# CASS COUNTY

# MICHIGAN

# HAZARD MITIGATION PLAN

# 2024

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## Glossary

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| BFE | Base Flood Elevation |
| CI/KR | Critical Infrastructure and Key Resources |
| DFIRM | Digital Flood Insurance Rate Map |
| DMA 2000 | Disaster Mitigation Act of 2000 |
| EMS | Emergency Medical Services |
| EMC | Emergency Management Coordinator |
| EMHSD | Emergency Management and Homeland Security Division |
| EAG | Emergency Action Guidelines |
| EOP | Emergency Operations Plan |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FMA | Flood Mitigation Assistance Grant Program |
| FP&S | Fire Prevention and Safety Grants |
| FOUO | For Official Use Only |
| HMGP | Hazard Mitigation Grant Program |
| HMP | Hazard Mitigation Plan |
| HMPG | Hazard Mitigation Planning Group |
| ICS | Incident Command System |
| LEPC | Local Emergency Planning Committee |
| MSP | Michigan State Police |
| NEHRP | National Earthquake Hazards Reduction Program |
| NEIC | National Earthquake Information Center |
| NFHL | National Flood Hazard Layer |
| NFIP | National Flood Insurance Program |
| NOAA | National Oceanic and Atmospheric Administration |
| NWS | National Weather Service |
| PDM | Pre Disaster Mitigation Grant Program |
| PoC | Point of Contact |
| RFP | Request for Proposal |
| SOP | Standard Operating Procedure |
| SSURGO | Soil Survey Geographic Database |
| USACE | United States Army Corps. Of Engineers |
| USDA | United States Department of Agriculture |
| USGS | United States Geological Survey |
| WID | Watershed Improvement District |
| WUI | Wildland Urban Interface |

## *1. Introduction*

Understanding the Emergency Management Cycle is the first step in effectively planning and operating in relation to all disaster related activities. The emergency management cycle is an open-ended and ongoing process. The five phases in the process are prevention, mitigation, preparedness, response, and recovery.

**Emergency Management Cycle**

"Hazard mitigation" is any action taken to permanently eliminate or reduce the long-term risk to human life and property from natural and technological hazards. It is an essential element of emergency management along with prevention, preparedness, response, and recovery.

Mitigation encourages long-term reduction of hazard vulnerability. As is the goal of emergency management, the goal of mitigation is to save lives and reduce property damage.

Cass County and its comprising jurisdictions, townships, villages, and city are susceptible to a wide range of natural, technological, man-made hazards, acts of terrorism, hazards that can threaten life and health, and impact the quality of life, property, the environment, and infrastructure. The Cass County Hazard Mitigation Plan was created to protect the health, safety, and economic interests of all who live, work, or pass through this community by reducing the impacts of natural and technological hazards through hazard mitigation planning, awareness, and implementation.

With that in mind, this plan shall serve as the foundation for hazard mitigation activities within the community. Implementation of the plan's recommendations is intended to help reduce injuries, loss of life and or destruction of property due to natural and technological hazards. The plan provides a path toward continuous proactive reduction of vulnerability to the most frequent hazards which result in repetitive and often severe social, economic, and physical damage. The ideal end-state will be total integration of hazard mitigation activities, programs, capabilities, and actions into normal day-to-day governmental functions, management practices, local zoning ordinances, building codes, and master plans.

The ability to integrate the Cass County Hazard Mitigation Plan into the larger framework of planning within the community has been met with many challenges. The focus of most planning within Cass County is on singular Local Township, Village, and the City of Dowagiac's Master Plans, covering population, housing and economic development, land use development, zoning, facilities, services, utilities, and transportation. While Townships, Villages, and the City of Dowagiac have Planning Commissions, the Master Plans are usually developed by companies outside of the community that have a pre-developed structure of what the Master Plan they develop will look like, which often leaves the Cass County Hazard Mitigation Plan as just a reference document with little integration, rather than the valuable planning document that it is.

Cass County's Office of Emergency Management is committed to Hazard Mitigation Plan integration and continues to work local officials and planners from Cass County, Townships, Villages, and the City of Dowagiac on the integrating of Cass County's Hazard Mitigation Plan into other planning mechanisms, and urge planning officials to think more comprehensively about the challenges facing a community, how to address them with the resources available, and how to guide the public and its decision makers toward goals and objectives that are reasonably constructed to achieve the desired results.

Many local government professionals are trained to manage particular and often isolated functions—civil engineering with sewer and water systems, for example, or law enforcement and fire officials with public safety—but few are trained to think about the welfare of the community in its entirety, with all the complex relationships that exist among land use, economic development, population growth, the environment, and the physical impact of the built environment on any number of other factors. Planners' ability to think big, long-term thoughts about the interrelatedness and interdependency of all these factors is crucial for hazard mitigation planning.

**The Disaster Mitigation Act of 2000 (DMA 2000)**

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 became law on October 30, 2000, and amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the "Stafford Act") (Public Law 93-288, as amended). Regulations for this activity can be found in Title 44 of the Code of Federal Regulations Part 206, Subpart M.

This legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. This act establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program.

Section 322 of the act specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for mitigation planning activities and increases the amount of

HMGP funds available to states who have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

The Disaster Mitigation Act of 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network will better enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. To implement the new Disaster Mitigation Act of 2000 requirements,

FEMA prepared an interim final rule, published in the Federal Register on February 26, 2002, at 44 CFR Parts 201 and 206, which establishes planning and funding criteria for states and local communities.

On October 31, 2007, FEMA subsequently published an Interim Rule in the Federal Register, which ensures the Flood Mitigation Assistance (FMA) program planning requirements are consistent with the mitigation planning regulations as cited in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201).

This interim rule established that local communities must comply with mitigation planning requirements to be eligible to apply for FEMA mitigation project grant funding, including FMA and FEMA's Severe Repetitive Loss Program. Meeting the requirements of the regulations cited above ensures participating jurisdictions in the planning area will be eligible to receive disaster assistance, including hazard mitigation grants available through the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended.

Cass County has the responsibility to coordinate activities relating to hazard evaluation and mitigation, and to prepare and submit to FEMA a local Cass County Hazard Mitigation Plan, following the criteria established in 44 CFR 201.6 and Section 322 of the Disaster Mitigation Act of 2000 (Public Law 106390).

***1.1 Purpose***

There are two primary purposes for creating a Hazard Mitigation Plan. First, the county is required to review all projects that involve the expenditure of County funds. The plan will serve as one basis for such a review.

Just as importantly, the County's Hazard Mitigation Plan is an excellent resource and guide for all manner of development projects proposed or being considered within Cass County. The Cass County Hazard Mitigation Plan can serve as an excellent tool for helping to evaluate good planning and support healthy development throughout Cass County.

Formal adoption and implementation of the Cass County Hazard Mitigation Plan will benefit Cass County, the City of Dowagiac, Villages, Townships, and school districts. By identifying problems and possible solutions in advance of a major emergency or disaster, Cass County and the participating jurisdictions will be in a better position to obtain pre- and post-disaster funding.

### *1.2 Executive Summary*

The Cass County Hazard Mitigation Plan is being updated to revise hazard mitigation activities for Cass County. The Cass County Hazard Mitigation Plan update is led by the Cass County Office Emergency Management Homeland Security and the Cass County Local Emergency Planning Committee (LEPC) evaluating mitigation measures to be undertaken, outlining a strategy for implementation.

With input from and approval of members of the Cass County Local Emergency Planning Committee (LEPC), county and local officials, and constituents whom they represent, the Cass County Hazard Mitigation Plan was created to protect the health, safety, and economic interests of Cass County residents and businesses by reducing the impacts of natural and technological hazards through hazard mitigation planning, awareness, and implementation.

The plan serves as the foundation for hazard mitigation activities and actions within Cass County. Implementation of recommendations will reduce loss of life, destruction of property and economic losses due to natural and technological hazards. The plan provides a path toward continuous, proactive reduction of vulnerability to hazards, which result in repetitive and oftentimes severe social, economic, and physical damage. The ideal end state is full integration of hazard mitigation concepts into day-to-day governmental and business functions and management practices.

This plan employs a broad perspective in examination of multi-hazard mitigation activities and opportunities in Cass County. Emphasis is placed on hazards that have occurred over time and that have resulted in threats to the public health, safety, and welfare, as well as the social, economic, and physical fabric of the community.

The plan addresses such hazards as floods, tornadoes, windstorms, winter storms, structural fires, hazardous material incidents and secondary technological hazards. Each hazard is analyzed from an historical perspective, evaluated for potential risk, and considered for possible mitigation action.

**This Cass County Hazard Mitigation Plan covers:** The County of Cass, the City of Dowagiac, the Villages of Cassopolis, Edwardsburg, Marcellus, and Vandalia, the Townships of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, and Wayne.

This document aims to produce the following outcomes:

1) Reduce loss of life and property within Cass County, the City of Dowagiac, Villages, Townships, and school districts due to natural disasters; and
2) Provide the framework and coordination to encourage government, and public and private organizations at all levels, to undertake mitigation to minimize potential disasters and to employ mitigation strategies in the recovery stages following disasters.

These outcomes will be brought about through the following planning process:

1) Identify, describe, and characterize the hazards to which Cass County and the plan's participating jurisdictions are susceptible.
2) Assess the risk of each hazard, including probability, frequency, exposure, and vulnerability.
3) Examine feasible mitigation opportunities appropriate for the identified hazards and prioritize those opportunities.
4) Implement mitigation actions to reduce loss of lives and property.
5) Identify mitigation opportunities for long-term planning consideration.

### *1.3 Acknowledgements*

Development of the Cass County Hazard Mitigation Plan required the time, talents, effort, and ideas of numerous individuals. Community leaders, residents, companies, Cass County staff, local, state, and non-profit organizations participated in the review, preparation, evaluation, and community outreach components of this Plan. Cass County would like to acknowledge and thank the participating jurisdictions for their cooperation and assistance in developing the Cass County Hazard Mitigation Plan:

- American Red Cross
- Borgess-Lee Memorial Hospital
- Cass County Board of Commissioners
- Cass County Central Dispatch
- Cass County Council on Aging
- Cass County Emergency Management
- Cass County Fire Association
- Cass County Drain Commissioner
- Cass County Medical Care Facility
- Cass County Public Transit
- Cass County Sheriff's Office
- Cass County Animal Control
- Cass County Historical Library
- Cass County Road Commission
- Cass Family Clinic
- CHT USA, Inc.
- City of Dowagiac Dept. of Public Safety
- EGLE – Environment, Great Lakes, and Energy
- Health Department-Environmental Division
- Michigan Dept. of Environmental Quality
- Michigan Dept. of Health and Human Services
- Michigan Dept. of Transportation
- Michigan Association Conservation District
- Michigan State Police Emergency Management Homeland Security Division
- Midwest Energy & Communications
- National Weather Service Northern Indiana
- NOAA Northern Indiana
- Pokagon Band Tribal Police
- Radio Amateur Civil Emergency Services-Kalamazoo
- SEMCO Energy
- United Way
- Van Buren / Cass County Health Department
- Woodlands Behavioral Healthcare

### *1.4 LOCAL Units of Government Participation*

In addition to the County of Cass, communities within Cass County participated in compiling information regarding local priorities and adopting local and/or county-wide mitigation actions. This Hazard Mitigation Plan was completed with the guidance of the Cass County Office of Emergency Management; LEPC; members of the community; representatives and leaders from communities in Cass County; the Michigan State Police Emergency Management Division, Mitigation/Recovery Section; and numerous other stakeholders.

| **Local Jurisdictions Represented in the Cass County Hazard Mitigation Plan**<br>*(All jurisdiction's continuing participation)*<br>*Primary Points of Contact:*<br>*Cass County Chief Elected Official*<br>*All Townships – Township Supervisors*<br>*City of Dowagiac – City Manager*<br>*All Villages – Village Presidents* | Completed Hazard Assessment | Input by fax email, mail, or phone | Met with LEPC or LEPC Member for Plan Updates |
|---|---|---|---|
| County of Cass | **Yes** | | |
| Calvin Township | **Yes** | | |
| Howard Township | **Yes** | | |
| Jefferson Township | **Yes** | | |
| LaGrange Township | **Yes** | | |
| Marcellus Township | **Yes** | | |
| Mason Township | **Yes** | **Yes** | |
| Milton Township | **Yes** | | |
| Newberg Township | **Yes** | | |
| Ontwa Township | **Yes** | | |
| Penn Township | **Yes** | **Yes** | |
| Pokagon Township | **Yes** | | |
| Porter Township | **Yes** | | |
| Silver Creek Township | **Yes** | **Yes** | |
| Volinia Township | **Yes** | | |
| Wayne Township | **Yes** | | |
| City of Dowagiac | **Yes** | | |
| Village of Cassopolis | **Yes** | **Yes** | |
| Village of Edwardsburg | **Yes** | | |
| Village of Marcellus | **Yes** | **Yes** | |
| Village of Vandalia | **Yes** | **Yes** | |

# DOCUMENTATION OF THE PLANNING PROCESS

***Per requirement 44 CFR Part 201.6(c) (1): [The plan must document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.***

## *2. Hazard Mitigation Plan Process*

### *2.1 COLLABORATION AND PLANNING PROCESS*

The Cass County Hazard Mitigation Plan was updated through the collaboration of the Cass County Local Emergency Planning Committee (LEPC), which was composed of representatives from Cass County's emergency response services, public service agencies, and representatives from villages, townships, and the City of Dowagiac. Additionally, the planning process included representation from individuals representing Cass County's special populations, businesses, and the public-at-large all of whom are not only stakeholders in the process but are potentially affected by each mitigation effort. Cass County's Office of Emergency Management acted as the lead agency for the completion of the Hazard Mitigation Plan update.

***The Michigan Hazard Mitigation Plan offered insight during the County plan update process, on Michigan's hazard mitigation goals, priorities, strategies, and other very useful planning information.***

The LEPC/LPT Hazard Mitigation Planning meeting dates were:
April 7, 2022, January 5, 2023, March 2, 2023, May 4, 2023, July 6, 2023
Sept 7, 2023

**Meeting April 7, 2022:** The Cass County Hazard Mitigation Plan was revised 2019. The EM mentioned that the planning for the revision began in January 2016 and brought up options on when the committee should begin planning for the next revision which will be due in March 2024. A few options were discussed on whether we should begin planning this year, beginning of next, or if he should continue to gather more information to get a better idea of when to start the planning on the revision. It was decided to continue gathering information to make the best decision.

**Meeting January 5, 2023:** The EM explained that the Hazard Mitigation Plan will expire in March 2024. After conducting some research, he found that the Grant Application process will take at least 9 months and hiring a company to update our plan, the company would need a year to a year and a half to complete the plan. This will most likely run past our expiration date. The EM will begin the Grant Application process however, we will still need to update our own plan for 2024. We will need to decide if we are going to create a subcommittee and begin this process as quickly as possible.

**Meeting March 2, 2023:** The plan is currently being updated with a deadline of March 2024. The plan is approximately 167 pages with current updates up to page 49. The EM explained the different sections such as Population changes, Wetlands maps, Census 2020 data and updates needed throughout the plan. The EM stated that the 2016 Hazard Mitigation plan is posted on the Cass County Emergency Management webpage found on the Cass County website. There is also a timeline of all updates being made on the current plan – 2024. The EM will also begin work with IT and attempt to get the 2024 Hazard Mitigation Plan on a share drive where all members can view and participate in the updates. The EM shared a couple pages from the Plan – Critical Assets and requests all members to review and submit any updates to him.

**Meeting May 4, 2023:** The EM pulled up the Cass County Website and explained how to reach the Emergency Management page, and then the link to the Hazard Mitigation Plan 2018. The EM then explained what was on the page and how it tracks the updating process for the new 2024 plan. The EM stated that he may be reaching out to some people in the group if he comes across sections in the plan that pertain to them. He will only send those specific pages and request any updates or changes.

**Meeting July 6, 2023:** The EM spoke on the latest updates to the Cass County Hazard Mitigation Plan. The plan is valid for 5 years and requires it to be updated and reviewed this year. The EM spoke on the current method of creating our High Hazard Vulnerability Assessment and other methods that may serve us better. The EM went over several slides showing what we currently have in the plan, what needs to be updated and options to replace

old data. The EM then walked through the Emergency Management website explaining where to find our current plan and other information.

**Meeting September 7, 2023:** A list was presented of the sections in the plan that have been updated since the last meeting. The section currently being updated is the State of Emergency Declarations, Federal and State.

The public was invited to attend the Local Emergency Planning Committee Hazard Mitigation Planning meetings and were welcomed to offer input on the Hazard Mitigation Plan in person, by mail, email, and phone.

This process not only included identification of the hazards threatening Cass County from each discipline and organization's perspective, but the ranking of each hazard according to likelihood of occurrence/re-occurrence and the short and long-term impact of such an occurrence on the county as related to:

- Life
- Health
- Property
- Finance
- Environment

It is important to note that populations not directly involved in the HMPG meetings (i.e., Township Supervisors) were contacted individually at various times throughout the process and given the opportunity to review data and proposed mitigation activities, either electronically and/or in print. In addition, it was requested that township officials pay particular attention to hazards which might occur within their communities, or which might impact their communities should they occur in adjacent townships. Moreover, it was advised that the Plan draft be presented during subsequent public meetings to ensure public awareness and to invite review and input from interested parties.

To maximize public participation, the Cass County Hazard Mitigation Plan was made available to the public through the Cass County website. Information on how to access the plan was also made available through email listserv, in person meetings, and social media prior to the meeting dates. This information provided instructions and contact information for upcoming meetings as well as a forum for the public to provide comments on the Plan.

Major updates included in this Cass County Hazard Mitigation Plan:

- 4-4 Climate Change
- 3-1 Cass County reference map.
- 3-1 Web link added to the Cass County website which provides links to each city, village, and township zoning information.
- 3-1 Cass County Land Use Maps.
- "List of Maps" updated and enhanced Cass County Fire District map.

### *2.2 Neighboring communities, additional stakeholders*

Electronic copies or directions to the Emergency Management website to the Cass County Hazard Mitigation Plan were submitted to secondary stakeholders with a request to review and provide input. These entities included:

- Southwest Michigan Planning Commission
- The National Weather Service – North Webster Office.
- Michigan Department of Environmental Quality – Paw Paw Office.
- Michigan Department of Natural Resources – Allegan Office.

- Michigan Farm Bureau – c/o Cass County Office.
- Berrien County Emergency Management.
- St. Joseph County (Michigan) Emergency Management.
- Van Buren County Emergency Management.
- Kalamazoo County Emergency Management.
- St. Joseph County (Indiana) Emergency Management.
- Elkhart County (Indiana) Emergency Management.

In addition to the hard work of the individuals who made up the Local Emergency Planning Committee's (LEPC) Hazard Mitigation planning group, the Cass County Hazard Mitigation Plan incorporated research and project data gathered by numerous County agencies.

Information gathered by these agencies was key for LEPC members to gain a better understanding of the vulnerabilities we face, our mitigation goals, and efforts of the individual agencies.
Subsequently, many of the projects proposed in this Hazard Mitigation Plan reflect efforts which once were the sole efforts of individual agencies – however, now are being attempted with the support of Cass County's Local Emergency Planning Committee Hazard Mitigation planning group.

These groups include:

## Cass County Conservation District

The Cass County Conservation District's mission is to protect and enhance Cass County's natural resources by providing educational and technical services to all land users, through sound land use management practices. The County Conservation District is devoted to protecting the County's water quality forestry and wildlife resources.

Widespread concern over land use and natural resources, and the Conservation team's commitment to protection, called for consideration of suggested mitigation by this group. Data gathered through the *Dowagiac River Watershed Project* played a particularly important role in the Hazard Mitigation Plan, as did information gathered regarding County soil and water quality.

Cass County Conservation District is a partner with the Michigan Agriculture Environmental Assurance Program (MAEAP). MAEAP-verified farms keep their land, water, and air as healthy as the food they produce. They represent the highest standards of environmental stewardship and responsible agriculture.

MAEAP is a three-phrase process: 1) Education, 2) Risk assessment & management changes, 3) State of Michigan verification.

## Cass County Road Commission

The Cass County Road Commission has the responsibility for the construction and maintenance of 267.33 miles of county primary roads and the maintenance of 738.68 miles of county local roads. At the direction of the townships, the Road Commission also constructs and improves local roads within the County.

The work of the Road Commission includes not only snow removal and road repair, but also the upgrading of existing roads and design and construction of new roads to current standards.

One of the few road commissions in the State of Michigan to have its own asphalt and gravel operations and centralized equipment maintenance facility in Cassopolis, the Road Commission accomplishes this work at the lowest possible cost; and, from the LEPC HMPG's perspective, with greater emphasis on local needs and interests.

Savings generated by this approach to county road work largely account for the over 738 miles of paved Cass County roads.

The unique autonomy of the Cass County Road Commission, in addition to the work performed to date, and plans for future improvements, has played an important role not only in establishing a level of transportation preparedness in the County, but in projecting what changes should be made to mitigate transportation concerns – such as the purchase of heavy equipment needed to support emergency response (example - support rapid removal of downed trees, recovery of eroded areas, and emergency snow removal).

## Cass County Council on Aging / Senior Center

The Cass County COA is dedicated to *Enhancing Life* for thousands of people. With locations in Cassopolis at 60525 Decatur Road and in Dowagiac at 227 S Front Street, you will find active, engaging programs that promote community, lifelong learning, and social connectedness.

The Cass County Council on Aging employs approximately 74 persons and is a County supported agency providing various activities, programs, and assistance to senior residents of Cass County 60 years of age and older.

The agency's goal is to provide support for seniors in their effort to remain in their own homes, and maintain independence, health, dignity, and self-respect. These efforts are supported through the provision of home delivered meals, senior transportation, homemaking assistance, respite, and numerous other support services, and serve almost 7,000 seniors per year.

The Senior Centers provide a location at which residents of all ages can maintain healthy lifestyles by participating in recreational, educational, and leisure activities.

The Council on Aging encourages the community to share their skills while at the same time enriching their own lives through increased knowledge and volunteer experience.

In view of the increase in population of people over the age of 55 (see demographic data), the Cass County Council on Aging not only plays a significant role in terms of preparedness to care for our citizens as they age, but also in mitigating the future needs of this growing population and responding to those needs during times of disaster.

Representing our largest group of vulnerable citizens, the COA played a key role in the development of the Plan and proposed many mitigation activities.

It should be noted that the Cass County Council on Aging is also a designated emergency shelter with generator back-up and is uniquely equipped to serve senior residents of Cass County in that capacity.

## Cass County Drain Commissioner

The Cass County Drain Commissioner's office is in the County Road Commission building in the Village of Cassopolis. The Drain Commissioner has jurisdiction for the maintenance and management of over 150 drains. The Drain Commissioner also maintains over 20 court decreed lake levels in the county. The lake levels are maintained by control structures like dams, berms, culverts, and other natural barriers. The Drain Office has a map and a list of these lakes.

The Drain Commissioner's office is also responsible for the enforcement of the Michigan Drain Code of 1956, the construction, maintenance, and inspection of all County drains, establishing drainage districts, and the determination and assignment of drain assessments.

In addition, the Drain Commissioner secures rights-of-way and easements for County drains, represents the County Drainage Districts in court proceedings, and reviews and approves all plats for subdivisions, manufactured home developments, and site condominium projects in Cass County.

The Drain Commissioner's office has established a set of goals through which it seeks to improve its service to the residents of Cass County. These include bringing all County drains into optimum working condition and maintaining them on a regular basis, assisting all County residents experiencing flooding problems, and educating the community on the importance and responsibilities of the Cass County Drain Commissioner's office.

Services provided through the Drain Commissioner play an important role in determining what mitigation efforts are necessary to resolve drain, flood plain and waterway issues.

**Ascension Borgess-Lee Hospital**

Located in the City of Dowagiac, Ascension Borgess-Lee Hospital is a progressive 25 bed Critical Access Hospital licensed by the State of Michigan and accredited by The Joint Commission.

Fourteen physicians are on the Active Medical Staff, and approximately 180 people are employed both full and part time by the hospital.

Inpatient areas include medical/surgical and the special care unit. In addition, the hospital has a 24/7 Emergency Department, as well as Laboratory, Radiology, Pharmacy, and Physical Therapy departments.

Not only does Ascension Borgess-Lee Hospital play a central role in preparedness and response to emergencies within the county, but their extensive participation in the hazard mitigation planning process, and their collaboration with Emergency Medical Service and Public Health teams, helped to identify and support numerous mitigation opportunities that will benefit not only Cass County, but health care providers throughout the region – including purchase of personal protective equipment for medical personnel, placement of a hazmat decontamination unit in the county, and enhancement of the county-wide medical communications system.

**Cass County Historical Commission**

*Historical Reflections of Cass County* was prepared by the Cass County Historical Commission in 1981 and it is an excellent inventory of the County's historic resources, found in this plan.

It is a comprehensive inventory and played a valuable role in helping to establish land development criteria especially as it pertains to mitigation against negative impacts on these important historic sites.

### *2.3 Public involvement encouraged.*

To maximize public participation, the Plan was made available to the public through the Cass County website. Additional information how to access the Hazard Mitigation Plan and on Hazard Mitigation Plan meeting dates was made available through public notices which were sent by email, letters, and flyers to each participating community in Cass County, along with flyers for the public posted to the County Administration Building public bulletin boards encouraging public participation in drafting the Cass County Hazard Mitigation Plan updates. Information on Hazard Mitigation Plan meetings was also posted on the Cass County Emergency Management website. These notices provided instructions and contact information for upcoming meetings as well as a forum for the public to provide comments on the Plan.

### *2.4 Existing Plans and Programs*

Because a Hazard Mitigation Plan is only a part of the emergency planning, mitigation, preparedness, response, and recovery process, a second objective of this planning process is to coordinate plan preparation with existing emergency plans, programs, procedures, and organizations established by Cass County. Future coordination of the Cass County Hazard Mitigation Plan with other activities in Cass County will be conducted by the Cass County Local Emergency Planning Committee. Individual members of the Cass County Local Emergency Planning Committee are to identify opportunities to incorporate this Plan into other County plans and programs. Any such

opportunities that are identified will be referred to the Cass County Local Emergency Planning Committee as a whole, for consideration. Incorporating this Plan into other plans and programs will ultimately be at the discretion of the County department or organization which administers the plans or programs.

Plans reviewed such as: Michigan Hazard Mitigation Plan, Allegan County Mitigation Plan, Calhoun County Mitigation, Van Buren County Mitigation Plan, Kalamazoo County Mitigation Plan, St. Joseph County IN Mitigation Plan, and the Michigan Hazard Mitigation Plan-April 2019 edition.

Plans reviewed for incorporation: Cass County Master Plan, also reviews of Township, City, and Villages Master Plans and Zoning Ordinances.

**Available Resources**

**Documentation Resources**

***Cass County Emergency Action Guidelines***

Cass County has county-wide Emergency Action Guidelines. These guidelines are continually being developed, tested, and updated.

***Cass County Hazard Mitigation Plan***

Cass County's last Hazard Mitigation Plan will expire March 2024. It has been reviewed and incorporated throughout this plan.

***Cass County Planning Documents***

Cass County and its participating jurisdictions provided a host of planning, zoning, and development related documents that could be expanded and improved, to accomplish hazard mitigation.

**Fiscal Resources**

The following is a list of federal, state, and local funding sources either available, or relevant to the Cass County Hazard Mitigation Plan.

***Economic Development Administration (EDA) and Disaster Recovery*** *(https://www.eda.gov/)*

This program utilizes investment assistance to help communities and regions devise and implement long-term economic redevelopment strategies through a variety of construction and non-construction projects that address economic development challenges in a regions impact by a major federally declared disaster.

***Fire Prevention and Safety Grants*** *(FP&S) (https://www.fema.gov/grants/preparedness/firefighters/safety-awards)*

These grants are administered by FEMA to enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury. Fire departments, local governments, and recognized community organizations are eligible to receive this funding.

***Flood Mitigation Assistance Program (FMA)*** *(https://www.fema.gov/grants/mitigation/flood-mitigation-assistance)*

The FMA program is designed to aid in the buyout of Repetitive Loss and Severe Repetitive Loss properties as well as assist in the funding of flood mitigation projects and activities. The FMA competitive selections focus on reducing or eliminating the risk of repetitive flood damage to buildings and structures insured by the National Flood Insurance Program (NFIP), and with NFIP-participating communities.

***Hazard Mitigation Grant Program (HMGP)*** *(https://www.fema.gov/grants/mitigation/hazard-mitigation)*

The HMGP is managed by FEMA and administered by MSP/EMHSD. The HMGP provides funding for state and local communities to implement long-term hazard mitigation measures that reduce or eliminate risk to people and property from natural and technological hazards and their effects. Funding for Michigan's HMGP is made available following a major disaster declaration in the state.

***Local Revenues & Budgets***

When applying for FEMA planning grants Cass County and its participating jurisdictions would provide the match fund amount required by FEMA.

***National Earthquake Hazards Reduction Program (NEHRP)*** *(https://www.nehrp.gov/)*
This program leads the federal government's efforts to reduce the fatalities, injuries, and property losses caused by earthquakes. This program is administered by FEMA in cooperation with the USGS, National Institute of Standards and Technology, and the National Science Foundation.

***Natural Resources Conservation Service (NRCS) – Conservation Stewardship Program***
*(https://www.nrcs.usda.gov/programs-initiatives/csp-conservation-stewardship-program)*
CSP is a voluntary conservation program that encourages producers to address resource concerns in a comprehensive manner by undertaking addition conservation activities; and improving, maintaining, and managing existing conservation activities.

***USDA – Community Facilities Direct Loan and Grant Program*** *(https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-direct-loan-grant-program)*
This program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial, or business undertakings.

***Pre-Disaster Mitigation Grant Program (PDM)*** *(https://www.fema.gov/grants/mitigation/pre-disaster)*
PDM is managed by FEMA and is a nationally competitive grant program. The Pre-Disaster Mitigation (PDM) grant program makes federal funds available to state, local, tribal, and territorial governments to plan for and implement sustainable cost-effective measures designed to reduce the risk to individuals and property from future natural hazards, while also reducing reliance on federal funding from future disasters. The program is authorized by Section 203 of the Stafford Act.

**Technical Resources**

***FEMA DFIRM – Map Data Center*** *(https://msc.fema.gov/portal/home)*
FEMA's NFHL data was instrumental in mapping floodplain locations and estimating potential flood impacts.

***Hazardous Materials Emergency Preparedness Grant (HMEP)*** *(https://www.phmsa.dot.gov/about-phmsa/working-phmsa/grants/hazmat/hazardous-materials-emergency-preparedness-hmep-grant)*
HMEP provides funding for planning and training activities focusing on HAZMAT related transportation safety.

***Integrated Planning Grants*** *(https://ecology.wa.gov/About-us/Payments-contracts-grants/Grants-loans/Find-a-grant-or-loan/Integrated-planning-grants)*
These grants provide funding to local governments to conduct assessments of Brownfield properties and develop integrated project plans for their cleanup and adaptive reuse. IPGs support efforts to conduct the key first steps in the cleanup and redevelopment process by helping to create an integrated project plan.

***NOAA Climate Data Online*** *(https://www.ncei.noaa.gov/cdo-web/)*
Weather data and historical events were primarily provided by NOAA's Climate Data Online. The CDO provides free access to NCDC's archive of global historical weather and climate data in addition to station history information.

***USACE US Army Corps of Engineers*** *(https://www.usace.army.mil/)*
The USACE provided Cass County data from its national dam inventory containing their location.

***USGS*** *(https://www.usgs.gov/)*
The USGS's studies and reports on earthquakes throughout the country from gathering satellite imagery to extracting polar and glacial ice cores, they collect information to show how climate change is affecting landscapes, waterways, and wildlife around the globe.

### *2.5 Public involvement in the Cass County Hazard Mitigation Plan maintenance*

Public involvement during the planning process is very important. Many opportunities were provided to obtain input from the public, particularly residents and businesses that have been affected by hazards. For the 2024 Plan update, the public was informed through several concurrent means, including:

- Contact Cass County Local Emergency Planning Committee members and their organizations.
- Information of Cass County Hazard Mitigation Plan maintenance meetings posted to Cass County official county website – Emergency Management page.
- Email, LEPC, and LPT meeting minutes posted for local jurisdictions in Cass County.
- Information of Plan maintenance posted to the Emergency Management website and social media.

Through regular public notification of Hazard Mitigation Plan meetings, the public is, and will continue to be encouraged to participate in Hazard Mitigation Plan meetings and Plan maintenance.

### *2.6 Plan Implementation and Maintenance*

Following review and approval of the *Cass County Hazard Mitigation Plan* by the Local Emergency Planning Committee Hazard Mitigation planning group, local officials, and the Cass County Board of Commissioners, the Plan will become one of several tools used by both county and local agencies to support mitigation and planning activities.

Copies will be provided in either print and/or electronic form to all local units of government, emergency response teams, department heads, and those we depend on for mutual aid – including, but not limited to, neighboring counties' administrations, emergency management coordinators, and support agencies – such as the local Farm Bureau, MSUE, DEQ, Chambers of Commerce, Parks & Recreation Departments, etc.

