

Hillsdale County, Michigan

Hazard Mitigation Plan

Prepared by the Region 2 Planning Commission for the Hillsdale County Board of Commissioners and Local Units of Government within Hillsdale County

Updated
November 2018

Hillsdale County Hazard Mitigation Plan

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Introduction

Purpose

In recent years hurricanes, massive flooding, and powerful earthquakes; natural disasters have rocked our country and the world. In our own community we have experienced massive ice and snow storms, hazardous material threats on our highways, powerful electrical storms, tornadoes, and a broken gas pipeline. These natural disasters affect our economy and our quality of life. They are costly, disruptive, and they threaten our health, welfare, and life style. Too often we ask, after the disaster, what could have been done to avoid, or lessen the impact of these catastrophic events?

The Federal Emergency Management Agency (FEMA) and the Michigan State Police (MSP) Emergency Management and Homeland Security Division (EMHSD) have partnered to encourage communities to plan for disasters and to develop and implement mitigation strategies to reduce the severity of these types of disasters. Grant funding originally provided for the preparation of this plan. Incentives are also occasionally made available through FEMA grant programs to communities for hazard mitigation, and to reduce the potential threat to life and property damage caused by natural and manmade disasters.

The Hazard Mitigation Plan is a community plan that anticipates natural, technological and human related disasters and identifies actions and activities to implement before disasters happen. Preparedness helps minimize damage to property and harm to our citizens. Hazard mitigation planning does not include emergency preparedness, nor does it include planning for emergency responses. Emergency preparedness and the planning for emergency responses are the responsibility of local public safety agencies and local units of government.

Hazard Mitigation Plans have a pre-disaster focus in order to develop strategies and implementation actions prior to the occurrence. This upfront planning can minimize the negative impacts associated with these disasters. Hazard mitigation planning must be comprehensive in order to address the many hazards that a community may face. Plans are implementation oriented and locally relevant. They contain both short and long-range action strategies.

Hillsdale County Hazard Mitigation Plan

Our community faces a wide range of potential hazards. They include in no particular order the following:

<ul style="list-style-type: none">× Civil Disturbances× Earthquakes× Subsidence× Scrap Tire Fires× Structural Fires× Wildfires× Riverine Flooding× Dam Failures× Energy Emergencies× Significant Infrastructure Failures× Passenger Transportation Accidents× Hazardous Material Incidents× Nuclear Power Plant Accidents	<ul style="list-style-type: none">× Oil and Natural Gas Well Accidents× Oil and Natural Gas Pipeline Accidents× Nuclear Attacks× Terrorism/Sabotage/WMD× Public Health Emergencies× Drought× Extreme Temperatures× Hail× Lightning× Severe Wind Events and Tornadoes× Snowstorms× Ice and Sleet Storms
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The Hazard Mitigation Plan includes a review of these potential threats and an analysis to determine which threats are most likely to occur in our community. The plan includes a set of strategies to address those hazards which are most likely to occur, that affect a high percentage of population, have the potential for severity, and may have a negative impact on the economy. The preparation of a hazard mitigation plan requires the involvement of agencies and governmental departments which have responsibilities in emergency response, public utilities, community safety, and the environment. Local elected officials, planners, and citizens must also be encouraged to participate. The planning process offers opportunities for community collaboration in an attempt to maximize the effectiveness and efficiency of mitigation efforts. This maximization of efficiency and effectiveness helps to assure the maximum community benefit and avoiding expenditures for the mitigation of hazards which have low risk to the community.

Hillsdale County Hazard Mitigation Plan

The Hazard Mitigation Plan contains the following:

A community profile, the identification of hazards and risks facing the community, an assessment of vulnerabilities, goals and objectives for the community, mitigation strategies, implementation measures, and a means for monitoring the effectiveness of plan recommendations.

Just as there is a wide range of hazards which potentially face our community, there is a wide range of alternative approaches for mitigating these hazards.

We can:

1. Remove the hazard.
2. Keep the hazard away from people.
3. Keep the people away from the hazard.
4. Alter design or construction to reduce the hazard.
5. Provide warnings and awareness to the community.

Approaches to the mitigation of hazards generally fall into the following categories:

1. Corrective measures. These include the acquisition of land, the relocation of people or businesses, redevelopment of an area, or the modification of an area to mitigate potential negative impacts.
2. Public works measures.
3. Planning and regulatory measures including planning, the use of zoning, regulations and codes, disclosure, moratoria, the purchase of development rights, and open space planning.
4. Persuasion and encouragement including the use of incentives.
5. Public education and awareness including public information, dissemination, public relations, public hearings, surveys, and public education.

Hillsdale County Hazard Mitigation Plan

Finally, it is important that hazard mitigation planning be fully incorporated into the community planning process. Many of the mitigation strategies which may be employed to reduce the severity of hazards also contribute to community sustainability and the enhancement of quality of life. Good community planning offers the opportunity to recognize synergies whereby the collective impact of actions can result in the realization of community goals. From this context, efficiency can be obtained in the expenditure of scarce resources with a maximization of community benefit.

Hillsdale County Hazard Mitigation Plan

Plan Preparation and Local Unit Involvement and Participation

Staff Involvement

The Hillsdale County Hazard Mitigation Plan originally was prepared by the staff of the Region 2 Planning Commission which was responsible for data collection and analysis. This update was prepared mainly by the staff of the County of Hillsdale Emergency Management office with outside input from several local sources.

Plan Preparation Oversight

Oversight for the preparation of the Hillsdale County Mitigation Plan was provided by the Hillsdale County Emergency Management Coordinator, the Hillsdale County Board of Commissions and local units of government in Hillsdale County.

The Hillsdale County Board of Commissioners was provided a presentation on the updated Hillsdale County Hazard Mitigation Plan on November 27, 2018. The presentation included a review of potential hazards facing the County, a proposed prioritization of hazards, goals and objectives, and hazard mitigation strategies. The Hillsdale Chapter of the Michigan Township Association met on TBA to review the proposed plan.

Hillsdale County Hazard Mitigation Plan

Local units of government in the county were contacted and requested to indicate their support for the hazard mitigation planning effort.

On each occasion, when the Hazard Mitigation Plan was discussed at a public meeting, citizens have the opportunity to comment on the preparation of the plan.

A listing of each local unit and their interest in participating in the hazard mitigation program may be found on the table entitled "Local Unit Involvement and Participation". Interest in the hazard mitigation plan as defined on the table is based upon the unit's expressed interest or continuous involvement in the preparation of the draft plan.

Hillsdale County Hazard Mitigation Plan				
LOCAL UNIT INVOLVEMENT AND PARTICIPATION				
Prepared December, 2008				
Local Unit	Units of Governments with Zoning Ordinances	Member Community Planning Committee	Interest in Hazard Mitigation Program	Hazard Mitigation Plan Adoption
Adams Township				
Allen Township				
Amboy Township				
Cambria Township				
Camden Township				
Fayette Township				
Hillsdale Township				
Jefferson Township				
Litchfield Township				
Moscow Township				
Pittsford Township				
Ransom Township				
Reading Township				
Scipio Township				
Somerset Township				
Wheatland Township				
Woodbridge Township				
Wright Township				
Village of Allen				
Village of Camden				
Village of Montgomery				
Village of North Adams				
Village of Waldron				
City of Hillsdale				
City of Jonesville				
City of Litchfield				
City of Reading				

Hillsdale County Hazard Mitigation Plan

Community Profile

Regional Location

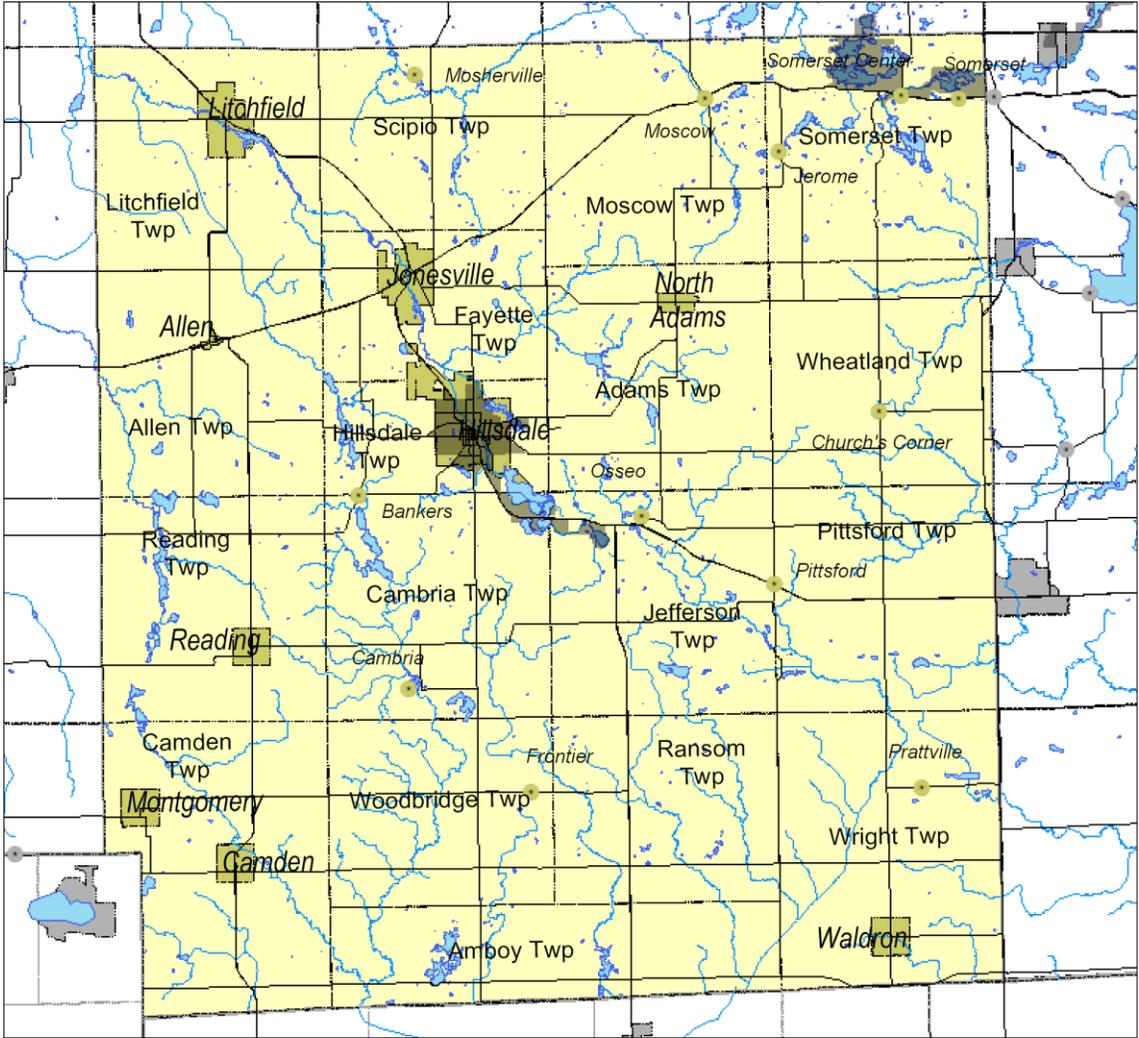
Hillsdale County is located in the south-central portion of the Lower Peninsula of Michigan. The State's Meridian — utilized by surveyors, land owners and other powers to identify the location of real property in Michigan— is also Hillsdale County's eastern border. US-127 (Meridian Road) roughly follows the Meridian. The southwest corner of the county is where the states of Michigan, Indiana, and Ohio meet.

Political Jurisdictions

The county is comprised of 18 townships, 9 incorporated cities and villages, and a variety of crossroads hamlets and other small settlements. The townships and incorporated cities and villages are governed by elected boards and councils. County residents are also represented by the Hillsdale County Board of Commissioners. County residents are represented by one of the 5 commissioners serving on the governing body. The entire county is also part of Michigan House District 58, Michigan Senate District 16, and Michigan District 7 of the U.S. House of Representatives.



Hillsdale County Hazard Mitigation Plan



Hillsdale County Communities

Municipalities

- Cities & Villages
- Townships
- Other Settlements
- Urbanized Areas

Transportation Facilities

- State Highways
- Other Major Roads

Source:
Center for Geographic Information,
Universal Maps, & R2PC

Hillsdale County Hazard Mitigation Plan

Hillsdale County Communities											
MCD	Plan Partici- pation	County Comm. District	MI House District	MI Sen- ate Dis- trict	US House District	MCD	Plan Partici- pation	County Comm. District	MI House District	MI Sen- ate Dis- trict	US House District
Cities						Townships (continued)					
Hillsdale		1&2	58	16	7	Camden	4	58	16	7	
Jonesville		2	58	16	7	Fayette	2	58	16	7	
Litchfield		2	58	16	7	Hillsdale	2	58	16	7	
Reading		3	58	16	7	Jefferson	4	58	16	7	
Villages						Litchfield	2	58	16	7	
Allen		3	58	16	7	Moscow	2	58	16	7	
Camden		3	58	16	7	Pittsford	5	58	16	7	
Montgomery		3	58	16	7	Ransom	4	58	16	7	
North Adams		4	58	16	7	Reading	3	58	16	7	
Waldron		5	58	16	7	Scipio	2	58	16	7	
Townships						Somerset	5	58	16	7	
Adams		4	58	16	7	Wheatland	5	58	16	7	
Allen		3	58	16	7	Woodbridge	4	58	16	7	
Amboy		4	58	16	7	Wright	5	58	16	7	
Cambria		3	58	16	7						

Community Characteristics

Hillsdale County was home to 46,688 people in the year 2010, according to the U.S. Census. The official estimate for the county in 2005 was 47,470 people, indicating slow population decline. Urban areas, which are based upon population density, existed around Hillsdale (including portions of Cambria and Jefferson Townships) and a portion of the Irish Hills Area (including the development around Lakes LeAnn and Somerset).

Hillsdale County Hazard Mitigation Plan

It is interesting to note that approximately 2/3 of the population lived in a township rather than a city or village in 2010. The following statistics about special groups of people also help to describe the population of Hillsdale County.

Population Density

The average density of population in the county was 56 ppsm (people per square mile) in 2010. However, population density varied across the county from a high of 386-1,553 ppsm in the cities and villages to a low of 28-156 ppsm in the townships. However, it is also important to note that, in all categories, the 10 unincorporated settlements within the county will have higher ratios or densities than the surrounding township.

Populations with Special Needs

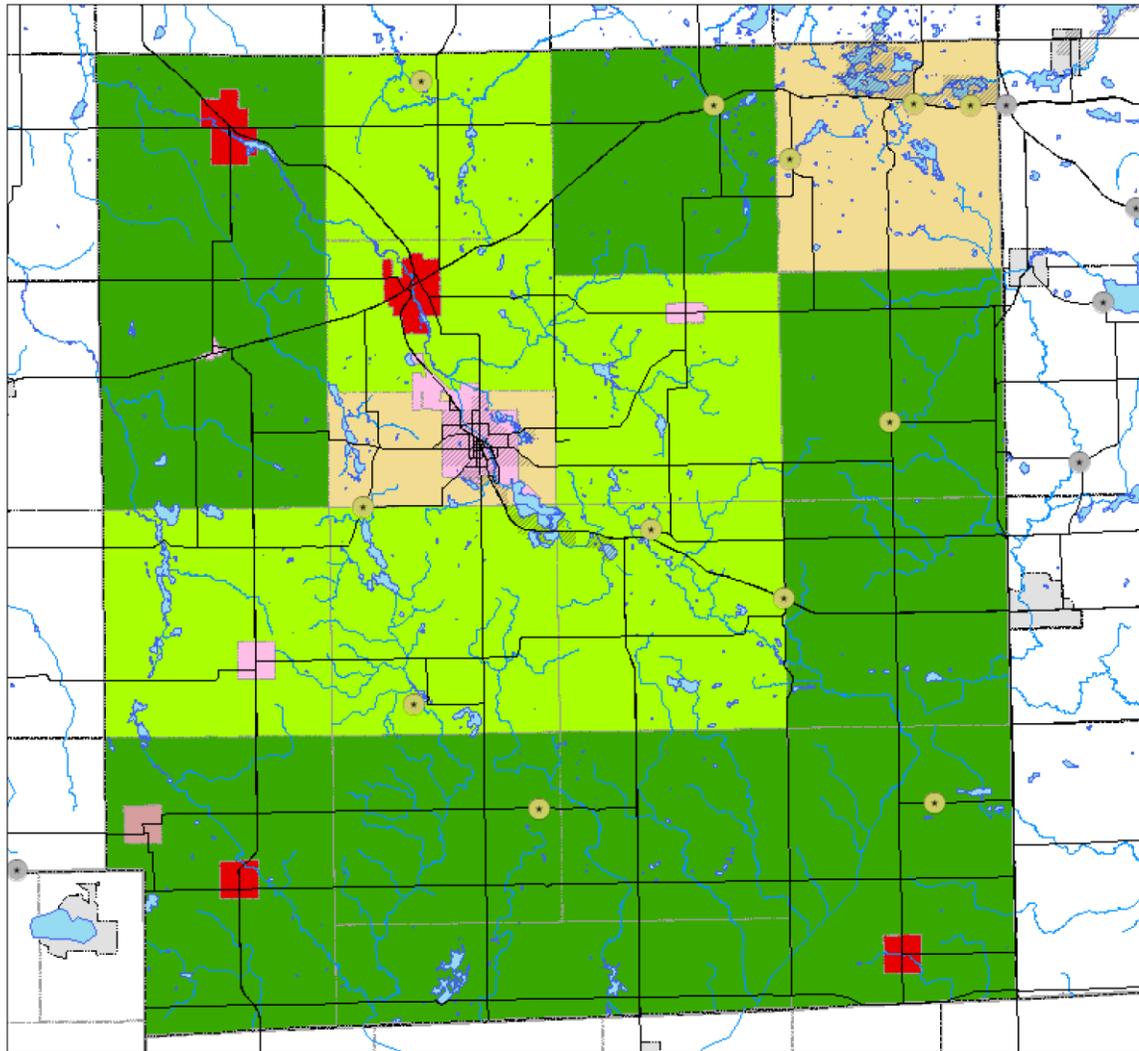
Several population groups within the county have special needs which must be given consideration in any serious analysis of the risks to residents:

Elderly Residents

Approximately 13% of Hillsdale County residents were at least 65 years old in 2010. For example, the City of Hillsdale (18%) and the City of Jonesville (17%) had the highest ratios of elderly residents and the City of Reading (10%), Village of Camden (10%) and the Townships of Moscow (11%), Ransom (10%), Scipio (9%), and Woodbridge (10%) had the lowest ratios. A couple of municipalities also host retirement/nursing homes and/or hospitals:

- ✦ The City of Hillsdale is the location of the Hillsdale County Medical Care Facility, a retirement/nursing home and the Hillsdale Hospital, a local hospital which includes a nursing home unit.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Population Density

People Per Sq. Mile

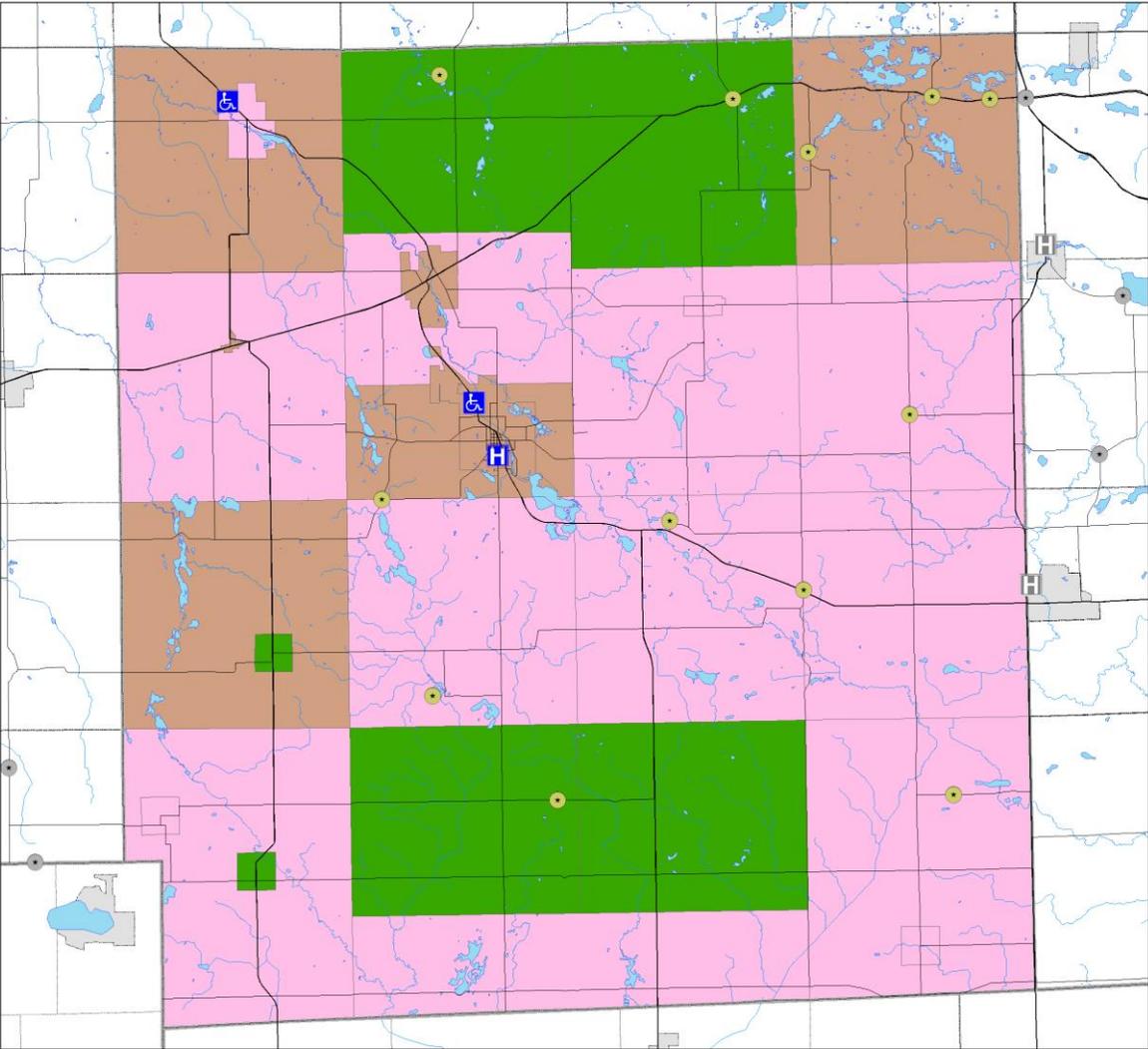
- 28 - 45 ppsm
- 46 - 88 ppsm
- 89 - 156 ppsm
- 157 - 386 ppsm
- 387 - 866 ppsm
- 867 - 1,553 ppsm

Settlements

- Unincorporated Settlements
- Urbanized Areas

Source:
2000 US Census,
Universal Maps, & R2PC

Hillsdale County Hazard Mitigation Plan



Hillsdale County Communities

Elderly Population

Population Over 64 Years of Age

- 09.00% - 11.99%
- 12.00% - 14.99%
- 15.00% - 18.00%

Hospitals and retirement/
nursing homes

H hospitals ♿ retirement/
nursing homes

Source(s):
2000 US Census, Carepathways.com,
retirementhomes.com, and
doctordirectory.com

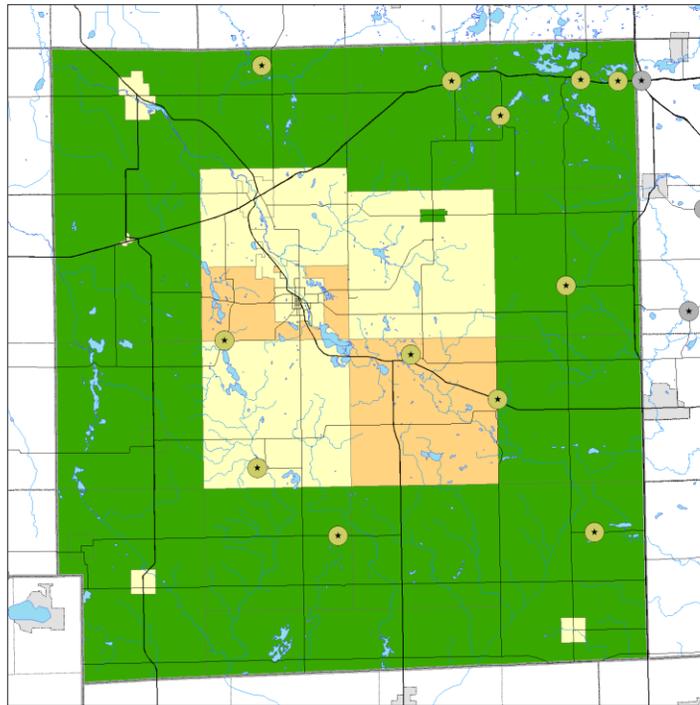
Hillsdale County Hazard Mitigation Plan

Disabled Residents

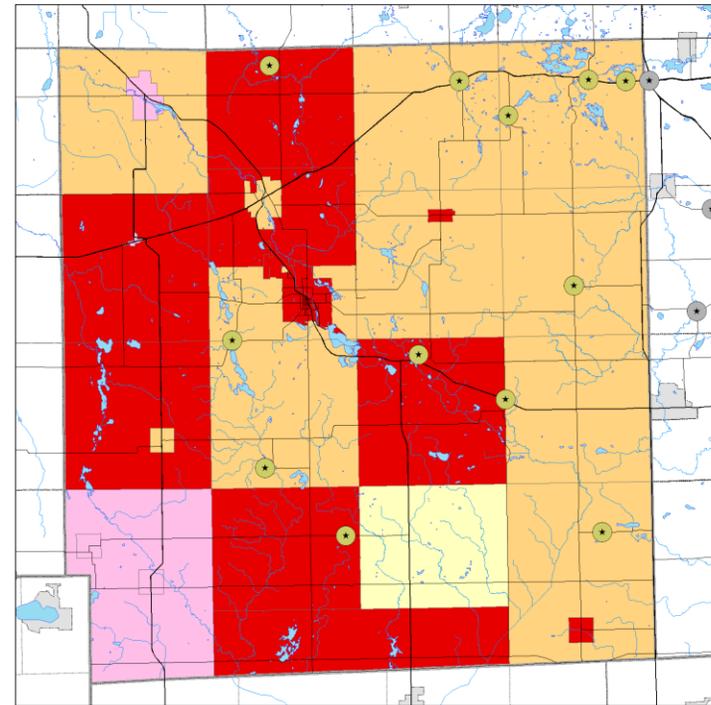
The 2010 U.S. Census surveyed the number of disabled people in two age groups:

- × **5-20 years of age.** Approximately 12% of residents between the ages of 5 and 21 were disabled in some way in 2010. For example, the Townships of Hillsdale (15%) and Jefferson (15%) had the highest ratios of disabled residents within the age group and the Villages of Allen (5%), Montgomery (5%) and, North Adams (5%); and the Townships of Ransom (5%), Wheatland (5%), and Woodbridge (6%) had the lowest ratios. It is interesting to note that all of the townships located on the periphery of the county had the smallest ratio
- × **21-64 years of age:** Approximately 20% of residents between the ages of 21 and 65 were disabled in some way in 2010. For example, the City of Litchfield (26%) and the Villages of Camden (29%) and Montgomery (30%), and the Townships of Allen (26%) and Camden (29%) had the highest ratios of disabled residents within the age group. The Townships of Hillsdale (16%), Pittsford (16%), Ransom (14%), and Somerset (16%) had the lowest ratios.

