, Clerk	Phone interview 11/9/23 Survey response 6/15/22
Chase Twp	Ken Polaski, Supervisor	Phone interview 11/6/23
Cherry Valley Twp		
Dover Twp	Cathy May, Supervisor	Phone interview 10/31/23
Eden Twp	N/A (elected or appointed official)	Survey responses 7/13/22, 7/19/22
Elk Twp	Jeff Mather, Deputy Supervisor N/A (elected or appointed official)	Phone interview 9/6/23 Survey responses 6/12/22, 7/13/22
Ellsworth Twp		
Lake Twp	N/A (elected or appointed official)	Survey response 7/15/22
Luther Village	Andy Treiber, President	Email 11/27/23
Newkirk Twp	N/A (elected or appointed official) Gretchen Allan	Survey responses 6/10/22, 7/13/22 Email 11/29/23
Peacock Twp	Mr. Walker N/A (elected or appointed official)	Phone interview 9/6/23 Survey response 7/22/22
Pinora Twp	Ms. Dennett, Supervisor	Phone interview 9/6/23
Pleasant Plains Twp	Mr. Braddy, Supervisor	Survey response 7/25/22 Phone interview 10/31/23
Sauble Twp	Ms. Nugent, Supervisor	Survey response 6/9/22 Phone interview 10/31/23
Sweetwater Twp	Supervisor	Phone interview 9/8/23
Webber Twp	Mr. Wogatzke, Supervisor	Phone interview 10/11/23
Yates Twp	Ms. Patterson, Treasurer Vedra Gant, Yates Dial-a-Ride Director	Phone interview 11/16/23 Survey response 7/18/22

MEETINGS

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

July 6, 2021: Lake County LEPC Meeting

Attendees:

Lake County Local Emergency Planning Committee (LEPC)
Minutes for July 6th, 2021

Christine Balulis- Lake County Commissioner District #6 - **Absent**
Robert Sanders- Lake County Commissioner District #1 - **Present**
Tobi Lake- Lake County Administrator - **Present**
Greg Bombich- Lake County Fire Officer Association - **Present**
Rich Martin- Lake County Sheriff - **Present**
Lt. Jeff White- Michigan State Police - **Present**
Leroy Williams- Lake County Road Commission - **Present**
Jim Herrema- Life EMS – Jeff Stockhill (Alternate)- **Absent**
Howard Perry- Yates Dial-a-Ride - **Absent**
Jeff Nawrot- American Red Cross - **Absent**
Donald Divis- Lake County 9-1-1 Central Dispatch - **Present**
Patrick Maddox- Lake County Emergency Management & Homeland Security - **Present**
Casey Guthrie- Lake County Equalization Director - **Absent**
Bret Haner- District 10 Health Department - **Absent**
Richard Heitmeyer- Baldwin Community Schools Superintendent - **Absent**
Mac Mcclellan- Region 6 Incident Management Team - **Absent**
Zack Vanderwall- West Michigan Community Mental Health - **Present**
Lori Schultz- Michigan Department of Health and Human Services – Kaei Meyer (Alternate) - **Absent**
Robert Woolever- R.A.C.E.S. - **Present**

Synopsis:

WMSRDC staff attended to introduce the hazard mitigation planning process.

September 7, 2021: Lake County LEPC Meeting

Attendees:

(Record unavailable)

Synopsis:

WMSRDC staff discuss outreach strategy and recent hazard events and concerns.