Upon presentation of the Cass County Hazard Mitigation Plan the Cass County Emergency Management Coordinator will offer to present an overview of the Plan, upon request, to help ensure a clear understanding of the Plan's purpose, and full use of the Plan to support mitigation and planning at the local level or cooperatively at the County and State levels. The Plan will be incorporated into other plans such as County, City, Village, Township Master Plans, and building & zoning code plans.

The Cass County Land Use Plan, the Cass County Water and Sewer Hazard Mitigation Plan, the Dowagiac River Watershed Plan, the Cass County Master Plan, as well as local City, Village, and Township Master Plans are local planning mechanisms for incorporating hazard mitigation activities.

It should be noted that this Plan does not replace any existing plans or programs but is intended to provide a reference on hazard mitigation to be used in planning and program development.

*The Cass County Local Emergency Planning Committee will monitor this Plan and engage local jurisdictions on an annual basis. Plan evaluation and maintenance is the responsibility of the Cass County Emergency Management Coordinator. A Plan evaluation may be necessary after a hazardous incident, after training or exercises, due to changes or completion of mitigation actions, and/or the development or change in other plans.*

*The Plan will be reviewed, at the very least, annually at the January Local Emergency Planning Committee meeting to assess progress on Action Items, changes in hazard history, and any known changes in vulnerability. The Plan will be reviewed, updated, and revised, as necessary every five (5) years to maintain consistency with the changing community as well as the goals and objectives of the County.*

*Public notification of Hazard Mitigation Plan meetings will be accomplished using social media, county website, email list serves, and in person presentations. The public is and will continue to be encouraged to participate in Hazard Mitigation Plan meetings and Plan maintenance. These notices will provide instruction and contact information for the public to provide comments on the Plan. The Plan will be available to the public through the Cass County Office of Emergency Management. All public comments will be reviewed by the Local Emergency Planning Committee during the annual January meeting. Any public comment deemed applicable by the Local Emergency Planning Committee will be considered when revising and amending the Plan.*

Review, notes can be consolidated in advance of the annual meeting, and at the annual review, changes can be reviewed for inclusion in the next version of the Plan. Should certain changes require immediate adoption, changes will, of course, be made at the next meeting of the Local Emergency Planning Committee and circulated to all Plan holders (either electronically or in print form) within 30 days of the agreed upon change(s).

## *3. Community Profile*

*Including cities, villages, and townships of the county*


***3.1 Cass County***

Established by the Territorial Legislature on November 15, 1829, and named in honor of Governor Lewis Cass, offers a vibrant and thriving blend of opportunities and lifestyles. Cassopolis is the County seat. Cass County was not as heavily forested and had more fertile prairie land than other nearby areas of Michigan. During early settlement, it attracted numerous settlers who wanted to farm. Cass County became known early on for the anti-slavery attitudes of its population. Pennsylvania Quakers made a settlement in Penn Township in 1829 which later became a prominent station on the Underground Railroad.

Located in southwest Michigan just north of South Bend, Indiana, and within a short distance of Chicago, Kalamazoo, Grand Rapids, Lansing and Detroit, Cass County is unique in its ability to satisfy the desires of those who prefer country living, lakefront environments or small city life and those who seek the benefits that proximity to metropolitan areas offers -- such as access to entertainment, education, culture and services. The best kept secret, however, is that residents and visitors need not look beyond the community to access all they desire.

Cass County boasts lakes, golf courses, tennis courts, hiking and biking trails, museums, art galleries, libraries, and restaurants; including a broad variety of activities that offer residents and visitors opportunities for recreation and education – throughout the year.

In addition, it is home to Southwestern Michigan College, award-winning K-12 schools, and offers easy access to two major universities – the University of Notre Dame and Indiana University – South Bend.

Over 50,000 people call Cass County home; and Cass County Government including 15 townships, 4 villages and the City of Dowagiac are committed to maintaining the quality of life and opportunities that has made this community so attractive.

The climate of Cass County consists of an average January temperature of 31°F and an average July temperature of 81°F. The county receives approximately 40 inches of rainfall and 66 inches of snowfall annually. Cass County's climate is influenced by air masses from Canada, the Gulf of Mexico, and the Great Lakes.

It is with the intent of preserving and enhancing this valued quality of life that the *Cass County Local Emergency Planning Committee* -- has prepared this Cass County Hazard Mitigation Plan.

A Hazard Mitigation Plan can be a valuable tool and a guide to mitigate the effects of hazards that may threaten the qualities that are valued in this fine community.

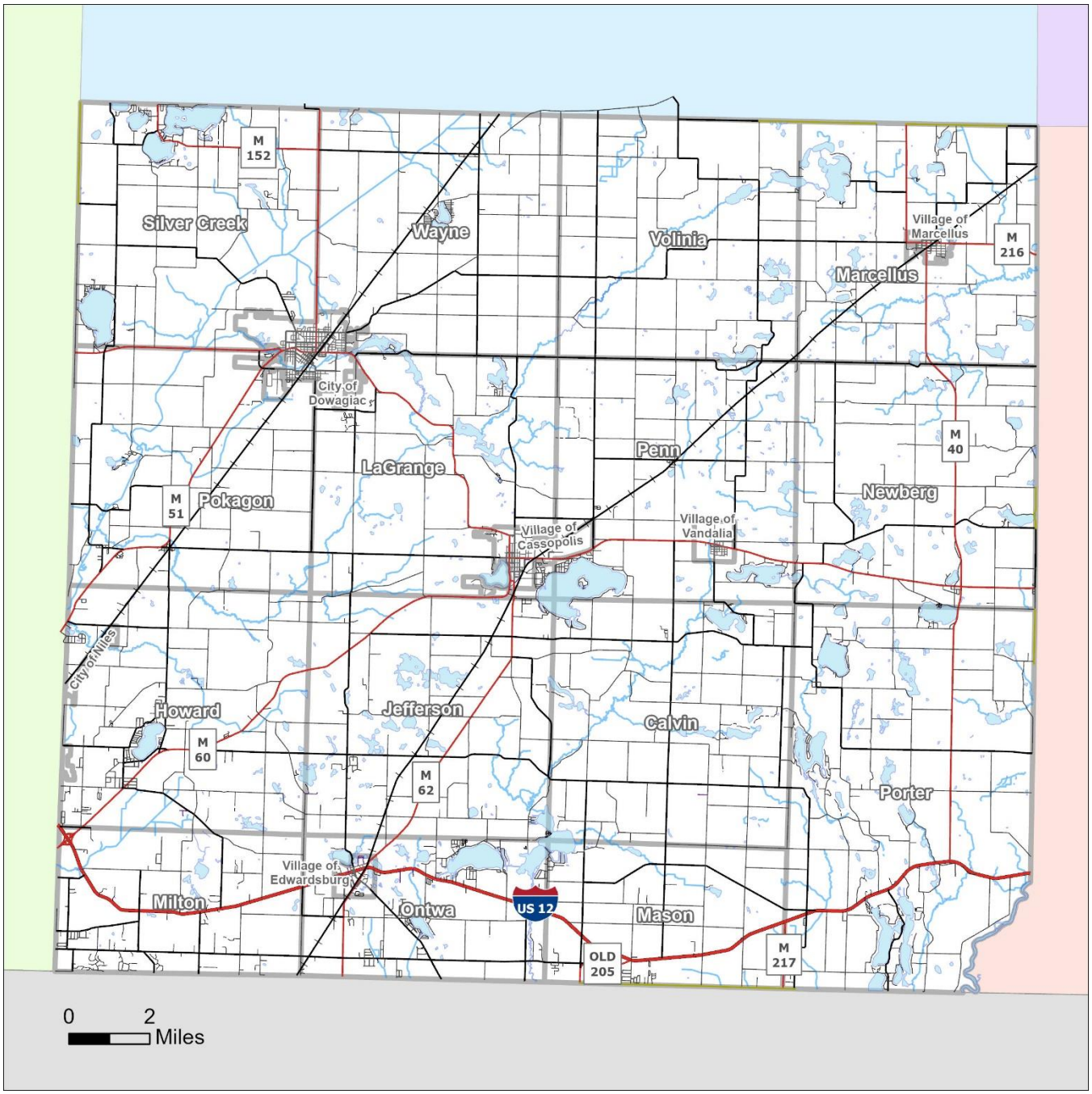
**An Overview of Cass County – Demographic Analysis**

Because an understanding of a community's demographics is a fundamental aspect of mitigation planning, this section describes the population of Cass County using a variety of statistics and information.

The growth and development that this community faces, including population, race and ethnicity, age, housing, and other growth indicators; as well as identification of natural and man-made resources, have a proven impact on a community, and therefore, warrant mitigation review.

The purpose of this section is to provide an understanding of the population of Cass County, and how the demographics might affect mitigation efforts.

## Cass County – 2023 Reference




Each Township, Village and the City of Dowagiac maintains their own zoning ordinance. Zoning information including maps and ordinances if provided by each Township, Village or the City of Dowagiac can be accessed at https://www.casscountymi.org/1271/Township-City-Village-Info. All zoning maps and ordinances are in PDF format.

**The following table lists the current zoning status for each jurisdiction in Cass County:**

**Table 1**

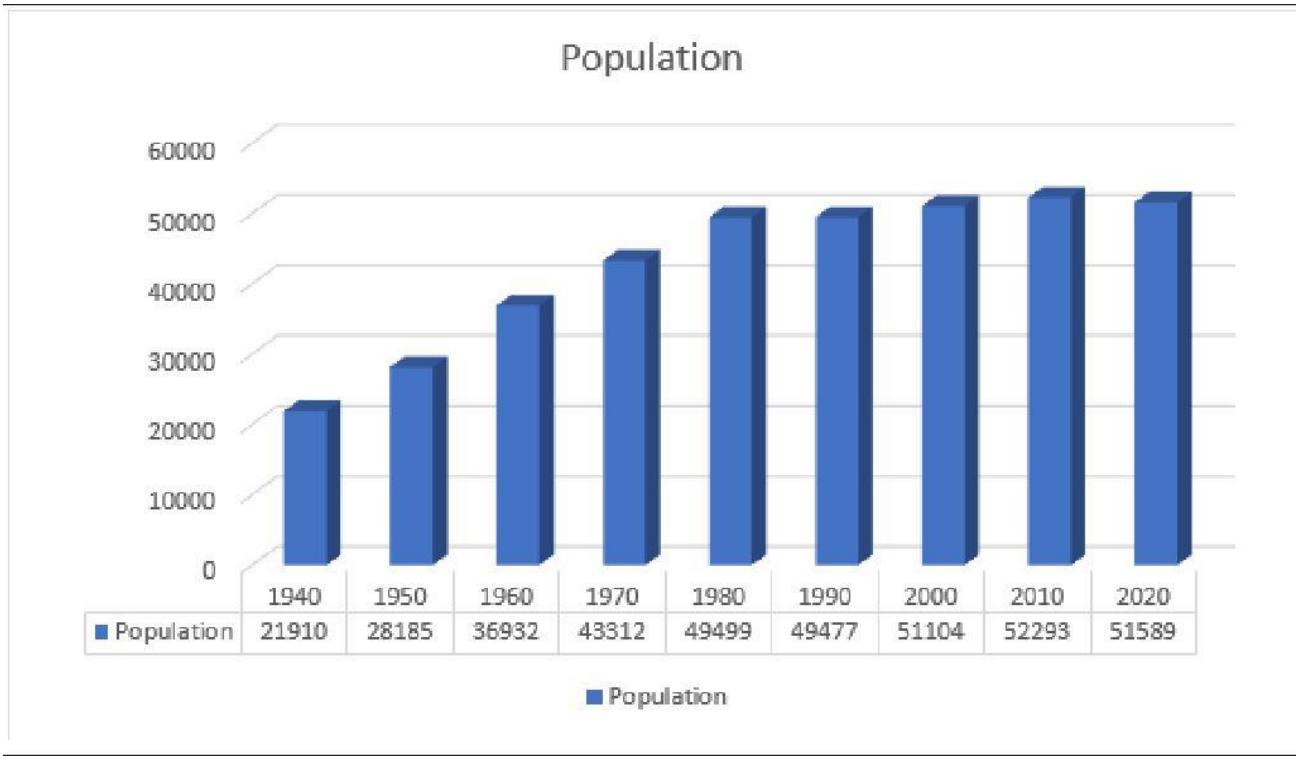
| TOWNSHIP GOVERNMENT | Zoning |
|---|---|
| Calvin Township | Local |
| Howard Township | Local |
| Jefferson Township | Local |
| LaGrange Township | Local |
| Marcellus Township | Local |
| Mason Township | Local |
| Milton Township | Local |
| Newberg Township | None |
| Ontwa Township | Local |
| Penn Township | Local |
| Pokagon Township | Local |
| Porter Township | Local |
| Silver Creek Township | Local |
| Volinia Township | Local |
| Wayne Township | Local |
| **MUNICIPALITIES** | **Zoning** |
| City of Dowagiac | Local |
| Village of Cassopolis | Local |
| Village of Edwardsburg | Local |
| Village of Marcellus | Local |
| Village of Vandalia | Local |

**Total population**

The total population of Cass County in 2010 was 52,293 people, which was a 2.3 percent increase of the 2000 population of 51,104. However, there was a 1.5% decrease from 2010 to 2020. The historical population trend for Cass County is presented in Graph 1, below.

From 1940 to 1980 the County's population more than doubled, growing 126 percent during this period. From 1980 to 2010 the population growth leveled off and grew 5.34 percent. From 2010 to 2020 the population decreased 1.35%.

**CASS COUNTY HISTORICAL POPULATION TREND – 1940 to 2020** **GRAPH 1**




**Intra-County Population**

Historical population growth was not distributed evenly throughout the County. Looking specifically at the County's two recent growth periods, 1980 to 2010, and 2010 to 2020 several townships accounted for most of the County's growth.

Table 2 presents the growth and growth rates for the County, the city, and townships for these two periods.

**CASS COUNTY, CITY OF DOWAGIAC, TOWNSHIPS - POPULATION GROWTH 1980 to 2020** **Table 2**

| | 1980 | 2010 | # Change 1980-2010 | % Change 1980-2010 | 2010 | 2020 | # Change 2010-2020 | % Change 2010- 2020 |
|---|---|---|---|---|---|---|---|---|
| Calvin Township | 1,643 | 2,037 | 394 | 19.34% | 2,037 | 1,993 | -44 | -2.16% |
| Howard Township | 6,524 | 6,207 | -317 | -5.11% | 6,207 | 6,275 | 68 | 1.08% |
| Jefferson Township | 1,963 | 2,541 | 578 | 22.75% | 2,541 | 2,590 | 49 | 1.90% |
| LaGrange Township | 3,526 | 3,500 | -26 | -0.74% | 3,500 | 3,787 | 287 | 7.87% |
| Marcellus township | 2,463 | 2,539 | 76 | 2.99% | 2,539 | 2,401 | -138 | -5.4% |
| Mason Township | 2,132 | 2,945 | 813 | 27.61% | 2,945 | 2,841 | 104 | 3.59% |
| Milton Township | 2,235 | 3,878 | 1,643 | 42.37% | 3,878 | 3,128 | -750 | -19.33% |
| Newberg Township | 1,383 | 1,632 | 249 | 15.26% | 1,632 | 1,602 | -30 | 1.85% |
| Ontwa Township | 5,787 | 6,549 | 762 | 11.64% | 6,549 | 6,904 | 355 | 5.27% |
| Penn Township | 2,044 | 1,774 | -270 | -15.22% | 1,774 | 1,755 | -19 | -1.07% |
| Pokagon Township | 2,394 | 2,029 | -365 | -17.99% | 2,029 | 2,119 | 90 | 4.33% |
| Porter Township | 3,857 | 3,798 | -59 | -1.55% | 3,798 | 3,750 | -48 | -1.26% |
| Silver Creek Township | 3,361 | 3,218 | -143 | -4.44% | 3,218 | 3,051 | -167 | -5.18% |
| Volinia Township | 1,182 | 1,112 | -70 | -6.29% | 1,112 | 1,096 | -16 | -1.43% |
| Wayne Township | 2,699 | 2,654 | -45 | -1.70% | 2,654 | 2,576 | -78 | -2.93% |
| City of Dowagiac | 6,307 | 5,879 | -428 | -7.28% | 5,879 | 5,721 | -158 | -2.68% |
| Village of Cassopolis | 1,933 | 1,774 | -159 | -8.22% | 1,774 | 1,712 | -62 | -3.49% |
| Village of Edwardsburg | 1,135 | 1,259 | 124 | 10.35% | 1,259 | 1,304 | 45 | 3.51% |
| Village of Marcellus | 1,134 | 1,198 | 64 | 5.48% | 1,198 | 1,074 | -124 | -10.35% |
| Village of Vandalia | 447 | 301 | -146 | -32.66% | 301 | 318 | 17 | 5.49% |
| Cass County | 49,49 | 52,29 | 2,794 | 5.34% | 52,29 | 51,58 | -704 | -1.34% |
| | 1980 | 2010 | # Change 1980-2010 | % Change 1980-2010 | 2010 | 2020 | # Change 2010-2020 | % Change 2010- 2020 |

**Top growth areas**

During the first growth period, 1980 to 2010, when the County's population increased by 5.34 percent, eight townships and the City of Dowagiac, Village of Cassopolis, and Village of Vandalia experienced a decline in population, while the Townships of Milton, Mason, Jefferson, Calvin, Newberg, and Ontwa seen substantial growth in population. During the second growth period, 2010-2020, the County experienced a population decrease of -1.34%. Eight of the 15 Townships showed a decrease, and two of the four villages show a decrease as well.

Not only did the level of growth change between these two periods, but the pattern of growth also changed. Of the six townships that accounted for most of the growth in the first period, all experienced a decline or extreme slow in growth in the second period. Howard, Jefferson, LaGrange, Mason, Newberg, Ontwa, and Pokagon Township continued to grow at a rate greater than the County as a whole.

**Urban Population**

Regarding the pattern of growth within the County, another important issue is the relative increase/decrease of the urban areas: the City of Dowagiac and the Villages of Cassopolis, Edwardsburg, Marcellus, and Vandalia.

During the County's relatively small population growth rate period from 1980 to 2010, three of the five urban places had declining populations. The other two villages, Edwardsburg, and Marcellus, increased in population that equaled or exceeded the County's overall rate. During the second period 2010-2020, there was a decrease in population in the City of Dowagiac, Village of Cassopolis, and Village of Marcellus. The Village of Edwardsburg and Village of Vandalia showed and increased higher than the County.

This data indicates that the health of the County's urban places is not good. During the highest growth period, only Edwardsburg increased in population faster than the County's average. During the slowest growth period, most urban places decreased in population, and again Edwardsburg exceeded the County's average growth rate, with Marcellus equaling the County's growth rate. Thus, the County's growth during the past sixty years has been almost exclusively a rural phenomenon. This, of course, has important implications for development policies and the impact of this growth on the community in both positive and negative terms.

**POPULATION GROWTH – CASS COUNTY URBAN AREAS 1980 TO 2010 & 2010 TO 2020** **Table 3**

| | Population 1980 | Population 2010 | Population Growth 1980 to 2010 | Growth Rate 1980 to 2010 | Population 2010 | Population 2020 | Population Growth 2010 to 2020 | Growth Rate 2010 to 2020 |
|---|---|---|---|---|---|---|---|---|
| City of Dowagiac | 6,307 | 5,879 | (428) | -6.79% | 5,879 | 5,721 | -158 | -2.68% |
| Cassopolis | 1,933 | 1,774 | (159) | -8.23% | 1,774 | 1,712 | -62 | -3.49% |
| Edwardsburg | 1,135 | 1,259 | 124 | 10.93% | 1,259 | 1,304 | 45 | 3.51% |
| Marcellus | 1,134 | 1,198 | 64 | 5.64% | 1,198 | 1,074 | -124 | -10.3% |
| Vandalia | 447 | 301 | (146) | -32.66% | 301 | 318 | 17 | 5.49% |
| Cass County | 49,499 | 52,293 | 2,794 | 5.64% | 52,293 | 51,589 | -704 | -1.35% |
| State of Michigan | 9,262,078 | 9,883,640 | 621,562 | 6.71% | 9,883,640 | 10,077,331 | 193,691 | 2.0% |

**Regional Population**

Further understanding of population growth can be obtained by comparing Cass County's growth with the growth rate for the region and the State as a whole.

For the present purposes, the region is defined as Cass County and the surrounding counties of Berrien, Kalamazoo, St. Joseph, and Van Buren in Michigan and Elkhart and St. Joseph in Indiana.

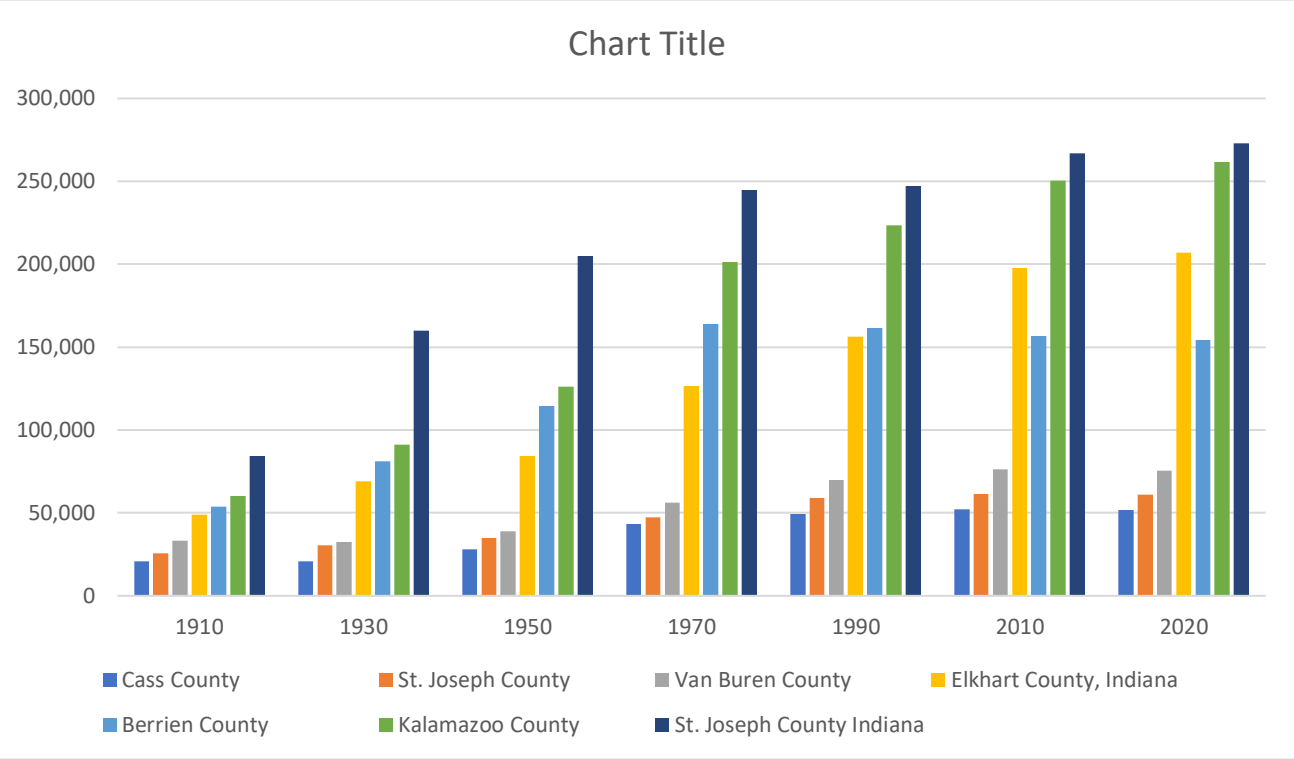
Graph 2 presents the growth and growth rates for Cass County and the region. During each decade of Cass County's growth period, 1940 through 1980, the population growth rate exceeded that of the region and the State.

The graph clearly shows that the population trend in Cass County has been very similar to that in Van Buren and St. Joseph, Michigan, counties. The other counties had varying growth patterns, although all have generally exhibited a trend of increasing population.

In the two subsequent decades, the County's growth rate has been less than that for the region and that of the State.

**HISTORICAL POPULATION TREND – CASS COUNTY AND ADJOINING COUNTIES**

**1910 TO 2020** **GRAPH 2**




**Demographic Analysis**

While the region and the State were experiencing double-digit growth rates, Cass County was growing even faster. When the regional and State growth rates were much lower, Cass County experienced even less growth than the region and the State.

Based on a regression analysis of this data, about 87 percent of the variation in the County's population growth rate is explained by the variation in the regional and State growth rates. Most of the growth in the County's population is driven by the factors that are driving population growth throughout the region and the State.

**POPULATION GROWTH RATES – CASS COUNTY, THE REGION, THE STATE 1940 TO 2020** **Table 4**

| | CASS COUNTY | | REGION | | STATE OF MICHIGAN | |
|---|---|---|---|---|---|---|
| | POP. | GROWTH OVER PREVIOUS | POP. | GROWTH OVER PREVIOUS | POP. | GROWTH OVER PREVIOUS |
| 1940 | 21,910 | | 512,429 | | 5,256,106 | |
| 1950 | 28,185 | 28.6% | 634,419 | 23.8% | 6,371,766 | 21.2% |
| 1960 | 36,932 | 31.0% | 792,640 | 24.9% | 7,823,194 | 22.8% |
| 1970 | 43,312 | 17.3% | 883,876 | 11.5% | 8,875,083 | 13.4% |
| 1980 | 49,499 | 14.3% | 934,997 | 5.8% | 9,262,078 | 4.4% |
| 1990 | 49,477 | 0.0% | 966,489 | 3.4% | 9,295,297 | 0.4% |
| 2000 | 51,104 | 3.3% | 1,039,195 | 7.5% | 9,938,444 | 6.9% |
| 2010 | 52,293 | 2.3% | 1,061,480 | 2.1% | 9,883,640 | -0.6% |
| 2020 | 51,589 | -1.35% | 1,084,060 | 2.13% | 10,077,331 | 1.96% |

**Implications for Population Growth**

It has been shown that the County's population growth is somewhat correlated with overall growth or lack thereof in the region and the State.

This implies that, if present trends continue, population growth within the county will be inconsistent and unpredictable, however the region will most likely continue to increase relative to the forces that are driving growth in the State. Thus, countywide growth and development policies will generally only have limited impact affecting the overall rates of population growth. Planning and zoning efforts, however, can serve to manage growth by encouraging growth in areas where infrastructure can expand to support it; or requiring that infrastructure be a pre-requisite to large-scale growth in areas where it does not currently exist.

Planning at this level would be a mitigation step toward the prevention of infrastructure shortfalls and failures, and toward the preservation of natural resources.

Within the County, the pattern of growth and development has varied throughout the various townships. The County's urban places have experienced little of this growth. Thus, planning policies should also focus on improving the quality of life of these urban places to provide an attractive urban focus for future growth.

**Race and Ethnic Origin**

An analysis of the race and ethnic origin of the population is useful for understanding the degree to which land use policies, as well as growth and development, may or may not disproportionately affect certain segments of the population.

Such an analysis can also indicate those areas where the needs and desires of specific groups may need to be considered. Relevant data on race and ethnic origin are presented in Table 5.

For the 2020 Census, respondents were allowed to respond by indicating more than one race.

For Cass County, 3.2 percent of the population indicated more than one race. While this result may or may not be significant, its impacts for planning and development are minimal. Thus, in the information below, the final race category includes both “other races” and those who indicated more than one race.

The information in Table 5 shows that Cass County is less racially and ethnically diverse than the State of Michigan as a whole. Indeed, non-whites are almost twice as prevalent throughout Michigan, 26.7 percent, as compared to Cass County where they constitute 14.9 percent of the population.

The relative lack of racial and ethnic diversity may or may not be an issue of public concern for the County’s residents, however, numbers suggest that it does not pose a particular demand on mitigation planning as it might in communities where ethnic diversity creates a racially charged atmosphere.

Although the County is relatively less diverse, there are several townships in which non-whites make up a significant portion of the population. African Americans, constitute a substantial portion of the population in the City of Dowagiac, Calvin, and LaGrange townships.

The presence of American Indians and Alaskan Natives is higher in Cass County than in the State as a whole, and the City of Dowagiac and Pokagon, Silver Creek, and Wayne townships have a higher proportion than the County.

The higher rate of Native Americans in the County’s population is related to the location of the Pokagon Band of the Potawatomi Indian Tribe in the County, with their tribal headquarters near Dowagiac.

Asians make up a significantly larger portion of the population in Mason, LaGrange, Porter, and Penn townships and closer to the State as a whole.

Finally, Hispanics make up a relatively large portion of the population in Pokagon, Penn, and Silver Creek townships and the City of Dowagiac. Thus, there are patches of racial and ethnic diversity spread throughout Cass County.

The most important of these are the higher percentage of African Americans in Dowagiac, Calvin, LaGrange, and Penn Townships, and the higher percentage of Hispanics in Silver Creek Township. In these communities, the needs and desires of these populations should be considered. At a minimum, efforts should be made to assure that their voices are heard during the planning and development processes.

However, although specific neighborhoods and communities may house higher concentrations of specific racial or ethnic groups, this study suggests that mitigation efforts by each community should focus primarily on quality housing and quality of life issues – regardless of race or ethnicity, as opposed to the issues faced in other communities between different ethnic groups.

**RACE AND ETHNIC ORIGIN – CASS COUNTY, CITY AND TOWNSHIP, STATE 2020** **Table 5**

| | Total | White | | African American | | Asian | | American Indian & Alaska Native | | Native Hawaiian or Other Pacific Islander | | Hispanic or Latino | | Two or more Races | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | # | % | # | % | # | % | # | % | # | % | # | % | # | % |
| Calvin | 1,638 | 1,318 | 80.5% | 198 | 12.10% | 4 | 0.2% | 12 | 0.7% | 4 | 0.20% | 7 | 0.4% | 76 | 3.3% |
| Dowagiac | 5,721 | 4,193 | 73.30% | 755 | 13.20% | 51 | 0.9% | 131 | 2.3% | 0 | 0.00% | 354 | 6.2% | 188 | 3.3% |
| Howard | 6,275 | 5,559 | 88.6% | 332 | 5.3% | 43 | 0.7% | 62 | 1.0% | 0 | 0.00% | 125 | 2.0% | 150 | 2.4% |
| Jefferson | 2,576 | 2,378 | 92.3% | 106 | 4.1% | 3 | 0.1% | 15 | 0.6% | 0 | 0.00% | 24 | 0.9% | 50 | 1.9% |
| LaGrange | 3,619 | 2,381 | 65.8% | 705 | 19.5% | 92 | 2.5% | 47 | 1.3% | 0 | 0.0% | 105 | 2.9% | 289 | 8.% |
| Marcellus | 2,232 | 2,053 | 92.0% | 16 | 0.7% | 22 | 1.0% | 53 | 2.4% | 0 | 0.00% | 60 | 2.7% | 28 | 1.30% |
| Mason | 2,862 | 2,449 | 85.6% | 7 | 0.2% | 129 | 4.5% | 22 | 0.8% | 0 | 0.0% | 62 | 2.2% | 136 | 4.8% |
| Milton | 3,235 | 2,916 | 90.1% | 45 | 1.4% | 12 | 0.4% | 0 | 0.0% | 0 | 0.0% | 166 | 5.1% | 96 | 3.0% |
| Newberg | 1,720 | 1,629 | 94.7% | 9 | .05% | 5 | 0.3% | 33 | 1.9% | 0 | 0.00% | 29 | 1.7% | 15 | 0.9% |
| Ontwa | 6,904 | 6,310 | 91.4% | 27 | 0.40% | 27 | 0.4% | 0 | 0.0% | 0 | 0.00% | 186 | 2.7% | 393 | 5.7% |
| Penn | 2,080 | 1,426 | 68.6% | 102 | 4.9% | 24 | 1.2% | 1 | 0.1% | 0 | 0.00% | 227 | 10.9% | 72 | 3.5% |
| Pokagon | 2,163 | 1,635 | 75.6% | 173 | 8.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.00% | 290 | 13.4% | 41 | 1.9% |
| Porter | 3,801 | 3,566 | 93.8% | 0 | 0.0% | 56 | 1.5% | 14 | 0.4% | 0 | 0.00% | 97 | 2.6% | 68 | 1.8% |
| Silver Creek | 3,073 | 2,782 | 90.5% | 25 | .8% | 0 | 0.0% | 39 | 1.3% | 0 | 0.00% | 171 | 5.6% | 56 | 1.8% |
| Volinia | 1,194 | 1,119 | 93.7% | 10 | 0.8% | 0 | 0.0% | 0 | 0.00% | 6 | 0.5% | 0 | 0.0% | 26 | 2.2% |
| Wayne | 2,552 | 2,190 | 85.8% | 26 | 1.0% | 0 | 0.0% | 50 | 2.0% | 0 | 0.00% | 230 | 0.9% | 56 | 2.2% |
| Cass Co. | 51,589 | 44,314 | 85.9% | 2,682 | 5.2% | 412 | 0.8% | 619 | 1.2% | 51 | 0.1% | 2,269 | 4.4% | 1,650 | 3.2% |
| State | 10,050,811 | 7,322,792 | 72.9% | 1,329,383 | 13.2% | 320,300 | 3.2% | 33,724 | 0.3% | 2,249 | 0.00% | 559,716 | 5.6% | 438,215 | 4.4% |

**Age Structure**

An analysis of the age of the County's population is important for planning on several very basic grounds. First, communities with more school age children will face schools and education issues more intensely than other communities. Or those with more elderly residents will face different issues, such as affordability of property taxes, transportation and accessibility, and service provisions. Median age is that age at which one-half of the population is older and one-half is younger. The County's median age is 45.3 years, which is 6 years older than the State's median age, 39.0. A comparison of the median age of the city and townships reveals that the population of the City of Dowagiac is significantly younger at 36.2 and Mason Township at 34.0 than the rest of the County, and younger than the State as a whole. In fact, this is the only city and township with a median age lower than the State's. At the same time, Howard (50.5), Penn (50.0), and Porter (52.6) Townships are significantly older than the remainder of the County.