Hillsdale County Hazard Mitigation Plan



5-20 Years of Age



20-64 Years of Age



Hillsdale County Communities

Disabled Population

Hillsdale County Hazard Mitigation Plan

Impoverished Residents

Approximately 10% of Hillsdale County residents were considered poor by the US Census in the Year 2010. For example, the City of Reading (12%) and the Villages of Camden (12%), Montgomery (14%) and Waldron (13%), which are all located on the southern border of the county, had the highest ratios of poor residents. The Village of North Adams (3%) and the Townships of Hillsdale (4%), Moscow (4%), Pittsford (4%), and Somerset (4%) had the lowest ratios.

Foreign Language Speakers

Approximately 4% of county residents spoke a language other than English at home in 2010. For example, the Townships of Camden (8%) and Woodbridge (11%), located in the southwestern corner of the county, had the highest ratios of foreign language speakers. The Cities of Litchfield (1%), Jonesville (2%) and Reading (1%); the Villages of Allen (2%), Camden (2%), and; and the Townships of Adams (2%), Allen (1%), Fayette (2%), Jefferson (2%), Moscow (2%), Scipio (2%), and Wright (1%) had the lowest ratios.

School Populations

Children congregate daily during the school year within the school facilities located in Hillsdale County.

Public School Facilities

Hillsdale Intermediate School District

Most of the students within the county are enrolled in schools that are part of the Hillsdale Intermediate School District:

- × **Camden-Frontier School District.** Camden-Frontier Elementary, Camden Frontier Middle, and Camden Frontier High (K-12 and located on a single campus).

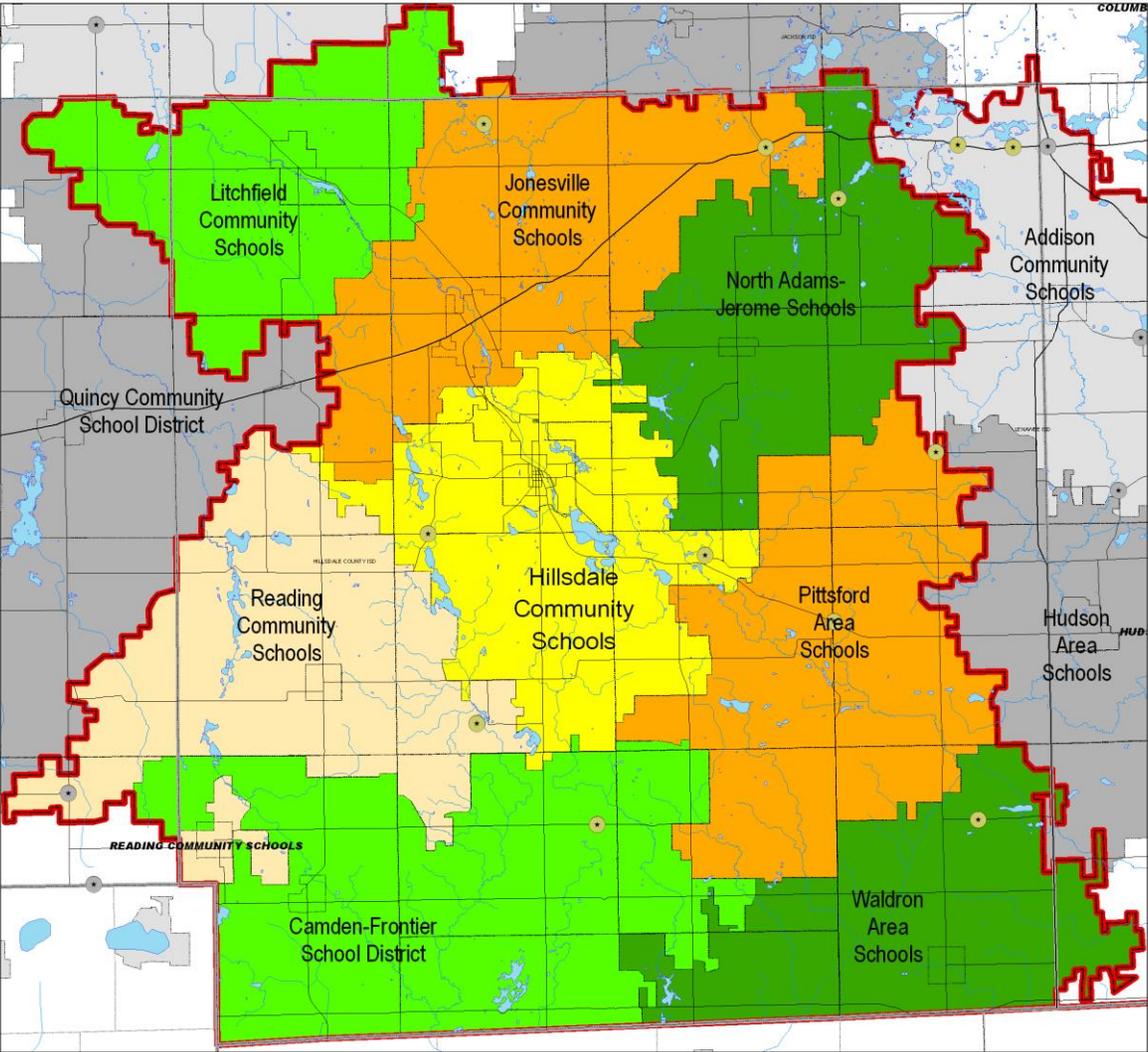
Hillsdale County Hazard Mitigation Plan

- × **Hillsdale Community Schools.** Bailey Elementary (PK), Gier Elementary (PK-K-4), Davis Middle (5-8), and Hillsdale High (9-12).
- × **Jonesville Community Schools.** Williams Elementary (K-5), Jonesville Middle (6-8), Jonesville High (9-12) and Jonesville Alternate High (9-12).
- × **Litchfield Community Schools.** Litchfield Elementary (K-5) and Litchfield High (6-12).
- × **North Adams-Jerome Schools.** North Adams-Jerome Elementary (K-6) and North Adams-Jerome High (7-12).
- × **Pittsford Area Schools.** Pittsford Area Elementary (K-6) and Pittsford Area High (7-12).
- × **Reading Community Schools.** Reynolds Elementary (K-6) and Reynolds High (7-12)
- × **Waldron Area Schools.** Waldron Elementary (K-5), Waldron Middle (6-8), and Waldron High (9-12) located on one campus.
- × **Charter Schools.** There are 2 charter schools in Hillsdale County. Hillsdale Preparatory (K-8) and Will Carleton Academy (K-12).

Other Local Public School Districts.

Significant portions of the Addison Community Schools, Hudson Area Schools, and Quincy Community Schools extend into Hillsdale County, although none have facilities within the county. Smaller portions of the Hanover-Horton Schools and Homer Community Schools also extend into the county.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Communities

School Facilities

- Hillsdale County Boundary
- Intermediate School District Boundaries
- Local School Districts in the Jackson
- Intermediate School District
- Local School Districts in the Jackson
- Local School Districts in other Intermediate
- School Districts

Source:
www.greatschools.net & R2PC

Hillsdale County Hazard Mitigation Plan

Private School Facilities

There are eight private schools operating in Hillsdale County. Amish School #1 (1-8), Cooper Amish (1-8), Freedom Farm Christian (K-12), Bird Lake Bible (K-12), Hillsdale College Academy (K-12), Ridgeview (1-8), Prattville SDA Elementary (K-8) and Countryside Montessori (PK).

Public Safety Organizations

Organizations that provide fire protection, emergency medical services (EMS), and police protection are found throughout Hillsdale County.

Fire Departments

There are 14 fire departments serving county residents: Allen Township FD, Camden FD, Hillsdale City FD, Hillsdale Township FD, Jonesville FD, Litchfield FD, Montgomery FD, Moscow Township FD, North Adams FD, Jefferson Township FD, Reading Community FD, Somerset Township FD, Wright-Waldron FD, and Woodbridge Township FD. Most fire stations are located in or near settlements and serve those population centers and the surrounding countryside. In addition, two Lenawee County fire departments, Addison and Hudson, provide coverage in areas of Eastern Hillsdale County. Several county fire departments provide fire coverage and/or mutual aid coverage to areas outside of the county and in Ohio and Indiana.

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EMS

Reading Emergency Unit serves the county with Advanced Life Support (ALS) and in some cases Basic Life Support (BLS) mobile units stationed in the Cities of Reading (#1), Hillsdale (#2), and Litchfield (#3). Somerset Township, and the City of Hudson and the Village of Addison also serve portions of the eastern side of the county with ALS and in some cases BLS units. Waldron Fire and EMS serves a portion of the southeastern part of the county with a Basic Life Support (BLS) unit. EMS services are also provided by the Hillsdale City FD, Moscow Township FD, Montgomery Village FD, North Adams Village FD, Jefferson Township FD, Pioneer (Ohio) FD, Wright-Waldron FD, and the Woodbridge Township FD with Medical First Responders (MFR) units.

Police Departments

County residents are served by a number of law enforcement agencies:

- × **State Police Posts.** State Police Jackson Post #13 serves Hillsdale County with a detachment (satellite office) located in Jonesville.
- × **Sheriffs Office.** The County Sheriff's Office is located in Hillsdale.
- × **Local Police Stations.** The following municipalities are served by their own municipal police force: the Cities of Hillsdale, Litchfield, Jonesville and Reading, and the Township of Somerset.

Hillsdale County Hazard Mitigation Plan

Seasonal Housing

Approximately 9% of Hillsdale County housing units were used seasonally in 2010 according to the U.S. Census. The variability between the local units of government, however, is quite dramatic. For example, a large percentage of housing units in Reading (36%), Amboy (23%), Somerset (18%), Cambria (18%), and Jefferson (18%) Townships are used seasonally. In comparison, none of the housing units in the City of Reading, the Village of Montgomery, or Wright Township were used seasonally. It is also important to note that seven organized camps are scattered across the county and a residential college campus is located within the City of Hillsdale.

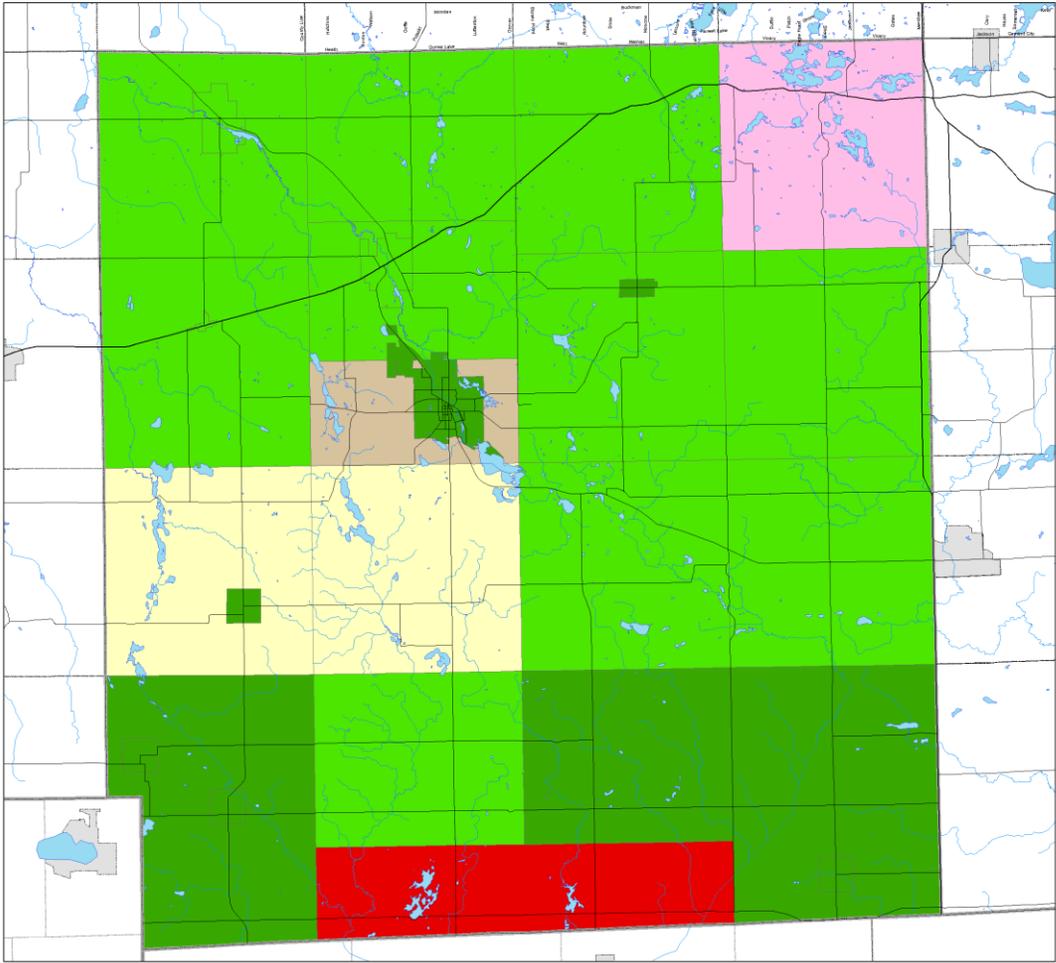
Median Home Values

The median home value in Hillsdale County was \$85,000 in 2010. Given the county's median home value and a total of 8,845 housing units, the housing stock within Hillsdale County was valued at almost \$152 million. The variability in housing values between the local units of government, however, was quite dramatic. For example, the median home values within Somerset (\$146,300), Amboy (\$140,800), and Hillsdale (\$116,700) Townships were all over \$100,000. In fact, those three jurisdictions accounted for almost 1/3 of the total value of residential real estate in the county. In comparison, the median home values in the City of Reading (\$56,700), the Village of Camden (\$60,800), and the Township of Wright (\$58,100) were all under \$60,000.

Future Land Use

Hillsdale County's future land use plan places concentrated residential, commercial, and industrial land uses around existing cities and villages, ponds and lakes, as well as some of the unincorporated settlements located along major roadways. However, scattered residential development already occurs along many of the roadways in the county --whether state highway, county primary road, or gravel road—creating greatly dispersed ribbons of low-density residential development.

Hillsdale County Hazard Mitigation Plan



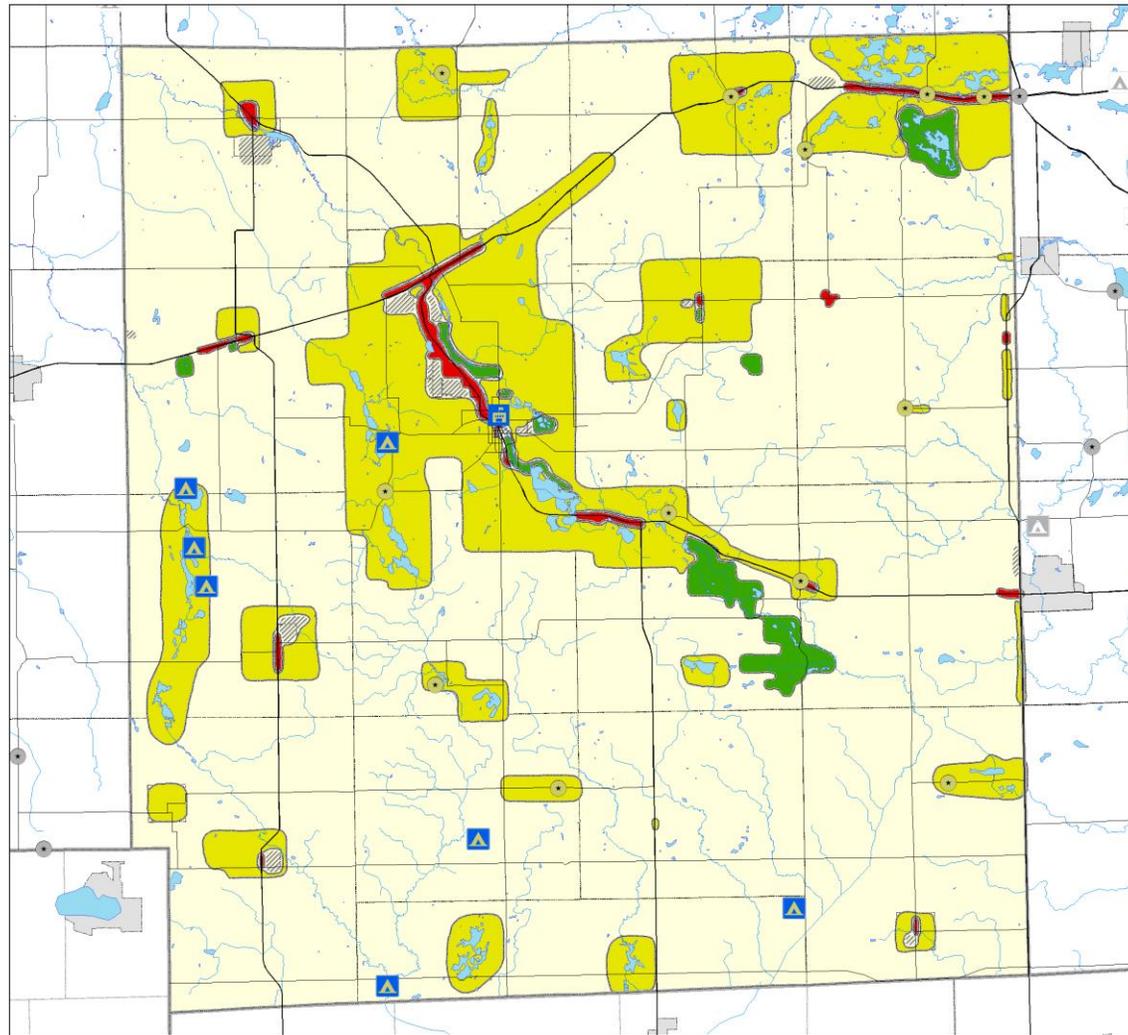
Hillsdale County Communities

Median Housing Values

- Dark Green: \$54,700 - \$72,499
- Light Green: \$72,500 - \$89,999
- Yellow: \$90,000 - \$107,499
- Brown: \$107,500 - \$124,999
- Red: \$125,000 - \$142,499
- Pink: \$142,500 - \$146,300

Source:
2000 US Census,
Universal Maps, & R2PC

Hillsdale County Hazard Mitigation Plan



Hillsdale County Communities

Future Land Use

- Low Density Residential
- Commercial
- Industrial
- Public

Source:
2000 US Census,
Universal Maps, & R2PC

Hillsdale County Hazard Mitigation Plan

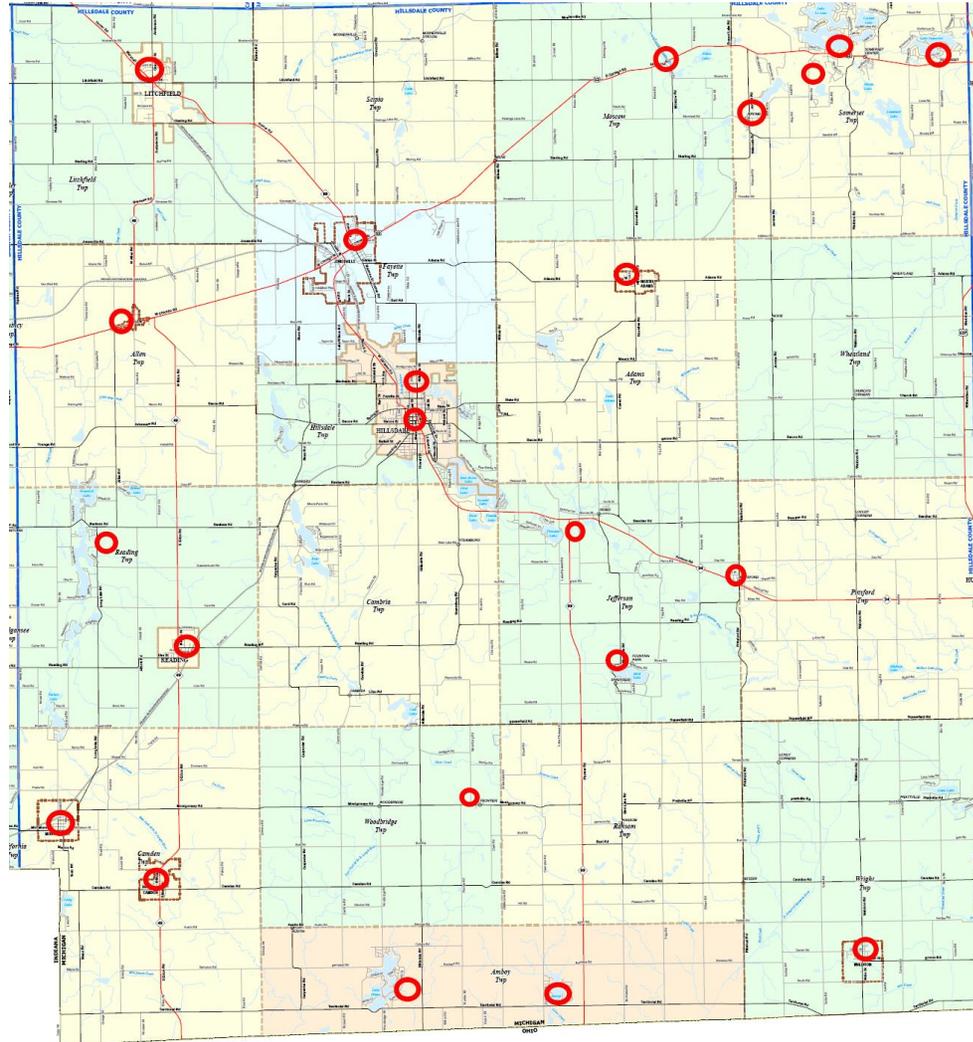
Emergency Warning Sirens

A coordinated system of emergency warning sirens to warn residents of the approach of tornadoes or nuclear attack is in place. These sirens are all owned by the municipality or organization where they are located but they are activated from either Hillsdale County Emergency Management or Central Dispatch. A listing of these sirens and their location are shown on the table entitled, "County Hazard Mitigation Plan – Emergency Warning Sirens". Twenty-two sirens are located primarily in population centers or in lake areas. While these urbanized areas are well covered with sirens, much of the rural area of the county is not served by a warning siren. The location of sirens is shown on the map entitled, "Hillsdale County, Michigan – Siren Coverage Map".