April 27, 2022: Lake County Townships Association Meeting

Attendees:

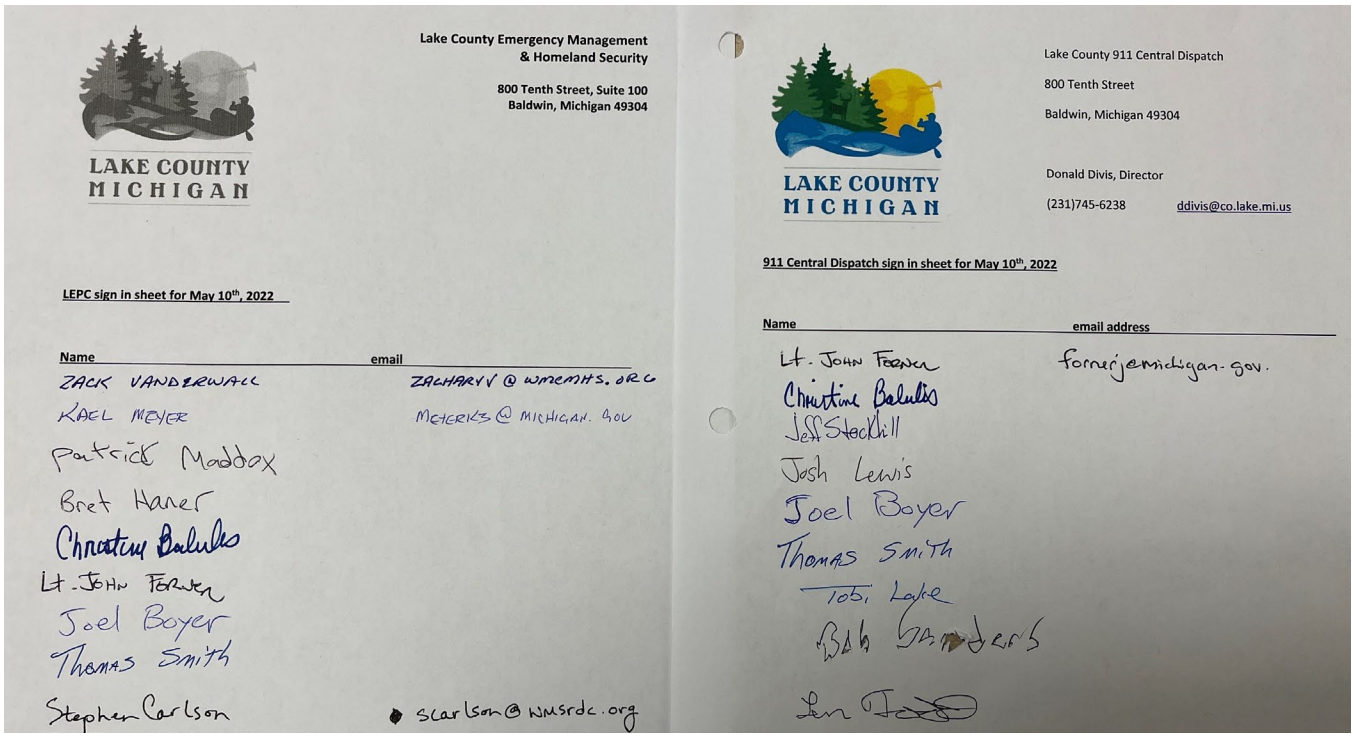
Townships represented at the meeting included: Chase, Cherry Valley, Peacock, Pinora, Sauble, Webber, and Yates

Synopsis:

WMSRDC presented an introduction to the hazard mitigation planning process, emphasize importance on participation in the planning process, and extended an invitation to take the online community hazards survey.

May 10, 2022: Lake County LEPC Meeting

Attendees:



LAKE COUNTY MICHIGAN

Lake County Emergency Management & Homeland Security

800 Tenth Street, Suite 100
Baldwin, Michigan 49304

LEPC sign in sheet for May 10th, 2022

Name	email
ZACK VANDERWALL	ZACHARYV @ WMCMHS.ORG
KAEL MEYER	MEYERKS @ MICHIGAN. GOV
Patrick Maddox	
Bret Haner	
Christine Balulis	
Lt. JOHN FORNER	
Joel Boyer	
Thomas Smith	
Stephen Carlson	scarlson@wmsrdc.org