Another important aspect of the age structure is the percentage of the population under the age of 18. For Cass County as a whole, 20.0 percent of the population is under the age of 18. This rate is slightly less than that for the State 21.0 percent. Persons under 5 years of age for the State is 5.3 percent compared to the County which is 4.7 percent.

The final important age category is the population over the age of 65. For Cass County, 21.5 percent of the population is over the age 65, as compared to 18.7 percent for the State as a whole. The City of Dowagiac is at 18.0 percent, which is on average with the State.

It appears that the age structure of the County's population introduces issues for mitigation planning for this special population – especially in terms of safety, quality of life and delivery of support services.

**Household Composition**

The final demographic issue for analysis is household composition. While the population as a whole and the percentage in certain age groups impact the nature of public services, it is the collection of individuals into households that poses issues for the physical development of the County. Information regarding relevant aspects of household composition is presented in Table 6.

**Household Composition – Cass County and State 2017-2021** **Table 6**

| US Census Quick Facts | CASS COUNTY 2010 | CASS COUNTY 2020 | STATE OF MICHIGAN 2010 | STATE OF MICHIGAN 2020 |
|---|---|---|---|---|
| Total Population | 52,293 | 51,589 | 9,883,640 | 10,077,331 |
| Population in Households | 51,819 | 50,948 | 9,654,572 | 9,855,615 |
| Number of Households | 20,604 | 20,707 | 3,872,508 | 4,041,760 |
| Total Housing Units | 25,887 | 25,576 | Not Avail | 4,611,660 |
| Average Household Size | 2.51 | 2.47 | 2.49 | 2.48 |
| Average Family Size | 2.96 | Not Available | 3.05 | Not Available |
| Married Couple Households | 11,251 | 10,553 | 1,857,127 | 1,831,996 |
| Percent of Total Households | 54.60% | 51.0% | 48.00% | 45.3% |
| Female Households – No Husband Present | 2,195 | 4,626 | 511,583 | 1,127,136 |
| Percent of Total Households | 10.70% | 22.3% | 13.20% | 27.9% |
| Households with Individuals Under 18 | 6,288 | 9,463 | 1,224,631 | 1,916,641 |
| Percent of Total Households | 30.50% | 18.3% | 31.60% | 19.0% |
| Households with Individuals Over 65 | 5,987 | 7,707 | 985,333 | 1,294461 |
| Percent of Total Households | 29.10% | 37.2% | 25.40% | 32.0% |
| Householder 65 or Older – Living Alone | 2,061 | 2,652 | 395,437 | 496,974 |
| Percent of Total Households | 10.00% | 12.8% | 10.20% | 12.3% |

This information indicates that the household composition in Cass County is like that for the State as a whole. The average persons per household in 2017-2021, 2.47, is almost the same for both, although the County's average family size, at 2.47 in 2010, is slightly smaller than the State's 2.48. The average family size percentages are not available on the 2020 Census.

A slightly greater percentage of the County's households are married couples, and a smaller percentage is female-headed households with no husband present. While these differences are significant, they are not out of the ordinary for rural areas and are below the State's average.

Finally, the percentage of households in Cass County with an individual over the age of 65 is higher than that for the State. However, the incidence of individuals aged 65 or older living alone is almost the same for the County as it is for the State.

**Demographic Analysis**

The assessment of household composition for Cass County indicates that there are no out-of-the ordinary issues that should impact planning and development.

**Housing Analysis**

The previous sections describe the population of Cass County and give a firm understanding of the people who reside in the County. This is fundamental to understanding growth and development, possible issues, and the probability of mitigation programs that relate to population.

This section is focused on the impact of population growth that is most noticeable upon the landscape; the type of housing in which the County's residents live, the placement of that housing, and the impact of development on physical and natural resources.

**Housing Units**

A housing unit is the basic unit of analysis in the housing assessment. A housing unit is a single, individual dwelling, whether it is a single-family detached house, a single apartment in an apartment building, or a mobile home.

This section assesses the quantity of housing in the County. According to the 2010 census, there were 25,887 housing units in Cass County and **t**he 2020 census shows 25,576 Housing units. This represents a decrease of 1.20%. However, there is an increase of 7.7 percent from 23,884 units in the County in 2000, and a 12.5 percent increase from 22,644 units in the County in 1990. The decrease in housing from 2010 to 2020 covers the growth rate in population, which is a common trend throughout the State and the nation as the average number of people per house continued decreasing during the previous decade.

Housing growth rates in the County ranged from a low of -63.53 in City of Dowagiac to a high of 119.01 in Ontwa Township.

The growth in housing units is important since it indicates the areas of the County where the most land is being converted into residential use. These are areas where the growth will most likely be noticeable.

In such areas planning takes on more importance than it does in other areas where the growth in housing is much less.

The rate of growth also has important implications for planning. Often it is in more rural, more sparsely populated areas that the growth in housing is felt because the jurisdictions are less likely to be equipped to plan and deal with increases as effectively.

**Increase in Housing Density – Cass County, City, and Townships 2010** **Table 7**

**Density = Housing units/sq. mile*

| | Land Area (Sq. Miles) | HOUSING DENSITY 1980 | 2000 | Housing Units 2010 | Housing Density 2010 | Density Change 2000 to 2010 |
|---|---|---|---|---|---|---|
| Calvin Township | 34.3 | 25.39 | 29.02 | 1,059 | 30.87 | 6.39 |
| City of Dowagiac | 4.54 | 652.74 | 654.43 | 2,675 | 589.21 | -9.97 |
| Howard Township | 35.3 | 71.09 | 76.48 | 2,772 | 78.53 | 2.68 |
| Jefferson Township | 36 | 24.03 | 27.34 | 1,072 | 29.78 | 8.92 |
| LaGrange Township | 34.6 | 46.15 | 47.94 | 1,686 | 48.73 | 1.64 |
| Marcellus Township | 34.9 | 33.99 | 35.53 | 1,244 | 35.64 | 0.32 |
| Mason Township | 20.5 | 48.06 | 50.97 | 1,248 | 60.88 | 19.44 |
| Milton Township | 21.3 | 37.28 | 45.65 | 1,471 | 69.06 | 51.28 |
| Newberg Township | 35.5 | 22.12 | 22.53 | 869 | 24.48 | 8.65 |
| Ontwa Township | 21 | 23.09 | 135.9 | 2,984 | 142.10 | 4.56 |
| Penn Township | 35.4 | 38.19 | 38.04 | 1,312 | 37.06 | -2.57 |
| Pokagon Township | 34.2 | 25.93 | 28.93 | 931 | 27.38 | -5.35 |
| Porter Township | 54.6 | 39.04 | 39.43 | 2,215 | 40.57 | 2.89 |
| Silver Creek Township | 34.2 | 71.62 | 73.42 | 2,424 | 70.88 | -3.46 |
| Volinia Township | 35.1 | 16.21 | 17.11 | 614 | 17.49 | 2.24 |
| Wayne Township | 34.8 | 34.72 | 35.92 | 1,311 | 37.67 | 4.88 |
| Cass County | 508 | 46.07 | 48.59 | 25,887 | 50.96 | 4.87 |

https://censusreporter.org/

**Continued Table 7**

| | Land Area (Sq. Miles) 2020 | Housing Units 2020 | Housing Density 2020 | Density Change 2010 to 2020 |
|---|---|---|---|---|
| Calvin Township | 34.3 | 1040 | 30.32 | -1.78% |
| City of Dowagiac | 4.5 | 2599 | 572.47 | -2.84% |
| Howard Township | 34.5 | 2788 | 78.98 | 0.57% |
| Jefferson Township | 34.7 | 1095 | 30.42 | 2.14% |
| LaGrange Township | 33.2 | 1717 | 49.62 | 1.84% |
| Marcellus Township | 33.2 | 1178 | 33.75 | -5.29% |
| Mason Township | 20.2 | 1209 | 58.98 | -3.13% |
| Milton Township | 21.1 | 1216 | 57.09 | -17.33% |
| Newberg Township | 34.5 | 840 | 23.66 | -3.34% |
| Ontwa Township | 19.4 | 3098 | 147.52 | 3.82% |
| Penn Township | 33.6 | 1269 | 35.85 | -3.27% |
| Pokagon Township | 34 | 933 | 27.44 | 0.22% |
| Porter Township | 51.5 | 2182 | 39.96 | -1.50% |
| Silver Creek Township | 32 | 2305 | 67.40 | -4.91% |
| Volinia Township | 34.4 | 563 | 16.04 | -8.29% |
| Wayne Township | 34.3 | 1259 | 36.18 | -3.96% |
| Cass County | 490.1 | 25,291 | 49.79 | -2.30% |

**Tenure and Occupancy**

Another important aspect of the County's housing is the degree to which it is owner-occupied or rented and the degree to which it is occupied or vacant. This section describes the tenure and occupancy of the County's housing stock.

**Housing Tenure and Occupancy – Cass County and State of Michigan 200-2010 Table 8**

| | Cass County 2000 | Cass County 2010 | State of Michigan 2000 | State of Michigan 2010 |
|---|---|---|---|---|
| Total Housing | 23,834 | 25,887 | 4,234,279 | 4,532,233 |
| Occupied Housing | 19,876 | 20,604 | 3,785,661 | 3,872,508 |
| Owner-Occupied | 16,106 | 16,508 | 2,793,124 | 2,793,342 |
| Percent of Total | 68% | 64% | 66% | 62% |
| Population | | 41,444 | | 7,183,134 |
| Renter-Occupied | 3,570 | 4,096 | 992,537 | 1,079,166 |
| Percent of Total | 15% | 16% | 23% | 24% |
| Population | | 10,375 | | 2,471,438 |
| Housing with Minors | | 6,288 | | 1,224,631 |
| Vacant Housing | 4,205 | 5,283 | 448,818 | 659,725 |
| Percent of Total | 17% | 20% | 11% | 14% |
| For Rent | | 459 | | 141,687 |
| For Sale | | 507 | | 77,080 |
| Seasonal or Occasional Use Housing | 3,031 | 3,303 | 233,922 | 263,071 |

**Housing Tenure and Occupancy – Cass County and State of Michigan 2010-2020 Table 8**

| | Cass County 2010 | Cass County 2020 | State of Michigan 2010 | State of Michigan 2020 |
|---|---|---|---|---|
| Total Housing | 25,887 | 25,415 | 4,532,233 | 4,590,384 |
| Occupied Housing | 20,604 | 20,586 | 3,872,508 | 4,039,537 |
| Owner-Occupied | 16,508 | 16,880 | 2,793,342 | 2,948,862 |
| Percent of Total | 64% | 82% | 62% | 73% |
| Population | 41,444 | 42,201 | 7,183,134 | 7,077,270 |
| Renter-Occupied | 4,096 | 3,705 | 1,079,166 | 1,090,674 |
| Percent of Total | 16% | 18% | 24% | 27% |
| Population | 10,375 | 9,263 | 2,471,438 | 2,617,619 |
| Housing with Minors | 6,288 | 4,323 | 1,224,631 | 826,269 |
| Vacant Housing | 5,283 | 4,828.85 | 659,725 | 550,846 |
| Percent of Total | 20% | 19% | 14% | 12% |

| | | | | |
|---|---|---|---|---|
| For Rent | 459 | No update available | 141,687 | No update available |
| For Sale | 507 | No update available | 77,080 | No update available |
| Seasonal or Occasional Use Housing | 3,303 | No update available | 263,071 | No update available |

Cass County has a high percentage of housing that is for seasonal use. This is expected considering the substantial number of lakes and lake front property. This fluctuating population should be considered when planning emergency preparedness and developing mitigation options that would address the possible impact by the presence of the seasonal population increase.

**Housing Types**

Single-family detached housing constitutes a substantially higher percentage of Cass County's housing than it does for the region and the State. All types of multi-family dwellings are a smaller percentage of housing in the County than in the region and the State. However, this is not unexpected in a rural jurisdiction.

Mobile homes constitute a higher percentage of housing in Cass County than the percentage of mobile homes in the region and the State.

Although at times there appears to be a generally poor public perception of manufactured housing, experience is showing that the quality of both the housing units themselves as well as manufactured housing developments has greatly exceeded public perceptions. Manufactured housing can be a higher quality, safer, yet affordable housing option than previously perceived.

However, under some Thunderstorm hazardous conditions, manufactured housing, specifically mobile homes, may fail to provide adequate shelter which may result in higher numbers of injuries and deaths. Mitigation efforts may well require Cass County to focus on the needs of this population.

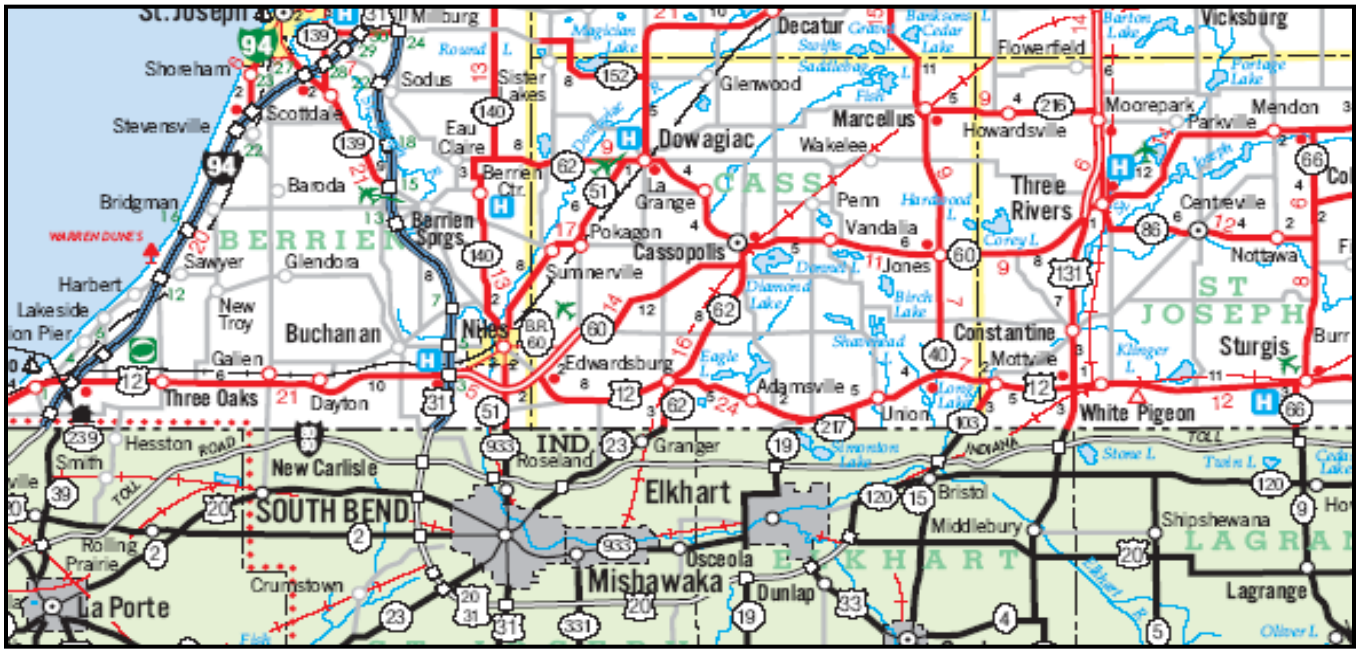
**Household Type Comparison** **Table 9**

| | Cass County | State of Michigan |
|---|---|---|
| **Total Housing Units** | 25,415 | 4,590,384 |
| Single unit | 21,857 | 3,529,539 |
| | 86% | 76.9% |
| Multi-unit | 1,686 | 823,550 |
| | 6.6% | 17.9% |
| Mobile Home | 1,834 | 235,720 |
| | 7.2% | 5.1% |
| Boat, RV, Van, Etc. | 38 | 1,575 |
| | 0.2% | 0.0% |

**Transportation Analysis**

This section summarizes the existing traffic conditions and data, identifies current roadway improvement plans and outlines traffic-related guidelines the County should consider that will help maintain an efficient and safe roadway system in the future.

REGIONAL TRANSPORTATION MAP




**Road Classification**

As part of the planning process, it is important to identify the function of the roadways that make up the County's system. Identification of road classifications assists in the determination of providing recommendations for appropriate land uses and zoning code standards along the various routes.

Implementation of capacity and access management standards helps preserve public safety, the public investment and maintains an efficient vehicular transportation system.

The functional classifications of roadways within Cass County are briefly noted below.

**U.S. Highways**

The function of this type of roadway is to facilitate the through movement of traffic on a regional basis between communities and other major activity centers. Highway US-12 is the only roadway of this type and runs East and West along the southern edge of Cass County. No state expressways or freeways are planned for Cass County. US-12 is under the jurisdiction of the Michigan Department of Transportation (MDOT).

**State Highways**

These major routes are also under the jurisdiction of MDOT and are primarily for the movement of regional traffic between communities, although they also provide access to adjacent properties.

M-60, M-62, M-51, M-40, M-216, and M-152 are the at-grade state highways that provide the through route road system in the County.

**County Primary Roads**
County primary roads are those that serve longer trips within urban areas or link adjacent population centers and major arterials. County primaries are designed to accommodate moderate to large traffic volumes dependent upon their overall design and construction. Speeds on these roadways are usually in the 35-55 mph range. Access to adjacent development is usually provided although some constraints regarding the design of a particular road may affect the extent of available access.

Primary roads are designated as either Class A (all weather or seasonal) or Class B (seasonal) roads. Examples of County primary roads include Marcellus Highway, Pokagon Highway, Decatur Road, Indian Lake Road, Dutch Settlement Street, and Redfield Street.

The Cass County Road Commission maintains 267.33 miles of County primary roads.

**County Local Roads**
County local roads collect and distribute traffic to and from higher classification roads. Traffic mobility is impeded through the allowance of additional curb cuts or access points to adjacent properties. These paved or gravel roadways are typically designed for speed limits in the 35-45 mph range. The Cass County Road Commission maintains approximately 738.68 miles of local County roads.

**Traffic Counts**
Traffic volume counts are a numeric tabulation based upon usage of a particular segment of roadway and are tools used to determine if roads are meeting or exceeding their designed capacity.

The Cass County Road Commission maintains traffic volume counts for primary County roads, and the Michigan Department of Transportation (MDOT) maintains data for state highways and interstates. These 24-hour traffic counts, commonly referred to as Average Daily Traffic (ADT), can help identify where volumes may be approaching or exceeding the design capacity of the road.

Traffic counts are not consistently collected for major and local streets under a municipality's or County's jurisdiction, but when taken do provide a "snapshot" of the current capacity and efficiency of the road and trends in vehicle travel.

According to MDOT's report of the annual average 24-hour traffic volume, there are two areas that experience over 10,000 vehicles per day, M-51 from Dowagiac to Edwards Road (11,900 vehicles) and M-60 from Baron Lake to Niles (10,400 vehicles).

Segments of US-12 experience a high traffic volume ranging from 6,000 to 8,000 vehicles per day with larger volumes of approximately 8,000 vehicles per day experienced at the Calvin Center Road intersection. M-51 and M-62 out of Dowagiac experience a range of 6,000 to 8,000 vehicles per day. M-62 from Cassopolis to Edwardsburg experiences approximately 6,500 vehicles per day.

In 2016 The Michigan Department of Transportation constructed a roundabout on US-12 at the intersection of Five Points Road and Old M-205.

Between January 2010 and August 2014 there were 20 crashes at the Five Points intersection. Four of those crashes involved serious injuries or fatalities. Three alternative options were considered by MDOT and Cass County officials. The roundabout option was chosen because of the safety benefits and minimal amount of property needed.

The $2.2 million investment will improve safety and traffic flow at the intersection, construction includes drainage improvements, signing and landscaping.

All indications, however, are that in spite of the existence of several accident-prone sites which might be considered in mitigation efforts, the existence and condition of Cass County roads, and plans for future expansion, is sufficient to providing necessary ingress and egress for daily needs. MDOT and the Cass County Road Commission are equipped to manage the roadways under emergency conditions.

## An Overview of Cass County – Natural Resources

There are numerous natural resources throughout Cass County. The natural environment creates both opportunities for and constraints to growth and development. For example, the numerous lakes and rivers are attractive for recreation and as amenities for residential uses. At the same time, even flood plain areas are under development pressure, although they are not suitable for development.

### Soils

Soils are a key component in determining the types of development suited to a particular property. Certain soils have the potential to swell when wet and to shrink when dry. These soils require special foundations and thus increase the costs of developing a property. Other soils have high clay content and are not very permeable or are permeable but have a very high-water table. This soil is generally not well suited for on-site septic drain fields.

There are other soils that have a moderate permeability rate that are well suited for septic systems. However, these soils tend to be highly productive for agricultural uses. This creates one of the most difficult quandaries for planning in rural areas: lands that are well suited for agricultural production are also well suited for low-density residential development.

Growth and development that is not well-managed and that is left to its own devices tends to result in the conversion of prime farmland and urban sprawl. Mitigation efforts, although not intended to discourage growth within the County, should focus on discouraging growth in areas not suited for such growth.

The US Department of Agriculture has developed a soil survey for most counties, including Cass County. This survey indicates the underlying soil types and describes the engineering properties and limitations of each type.

In many areas of Michigan, the state Department of Natural Resources has converted the soil surveys' paper maps into a digital computerized form that can be combined with other maps, such as property maps. However, this important planning resource has not yet been developed for Cass County. Thus, efforts should be undertaken to have a digital soil map developed prior to the next update of the County's Hazard Mitigation Plan.

Until then, the use of the soil survey is limited for purposes of county planning. However, the soil survey should be consulted regarding specific development projects and proposals. Indeed, each local planning commission or zoning board should have a copy of the Cass County Soil Survey on hand as they review zoning cases and development proposals.

### Flood Plains

Flood plains are located adjacent to rivers, streams, creeks, and lakes and are areas that are inundated with water during times of heavy rains or annual snow melt runoff. Flood plains serve as natural protection against flooding and are a natural safety valve for the collection and removal of storm water and excess surface water within a watershed. Development within a flood plain will result in the further displacement of water and compound flooding problems.

Development in flood plains should be discouraged or prohibited, if possible, in order to minimize potential property damage and loss. Flood plains should be maintained as natural open space or utilized for low impact development such as parks, golf courses and other similar uses not incorporating substantial physical structures that would be subject to damage or displace water further.

The National Flood Insurance Program (NFIP) identifies land designated as potential flood prone areas and maintains a program in which property owners may purchase subsidized flood insurance if their community participates in the program. Page 100 presents information regarding the NFIP status of each jurisdiction in Cass County.

**Surface Water Wetlands**

There are numerous lakes, streams, and rivers in Cass County. These natural resources are widely valued throughout the community. Indeed, there are 10,000 acres of surface water in Cass County.

Equally as important as the surface waters are the wetlands that serve to protect the quality of waters in the County. The Natural Resources Inventory Map identifies four types of wetlands. The acreage of each of these types is presented below.

**Wetland Acreage By Category** **Table 10**

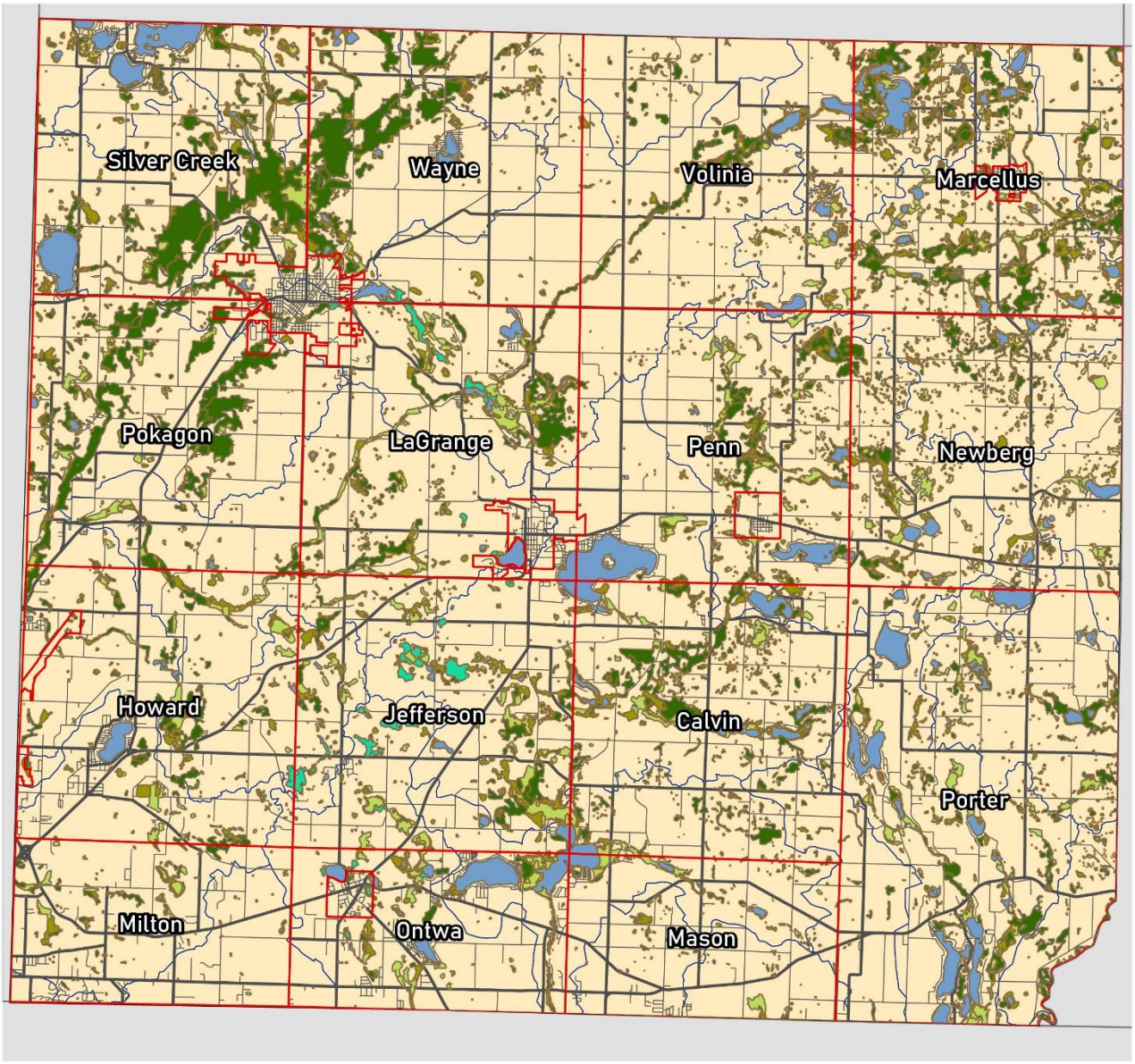
| WETLAND TYPE | ACRES | % COUNTY AREA |
|---|---|---|
| Aquatic Bed | 1,139.8 | 0.35% |
| Emergent | 10,827.5 | 3.33% |
| Forested | 21,232.9 | 6.53% |
| Scrub-Shrub | 7,024.7 | 2.16% |
| Unconsolidated Bottom | 10,034.9 | 3.09% |
| Unconsolidated Shore | 1.06 | 0.0003% |

Wetlands that are adjacent to surface waters are extremely important for protecting the quality of those waters. Wetlands filter sediments and pollutants from storm water runoff before it flows into the lakes, rivers, and streams. Wetlands also provide habitat and biomass for marine resources. Finally, wetlands help stabilize water courses and reduce erosion. However, wetlands themselves are fragile eco-systems and are susceptible to damage from inappropriate development. Studies have shown that a 100-foot vegetated buffer adjacent to wetlands can reduce the pollutant loading in storm water runoff by 40 percent and can reduce sediment loading by up to 70 percent.

Thus, the Natural Resources Inventory Map indicates a 100-foot buffer around surface waters and the adjacent wetlands. To improve existing water quality and to prevent degradation of water quality, measures should be considered to minimize or restrict development within this 100-foot buffer.