Hillsdale County Hazard Mitigation Plan EMERGENCY WARNING SIREN 2017					
Siren Name	Make	Model	Range	Street	Remote
1	Federal	1000 at	128 DB	32 E. Carleton Rd, Hillsdale	Radio
1A	Federal	2001 SRN	2 Miles	40 E. College St., Hillsdale	Radio
2	Federal	5 th 10B	3 Miles	2184 Ash-Te-Wette Dr., Hillsdale OUT-OF-SERVICE	Radio
3	Federal	1100 Thunderbolt	5 Miles	114 E. Chicago St. Jonesville	Radio
4	Federal	2001 AC\DC	2 Miles	221 Jonesville St., Litchfield	Radio
5	Federal	5 UK	2 Miles	7731 E. Chicago Rd., Moscow	Radio
6	Federal	2001 AC\DC	2 Miles	229 W. Chicago Rd., Allen	Radio
7	Federal	2001 AC\DC	2 Miles	101 S. Pittsford Rd., Pittsford	Radio
8	Federal	2001 AC\DC	2 Miles	112 E. Center St., Waldron	Radio
9	Federal	5th 10B	3 Miles	200 Michigan St., Reading	Radio
10	Unknown	Unknown	2 Miles	100 N. Main St., Camden	Siren Site
11	Federal	AU37X	2 Miles	125 W McCallum St., Montgomery	Siren Site
12	Federal	Unknown	2 Miles	2216 E. Montgomery Rd., Frontier	Siren Site
13	Federal	1000 3-B	128 DB	129 W. Main St., North Adams	Radio
14	Federal	2001 SRN	2 Miles	9223 Shannon Dr., Somerset Township	Radio
15	Federal	2001 SRN	2 Miles	11611 Sauk Trail, Lake LeAnn, Somerset Township	Radio
16	Federal	2001 SRN	2 Miles	10008 Baker Rd., Somerset Township	Radio
17	Federal	2001 SRN	2 Miles	Jerome/Moore Rd., Somerset Township	Radio
18	Federal	2001 AC\DC	2 Miles	Long Lake Road/Chief St., Reading Township	Radio
19	Federal	2001 AC\DC	2 Miles	4500 S. Bird Lake Rd., Jefferson Township	Radio
20	Federal	2001 AC\DC	2 Miles	3255 Pioneer Rd, Jefferson Twp.	Radio
21	Federal	2001 AC\DC	2 Miles	14419 W. Territorial Rd., Lake Diane - Amboy Township	Radio
22	Federal	2001 AC\DC	2 Miles	4120 E. Territorial Rd., Merry Lake - Amboy Township	Radio

Hillsdale County Hazard Mitigation Plan

Warning Siren Location Map



Hillsdale County Hazard Mitigation Plan

Potential Hazards

A wide variety of hazards are known or have the potential to occur in Hillsdale County:

Civil Disturbances

1. Correctional Facility Uprisings and Other Civil Disturbances

Earthquakes and Subsidence

2. Earthquakes
3. Subsidence

Fire Hazards

4. Scrap Tire Fires
5. Structural Fires
6. Wildfires

Flooding Hazards

7. Riverine Flooding
8. Dam Failures

Energy and Utility/Infrastructure Failures

9. Energy Emergencies
10. Significant Infrastructure Failures
11. Passenger Transportation Accidents

Hazardous Materials Incidents

12. Fixed Site and Transportation-Related Hazardous Materials Incidents
13. Nuclear Power Plant Accidents
14. Oil and Natural Gas Well Accidents
15. Oil and Natural Gas Pipeline Accidents

Homeland Security

16. Nuclear Attacks
17. Terrorism/Sabotage/WMD
18. Public Health Emergencies

Hillsdale County Hazard Mitigation Plan

Extreme Weather

19. Drought
20. Extreme Temperatures
21. Hail
22. Lightning
23. Severe Wind Events and Tornados
24. Snowstorms
25. Ice and Sleet Storms
26. Invasive Species

Hillsdale County Hazard Mitigation Plan

1. **Civil Disturbances - Correctional Facility Uprisings and Other Civil Disturbances**

Civil disturbances fall into two categories; correctional facility uprisings and other civil disturbances.

Correctional Facility Uprisings

Correctional facility uprisings consist of riots and other disturbances at correctional facilities within the county. These are often related to perceived unjust rules or living conditions or gang rivalries.

The county jail is the only correctional facility in Hillsdale County. No serious uprisings in the county jail are known to have occurred.

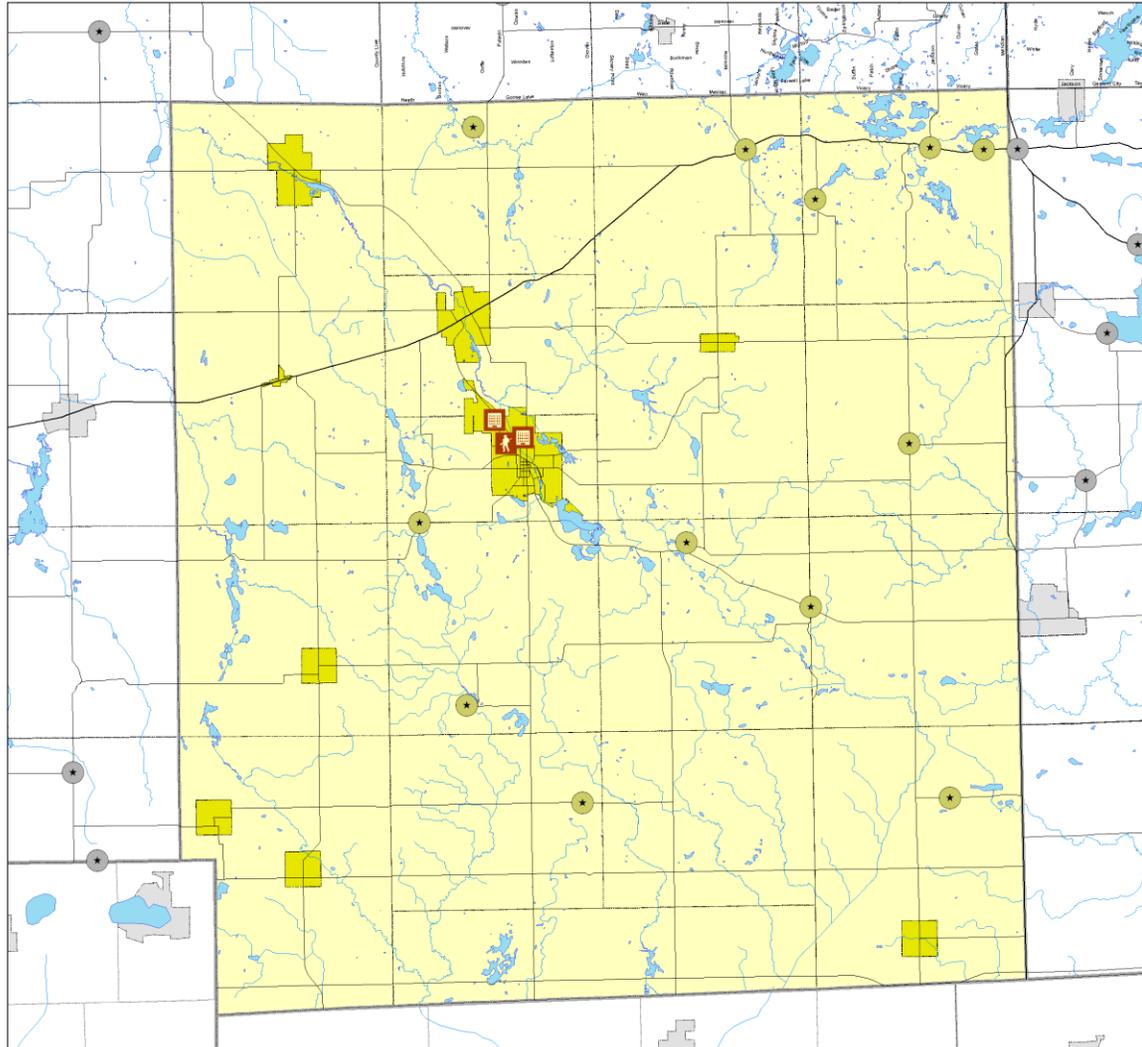
Other Civil Disturbances

According to the Michigan Hazard Analysis, when civil disturbances occur, they are usually an offshoot or result of one or more of the following events:

1. labor disputes where there is a high degree of animosity between the participating parties,
2. high-profile/controversial judicial proceedings,
3. implementation of controversial laws or other governmental actions,
4. resource shortages caused by a catastrophic event,
5. disagreements between special interest groups over a particular issue or cause, or
6. a perceived unjust death or injury to a person held in high esteem or regard.

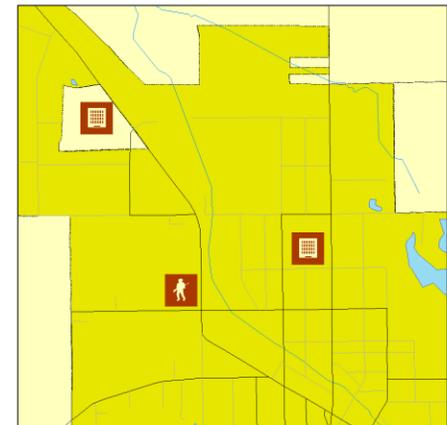
Many of these disturbances are designed to interfere with normal business functions in an attempt to make a political statement. While generally uncommon, the potential still exists for these to occur. Civil disturbances can occur at local schools and colleges, during labor disputes with major employers in the county, at various city and township public meetings, the county courthouse, as sites of local disasters and at several other unanticipated venues.

Hillsdale County Hazard Mitigation Plan



Potential Sites for Civil Disturbances in Hillsdale County

-  Hillsdale County Jail
-  Colleges

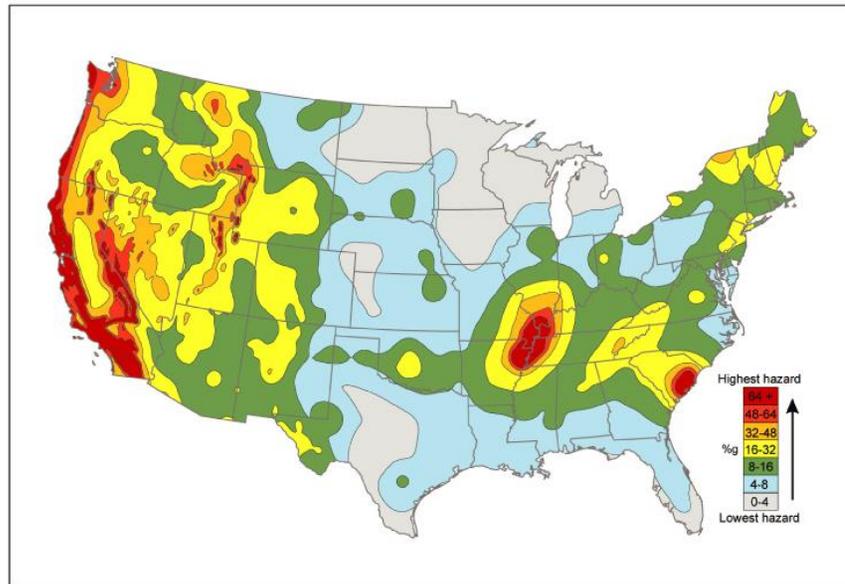


Hillsdale County Hazard Mitigation Plan

2. Earthquakes

As the Michigan Hazard Analysis indicates, Hillsdale County “is in an area in which there is a low probability of earthquake occurrences. [The] area may be affected by distant earthquakes that occur in the New Madrid Seismic Zone and upstate New York. The New Madrid Seismic Zone poses the

most significant threat.” If an earthquake were to hit Hillsdale County, there would only be a 1-in-50 chance of the resulting horizontal shaking accelerating more than 4-8% in the next 50 years. Fortunately, less than 1.5% of the land in the county is involved in landslides.



“The greatest impact on” Hillsdale County, according to the Michigan Hazard Analysis, will “probably come from the damage to natural gas and petroleum pipelines. If [an] earthquake occurs in the winter, [the county] could be severely impacted by fuel shortages. Damage would probably be negligible in well-designed and constructed buildings. However, poorly designed and constructed buildings could suffer considerable damage under the right circumstances”.

Hillsdale County Hazard Mitigation Plan

3. Subsidence

“Subsidence, as the Michigan Hazard Analysis indicates, “is the lowering or collapse of the land surface due to loss of subsurface support. It can be caused by a variety of natural or human-induced activities. Natural subsidence occurs when the ground collapses into underground cavities produced by the solution [(e.g., erosion)] of limestone or other soluble materials by groundwater. Human-induced subsidence is caused principally by groundwater withdrawal, drainage of organic soils, and underground mining. Generally, subsidence poses a greater risk to property than to life. In southern Lower Michigan, the primary causes of subsidence are salt mining, gypsum mining, and coal mining. None of these three causes is significant in Hillsdale County.

4. Scrap Tire Fires

According to the Michigan Hazard Analysis, management “of scrap tires has become a major economic and environmental issue. Scrap tire disposal sites are breeding grounds for mosquitoes. From an emergency management perspective, the most serious problem that scrap tire disposal sites pose is that they can be a tremendous fire hazard if not properly designed and managed.”

There are no registered scrap tire collection sites or haulers in Hillsdale County, according to the Michigan Department of Environmental Quality (MDEQ). A map produced by Tetra Tech EM Inc. for the MDEQ indicates that one illegal tire disposal site storing 2,000-9,999 tires is located north of Jonesville. However, the MDEQ also states that a total of 302,500 scrap tires were stockpiled in the county in 2004, according to the Michigan Hazard Analysis. Because there are scrap tires located in Hillsdale County, there is always a possibility of a fire, but it appears quite low.

Hillsdale County Hazard Mitigation Plan

5. Structural Fires

“In terms of average annual loss of life and property,” according to the Michigan Hazard Analysis, “structural fires — often referred to as the ‘universal hazard’ because they occur in virtually every community — are by far the biggest hazard facing most communities in Michigan and across the country.” Over 1.7 million fires occurred in the State of Michigan during the period of 1975-2003, resulting in an average of over 63 thousand fires a year, with an annual average loss of \$360.7 million. Hillsdale County was in the bottom half of Michigan counties for the number of fires per 1,000 people in 2003.

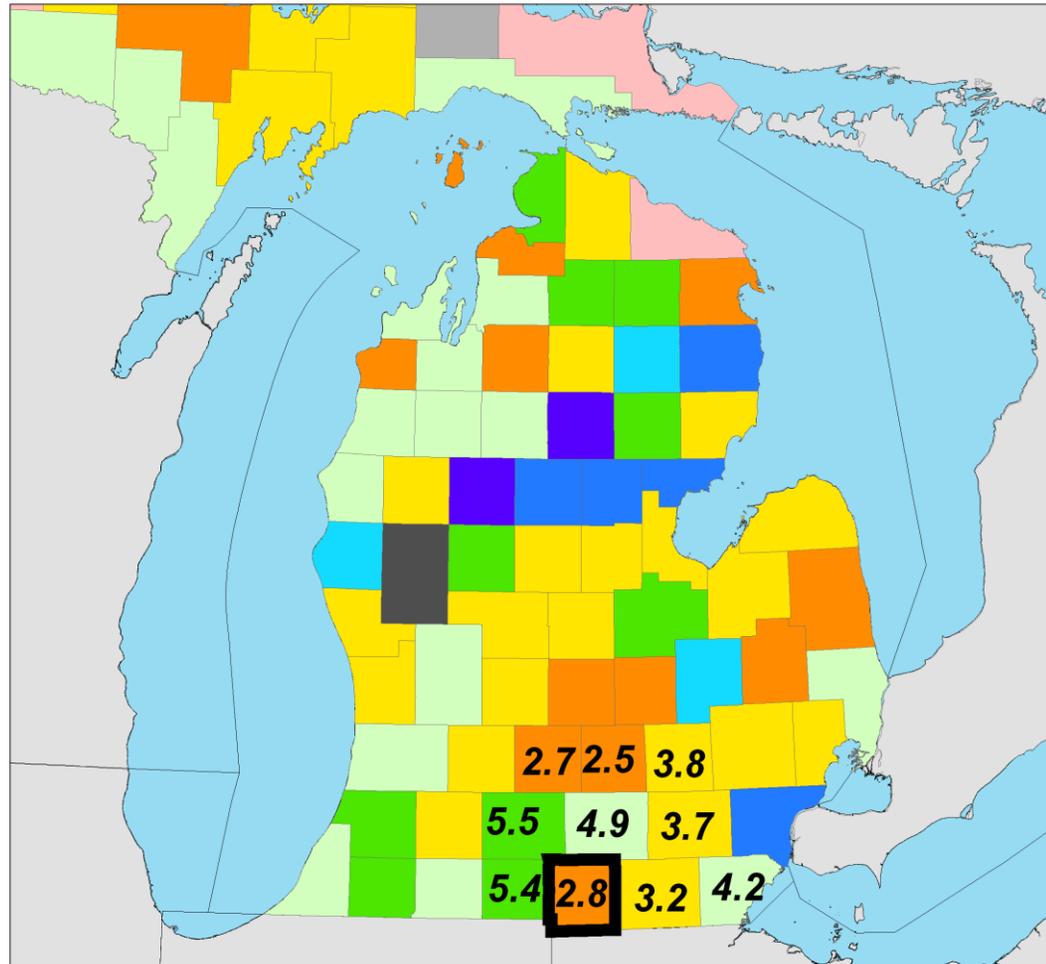
Unfortunately, death can be an outcome of structural fires, and “Michigan’s fire death rate in 1996 of 21.2 persons per million people puts it in the upper third of all states in the nation.” According to the office of the State Fire Marshal, an average of 157 persons a year died in Michigan fires during the period of 2000-2004.

2003 Michigan Fire Statistics				
	Incidents	Injuries	Deaths	Loss (\$)
Residential	12025	507	148	\$170,375,902
Public Assembly/Stores	1,834	51	0	\$20,176,696
Industry	4,900	138	9	\$42,941,484

Fires can occur in industrial and public assembly/mercantile structures as well as residences. As the adjacent table illustrates, residential fires comprised 80% of the total number of fires and 86% of the monetary losses. Fires in stores and other places of public assembly comprised 7% of the total number of

fires and 9% of the monetary losses. Industrial fires comprised 26% of the total number of fires and 18% of the monetary losses.

Hillsdale County Hazard Mitigation Plan



1998 Michigan Structural Fires

Fires Per 1,000 Population in 1998

- <1.00
- 1.00 - 1.99
- 2.00 - 2.99
- 3.00 - 3.99
- 4.00 - 4.99
- 5.00 - 5.99
- 6.00 - 6.99
- 7.00 - 7.99
- 8.00 - 8.99
- 9.00 - 9.99
- >10.00

Sources:
Michigan State Police, Fire Marshal Division; The National Atlas for the USA; and Center for Geographic Information, State of Michigan

Hillsdale County Hazard Mitigation Plan

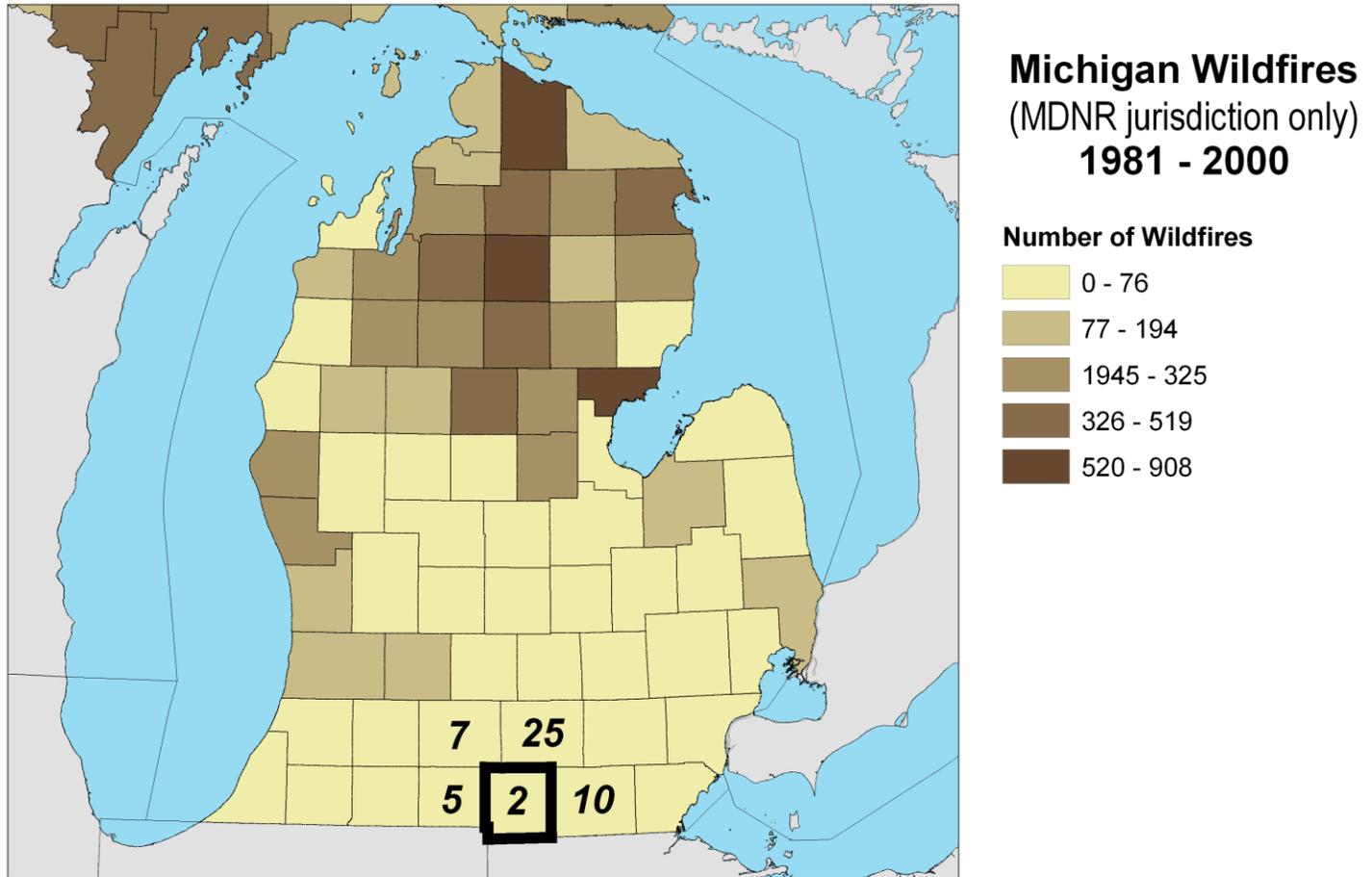
6. Wildfires

“Michigan,” according to the Michigan Hazard Analysis, “has the fifth largest timberland acreage, with 4.2 million acres of softwoods and 13.1 million acres of hardwoods. That vast forest cover is a boon for both industry and recreation. However, it also makes many areas of Michigan highly vulnerable to wildfires. Because Michigan’s landscape has changed substantially over the last several decades, due to wild land development, the potential danger from wildfires has become more severe. Increased development in and around rural areas (a 60% increase in the number of rural homes since the 1980s) has increased the potential for loss of life and property from wildfires.” Much of the recent development in Hillsdale County is also exurban in nature.

There were two fires affecting 20 acres on Michigan Department of Natural Resources (MDNR) controlled land in Hillsdale County between 1981 and 2000.

According to the MDNR, 365 fires in 2003 resulted in the burning of 3,549 acres. The number of fires occurring between January and May 2004 was 179 (affecting 1,350 acres), illustrating that wildfires can happen anytime, not just the dry summer months.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Hazard Mitigation Plan

7. Riverine Flooding

“Floods can damage or destroy public and private property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and result in fatalities,” according to the Michigan Hazard Analysis. “People may be stranded in their homes for several days without power or heat, or they may be unable to reach their homes at all. Long-term collateral dangers include the outbreak of disease, widespread animal death, broken sewer lines causing water supply pollution, downed power lines, broken gas lines, fires, and the release of hazardous materials.”