LAKE COUNTY MICHIGAN

Lake County 911 Central Dispatch
800 Tenth Street
Baldwin, Michigan 49304

Donald Divis, Director
(231)745-6238 ddivis@co.lake.mi.us

911 Central Dispatch sign in sheet for May 10th, 2022

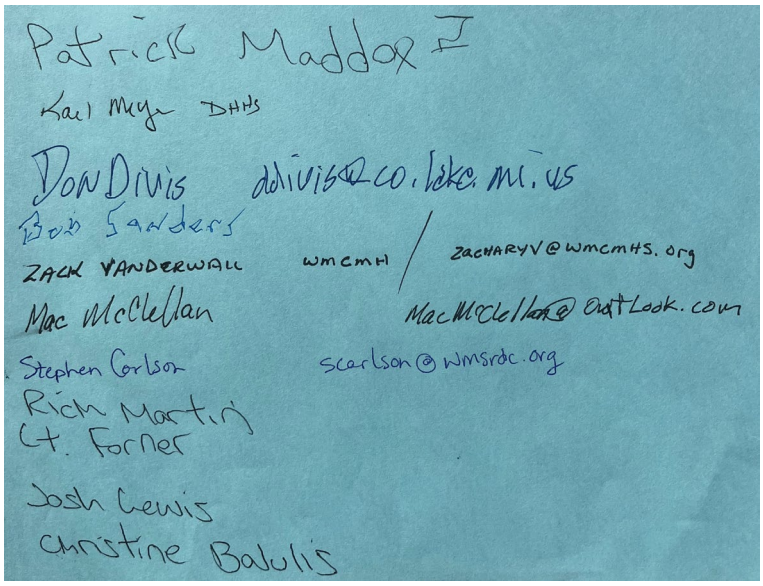
Name	email address
Lt. JOHN FORNER	fornerj@michigan.gov.
Christine Balulis	
Jeff Stockhill	
Josh Lewis	
Joel Boyer	
Thomas Smith	
Tobi Lake	
Bob Sanders	
[illegible]	

Synopsis:

Review of survey responses to-date and made preparations for public meeting during the upcoming September LEPC meeting.

July 12, 2022: Lake County LEPC Meeting and Hazard Mitigation Public Hearing

Attendees:



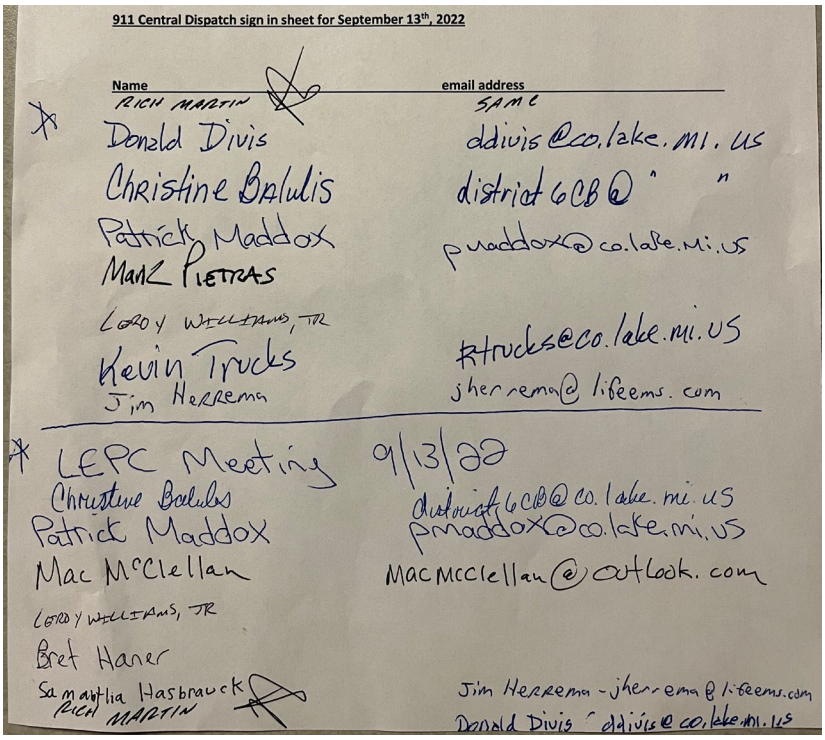
Patrick Maddox II
Kael Meyer DHHS
Don Divis ddivis@co.lake.mi.us
Bob Sanders
ZACK VANDERWALL WMCMH / ZACHARYV@WMCMHS.org
Mac McClellan MacMcClellan@OutLook.com
Stephen Carlson scarlson@wmsrdc.org
Rich Martin
Lt. Forner
Josh Lewis
Christine Balulis