# Wetlands Inventory

Cass County, Michigan




WETLAND CLASSIFICATIONS

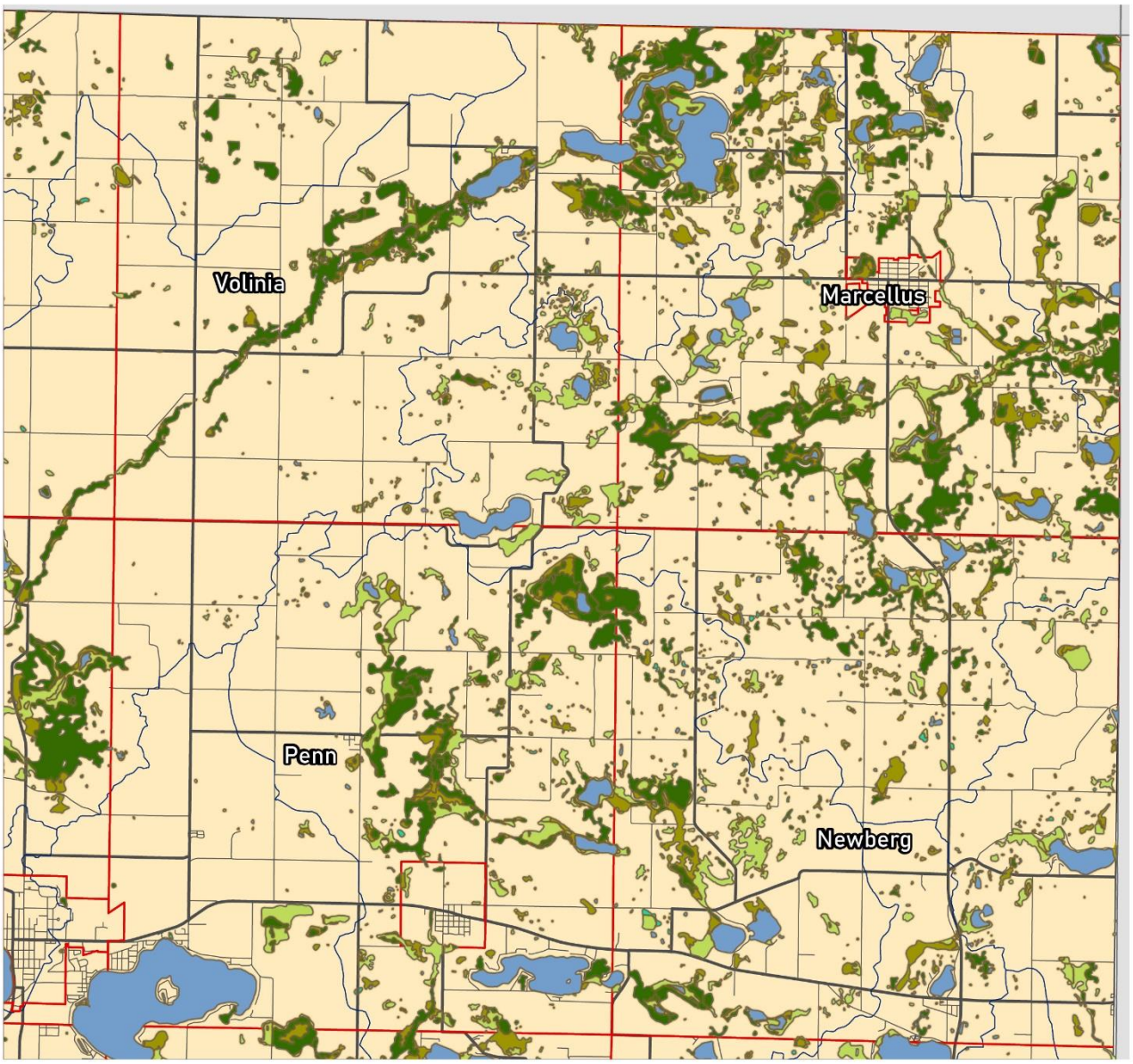
- Aquatic Bed
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore

- 100-Foot Buffer
- Watershed Boundary

Scale: 1:195,000
Author: Cass County GIS

# Wetlands Inventory

NE Quadrant, Cass County, Michigan




WETLAND CLASSIFICATIONS

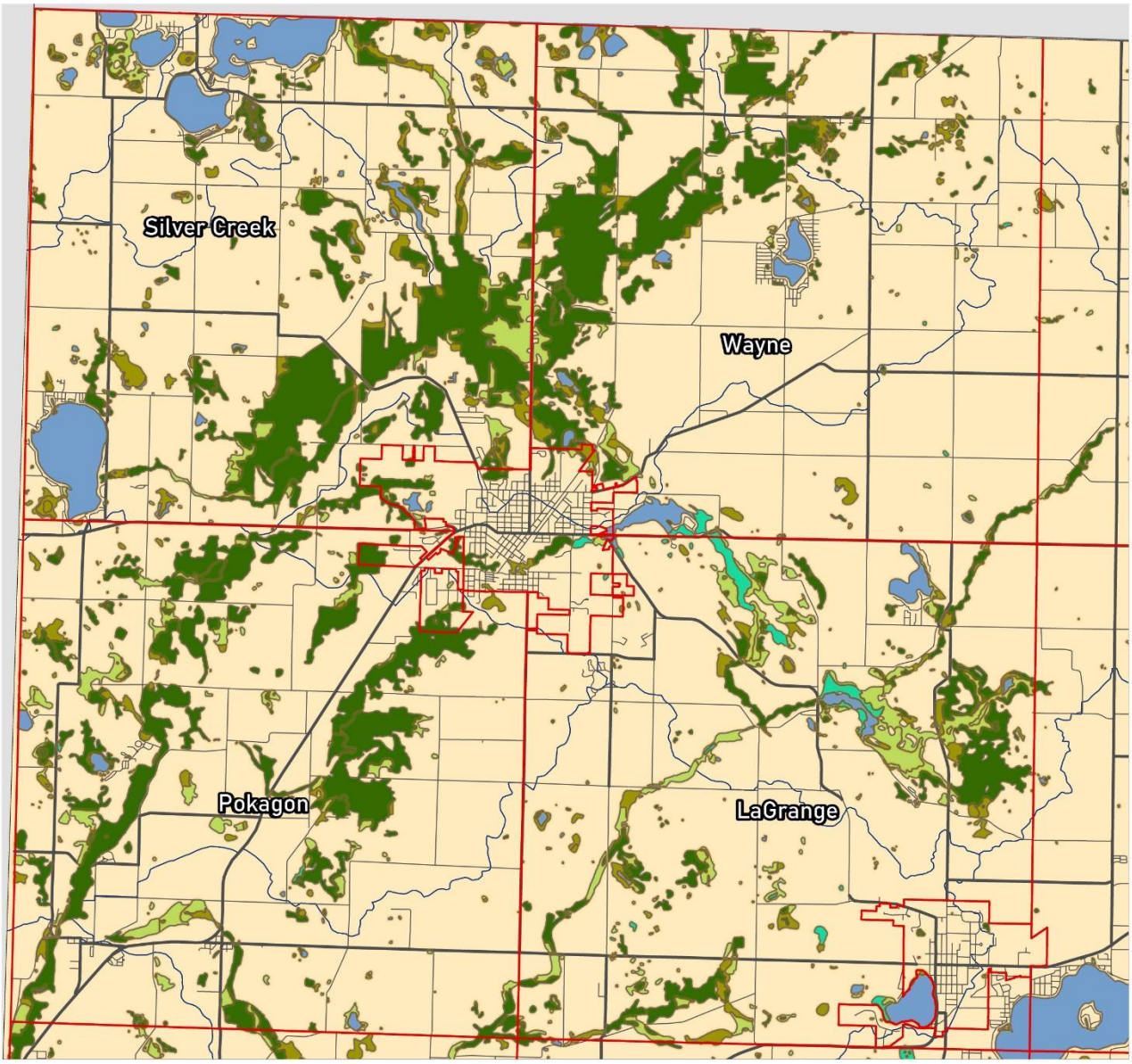
- Aquatic Bed
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore

- 100-Foot Buffer
- Watershed Boundary

Scale: 1:105,000
Author: Cass County GIS

# Wetlands Inventory

NW Quadrant, Cass County, Michigan




WETLAND CLASSIFICATIONS

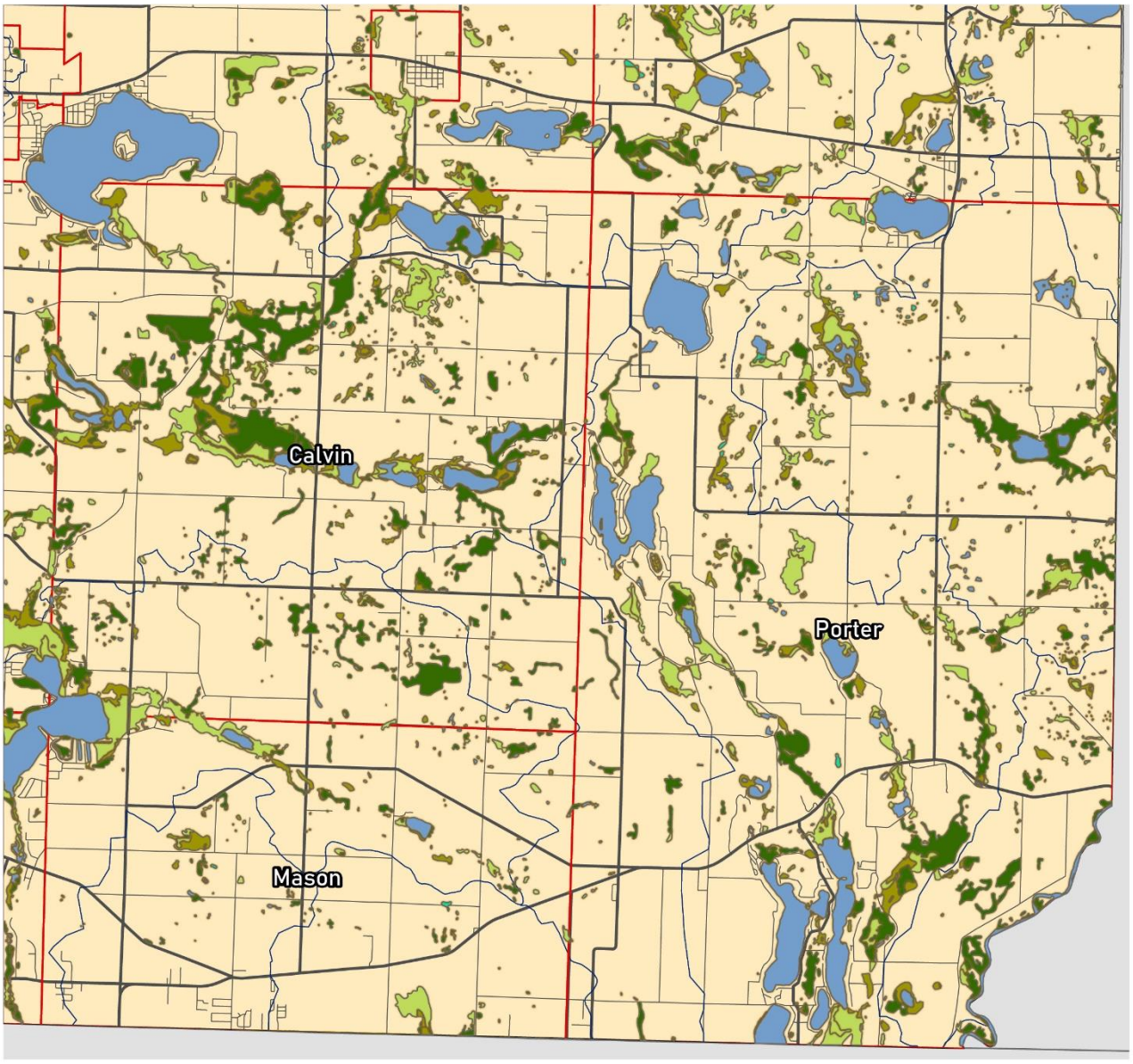
- Aquatic Bed
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore

- 100-Foot Buffer
- Watershed Boundary

Scale: 1:105,000
Author: Cass County GIS

# Wetlands Inventory

SE Quadrant, Cass County, Michigan




## WETLAND CLASSIFICATIONS

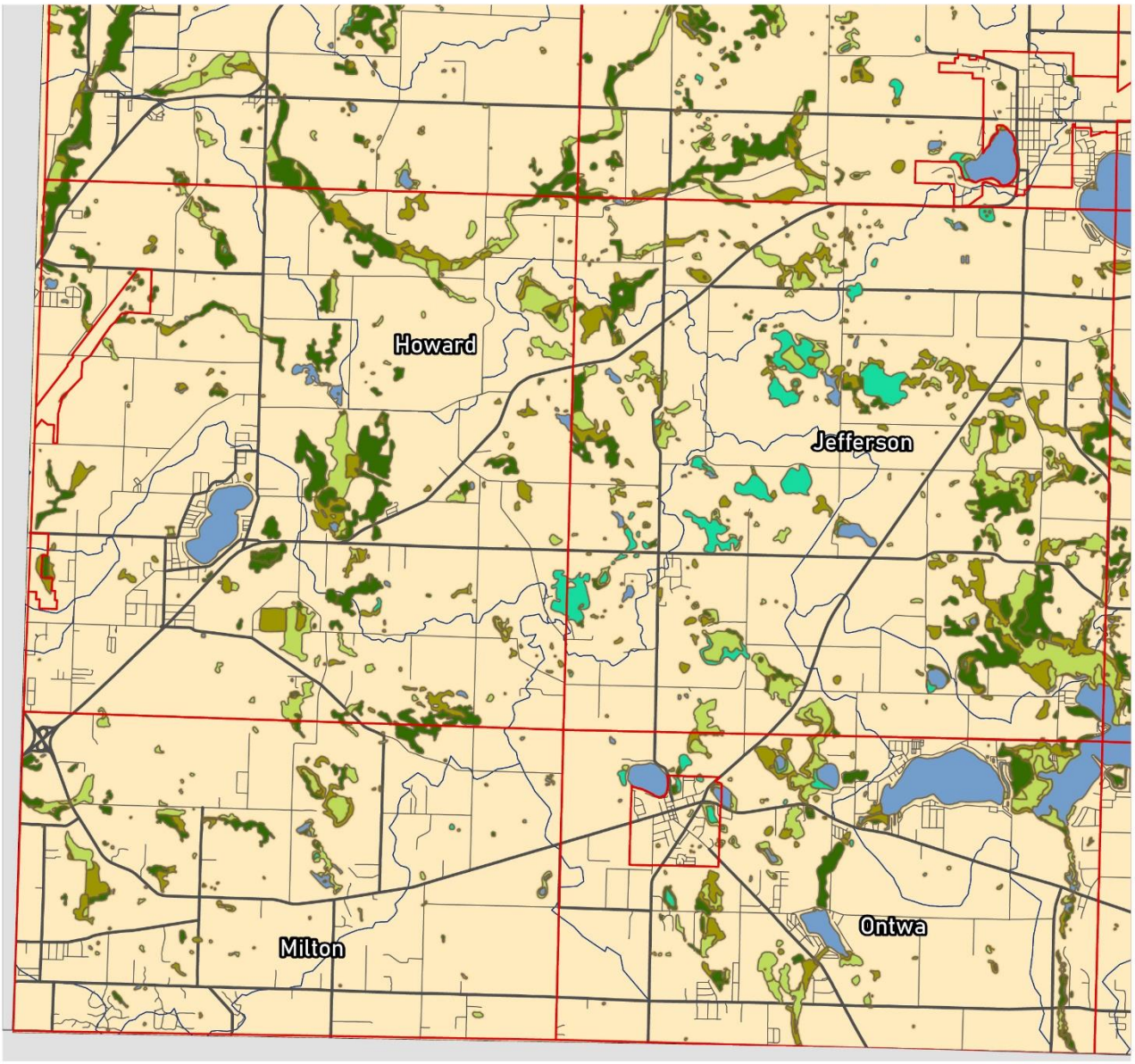
- Aquatic Bed
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore

- 100-Foot Buffer
- Watershed Boundary

Scale: 1:100,000
Author: Cass County GIS

# Wetlands Inventory

SW Quadrant, Cass County, Michigan




WETLAND CLASSIFICATIONS

- Aquatic Bed
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore

- 100-Foot Buffer
- Watershed Boundary

Scale: 1:100,000
Author: Cass County GIS

The Historical Resources Inventory Map identifies the location of historic resources that are included on the State and National Registers of Historic Sites, Buildings, and Landmarks. The Hazard Mitigation Plan does not call for specific historic preservation efforts. However, identified threats to historic sites through inappropriate development could be served by specific mitigation efforts. Therefore, proposed developments in the vicinity or within sight of these identified resources should be reviewed and carefully considered for any potential impact on historic resources. Some of the historic resources identified are the:

- Cass County Courthouse
- Cass County Office Building/Masonic Temple
- Centennial Hall building
- Chain Lake Baptist Church Cemetery
- First Methodist Episcopal Church, 60041 Vermon St., Pokagon Township
- First Universalist Church of Dowagiac
- Jarius Hitchcox House
- Indian Lake Cemetery
- Carroll Sherman and Bessie E. Jones House, 170 W. Main St., Marcellus
- George Washington Jones House, 180 W. Main St., Marcellus
- Joseph Webster Lee House
- Judd Lumber Company Historic Marker
- Mason District No. 5 Schoolhouse, 17049 US 12, Edwardsburg
- Michigan Central Railroad Dowagiac Depot, 200 Depot Dr., Dowagiac
- George Newton House, 20689 Marcellus Hwy. Marcellus
- Poe's Corners Informational Designation
- Salvador T. Read House
- Sacred Heart of Mary Catholic Church
- Smith's Chapel and Cemetery, Redfield Rd. between Brush & Fir Rds.
- Thompson Road-Air Line Railroad Bridge, Thompson Rd. Over abandoned RR Right-of-way
- Underground Railroad Informational Designation
- Wayne Township School District No.7 School

**Existing Land Uses**

At least four times in the last thirty years, the existing land use and development pattern for Cass County has been identified and evaluated. The first was for the 1975 Cass County General Development Plan. The second was for the 1992 Update to the 1975 Cass County General Development Plan. Third, was the 1999 Cass County Water and Sewer Hazard Mitigation Plan. The most recent is the Cass County Master Plan Chapter 4: FUTURE LAND USE PLANS, Appendix C: LAND USE.

These plans identified generally how land was being used in the County and evaluated development trends to project future land use demands.

The base data comes from the assessment database of each of the local assessors for 2001. This data was then field checked during the summer of 2002. The information is presented graphically on the Existing Land Use Map, which is presented at the end of this Chapter. The map groups each parcel of land in the County into one of the following land use categories: Public, Agriculture, Commercial, Industrial, Residential, and Undefined.

In terms of mitigation, identification of current land uses can serve as a prompt for local communities to consider whether they wish to preserve these land uses or encourage changes. Mitigation efforts, through land use plans and zoning ordinances can serve as the basis for fulfilling the specific community's objectives.

**Existing Land Uses Cass County 2002 and 2012** **Table 11**

| LAND USE CATEGORY | ACREAGE 2002 | % 2002 | ACREAGE 2012 | % 2012 |
|---|---|---|---|---|
| Agriculture / Forestry | 220,332 | 72.24% | 186,436 | 60.96% |
| Residential | 72,542 | 23.78% | 91,916 | 30.05% |
| Commercial | 2,785 | 0.91% | 4,881 | 1.60% |
| Industrial | 2,479 | 0.81% | 1,987 | 0.65% |
| Public / Tax Exempt | 6,623 | 2.17% | 11,717 | 3.83% |
| Pokagon Band of Potawatomi | | | 1,897 | 0.62% |
| Other | 245 | 0.08% | 6,996 | 2.29% |
| Total Acreage | 305,006 | 100.00% | 305,829 | 100.00% |
| Source for 2012 Acreage information: Cass County Master Plan July 1st, 2014, scheduled update in 2024. | | | | |

**Agriculture / Forestry:** This classification includes parcels used partially or wholly for agriculture, with or without buildings, and including adjacent parcels under the same ownership that may be vacant or wooded and may include one or more agricultural buildings.

**Residential:** This classification includes platted and unplatted land parcels, and condominiums used for or most apt to be used for residential purposes.

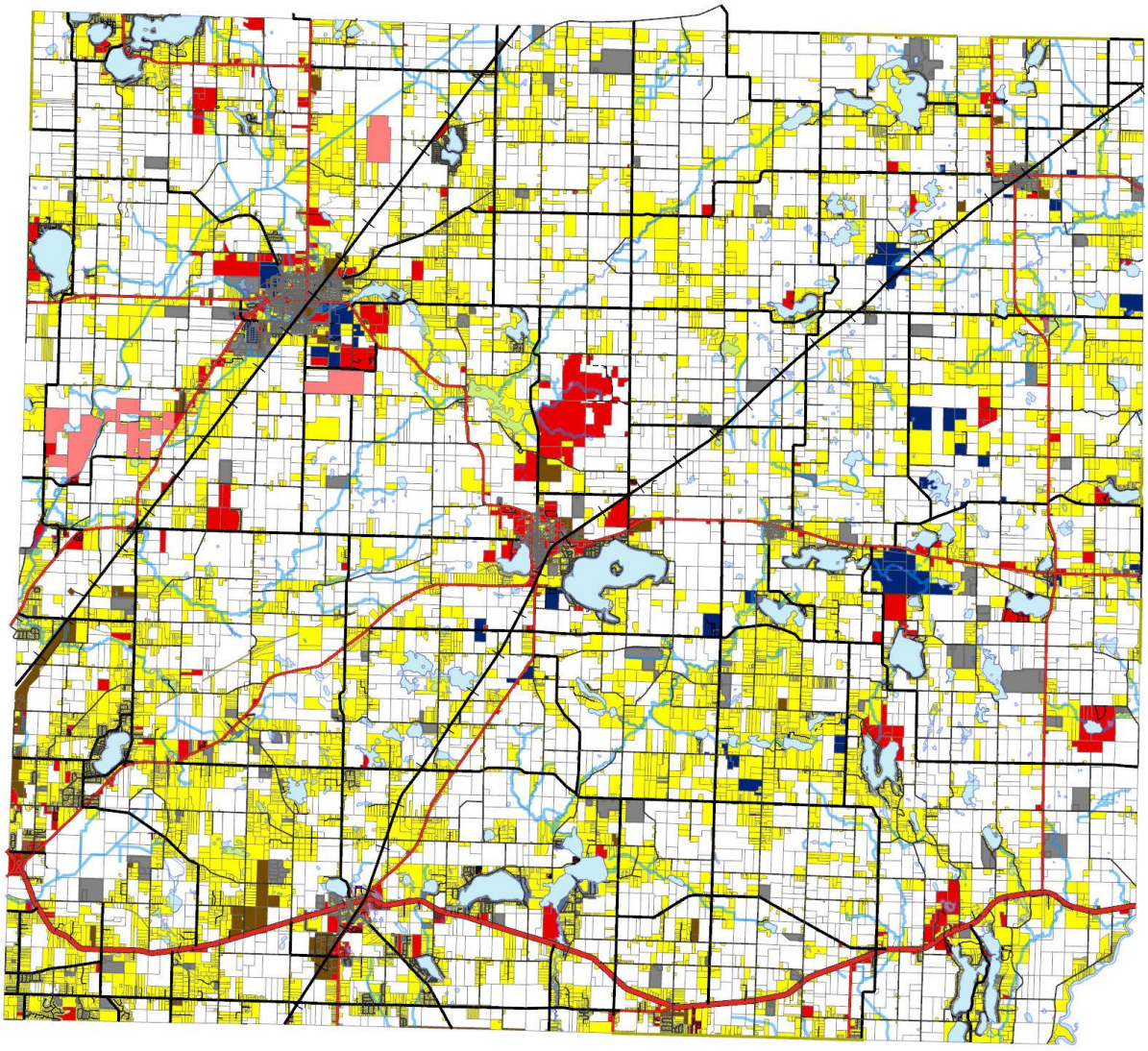
**Commercial:** This classification includes platted and unplatted land parcels used for commercial purposes including wholesale, retail, and service-oriented businesses, with or without buildings, and includes parcels used as golf courses, boat clubs, ski areas, and apartment buildings or an apartment complex with more than four units. “Home occupations" do not generally have a commercial classification.

**Industrial:** This classification includes platted and unplatted land parcels used for manufacturing and processing purposes, with or without buildings, and includes parcels used for utility sites for generating plants, pumping stations, substations, compressing stations, warehouses, rights-of way, and the removal or processing of sand, gravel, stone, or mineral ores.

**Public / Tax Exempt:** This classification includes platted and unplatted land parcels not under private ownership such as municipally owned land, public schools, and religious institutions.

**Pokagon Band of Potawatomi Indians:** This classification of land is not tax-based and includes all land under the ownership of the Pokagon Band of Potawatomi Indians and that which is held in federal trust for the Pokagon Band. The vast majority of this land is located in Pokagon Township and approximately one-third is tax exempt (that which is held in federal trust) and the balance is taxed as described above.

**Other:** This classification includes property subject to a land division application or one which has yet to be recorded, and property classified as “developmental.” “Developmental” property includes parcels of more than five acres without buildings, or more than 15 acres with a market value more than its value in use. The developmental classification is normally used in areas of changing use near significant population centers. Most of the acreage included in this classification is farmland.



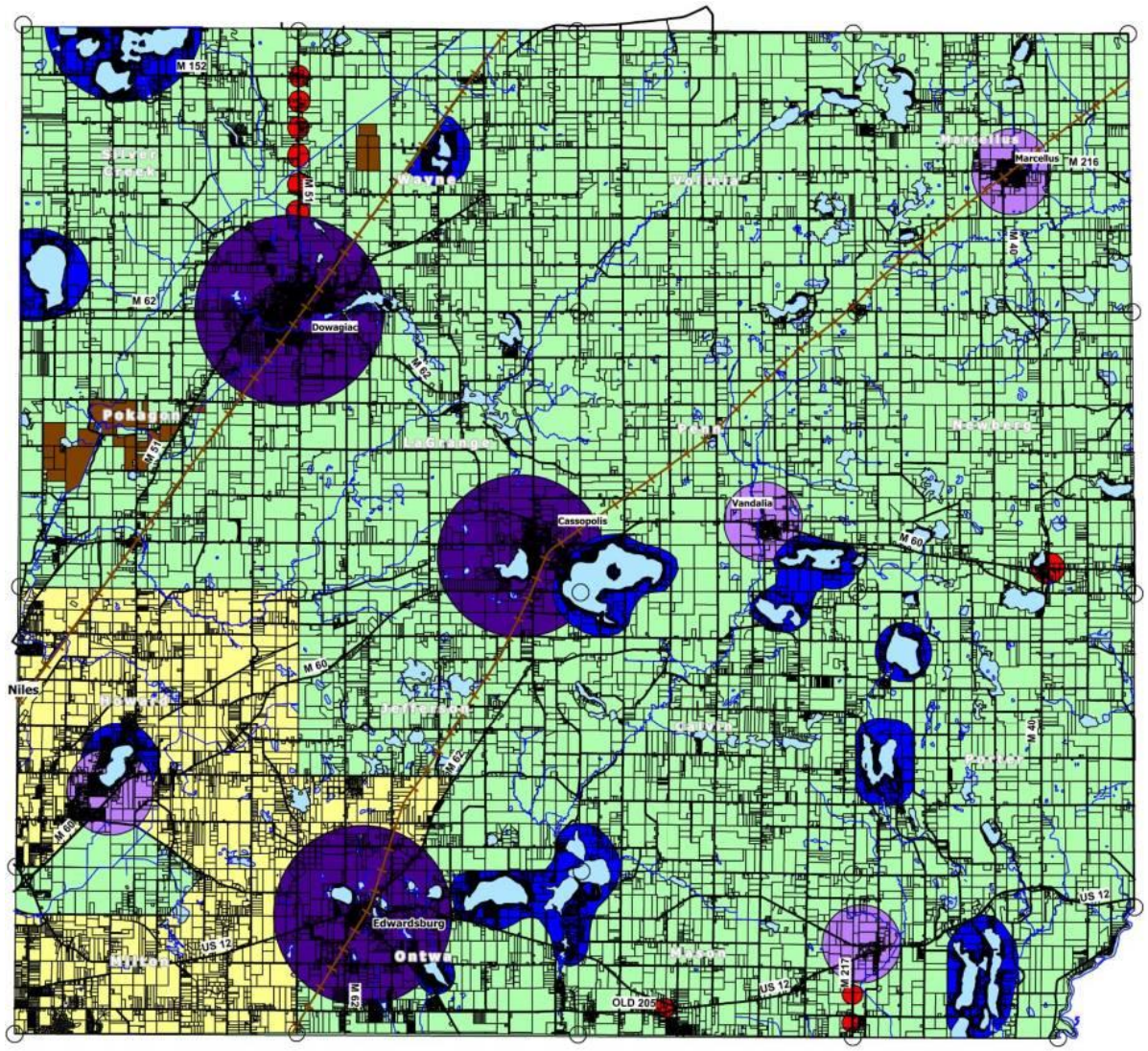
**2023 General Existing Land Use**

- Agriculture/Forestry
- Commercial
- Industrial
- Residential
- Public/Tax Exempt
- Other
- Tribal Land

Date: February 28, 2023
Data Source: Cass County Equalization

The assessment of current land uses was necessary to establish a basis for understanding how residents of the county have fulfilled their individual needs for housing, agriculture, industry, commercial endeavors and recreation to date. When asked what residents valued most about Cass County, the top characteristics, regardless of area of the county, included references to rural character, agricultural base, natural features, natural beauty, and water quality.

When asked where the focus should be for the future, residents placed greatest emphasis on preservation of these qualities while also encouraging efforts to increase business opportunities, provide housing and increase tourism and recreational activities within the county. However, increased awareness regarding "urban sprawl" and the loss of agricultural lands across the state was clear in that residents seemed to recognize that growth could be encouraged, but designated to areas capable of supporting growth, areas with access to the infrastructure and resources necessary for development.




# CASS COUNTY
# FUTURE LAND USE MAP

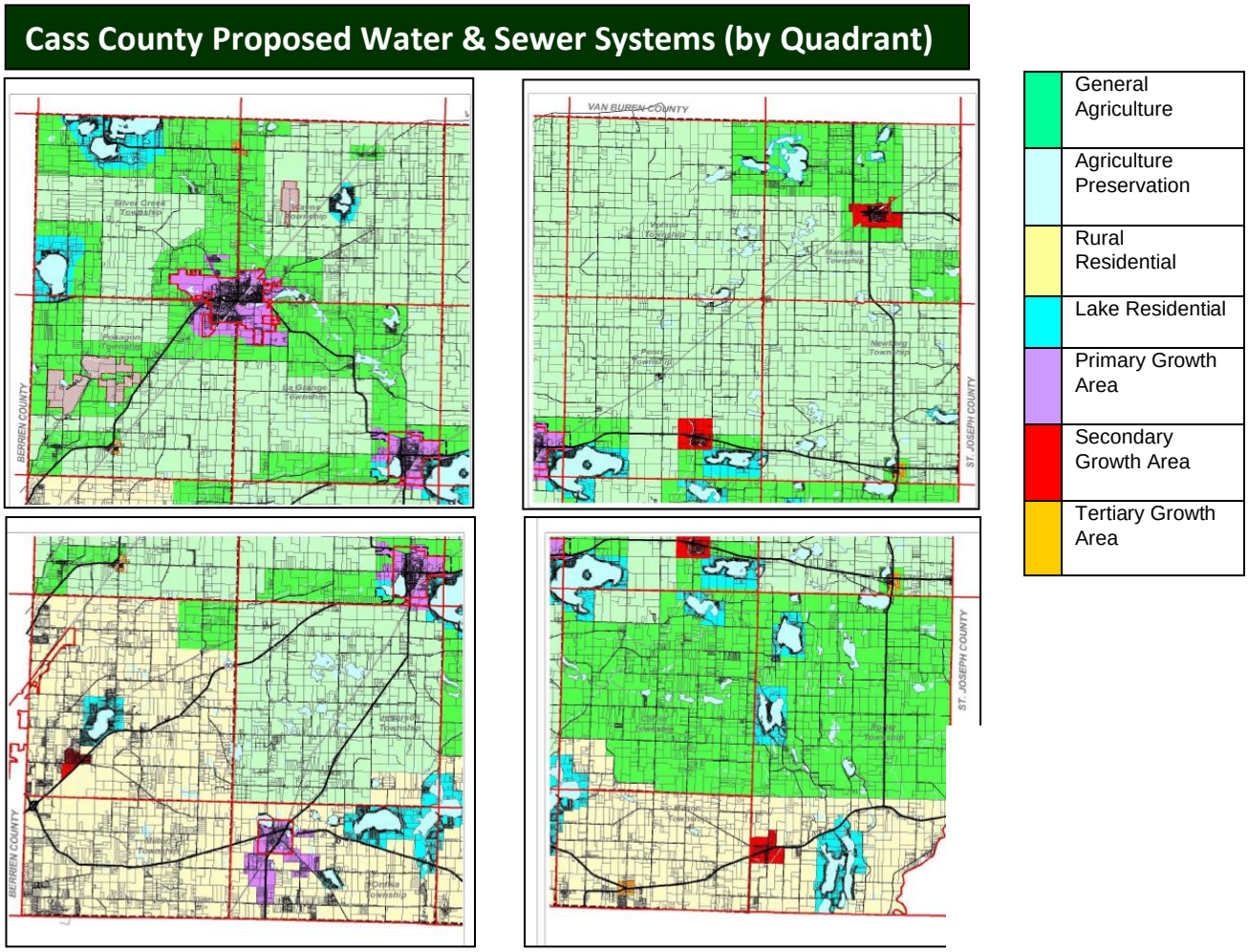
Cass County Master Plan

**FUTURE LAND USE LEGEND**

- Agricultural Preservation Area
- Primary Urban Growth Areas
- Secondary Urban Growth Areas
- Rural Residential Settlement Areas
- Lake Residential Areas
- Highway Commercial Area
- Pokagon Band of Potawatomi Indians Area
- Township Boundary

**Water and Sewer Infrastructure**

In 1999, the County prepared a comprehensive study of water and sewer needs in the County and developed a plan to address those needs. The 1999 Water and Sewer Master Plan recognized the County's extensive natural features, including lakes, streams, forests, and parks, and it recognized that the provision of water and sewer infrastructure was essential for preserving and protecting those resources. The current and proposed services areas for water and sewer systems are indicated on the following maps.




Primary growth areas indicate existing sewer systems and areas targeted for system expansion. Similarly, lake areas indicate existing systems and/or areas targeted for new systems. Intense growth in these areas and increased use of waterways suggests the need for increased attention to these areas and support of sewer and water systems to protect the quality of water and prevent contamination.

Secondary growth areas are where residential and business growth are expected to occur, but at a lesser rate. In these areas, the possible need for sewer and water is noted, but not in the immediate future. It should be noted that should trends change over the next few years, primary and secondary growth areas might require further review, as might other areas which are not currently expected to warrant sewer and water systems.

Agricultural and Ag Preservation areas are least likely to require sewer and water, and providing such services in remote areas would be extremely cost-prohibitive. Furthermore, if extensive residential, commercial, or industrial growth is allowed in non-sewered/non-watered areas, failure to provide these services could negatively affect water quality. Therefore, it was determined that extensive growth in Agricultural and Ag Preservation areas should be discouraged.

### *3.2 Critical Assets*

Cass County's Risk Assessment identifies specific assets located throughout the county and the hazards to which these facilities are susceptible.

In the FEMA planning guide Critical facilities are defined as those facilities that "are essential to the health and welfare of the whole population and are especially important following hazard events". Critical facilities are defined as fire stations, police/law enforcement facilities, hospitals, shelters, administration buildings, airports, and nursing home/assisted care facilities.

**Critical Governmental Facilities**

- Cass County Administration Building
- Cass County Law & Courts
- City of Dowagiac
- Village of Cassopolis
- Village of Edwardsburg
- Village of Marcellus
- Village of Vandalia
- Calvin Township
- Howard Township
- Jefferson Township
- LaGrange Township
- Marcellus Township
- Mason Township
- Milton Township
- Newberg Township
- Ontwa Township
- Penn Township
- Pokagon Township
- Porter Township
- Silver Creek Township
- Volinia Township
- Wayne Township

**Law Enforcement**

- Cass County 9-1-1 Central Dispatch
- Cass County Sheriff's Office and Jail
- City of Dowagiac Police Department
- Village of Cassopolis Police Department
- Ontwa Township Edwardsburg Police Dept.
- Pokagon Band of Potawatomi Police Dept.