Flooding Events

Limited flooding has occurred in Hillsdale County, causing little damage. The headwaters for five different watersheds are located in the county. There are no "repetitive loss properties" located in Hillsdale Counties, according to a FEMA list dated March 31, 2010. The National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC) recorded the following occurrences of flooding in the county from 1950 through 2003:

Hillsdale County Hazard Mitigation Plan

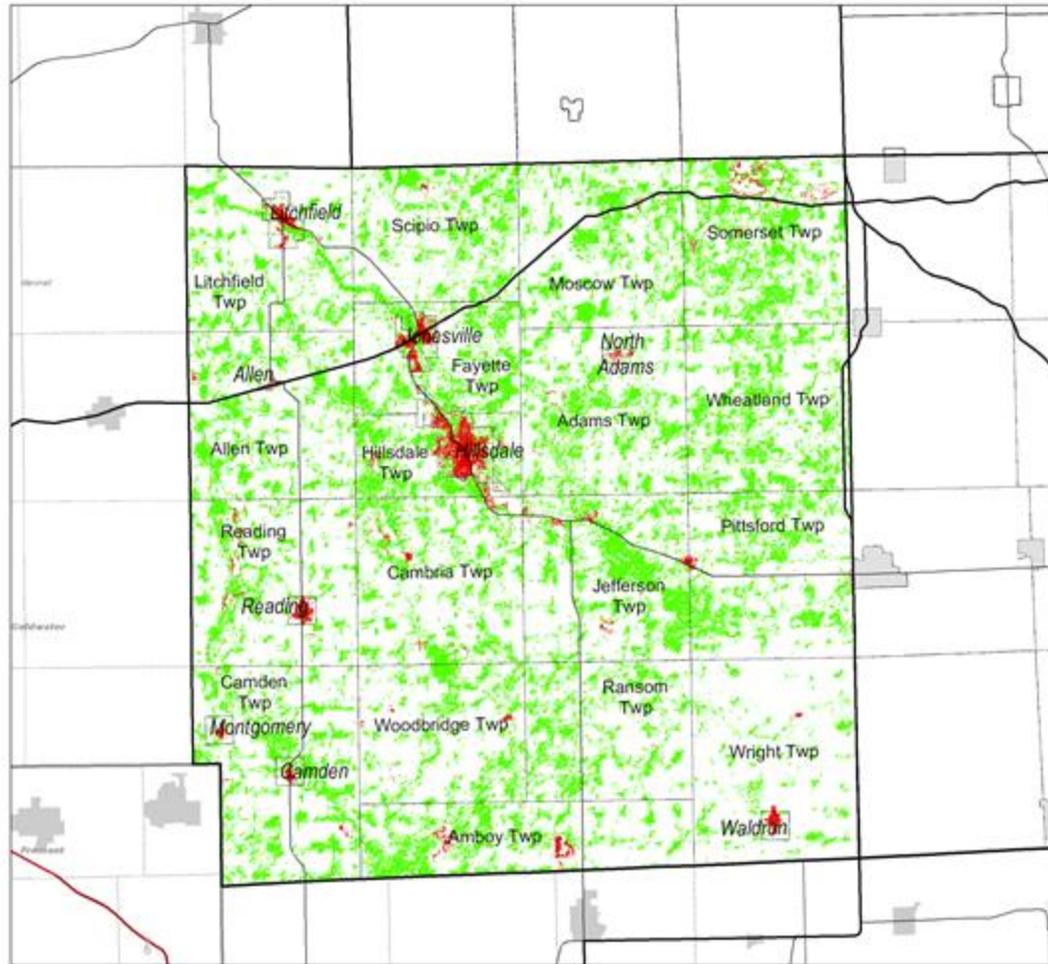
TABLE IV-7, Flood Events, Hillsdale County (1950-2010)		
Date	Description	MCD's*
05/09/1996	03:30:00 PM EST. Flash Flood. Rain totals of nearly 3 inches resulted from thunderstorms moving across the county, causing flooding of streets and some basements as well as overflow of small streams.	Hillsdale
06/17/1996	04:00:00 PM EST. Property Damage: \$150,000. Flash flooding from rains measured at over three inches caused road washouts and damage to culverts, bridges, and homes. A bridge along Ridge Drive was washed away. Many houses suffered water damage near Berry Lake.	Hillsdale
09/09/1997	11:00:00 PM EST. The Hillsdale County Sheriff's Department reported several rural roads in Allen Township were washed out.	Allen
09/09/1997	11:00:00 PM EST. The Hillsdale County Sheriff's Department reported parts of Michigan Highway 99 were flooded in and around the city of Hillsdale.	Hillsdale

* Minor Civil Division

The following Hillsdale County communities have been mapped and participate in the National Flood Insurance Program:

- the City of Hillsdale
- the City of Litchfield
- the City of Jonesville
- Reading Township.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Forested & Urbanized Lands

- Forested Lands
- Urbanized Areas

Source:
Center for Geographic Information,
State of Michigan

Hillsdale County Hazard Mitigation Plan

8. Dam Failures

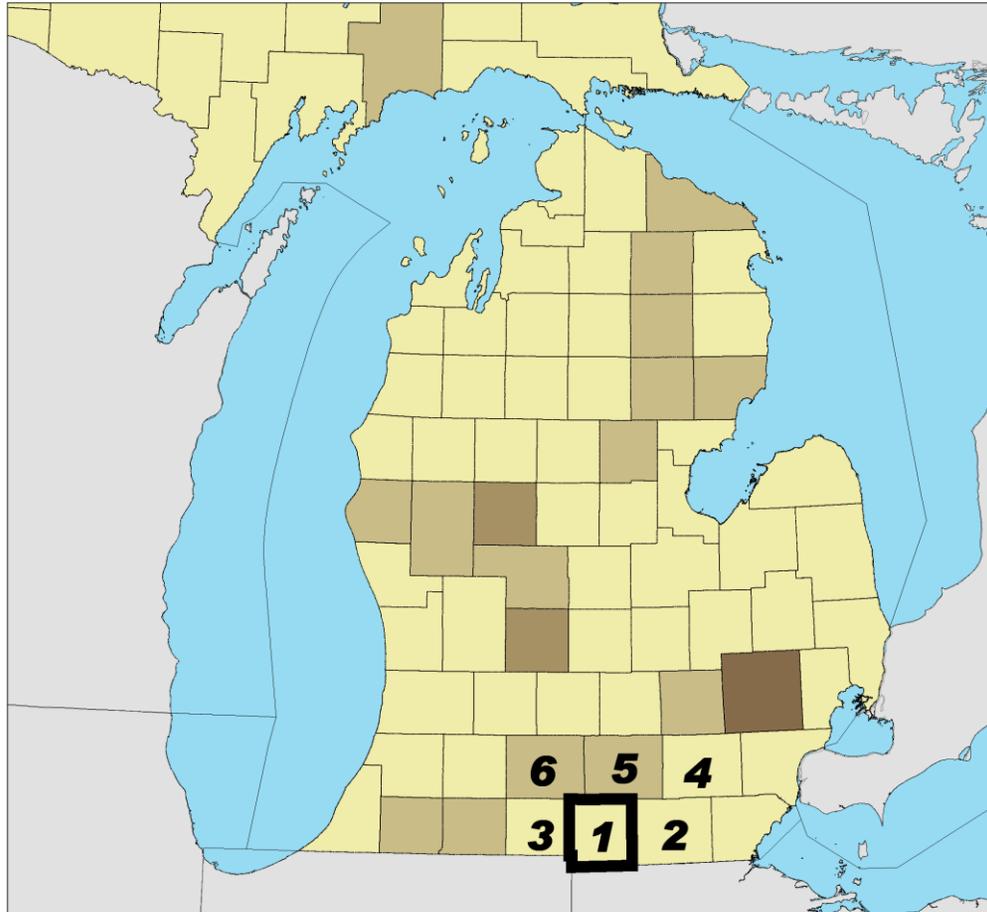
“A dam failure,” according to the Michigan Hazard Analysis, “can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Dam failures occur not only during flood events, which may cause overtopping of a dam, but also be a result of poor operation, lack of maintenance and repair, and vandalism. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation.

The Michigan Department of Natural Resources and Environmental Quality (MDNRE) states that when a dam is given a “Hazard Potential Rating” (High, Significant, or Low), this rating does not indicate the dam’s failure potential. If the dam should fail, this rating identifies how much damage would occur down-stream of the failure. In addition to this rating, dams are given a condition assessment during the dam safety inspection process. This assessment is what indicates the dam’s failure potential. There are five assessment levels: Satisfactory, Fair, Poor, Unsatisfactory, and Not Rated. Each of these assessment levels indicates the presence or absence of deficiencies with the dam.

According to MDNRE’s database, as of 2017, there are six dams with significant hazard potential ratings and 40 dams with low hazard potential ratings. Considering the condition of the existing dams, there is a medium likelihood that Hillsdale County will experience a dam failure in the upcoming years. In recent years one dam, South of the City of Jonesville, failed with no serious consequences.

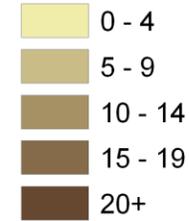
In addition to the flooding potential caused by a dam failure, there is concern that at least one of the existing dams, in the City of Hillsdale, could spread contamination contained in sediment downstream should it fail. The City of Hillsdale is working with the MDNRE and licensed contractors to determine the extent of the possible contamination and develop a plan to mitigate any effects. The City is working towards possibly removing the dam which no longer serves a purpose.

Hillsdale County Hazard Mitigation Plan



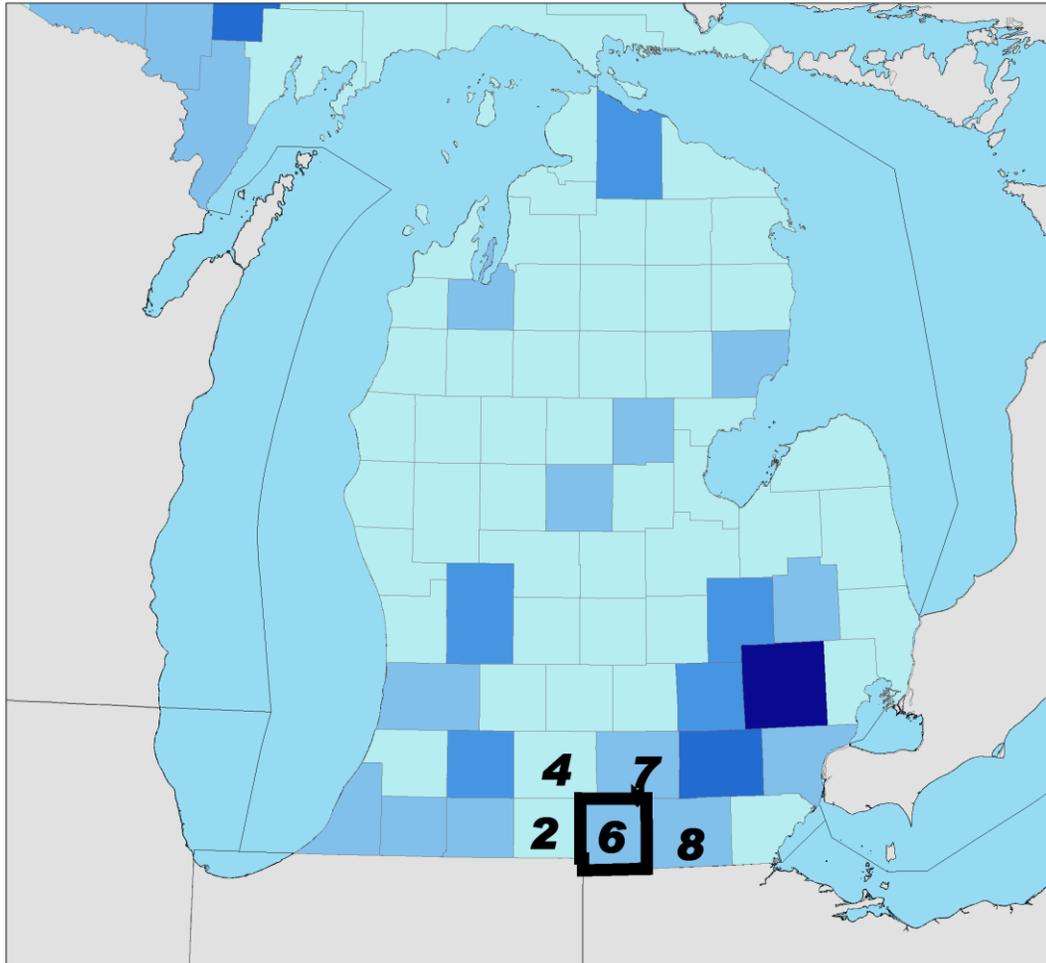
Hillsdale County Past Dam Failures

Documented Failures



Sources:
Michigan Department of Environmental Quality; The National Atlas for the USA; and Center for Geographic Information, State of MI

Hillsdale County Hazard Mitigation Plan



Hillsdale County Potential Dam Failures

Potential Failures

- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24
- 25 - 29

Sources:
Michigan Department of Environmental Quality; The National Atlas for the USA; and Center for Geographic Information, State of MI

Hillsdale County Hazard Mitigation Plan

9. Energy Emergencies

“An adequate energy supply,” according to the Michigan Hazard Analysis, “is critical to Michigan’s (and the county’s) economic and social well being. The American economy and lifestyle are dependent on a non-interrupted, reliable, and relatively inexpensive supply of energy that includes gasoline to fuel our vehicles, and electricity, natural gas, fuel oil, and propane to operate our homes, businesses and public buildings. To date, Americans have always dealt with short term energy disruptions caused by severe weather damage (i.e., downed power lines and poles), broken natural gas and fuel pipelines, and shortages caused by the inability of the energy market to adequately respond to consumer demand and meet required production.” However, the 1973-74 Oil Embargo, the natural gas shortage of 1976-77, the 1979 major price increases in oil resulting from the Iranian Revolution, during the Gulf War in 1991 (after Iraq invaded Kuwait and destroyed many of its oil fields) and in the aftermath of the September 11, 2001 terrorist attacks in the U. S. forced the country to face the reality that it is highly vulnerable to energy disruptions”

There are three types of energy emergencies:

1. the physical destruction to energy production or distribution facilities caused by severe storms, tornadoes, floods, earthquakes, or sabotage,
2. a sharp sudden escalation in energy prices, usually resulting from a curtailment of oil supplies,
3. a sudden surge in energy demand caused by a national security emergency involving mobilization of U.S. defense forces.”

One emergency Presidential Declaration (3189) was enacted for the period of August 14 to 17, 2003 because of electric power failure that caused the largest blackout in North American history.

Hillsdale County Hazard Mitigation Plan

Hillsdale County has experienced numerous severe electrical power outages, caused mostly by severe weather such as windstorms or ice and sleet storms and occasionally by equipment failure that are referred to in the Michigan Hazard Analysis. Fortunately, most of those occurred in months where severe cold temperatures were not a problem. If they had occurred during the cold winter months, there certainly would have been a potential for loss of life — especially among the elderly and other more vulnerable members of society. Hillsdale County has experienced many winter storm and high wind events in the past. Because of this, there is a high probability that electrical outages will occur again in the near future.

10. Significant Infrastructure Failures

“Michigan’s citizens are dependent on the public and private utility infrastructure to provide essential life supporting services such as electric power, heating and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation. When one or more of these independent, yet interrelated systems fail due to disaster or other cause —even for a short period of time— it can have devastating consequences.” The following listing describes the various types of infrastructure systems (all of which can fail):

- × Water Distribution
- × Wastewater Collection/Treatment
- × Surface Drainage
- × Telecommunications

Hillsdale County has been spared the difficulties related to disastrous infrastructure failures. Such failures are possible, however.

Hillsdale County Hazard Mitigation Plan

11. Passenger Transportation Accidents

A passenger transportation accident is defined as a crash or accident involving an air, land or water-based commercial passenger carrier. While the safety record of passenger commercial transportation is very good for aircraft, buses, and trains; crashes are possible. There is a potential for harm or fatalities. Air crashes may occur in flight, with equipment malfunction or sabotage, on landings and take-offs, and while vehicles are moving on the ground.

The Hillsdale Municipal Airport is the only public use airport in Hillsdale County. The general utility facility is under public ownership. Small personally owned planes and a few smaller business jets are the primary users. Patriot Aviation, the current contracted service provider at the airport, indicates the largest jets that occasionally use the facility can carry approximately 15 persons and baggage.

Several local public transit and school bus routes traverse Hillsdale County, but no other modes of passenger transportation directly serve county residents.

Hillsdale County has had no serious high fatality crashes involving commercial carriers.

“When responding to any of these types of commercial transportation accidents, emergency personnel may be confronted with a number of problems, including:

- × suppressing fires,
- × rescuing and providing emergency first aid for survivors,
- × establishing mortuary facilities for victims,
- × detecting the presence of explosive, radioactive or otherwise hazardous materials, and
- × providing crash site security, crowd and traffic control, and protection of evidence.

Hillsdale County Hazard Mitigation Plan

12. Hazardous Material Incidents: Fixed Site and Transportation

Fixed Site

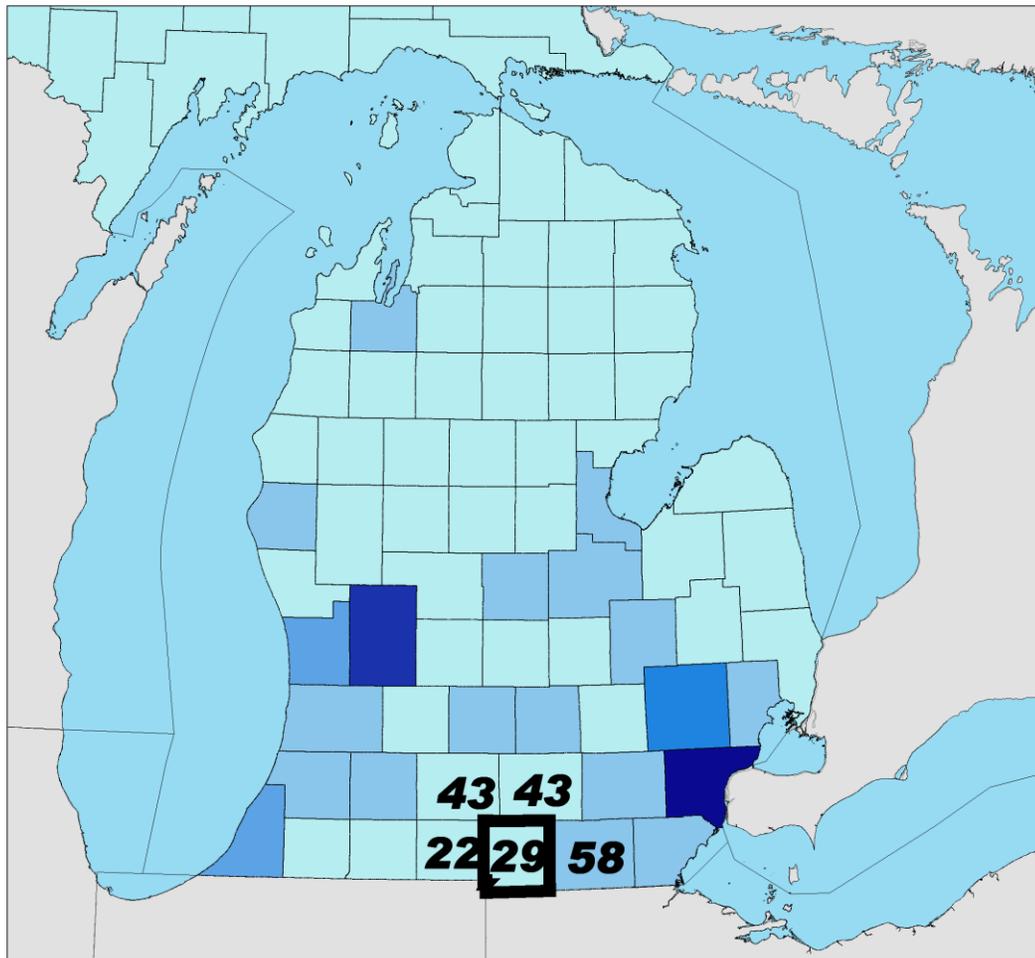
A fixed site hazardous material incident, according to the Michigan Hazard Analysis, is an “uncontrolled release of hazardous materials from a fixed site capable of posing a risk to life, health, safety, property or the environment.” This definition includes industrial accidents.

"The Superfund Amendments and Reauthorization Act (SARA) Title III program," according to the Michigan Department of Environmental Quality (MDEQ), "is committed to efficiently and effectively overseeing data collection and quality assurance of environmental information transmitted to the MDEQ. This includes providing support to the Michigan Emergency Planning and Community Right-to-Know Commission (SERC) on coordination of hazardous materials enforcement, response, and planning in the State of Michigan."

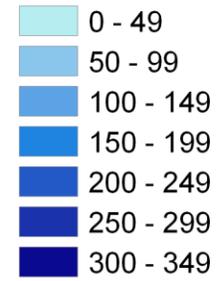
According to the Michigan Hazard Analysis, Hillsdale County had 25 SARA Title III sites as of September 2017.

No recent industrial accidents of any significance in Hillsdale County were recorded in the Michigan Hazard Analysis, and no hazardous materials incidents of any significance have been reported since 1976, the first year such records were kept.

Hillsdale County Hazard Mitigation Plan



Michigan's SARA Title III Sites



Sources:
Michigan Hazard Analysis, The National Atlas for the USA; and Center for Geographic Information, State of Michigan

Hillsdale County Hazard Mitigation Plan

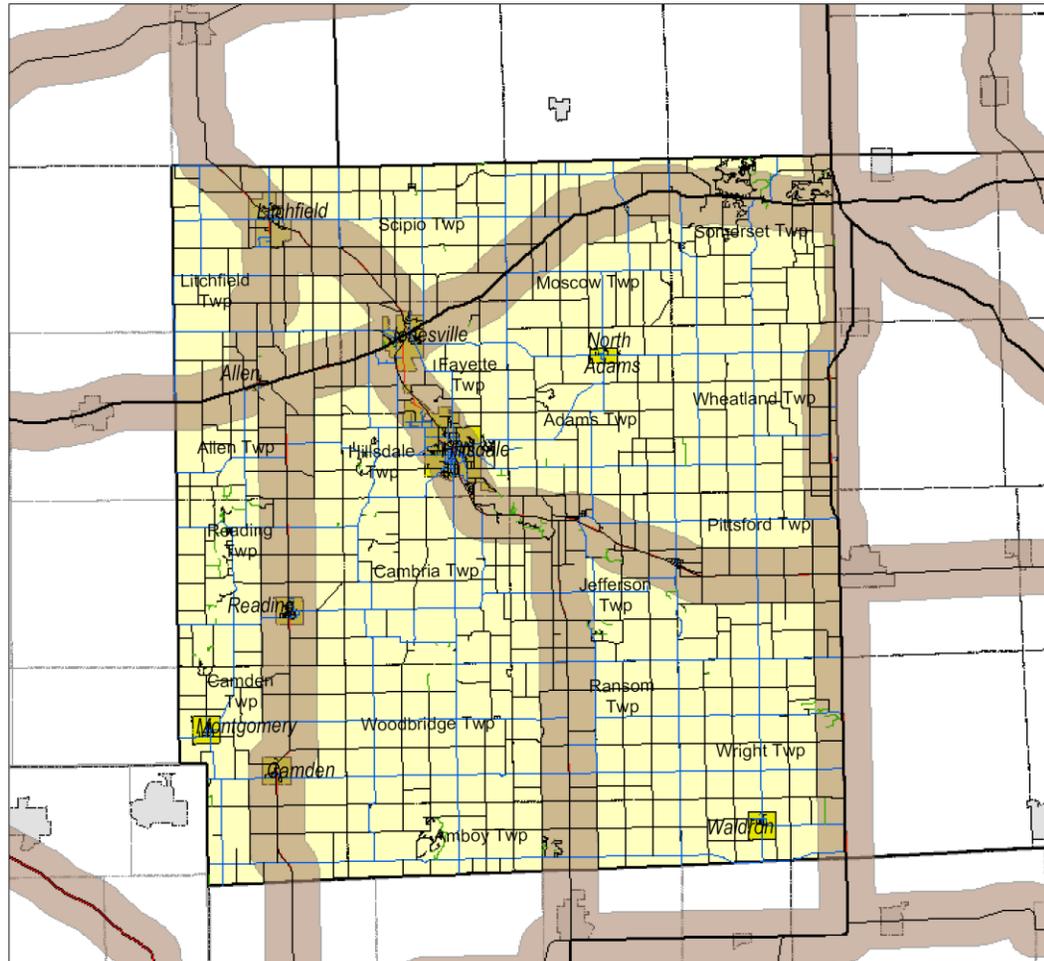
Transportation

A transportation hazardous material incident, according to the Michigan Hazard Analysis, is an “uncontrolled release of hazardous materials during transport capable of posing a risk to life, health, safety, property or the environment.”

Several state U.S. highways traverse Hillsdale County (e.g., M-34; M-49; M-99; US-12 and US-127). Highways, in addition to major local roads and streets – are the most likely thoroughfares utilized for the transport of hazardous materials. However, it is important to note that parts of many hazardous material transport routes will occur on minor local roads and streets. Railroads are also occasionally utilized for the transport of hazardous materials. The rail lines located in the county are now owned by the Hillsdale County Railway. There are several abandoned sets of tracks.