Synopsis:

Review of hazard rating and ranking methodology and review of research compiled regarding recent hazard events since 2014.

September 13, 2022: Lake County LEPC Meeting

Attendees:



911 Central Dispatch sign in sheet for September 13th, 2022

Name	email address
RICH MARTIN	SAME
Donald Divis	ddivis@co.lake.mi.us
Christine Balulis	district6CB@ " "
Patrick Maddox	pmaddox@co.lake.mi.us
Mark Pietras	
LEROY WILLIAMS, JR	
Kevin Trucks	ktrucks@co.lake.mi.us
Jim Herrema	jherrema@lifeems.com
LEPC Meeting 9/13/22	
Christine Balulis	district6CB@co.lake.mi.us
Patrick Maddox	pmaddox@co.lake.mi.us
Mac McClellan	MacMcclellan@outlook.com
LEROY WILLIAMS, JR	
Bret Haner	
Samantha Hasbrauck	
RICH MARTIN	
	Jim Herrema - jherrema@lifeems.com
	Donald Divis - ddivis@co.lake.mi.us

Synopsis:

Review of updated demographic profile information. LEPC also approved the revised hazard rating and rankings for updated plan.

November 1, 2022: Lake County LEPC Meeting and Public Input Opportunity

Attendees:

Robert Sanders- Lake County Commissioner District #1
Tobi Lake- Lake County Administrator
Rich Martin, Chairperson- Lake County Sheriff
John Forner – Lt. Michigan State Police – Lt. Coleman
Leroy Williams- Lake County Road Commission
Jeff Stockhill Life EMS (Alternate)
Josh Bova- Yates Dial-a-Ride
Donald Divis- Lake County 9-1-1 Central Dispatch
Patrick Maddox- Lake County Emergency Management & Homeland Security
Bret Haner- District 10 Health Department
Mac Mcclellan- Region 6 Incident Management Team
Zack Vanderwall- West Michigan Community Mental Health
Kael Meyer MDHHS (Alternate)
Stephen Carlson WMSRDC

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 and vulnerable populations
- review of seasonal peak population estimates

January 10, 2023: Lake County LEPC Meeting

Attendees:

Christine Balulis, Secretary- Lake County Commissioner District #6
Robert Sanders- Lake County Commissioner District #1
Tobi Lake- Lake County Administrator
Rich Martin, Chairperson- Lake County Sheriff
Lt. Coleman – Lt. Michigan State Police
Leroy Williams- Lake County Road Commission
Jeff Stockhill Life EMS (Alternate)
Josh Bova- Yates Dial-a-Ride
Donald Divis- Lake County 9-1-1 Central Dispatch
Patrick Maddox- Lake County Emergency Management & Homeland Security
Bret Haner- District 10 Health Department
Zack Vanderwall- West Michigan Community Mental Health
Kael Meyer MDHHS(Alternate) – Meyer
Orville Theaker Michigan State Police
Stephen Carlson WMSRDC

Synopsis:

The meeting featured a Public Officials Conference presented by Lake County Emergency Management and Michigan State Police. No public officials were present. WMSRDC gave an update on hazard mitigation planning participation to-date and recapped revised hazard rating and rankings.