**EMS**

- Edwardsburg Ambulance
- Marcellus Ambulance Service
- Newberg Township Ambulance Service
- SMCAS Ambulance Service
- SEPSA/Porter Ambulance Service

**Fire Services**

- Central Cass Interlocal Fire Department
- Dowagiac Fire Department
- Edwardsburg Fire Department
- Howard Township Fire Department
- Indian Lake Volunteer Fire Department
- Marcellus Fire Department
- Newberg Township Fire Department
- Penn Township Fire Department
- Pokagon Volunteer Fire Department
- SEPSA/Porter Fire Department
- Wayne Township Fire Department

**Public Works**

- Cass County Road Commission
- City of Dowagiac Public Works
- Village of Cassopolis Public Works
- Village of Edwardsburg Public Works
- Village of Marcellus Public Works
- Village of Vandalia Public Works

**Transportation Infrastructure / Facilities**

- Amtrak
- Canadian National Railway
- Cass County Public Transit
- Dial-a-Ride Transit
- Dowagiac Municipal Airport
- Roads
- Bridges

**Food and Agriculture**

- Mennel Milling Company of Michigan

**Healthcare and Long Term Care**

- Borgess-Lee Memorial Hospital
- Cassopolis Family Clinic
- Van Buren / Cass County District Health
- Cass County Medical Care Facility
- Timbers of Cass County
- Woodlands Behavioral Healthcare

**Schools and Educational Facilities**

- Southwestern Michigan College
- Brookside Learning Center
- Calvary Bible Academy
- Cassopolis Middle School
- Dowagiac Middle School
- Eagle Lake Elementary
- Edwardsburg High School
- Edwardsburg Intermediate
- Edwardsburg Middle School
- Edwardsburg Primary
- Howard Ellis Elementary
- Justus Gage Elementary
- Kincheloe Elementary
- Lewis – Cass ISD
- Marcellus Elementary
- Marcellus Middle/Senior High School
- North Pointe Center
- Pathfinders Alternative & Adult Education
- Patrick Hamilton Elementary
- Ross Beatty Junior/Senior High School
- Sam Adams Elementary
- Union High School
- Volinia Outcomes School

**Post Offices**

- Cassopolis Post Office
- Dowagiac Post Office
- Edwardsburg Post Office
- Marcellus / Jones Post Office

**Public Libraries**

- Cass District Library Cassopolis
- Cass District Library Edwardsburg
- Cass District Library Howard
- Cass District Historical Library Cassopolis
- Cass District Library Mason / Union
- Dowagiac District Library
- Marcellus Township Library

**Utilities**

- American Electric Power
- Consumers Energy
- Frontier Communications
- Midwest Energy
- Numerous Propane Suppliers
- SEMCO Energy

**Other Critical Facilities**

- Enbridge Pumping Station, Milton Twp.
- Banking and Financial Institutions
- Michigan National Guard Armory Dowagiac
- Numerous Fuel Suppliers
- Water and Sewage Systems
- CHT USA

# *4. Hazards, Risk Assessment, and Rankings*

***Per requirement 44 CFR Part 201.6 (c)(2)(i): [The risk assessment shall include] A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.***

### *4.1 Hazard Ranking*

After a review of the Cass County community profile, a Cass County hazard ranking was completed using a three-step process. The first step was the selection of evaluation criteria, the second step was assigning relative weights to each of the rating criteria and the third step was assigning point values in each of the selected criteria for each of the hazards.

The selection of the evaluation criteria was done after determining which aspects of the hazards were of most concern to the community. Eight evaluation criteria (explained below) were selected. Each of the evaluation criteria was then assigned a "weight" to express the level of importance each of the criteria will have in ranking hazards. Using spreadsheets, values were input and calculated to provide a hazard score and ranking as shown in the following tables.

**Hazard Analysis Evaluation Criteria**

The following is a list of evaluation measures that were used to evaluate each hazard facing the community:

***Occurrence***

| | |
|---|---|
| **1. History** (has it happen in the past) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |
| **2. Probability** (likelihood this will occur) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |

***Significance of Impact***

| | |
|---|---|
| **3. Human Impact** (possibility of death or injury) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |
| **4. Property Impact** (physical losses & damages) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |
| **5. Business Impact** (interruption of services) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |

***Capabilities***

| | |
|---|---|
| **6. Preparedness** (preplanning) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |
| **7. Internal Response** (time, effectiveness, resources) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |
| **8. External Response** (community/mutual aid, staff & supplies) | 0 = N/A; 1 = Low; 2 = Moderate; 3 = High |

A Hazard and Vulnerability Assessment Tool (sample assessment tool table 12) was used to collect hazard information from Villages, Townships, the City of Dowagiac, agencies, departments, schools, tribal and other community partners.

All Hazard and Vulnerability Assessments collected were compiled into a Cass County Countywide Hazard and Vulnerability Assessment using two decimal places to better reflect each assessment received in the overall Cass County Countywide compiled assessment.

Due to incidents occurring between 2013 to 2022 hazard rankings and priorities have changed, for example Winter Weather Hazards were rated as priority #5 in 2010 and were rated as priority #2 in 2018. Except for Thunderstorm Hazards, Hazardous Material Transportation, and Hazardous Material Fixed Sites, all other hazard rankings and priorities changed.

Mitigation efforts receiving less attention than in the previous hazard mitigation plan are: Scheduled tree trimming and tornado shelters in mobile home parks.

Mitigation progress:

1. ***Enhancing warning systems.*** Milton Township implemented a plan to install 9 outdoor warning sirens by 2026, with 3 sirens already installed.

2. ***Promote Storm Ready.*** Cass County became a Storm Ready Community on September 9th, 2016. Our next inspection is scheduled in the fall of 2023.

3. ***Promote Weather Spotter Training and increase NOAA weather radio coverage.*** Cass County Emergency Management partners with Southwestern Michigan College to host bi-annual Weather Spotter Training and has distributed over 200 NOAA Radios throughout Cass County in recent years. The most recent Skywarn training was March 6th, 2023.

4. ***Increase public awareness on hazards and potential impact.*** Cass County Emergency Management and community partners maintain a social media presence providing preparedness and mitigation information to the public. Promoting Severe Weather Awareness, Winter Hazards Awareness, Statewide Tornado Drill, Disaster Assistance, Travel Advisories, and other information.

5. ***Community Emergency Response Teams (CERT).*** Cass County Emergency Management conducted CERT classes prior to the COVID 19 pandemic. The CERT team was not maintained during the pandemic, and we are now in a rebuild planning phase. The CERT program is highly valuable and has become a priority for Emergency Management.

6. ***Hazardous materials***. Cass County first responders maintain strong training programs regarding hazardous materials; many responders attend the annual Pipeline Safety Awareness program, and in recent years have received several trainings on pipeline and tank car hazardous material response. We have had Railroad organizations conduct training sessions in 2022 and 2023.

***7.*** ***Pipeline Replacement.*** Enbridge pipeline stretches diagonally across Cass County west to east. In 2012 and 2013 Enbridge completed a replacement pipeline of approximately 210 miles eliminating the need for significant repairs on Line 6B pipe sections that would have been required over several years.

8. ***Energy and Communications.*** In 2017 Midwest Energy in Cassopolis opened a new facility incorporating state-of-the-art energy and technology advancements continuing to enhance electric and propane service, and now are also a full-service communications company that embarked on a five-year plan in 2015 to deploy fiber internet across its southwest Michigan service territory. The construction of a Smart Park has begun in 2023 located on MEC's property.

9. ***Planning for Dam Failure.*** Emergency Action Plans for Mottville Dam are reviewed and updated, with local input, by Indiana Michigan Power each year. Other plans are maintained for the Adamsville Dam, Lower Mill Pond Dam, and Upper Mill Pond Dam with oversight by the DEQ, Dam Safety Program.

10. ***All-Hazard Planning.*** Cass County maintains all-hazards Emergency Action Guidelines that are reviewed for updating and enhancement on an annual basis.

11. ***Whole Community Planning.*** Cass County Emergency Management engages with Townships, Villages, City, schools, businesses, and other community partners to develop emergency preparedness plans, looking first at what we can prevent, or mitigate. Assisting all offices, private and local government, has been a primary focus for the emergency management office.

12. ***Training.*** Local, regional, and statewide training is offered annually on all-hazards, Spotter Training, Pipeline Training, Homeland Security, Interoperable Communications and MEMA Conferences, along with classes offered by the Michigan State Police Emergency Management and Homeland Security Training Center. Regional trainings on Continuity of Government, Mass Fatality, Biological Awareness, Radiological Incident, School Safety, Active Shooter, Hazmat Awareness, Rail Tank Car Incident, Operational Based Threat, Risk, and Vulnerability, and many other classes have been held.

13. ***Exercises.*** In FY2018 exercises held were Flooding TTX, EOC Hazmat TTX, and EOC Orientation. FY2020 the Cass County EOC conducted an Orientation workshop Exercise "Winter Blast". FY 2021 the Cass County Emergency Management Office conducted an EOC Exercise Drill, Flu Clinic-SMC, a Law and Courts Exercise, and attended a Regional Dive Team Exercise. FY 2022 The EM office conducted several exercises and drills that included the Cass Medical Care Facility, Cass Family Clinic, Courthouse drills,

High Waters CommEx, Niles Clinic drill, and a Region 5 Full Scale Exercise. FY 2023 included an EOC Functional Exercise, FEMA IPAWS, and Region 5 Marine & Dive FSX.

14. Each year Cass County Emergency Management conducts and/or participates in many local and regional exercises covering all-hazards.

***15. Drains: Cleaning, Maintenance, and Repair***

**2022**

a. Four County Drain: The Drain was cleaned, and a failed culvert removed to alleviate flooding on VanBuren Street at Sheldon Creek Road in Marcellus Township.

b. Union Stateline Drain was cleared of trees from US 12 to Chapel Hill Road in Porter Township. 2 culverts on Union Road north of Chapel Hill were cleaned out. Additional work is pending.

c. Mud & Pine Lake Drain in Marcellus was ditched and cleared of debris from Mud Lake to Maple Road. This has resulted in a significant reduction in flooding calls on Pine Lake.

d. Lilly Lake Drain: Beaver dams on 3 occasions were removed based on flooding calls. Some ditching was performed, and trappers called in to control the issue.

e. Pleasant Lake Drain: The drain was cleared of deadfall from Pleasant Lake to M-62. The culvert under the railroad was replaced by Grand Trunk Rail. This has returned the lake levels to historic norms. No flooding calls have been documented since the work was performed.

**2023**

a. Union Stateline Drain: Ditching occurred along Union Road and follow up work done at Chapel Hill and US12. This work has not been performed in decades and has alleviated flooding on Union Road.

b. Goodwin Drain: A large storm washed out a culvert on Cassopolis St. The culvert was replaced, and the ditch cleared of debris washed in during the event.

c. Twin Lakes Road Drain: A landowner complaint led to the clearing of the ditch along Twin Lakes Road in Wayne Township. This has significantly improved flow from many acres of farmland in Cass County and VanBuren County.

d. A culvert was repaired on the Mud Lake Extension drain in Howard township which had caused flooding for a property owner.

e. A failed culvert on the Red Run drain was removed and some maintenance ditching performed to alleviate a high-water condition for a group of farmers in Volinia Township.

f. All Dams in Cass County underwent inspections by engineers from Fleis Vanderbrink. The initial report is dams are in good condition, but the final report will be received and filed by year end. Any needed maintenance will be performed in 2024.

g. MEGLE engineering personnel performed the Dam inspection on the McMillan Dam in Volinia Township. This is the county's only high hazard dam.

### *4.2* SAMPLE – Hazard and Vulnerability Assessment Tool

**Table 12**

| **Hazard & Vulnerability Assessment Tool Example**<br>**Event Rating**<br>**0=N/A, 1=Low, 2=Moderate, 3=High** | **History**<br>*Has happen in the past* | **Probability**<br>*Likelihood this will occur* | **Human Impact**<br>*Possibility of death or injury* | **Property Impact**<br>*Physical losses and damages* | **Business Impact**<br>*Interruption of services* | **Prepared-ness**<br>*Preplanning* | **Internal Response**<br>*Time, effectiveness, resources* | **External Response**<br>*Community/ Mutual Aid staff & supplies* | **Risk**<br>*Relative threat** **0-100%** |
|---|---|---|---|---|---|---|---|---|---|
| Thunderstorm Hazards (Lightning, Hail, Severe Winds, Tornado) | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 89% |
| Winter Weather Hazards | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 44% |
| Infrastructure Failure | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 30% |
| War/Nuclear Attack/WMD | 0 | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 26% |
| Cyber Security | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 1 | 22% |
| Extreme Temperatures (Hot & Cold) | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 22% |
| Structural Fires | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 19% |
| Pipeline Accidents (Oil/Gas) | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 15% |
| Terrorism & Criminal Activity | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 11% |
| Nuclear Power Plant Accidents | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11% |
| Hazardous Material Incidents (Transportation) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 11% |
| Public Health Emergencies | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 11% |
| Hazardous Material (Fixed Site) | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 11% |
| Transportation Accidents | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 11% |
| Civil Disturbance | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 11% |
| Dam Failures | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 11% |
| Riverine Flooding | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11% |
| Urban Flooding | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 11% |
| Earthquakes | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 11% |
| Drought | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 7% |
| Wildfire | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 0% |
| Scrap Tire Fires | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0% |
| Shoreline Flooding | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| Subsidence (Sink Hole) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| **Average Score** | **0.9166667** | **1.13** | **0.83** | **1.04** | **1.25** | **1.04** | **0.83** | **1.46** | **16%** |
| ** Threat increases with percentage.* | | | Severity=(Magnitude-Mitigation) | | | *Risk = Probability * Severity (0.01)* | | | |

**Cass Countywide Assessment** **Table 13**

| Hazard & Vulnerability Assessment Tool Cass Countywide Assessment<br>**Event Rating 0=N/A, 1=Low, 2=Moderate, 3=High** | History<br>*Has happen in the past* | Probability<br>*Likelihood this will occur* | Human Impact<br>*Possibility of death or injury* | Property Impact<br>*Physical losses and damages* | Business Impact<br>*Interruption of services* | Prepared-ness<br>*Preplanning* | Internal Response<br>*Time, effectiveness, resources* | External Response<br>*Community/ Mutual Aid staff & supplies* | Risk<br>*Relative threat** ***0-100%*** |
|---|---|---|---|---|---|---|---|---|---|
| Thunderstorm Hazards (Lightning, Hail, Severe Winds, Tornado) | 2.86 | 2.83 | 1.94 | 2.75 | 2.83 | 2.03 | 2.03 | 2.00 | 79% |
| Winter Weather Hazards | 2.81 | 2.83 | 1.78 | 1.75 | 2.17 | 2.14 | 2.14 | 2.00 | 60% |
| Structural Fires | 2.18 | 2.21 | 1.76 | 2.26 | 1.79 | 2.26 | 1.91 | 2.15 | 48% |
| Transportation Accidents | 1.89 | 2.14 | 2.09 | 2.03 | 1.51 | 1.94 | 1.94 | 1.97 | 45% |
| Extreme Temperatures (Hot & Cold) | 2.31 | 2.20 | 1.54 | 1.09 | 1.66 | 1.80 | 1.74 | 1.77 | 35% |
| Pipeline Accidents (Oil/Gas) | 0.91 | 1.31 | 1.31 | 1.57 | 1.86 | 1.60 | 1.26 | 1.57 | 23% |
| Terrorism & Criminal Activity | 0.82 | 1.38 | 1.53 | 1.68 | 1.21 | 1.38 | 1.18 | 1.50 | 23% |
| Hazardous Material Incidents (Transportation) | 0.94 | 1.44 | 1.35 | 1.41 | 1.38 | 1.24 | 1.32 | 1.32 | 22% |
| Infrastructure Failure | 1.06 | 1.29 | 1.09 | 1.29 | 1.89 | 1.34 | 1.20 | 1.23 | 20% |
| Hazardous Material (Fixed Site) | 0.77 | 1.23 | 1.23 | 1.34 | 1.20 | 1.51 | 1.23 | 1.57 | 17% |
| War/Nuclear Attack/WMD | 0.26 | 0.97 | 1.65 | 1.47 | 1.65 | 1.00 | 0.91 | 1.00 | 17% |
| Wildfire | 1.09 | 1.32 | 0.88 | 1.41 | 1.00 | 1.38 | 1.21 | 1.47 | 16% |
| Public Health Emergencies | 1.06 | 1.43 | 1.26 | 0.69 | 1.03 | 1.31 | 1.29 | 1.31 | 16% |
| Drought | 1.20 | 1.37 | 0.69 | 1.11 | 0.91 | 0.91 | 0.83 | 0.91 | 14% |
| Cyber Security | 0.66 | 1.29 | 0.60 | 0.97 | 1.29 | 1.09 | 0.91 | 0.80 | 14% |
| Civil Disturbance | 0.74 | 1.03 | 1.06 | 1.09 | 0.94 | 1.00 | 0.89 | 1.11 | 12% |
| Riverine Flooding | 0.86 | 1.03 | 0.83 | 0.97 | 0.77 | 0.89 | 0.80 | 0.97 | 10% |
| Nuclear Power Plant Accidents | 0.24 | 0.74 | 1.21 | 1.15 | 1.21 | 1.09 | 1.03 | 1.06 | 10% |
| Earthquakes | 0.49 | 0.94 | 0.77 | 1.03 | 0.89 | 0.86 | 0.86 | 0.94 | 9% |
| Shoreline Flooding | 0.86 | 0.94 | 0.31 | 0.72 | 0.56 | 0.69 | 0.64 | 0.64 | 6% |
| Scrap Tire Fires | 0.56 | 0.79 | 0.35 | 0.76 | 0.68 | 0.91 | 0.82 | 1.03 | 5% |
| Urban Flooding | 0.60 | 0.69 | 0.51 | 0.63 | 0.71 | 0.71 | 0.71 | 0.83 | 5% |
| Subsidence (Sink Hole) | 0.14 | 0.63 | 0.54 | 0.77 | 0.66 | 0.26 | 0.26 | 0.60 | 5% |
| Dam Failures | 0.21 | 0.35 | 0.29 | 0.62 | 0.59 | 0.65 | 0.71 | 0.79 | 2% |
| **Average Score** | **1.06** | **1.35** | **1.11** | **1.27** | **1.27** | **1.25** | **1.16** | **1.27** | **0.21** |
| ** Threat increases with percentage.* | | | Severity=(Magnitude-Mitigation) | | | *Risk = Probability * Severity (0.01)* | | | |

**Note:** Many hazard assessments are based upon a limited historical analysis and therefore their estimated rankings should be treated merely as rough estimates.

| **Summary of each jurisdiction's vulnerability**<br>H=High (more than 65%)<br>M=Medium (36% to 65%)<br>L=Low (less than 35%) | Calvin Township | Howard Township | Jefferson Township | LaGrange Township | Marcellus Township | Mason Township | Milton Township | Newberg Township | Ontwa Township | Penn Township | Pokagon Township | Porter Township | Silver Creek Township | Volinia Township | Wayne Township | City of Dowagiac | Village of Cassopolis | Village of Edwardsburg | Village of Marcellus | Village of Vandalia | Cass County Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thunderstorm Hazards (Lightning, Hail, Severe Winds, Tornado) | H | H | H | H | H | M | H | H | H | L | H | H | M | M | M | H | M | H | H | H | H |
| Winter Weather Hazards | H | H | H | H | H | M | H | H | H | L | H | M | M | M | L | H | M | H | H | H | M |
| Structural Fires | M | H | H | M | L | M | M | L | H | L | M | H | L | L | H | H | L | M | L | M | M |
| Transportation Accidents | M | M | M | M | H | H | H | M | L | L | M | M | L | L | L | M | L | M | H | M | M |
| Extreme Temperatures (Hot & Cold) | L | L | M | M | L | L | L | L | H | L | M | L | M | L | L | L | L | M | M | M | M |
| Hazardous Material Incidents (Transportation) | M | M | H | M | M | M | L | L | M | L | M | M | L | L | L | M | L | M | L | M | M |
| Pipeline Accidents (Oil/Gas) | L | L | L | L | L | H | L | L | L | M | L | H | L | L | L | L | L | L | L | M | L |
| Terrorism & Criminal Activity | L | L | M | L | L | L | L | L | L | L | L | M | L | L | L | H | L | L | | L | L |
| Infrastructure Failure | M | L | L | L | L | L | L | L | L | L | L | M | L | L | M | L | M | L | L | L | L |
| Hazardous Material (Fixed Site) | L | L | L | L | L | L | L | L | L | M | L | M | L | L | L | M | L | L | L | L | L |
| Public Health Emergencies | L | L | L | L | L | L | L | L | L | L | L | M | L | L | L | M | L | L | L | L | L |
| Wildfire | L | L | L | L | L | L | L | L | L | L | L | M | M | L | L | L | L | L | L | L | L |
| War/Nuclear Attack/WMD | L | L | M | L | M | L | L | L | L | L | L | M | L | L | L | M | L | L | | L | L |
| Cyber Security | L | L | L | L | L | L | M | L | L | L | L | L | M | L | L | L | M | L | L | L | L |
| Drought | H | L | L | L | L | L | L | L | L | L | L | M | L | L | L | L | L | L | L | L | L |
| Riverine Flooding | L | L | L | L | M | L | L | L | L | L | L | M | L | L | L | L | NA | L | L | L | L |
| Civil Disturbance | L | L | L | L | L | L | L | L | L | L | L | H | L | L | L | L | L | L | L | L | L |
| Nuclear Power Plant Accidents | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | NA | L | | L | L |
| Earthquakes | L | L | L | L | L | L | L | L | L | L | L | M | L | L | L | L | L | L | L | L | L |
| Shoreline Flooding | L | L | L | L | L | L | L | L | L | L | L | L | NA | L | L | L | NA | L | L | L | L |
| Urban Flooding | L | L | L | L | M | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| Scrap Tire Fires | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| Subsidence (Sink Hole) | L | L | L | L | L | L | L | L | L | L | L | M | L | L | L | L | L | L | L | L | L |
| Dam Failures | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | N/A | N/A | L | N/A | L |

**Cass County Hazard Ranking 2022** **Table 14**

| Ranking | Cass County Hazards Ranking 2022 | Rating (10=high / 0=low) |
|---|---|---|
| 1 | Thunderstorm Hazards (Lightning, Hail, Severe Winds, Tornado) | 7.89 |
| 2 | Winter Weather Hazards | 5.97 |
| 3 | Structural Fires | 4.75 |
| 4 | Transportation Accidents | 4.46 |
| 5 | Extreme Temperatures (Hot & Cold) | 3.49 |
| 6 | Hazardous Material Incidents (Transportation) | 2.31 |
| 7 | Pipeline Accidents (Oil/Gas) | 2.26 |
| 8 | Terrorism & Criminal Activity | 2.21 |
| 9 | Infrastructure Failure | 2.03 |
| 10 | Hazardous Material (Fixed Site) | 1.71 |
| 11 | Public Health Emergencies | 1.71 |
| 12 | Wildfire | 1.61 |
| 13 | War/Nuclear Attack/WMD | 1.57 |
| 14 | Cyber Security | 1.38 |
| 15 | Drought | 1.36 |
| 16 | Riverine Flooding | 1.17 |
| 17 | Civil Disturbance | 0.98 |
| 18 | Nuclear Power Plant Accidents | 0.97 |
| 19 | Earthquakes | 0.94 |
| 20 | Shoreline Flooding | 0.55 |
| 21 | Urban Flooding | 0.53 |
| 22 | Scrap Tire Fires | 0.47 |
| 23 | Subsidence (Sink Hole) | 0.46 |
| 24 | Dam Failures | 0.20 |

*4.3 Hazard Profiles*

## #1 ~ Thunderstorm Hazards:

- Tornado
- Severe Wind
- Hail
- Lightning

**Tornado**

**Description**

A tornado is described as a rapidly rotating column of air that is in contact with both the surface of the Earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Tornadoes come in many shapes and sizes; they are often visible in the form of a condensation funnel originating from the base of a cumulonimbus cloud, with a cloud of rotating debris and dust beneath it. Most tornadoes have wind speeds of less than 110 miles per hour, are about 250 feet across, and travel a few miles before dissipating. The most extreme tornadoes can attain wind speeds of more than 300 miles per hour, are more than a mile in diameter, and stay on the ground for dozens of miles. Property damage from tornadoes is in the hundreds of millions of dollars every year. Michigan averages approximately 15 tornadoes per year, most occurring in the southern Lower Peninsula.

**Hazard Analysis**

Tornadoes in Michigan 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 violently rotating columns of wind known as funnel clouds. Winds that converge from different directions, heights, or at different speeds are the source of the spinning pattern that gets concentrated as distinct funnels of wind. Michigan lies at the northeastern edge of the nation's primary tornado belt, which extends from Texas and Oklahoma through Missouri, Illinois, Indiana, and Ohio. 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, which provides the other mechanism by which tornadoes can cause such severe destruction. The data below also proves that Cass County may experience one tornado every three years.

**Historical Hazard impacts and Cass County**

Since 1950 Cass County has experienced 19 tornadoes.

**F1 Tornado: On June 22nd, 1957,** 0 fatalities, 0 injuries reported.

**F1 Tornado: On October 8th, 1959,** 0 fatalities, 0 injuries reported.

**F0 Tornado: On August 16th, 1968,** 0 fatalities, 0 injuries reported.

**F1 Tornado: On June 20th, 1974,** 0 fatalities, 0 injuries reported.

**F1 Tornado: On August 27th, 1978,** 0 fatalities, 0 injuries reported. The F1 Tornado touched down briefly along Chain Lakes Street destroying two trailers, a corn crib, and fell 50 trees. A home also had the siding torn off two sides. One resident witnessed the touchdown.

**F1 Tornado: On June 7th, 1980,** 0 fatalities, 0 injuries reported.

**F2 Tornado: On June 19th, 1986,** 0 fatalities, 0 injuries reported. F2 Tornado damaged 24 houses, 6 extensively. Many trees were snapped off or uprooted, blocking streets. Several cars were damaged.

**F1 Tornado: On July 15th, 1988,** 0 fatalities, 0 injuries reported.

**F1 Tornado: On July 16th, 1990,** at approximately 5:19 PM, 0 fatalities, 0 injuries reported. F1 Tornado, this tornado had many sightings. The first sighting was near Barron Lake where it blew 3 pontoon boats on shore 40 feet. The only other damage after the pontoon boat was downed trees.

**F2 Tornado: On July 13th, 1992,** at approximately 10:14 PM, a F2 Tornado touched down in Silver Creek Township in Cass County, cutting a path approximately 1 mile wide for a distance of approximately 5 miles in eastern Silver

Creek Township and western Wayne Township, approximately miles north of Dowagiac Michigan. On the Joe Hassel farm on Elm Street migrant workers' homes were destroyed, 74 migrant workers were left homeless and had to be sheltered. A total of 17 homes were destroyed, 5 homes with major damage, and 17 homes with minor damage. 25 persons were injured and transported to area hospitals. No fatalities were reported. Damage was estimated at $3.5 million, with nearly $2.7 million of that total being agricultural damage. A Governor's Disaster Declaration was granted to provide supplemental state assistance with security, sheltering and mass care.

**F2 Tornado: On August 25th, 1998,** at approximately 1:10 AM. One mobile home was destroyed on the south side of Juno Lake and several other homes around Juno, Painter, Eagle, and Christiana Lake suffered minor to moderate structural damage. An RV was tossed about and rotated 180 degrees which caused major damage. Numerous trees were completely flattened which also caused damage to homes. Many roads were blocked by fallen trees…snapped power poles and downed power lines. This tornado began in Niles Michigan and peaked in intensity and width 3 miles northwest of Edwardsburg where it widened out to a half of a mile, and a path 9 miles long. The tornado continued southeast towards the town of Bristol in Elkhart County before lifting. 0 fatalities, 0 injuries reported.

**F1 Tornado: On August 25th, 1998,** at approximately 1:15 AM. An F1 tornado weakened as it passed just east of Adamsville, but still caused extensive damage to several farms along and primarily south of highway 12. Several homes and vehicles sustained major damage due to fallen trees.

**F3 Tornado: On October 24th, 2001**, at 2:50 PM, a series of storms not immediately identified as tornadic in nature, sliced diagonally across the center of Cass County producing an EF3 Tornado, with a path of destruction of 440 feet wide and 32 miles long, causing widespread and severe damage to the southeast portion of the Cass County, the Townships of Calvin, Jefferson, Howard, Newberg, Marcellus, Mason, Milton, Ontwa, Penn, and Porter, and the Villages of Edwardsburg and Cassopolis – including blowing homes off of foundations, toppling of mobile homes and complete destruction of several barns and outbuildings. 13 homes were destroyed, 156 homes with major damage, 271 homes with minor damage, 3 businesses destroyed, 5 businesses with major damage, and 4 businesses with minor damage. 1 Fatalities, 2 reported injuries (information on fatalities and injuries is from the Tornado History Project).

**F1 Tornado: On October 24th, 2001,** a series of storms not immediately identified as tornadic in nature sliced diagonally across the center of Cass County also producing a second Tornado in Cass County, which was determined to be an F1 Tornado. The F3 Tornado and F1 Tornado followed an almost identical path diagonally across the center of Cass County.

**F0 Tornado: On July 21st, 2004,** an F0 Tornado hit Cass County. Much of the wind damage was caused by straight line winds estimated between 70 and 85 mph as a fast-moving line of severe thunderstorms moved east across the area. 2 distinct damage tracks were noted in the area, with several tree limbs broken off, a few large trees uprooted, power poles damaged, and some structural damage being observed in both areas.
Damage was noted along a 14-mile-long track starting from just north of Clear Lake in Berrien County Michigan, extending east to the north side of Buchanan. The damaged track continued into the northern part of Niles and then crossing into western Cass County, near Barron Lake, where the damage ended on the east side of the lake.

A second area of damage, roughly 6 miles long, was noted starting just east of Edwardsburg in southwestern Cass County and continuing to the east side of Juno Lake. There was evidence of a touchdown by a weak F0 tornado on the west side of Eagle Lake on North Shore Road. The track of the tornado went approximately a half mile and was 50 yards wide, with the tornado not always in contact with the ground. The tornado finally lifted on the north side of Eagle Lake. Damage continued to campgrounds in the area as well as residences on all but the south side of Juno Lake.

**EF2 Tornado: On June 5th, 2010**, at 11:50 PM, Cass County was hit by severe wind, rain, and an EF2 Tornado. The tornado began a half of a mile southwest of Southwestern Michigan College near the City of Dowagiac and

continued east ending near route M-62 just south of Cass Street. The tornado had a path length of 2.75 miles. Numerous houses were damaged in the Pokagon Tribal subdivision south of Southwestern Michigan College, and extensive tree damage was received along the path. Maximum winds were estimated at 111 to 135 mph. 0 homes destroyed, 0 homes with major damage, 9 homes with minor damage, and 31 other homes affected. 0 fatalities, no serious injuries were reported.

**EF1 Tornado: On November 17th, 2013,** at approximately a strong low-pressure system moved through the region. Storms began to fire in central Illinois ahead of a strong cold front during the early afternoon hours and quickly reached severe limits. Initially, the storms fired as distinct super cells moving at forward speeds of 50-60 mph! Eventually, the super cells merged into a squall line that raced across Indiana, Michigan and into Ohio during the late afternoon to early evening hours.

At approximately 3:27 PM EST on November 17, 2013, an EF-1 tornado touchdown just west of the Ross Beatty Jr.-Sr. High School near Cassopolis, Cass County, Michigan. The tornado path length was just under 0.5 miles, path width was 50 yards, and with maximum estimated wind speed of 110 mph. Numerous trees were snapped and thrown. A two-story barn was destroyed with debris scattered. A second nearby barn lost its roof. As the tornado continued northeast towards Park Shore Golf Course it destroyed a two-car detached garage with debris carried 500 yards to the northeast and did major damage to the two homes on each side of the detached garage.

Across Cass County Michigan there was widespread wind damage, numerous pole barns with roofs peeled off, many trees down on homes and across roadways. Fortunately for Cass County Michigan there were no reports of serious personal injury or death due to the Tornado and severe wind event. 2 homes destroyed, 2 homes with major damage, 6 homes with minor damage, 2 homes affected. 2 barns destroyed, 3 barns with major damage, 1 barn with minor damage. 0 fatalities, 0 injuries reported.

**EF0 Tornado: On March 24th, 2016,** at approximately 3:14 PM an EF0 tornado touched down at the north end of Sundance Road, just south of US-12, near the Village of Edwardsburg. The tornado tracked east northeast and heavily damaged a barn, as well as removing a small section of a roof on a church. Peak winds of 75 mph, path length 1.4 miles long and 150 yards wide. 0 homes destroyed, 0 homes with major damage, 4 homes with minor damage, and at least 3 homes affected. 0 fatalities, 0 injuries reported.

**EF1 Tornado: On February 28th, 2017,** an EF1 Tornado hit the southeast corner of the City of Dowagiac. 0 homes destroyed, 3 homes with major damage, 3 homes with minor damage, and 17 homes affected.

In Pokagon Township Pine Row Trail, 4 homes had minor damage, and 2 mobile homes just outside of the city limits of Dowagiac were destroyed.

**EF1 Tornado: On February 28th, 2017,** a second EF1 Tornado also hit Calvin Township at the intersection of Brownsville Street and Calvin Center Road, and also South Shore Drive. 1 mobile home destroyed, 1 home with major damage, 1 home with minor damage, 15 homes affected, and the Calvin Center SDA School was also affected.