Fortunately, no disastrous post-1978 (the first year of records) Hillsdale County hazardous material transportation incidents were recorded in the Michigan Hazard Analysis

Hillsdale County Hazard Mitigation Plan

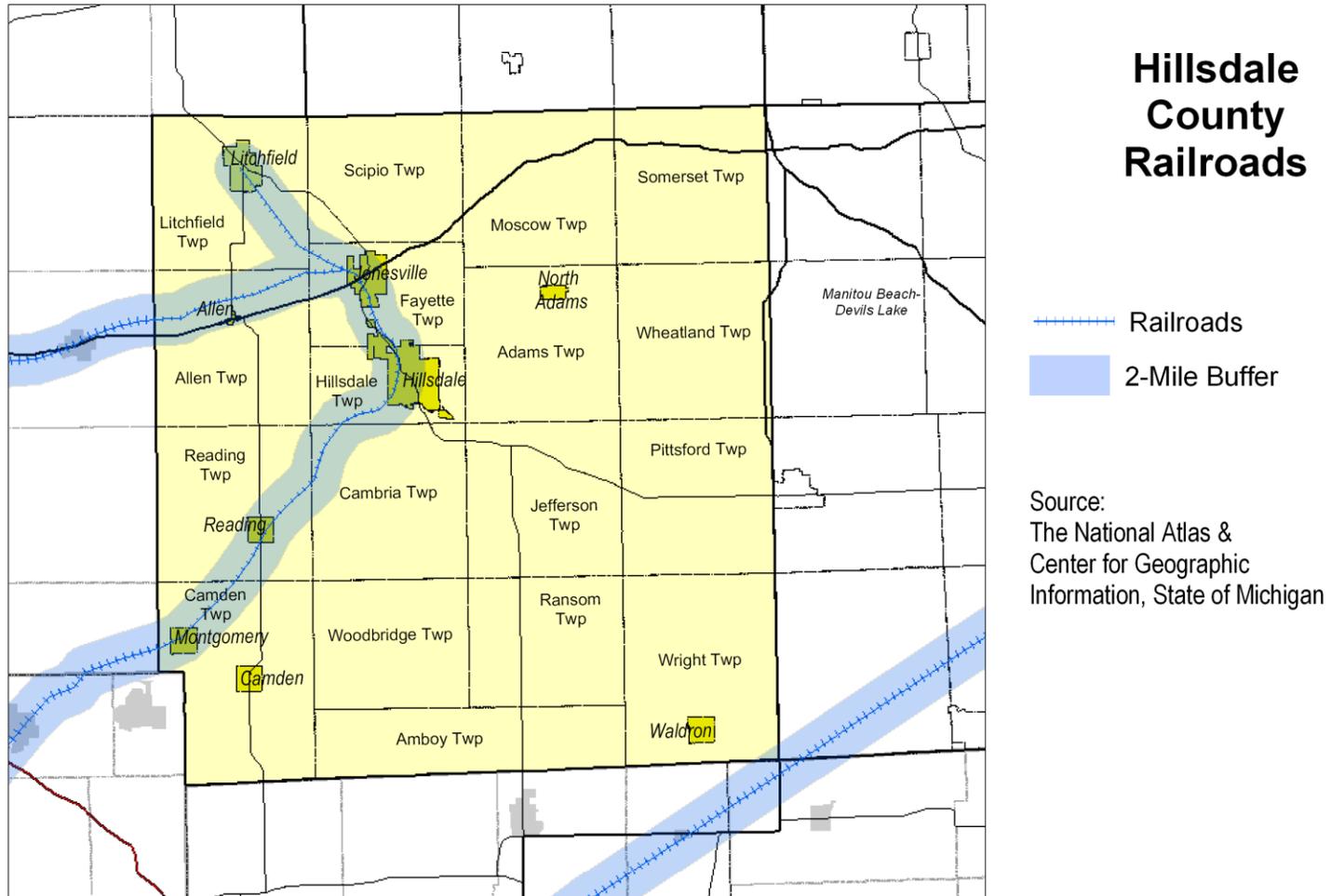


Hillsdale County Highways, Roads, & Streets

- State Highways
- 1-Mile Radius Buffer
- Major Roads & Streets
- Minor Roads & Streets
- Private Roads & Streets

Source:
The National Atlas &
Center for Geographic
Information, State of Michigan

Hillsdale County Hazard Mitigation Plan



Hillsdale County Hazard Mitigation Plan

13. Nuclear Power Plant Accidents

Even though “the construction and operation of nuclear power plants are closely monitored and regulated by the Nuclear Regulatory Commission (NRC),” according to the Michigan Hazard Analysis, “accidents at these plants are considered a possibility and appropriate on-site and off-site emergency planning is conducted.” The following list —summarized from the Analysis— records significant nuclear power plant accidents (including an accident in Michigan):

1986 — Chernobyl, Ukraine

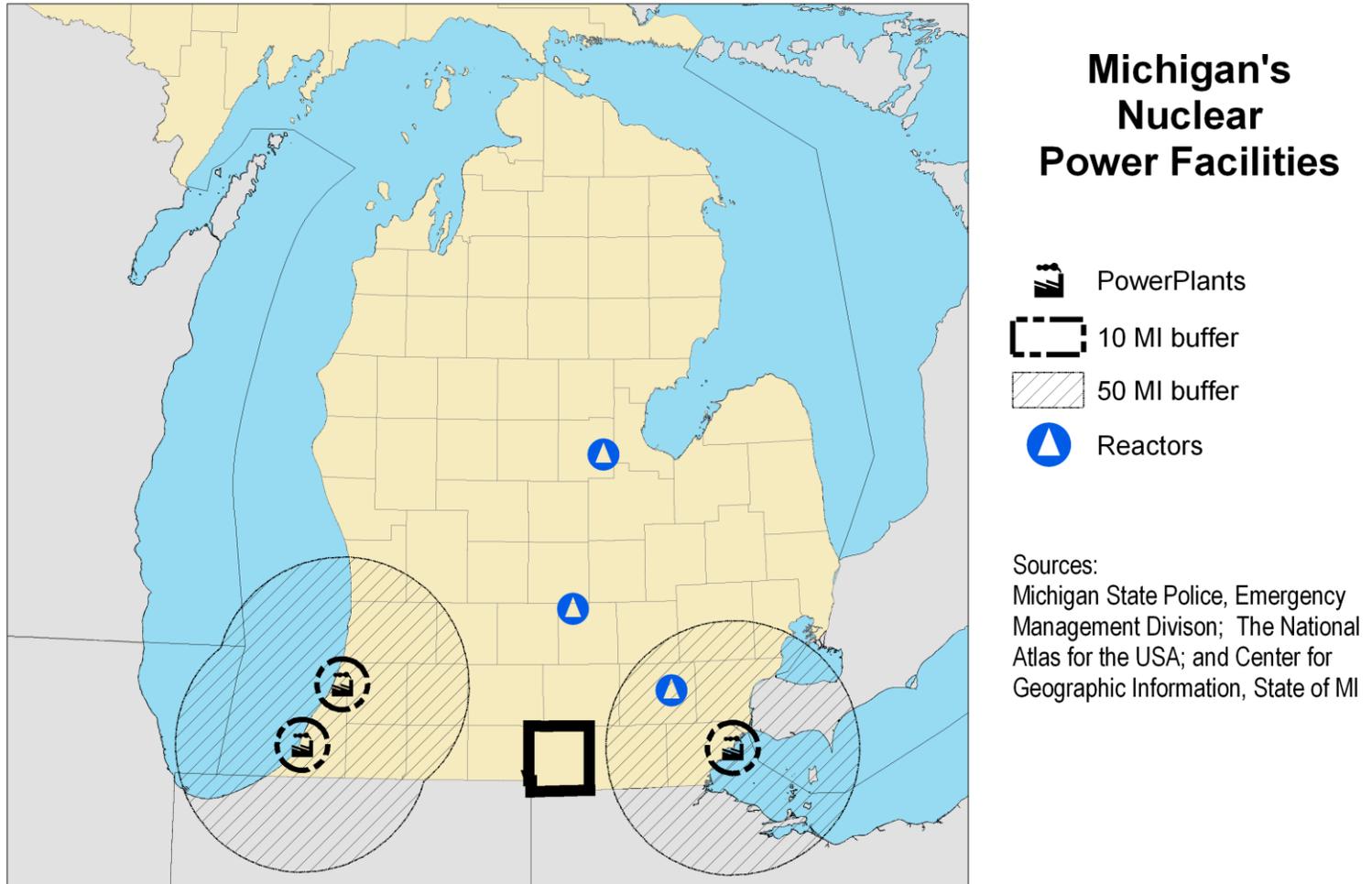
1979 — Three Mile Island, Harrisburg, Pennsylvania

1966 — Enrico Fermi-1, Monroe County, Michigan

A primary emergency planning zone (EPZ) is established within a 10-mile radius of each nuclear power plant. “Within this zone,” according to the Michigan Hazard Analysis, “plans are developed to protect the public through in-place sheltering and evacuation, in the event of an accident.” A secondary emergency management zone is established within “a 50-mile radius around most plants, exist for planning considerations which prevent the introduction of radioactive contamination into the food chain.”

There are no nuclear power plants in Hillsdale County, nor is the county within the 10- or 50-mile EPZ for any plant.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Hazard Mitigation Plan

14. Oil and Natural Gas Well Accidents

“Oil and natural gas are produced from fields scattered across 63 counties in the Lower Peninsula,” according to the Michigan Hazard Analysis, including Hillsdale County, which hosts 1,328 oil and gas wells. Although the industry “has a fine safety record, the threat of accidental releases, fires and explosions still exists.” In addition to these hazards, many of Michigan’s oil and gas wells contain extremely poisonous hydrogen sulfide (H₂S):

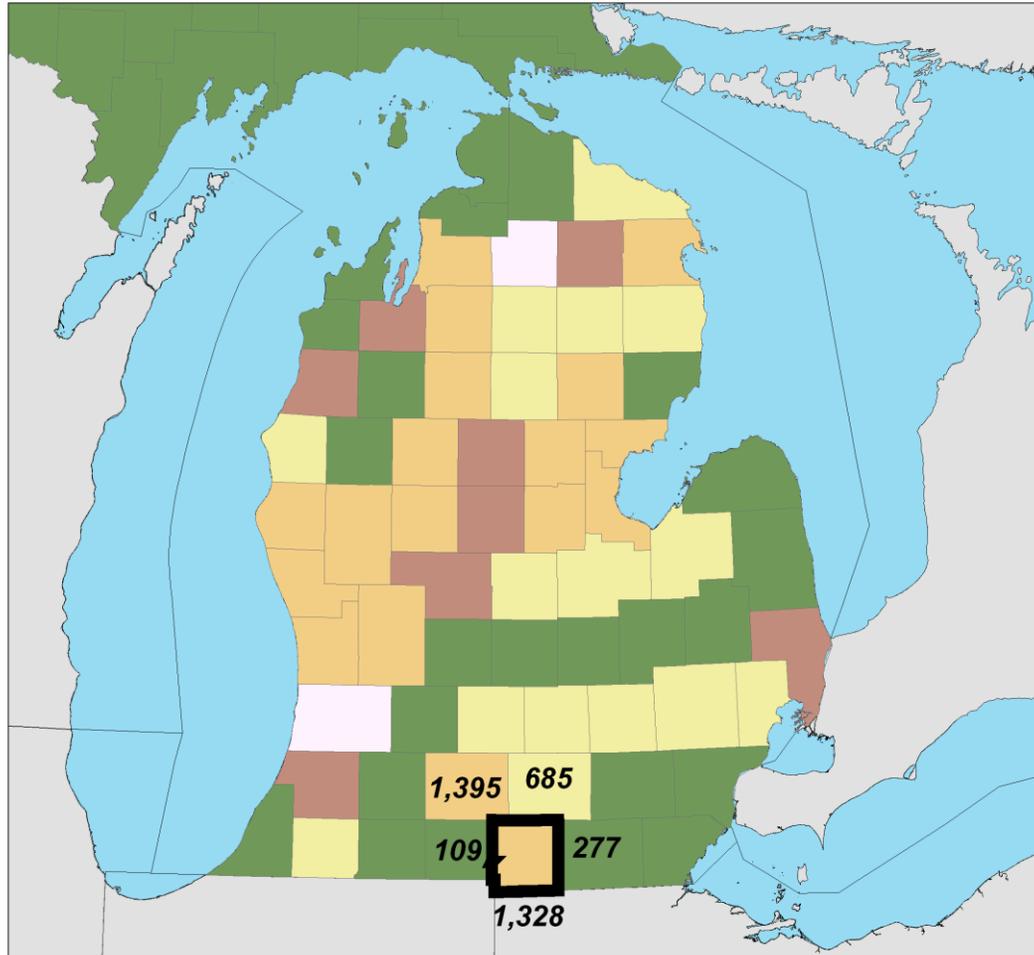
The following table summarizes the physiological responses likely to occur with exposure to H₂S:

Physiological Response to H ₂ S Exposure	
Parts per Million	Physiological Response
10 ppm	Beginning eye irritation.
50-100 ppm	Slight conjunctivitis & respiratory tract irritation with 1 hour of exposure.
100 – 200 ppm	Coughing, eye irritation, loss of sense of smell after 2-15 minutes. Altered respiration, pain in the eyes and drowsiness after 15-30 minutes followed by throat irritation after 1 hour. Several hours of exposure results in gradual increase in severity of these symptoms and death may occur within the next 48 hours.
200-300 ppm	Marked conjunctivitis & respiratory tract irritation after 1 hour of exposure.
500-700 ppm	Loss of consciousness & possibly death in 30 minutes to 1 hour.
700-1,000 ppm	Rapid unconsciousness, cessation of respiration & death.
1,000-2,000 ppm	Unconsciousness at once, with early cessation of respiration and death in a few minutes. Death may occur even if the individual is removed to fresh air at once.

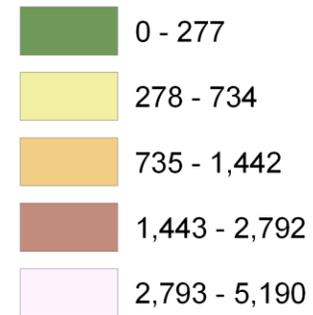
Source: Michigan Hazard Analysis

There have been no oil or natural gas incidents in Hillsdale County, although the potential exists.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Oil and Gas Wells



Sources:
Michigan State Police, Emergency Management Division; The National Atlas for the USA; and Center for Geographic Information, State of MI

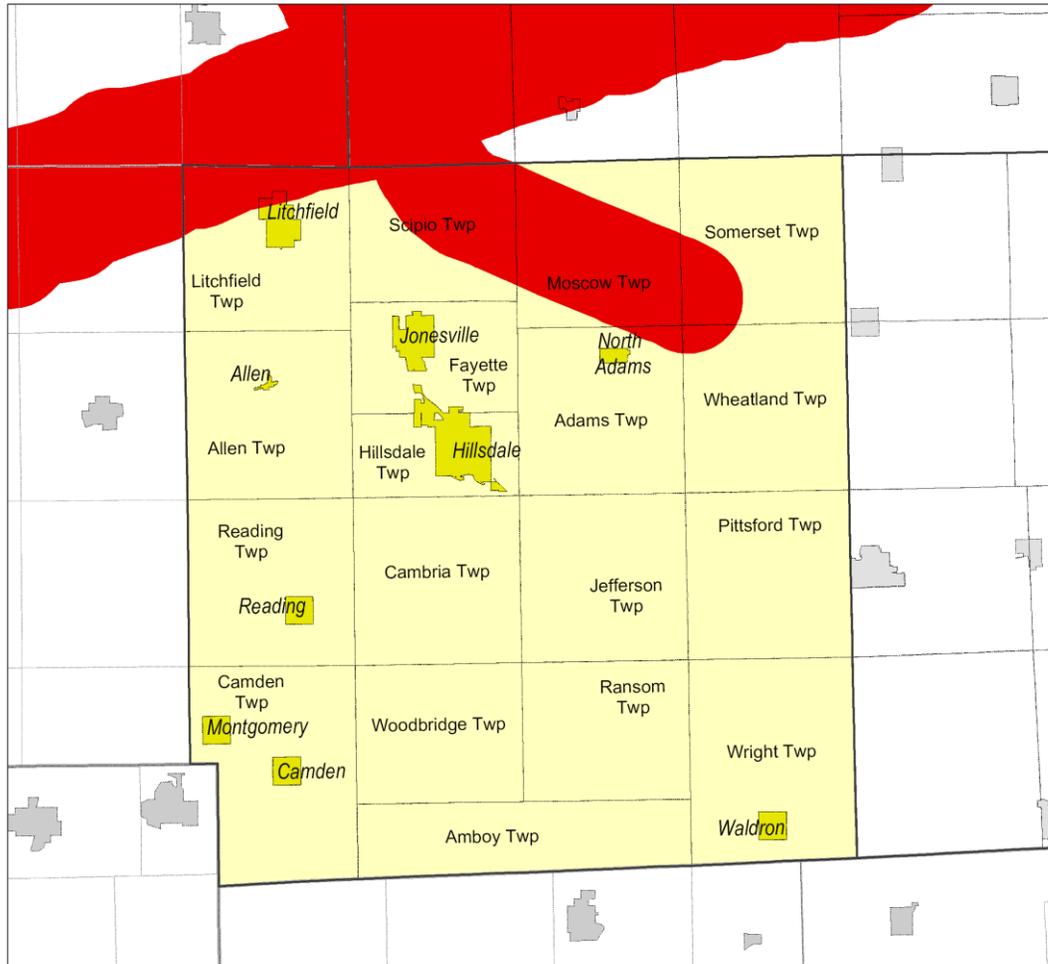
Hillsdale County Hazard Mitigation Plan

15. Oil and Natural Gas Pipeline Accidents

“Though often overlooked,” according to the Michigan Hazard Analysis, “petroleum and natural gas pipelines pose a real threat in many Michigan communities” including Hillsdale County. Petroleum and natural gas pipelines can leak or fracture and cause property damage, environmental contamination, injuries, and even loss of life. The vast majority of pipeline accidents that occur in Michigan are caused by third party damage to the pipeline, often due to construction or some other activity that involves trenching or digging operations. While it is true that the petroleum and natural gas industries have had a fine safety record, and that pipelines are by far the safest form of transportation for these products, the threat of fires, exposure, ruptures, and spills nevertheless exists. In addition to these hazards, there is the danger of hydrogen sulfide (H₂S) release.” The preceding table summarizes the physiological responses likely to occur with exposure to H₂S.

Pipelines extend into the northern tier of townships in Hillsdale County. No disastrous pipeline accidents are recorded in the county in the Michigan Hazard Analysis. The probability of future incidents is extremely low, but because there are pipelines in Hillsdale County, the possibility is there.

Hillsdale County Hazard Mitigation Plan



Hillsdale County Oil & Gas Pipelines

 4-mile Wide Pipeline Corridors

Source:
Center for Geographic Information,
State of Michigan

Hillsdale County Hazard Mitigation Plan

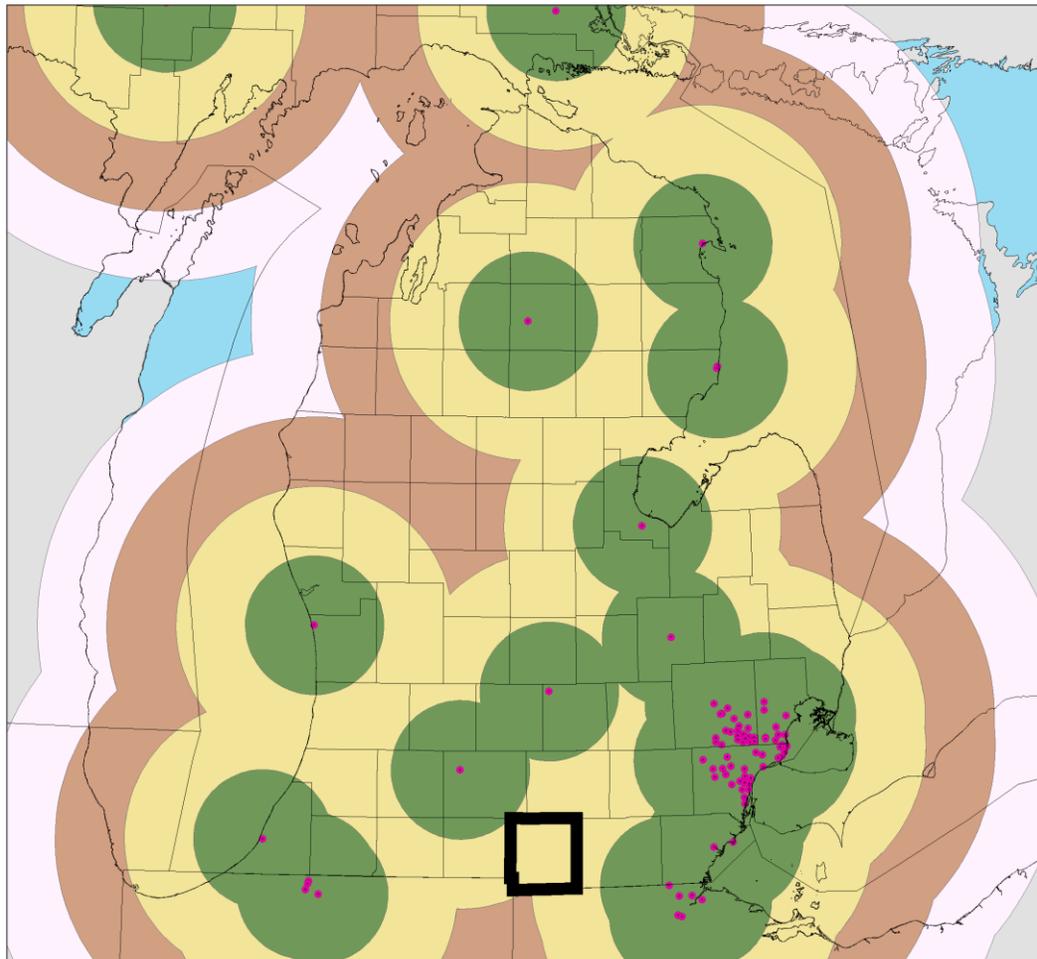
16. Nuclear Attacks

“World events in recent years,” according to the Michigan Hazard Analysis, “have greatly changed the nature of the nuclear attack threat against the United States. However, while the threat of attack is diminished, it is still a possibility due to the large number of nuclear weapons still in existence in present-day Russia and throughout the rest of the world.” North Korea has been attempting to gain the capability to launch missiles into the United States. Based upon the Nuclear Attack Planning Base 1990 (NAPB-90), the Federal Emergency Management Agency categorizes seven potential types of nuclear targets:

- × commercial power plants,
- × chemical facilities,
- × counterforce military installations,
- × other military bases,
- × military support industries,
- × refineries, and
- × political targets.

Fortunately, no potential nuclear targets are located in Hillsdale County. However, lack of potential targets does not eliminate the threat since the accuracy of the instrument(s) used is not guaranteed.

Hillsdale County Hazard Mitigation Plan



Michigan's Potential Nuclear Targets

-  Potential Nuclear Targets
-  0 - 25 miles
-  25 - 50 miles
-  50 - 75 miles
-  75 - 100 miles

Sources:
Michigan State Police, Emergency Management Division; The National Atlas for the USA; and Center for Geographic Information, State of MI

Hillsdale County Hazard Mitigation Plan

17. Sabotage/Terrorism/Weapons of Mass Destruction (WMD)

“In today’s world, sabotage/terrorism can take on many forms, although civilian bombings, assassination and extortion are probably the methods with which we are most familiar. Unfortunately, with advances in transportation and technology, sabotage/terrorism has now crossed the oceans into the United States. Equally alarming is the rapid increase in the scope and magnitude of sabotage/terrorism methods and threats, which now, in addition to bombings, include:

- × nuclear, chemical and biological weapons,
- × information warfare / cyber attacks
- × ethnic/religious/gender intimidation (hate crimes),
- × state and local militia groups that advocate the overthrow of the U.S. Government,
- × eco-extremism, designed to destroy or disrupt specific research or resource related activities,
- × pre-meditated attacks upon schools, workplaces, transportation systems or other places of public assembly, and
- × organized criminal enterprises and activities.

There are no known organizations within Hillsdale County involved in any type of sabotage, terrorism, or the proliferation of weapons of mass destruction however one may develop.

18. Public Health Emergencies

“Public health emergencies can take many forms,” according to the Michigan Hazard Analysis:

- × disease epidemics,
- × large-scale incidents of food or water contamination,
- × extended periods without adequate water and sewer services,
- × harmful exposure to chemical, radiological or biological agents, and
- × large-scale infestations of disease-carrying insects or rodents.

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“Public health emergencies can occur as primary events by themselves, or they may be secondary events to another disaster . . . [and] have the potential to adversely impact a large number of people,” according to the Michigan Hazard Analysis. “Perhaps the greatest emerging public health threat would be the intentional release of [a] radiological, chemical or biological agent. Fortunately, to date, Michigan has not experienced such a release aimed at mass destruction. However, Michigan has experienced hoaxes and it is probably only a matter of time before an actual incident of that nature and magnitude does occur.”

No public health emergencies have ever been declared in Hillsdale County, according to the Michigan Hazard Analysis. However, at least 3 statewide emergencies may have affected local residents:

- × **Chemical Contamination (Polybrominated Biphenyl)** — Thousands of cattle and other animals died in 1973 from poisoning after a chemical company accidentally sent bags of a fire retardant in conjunction with a shipment of a livestock feed supplement.
- × **Foodborne Contamination (Hepatitis A)** — Almost 300 cases of Hepatitis A in at least four school districts in the spring of 1997 were caused by frozen strawberries.
- × **Communicable Disease Epidemic (Influenza Pandemic)** — “Influenza is an example of a potential public health emergency of [a] very large proportion.” Flu pandemics caused widespread deaths nationally in 1957-1958 and 1968-1969. People suffer from the flu in the county every year.

Public Water Well testing for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) has been recently initiated in the County by the State of Michigan. At this writing, no amounts above the threshold have been reported however testing continues.

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19. Drought

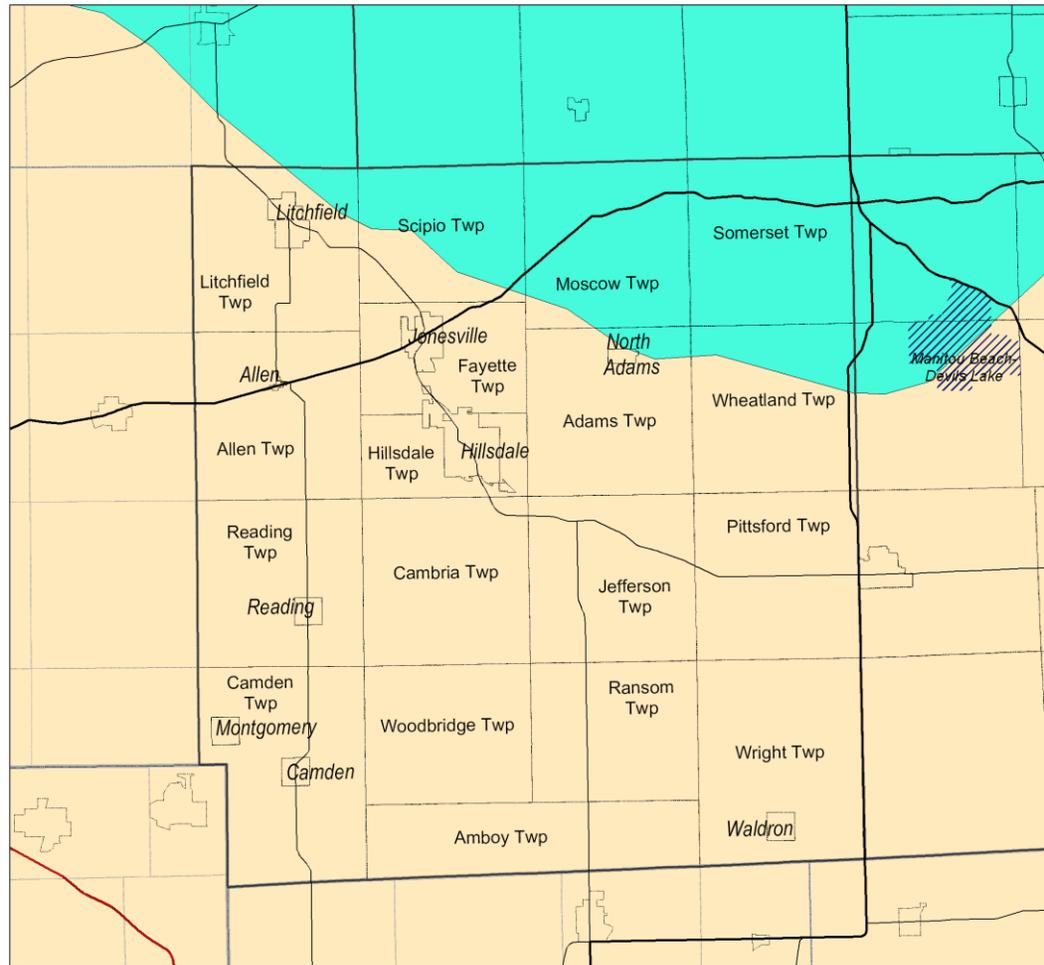
The “entire state is subject to the impacts of drought,” according to the Michigan Hazard Analysis.

“Large urbanized areas,” according to the Michigan Hazard Analysis “are more vulnerable to water shortages and business disruptions due to the sheer number of water users that are competing for the limited water resources. In those areas, water management strategies typically have to be implemented to deal with the water shortage problems. Public health and safety concerns are also numerous — everything from maintaining adequate water supply for fire-fighting to addressing the needs of the elderly, children, ill or impoverished individuals suffering from [heat-related] stress and illness.”