May 9, 2023:

Attendees:

Christine Balulis, Secretary- Lake County Commissioner District #6
Robert Sanders- Lake County Commissioner District #1
Tobi Lake- Lake County Administrator
Greg Bombich- Lake County Fire Officer Association
Rich Martin, Chairperson- Lake County Sheriff
Leroy Williams- Lake County Road Commission
Jeff Stockhill Life EMS (Alternate)
Donald Divis- Lake County 9-1-1 Central Dispatch
Patrick Maddox- Lake County Emergency Management & Homeland Security
Casey Guthrie- Lake County Equalization Director
Mike Cameron- R.A.C.E.S.- Present
Stephen Carlson WMSRDC

Synopsis:

WMSRDC initiated a review of hazard mitigation plan goals & objectives.

July 11, 2023: Lake County LEPC Meeting

Attendees:

Christine Balulis, Secretary- Lake County Commissioner District #6
Tobi Lake- Lake County Administrator
Rich Martin, Chairperson- Lake County Sheriff
John Forner – Lt. Michigan State Police – (Alternate) Lt. Coleman
Leroy Williams- Lake County Road Commission
Jeff Stockhill Life EMS (Alternate)
Donald Divis- Lake County 9-1-1 Central Dispatch
Patrick Maddox- Lake County Emergency Management & Homeland Security
Casey Guthrie- Lake County Equalization Director
Bret Haner- District 10 Health Department
Kael Meyer- Michigan Department of Health and Human Services
Mike Cameron- R.A.C.E.S.
Stephen Carlson WMSRDC

Synopsis:

WMSRDC reviewed hazard mitigation plan progress, discussed issue of emergency shelter certification, and revised hazard mitigation plan goals & objectives.

August 31, 2023: Lake County Townships Association Meeting

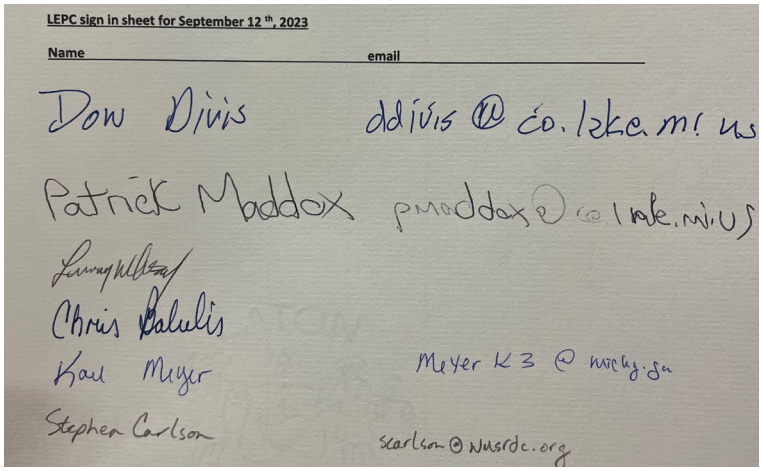
Attendees:

Synopsis:

WMSRDC staff presented the status of the hazard mitigation planning process and encouraged participation from communities. Opportunities to participate included review of hazard mitigation progress and review of draft sections available online.

September 12, 2023: LEPC Meeting & Public Comment Opportunity

Attendees:



LEPC sign in sheet for September 12 th, 2023

Name	email
Don Divis	ddivis@co.lake.mi.us
Patrick Maddox	pmaddox@co.lake.mi.us
[illegible]	
Chris Balulis	
Karl Meyer	Meyer K3 @ michigan
Stephen Carlson	scarlson@wmsrdc.org

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 a review of the "what and why" of hazard mitigation and gave information regarding the status of the hazard mitigation plan and steps needed to complete the update.