***Direct Impacts***

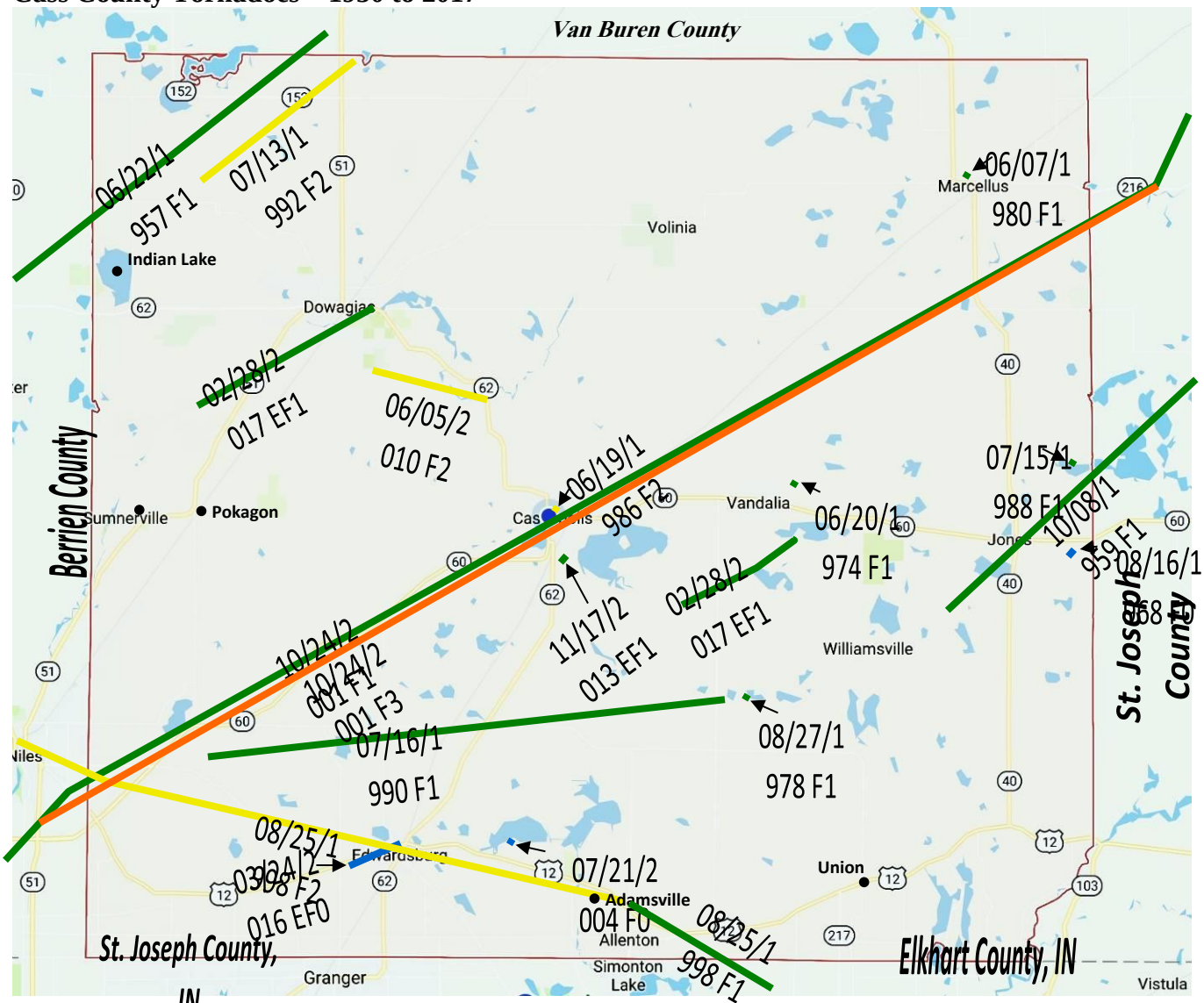
Directly, tornados impact the physical contents of the County, including structures, crops, and population. Damages caused by the tornado results in large amounts of debris, which may clog transportation networks, create a large population who require shelter or alternative living conditions, and may delay the response of emergency personnel during and after the event, and the arrival of relief supplies and assistance following the event. As with almost all disasters, there are also psychological impacts on the population both directly and indirectly affected by the event which may result in immediate or delayed reactions to the event.

***Indirect Impacts***

Indirect impacts of tornado often include large rebuilding costs and timeframes for reconstruction or repair of damaged homes, shops, roadways, or other buildings. When a tornado event impacts a large portion of the

community, these impacts may increase in severity as the timeframe of recovery is prolonged. The psychological impact of tornados may indirectly impact the community's recovery as well. Loss of revenue due to closed and damaged buildings, damaged transportation networks, and delayed employment conditions may also indirectly or directly impact the communities.

**Cass County Tornadoes – 1950 to 2017**




The Enhanced Fujita (EF) Scale classifies tornadoes into the following categories:

| EF0 | EF1 | EF2 | EF3 | EF4 | EF5 |
|---|---|---|---|---|---|
| Weak | Moderate | Significant | Severe | Extreme | Catastrophic |
| 65-85 mph | 86-110 mph | 111-135 mph | 136-165 mph | 166-200 mph | 200+ mph |

| Date | Rating | Deaths | Injuries | Damage | Date | Rating | Deaths | Injuries | Damage |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 06/22/1957 | **F1** | 0 | 0 | 0 | 07/21/2004 | **F0** | 0 | 0 | 0 |
| 10/08/1959 | **F1** | 0 | 0 | 250 | 06/05/2010 | **EF2** | 0 | 0 | 100,000 |
| 08/16/1968 | **F0** | 0 | 0 | 0 | 11/17/2013 | **EF1** | 0 | 0 | 0 |
| 06/20/1974 | **F1** | 0 | 0 | 250 | 03/24/2016 | **EF0** | 0 | 0 | 100,000 |
| 08/27/1978 | **F1** | 0 | 0 | 25,000 | 02/28/2017 | **EF1** | 0 | 0 | 0 |
| 06/07/1980 | **F1** | 0 | 0 | 25,000 | 02/28/2017 | **EF1** | 0 | 0 | 0 |
| 06/19/1986 | **F2** | 0 | 0 | 2,500,000 | | | | | |
| 07/16/1990 | **F1** | 0 | 0 | 2,500 | | | | | |
| 07/13/1992 | **F2** | 0 | 25 | 250,000 | | | | | |
| 08/25/1998 | **F2** | 0 | 0 | 500,000 | | | | | |
| 08/25/1998 | **F1** | 0 | 0 | 300,000 | | | | | |
| 10/24/2001 | **F3** | 0 | 0 | 5,000,000 | **EF0-16%** | **EF1-58%** | **EF2-21%** | **EF3-5%** | |
| 10/24/2001 | **F1** | 0 | 0 | 0 | | | | | |

**Enhanced Fujita Scale for Tornado Damage** **Table 15**

| **Enhanced Fujita Scale for Tornado Damage** |
|---|
| **EF0 wind speeds 65 – 85 mph. Minor Damage:** Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.<br>Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0. |
| **EF1 wind speeds 86 – 110 mph. Moderate Damage:** Damage likely due to small flying debris. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken. |
| **EF2 wind speeds 111 – 135 mph. Significant Damage:** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground. |
| **EF3 wind speeds 136 – 165 mph. Severe Damage:** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance. |
| **EF4 wind speeds 166 – 200 mph. Extreme Damage:** Well-constructed houses and whole frame houses completely leveled; cars thrown, and small missiles generated. |
| **EF5 wind speeds greater than 200 mph. Catastrophic, Destruction:** Complete destruction, often no debris left on site. |

The repeated impact of tornadoes and severe wind events makes Thunderstorm Hazards the highest-ranking hazard among Cass County's identified hazards.

Densely populated areas around the Cass County's many lakes, are most often heavily wooded, and have a particularly difficult time during recovery because of the many trees and power lines that fall during Thunderstorm Hazards and difficulty maneuvering on narrow streets filled with debris.

Rural areas, although not as heavily affected by downed trees in terms of travel, do suffer from difficulties that revolve around long-term power outages caused by downed trees and limbs – outages which affect not only access to light and heat, but access to water because of the number of farms and properties with wells.

An additional burden is placed on farmers with large numbers of livestock who face very specific needs in terms of watering, cleaning and even cooling. Failure to adequately address these needs over several days could quickly result in the loss of large numbers of livestock.

Damage, although of tremendous concern, is overshadowed by the vulnerability of portions of our population during tornado/wind events – particularly those with high levels of exposure and few, if any, protective options. This includes people living in trailers, unsecured modular homes, homes without basements and special populations.

**Severe Thunderstorm**

**The Description**

According to the National Weather Service severe thunderstorms are defined as thunderstorms with winds of 58 miles per hour or greater and/or with hail 1 inch in diameter or larger. Severe Thunderstorms are a common occurrence in many areas in Michigan. Along the Great Lakes shoreline, strong winds occur with regularity, and gusts of over 74 miles per hour (hurricane velocity) do occasionally occur in conjunction with a storm system. Severe Thunderstorms can cause damage to homes and businesses, power lines, trees, and agricultural crops which may require temporary sheltering of individuals without power for extended periods of time. Severe Thunderstorms occur in all areas of Michigan.

Between January 1st, 1997, and August 14, 2017, in Cass County there have been 106 Severe Thunderstorms with winds of 50 miles per hour or higher. Severe Thunderstorms during this period have caused over $1.149 million dollars in damages, with 0 deaths and 6 reported serious injuries. *(Source: NOAA Storm Events Database)*

**Historical Hazard impacts and Cass County**

06/21/1997 02:00 AM Severe Thunderstorm in Marcellus 13K in property damage, 04:08 PM Severe Thunderstorm in Edwardsburg 3K in property damage.

07/02/1997 06:45 AM Severe Thunderstorm in Dowagiac 25K in property damage, 06:45 AM Severe Thunderstorm in Pokagon 25K in property damage, 06:50 AM Severe Thunderstorm in Edwardsburg 300K in property damage: Trees and power lines reported downed on the south side of Dowagiac. Lightning also damaged several power transformers. As this isolated cluster of severe thunderstorms crossed central and southeast Berrien County and western and southern Cass County, hail up to 2 1/4" in diameter fell and straight-line winds were estimated as high as 70 mph. Widespread agricultural hail damage was reported in central Berrien County and a significant amount of wind damage to homes was reported in Berrien Springs and Edwardsburg. Power outages across Berrien and Cass Counties totaled 21,500 with this cluster of severe thunderstorms.

07/14/1997 04:35 PM Severe Thunderstorm in Edwardsburg 5K in property damage, 04:35 PM Severe Thunderstorm in Dowagiac 5K in property damage: Cass County Central Dispatch reported trees and power lines knocked down in the Dowagiac area. A cold front moved east across Lake Michigan and Michigan's Lower Peninsula during the afternoon and evening hours of Monday, July 14, 1997. As this frontal boundary collided with the warm and unstable air mass across the state, strong to locally severe thunderstorms developed mainly across the southern two tier of counties. Isolated reports of nickel-size hail and wind gusts up to 70 mph were received. Downed trees and power lines cut power to approximately 48,000 Consumers Energy customers in southwest and south-central Lower Michigan. No injuries were reported.

08/16/1997 01:15 PM Severe Thunderstorm in Jones 3K in property damage, and in Marcellus 5K in property damage, 08:45 PM Severe Thunderstorm in Jones 20K in property damage: Cass central dispatch reported trees downed near Jones. On Saturday, August 16, 1997, a cold front moved slowly south across Michigan's Lower Peninsula. One low pressure wave moved along the front early that morning, resulting in severe thunderstorm development over south-central Lower Michigan. Later that afternoon, with very humid and unstable air in place across far southern Lower Michigan, another frontal wave caused severe thunderstorm development along the southern 2 tier of counties across southern Michigan. The thunderstorms produced heavy rainfall amounts of 2 to 5 inches in the counties bordering northern Indiana and northern Ohio, along with isolated reports of wind damage from 60 mph thunderstorm wind gusts. One thunderstorm produced golf ball-sized hail in Edwardsburg in Cass County on Saturday afternoon. Local utility companies reported approximately 55,000 power outages during the afternoon and evening across far southern Michigan, most a result of lightning strikes, but some due to downed trees and utility poles.

06/18/1998 10:15 PM Severe Thunderstorm in Dowagiac 25K in property damage: Numerous trees and power lines blown down.

08/24/1998 04:04 PM Severe Thunderstorm in Adamsville 10K in property damage.

11/10/1998 09:40 AM Severe Thunderstorm Countywide 50K in property damage: Extensive damage occurred to trees, power lines and poles across the country.

05/06/1999 11:40 AM Severe Thunderstorm in Dowagiac 15K in property damage: Several trees and power lines were blown down.

03/15/2000 08:00 PM Severe Thunderstorm in Dowagiac 10K in property damage: A strong thunderstorm microburst blew down trees, branches, and windows out of a house. A woman at the residence was outside when the storm hit; she suffered minor injuries from the blown debris.

06/28/2003 03:15 PM Severe Thunderstorm in Dowagiac 50 kts, in Cassopolis Law enforcement reported large trees down and a large tree fell on a church tent injuring 4 people, one seriously.

05/21/2004 11:20 AM Severe Thunderstorm in Cassopolis 60 kts. 5K in property damage: Law enforcement reported trees and power lines down countywide and a semi-truck rolled over.

05/15/2007 4:15 PM Severe Thunderstorm Wind at the Dowagiac Cass Airport 55 kts. 25K in property damage: Several trees and power lines reported across the entire county.

12/23/2007 04:50 AM Severe Thunderstorm in Dowagiac 55 kts. 20K in property damage: Law enforcement officials reported numerous trees and power lines down across the county.

04/25/2008 11:01 PM Severe Thunderstorm in Cassopolis 55 kts. 10K in property damage: Local law enforcement reported trees and power lines blown down by estimated winds of around 65 mph.

06/06/2008 3:45 PM Severe Thunderstorm in Indian Lake 55 kts. 10K in property damage: Amateur radio operators reported a tree down onto an occupied house. No injuries were reported. Damage is estimated at $10,000. A line of thunderstorms moved from northeastern Indiana into portions of far southern Lower Michigan. Straight-line wind damage was reported across the area.

06/15/2008 09:17 AM Thunderstorm Wind at Eagle Pt 50 kts. County officials reported several trees were blown down. The first in a series of three thunderstorm complexes that affected the area during the 15th and 16th moved out of Illinois into far southern lower Michigan during the morning hours of the 15th. The storms varied in intensity, occasionally becoming severe with a handful of wind damage reports.

07/02/2008 7:00 PM Thunderstorm Wind at Cassopolis 55 kts.: Law enforcement officials reported trees down in several locations across the county. Numerous thunderstorms developed ahead of a cold front dropping south through the Great Lakes. 30 to 40 knots of shear as well as a moist unstable atmosphere allowed for several small bowing segments to develop with areas of wind damage reported.

04/05/2010 10:30pm A slow moving warm front, which extended from northern Illinois into far southern lower Michigan, provided the focus for numerous showers and thunderstorms. A few of these storms produced damaging winds of greater than 70 mph and hail to one inch in diameter. An area of scattered damage originated at the Dowagiac airport, with a hangar suffering moderate damage. The wind damage continued to expand with the roof being shifted off a business in the 54000 block of M-51. The remainder of the damage was confined to numerous three-to-four-foot diameter trees being uprooted or snapped, as well as some large branches down. A few of these did fall on a few structures but damage was very limited. Damage for the area is estimated at $400,000.

06/23/2014 4:45pm Weak surface low pressure was centered in the western Great Lakes. While some upper-level support was entering the region, shear profiles kept thunderstorms somewhat disorganized. A few clusters of thunderstorms took on bowing characteristics, causing small areas of wind damage. Law enforcement officials reported trees down across the eastern part of the county. Many roads are flooded.

02/28/2017 9:00pm A warm front moved into far southern Lower Michigan, enhancing low level shear and an already unstable environment to allow for a line of thunderstorms to develop and become severe as it tracked across far southern Lower Michigan and far Northern Indian. Sporadic wind damage reports were noted, along with occasional circulations along the line producing brief tornadoes in Berrien, Cass, and St. Joseph counties. Additional severe weather occurred with a second line of storms during the early morning hours of March 1st. The public reported a few power poles were blown down on M-51

05/02/2018 8:00pm East to west oriented MLCAPE axis of 1000 to 2000 J/KG existed across far southern Lower Michigan and far northern Indiana. Effective shear was maximized across northwestern Indiana but did lower somewhat with southward extent. A line of thunderstorms moved across southern Lake Michigan into northwestern Indiana. Additional storms developed further south along theta-e axis. The result was damaging wind gusts, a few that were significant with reports of trees, tree limbs and power lines down in several areas. Localized flooding occurred in some areas, mainly those prone to high water.

06/13/2022 7:30pm A volatile environment of over 4000 J/KG of SBCAPE, combined with 45 to 60 knots of effective shear set the stage for multiple rounds of thunderstorm during the afternoon and evening hours of June 13th. Initial storms remained poorly organized but did produce sporadic wind damage or hail. A more substantial thunderstorm development evolved during the evening hours in northwestern Indiana and Southwestern Lower Michigan and progressed southeast, eventually producing several swaths of wind damage. In far southern Lower Michigan, damage occurred in portions of Berrien, St. Joseph, and Branch counties with the most intense occurring from Three Rivers to Sturgis. Numerous reports of trees down in the area south of Marcellus.

08/03/2022 3:30pm A line of thunderstorms produced damaging wind gusts in southern Michigan. There was one direct fatality. Local law enforcement reported a large tree limb fell onto the cab of a vehicle, spun the limb into the roadway while the vehicle continued westbound, striking another tree on the side of the road.

**Lightning**

**The Description**

Lightning is a sudden discharge of electricity from within a thunderstorm. Although lightning is often perceived as a minor hazard, it damages many structures and kills and injures more people in the U.S. per year, on average, than hurricanes. Many lightning deaths and injuries could be avoided if people would have more respect for the threat that lightning presents.

**Historical Hazard Impacts**

In the past, within Cass County, lightning strikes have hit the Cass County Sheriff's Office radio tower, Cass County 911 Dispatch Center, and Indian Lakes Fire Department. Common issues and damages caused by these lightning strikes are to radio communications, computer, cable, internet, and phone service. All these structures are grounded and located in populated business or residential areas. The Cass County Dispatch Center is of cement block and brick construction, and the Indian Lakes Fire Department is of metal pole barn construction.

6/13/1994 13:45 PM Lightning in Cassopolis struck a house and ignited a fire (No damage estimate).

**The Problem**

The impact of lightning strikes on critical infrastructure and key facilities within Cass County are areas of concern and may need to be addressed as what appears to be a tendency for certain structures to attract lightning.

Globally, there are about 2,000 thunderstorms occurring at any given time, and those thunderstorms cause approximately 100 lightning strikes upon the ground each second. In the United States, approximately 100,000

thunderstorms occur each year, and every one of those storms generates lightning. It is not uncommon for a single thunderstorm to produce hundreds or even thousands of lightning strikes.

As an indicator of the circumstances involving lightning fatalities, injuries, and damage in the United States, consider the following statistics compiled by the National Oceanic and Atmospheric Administration (NOAA) and the National Lightning Safety Institute (NLSI) for the period of 1959-1994:

Location of Lightning Strikes

- 40% are at unspecified locations
- 27% occur in open fields and recreation areas (not including golf courses)
- 14% occur to someone under a tree (not including golf courses)
- 8% are water-related (boating, fishing, swimming, etc.)
- 5% are golf-related (on golf course or under tree on golf course)
- 3% are related to heavy equipment and machinery
- 2.4% are telephone-related
- 0.7% are radio, transmitter and antenna-related

Gender of Victims: 84% are male; 16% are female.

Months of Most Strikes: July (30%); August (22%); June (21%)

Most Likely Time Period of Reported Strikes: 2:00 PM – 6:00 PM

Number of Victims: One victim (91%); two or more victims (9%)

Weather.gov - Michigan

- Lightning Fatalities 1959-2016: 110
- Death Rate Per Million People from 1959-2016: 0.20

**Impact**

Lightning has a discouraging effect on outdoor activities and has also caused casualties (including death) and severe property damage, including the ignition of structural fires and wildfires, which in turn present serious additional risks and harm to the public and its property. Electrical and communications infrastructure can be affected by lightning strikes, causing widespread inconvenience and, in some cases, life-threatening impairment of needed medical equipment and emergency response.

First Responders tend to work outdoors in conditions from which most residents are taking shelter. Although special training and safety precautions have usually been taken, nevertheless, responders are more exposed to and at-risk from lightning. This inhibits the ability of responders to work safely outdoors.

Because it is virtually impossible to provide complete protection to individuals and structures from lightning, this hazard will continue to be a problem for Cass County's residents, communities, and visitors. However, lightning deaths, injuries, and property damage can be reduced through a combination of:

- Public education
- Weather preparedness planning of weather sensitive events
- Public awareness, public alerting
- Use of weather technology
- Proper building safety provisions
- Use of surge protectors on critical electronic equipment
- Simple common sense

**Hail**

**The Description**

A condition where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that fall to the earth. Hail 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. Sometimes, however, strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, causing an unexpected hazard at places that otherwise might not appear threatened. Hailstones range in size from a pea to a golf ball, and hailstones larger than baseballs are possible in the most severe thunderstorms. Hail is formed when strong updrafts in thunderstorms provide a medium for the growth and accumulation of ice crystals. Hailstone continues to grow until updrafts can no longer hold their weight aloft. Hailstones then descend to the ground, battering crops, denting autos, and injuring livestock, wildlife, and people. Large hail can indicate the presence of an unusually dangerous thunderstorm.

Between January 1st, 1997, and June 27, 2023, in Cass County there has been 32 Hail events with hail ¾ of an inch or larger. *(Source: NOAA Storm Events Database)*

**Historical Hazard impacts and Cass County**

08/16/1997 15:55 Hail 1.50 in. at Edwardsburg
08/24,25/1998 03:10 Hail 0.75 in. at Marcellus
05/09/2000 17:00 Hail 2.75 in. at Marcellus
07/28/2000 15:05 Hail 1.00 in. at Edwardsburg
05/07/2003 17:15 Hail 1.75 in. at Cassopolis
05/07/2003 17:42 Hail 0.75 in. at Edwardsburg
07/06/2003 16:37 Hail .75 in. at Barron Lake
03/01/2004 20:10 Hail .75 in. at Cassopolis
05/14/2004 24:25 Hail 1.50 in. at Edwardsburg $12,000 in damages to roofs and a recreational vehicle. Public reported ping pong ball size in Edwardsburg on Eagle Lake
02/16/2006 18:45 Hail 0.88 in at Edwardsburg
06/28/2006 24:12 Hail 1.00 in. at Vandalia
04/26/2011 17:10 Hail 1.00 in. at Dowagiac
07/02/2011 16:37 Hail 1.00 in. at Cassopolis
08/13/2011 15:30 Hail 0.88 in. at Cassopolis
08/13/2011 15:51 Hail 1.0 in. at Jones
03/15/2012 03:22 Hail 0.75 in. at Edwardsburg
05/03/2012 18:04 Hail 0.75 in. at Marcellus
05/03/2012 22:10 Hail 0.75 in. at Red Mill
06/25/2013 16:30 Hail 0.75 in. at Dowagiac
06/25/2013 17:10 Hail 1.0 in. at Marcellus
07/23/2014 00:45 Hail 1.25 in. at Edwardsburg
07/17/2015 20:39 Hail 0.88 in. Dowagiac
07/17/2015 20:55 Hail 1.25 in. at Dowagiac
04/25/2016 21:19 Hail 0.75 in. at Marcellus
04/25/2016 21:20 Hail 1.00in. at Marcellus
03/14/2019 15:49 Hail 0.75 in. at Edwardsburg
04/07/2020 21:00 Hail 0.75 in. at Barron Lake
04/07/2020 21:08 Hail 0.75 in. at Barron Lake
06/20/2021 18:15 Hail 0.75 in. at Sandy Shores
06/20/2021 18:18 Hail 1.75 in. at Sandy Shores

06/20/2021 23:49 Hail 0.75 in. at Sandy Shores

**The Problem**

In general, all of Cass County's agricultural crops, buildings, and vehicles are to some degree vulnerable to hail damage. The essential functions of the critical facilities are not likely to be impacted by hail. Nor are any at-risk populations any more vulnerable than the general population.

Damaging hail does not affect the entire County in one event. Hail is a geographically isolated event that affects only several square miles at any one time. In terms of crop losses, the actual damage that occurs will depend on the type of crop and the growth stage of the plants when hail occurs. In terms of property losses, the actual damages will depend on the housing density and density of automobiles in the impacted area. This is highly variable across the County. A hailstorm in a rural area in the early spring when the crops are just emerging will have much less of an impact than a storm of the same intensity occurring later in the growing season when the crops are more susceptible to damage and when there is no time to replant if the crop is a total loss. Considering the historical annual occurrences of hail, Cass County might experience 1.25 hail events per year.

**NATIONAL WEATER SERVICE WEATHER FATALITIES 2016** **GRAPH 3**


*(National Weather Service office of Climate, Water, and Weather Services)*

**Mitigation Alternatives**

- Continue public education on severe weather awareness, and weather hazards, through programs such as the National Weather Service Weather Spotter training program.
- Increased use of NOAA Weather Radios, and computer and cell phone weather apps.
- Identify county, city, and village facilities and infrastructure in need of mitigation to prevent and minimize the impact of lightning strikes.
- Identify historical sites subject to lightning strike (i.e., Rugged Cross Church, One-room schoolhouses, The Cass County Historic Courthouse, Underground Railroad sites, etc.)
- Increase public awareness regarding the dangers of Thunderstorm Hazards, and more importantly, the protective measures to be taken during Thunderstorm Hazards watches and warnings.
    - Since different populations (senior citizens, mobile home residents, residents without basements, etc.) have varying abilities for dealing with Thunderstorm Hazards, develop targeted messages for each identifying specific measures to be taken during Thunderstorm Hazards.
    - Identify means for communicating directly with these populations.
    - Conduct targeted presentations to offer important information.
    - Review programs on a regular basis to ensure on-going awareness.

- Enhance early warning systems.
    - Identify communities most likely to benefit from early warning siren systems based on population density, lack of other warning systems, etc.
    - Identify appropriate warning siren systems, coverage areas and associated costs.
    - Support efforts to access funding to complete each project.
- Identify vulnerable populations in each community – including senior citizens, people with disabilities, those with life-threatening illnesses or dependent on life-sustaining equipment, and those living in sub-standard or compromised housing – especially those with young children, and non-English speaking populations -- and generate Thunderstorm Hazards warning and support systems tailored to address these specific populations.
    - Work with community action agencies to identify vulnerable populations and establish an approved and regularly updated database, which includes individuals subject to higher-than-average risks during Thunderstorm Hazards.
    - Create a collaborative information campaign to encourage populations to enroll in the database, or to enroll family members in the database.
    - Establish a system – employing emergency responders, CERT team members, local officials, and other community volunteers in providing systematic support to vulnerable individuals within each community before, during, and after Thunderstorm Hazards events.
    - Identify specialized support services necessary to care for the unique needs of these vulnerable populations during Thunderstorm Hazards and other emergency events including medically staffed shelters, translating services, specialized transport systems to accommodate non-ambulatory individuals, etc.
- Establish and support Community Emergency Response Team (CERT) programs.
    - As mentioned above, employ community CERT team members to initiate local response before, during, and after Thunderstorm Hazards events.

    - Establish response procedures that identify and call for priority attention for vulnerable populations within each community.
    - Ensure that CERT team members are familiar with the needs of the community.
- Seek/Support legislation requiring protective shelters for trailer parks and modular home parks.
    - Work with state representatives to encourage legislation requiring all new mobile and modular home parks provide approved storm shelters,
    - Encouraging all mobile and modular home park owners to retrofit facilities with the support of either tax abatements or mitigation funding support.
- Encourage the inclusion of protective rooms/areas in all residential building codes.
    - Work with area builders and realtors to encourage recommendations for “safe rooms” in all housing built within the county.
    - Initiate a “safe room” campaign that provides the public with options for safe room construction, identify costs, and offers incentives and/or support to those who are interested in constructing safe rooms.
- Encourage/support protective measures where possible by local businesses, to require protection from Thunderstorm Hazards.
    - Work with area businesses to emphasize the importance of in-house emergency plans and specifically, identification of “safe areas”.
    - Encourage area businesses to exercise their emergency plans – especially regarding movement of employees and the public into safe areas.
- Improve the response capability of emergency response teams where possible, to minimize loss of life, and support positive outcomes.
    - Ensure that all emergency response teams have the information and training needed to respond safely and efficiently to Thunderstorm Hazards emergencies.
    - Ensure that all emergency response teams have the equipment needed to respond safely and efficiently to Thunderstorm Hazards emergencies.
    - Work with emergency response teams to acquire needed information, training, and equipment.
    - Review/Revise procedures as needed to improve response capability/efficiency.
- Continue tree trimming and maintenance.
- Identify designated community tornado shelters.
- Encourage emergency generators and back-up power supply for public service departments, special needs facilities and community shelters.
- Establish interoperability of radio systems between all key agencies and organizations

**#2 Winter Weather Hazards**

**The Description**

Winter storms can bring periods of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility. Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds bearing enormous amounts of snow. Most of the snow accompanying a blizzard is in the form of fine, powdery particles of snow which 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.

As a result of being surrounded by the Great Lakes, Michigan experiences large differences in snowfall in relatively short distances. The annual mean accumulation ranges from 30 to 170 inches of snow. The highest accumulations are in the northern and western parts of the Upper Peninsula. Because of the "lake effect" on weather patterns, snowstorms tend to be more severe if prevailing winds bring them in from one of the Great Lakes.

Ice and Sleet Storms can generate enough ice or sleet to result in hazardous conditions and/or property damage. Sleet storms differ from ice storms in that sleet is like hail (only smaller) and can be easily identified as frozen rain drops (ice pellets) that bounce when hitting the ground or other objects. Sleet does not stick to trees and wires, but sleet in sufficient depth does cause hazardous driving conditions. Ice storms are the result of cold rain that freezes on contact with the surface, coating the ground, trees, buildings, overhead wires, etc. with ice, sometimes causing extensive damage. When electric lines are down, inconveniences are felt in households and economic loss and disruption of essential services is often experienced in affected communities. Michigan has had numerous damaging ice storms over the past few decades.

**Historical Hazard impacts and Cass County**

**Blizzards**

Between January 1st, 1997, and January 1st, 2023, Cass County had four Blizzard events:

02/03/2007 10:00 – 15:41 County wide Blizzard conditions were reported by officials throughout the county, especially in outlying areas, causing significant travel problems. Wind gusts as high as 50 mph were reported causing zero visibilities and nearly impossible travel. In addition, wind chills of 15 to 25 degrees below zero were common.

12/21/2008 - 06:00 to 12/22/2008 - 08:00 Countywide heavy lake-effect snow squalls combined with frequent wind gusts more than 40 mph produced blizzard conditions across Cass County, especially during the afternoon and evening hours on December 21st. A trained spotter near Cassopolis reported whiteout conditions due to high winds and snow showers. Many roads were impassable due to 3- to 5-foot-high snow drifts. Snowfall amounts were generally between 3 and 8 inches, although far northwest Cass County received nearly a foot of snow.

02/01/2011 - 16:00 to 02/02/2011 - 03:00 Countywide blizzard conditions were experienced during the late afternoon and evening hours of February 1st as an intense low-pressure system approached from the southwest. Wind gusts of more than 40 mph, combined with the falling heavy snow, created reduced visibilities below an eighth of a mile at times. Snowfall rates of 1 to 2 inches per hour were common, with totals across the county generally ranging between 7 and 10 inches. Significant blowing and drifting snow resulted in numerous accidents and school closings across the region.

12/22/2022 - 15:30 A major winter storm brought snow and blowing snow that led to blizzard conditions at times from early Friday morning through early Saturday evening. Storm total snowfall amounts ranged from 10 to 16 inches across the western portions of the county to 3 to 6 inches across the eastern portions of the county. A CoCoRaHS observer reported 16.3 inches of snow accumulation near Barron Lake, MI. Widespread blowing and

drifting snow led to blizzard conditions at times with wind gusts as high as 50 mph. Numerous slide-offs and accidents were reported. Travel became very difficult to impossible with several road closures reported.

**Winter Weather**

While each winter storm event will have some similarities, each event is different depending upon whether it is "lake effect" or "system snow", wind and wind direction, temperature, intensity, and duration.

Michigan's Department of Transportation is staffed 24 hours a day during snow events and fully staffed during major snow events to keep all trunk lines open, US-12, M-40, M-51, M-60, and M-62.

The Cass County Road Commission has established a policy of plowing county roads after a snow event of at least 4 inches. The primary roads are plowed first, such as the main connecting roads to villages or towns; then secondary roads, which are more rural areas; then gravel roads, subdivisions, and lake communities. The Cass County Road Commission is committed to having a road plowed within 2 miles of each homeowner during a snow event. In the event of an emergency such as a patient needing medical attention the road commission works directly with the Sheriff's Office to coordinate snow removal services.