“In rural agricultural areas,” according to the Michigan Hazard Analysis, “. . . drought brings on a host of other problems to address. The agricultural areas of southern Lower Michigan are highly vulnerable to drought conditions that impact the quantity or quality of crops, livestock, and other agricultural activities. A prolonged drought can seriously impact local and regional income, which in turn has a rippling effect on the other components of the economy. Drought can also cause long-term problems that can affect the viability of some agricultural operations, and increase the threat of wildfire.”

The majority of Hillsdale County is included in the 37.5 inch precipitation range with the remainder of the county in the 32.5 inch range. Hillsdale County is in the middle range for precipitation when compared with the western half of the nation (29.9 inches or less rainfall a year) and the southeastern U.S. (40.0 or more inches a year). Drought however, according to the Michigan Hazard Analysis, “is a normal part of the climate of Michigan . . . including areas with high and low average rainfall.” No droughts were recorded in the county by the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA). The Marshal Aquifer, which covers much of the northeast of the county, may provide some relief to those areas in the event of a drought.

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Hillsdale County Acquifers

 Marshall aquifer

Source:
Center for Geographic Information,
State of Michigan

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20. Extreme Temperatures

“Prolonged periods of extreme temperatures,” according to the Michigan Hazard Analysis, “whether extreme summer heat or extreme winter cold, can pose severe and often life-threatening problems for” the residents of Hillsdale County. “Although they are radically different in terms of initiating conditions, the two hazards share a commonality in that they both primarily affect the most vulnerable segments of the population – the elderly, children, impoverished individuals, and people in poor health.” Extreme summer heat can result in heatstroke, heat exhaustion, heat syncope, and heat cramps. Extreme winter cold can result in hypothermia and frostbite.

A 29-year (i.e., 1981-2010) compilation of temperature data from a weather station reporting to the Michigan State Climatologists Office located in the vicinity of Hillsdale indicates a daily average temperature range of 15°F – 82°F. Over the 29-year period, a maximum temperature greater than 90°F was only reached on eight days annually and less than 32°F on 49 days annually; a minimum temperature less than 32°F was reached on 149 days annually during that period and less than 0°F on 11 days annually. A low of -20°F was recorded in February of 1967 and a high of 98°F was recorded in June of 1953.

The NCDC recorded a temperature of 9°F (-35 to -30°F wind chill) during December 1995 in 37 counties. The cold wave resulted in three deaths.

Several other significant heat waves listed in the Michigan Hazard Analysis:

- × July 1936 — temperatures exceeded 100°F for several days, causing 570 deaths statewide
- × Summer 1988 — 39 days with 90°F or more temperatures
- × July 1995 — 28 heat-related fatalities in the state
- × July 1999 — city residents were treated for heat-related problems statewide
- × June-August 2001 — heat stress index readings soared well above 100°F on many days

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21. Hail

“Hail,” according to the Michigan Hazard Analysis, “is a product of the strong thunderstorms that frequently move across the state. As one of these thunderstorms passes over, hail usually falls near the center of the storm, along with the heaviest rain. Most hailstones range in size from a ¼” to a golf ball, but hailstones larger than baseballs have occurred with the most severe thunderstorms. Hail is formed when strong updrafts within the storm carry water droplets above the freezing level, where they remain suspended and continue to grow larger until their weight can no longer be supported by the winds. They finally fall to the ground, battering crops, denting autos, and injuring wildlife and people. Large hail is a characteristic of severe thunderstorms, and it may precede the occurrence of a tornado. The National Weather Service began recording hail activity in Michigan in 1967. Statistics since that time indicate that over 70% of severe thunderstorms that produce hail have occurred during the months of May, June, July, and August, the prime growing season in Michigan.

TABLE IV-21, Hail Events, Hillsdale County (1950-2010)		
Date	Description	MCD's
05/25/1973	2045 CST. Beginning LAT/LON: 41°56'N / 84°48'W. Magnitude: 1.00 inches. No additional details reported.	Allen
05/11/1974	1430 CST. Beginning LAT/LON: 41°55'N / 84°37'W. Magnitude: 1.75 inches. No additional details reported.	Hillsdale
05/11/1974	1440 CST. Beginning LAT/LON: 42°03'N / 84°30'W. Magnitude: 1.75 inches. No additional details reported.	Moscow
06/15/1974	0820 CST. Beginning LAT/LON: 42°03'N / 84°45'W. Magnitude: 1.25 inches. No additional details reported.	Litchfield
06/15/1974	0830 CST. Beginning LAT/LON: 41°55'N / 84°37'W. Magnitude: 0.75 inches. No additional details reported.	Hillsdale

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07/03/1975	1230 CST. Beginning LAT/LON: 41°50'N / 84°45'W. Magnitude: 1.00 inches. No additional details reported.	Reading
06/02/1980	1900 CST. Beginning LAT/LON: 41°43'N / 84°25'W. Magnitude: 0.75 inches. No additional details reported.	Waldron
07/12/1980	1900 CST. Beginning LAT/LON: 41°47'N / 84°48'W. Magnitude: 1.50 inches. No additional details reported.	Montgomery
09/22/1980	1550 CST. Beginning LAT/LON: 41°55'N / 84°37'W. Magnitude: 1.75 inches. No additional details reported.	Hillsdale
05/02/1983	0830 CST. Beginning LAT/LON: 41°53'N / 84°46'W. Magnitude: 1.50 inches. No additional details reported.	Reading
05/02/1983	0940 CST. Beginning LAT/LON: 41°53'N / 84°34'W. Magnitude: 1.50 inches. No additional details reported.	Osseo
06/13/1984	0950 CST. Beginning LAT/LON: 41°59'N / 84°40'W. Magnitude: 0.75 inches. No additional details reported.	Jonesville
08/26/1986	1639 CST. Beginning LAT/LON: 41°45'N / 84°46'W. Magnitude: 2.00 inches. No additional details reported.	Camden
04/23/1988	2035 CST. Beginning LAT/LON: 41°55'N / 84°48'W. Magnitude: 1.75 inches. No additional details reported.	Allen
04/23/1992	1445 CST. Beginning LAT/LON: 41°53'N / 84°34'W. Magnitude: 1.00 inches. No additional details reported.	Osseo
04/12/1994	2118 EST. Magnitude: 0.75 inches. Marble-sized hail was reported along with a 50 mph winds gust.	Montgomery
06/13/1994	1905 EST. Magnitude: 0.75 inches. No additional details reported.	Hillsdale
09/25/1994	1902 EST. Ending Location: 23 SW JXN. Magnitude: 0.75 inches. No additional details reported.	Litchfield

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09/25/1994	1922 EST. Beginning Location: Unknown. Ending Location: 14 SSE Jackson. Magnitude: 1.00 inches. Hail covered ground along U.S. 12 in Somerset.	Somerset
04/12/1996	02:45:00 PM EST. Beginning LAT/LON: 41°50'N / 84°45'W. Ending LAT/LON: 41°51'N / 84°22'W. Magnitude: 2.00 inches. \$2.0 Million in Property Damage. Hail of 1-3/4 to 2 inches diameter was reported along the path of a severe thunderstorm from Reading to near Hudson on the Lenawee County line. Widespread hail damage occurred with windows on west side of buildings broken and vinyl or aluminum siding left with holes and cracks. Highway M-34 was covered with hail between Pittsford and Hudson. Numerous recreational vehicles parked at a dealership were badly damaged.	Reading
07/06/1997	03:32:00 PM EST. Beginning LAT/LON: 42°03'N / 84°45'W. Ending LAT/LON: 42°03'N / 84°45'W. Magnitude: 0.75 inches. No additional details reported.	Litchfield
05/31/1998	05:11:00 AM EST. Beginning LAT/LON: 42°03'N / 84°45'W. Ending LAT/LON: 42°03'N / 84°45'W. Magnitude: 0.75 inches. No additional details reported.	Litchfield
06/26/1998	05:20:00 AM EST. Beginning LAT/LON: 41°45'N / 84°46'W. Ending LAT/LON: 41°45'N / 84°46'W. Magnitude: 0.88 inches. No additional details reported.	Camden
07/28/1999	07:20:00 PM EST. Beginning LAT/LON: 41°54'N / 84°30'W. Ending LAT/LON: 41°53'N / 84°32'W. Magnitude: 1.00 inches. Tree limbs were also blown down.	Pittsford
07/29/1999	09:42:00 PM EST. Beginning LAT/LON: 41°45'N / 84°46'W. Ending LAT/LON: 41°49'N / 84°40'W. Magnitude: 0.75 inches. No additional details reported.	Camden

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04/20/2000	01:48:00 PM EST. Beginning LAT/LON: 41°47'N / 84°48'W. Ending LAT/LON: 41°47'N / 84°48'W. Magnitude: 0.75 inches. Synoptic and Mesoscale conditions for April 20, 2000. . . A significant mid-latitude cyclone developed over the Midwest on the 19th and 20th. A strong mid-level jet at 75 knots combined with a 40 knot low-level jet triggered rapid severe storm development across central and northern Illinois during the morning hours of the 20th. Storms quickly organized into a squall line with several embedded bows which then tracked across northern Indiana and northwest Ohio. Reports of damaging winds and large hail were common with the storms during the afternoon of the 20th.	Montgomery
04/20/2000	02:09:00 PM EST. Beginning LAT/LON: 42°03'N / 84°22'W. Ending LAT/LON: 42°03'N / 84°22'W. Magnitude: 0.75 inches. Synoptic and Mesoscale conditions for April 20, 2000. . . A significant mid-latitude cyclone developed over the Midwest on the 19th and 20th. A strong mid-level jet at 75 knots combined with a 40 knot low-level jet triggered rapid severe storm development across central and northern Illinois during the morning hours of the 20th. Storms quickly organized into a squall line with several embedded bows which then tracked across northern Indiana and northwest Ohio. Reports of damaging winds and large hail were common with the storms during the afternoon of the 20th.	Somerset
05/09/2000	06:45:00 PM EST. Beginning LAT/LON: 41°55'N / 84°37'W. Ending LAT/LON: 41°55'N / 84°37'W. Magnitude: 0.75 inches. Synoptic and mesoscale conditions during the afternoon of the 9th... A significant mid-level shortwave trough extended through the Mississippi valley during the afternoon with a deepening surface low over northeast Illinois. Much of northern Indiana and southern Michigan were in the warm sector with surface based CAPE of 2500 J/kg and increasing deep layer shear in advance of a 70 knot mid-level jet max ahead of the mid-level shortwave. A prefrontal squall line quickly developed late in the afternoon along the Illinois/Indiana state line. Additional isolated supercells developed in advance of this line and were mainly responsible for the swath of large hail from Wabash to Steuben counties. The squall line gradually organized into a large bow echo with the apex of the bow tracking from southwest Whitley county eastward through northern Allen and into western Defiance	Hillsdale

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	county in Ohio where the greatest widespread wind damage was observed.	
07/28/2000	02:46:00 PM EST. Beginning LAT/LON: 42°02'N / 84°28'W. Ending LAT/LON: 42°02'N / 84°28'W. Magnitude: 1.75 inches. No additional details reported.	Jerome
06/14/2002	02:23:00 PM EST. Beginning LAT/LON: 41°47'N / 84°36'W. Ending LAT/LON: 41°47'N / 84°36'W. Magnitude: 0.75 inches. No additional details reported.	Frontier
04/04/2003	07:00:00 PM EST. Beginning LAT/LON: 41°49'N / 84°45'W. Ending LAT/LON: 41°49'N / 84°45'W. Magnitude: 0.75 inches. No additional details reported.	Reading
04/04/2003	07:20:00 PM EST. Beginning LAT/LON: 41°53'N / 84°32'W. Ending LAT/LON: 41°53'N / 84°32'W. Magnitude: 0.75 inches. No additional details reported.	North Adams
05/09/2003	10:50:00 PM EST. Beginning LAT/LON: 41°50'N / 84°45'W. Ending LAT/LON: 41°50'N / 84°45'W. Magnitude: 0.75 inches. No additional details reported.	Reading
05/09/2003	10:58:00 PM EST. Beginning LAT/LON: 42°04'N / 84°32'W. Ending LAT/LON: 42°04'N / 84°32'W. Magnitude: 1.75 inches. No additional details reported.	North Adams
07/20/2003	02:19:00 PM EST. Beginning LAT/LON: 41°57'N / 84°46'W. Ending LAT/LON: 41°57'N / 84°46'W. Magnitude: 1.50 inches. No additional details reported.	Allen
07/20/2003	02:52:00 PM EST. Beginning LAT/LON: 41°42'N / 84°42'W. Ending LAT/LON: 41°42'N / 84°42'W. Magnitude: 0.75 inches. No additional details reported.	Camden
08/01/2003	02:58:00 PM EST. Beginning LAT/LON: 41°53'N / 84°39'W. Ending LAT/LON: 41°53'N / 84°39'W. Magnitude: 0.88 inches. No additional details reported.	Hillsdale
08/01/2003	03:36:00 PM EST. Beginning LAT/LON: 42°01'N / 84°32'W. Ending LAT/LON: 42°01'N / 84°32'W. Magnitude: 1.75 inches. No additional details reported.	North Adams
08/01/2003	04:39:00 PM EST. Beginning LAT/LON: 41°55'N / 84°37'W. Ending LAT/LON: 41°55'N / 84°37'W. Magnitude: 0.75 inches. No additional details reported.	Hillsdale
05/06/2004	09:20:00 PM EST. Beginning LAT/LON: 41°58'N / 84°32'W. Ending LAT/LON:	North Adams

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	41°58'N / 84°32'W. Magnitude: 2.00 inches. No additional details reported.	
05/13/2005	04:35:00 PM EST. Beginning LAT/LON: 42°03'N / 84°33'W. Ending LAT/LON: 42°03'N / 84°33'W. Magnitude: 0.75 inches. No additional details reported.	Litchfield
09/22/2005	06:05:00 PM EST. Beginning LAT/LON: 41°47'N / 84°48'W. Ending LAT/LON: 41°43'N / 84°43'W. Magnitude: 0.88 inches. No additional details reported.	Montgomery
04/22/2006	06:30:00 PM EST. Beginning LAT/LON: 42°03'N / 84°45'W. Ending LAT/LON: 42°03'N / 84°45'W. Magnitude: 0.75 inches. No additional details reported.	Litchfield
06/21/2006	06:20:00 PM EST. Beginning LAT/LON: 41°53'N / 84°34'W. Ending LAT/LON: 41°53'N / 84°34'W. Magnitude: 1.00 inches. Numerous reports of hail up to quarter size reported throughout the county.	Osseo
05/01/2007	12:54:00 PM EST. Beginning LAT/LON: 41°45'N / 84°45'W. 41°53'N / 84°32'W Ending LAT/LON: Not Known. Magnitude: 0.88 inches. A stationary boundary was located across far southern Lower Michigan during the mid afternoon hours. As instability increased, numerous storms began to develop with many producing hail.	Camden
05/01/2007	15:02:00 PM EST. Beginning LAT/LON: 41°53'N / 84°32'W. Ending LAT/LON: Not Known. Magnitude: 1.00 inches. A stationary boundary was located across far southern Lower Michigan during the mid afternoon hours. As instability increased, numerous storms began to develop with many producing hail.	Osseo
05/01/2007	15:45:00 PM EST. Beginning LAT/LON: 41°50'N / 84°45'W. Ending LAT/LON: Not Known. . Magnitude: 1.00 inches. A stationary boundary was located across far southern Lower Michigan during the mid afternoon hours. As instability increased, numerous storms began to develop with many producing hail.	Reading

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22. Lightning

Lightning, caused by thunderstorms, according to the Michigan Hazard Analysis, “is a random and unpredictable product of a tremendous energy. [The] perception [of lightning as a minor hazard] lingers despite the fact that lightning damages many structures and kills and injures more people in the United States per year, on average, than tornadoes or hurricanes.”

“In terms of property losses from lightning,” according to the Michigan Hazard Analysis, “statistics vary widely according to source. However, suffice it to say that annual lightning-related property damages are conservatively estimated at several billion dollars per year, and those losses are expected to continue to grow as the use of computers and other lightning-sensitive electronic components [become] more prevalent. Unfortunately, lightning has [also] taken a tremendous toll on Michigan’s citizens in terms of injury and loss of life. Since 1959 . . . Michigan has incurred 108 lightning

deaths, 693 lightning injuries, and 792 lightning casualties (deaths and injuries combined) – consistently ranking it near the top of the nation in all three categories.”

Lightning related Deaths & Injuries in Michigan 1959 - July 2004			
	Deaths	Injuries	Casualties
Open fields & rec areas	38.4%	39.7%	39.5%
Unspecified locations	18.2%	36.1%	33.8%
Under a tree	26.3%	15.0%	16.4%
Comm equip & heavy equipment/machinery	6.1%	5.5%	5.6%
Water related (boating, fishing, swimming, etc.)	11.1%	3.8%	4.7%
	99	693	792

A total of two lightning events were reported in the county, and 244 statewide, between 1993 and 2004 to the NCDC. Unfortunately, one death was attributed to lightning in the county and 13 deaths and 124 injuries statewide. The lightning also accounted for \$50 thousand in property damages in the county and \$20 million statewide.

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TABLE IV-22, Lightning Events, Hillsdale County (1950-2010)

Date	Description	MCD's
04/27/1994	0100 EST. Property Damage: \$50,000. Lightning struck a home causing extensive damage from smoke.	Hillsdale
07/21/2001	04:00:00 PM EST. Fatalities: 1. Man went outside to check possible lightning damage to barn. While standing outside of barn was hit by lightning and died shortly after at Hillsdale Community Health Center.	Hillsdale

23. Severe Wind Events and Tornadoes

“Severe winds spawned by thunderstorms or other storm events,” according to the Michigan Hazard Analysis, “have had devastating effects on Michigan.” Severe wind events are characterized by wind velocities of 58 miles per hour or greater with gusts sometimes exceeding 74 miles per hour.

A total of 154 severe and/or “thunderstorm” wind events were reported in Hillsdale County between 1950 and 2010 according to the NCDC. Recorded wind speeds for 40 of the events ranged from 42 knots to 60 knots. A wind speed of 50 knots was recorded for 75% of the record wind speeds. Severe winds accounted for \$5.4 million of property damages. No deaths, but two injuries were attributed to severe winds.”

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TABLE IV-23, Severe Wind Events, Hillsdale County (1950-2010)

Date	Description	MCD's
11/18/1994	1200 EST. Beginning and Ending Locations unknown. Magnitude: 62 knots. Downed power lines resulted in scattered power outages and numerous small forest and grass fires. Gusts of 40 to 50 mph were widespread throughout the state. Over \$1 Million in Property Damage occurred.	
04/06/1997	04:00:00 PM EST. Beginning and Ending Locations unknown. Winds increased to sustained speeds of 35 to 45 mph out of the west shortly after frontal passage. Frequent wind gusts of 50 to 70 mph were common. Widespread wind damage and lake shore beach erosion was reported across the area. Property Damage was estimated at \$5 Million.	
09/29/1997	12:00:00 PM EST. Beginning and Ending Locations unknown. Magnitude: 42 Knots. Gusts reached 46 mph at Jackson County Airport. The winds caused some trees and power lines to come down, which resulted in 35,000 power outages across the region. Felled trees blocked a few isolated roads across the area for a brief time including Vicary Road in Hillsdale. No property damage estimates are available.	
03/09/2002	12:37:00 PM EST. Beginning and Ending Locations unknown. Winds just above the surface ranged from 70 to 80 mph. The combination of these 2 factors was tapped by a narrow line of showers immediately ahead of the cold front. Widespread reports of trees, tree limbs and power lines being blown down were received as surface winds of 50 to 70 mph were experienced by many areas.	
11/12/2003	05:00:00 PM EST. Beginning and Ending Locations unknown. Magnitude: 56 Knots. Winds gusted to 65 MPH behind a strong cold front that moved across the region during the late afternoon and evening. Numerous power outages occurred with trees and power lines down.	
03/05/2004	12:00:00 PM EST. Beginning and Ending Locations unknown. Magnitude: 52 Knots. An intense area of low pressure moving across Michigan produced sus-	

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	tained winds of 40 MPH with measured gusts to 60 MPH across all of Northern Indiana, Northwest Ohio and Southwest Lower Michigan from late morning through early evening. Widespread reports of trees and power lines down were received from law enforcement across the region.	
10/30/2004	05:10:00 PM EST. Location: Unknown. Magnitude: 42 knots. Property Damage: \$6,000. Winds across portions of far southern Lower Michigan were sustained in the 25 to 35 mph range with some areas reporting gusts between 45 to as high as 55 mph. Reports of small branches down and a few downed power lines were received. Some of the measured wind gusts included 53 mph at Coldwater, 51 in Hillsdale and 48 mph at Benton Harbor.	
02/11/2009	22:00:00 PM EST. Beginning and Ending Locations unknown. Magnitude: 50 Knots. County officials reported scattered to numerous trees, tree limbs and power lines down across the county. Deep low pressure tracked across the Great Lakes, dragging along a strong cold front. Behind the front sustained winds were frequently in the 35 to 45 mph range with gusts of between 55 and as high as 70 mph in some areas. This caused scattered to numerous trees and power line damage along with some structure damage.	
12/09/2009	11:00:00 AM EST. Beginning and Ending Locations unknown. Magnitude: 50 Knots. Very windy conditions were seen across the area on December 9th as a deep area of low pressure tracked into northern Lower Michigan. Wind gusts between 45 and 60 mph were common during the late morning and afternoon hours. There were reports of power lines and trees down across the region due to the strong winds, which resulted in isolated power outages.	

A Governor's Disaster Declaration requiring a Hurricane Evacuation was passed on September 4, 2005 that affected the entire state, including Hillsdale County. A Presidential Declaration was enacted (Emergency 3225) on September 7, 2005 for the entire state because of the same emergency.

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TABLE IV-23a, Thunderstorm Wind Events, Hillsdale County (1950-2010)

MCD	Date	Time	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Jonesville	04/19/1963	1821	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	06/28/1965	1510	Thunderstorm Wind	60 Knots	0	0	0	0
Moscow	06/01/1980	1530	Thunderstorm Wind	52 Knots	0	0	0	0
Montgomery	09/22/1980	1550	Thunderstorm Wind	52 Knots	0	0	0	0
Osseo	07/07/1991	1835	Thunderstorm Wind	52 Knots	0	0	0	0
Waldron	07/04/1992	2130	Thunderstorm Wind	54 Knots	0	0	0	0
Allen	07/13/1992	1900	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	04/15/1993	1650	Thunderstorm Winds	52 Knots	0	0	0	0
Somerset	08/01/1995	1515	Thunderstorm Winds	50 Knots	0	0	0	0
Somerset	08/12/1995	1920	Thunderstorm Winds	50 Knots	0	0	0	0
Reading	08/15/1995	1545	Thunderstorm Winds	50 Knots	0	0	0	0
Litchfield	07/20/1998	10:50 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Reading	07/20/1998	10:55 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Litchfield	07/21/1998	04:35 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	07/21/1998	04:49 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Litchfield	04/20/2003	02:55 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Litchfield	06/28/2003	04:30 PM	Thunderstorm Wind	50 Knots	0	0	0	0

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Litchfield	06/28/2003	04:35 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Montgomery	07/04/2003	06:23 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Litchfield	07/04/2003	10:50 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Somerset Center	07/04/2003	11:05 AM	Thunderstorm Wind	50 Knots	0	1	0	0
Waldron	07/04/2003	11:26 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Bankers	07/08/2003	01:45 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Litchfield	07/20/2003	02:15 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Jonesville	07/20/2003	02:20 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Allen	07/20/2003	02:25 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	08/01/2003	04:39 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Osseo	08/16/2003	03:25 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	08/16/2003	03:32 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	08/16/2003	03:32 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	08/16/2003	03:39 PM	Thunderstorm Wind	51 Knots	0	0	0	0
Jonesville	08/25/2003	10:45 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Jonesville	08/25/2003	10:45 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	08/27/2003	02:55 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	09/24/2003	05:50 PM	Thunderstorm Wind	50 Knots	0	0	0	0
North Adams	09/24/2003	06:00 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Osseo	05/21/2004	12:40 PM	Thunderstorm Wind	60 Knots	0	0	0	0

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Hillsdale	06/14/2004	01:25 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	07/06/2004	11:07 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	07/06/2004	11:15 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	07/21/2004	08:10 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Osseo	05/13/2005	04:40 PM	Thunderstorm Wind	55 Knots	0	0	0	0
Osseo	06/09/2005	02:30 PM	Thunderstorm Wind	50 Knots	0	0	5K	0
Hillsdale	06/26/2005	05:45 PM	Thunderstorm Wind	50 Knots	0	0	20K	0
Moscow	06/26/2005	05:58 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Hillsdale	06/30/2005	05:45 PM	Thunderstorm Wind	50 Knots	0	0	15K	0
Pittsford	06/30/2005	06:25 PM	Thunderstorm Wind	50 Knots	0	0	10K	0
Litchfield	06/30/2005	09:45 AM	Thunderstorm Wind	50 Knots	0	0	10K	0
Hillsdale	06/30/2005	10:00 AM	Thunderstorm Wind	50 Knots	0	0	10K	0
Hillsdale	07/21/2005	06:15 PM	Thunderstorm Wind	50 Knots	0	0	1K	0
Jonesville	07/25/2005	09:30 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Camden	07/25/2005	09:50 PM	Thunderstorm Wind	50 Knots	0	0	0	0
Osseo	11/06/2005	03:58 AM	Thunderstorm Wind	50 Knots	0	0	0	0
Allen	05/30/2006	03:03 PM	Thunderstorm Wind	55 Knots	0	0	0	0
Hillsdale	05/30/2006	03:19 PM	Thunderstorm Wind	55 Knots	0	0	0	0
Hillsdale	06/21/2006	05:35 PM	Thunderstorm Wind	50 Knots	0	0	5K	0
Hillsdale	07/17/2006	11:54 PM	Thunderstorm Wind	52 Knots	0	0	0	0

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Hillsdale	05/15/2007	14:15 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Hillsdale	05/15/2007	17:33 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Hillsdale	06/27/2007	15:50 PM	Thunderstorm Wind	55 Knots	0	0	10K	0K
Litchfield	06/27/2007	15:58 PM	Thunderstorm Wind	55 Knots	0	0	10K	0K
Hillsdale	08/07/2007	17:11 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Hillsdale	08/23/2007	18:22 PM	Thunderstorm Wind	55 Knots	0	0	10K	0K
Hillsdale	08/24/2007	16:20 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Waldron	06/15/2008	17:22 PM	Thunderstorm Wind	55 Knots	0	0	10K	0K
Hillsdale	06/26/2008	14:06 PM	Thunderstorm Wind	50 Knots	0	0	0K	0K
Jonesville	07/02/2008	17:50 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Cambria	07/02/2008	18:00 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Somerset Center	07/02/2008	18:00 PM	Thunderstorm Wind	55 Knots	0	0	0K	0K
Reading	07/02/2008	18:01 PM	Thunderstorm Wind	60 Knots	0	0	0K	0K
Allen	06/08/2009	19:55 PM	Thunderstorm Wind	50 Knots	0	0	0K	0K
TOTALS:					0	2	507K	0

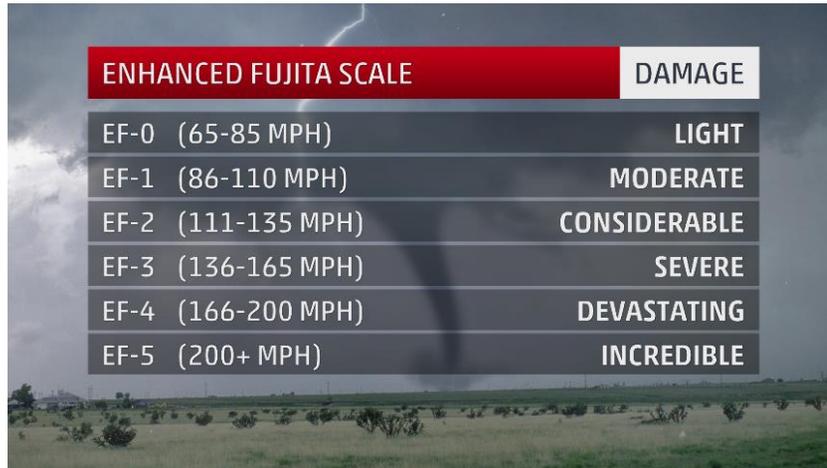
“Tornadoes in Michigan,” according to the [Michigan Hazard Analysis](#), “are most frequent in the spring and early summer when warm, moist air from the Gulf of Mexico collides with cold air from the polar regions to generate severe thunderstorms. These thunderstorms often produce the violently rotating columns of wind that are called tornadoes. Most of a tornado’s destructive force is exerted by the powerful winds that knock down walls and lift roofs from buildings in the storm’s path. The violently rotating winds then carry debris aloft that can be blown through the air as dangerous missiles.