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 Soil Survey of Lake and Wexford Counties, Michigan (1985)

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/

Lake County Master Plan (2012)

Lake County Emergency Action Guidelines

Lake County Community Wildfire Protection Plan (2014)

Lake County Equalization Report (2023)

MLive (news) https://www.mlive.com/

WZZM 13 (news) https://www.wzzm13.com/

9 & 10 News (news) https://www.9and10news.com

ARTICLES & PUBLIC NOTICES

Articles and public notices published during the Lake 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.

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.

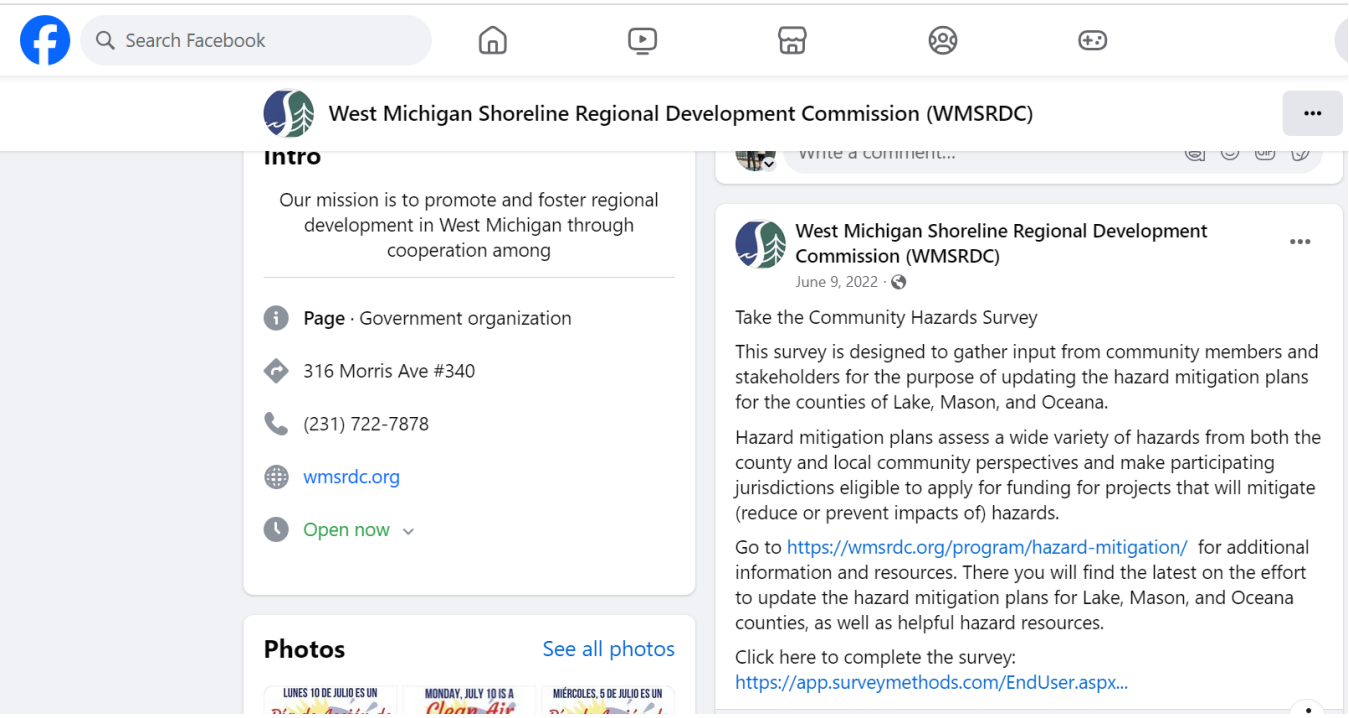
Local Planning Clearinghouse

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 in the Lake County Star on October 27, 2022