During times of severe winter weather, it is not uncommon for Cass County to issue a "Travel Advisory" when travel conditions are hazardous, and the motoring public is being asked to stay off the roadways in Cass County.

The motoring public should not travel unless necessary, if travel is inevitable precautions should be taken to ensure traveling safety.

- A "Travel Warning" is issued when travel conditions are extremely dangerous and a serious threat to the safety of the public.
- All non-emergency motoring public are directed to stay off the roadways in Cass County Michigan and should refrain from all travel due to extremely dangerous conditions.
- A *"Local Snow Emergency"* is issued when extreme weather conditions cause a direct threat to life and property for not only the residences, but responders and public works agencies as well.
- All motoring public are directed to stay off the roadways and refrain from all travel in Cass County Michigan during this time.
- The public, schools, businesses, government agencies, and other organizations should implement emergency actions.
- A *"Local Snow Emergency"* is lifted once conditions return to a manageable level.

During times of severe winter weather, residents should be prepared to shelter-in-place for at least 3 days.

Between January 1st, 1997, and January 1st, 2023, Cass County had seven Severe Winter Weather events:

12/12/2008 - 09:00 – 16:00 An intense single lake effect band developed off the relatively warm waters of Lake Michigan. The eastern part of Berrien County and all of Cass County experienced moderate to heavy snow for several hours with 3 to 5 inches of snow falling by the end of the event. The snowfall contributed to at least 2 accidents in Cass County, with 6 injuries occurring. Six people were treated for injuries in two separate accidents because of icy roads. A 32-year-old male from Dowagiac was traveling south on Wilbur Hill Road in LaGrange Township, when he lost control of his vehicle at 1:45 p.m. His vehicle ran off the road and struck a tree. He was treated and released. Five people were treated for injuries from a three-vehicle accident on Marcellus Highway, just west of Atwood Road in Wayne Township at 430 pm. A 42-year-old woman from Marcellus was driving on Marcellus Highway when she lost control of her vehicle. It crossed the center line and struck two other vehicles. A 62-year-old female from Dowagiac, was driving the first vehicle struck. Cass County police say she was not injured. The second vehicle struck was driven by an 18-year-old female from Dowagiac. She and two passengers were treated and released from Borgess Lee Memorial Hospital. Another 18-year-old passenger in the first car was in critical condition at the time of the report.

12/26/2008 - 06:00 – 12:00 Periods of freezing rain led to icy roadways and numerous accidents during the morning hours of December 26th. Ice accumulations were generally less than 0.20 across the region.

02/20/2011 - 11:00 to 02/21/2011 Freezing rain developed around noon on February 20th and continued through the rest of the day into the early morning hours of February 21st. Ice accretions of 0.10 to 0.25 were common across the county. This created icing on power lines and trees which led to scattered power outages across the county. There were also reports of slide-offs and accidents.

02/04/2014 - 20:00 to 02/05/2014 - 13:00 Snow developed during the early evening hours of February 4th and became heavy at times during the morning hours of February 5th. The accumulating snow and reduced visibilities to a quarter of a mile at times created hazardous travel conditions. Numerous schools were closed on Wednesday, February 5th, due to the heavy snow and poor road conditions. Total snow accumulations across the county generally ranged between 5 and 7 inches.

02/17/2014 - 16:00 to 02/18/2014 - 04:00 A quick 4 to 6 inches of snow resulted in roads becoming snow covered and slick. Wind gusts to 35 mph, combined with periods of heavier snow, created near whiteout conditions at times. Significant blowing and drifting snow also allowed some secondary roads to become impassible. There were school delays and closings on Tuesday, February 18th.

01/07/2015 - 02:00 to 16:00 Lake effect snow bands developed during the early morning hours of January 7th and persisted through much of the day. Total snow accumulations across the country generally ranged between 3 and 8 inches, heaviest across western portions of Cass County. The falling snow and wind gusts of 25 to 30 mph reduced visibilities and created areas of blowing and drifting snow. Wind chills during the event generally ranged between 5 below zero and 15 below zero. There were school delays along with reports of slide-offs across the region.

01/30/2019 – 0100 Gusty west winds ushered in a bitterly cold arctic air mass on January 30th into the morning hours of January 31st. The coldest of the air and strongest winds occurred during the morning hours of January 30th when the wind chill value near La Grange dropped to 38 degrees below zero. Wind chills through the event generally ranged between 25 and 40 degrees below zero. Many businesses and schools were closed on both January 30th and January 31st due to this record breaking shot of dangerous cold air. Lake effect snow showers and blowing snow also helped wreak havoc on area roads.

Between January 1st, 1997, and January 1st, 2017, Cass County had twenty-four Lake-Effect Snow events:

11/11/1997 - 2100 A cold front moved across western Lower Michigan during the early morning hours of November 12th, resulting in a lake-enhanced snow event which began late evening, Tuesday, November 11th. In general, 1 to 5 inches of snow fell across western and southern Lower Michigan, with 3-to-5-inch amounts confined to Lake, Ottawa, Kent, Allegan, Barry, Eaton, Ingham, and Kalamazoo Counties. The snow-covered and icy roads caught many overnight and early morning motorists by surprise. Slippery conditions are believed to have contributed to a seven-car pile-up on the northbound span of the U.S. 31 drawbridge late Tuesday night in Grand Haven. Two injuries were reported. 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. Snow reports included 5.0 inches in Grandville, 4.8 inches at the National Weather Service Office in southeast Grand Rapids, 4.5 inches in Hudsonville, 3.6-4.0 inches in Allegan, 3.2 inches in Hastings, 3.0 inches in Oshtemo, 3.0 inches in East Lansing, and 1.5 inches in Battle Creek.

11/15/1997 – 1800 An intense band of lake effect snow developed down the length of eastern Lake Michigan in a north wind flow and resulted in snow accumulations of 6 to 18 inches across far western Van Buren County and most of Berrien County. As the wind flow turned slightly more northwest during the morning hours of Sunday, November 16th, lake effect snow bands moved further inland across western Ottawa, western Allegan, central Van Buren, and Cass Counties. Snow totals in these areas ranged from 2 to 5 inches by the time the lake effect diminished. The worst conditions were felt across southwest Berrien County, where storm accumulations reached 18 inches in the New Buffalo-Sawyer areas. The weight of the heavy, wet snow downed tree limbs and power lines which cut power to 3,000 American Electric Power customers in southwest Berrien County. Snow reports included

13 inches in Baroda, 12 inches in St. Joseph and Coloma, 11 inches in Buchanan, 10 inches in Stevensville, 6 inches in South Haven, 4.7 inches in Holland, and 4.5 inches in Fennville.

12/4/1997 – 1900 An upper-level low pressure system brought colder air across Lake Michigan into western Lower Michigan during the night of Thursday, December 4th through late afternoon Friday, December 5th. West to northwest winds brought lake effect snow showers inland across most of the western counties of the lower peninsula, resulting in snow accumulations which ranged from 1 to 11 inches in the above noted counties. As is typically the case with the lake effect, snowfall totals across the region were highly variable in nature. Roads became snow-covered and slippery in the region with the usual increased number of minor accidents associated with snowfall across West Michigan. The morning rush hour was especially hazardous, as heavier snow squalls were reported south of Grand Rapids and Holland across Allegan and Van Buren Counties. Snowfall reports indicated the most significant accumulations were across Mason, Oceana, northern Muskegon, Allegan, Van Buren, northern Cass, and western Kalamazoo Counties. In these areas, accumulations averaged 6 to 11 inches. Snow reports included 11.2 inches in Scottville, 8 inches in Plainwell and Oshtemo, 7.5 inches in Pentwater, and 6 inches in Cassopolis.

12/30/1997 – 0700 A northwest wind flow around a strong low-pressure system which was moving up the East Coast brought a surge of arctic air south across Lake Michigan from Tuesday morning, December 30th, through midday Wednesday, December 31st. Lake effect snow brought accumulations which ranged from 2 to 12 inches across the counties bordering Lake Michigan. The only inland county which received significant accumulations was Cass County, which received 2 to 4 inches of snow. Major highways affected by the heavy snow showers included Interstate 94 west of Paw Paw, Interstate 196 south of Zeeland, Interstate 96 in Muskegon County, and U.S. Highway 31 along the length of the West Michigan lake shore. Snowfall reports included 12 inches in New Buffalo, 8-12 inches in South Haven area, around 6 inches in the Benton Harbor/St. Joseph area, and 5-8 inches across Muskegon, Oceana, and Lake Counties.

03/10/1998 – 0100 Northwest winds blowing across Lake Michigan behind an arctic cold front brought lake effect snow showers and squalls inland across portions of the counties bordering the lake in western Lower Michigan and as far inland as Cass County in extreme southwest Lower Michigan. The lake effect snow began around 1:00 am EST Tuesday, March 10th and continued until 7:00 am Wednesday, March 11th. In the counties listed, lake effect snowfall accumulations ranged from 2 to 9 inches. Snowfall was heaviest across northwest Mason, extreme western Allegan, western Van Buren, northern Berrien, and northwest Cass counties. Snowfall accumulations reached 9 inches near Glenn and Ganges (Allegan County) and South Haven (Van Buren County); 6 inches near Saugatuck (Allegan), Coloma and Watervliet (Berrien), and Dowagiac (Cass); and 4 inches in Niles and Benton Harbor (Berrien).

12/07/2006 – 0000 A cold front ushered in colder air across the relatively warm waters of the Great Lakes, resulting in several bands of lake effect snow showers. One dominant band set up from far southwestern Michigan into Northern Indiana. Amounts ranged from 11 inches in Marcellus to 7 inches in Cassopolis, to 6 inches in White Pigeon, Sturgis, and Union. A persistent band of moderate to heavy lake effect snow dumped 11 inches in Marcellus, 7 inches in Cassopolis and 6 inches in Jones and Union.

01/27/2007 - 18:00 to 01/29/2007 00:00 A surge of arctic air moved across the relatively warm waters of Lake Michigan. A significant single band of lake effect snow developed and meandered across parts of far southwestern Lower Michigan. In general accumulations of 6 to 10 inches were seen into St Joseph County. In areas where the band persisted for over 24 hours, extreme snowfall amounts occurred with accumulations of 15 inches in Benton Harbor area to 20 inches in Stevensville. Law Enforcement officials in Cassopolis reported 8.3 inches of snow.

01/29/2007 - 22:00 to 01/31/2007 01:00 An Alberta clipper system ushered in a reinforcing shot of cold air to the Great Lakes, resulting in another round of lake effect snowfall. A series of meso circulations that moved down the lake assisted in the enhancement of the lake effect bands. Local snow accumulation of 6 inches to 12 inches was recorded in parts of Berrien County. In Cass County, Cassopolis reported 12 inches of total snowfall from the lake effect event.

11/20/2008 - 10:00 to 11/21/2008 04:00 An intense single lake-effect band set up over Cass County November 20th and continued into very early November 21st. The heaviest snowfall reports were across the western half of the county, with 10 of snow accumulation reported just northwest of Dowagiac. Several slide-offs and some accidents were reported.

12/06/2008 – 0400 Light snow developed ahead of an Alberta Clipper early Saturday morning and continued into Saturday afternoon. Lake-effect snow showers developed behind the clipper, with snowfall totals from the event ranging between 3 and 7 inches. There was a CoCoRaHS report of 6.2 just northwest of Dowagiac. The fallen snow, plus blowing and drifting snow with reduced visibilities, led to icy road conditions with a few accidents reported.

02/21/2009 - 23:00 to 02/22/2009 22:00 Northwest flow and cold air advection behind a potent low-pressure system led to a prolonged period of lake-effect snow on February 22nd. A very heavy lake-effect snow band set up over far northeastern Cass County around 3:00 am, before weakening over the area by 7:00 am. Snowfall rates of 1 to 2 inches were common within this band, with visibilities near zero at times. Total snowfall from the lake-effect snow ranged between 8 and 12 inches, with a report of nearly 10 inches near Dowagiac. Heavy snow, combined with gusty winds created low visibilities with reports of slide-offs and accidents across the region.

12/09/2009 - 15:00 12/10/2009 19:00 Moderate to heavy lake enhanced snow developed during the afternoon of December 9th. This transitioned into a lake-effect snow event that night into much of December 10th. Strong winds accompanied the lake-effect snow, which created whiteout conditions at times along with drifting. The heaviest accumulations were seen across the northwest corner of Cass County, where amounts more than a foot were common. A trained spotter reported 17.3 inches of total snow accumulation 5 miles north-northwest of Dowagiac.

01/01/2010 - 13:00 to 01/02/2010 03:00 Heavy Lake effect snow fell during the afternoon and evening hours of January 1st, before tapering off to lighter snow showers and flurries by early January 2nd. Snowfall rates of 2 to 3 inches per hour were common, with snowfall accumulations more than ten inches across western Cass County. A CoCoRaHs spotter reported 11.3 inches of snow in Dowagiac, while a trained spotter reported 11.4 inches of snow accumulation 2 miles north of Granger, IN in Cass County. Gusty winds accompanied the heavy snow, which resulted in numerous reports of visibilities near zero and drifting snow.

12/05/2010 - 05:00 to 12/07/2010 19:00 A long duration lake effect snow event affected the area December 5th through December 7th. The lake effect snow bands were cellular and short-lived, resulting in periods of moderate to heavy lake effect snow during this time. Snowfall totals for the entire event ranged between 8 and 14 inches across Berrien and Cass County. A CoCoRaHs observer in Dowagiac reported 12.5 inches of total snow accumulation. This snowfall, combined with blowing and drifting snow from gusty winds, led to numerous accidents on area roadways and school closures.

01/07/2011 - 09:00 to 01/08/2011 13:00 Heavy Lake effect snow bands developed across mainly western portions of Cass County during the day on January 7th and transitioned into an intense single band late on January 7th into much of the morning hours of January 8th. Snowfall rates of greater than 4 inches per hour were reported within this single band, with total snowfall amounts generally ranging between 1 and 2 feet in western Cass County. A CoCoRaHS observer in Dowagiac reported over 14 inches of total snow accumulation. Rapidly accumulating snow combined with visibilities less than a quarter of a mile created hazardous driving conditions across the county, resulting in accidents and slide-offs.

01/01/2012 - 19:00 01/03/2012 04:00 Lake effect snow, heavy at times, developed behind a strong cold front as arctic air filtered in over relatively warm lake waters. Total snow accumulations generally ranged between 8 and 12 inches across the county, with a report of 11 inches at Edwardsburg. The falling snow combined with gusty winds created reduced visibilities to less than a quarter of a mile at times, along with significant blowing and drifting snow. This led to cancelled events and reports of slide-offs and accidents across the region.

01/31/2013 - 09:00 to 01/31/2013 23:59 Bands of moderate to heavy lake effect snow developed during the morning hours of January 31st and continued through the late morning hours of February 1st. 24-hour snow accumulations varied across the county, with the heaviest accumulations generally ranging between 5 and 10 inches. There was a report of 9.2 inches near Dowagiac. Temperatures were well below freezing, with snowfall making the roads snow covered and slick, resulting in slide-offs and accidents across the region.

11/26/2013 - 23:00 to 11/27/2013 20:00 Lake effect snow bands set up over western Cass County during the evening hours of November 26th and continued through the afternoon and early evening hours of November 27th. Snowfall totals ranged from less than an inch in far eastern Cass County to between 6 and 12 inches across far western Cass County. Reduced visibilities, with snowfall rates of 1 to 2 inches per hour at times, created hazardous driving conditions across the area. Accidents and slide-offs were reported across the region.

11/17/2014 - 16:00 to 11/18/2014 15:00 Lake effect snow bands set up over the area, heaviest during the overnight hours when snowfall rates exceeded an inch per hour at times. Total snowfall amounts were highly variable, ranging from around 4 inches in southeast Cass County to more than a foot in northwestern portions of the county. A spotter reported 16.3 inches of snow accumulation near Dowagiac. Gusty winds, rapid snow accumulation, and reduced visibilities created hazardous driving conditions and accidents across the area.

02/18/2015 – 1100 Dangerous wind chills to 20 below zero and accumulating lake effect snow showers affected southwest Lower Michigan behind an arctic cold front February 18th into February 19th. Lake effect snow showers created hazardous driving conditions behind an arctic front February 18th into February 19th. There were reports of slide-offs and accidents across the region thanks to reduced visibilities and snow-covered roads. Total snow accumulations were highly variable across the county, generally ranging between 4 and 10 inches. There was a report of 8 inches 2 miles east of Niles. Wind chills dropped to between 10 below and 20 below zero during this time which led to numerous school delays and closings.

01/29/2017 – 1600 Heavy Lake effect snow developed across southwest Lower Michigan late on January 29th into early January 30th. Reduced visibilities, snow covered roads and localized snowfall totals more than 6 inches created difficult driving conditions. Periods of moderate to heavy lake effect snow showers accumulated to between 3- and 8-inches mid-afternoon on January 29th into the early morning hours of January 30th. The heaviest snowfall totals were reported across western Cass County. There was a report of 8.0 inches of total snow accumulation 2 miles northeast of Niles. Reduced visibilities and snow-covered roads aided in slide-offs and minor accidents across the region during this time. Many schools were delayed on January 30th.

12/12/2017 – 0200 Bands of locally heavy lake effect snow created difficult travel and whiteout conditions on December 12th. Periods of heavy lake effect snow on December 12th led to total snowfall accumulations ranging between 4 and 10 inches across the county. There was a report of 9.5 inches of snow near Dowagiac. Intense snowfall rates and wind gusts to 35 mph also reduced visibilities leading to whiteout conditions and numerous accidents.

01/03/2018 – 1400 A long duration lake effect snow event created difficult travel conditions January 3rd through January 6th. Three-day snowfall totals ranged between 1 and 2 feet across Berrien County. Periods of lake effect snow developed late January 3rd and persisted through January 6th. The heaviest snow accumulations fell across far western Cass County, where total amounts ranged between 8 and 12 inches (per radar and satellite estimates). Reduced visibilities and snow-covered roads with more intense snow showers created difficult travel and accidents across the county.

12/24/2020 – 1500 Heavy Lake effect snow developed late December 24th extending into morning of December 25th. Snowfall totals ranged from 4 to 15 inches with the greatest amounts of 8 to 15 inches across Berrien County and far western Cass County. The heavy lake effect snow from evening of December 24th through early afternoon December 25th. The heaviest snow was early morning on December 25th. Storm total snowfall of 4 to 9 inches. There was a report of 6.8 inches at Barron Lake. Visibility was reduced to less than one quarter of a mile at times and snow-covered roads created hazardous travel conditions. Reports on slide offs and accidents.

**The Problem**

Cass County's proximity to Lake Michigan places it at the edge of the Lake Effect Snow boundary, which often means that significant portions of the county are subject to excessive snowfall. Additionally, the rural nature of the community with its large open fields often supports large areas of blowing and drifting – resulting, at times, in serious travel concerns as well as accessibility issues for emergency responders.

Since mitigation efforts cannot eliminate the threat of excessive snow and ice, attention will be placed on minimizing the impact – in terms of public education of winter hazards safety, promote winter hazard awareness and notification; improve our ability to respond to excessive snow/ice, and increasing the speed of recovery from the problems created.

Considering Cass County's geographic location, recorded annual occurrences, and level of frequency, it is estimated that a winter weather hazard will occur twice a year.

**Winter Precipitation** **Table 16**

| | |
|---|---|
| Sleet/Freezing Rain | Precipitation that falls when temperatures hover around freezing. Sleet/freezing rain may fall in varying quantities – and results in difficult, often treacherous, travel conditions. Large quantities may result in falling tree limbs and downed power lines. |
| Flurries | Light snowfall for short duration. Little or no accumulation. |
| Snow Showers | Snow falling at varying intensities for brief periods of time. Minimal snow accumulation. |
| Snow Squalls | Brief, but intense, snow showers accompanied by strong, gusty winds. Accumulation may be significant. |
| Blowing Snow | Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground that is picked up by the wind. |
| Heavy Snowfall | Heavy amounts of snow falling over long periods of time and resulting in difficulty in travel. |
| Blizzard | Winds of 35 miles an hour (or more) with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours. |

**Mitigation Alternatives**

- Increase public awareness of the winter weather hazards and the potential impacts – especially for vulnerable populations.
    - Increase severe winter weather awareness efforts through increased dissemination of information to media groups.
    - Maintain a weather awareness presence on social media, Facebook, and Twitter
    - Identify populations most likely to suffer excessively due to severe winter weather.
    - Work with community service groups (i.e. Council on Aging, CERT, and neighborhood watch teams, FIA, etc.) to tailor communications regarding severe winter weather for vulnerable populations.
- Increased NOAA weather Radio Coverage
- Scheduled tree trimming.
- Work with the Cass County Road Commission, emergency response teams, Cass County Council on Aging, and related services -- to identify vulnerable populations and ensure coordinated efforts to secure those populations, if needed, during a snow emergency.

- Ensure that severe winter weather support is included in community-based emergency action plans (i.e., Road Commission, COA, CERT, and neighborhood watch).
- Establish emergency communications procedures between the EOC and community-based teams to ensure that vulnerable populations are receiving adequate support during severe winter weather as well as all residents throughout the county.

- Interoperability of radio systems between all key agencies and organizations

## # 3 Structural Fires

**The Description**

Each occurrence of a structural fire has a serious impact on individuals and families that can result in the loss of valuable and cherished possessions and at times, the loss of life. The challenges of fighting commercial/industrial fires, as well as natural fires, sometimes inaccessible areas, carry additional concerns for firefighter safety.

Subsequently, the Fire Section of the Hazard Mitigation Plan seeks both to minimize the likelihood of fire, and to enhance the ability of area firefighters to respond quickly and efficiently when called to fight fires of all kinds.

In addition, the effort will be made to enhance the safety of our firefighters through increased training and exercise. In addition, the purchase of equipment is needed to support safe operations and ensure long-term functionality. The strengthening of mutual aid agreements and cooperation across local districts and county-lines including across emergency response disciplines.

**The Problem**

As an agriculturally based community, it goes without saying that Cass County supports the operation of several granary elevators. Subsequently, the threat of granary explosion exists. The key, of course, is to ensure that operators understand the risk and are trained in preventing such occurrences.

Not only would the immediate physical impact of such an event be catastrophic, but the long-term impact for the local economy would be significant. Even minimal investments in education and mitigation would do much to ensure safe operations and enhanced response to such events.

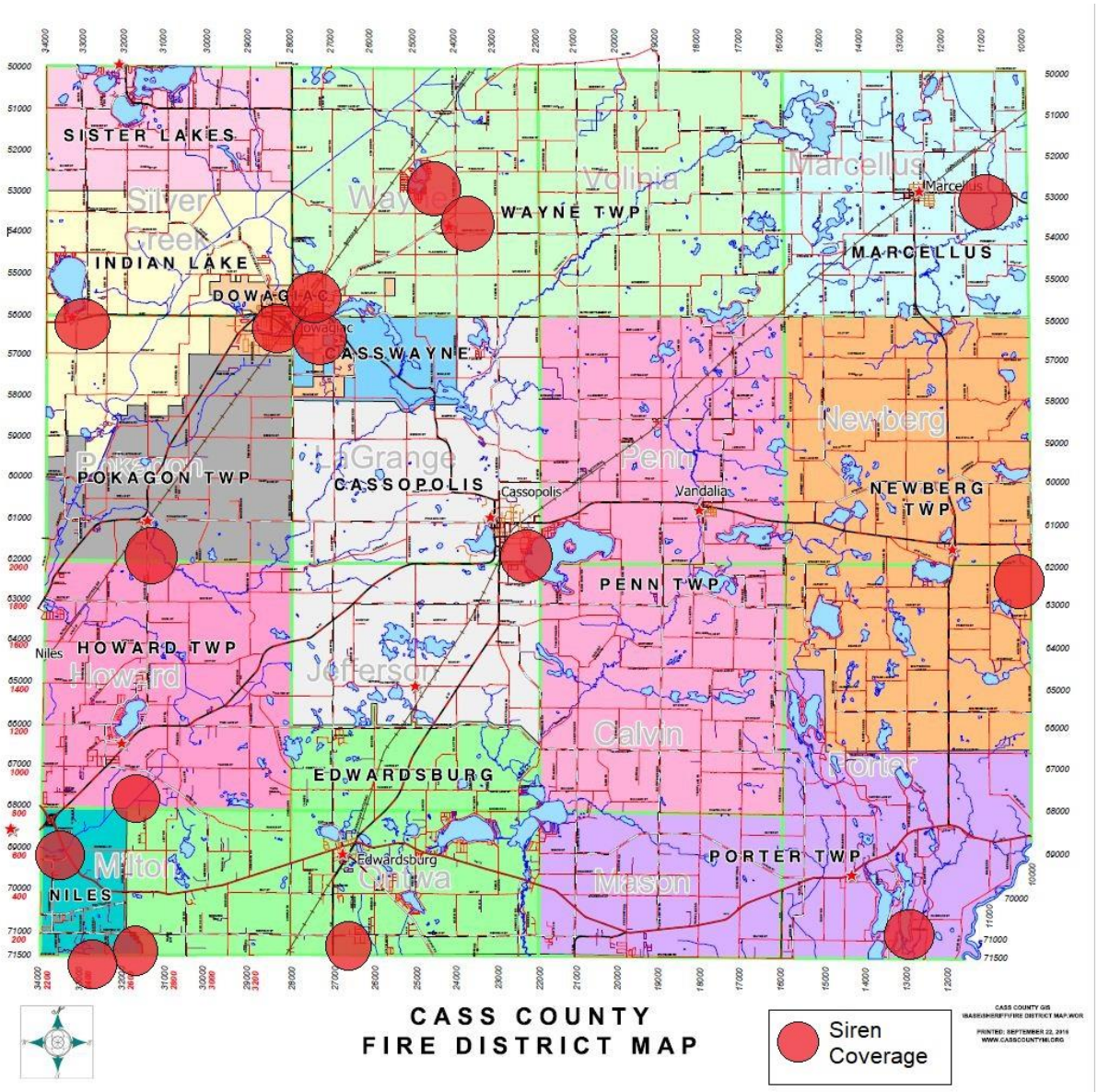
**Mitigation Alternatives**

- Ensure adherence to existing fire codes.
- Promote local jurisdiction, Township, Village, and City burn permit process and restrictions.
- Public education on the legal penalties of damage caused by a fire hazard.
- Continue to educate emergency responders with an emphasis on proper response to granary explosions.
  - Educate responders as to safe response to granary explosions.
  - Provide exercise opportunities to test and ensure that standard operating procedures are appropriate, and responders have the necessary training and support to respond to a granary explosion safely and efficiently.
  - Seek additional training as needed to support emergency responders facing such conditions.
  - Seek funding for additional equipment (protective gear, air-monitoring equipment, SCBA's, etc.) to ensure safe and efficient response.
- Ensure AG operators have access to feed and supplies should a granary explosion occur and interrupt their ability to access adequate feed stores for area livestock.
  - Meet with representatives of the AG community to create systems by which the farm community can receive assistance in accessing granary services and reducing the financial impact of the increased burden of accessing distant services.

- Establish mutual aid/support systems to provide necessary back-up feed supplies.

- Establish a program for public education on fire safety.
  - Install and maintain smoke detectors and fire extinguishers.
- Enhance interoperability of radio systems between all key agencies and organizations.

**Cass County Fire Districts 2023**




**#4 Transportation Accidents**

**The Problem**

Cass County's natural beauty and proximity to large metropolitan areas is both a blessing and a burden. Tourists from across the Midwest find our lakes and beautiful rural areas an attractive escape from city life which contributes to a tremendous influx and outflow of people each weekend during the tourist season.

Similarly, the availability of high-speed trains makes it possible for many residents to be employed in distant areas, while calling Cass County home. Unfortunately, this central location between Chicago and Detroit also places Cass County as a primary corridor for the transportation of goods by road and rail – goods that include hazardous materials.

It is not difficult to recognize that the combination of large numbers of travelers and large numbers of transport vehicles can be a lethal combination and is a valid cause for concern.

**Primary Goals**

The core focus under this category is not only to minimize the likelihood of transportation and mass casualty accidents, but to enhance our preparedness and our ability to respond effectively and efficiently to those incidents that do occur. Additionally, this category lends itself to the need to enhance the average level of Emergency Medical Response in Cass County from EMT to Paramedic level.

**Mitigation Alternatives**

- Identify potential transportation problems and seek opportunities to mitigate problem areas.
    - Improve design, routing, and traffic control at problem roadway areas.
    - Improve designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
    - Long-term planning provides more connector roads for reduced congestion of arterial roads.
    - Use of designated truck routes.
    - Work with consultants, state and local transportation officials to identify potential problem areas (i.e. population areas intersecting with hazardous material routes) and assess the actual degree of vulnerability to accidents.
    - Establish a list of mitigation options to resolve transportation hazards.
    - Prioritize transportation mitigation options.
    - Seek funds to complete transportation hazard mitigation projects.
- Enhance emergency response regarding transportation accidents.
    - Equipment and Training for:
        - Hazardous material response
        - Mass casualty response
        - Multi-vehicle incidents
        - Rail incident response
    - Prioritize training and, as funds become available, bring core training to area responders.
    - Where training to the highest levels is not possible, establish mutual aid and/or contract arrangements to ensure a full-scale response.
- Enhance interoperability of radio systems between all key agencies and organizations.

## #5 Extreme Temperatures

**The Description**

Prolonged periods of very high or very low temperatures, often accompanied by exacerbating conditions such as high humidity and lack of rain, or heavy snowfall and high winds. Extreme temperatures, whether it is extreme heat or extreme cold, share a commonality in that they both primarily affect the most vulnerable segments of society such as the elderly, children, impoverished individuals, and people in poor health. The major threats of extreme heat are heatstroke (a major medical emergency), and heat exhaustion. Extreme heat is a more serious problem in urban areas, where the combined effects of high temperature and high humidity are more intense. The major threats of extreme cold are hypothermia (also a major medical emergency) and frostbite. Michigan is subject to both extreme high temperatures and extreme low temperatures.

**Historical Hazard Impacts and Cass County**

Each year from 1981 to 2010 (no new information after 2010) Michigan's State Climatologist's office has recorded extreme high temperatures for Cass County of 90 + degrees, while the average high temperature for June, July, and August is 81 degrees and the mean temperature is about 70 degrees.

07/071988 the high temperature was 101 degrees.

07/31/1999 the high temperature was 103 degrees.

Each year from 1971 to 2010 Michigan's State Climatologist's office has recorded extreme low temperatures for Cass County of 1 degree or lower with the average extreme low temperature for this period is -11 degrees. The average low temperature for December, January, and February is 14 degrees and the mean temperature is 23 degrees.

02/07/1978 the extreme low was -23 degrees.

01/16/1972 the extreme low was -21 degrees.

01/21/1984, 12/23/1989, and 01/20/1994 the extreme low was -20 degrees.

12/19/1995 0400 Cold wave in all Southeast Lower Michigan 3 deaths: A cold wave resulted in three deaths by hypothermia in the city of Detroit during the period from the early morning on the 9th through the morning on the 10th. Two of the deaths occurred on the street, and the third occurred in a van. Low temperatures during that period ranged from three above zero in Detroit, to one above zero in Flint, to one below zero at the Weather Service Forecast Office in White Lake, Michigan. On the 9th, winds averaging 20 to 25 mph combined with afternoon temperatures in the single digits to produce wind chills of 30 to 35 below zero.

From 2017-2021 the US Census Bureau estimates about 12.1% of the population, under the age of 65, in Cass County are living with a disability, which is considerably higher than the national estimate of 8.7%.

The Census Bureau estimates in Cass County 12.4% of the population are living in poverty, almost the same as the national estimate of 11.6%. The median household income in 2017-2021 for Cass County was $60,725 and the nation median income was $69,021.

Cass County's Office of Emergency Management has reached out to region 4 Area Agency on Aging, the Department of Health & Human Services, Van Buren / Cass County Health District, and Cass County Council on Aging to better identify and coordinate preparedness planning for functional needs populations.

**The Problem**

Currently, extreme temperatures are more easily tolerated due to improved insulating and heating/cooling capabilities and improved protective construction measures. However, the inability to take advantage of protective measures or react to threats due to factors such as: age, disability, poverty, or simple lack of awareness can result in risks to health and safety including death during periods of extreme heat or cold.

**Mitigation Alternatives**

- Increase public awareness regarding protective measures available during extreme weather – specifically extreme heat and cold.
    - Adopt a regular program of seasonal notification to support increased awareness of weather-hazards.
    - Continue to update current weather-awareness programs and seek new opportunities to present information to the public via presentations, press releases, media coverage, in-school programs, etc.
    - Increase public awareness regarding vulnerability of "others" (i.e. - senior citizens, very young children, those with compromised health, etc.)
- Identify community shelter sites.
- Identify vulnerable populations most likely to be affected by temperature extremes.
    - Identify vulnerable populations in each community – including senior citizens, people with disabilities, those with life-threatening illnesses or dependent on life-sustaining equipment, and those living in sub-standard or compromised housing (especially those with young children) – most likely to be affected by temperature extremes – either through direct exposure or because of mitigating factors such as poverty or impaired ability to follow protective measures.
- Promote emergency generators for community shelters and other areas where vulnerable population might be.
- Establish and support Community Emergency Response Team (CERT) programs.
    - In keeping with the commitment to care for vulnerable populations, work within each community to establish locally based support networks for the purpose of 1) identifying vulnerable people in each area, 2) caring for those individuals and families, in times of emergency, disaster, and need.
    - Ensure that these "teams" are adequately trained to provide initial responses and to request additional support as needed.
    - Establish a system whereby these teams meet on a regular basis to support on-going training, share important information and updates, and test their capabilities.
    - Establish a system of information dissemination to make teams more visible and to ensure that the public understands that these teams exist to support them in times of need.
    - Establish a system of credentialing team members to ensure that only those who complete required training are called to respond.
- Enhance interoperability of radio systems between all key agencies and organizations.