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Tornadoes Affecting Michigan and Hillsdale County

“National Weather Service data,” according to the Michigan Hazard Analysis, “indicates that there were 23 tornadoes resulting in eight deaths in Hillsdale County during the period between 1950 and July 2001. All of the tornado events occurring in Hillsdale County occurred during the months of March through October. The intensity of the tornadoes ranged from EF0 – EF4, with 9% at EF4, 4% at EF3, 39% at EF2, 17% at EF1, 30% at EF0. EF3 tornadoes are classified as “severe” with wind speeds of 136 to 165 mph resulting in severe damage.

A total of two tornadoes (F3 and F4 Fujita Scale) touched down in Hillsdale County resulting in six deaths and 94 injuries on Palm Sunday, 1965. A tornado affecting the Hillsdale area resulted in two deaths and 31 injuries in 1974. EF4 tornados are classified as “devastating”. EF4 tornados can level even well-constructed houses. Cars are thrown, thus generating large missiles.



ENHANCED FUJITA SCALE	DAMAGE
EF-0 (65-85 MPH)	LIGHT
EF-1 (86-110 MPH)	MODERATE
EF-2 (111-135 MPH)	CONSIDERABLE
EF-3 (136-165 MPH)	SEVERE
EF-4 (166-200 MPH)	DEVASTATING
EF-5 (200+ MPH)	INCREDIBLE

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TABLE IV-23b, Tornado Events, Hillsdale County (1950-2010)

Date	Description	MCD's
06/24/1958	1900 CST. Beginning LAT/LON: 41°45'N / 84°46'W. Ending LAT/LON: 41°45'N / 84°41'W. Magnitude: F1. Length: 3.60 Miles. Width: 30 Yards. Property Damage: \$2,500. No additional details reported.	Camden
08/22/1964	1325 CST. Beginning LAT/LON: 41°46'N / 84°26'W. Ending LAT/LON: 41°53'N / 84°18'W. Magnitude: F2. Length: 10.30 Miles. Width: 100 Yards. Property Damage: \$25,000. No additional details reported.	Waldron
04/11/1965	1820 CST. Beginning LAT/LON: 41°53'N / 84°50'W. Ending LAT/LON: 41°57'N / 84°22'W. Magnitude: F4. Length: 24.20 Miles. Width: 1760 Yards. Property Damage: \$25 Million. Fatalities: 3. Injuries: 47. No additional details reported.	Somerset
04/23/1968	1150 CST. Beginning LAT/LON: 41°47'N / 84°36'W. Ending LAT/LON: 41°53'N / 84°28'W. Magnitude: F1. Length: 9.30 Miles. Width: 200 Yards. Property Damage: \$250,000. Injuries: 1. No additional details reported.	Hillsdale
07/23/1968	1830 CST. Beginning LAT/LON: 41°55'N / 84°39'W. Ending LAT/LON: 41°55'N / 84°31'W. Magnitude: F1. Length: 6.40 Miles. Width: 67 Yards. Property Damage: \$25,000. No additional details reported.	Hillsdale
07/04/1969	1600 CST. Beginning LAT/LON: 41°59'N / 84°42'W. Ending LAT/LON: 41°52'N / 84°22'W. Magnitude: F2. Length: 18.70 Miles. Width: 100 Yards. Property Damage: \$250,000. No additional details reported.	Jonesville
06/12/1973	1630 CST. Beginning LAT/LON: 41°56'N / 84°38'W. Ending LAT/LON: Not Known. Magnitude: F0. No additional details reported.	Hillsdale

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04/03/1974	1844 CST. Beginning LAT/LON: 41°55'N / 84°39'W. Ending LAT/LON: 42°05'N / 84°24'W. Magnitude: F2. Length: 17.00 Miles. Width: 440 Yards. Property Damage: \$2.5 Million. Fatalities: 2. Injuries: 31. No additional details reported.	Hillsdale
04/03/1974	1915 CST. Beginning LAT/LON: 41°45'N / 84°25'W. Ending LAT/LON: 41°50'N / 84°23'W. Magnitude: F2. Length: 5.40 Miles. Width: 167 Yards. Property Damage: \$25,000. Injuries: 2. No additional details reported.	Waldron
04/03/1974	1915 CST. Beginning LAT/LON: 41°43'N / 84°25'W. Ending LAT/LON: 41°47'N / 84°20'W. Magnitude: F2. Length: 5.60 Miles. Width: 33 Yards. Injuries: 5. No additional details reported.	Waldron
05/21/1975	1630 CST. Beginning LAT/LON: 41°59'N / 84°48'W. Ending LAT/LON: 42°02'N / 84°40'W. Magnitude: F0. Length: 7.20 Miles. Width: 33 Yards. Property Damage: \$2,500. No additional details reported.	Allen
03/12/1976	1605 CST. Beginning LAT/LON: 41°48'N / 84°24'W. Ending LAT/LON: 41°49'N / 84°22'W. Magnitude: F2. Property Damage: \$250,000. No additional details reported.	Pittsford
03/12/1976	1640 CST. Beginning LAT/LON: 42°03'N / 84°35'W. Ending LAT/LON: 42°04'N / 84°30'W. Magnitude: F2. Length: 3.60 Miles. Width: 133 Yards. Property Damage: \$250,000. No additional details reported.	Moscow
07/18/1977	1100 CST. Beginning LAT/LON: 41°59'N / 84°36'W. Ending LAT/LON: 41°58'N / 84°30'W. Magnitude: F2. Length: 4.70 Miles. Width: 33 Yards. Property Damage: \$25,000. No additional details reported.	Adams
06/07/1979	1625 CST. Beginning LAT/LON: 42°00'N / 84°32'W. Ending	Moscow

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	LAT/LON: Not Known. Magnitude: F0. Length: 0.50 Miles. Width: 20 Yards. No additional details reported.	
09/25/1984	1520 CST. Beginning LAT/LON: 41°56'N / 84°25'W. Ending LAT/LON: Unknown. Magnitude: F2. Length: 2.10 Miles. Width: 90 yards. Property Damage: \$250,000. No additional details reported.	Wheatland
05/15/1988	1704 EST. Beginning LAT/LON: 41°43'N / 84°25'W. Ending LAT/LON: Unknown. Magnitude: F0. Length: 0.2 Miles. Width: 10 yards. . No additional details reported.	Waldron
03/27/1991	1937 EST. Beginning LAT/LON: 41°43'N / 84°36'W. Ending LAT/LON: 41°47'N / 84°31'W. Magnitude: F3. Length: 5.00 Miles. Width: 400 Yards. Property Damage: \$25,000. No additional details reported.	Amboy
10/24/2001	06:00:00 PM EST. Beginning LAT/LON: 41°45'N / 84°33'W. Ending LAT/LON: 41°47'N / 84°32'W. Magnitude: F1. Length: 2.00 Miles. Width: 60 yards. Property Damage: \$350,000. Tornado with F1 damage mainly on the north side of Ransom. Garages and sheds destroyed and significant roof damage to homes with twisting of signs and trees.	Ransom
07/10/2003	08:24:00 PM EST. Beginning LAT/LON: 41°43'N / 84°43'W. Ending LAT/LON: 41°42'N / 84°43'W. Magnitude: F0. Length: 0.10 Miles. Width: 50 Yards. Property Damage: \$1,000. Law enforcement and emergency management reported a brief F0 tornado touched down 4 miles southeast of Camden and quickly lifted. A storage shed and some trees were damaged.	Camden
08/01/2003	03:40:00 PM EST. Beginning LAT/LON: 42°01'N / 84°30'W. Ending LAT/LON: 42°01'N / 84°30'W. Magnitude: F0. Length: 0.10 Miles. Width: 10 Yards. A brief touchdown was observed by fire personnel near Sterling and Walworth roads. No damage or injuries were reported with the touchdown.	Hillsdale

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24. Snowstorms

Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds (35+ miles per hour) bearing enormous amounts of snow. Most of the snow accompanying a blizzard is in the form of fine, powdery particles that are wind-blown in such great quantities that, at times, visibility is reduced to only a few feet. Blizzards have the potential to result in property damage and loss of life. Just the cost of clearing the snow can be enormous, including the loss and disruption of essential services in affected communities.”

Several recent significant snowstorms of statewide significance, as reported in the Michigan Hazard Analysis, are worth mentioning:

TABLE IV-24, Snow Events, Hillsdale County (1950-2010)		
Date	Description	MCD's
January 26-31, 1977	A Presidential Emergency (3030) was declared for 15 counties, including Hillsdale because of a massive snowstorm and blizzard. The Governor also declared a statewide disaster.	Hillsdale County
January 26-27, 1978	A Presidential Disaster (Emergency 3057) was declared statewide due to a blizzard and snowstorm hitting the entire state. The Governor also declared a statewide disaster.	Hillsdale County
25 Feb 1994	1100 EST. Location: South Third of Lower Michigan. An intense snow burst caused five to eight inches of snow to fall across most of the southern third of lower Michigan. The heaviest snowfalls, seven to eight inches, fell over a 50-mile wide area across southern lower Michigan. On the north side of the area were the cities of Grand Rapids, Lansing and Flint. Detroit, Jackson and Kalamazoo were on the southern edge of the heaviest snowfall area. Snowfall rates of one to two inches an hour, for a period to two to three hours, were common. Northeast to east winds at 15 to 25 mph with frequent gusts to 35 mph combined with temperatures around 20F resulted in wind chill values	Hillsdale County

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	of 10 to 20 degrees below zero. The combination of strong winds and heavy snow caused near blizzard conditions for a period of about six hours.	
06 Dec 1994	1800 EST. Location: Southern Lower Michigan. Snow amounts of 2 to 4 inches occurred over extreme southern lower Michigan, where some of the precipitation fell as freezing rain. Numerous traffic accidents were reported across the area, along with scattered power outages.	Hillsdale County
19 Mar 1996	08:30:00 PM EST. Beginning and Ending Locations unknown. Four to 8 inches of snow fell in a band that covered eastern Branch, Hillsdale, Jackson, and southeast Ingham Counties. Winds up to 45 mph caused drifts up to 2 feet, forcing the closing of many roads and schools. Power outages also affected nearly 5,000 customers.	Hillsdale County
11 Nov 1997	09:00:00 PM EST. Beginning and Ending Locations unknown. The snow-covered and icy roads caught many overnight and early morning motorists by surprise. The snow initially melted on road surfaces overnight, then froze early Wednesday morning as temperatures fell below freezing. This resulted in extremely icy conditions and an unusually high number of minor accidents, which included many slide-offs into ditches. Accidents with injuries were reported in Battle Creek, St. Joseph and Cass Counties, Hillsdale County (a rollover accident), and Branch, Mecosta, Osceola, and Newaygo Counties.	Hillsdale County
15 Nov 1997	07:00:00 AM EST. Beginning and Ending Locations unknown. Low pressure tracked across southern Lower Michigan on Saturday, November 15th, and produced a band of light snow. Snow accumulated 3 to 4 inches across Branch, Jackson, and Hillsdale Counties during the 14 hour period.	Hillsdale County
10 Dec 1997	01:00:00 AM EST. Beginning and Ending Locations unknown. A winter storm which tracked across the Ohio Valley region from southwest Indiana into northern Ohio produced an area of heavy, wet snow across the southern third of Michigan's Lower Peninsula. The weight of the wet snow caused power outages in Berrien, Branch, Hillsdale, Ingham, and Jackson Counties. Up to 18,000 customers lost power at the height of the storm due to arcing	Hillsdale County

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	wires and downed branches.	
22 Jan 1998	07:00:00 PM EST. Beginning and Ending Locations unknown. The storm spread a large swath of moderate to occasionally heavy snow across most of western, central, and southern portions of Michigan's Lower Peninsula from Thursday evening through mid-morning Friday, January 22nd-23rd. Snowfall reports included 6.5 inches in Dansville and 6.0 inches in Stockbridge, both in eastern Ingham County, 5.5 inches in Jackson, 5.2 inches in Allegan, 5.0 inches in Lansing, Hastings, and Reed City, 4-5 inches reported in the Grand Rapids-Muskegon-Holland metropolitan area, and around 4 inches in Kalamazoo, Battle Creek, St. Joseph and Hillsdale.	Hillsdale County
11 Dec 2000	08:00:00 AM EST. Beginning and Ending Locations unknown. Heavy snow developed quickly during the morning and mixed with some sleet at times due to the tremendous warm air advection out ahead of the intensifying system. Heavy snow continued into the early morning hours of the 12th with thunder snow reported at several locations in northwest Indiana and southwest Michigan. Strong gradient winds developed creating near blizzard conditions over northwest Indiana and southwest Michigan and caused some damage to trees and power lines. A Presidential Disaster (Emergency 3160) was declared from 39 counties, including Hillsdale.	Hillsdale County
22 Feb 2003	04:00:00 PM EST. Beginning and Ending Locations unknown. Rain changed to snow in the late afternoon and quickly accumulated 6 to 7 inches mainly in the southern half of the county. The snow ended after midnight.	Hillsdale County
27 Jan 2004	09:00:00 PM EST. Beginning and Ending Locations unknown. A combination of snow from an area of low pressure moving across Ohio and lake enhancement from northwest flow behind this storm caused heavy snow across the area with general accumulations of 8 to 10 inches and over 12 inches in some locations.	Hillsdale County

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22 Dec 2004	11:50:00 AM EST. Beginning and Ending Locations unknown. Low pressure moved out of the western Gulf of Mexico and tracked towards eastern Ohio. Abundant moisture accompanying the system allowed for a large area of snow to blanket much southern Lower Michigan. Amounts across far southern Lower Michigan were generally from 2 to 5 inches, with Kinderhook in Hillsdale county receiving 6 inches of total snowfall.	Hillsdale County
01 Dec 2007	17:00:00 PM EST. Beginning and Ending Locations unknown. A brief burst of light to moderate snow, mixed at times with sleet during the evening hours switched over to freezing rain. Spotters reported around 2 tenths of an inch of ice covering roads, trees and power lines. Some power outages were noted with several accidents. Winds of 15 to 25 mph assisted with power line damage.	Hillsdale County
15 Dec 2007	10:15:00 AM EST. Beginning and Ending Locations unknown. Ten to twelve inches of snow fell along with blowing and drifting snow, creating difficult travel conditions for the entire county.	Hillsdale County
04 Mar 2008	14:00:00 PM EST. Beginning and Ending Locations unknown. Spotters reported six to eight inches of snow across the county. Across much of Hillsdale County, a narrow band of five to eight inches of snow blanketed the area.	Hillsdale County
09 Feb 2010	04:00:00 AM EST. Beginning and Ending Locations unknown. A steady light to moderate snow fell February 9th into early February 10th with snowfall totals ranging between 7 and 10 inches across the county. Winds of 15 to 25 mph allowed for some blowing and drifting of the snow. The accumulating snow and wind led to slide-offs and accidents, along with school closings.	Hillsdale County

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Monthly snowfalls are recorded from a weather station located in the vicinity of Hillsdale for the 30-year period of 1951 and 1980, according to the Michigan State Climatologist's Office. The average seasonal snowfall (September-May) during this time period was 57.26 inches, with a low of 1.25 inches in September, October, and a high of 13.68 inches in December.

A total of 32 snow storm events were reported in Hillsdale County between 1950 and 2010 according to the NCDC. No damages, deaths, or injuries in Hillsdale County were attributed to these winter storm events. Because these storms cover massive land areas, only storms that provided detail to Hillsdale County events are listed above. Hillsdale County was impacted by several major snow and winter storms over the last 60 years. Details as to how Hillsdale County was specifically affected are not available.

25. Ice and Sleet Storms

"Ice storms," according to the Michigan Hazard Analysis, "are sometimes incorrectly referred to as sleet storms. Ice storms are the result of cold rain that freezes on contact with the surface, coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. When electric lines are downed, households may be without power for several days, resulting in significant economic loss and disruption of essential services in affected communities."

The following table cites specific ice events that affected Hillsdale County:

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TABLE IV-25, Ice and Sleet Events, Hillsdale County (1950-2010)		
Date	Description	MCD's
March 2 to 7, 1976	Ice Storm with accompanying high winds and tornadoes struck Hillsdale and 28 other counties in central Lower Michigan. The storms, considered to be one of the worst to hit the state, caused over \$56 million in damage and widespread power outages. A Presidential Major Disaster was granted.	Hillsdale County
01/01/1985	Ice Storm affecting Hillsdale and 12 other counties in southern Lower Michigan. Up to one inch of freezing rain downed tree limbs, trees, and power lines, blocked roads, and caused widespread power outages. More than 430 thousand electric customers were without power for up to 10 days. An estimated \$50 million in public and private damages, three deaths, and eight injuries are attributed to this event. A Governor's Disaster Declaration was issued.	Hillsdale County
14 Mar 1997	01:30:00 AM EST. Beginning and Ending Locations unknown. The worst hit areas included the counties of Jackson, Kalamazoo, Calhoun, Branch, and Hillsdale. Ice accumulations in these areas were near 1 inch. Power was out, up to 24 hours, in Kalamazoo County (29,000 customers) and Jackson County (38,000 customers). Statewide, over 250,000 customers were without power at the height of the storm. Trees and power lines were downed throughout the County Warning Area. Automobile accidents occurred almost continuously throughout the storm.	Hillsdale County

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A total of 11 ice storm events were reported in Hillsdale County between 1950 and 2010 to the NCDC, which is maintained by the National Oceanic and Atmospheric Administration¹. The most significant event was a heavy snowstorm that mixed with freezing rain causing more than \$5 million in property damage over most of Michigan (including Hillsdale County) in January of 1994. No deaths or injuries were attributed to these winter storm events.

26. Invasive Species

According to the Michigan Hazard Analysis, an invasive species is “a species that has been introduced by human action to a location where it did not previously occur naturally, becomes capable of establishing a breeding population in the new location without further intervention by humans, and becomes a pest, threatening the local biodiversity.” Michigan has experienced invasive insects, microbes, water species, and animal diseases. Historically, Michigan has had approximately one new invasive species introduced every 2 to 5 years. No human deaths or injuries have been reported because of an invasive species, the property damage to agriculture can be high.

Hillsdale County Hazard Mitigation Plan

Priority, Risk, and Vulnerability Assessment

The previous chapter of this plan identified a wide range of potential hazards facing Hillsdale County. However, each of these hazards do not pose the same degree of risk to the community. The purpose of this chapter is to identify those hazards which are likely to have the greatest impact on Hillsdale County in terms of property damage and public safety.

Hazards will be reviewed in terms of their likelihood of occurrence, percentage of the population affected, the severity of the hazard, and the potential for negative impacts on the local economy. A review of these hazards in terms of their risk, and the vulnerability they pose to the community will help guide the community in its development of mitigation strategies and actions. This type of analysis is critical. Hillsdale County, like other communities in Michigan, currently faces severe governmental revenue shortages. It is imperative that funds be allocated among projects and programs to deliver the greatest benefit to the community.

The hazard mitigation planning process must include a means of community participation and involvement to identify hazards which pose the greatest threat to the community.

Hazards which pose the greatest threat to the community were identified through a ranking process using the following six characteristics:

- likelihood of occurrence,
- percent of population affected,
- potential for causing casualties,
- negative economic affects,
- public awareness of the hazard, and
- the potential for corollary affects.

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Each of the potential hazards identified was ranked for each of the six characteristics of hazards. This ranking ranged from 0 to 10, with 0 being a rating of no significance and 10 being a rating of high significance. In addition, the characteristics were weighted to reflect perceptions of community values based upon discussions with the Director of Hillsdale County Emergency Management, the Hillsdale County Board of Commissioners, and representatives of Hillsdale County townships.

The **likelihood of occurrence** received 30% of the total weighting. The **percentage of population affected** and the **potential for causing casualties** each received 20% of the weighting. The **potential for negative economic effects** received 15%. **Public awareness** of the hazard received 5%, and the **occurrence of any corollary events** received 10%.

The ranking of each hazard for each of the six characteristics, and the application of weighting of the characteristics, resulted in a total rate score for each hazard. The higher the score, the more important the need to develop mitigation strategies and projects to reduce the severity of the event. The results of this analysis are found in the following table. The total ranking for each individual hazard was established by multiplying the individual ranking by the weight assigned to each characteristic. The sums of each of these individual ratings comprised the total ranking for each hazard.

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Hazard Ranking and Vulnerability														
Hazard	Likelihood of Occurrence		Percent of Population Affected		Potential for				Public Awareness of Hazard		Corollary Effects		Total	
					Causing Casualties		Negative Economic Effects							
	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rate	
Civil Disturbances	1	0.30	0	0.00	6	1.20	1	0.15	10	0.50	1	0.10	2.25	
Earthquakes & Subsidence														
Earthquakes	2	0.60	10	2.00	1	0.20	1	0.15	10	0.50	1	0.10	3.55	
Subsidence	1	0.30	0	0.00	1	0.20	0	0.00	10	0.50	0	0.00	1.00	
Fire Hazards														
Scrap Tire Fires	3	0.90	1	0.20	1	0.20	0	0.00	10	0.50	1	0.10	1.90	
Structural Fires	10	3.00	3	0.60	5	1.00	2	0.30	0	0.00	0	0.00	4.90	
Wildfires	7	2.10	2	0.40	1	0.20	1	0.15	9	0.45	2	0.20	3.50	
Flooding Hazards														
Riverine Flooding	8	2.40	1	0.20	1	0.20	4	0.60	5	0.25	5	0.50	4.15	
Shoreline Flooding	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00	
Dam Failures	1	0.30	1	0.20	1	0.20	3	0.45	10	0.50	5	0.50	2.15	
Energy and Utility/Infrastructure Failures														
Energy Emergencies	10	3.00	10	2.00	2	0.40	3	0.45	0	0.00	2	0.20	6.05	
Significant Infrastructure Failures	2	0.60	8	1.60	2	0.40	8	1.20	8	0.40	2	0.20	4.40	
Transportation Accidents	0	0.00	0	0.00	8	1.60	0	0.00	0	0.00	1	0.10	1.70	

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Hazard Ranking and Vulnerability Cont...														
Hazard	Likelihood of Occurrence		Percent of Population Affected		Potential for				Public Awareness of Hazard		Corollary Effects		Total	
	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rate	
Hazardous Materials Incidents														
Fixed Site HazMat Incident	1	0.30	1	0.20	2	0.40	2	0.30	9	0.45	1	0.10	1.75	
HazMat Transportation Incident	1	0.30	1	0.20	1	0.20	1	0.15	5	0.25	1	0.10	1.20	
Nuclear Power Plant Accidents	0	0.00	0	0.00	0	0.00	0	0.00	10	0.50	0	0.00	0.50	
Oil & Gas Well Accidents	4	1.20	1	0.20	1	0.20	0	0.00	8	0.40	0	0.00	2.00	
Pipeline Accidents	1	0.30	1	0.20	1	0.20	1	0.15	9	0.45	1	0.10	1.40	
Homeland Security														
Nuclear Attacks	1	0.30	5	1.00	5	1.00	5	0.75	10	0.50	5	0.50	4.05	
Terrorism/Sabotage/WMD	1	0.30	1	0.20	1	0.20	0	0.00	10	0.50	0	0.00	1.20	
Public Health Emergencies	1	0.30	5	1.00	5	1.00	5	0.75	10	0.50	5	0.50	4.05	
Extreme Weather														
Drought	2	0.60	10	2.00	1	0.20	1	0.15	9	0.45	2	0.20	3.60	
Extreme Temperature	10	3.00	3	0.60	1	0.20	0	0.00	10	0.50	0	0.00	4.30	
Thunderstorms														
Hail	10	3.00	3	0.60	1	0.20	1	0.15	0	0.00	2	0.20	4.15	
Lightning	10	3.00	3	0.60	3	0.60	1	0.15	0	0.00	2	0.20	4.55	
Severe Winds	10	3.00	3	0.60	1	0.20	1	0.15	0	0.00	2	0.20	4.15	
Tornadoes	8	2.40	3	0.60	5	1.00	5	0.75	0	0.00	2	0.20	4.95	
Severe Winter Weather														
Snow Storms	10	3.00	10	2.00	1	0.20	0	0.00	0	0.00	2	0.20	5.40	
Ice and Sleet Storms	10	3.00	10	2.00	1	0.20	0	0.00	0	0.00	2	0.20	5.40	
Percent of Points	30%		20%		20%				15%		5%		10%	100%

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The evaluation of risk and vulnerability conducted by staff led to a preliminary prioritization of hazards facing Hillsdale County to be: 1) Energy Emergencies, 2) Snow Storms, 3) Ice Storms, 4) Tornadoes, 5) Structural Fires, 6) Lightning, and 7) Significant Infrastructure Failures. These preliminary priority hazards were presented to and reviewed by the Director of Hillsdale County Emergency Management, the Hillsdale County Board of Commissioners, and representatives of Hillsdale County townships. This review by local officials resulted in a modification of these priorities.