NOTICE OF PUBLIC HEARING REGARDING HAZARD MITIGATION

The West Michigan Shoreline Regional Development Commission (WMSRDC), in cooperation with Lake County Emergency Management, has begun the process of updating the Lake County Hazard Mitigation Plan. Public input is requested regarding community hazards that pose a threat to people and property in Lake County. A public hearing to discuss Hazard Mitigation and receive input from community members will take place during the county's local emergency planning committee (LEPC) at 11:00 AM on November 1, 2022 at the Lake County Courthouse located at 800 10th St in Baldwin. 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:

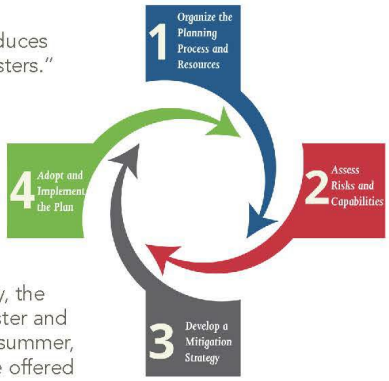
- **City of Muskegon Heights**
  - Industrial Parks Master Plan
- **Oceana County**
  - Workforce & Economic Diversification Study
- **City of Hart**
  - Wastewater System Improvements
- **Lake County**
  - Economic Diversification Initiative

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!

Orchard in Oceana County that will be impacted by the multiple EDA grants currently ongoing in the county

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 – Published in the Lake County Star on September 7, 2023

AFFIDAVIT OF PUBLICATION

RECEIVED
SEP 08 2023
WMSRDC

STATE OF MICHIGAN
County of Lake

Candy Reichert, being duly sworn, deposes and says that she is one of the editors, publishers, representatives of the Lake County Star, a newspaper published and circulated in said County of Lake, and the annexed notice was duly printed and published in the said newspaper on the following dates:

September 07, 2023

Candy Reichert

Candy Reichert

Subscribed to and sworn to me this 7th day of September 2023.

Danielle Smits

Notary Public: Danielle Smits
State of Michigan, County of Lake
My Commission Expires: July 02, 2028
(Acting in the county of Lake)

DANIELLE SMITS
NOTARY PUBLIC - MICHIGAN
MONTCALM COUNTY
ACTING IN THE COUNTY OF Lake
MY COMMISSION EXPIRES July 2, 2028

HAZARD MITIGATION
PUBLIC MEETING

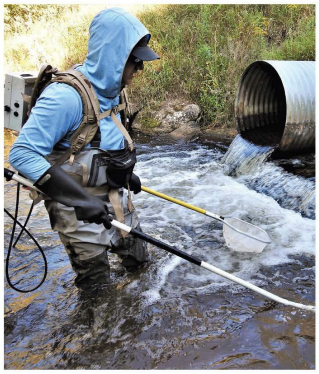
Public input is requested for the Lake County Hazard Mitigation Plan, which is being updated by Lake County Emergency Management with assistance from the West Michigan Shoreline Regional Development Commission (WMSRDC). Draft sections of the plan are available for public review at https://wmsrdc.org/program/hazard-mitigation/overview/. The public is invited to comment on these sections at the Lake County Local Emergency Planning Committee (LEPC) meeting on September 12th at 10:30 A.M. at the Lake County Courthouse located at 800 10th St in Baldwin. 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.

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.



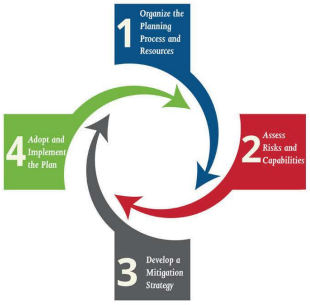
To complete all anticipated construction activities and post-monitoring efforts, WMSRDC has collaborated with NOAA to extend the project deadline through September 2024. Project partners for the three projects include Muskegon County Road Commission, Oceana County Road Commission, Grand Valley State 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.

<u>Project Eligibility Criteria</u>

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.