Local officials noted the presence of oil and gas wells in Hillsdale County and expressed the need to include oil and gas wells as a priority hazard, instead of “significant infrastructure failures”. In addition, local officials voiced local concern for wildfires and replaced lightning with wildfire hazards, noting that lightning was the cause of many wildfires. Finally, local officials directed that “public health emergencies” be added as a priority hazard, expressing concern, in particular, for livestock disease, but also for other infectious diseases which could infect residents.

The eight hazards identified by local officials in priority order are cited in the “Top Hazards” sidebar.

Top Hazards	
#1	Energy Emergencies
#2	Snow Storms
#3	Ice Storms
#4	Tornadoes
#5	Structural Fires
#6	Wildfires
#7	Oil and Gas Wells
#8	Public Health Emergencies

Hillsdale County Hazard Mitigation Plan

Goals and Objectives

The establishment of goals and objectives is a critical component of any community master plan. Goals provide general direction for the community and serve as the basis for the formation of policy and decision making. Goals help to explain what the community intends to achieve as a result of the planning process. Goals are long-term and generally represent broad visions for the community.

Objectives are benchmarks which may be used to determine whether goals are met. Objectives are specific, measurable and have a defined completion date. The development of these goals and objectives was based in part upon the goals included in the Hillsdale County Comprehensive Plan adopted on December 12, 2002 and in discussions with local officials.

Goals and objectives for the Hillsdale County Hazard Mitigation Plan are as follows:

- 1. Encourage all units of government to work together to develop policy, plans, and zoning ordinances consistent with one another so that all the people and uses of the land can co-exist in a manner that protects the environment, the people who live in the county, and businesses and industries that conduct operations within Hillsdale County.**
 - A. Maintain a meaningful communication program with all the townships, villages and cities in Hillsdale County.
 - B. Continually provide opportunities for public input on growth and development issues facing local and county government.
 - C. Expand county public facilities and services as necessary for protection and maintenance of the public health, safety, and welfare, provided improvements are consistent with the Hillsdale County Comprehensive Plan future land use pattern.
 - D. Implement a program that fosters intergovernmental coordination in growth management and planning decisions.
 - E. Identify communities that may be in need of improved public services.
 - F. Prioritize a schedule of improvements that addresses timing, cost and possible funding sources.

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- G. Develop and maintain regular and meaningful communication programs with local units of government. This encourages regional agencies to discuss and plan for infrastructure and non-infrastructure based public facilities and services. Additionally, there should be opportunities for shared facilities and services incorporating alternative strategies for contracted services versus individual local unit of government-operated services.

2. Encourage well-planned intensive development in existing urban areas or existing growth corridors that have public services available.

- A. Encourage local units of government to expand public facilities and services such as public water and sewer or paved roads, particularly where the public health, safety, or welfare are at risk.
- B. Promote residential development in and around existing urbanized areas where community facilities and services can be both effective and efficient.
- C. Develop and implement land use policies that foster a safe efficient transportation network.
- D. Develop a priority review system for paving streets and roads that considers land use and appropriate decisions.
- E. Support intensive uses and developments along major roadways that reduce the number of access points.
- F. Expand alternative transportation facilities, including walkways and bicycle paths.
- G. Encourage input into the local process so that the potential for traffic congestion and hazards can be minimized.
- H. Encourage the development of infrastructure that will support high tech services.
- I. Review of land uses and zoning changes at the county level will include consideration as to how the proposed development preserves the agricultural and rural character of the countryside.
- J. Develop model zoning regulations that are designed to protect farming activities in agricultural areas from nuisances associated with incompatible adjacent uses.

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- K. Where residential development must occur in agricultural areas, encourage that the land be divided and subsequent structures built on less productive farmland.
- L. Recognizes the potential conflicts that can occur between agricultural and residential uses. Support farming operations and practices when those farm activities meet Michigan Department of Agriculture's (Right to Farm Act) Generally Accepted Agricultural Management Practices (GAMPS).

3. Encourage the preservation of the County's agricultural base, its open space, and natural resources by supporting growth in and around existing urbanized areas.

- A. Provide a framework for preservation of open spaces by coordinating local land use plans and related documents.
- B. Protect the open space and rural character of the county from encroaching sprawl.
- C. Protect open spaces, including environmentally sensitive lands, woodlots, fields and farmlands, while at the same time providing landowners a reasonable use of the land.
- D. Local units of government are encouraged to adopt programs and tools specifically designed to preserve open space.
- E. Protection of groundwater resources, natural features, and other environmental features must be a primary consideration when reviewing zoning development proposals.
- F. Facilitate the education with regards to the county's reliance on its water resources and the potential negative affects that irresponsible land use can cause.
- G. Assure that new intensive types of developments comply with applicable local, county, state and federal regulations.
- H. Encourage the preservation of open space within planned intensive developments.
- I. Protect and preserve agricultural areas within the county that have prime agricultural soils.

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- J. Preserve major farms, Centennial Farms, and lands enrolled in PA 116 or other conservation programs or easements.
- K. Consider the potential future negative impacts on the county as a whole, prior to extending or improving infrastructure services into and through rural and agricultural areas.
- L. Promote adoption of township zoning standards that discourage haphazard residential sprawl into the rural agricultural areas.

4. Support the establishment of a sound economic base through a combination of industrial and commercial establishments.

- A. Commercial development should be supported in urbanized areas and where high intensity uses already exist, and sewer, water, and other infrastructure is available.
- B. Encourage clustered commercial uses that minimize curb cuts and driveways.
- C. Support new commercial development and redevelopment and residential uses.
- D. Utilize office uses as transition areas between commercial development and residential uses.
- E. Encourage development of a training infrastructure that will support a highly skilled work force.
- F. Encourage industrial development in existing industrial parks where roads, water and sewer exist.
- G. Encourage redevelopment of abandoned industrial sites.
- H. Ordinance regulations should require adequate landscaping, open space, or other means to limit conflicts between uses.
- I. Implement a plan that prevents the premature conversion of land to uses other than their long-term planned use.
- J. Provide opportunities for home-based occupations.

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- 5. Promote Hillsdale County as a place with individual identity while maintaining a rural character; keeping the diversity of people and environment in balance and encouraging orderly community growth.**
- A. Develop and utilize recreation programming that covers all ages, all program areas, and all seasons, and include programs for special populations.
 - B. Develop cultural interest programs.
 - C. Develop plans that promote fitness and wellness, and implement them.
 - D. Develop a program plan to increase park usage, incorporating existing and future facilities.
 - E. Encourage, maintain, and update the county's five (5) year Parks and Recreation Plan including an inventory of existing facilities and services.
 - F. Identify deficiencies in its recreation facilities and services and encourage development where these programs are not available.
 - G. Provide for alternative affordable housing developments, particularly in the urbanized areas where adequate services needed to support those developments already exist.
 - H. Plan for residential developments that will minimally encroach or encourage sprawl into agricultural areas.
 - I. Encourage local units of government to seek alternative types of housing.
 - J. Assist communities in the adoption of flexible zoning techniques such as Planned Unit Developments (PUD) and Open Space Ordinances that promote clustered developments.
 - K. Assist townships, cities, and villages in their efforts to adopt ordinance regulations that incorporate the preservation of natural resource systems and open space.
 - L. Discourage residential development in areas where public services and/or natural conditions are inadequate to support the proposed density.

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- M. Develop model ordinances that townships can adopt whose purpose is to foster the establishment of residential developments that maintain rural character and preserve agricultural land.
- N. Develop a uniform system to assemble information from applicants for land development projects to ensure that utilities, infrastructure, and services are adequate to serve the proposed loses.
- O. Encourage townships to adopt and implement ordinance provisions that are consistent with one another, while at the same time, maintaining and preserving agricultural land.
- P. Assist townships that do not have land use plans or zoning ordinances to prepare and adopt these documents.

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Hazard Mitigation Plan and Mitigation Strategies

Research conducted on various natural, technological, and man-made hazards reveals that, relative to other areas of the United States, Hillsdale County is a relatively safe place to live. Loss of life and damage to property from the hazards reviewed is relatively minimal. The Hillsdale County community is not plagued with threats from recurrent hurricanes, riverine flooding common to other areas of the Midwest, earthquakes of the potential evident in the western United States, or the types of wildfires common in dry climates on the U.S. west coast. The community does, however, face significant threat to life and property associated with electrical power failures, severe winter snow and ice storms, tornadoes, structural fires, wildfires, threats from oil and gas wells, and public health emergencies.

The purpose of this plan is to anticipate the potential consequences of these events upon the community and to take measures and implement strategies to minimize the impact of the severity of these hazards. The plan is intended to protect the health, safety, and economic interests of residents by reducing the impacts of these natural, technological, and man-made hazards through hazard mitigation planning, awareness, and implementation.

Action taken to eliminate or reduce the long-term risk to human life and property will not only help to minimize the impacts of disasters, but will enable a rapid recovery and restoration of community normalcy. As such, the Hazard Mitigation Plan is an essential element of emergency planning, in addition to the emergency services offered by Hillsdale County's law enforcement, fire protection, public health, and emergency medical services, and their activities and planning for preparedness, response, and recovery.

Local governmental units in Hillsdale County, in common with local units of government throughout the state, face increasingly difficult challenges in terms of revenues to fund local governmental operations, activities, and programs. Planning for natural disasters and implementing measures to mitigate those disasters, can, in the long run, save tax dollars.

FEMA has noted that every dollar spent on hazard mitigation results in a savings of four dollars. While the responsibilities of local government extend well beyond addressing the potential hazards local communities face, the wise use of expenditures to mitigate such hazards will benefit the community in terms of the funding need for all local governmental operations.

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Simply put, limited dollars should be expended where they generate the greatest amount of effectiveness in terms of the delivery of public services. It should also be noted, that the collective efforts of local government in developing hazard mitigation strategies and actions will result in savings nationally, and will contribute to the well being of our nation.

A set of mitigation strategies have been developed for Hillsdale County by the staff of the Region 2 Planning Commission, which were updated and then reviewed by the Hillsdale County Board of Commissioners at a regular meeting on November 27, 2018. Citizens in attendance were offered an opportunity to participate in the review process. The proposed plan and mitigation strategies were also sent electronically to the clerk of each township city and village and was presented to the Hillsdale Chapter of the Michigan Townships Association at their regular meeting of December 5, 2018. The draft plan was modified according to input received.

The result of the efforts by the Hillsdale County Board of Commissioners with input from citizens and from Hillsdale County local units of government were a set of mitigation strategies which could be applied to address the hazards the community faces. These strategies could be categorized in two ways. First, a set of strategies were proposed which could apply generally to address all of the hazards which face the Hillsdale communities. Second, strategies were identified to address priority hazards focused on by the local units of government mentioned above.

Strategies that would apply to all hazards are:

1. **Implement and enhance public information and education programs aimed at Hillsdale County citizens regarding potential emergencies and how to prepare and respond.** As result of the preparation of this plan and the comprehensive view of hazards facing the community, it was determined that there is a need to develop an enhanced public information and education program to inform citizens about the potential hazards facing Hillsdale County. A knowledgeable citizen base can do much to minimize the potential for damage and threat to human life.
2. **Incorporate hazard mitigation planning in the community master planning.** As a means of mitigating the hazards facing the county, there is a need to incorporate hazard mitigation planning into each community's master planning process. The protection of the public, health, safety and welfare is central to governmental planning. The incorporation of hazard mitigation planning as an elemental part of the community planning process will assure a review of the hazard mitigation plan at least once every five years when the Community Master Plan is reviewed and updated.

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3. **Update the hazard mitigation plan every five years, or as deemed necessary.** An update of the hazard mitigation plan every five years will offer an opportunity to reassess the hazards facing the community and adjust mitigation strategies as necessary. This review and adjustment will result in a maximization of the use of limited resources and a reduction of the impacts of the hazards.

Much progress has been made on strategy number one, though still more work remains. Through websites, media campaigns, and community notification systems, citizens are better and more rapidly informed when events threaten their lives, homes and businesses. Limited progress has been made on strategy number two. Strategy number three is the purpose of this most recent update.

Mitigation Strategies for Specifically Identified Hazards

As noted in the “Hazard Risk and Vulnerability” chapter of this report, priorities have been established for the following hazards in decreasing order of importance:

1. Energy Emergencies
2. Snow Storms
3. Ice Storms
4. Tornadoes
5. Structural Fires
6. Wildfires
7. Oil and Gas Well Hazards
8. Public Health Emergencies

Each of these emergencies is addressed below. In addition, other emergencies, which have not been identified as a particular hazard to the community, but which, because of their severity, prevalence, or their impact

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on large numbers of community residents, are also addressed. In each case, strategies are proposed for implementation to minimize potential damages from these catastrophic events.

Energy Emergencies

The top hazard facing Hillsdale County is the interruption of electrical energy to the community's industry, business, institutions, and private residences. Interruptions are frequently, but not always, caused by storm events. The following mitigation strategies are proposed:

1. Critical facilities, such as hospitals, schools, jails, nursing homes, emergency communication facilities, care facilities and similar institutions require the use of backup generators for electrical power in the event of a power failure. A prioritized listing of equipment needs and costs should be assembled by each of these entities so that the purchase, update or repair of equipment can be scheduled based on resources available to meet the need.
2. Where possible, to resist damage from severe winds and the accumulation of ice, electrical and telephone lines should be buried where the costs associated with the activity can be justified based upon the costs of service disruption, the likelihood of recurrence, or the public health and safety risk to the community. The cost of such action will be determined and lines will be buried where justified when funds allow.
3. Various utility service providers, such as electric utilities, telephone companies and cable television services, have programs to minimize tree damage to their lines. These maintenance programs and the development of a policy regarding the types of vegetation to be located within utility corridors to minimize potential service outage should be coordinated. The representatives of these utilities should meet to discuss the coordination of these activities to reduce costs and the development of a vegetation policy.

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4. Redundancies in utility and communication systems, especially those associated with critical communications, public safety, and health care should be implemented where feasible to reduce or eliminate downtime.

Ice and Snowstorm Emergencies

Hillsdale County has experienced ice and snow storm emergencies in the past. These emergencies are associated with large amounts of snowfall or ice storms in which the accumulation of ice results in slips and falls, transportation hazards due to impassable or slippery conditions, downed trees and tree limbs, and energy failures associated with fallen tree limbs and the sheer weight of ice on powerlines and poles. Mitigation strategies for ice and snow storms are as follows.

1. There is a need for pre-planning for debris management staging and storage areas. In anticipation of downed trees and tree limbs, strategies must be in place to predetermine locations for the collection and processing of snow and tree limbs in urban areas. The establishment of such staging areas will facilitate the clearing of roads and handling of debris and snow. Specific plans for disposal of debris cannot be made until you know what it is and where it is located. The county Emergency Plan generally addresses the disposal of snow and debris in an expedient fashion, mostly by disposal in the right of way along and beside all county roads.
2. The American Red Cross has identified local schools, churches and other buildings throughout the county as shelters which could be designated as warming sites where vulnerable residents could go to escape the effects of loss of heat in their homes due to power outages. These locations will be announced to the public through numerous means as these sites are opened depending on need and the availability of the sites identified. Not all sites will be opened in every instance. When funding or grants become available, priority for funding of emergency generators, perhaps on a cost share basis, should be given to those sites willing to serve as shelters but which do not have emergency power available.

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Tornadoes

Hillsdale County has experienced deaths and substantial property damage from tornadoes. While no wide-spread tornado damage has been experienced over the past several years, tornado events are possible and could result in loss to human life and substantial property damage in the county. Mitigation strategies to address the potential effects from tornadoes are as follows:

1. Public early warning systems will be assessed to determine their function, adequacy, and coverage. Sirens will be installed where warranted, and those in operation will be prepared or replaced where necessary as local funds and grant funds permit. The County does not own or maintain any sirens. It is the responsibility of each local municipality, lake association, etc. to install and maintain their siren system(s) as they see fit. Particular attention, however, should be focused on mobile home parks and lake communities where a warning siren may be installed to provide an audible warning to residents who are frequently outdoors where sirens do the most good. Citizens are also encouraged to take steps to keep themselves informed of daily weather forecasts and hazards using NOAA weather radio, cell phone “apps” and other tools that are readily available at little or no cost.
2. There is a need to assure that anchoring required in building codes and the HUD manufacturing code for manufactured housing is provided and properly installed. The responsibility for this review rests with local units of government and building codes.
3. Shelter areas – certain areas should have tornado shelters that are accessible to nearby residents and the public. Local officials should meet with mobile home park owners to determine the feasibility of installing tornado shelters for park residents where none currently exist. Where there is a need for such shelters, funding alternatives should be determined and the operators should be encouraged to construct the shelter.
4. Hillsdale County’s Emergency Management Office and Emergency Operations Center have been moved into a building co-located with Central Dispatch with back-up power installed. This building was designed and built to withstand all but the EF-4 and EF-5 tornadoes. This will not guarantee but make more probable the availability of these functions.

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Structural Fires

Structural fires pose a threat to human life and are a leading cause of property damage and destruction in Hillsdale County. In addition to these losses, the cost of fire protection services is perhaps the highest budgeted item for most local units of government. Mitigation strategies to both reduce the incidents of structural fires and reduce the cost of fire protection services are as follows:

1. There is a need to expand fire protection sprinkler systems, particularly in existing older buildings in downtown areas. Fire protection sprinkler systems are effective in extinguishing structure fires. Sprinkler systems are especially important in high rise buildings in downtown areas, where, due to the number of persons working in buildings, evacuation of large numbers of people is cumbersome.
2. Hillsdale County has a good system of fire protection provided by its local units of government. An effective mutual aid system exists. The biggest challenge to most of these departments is adequate personnel coverage during week day hours. Local units of government should review and consider the development of additional intergovernmental agreements for cooperation in responding to fire emergencies, including equipment purchases and training, to promote cooperation among and between units and reduce fire protection costs. The goal of such efforts should be enhancement of fire protection services at a reduced cost. The responsibility for the implementation of these measures rests with the collective fire departments in the county and their local governing bodies.
3. All citizens should be strongly encouraged to install and maintain smoke detectors to minimize the loss of lives and property from structural fires.

Wildfire Emergencies

Wildfires are a concern of local officials. The county experiences numerous wildfires and grass fires every year. Many of these pose a threat to structures in or near their path. As residential development continues to grow in rural areas, any one of these fires could pose a serious threat to large numbers of dwellings and

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to the lives of their residents if they grow beyond local control. The following strategies are recommended to mitigate the potential impacts of wildfires:

1. The county, or its local units of government, should consider the creation and enforcement of local ordinances that require burn permits and the restriction of campfires and outdoor burning during dry times of the year. Note – few local ordinances exist due to the existence of these at the State level.
2. Local communities, along with the county, should require the clean-up of areas of abandoned or collapsed structures and removal of accumulated junk and debris within a reasonable time to minimize the potential for arson or spontaneous combustion. Townships who have attempted this, however, have been met with strong citizen resistance in some cases.
3. Promote the safe disposal of yard and household waste rather than through open burning by providing community mulching areas for yard waste and recycling sites for household waste.
4. Residents should be educated in the safe use, cleaning, and maintenance of fireplaces and chimneys and encouraged to use spark arresters at the top of their chimney.

Oil and Natural Gas Well Accidents

Hillsdale County has a large number of oil and gas wells. Although the industry has a good safety record in Hillsdale County, the threat of accidental releases, fire, and explosions exists. Therefore, local officials have indicated an interest in identifying mitigation strategies. Strategies proposed for oil and gas hazard mitigation are as follows:

1. There is a need to develop a community awareness program in those townships and affected cities and villages to advise area residents of potential dangers and personal protection actions.
2. Buffer strips should be constructed to segregate wells, storage tanks, and other production facilities from roads and adjacent land uses consistent with the level of risk posed.
3. A program of public awareness of pipeline location and emergency procedures should be employed by the owners of these facilities in conjunction with the local unit of government.

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4. Wells that are no longer active or usable should be filled and capped according to State of Michigan guidelines.

Public Health Emergencies

There is a need to consider the threats of infectious diseases to residents. In particular, older residents are at risk, and over the 20-year planning horizon, Hillsdale County will continue to have a comparatively large percentage of older persons in its population.

The responsibility for addressing public health emergencies rests with the Branch/Hillsdale/St. Joseph Community Health Agency. The Health Agency has an emergency preparedness coordinator. This coordinator, in conjunction with the agency director, has the responsibility to assess community health emergencies and to implement appropriate measures to address these emergencies. The following mitigation strategies have been recommended and will be implemented with the assistance and participation of the coordinator:

1. Residents are encouraged to receive immunizations against communicable diseases. The health department has programs to provide residents with immunizations against communicable diseases. Flu shots are issued at clinics held at the start of the flu season, usually in early October. Vaccines are available at these clinics. It is particularly important that immunization promotion be targeted to residents who are the most vulnerable to disease. Older residents and residents with conditions affecting immunity should be offered immunizations. It may be necessary to offer incentives to these vulnerable populations to boost the number of immunizations to a level which minimizes the spread of disease. Immunizations are also available at many local pharmacies, doctor's offices and the Hillsdale Hospital for a fee which may be covered by health insurance.

These immunizations may not only result in a healthier population, they may also provide a reduction in the amount of sick time taken by employees for Hillsdale area businesses. Savings in productivity

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may substantially exceed the cost of the immunization program. The Branch/Hillsdale/St. Joseph Community Health Agency is encouraged to continue its immunization program and to seek grant resources where necessary to assist in program implementation.

2. A program is in place in the community to increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential health emergencies. Low-cost measures are available for individuals to protect themselves from infectious diseases. An on-going information campaign is necessary to enhance the current public information and awareness programs regarding the causes, symptoms, and protective actions to address disease.
3. There is a need to assess the potential for diseases affecting livestock, and in particular, diseases which may affect wildlife with the possibility of a crossover of these diseases into farm animals and human populations. The MSU Cooperative Extension service office and website offers updated information regarding the prevention of disease for farm animals and wildlife.

In addition, a program to cull the deer population in the City of Hillsdale has been implemented. This program is undertaken in cooperation with the Michigan Department of Natural Resources (MDNR). Herd management may be necessary on an ongoing basis to control population levels and maintain the health of deer herds to avoid the spread of disease. A continuation of the program is recommended subject to review and approval by MDNR.

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Plan Maintenance and Implementation

Implementation

The implementation of the Hillsdale County Hazard Mitigation Plan will depend upon the cooperative efforts of the Hillsdale County Planning Commission and the planning committees and commissions of all local units of government.

Plan Update

The Hillsdale County Hazard Mitigation Plan will be made available through the Emergency Management page on the Hillsdale County website to all local units of government who will be encouraged to incorporate the hazard mitigation planning process into their local master plans. At the time of update, the community will be advised of the contents of the Hazard Mitigation Plan so that they may incorporate relevant provisions of the plan into their local master plan. In addition, the local units will be encouraged to review potential hazards facing their unit of government and to develop mitigation strategies which can be applied. The strategies resulting from this effort should be provided to the Hillsdale County Emergency Management office for their use in the preparation of this and future updates to this document.

Public Participation

Public participation is viewed to be an important component in the planning process, in the development of in the goals, objectives, and strategies contained within the plan, but also to facilitate the implementation of strategies.

The public is offered the following opportunities for participation in the hazard mitigation planning process:

1. **Public hearings** – public hearings should be held by each unit of government which considers adoption of or reviews the Hillsdale County Hazard Mitigation Plan at one of their regularly scheduled meetings.
2. **Public discussion** – public discussion should be held in these forums specifically for the plan at the meetings mentioned above.

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3. **Web based opportunities** – The provisional new plan will be posted on the County Website for citizen review and participation in the updating process.