## # 6 Hazardous Material Incidents (Transportation)

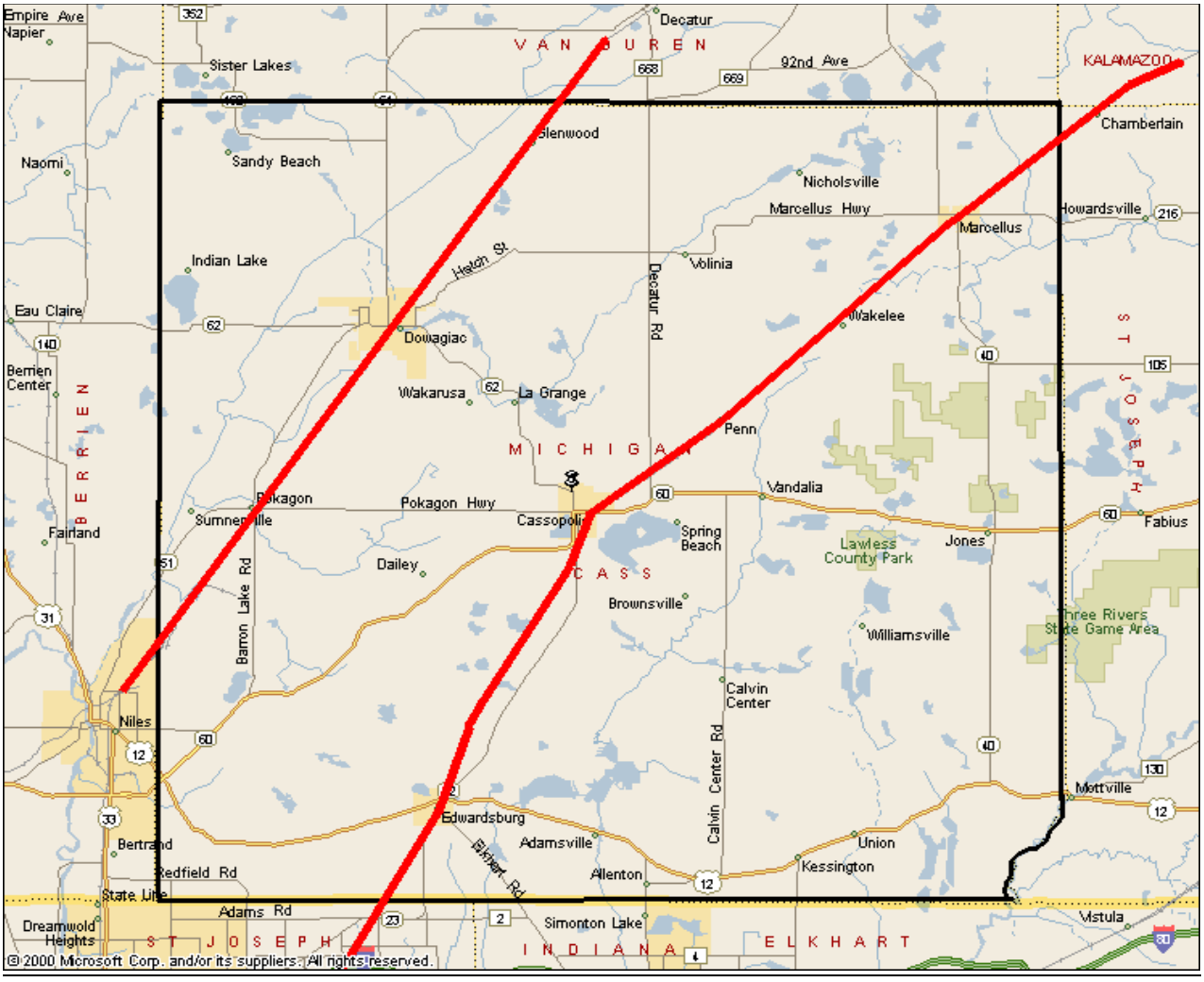
**The Description**

A hazardous material transportation incident is an uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property, and the environment. All modes of transportation - highway, railroad, waterway, airway, and pipeline carry thousands of hazardous material shipments daily through local communities. A transportation accident could cause a local emergency affecting many people. The U.S. Department of Transportation regulates the transportation and shipping of over 18,000 different materials. Areas most at risk are within a 1–5-mile radius of a major transportation route along which hazardous material shipments move. All areas in Michigan are potentially vulnerable to a hazardous material transportation incident, several local main routes of transportation cross through Cass County, and the large number of hazardous material shipments that occur daily.

**The Problem**

Due to the prevalence of multiple hazardous material road and rail-transport lines bisecting Cass County the threat of a toxic spill exists and therefore mitigation actions should be considered.

**Major Cass County Road / Rail Hazmat Routes**




Railroad (Hazmat Transport)
Highway (Hazmat Transport)

**Historical Hazard Impacts in Cass County**

| | | |
|---|---|---|
| 7/18/1996 | Union | Semi-truck accident fuel spilled onto roadway and ditch. Diesel fuel, oil, antifreeze/150 gallons. |
| 12/5/1997 | Union | Vehicle rollover fuel spilled into swampy area. Diesel fuel 20-25 gallons. |
| 4/25/1998 | Dowagiac | Farm tractor accident pulling chemical tank. Rubigan Fungicide Pounce 200 gallons. |
| 2/4/1999 | | Vehicle rollover fuel spill. Diesel fuel approximately 75 gallons. |
| 6/14/2000 | Marcellus | Locomotive diesel fuel spill while sitting on the main track, 20-30 gallons. |
| 8/2/2000 | | Vehicle rollover in wetland during pipeline construction. Diesel fuel & Hydraulic fluid 5 gallons of each. |
| 9/1/2000 | Dowagiac | Vehicle accident, car in creek (swamp). Gasoline and engine oil unknown volume. |
| 7/7/2002 | Dowagiac | A truck rollover leaking diesel fuel into creek. Diesel fuel & hydraulic fluid unknown volume. |
| 8/9/2003 | Dowagiac | Vehicle off bridge into Dowagiac Creek. Gasoline, oil, unknown volume. |
| 1/13/2004 | Adamsville | Barrel dropped in road; 20 gallons used oil. |
| 6/24/2004 | Jones | A semi-truck lost its fuel tank. Diesel fuel about 60 gallons. |
| 8/3/2005 | Decatur | Vehicle accident, propane tank leaking, 40 homes evacuated, unknown volume. |
| 7/10/2006 | Cassopolis | Calcium Chloride spill, a few hundred gallons. |
| 3/6/2007 | Cassopolis | Locomotive diesel fuel spill, punctured fuel tank, approximately 800 gallons. |
| 4/27/2007 | Niles | Diesel fuel spill onto roadway, 35 gallons. |
| 12/29/2008 | Union | Truck accident on the side of the road. Oil and antifreeze unknown volume. |
| 5/8/2009 | Marcellus | Diesel fuel release, approximately 200-250 gallons |
| 08/23/2018 | US12/M40 | Bailer Choice approximately 300-gallon tank fell off a truck, states hazardous to humans and animals. |
| 06/27/2019 | M 62/Garrett Rd | Car with a fuel spill requesting a wash down. |
| 06/29/2019 | M 51/Indian Lake Rd | Anhydrous leak, portable tank. Substantial leak, no structures close Enough for an Evac Plan. |
| 08/17/2019 | M 217/Stateline Rd | Caller Hit something in the road and is leaking approximately 80 gallons of diesel fuel. |

06/16/2020 1067 Kish Rd Peterson Farm, Anhydrous Ammonia Leak, 1 person transported to Hospital.

**Mitigation Alternatives**

- Improve design, routing, and traffic control at problem roadway areas.
- Improve designs at problem railway/roadway intersections (at grade crossings, rural signs, and signals for Railroad crossing).
- Long-term planning provides more connector roads for reduced congestion of arterial roads.
- Proper planning, design, maintenance of, and enhancements to designated truck routes.
- Increase responder awareness regarding materials being transported by road and rail through Cass County and provide necessary training to ensure proper response and increase public safety.
    - Work with rail officials and local responders to ensure a strong working relationship, and a solid understanding of hazmat transport and response and detailed response by all parties to a hazmat incident.
    - Identify responder needs (S.O.P.'s, training, equipment), based on these interactions.
    - Update standard operating procedures as needed to satisfy shortfalls.
    - Pursue training as needed to satisfy shortfalls.
    - Seek sources of funding to support the purchase of equipment needed to satisfy response capability shortfalls.
    - Conduct exercises to ensure an understanding of S.O.P.'s and response procedures.
- Promote safer hazardous material transportation routes.
    - Assess the possibility of diverting hazardous chemicals from routes through highly populated areas of the county.
    - Work with local and state officials to divert hazardous material traffic from highly populated areas of the county to appropriate roadways.
    - Encourage the development of alternate roadways, and associated signage, that would support efforts to move hazardous materials away from populated areas.
    - Seek funding to support development of alternate routes.
- Enhance public warning systems and networks.
- Enhance evacuation plans and community awareness of them.
- Enhance interoperability of radio systems between all key agencies and organizations.

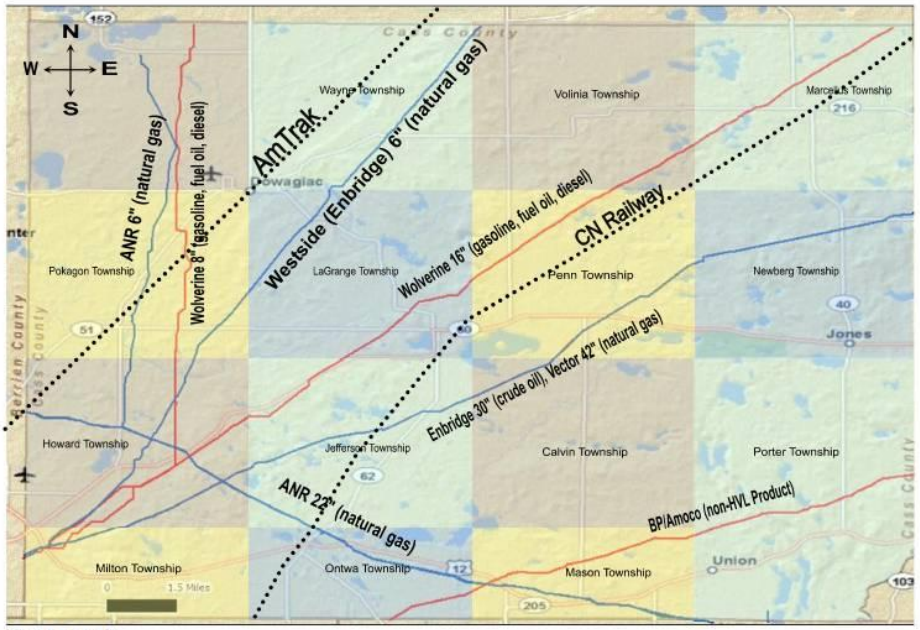
**# 7 Hazmat Pipeline (Oil, Gas Well)**

**The Description**

An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline. As a major petroleum and natural gas consumer in the United States, vast quantities of petroleum and natural gas are transported through and stored in Michigan. Though often overlooked as a threat because much of the petroleum and gas infrastructure in the state is located underground, petroleum and gas pipelines can leak, erupt, or explode, causing property damage, environmental contamination, injuries, and loss of life. In addition to these hazards, there is also a danger of hydrogen sulfide release. Hydrogen sulfide is an extremely poisonous gas that is also explosive when mixed with air temperatures of 500 degrees or above. In addition to pipelines, these dangers can be found around oil and gas wells, pipeline terminals, storage facilities, and transportation facilities where the gas or oil has high sulfur content.

**Historical Hazard impacts and Cass County**

One or more pipelines run through all the fifteen Cass County Townships.



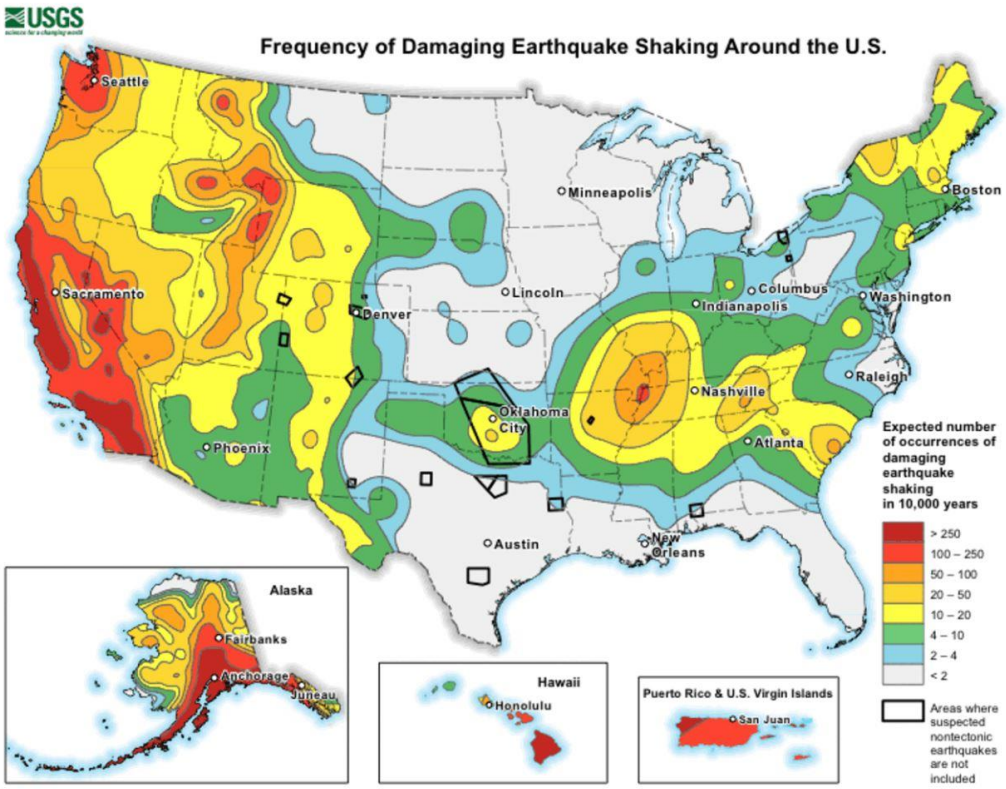

*Not to scale*

Cass County has many pipelines that run throughout the county. Pipeline companies do not anticipate any effects to their pipeline system from minor earthquakes, and do not anticipate any major earthquakes in the area as seismic activity has been historically low. Pipeline companies have seismic monitoring in place and mitigation plans if safe industry thresholds are exceeded. Mitigation measures would include assessments and in very unlikely conditions would also include proactive shut down of the pipeline system until an inspection could ensure safety. Additionally, in a significant seismic event, pipeline companies assess the event and issue a field notification for Right of Way (ROW) inspection for signs of ground or pipeline displacement in areas where the ground is susceptible to liquefaction and/or landslides. If ground or pipeline displacement is observed, pipeline companies will assess their pipeline for fitness of service and initiate any required remediation.

The probability of earthquake damage to pipeline systems in Cass County is low based on historical records (see https://www.usgs.gov/programs/earthquake-hazards). The following graphic shows a USGS map showing two-percent probability of exceedance in 50 years of various peak ground acceleration values. In Cass County, Michigan, the highest ground acceleration with two-percent probability of exceedance in 50 years would be 0.06g, which would have no effect on the pipe. The likelihood of ground acceleration exceeding 0.2g would be much lower.

| **Earthquake Intensity – Modified Mercalli Scale** |
|---|

| Intensity | Shaking | Description/Damage |
|---|---|---|
| I | Not Felt | Not felt except by a few. |
| II | Weak | Felt only by a few persons at rest, especially on upper floors of buildings. |
| III | Weak | Felt quite noticeably by people indoors, especially on upper floors of buildings. Cars may rock slightly. |
| IV | Light | Felt indoors by many, outdoors by a few. Cars rock noticeably. |
| V | Moderate | Felt by nearly everyone, some windows broken. Unstable objects overturned. |
| VI | Strong | Felt by all. Furniture may move, some fallen plaster. Slight damage. |
| VII | Very Strong | Slight damage to well-built structures. Considerable damage to poor built structures. |
| VIII | Severe | Considerable damage in ordinary structures. Major damage to poor built structures. |
| IX | Violent | Considerable damage in well-built structures. Buildings shifted off foundations, partially collapsed structures. |
| X | Extreme | Major Damage, some well-built structures destroyed. Rails bent. |




*Sources/Usage: Public Domain.*

This map shows how often scientists expect damaging earthquake shaking around the U.S. (Public domain.)

December 12, 2006, Mason Township (Cass County) – A natural gas pipeline explosion occurred at US-12 and Tharp Lake Road in Mason Twp. Homes within a half mile of the incident were evacuated, and traffic was also diverted. The explosion occurred when a Midwest Energy employee was operating a trencher and struck a pipeline, resulting in one fatality.

**The Problem**

Many gas and oil pipelines – including Enbridge, Trans Canada, Wolverine, BPI, Vector and others, crisscross Cass County. Subsequently, there is serious concern over the potential for accidents and the immediate impact such an incident would have on the environment; as well as the long-term affect it would have on the health and well-being of Cass County residents.

Pipeline officials host annual meetings for emergency responders during which they provide important educational information, update contacts, and help with public education programs. Therefore, the effort is not to generate educational information, but to increase public awareness of pipeline safety. Local pipeline companies have recently increased their survey data collection program and have actively contacted first responders within the county.

**Primary Goal**

Although the best mitigation would be to eliminate the threat of pipeline incidents, the reality is that Cass County will continue to be a corridor for fuels moving between the key metropolitan areas of Chicago and Detroit. At this point, there is little or no option that would allow us to eliminate the threat of incidents. There is, however, the opportunity to minimize the likelihood of incidents, and subsequently, the threats they pose to our environment, and our residents. Our primary goal for this hazard is to increase public education and pipeline safety, in addition to providing emergency responders with the education, training and tools needed to respond to pipeline incidents.

**Mitigation Alternatives**

- Enhance pipeline awareness, education and training for emergency responders and the public.
    - Increase use of pipeline educational materials for public awareness and promote MISS DIG 811.
    - Enhance response capabilities of emergency responders regarding pipeline emergencies.
    - Work with emergency responders to determine options for resolving education, training, and equipment shortfalls.
- Enhance interoperability of radio systems between all key agencies and organizations.

## # 8 Infrastructure Failures

- Including roads, bridges, electrical, communication, water, and sanitary sewer systems.

**The Description**

A failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services. Such interruptions could last for periods of a few minutes to several days or more. Public and private utility infrastructure provides 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 Problem**

Although the term infrastructure failure typically refers to structural insufficiencies that result in building collapses or system shut-downs due to excessive stresses, Cass County's Local Emergency Planning Committee saw relevance in also addressing "other" types of failures – specifically those caused by poor planning and/or failure to upgrade systems as needed to support increased use. For example, as in many rural communities, much of Cass County relies on ground water (on-site wells) for its drinking water supply, on-site waste treatment (septic tanks and drain fields), and on large amounts of groundwater for crop irrigation.

As individual communities continue to grow, and populations increase, the impact on groundwater becomes greater, and the need for proper planning and mitigation becomes more evident. Much of the Infrastructure Failure section of this Mitigation Plan focuses on proper planning to reinforce existing systems, and to create systems that will not fail.

In 1999, Cass County responded to concerns over water quality by developing a new 20-year Master Water and Sewer Plan. The proposed future water/sewer service areas identified in that Plan are the basis for the

identification of the growth areas in the Future Land Use Plan and one of the considerations for water quality mitigation in this Hazard Mitigation Plan.

**Water Contamination – Groundwater (Accidental)**

Groundwater contamination, whether accidental or intentional, is a threat that stands to have the greatest impact on the health, safety and well-being of residents and visitors to Cass County. Contamination of groundwater is most typically believed to occur as a direct result of undesirable or inefficient operations where known chemicals or contaminants are being used – such as gasoline stations and factories. In most cases, officials and the public are aware of the potential for contamination at these sites and are actively involved in imposing protective measures and testing requirements to protect groundwater. If followed, these requirements do, in fact, serve to protect a community's groundwater.

However, groundwater contamination occurs to a much greater degree through unrecognized "non-point" sources – sources that are not directly traced to a specific source such as run-off into lakes and streams from farm fields in agricultural areas or from parking lots and roads in more residential areas.

In fact, any substance that is undesirable in groundwater – oils, fuels, fertilizers, farm and lawn chemicals, and household cleaners -- yet is dispersed or disposed of either on the ground or injected into the ground has potential to reach groundwater. This "indirect" and often unrecognized contamination of groundwater poses one of the most serious threats to water quality because it is not perceived as a threat. It does, however, have a clear – often serious – impact on water quality and the health and safety of a community.

Not only does contamination of groundwater result in threats to the immediate health and physical safety of those who use it, but the fact that contamination may not be recognized for long periods of time can have serious long-term consequences as well.

Groundwater contamination is difficult, and sometimes impossible to reverse through other than natural means – meaning only time and nature can cause recovery. Yet over time, not only is the contaminated area not fit for human or animal life, but plant quality and the use of the land may be seriously affected or destroyed for some time. Additionally, groundwater contamination may be difficult to trace. The size of the underground aquifer, the amount of contaminant, and the depth of the water table can all have an impact on the degree of contamination and the area affected.

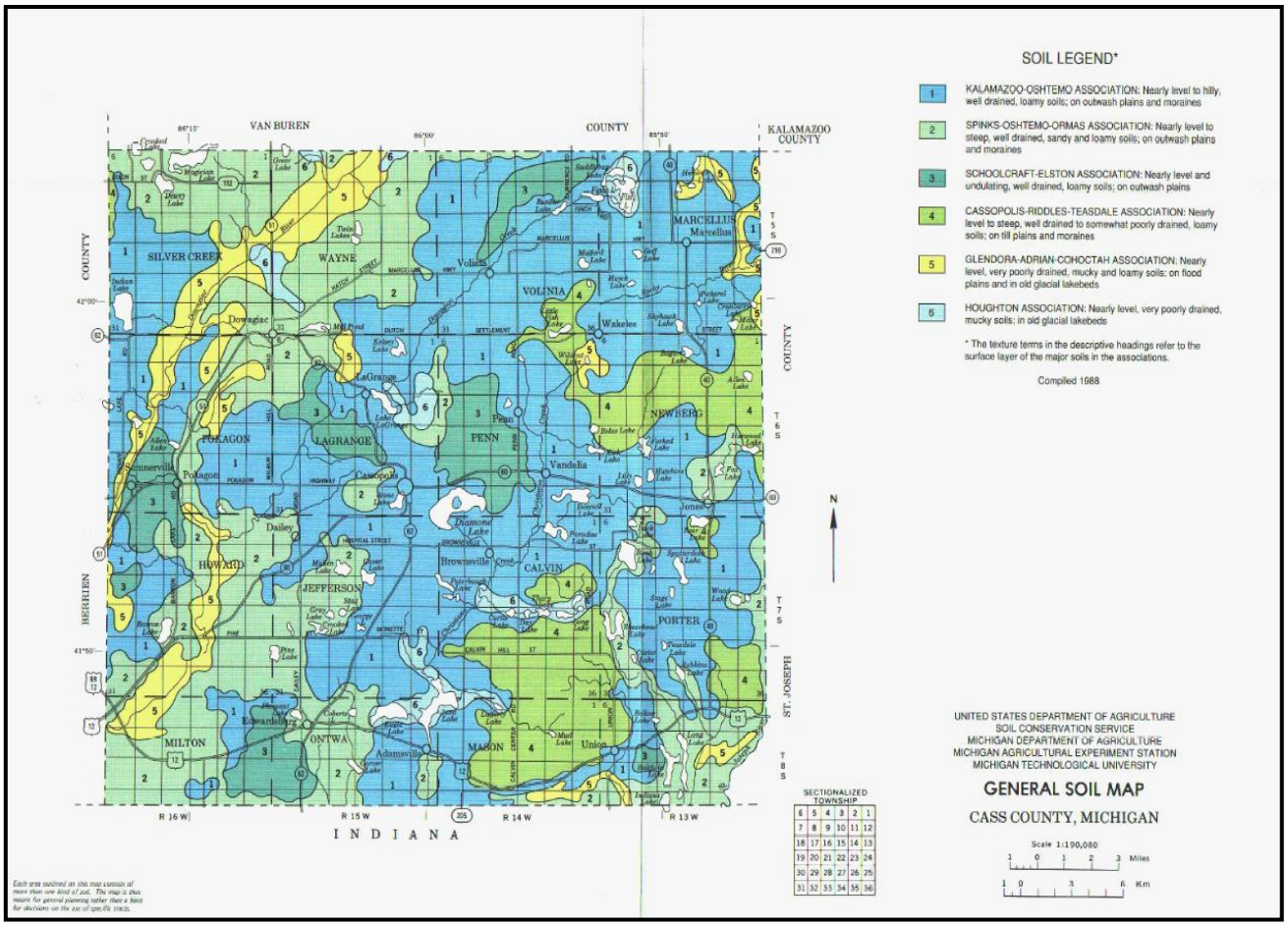
Although clay soils do exist, large areas within Cass County reveal Kalamazoo to Oshtemo Loam -- meaning that water on the surface moves very quickly through soils to sub-surface water. In areas where the water table is shallow, for example, around lakes and streams, soil cannot adequately filter water – especially when it moves in large quantities or contains large amounts of contaminants.

Additionally, once water reaches the aquifer, the fact that Cass County's underground aquifers are contiguous, raises concerns that significant contamination in one area may in fact travel to distant areas, often without any recognizable signs until serious contamination has occurred.

Groundwater contamination can also have serious economic effects on a community as well. Areas known for contamination will suffer loss from tourism, not only in the immediate area, but often over an entire community.

Additionally, land sales and land productivity grind to a halt, meaning the effect can be financially devastating not only for landowners, but the entire community.

Mitigation efforts to protect groundwater in all forms stand to have a great positive impact on residents and visitors to Cass County in terms of health, safety, and welfare, and in terms of quality-of-life and economic viability.



**Common Sources of Non-Point Source Water Contamination**

| |
|---|
| Accidental spills – agriculture |
| Accidental spills – industry |
| Construction in areas with soils not adequately suited to adequate water filtration |
| Fertilizers |
| Herbicides |
| Improper disposal of animal carcasses |
| Improper disposal of animal waste |
| Improper disposal of household chemicals/cleaners |
| Improper disposal of human waste by septic haulers |
| Improper disposal of oils and fuels |
| Improperly maintained septic tanks and drain fields |
| Inadequate buffering of disposed of materials in proximity to waterways and wetlands |
| Leaking fuel tanks |
| Leaking oil pans |
| Pesticides |
| Run-off from agricultural fields |
| Run-off from golf courses |
| Run-off from residential areas |
| Run-off from roadways |

**Mitigation Alternatives**

- Develop policies and procedures to ensure all existing and new infrastructure is maintained.
    - Work with communities that currently have operating sewer and water systems to assess system capabilities and possible shortfalls.
    - Work with community officials to project future needs.
    - In view of current weaknesses, and anticipated future needs, identify remedies for each system (i.e., back-up generator systems, fail-safe systems, etc.).
    - Establish mitigation as a priority at the local level and work with local/county officials to satisfy shortfalls either collaboratively at the local level, or with the support of state/federal resources.
    - Support efforts to pursue outside resources, if needed, to resolve shortfalls.
    - Ensure proper training of public works responders to address system needs.
    - Ensure proper training of local officials regarding current/future system needs.
- Encourage exercising at the local level to test capabilities of local public works agencies to deal with infrastructure emergencies (i.e., long-term power outages, system failures, etc.)
- Collaborate with all County jurisdictions to develop emergency plans for critical infrastructure including area schools, hospitals, factories, and other appropriate community sites.
- Establish commitment at the local and county levels to proper land use planning to support necessary infrastructure development.
    - Work closely with local and county officials to reveal the importance of planning to help prevent contamination of water resources.
    - Encourage effective use of water quality “tools” (i.e., buffer zones, filtration fields, constructed wetlands, etc.) to reduce the likelihood of contamination of non-point source pollutants (i.e., driveway runoff, agricultural runoff, erosion, etc.)
- Establish a system of education for the public and those in the Ag community to whom non-point source contamination is most often attributed.
    - Increase awareness regarding point-source and non-point source contamination.
    - Educate the public, local officials and those likely to contribute to non-point source water contamination, regarding measures available to protect groundwater.
    - Work with township zoning officials to ensure the creation of “buffer zones” and filtration areas in areas of residential growth.
    - Work with the farm community to ensure the creation of similar “buffer zones” (in accordance with GAMPs) to ensure proper filtration of water before reaching waterways or leaching into groundwater.
    - Encourage rapid local response to reports of run-off and contamination.
    - Work to strengthen DEQ response to contamination in Cass County.
    - Work with local and State officials to strengthen enforcement programs and increase penalties for those who intentionally contaminate groundwater through improper disposal of waste (i.e., septic waste, animal waste, chemical disposal).
    - Exercise local officials and emergency response teams to test response capability to contamination threats.
- Interoperability of radio systems between all key agencies and organizations.
- Do nothing and absorb losses from infrastructure failure hazards as they occur.

## # 9 Terrorism and Other Criminal Activity

### The Description

The intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives. Terrorism and other criminal activity can take many forms or have many vehicles for delivery, including: 1) bombings; 2) assassinations; 3) organized extortion; 4) use of nuclear, chemical, radiological, and biological weapons; 5) information warfare; 6) ethnic/religious/gender intimidation (hate crimes); 7) state and local militia groups that advocate overthrowing the U.S. Government; 8) Eco extremism, designed to destroy or disrupt specific research or resource-related activities; and 9) widespread and organized narcotics smuggling and distribution organizations.

### The Problem

To the average citizen, incidents of terrorism are most often attributed to foreign sources and are considered unlikely to occur in this tranquil rural community. However, it is in just such communities where acts of local terrorism and other criminal activities do in fact occur. Disgruntled employees, militia-based groups, radical interest groups, and even those involved in domestic violence, are, in fact, perpetrators of acts of terrorism and other criminal activity.

Additionally, the influx of meth-lab operators, although usually unseen by the public, also poses serious threats to the security and well-being of this community. Meth lab operators and their customers are responsible for most of the crimes within Cass County. This means that our own statistics, and our position as third in the state for meth-related crime, places our residents at high risk of either being a victim of crime or a victim of the hazardous chemicals that are improperly disposed of by operators.

Unfortunately, the assumption that small rural communities would not be likely targets of foreign sabotage might also make us more vulnerable because the impact on this nation of an attack on the “heartland” could, in fact, be more destructive psychologically than an attack on the large cities or critical infrastructures where we “believe” attacks will occur.

Although the likelihood of this type of event occurring in Cass County is low, the outcome would be extremely disastrous and therefore mitigation alternative and actions need to be considered.

### Mitigation Alternatives

- Increase law enforcement’s ability to prevent, prepare for, respond to and support recovery from acts of terrorism and other criminal activity.
    - Identify shortfalls to be addressed regarding law enforcement’s ability to prevent/prepare for/respond/recover from acts of terrorism and other criminal activity.
    - Seek funding through local/state/federal sources to enhance targeted prevention/preparedness /response and recovery efforts as they relate to terrorism and other criminal activity – and in particular meth-lab operations and the sale/use of methamphetamine in Cass County.
    - Seek training opportunities to enhance law enforcement capabilities.
    - Exercise teams in response to terrorism and other criminal activity to ensure highest levels of preparedness.
- Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for terrorism and other criminal activity.

- Increase public awareness regarding the likelihood – and potential sources of acts of terrorism and other criminal activity.
- Work with local law enforcement to create a public information campaign to increase public awareness regarding local acts of terrorism and other criminal activity.
- Seek opportunities to present information to the public via media, public gatherings, community groups and organizations, local government meetings, schools, etc.
- Ensure information is reviewed/updated to address questions/concerns raised by the public.
- Encourage frequent use of information to ensure widespread recognition of the problem and support community-reporting of suspicious incidents.

- Monitoring of organizations and activities that may threaten the community.
- Develop site emergency plans for area schools, hospitals, factories, businesses, and other appropriate facilities.
- Interoperability of radio systems between all key agencies and organizations.

### # 10 HazMat – Fixed Site

- **Agriculture**
- **Commercial**

The Description

An uncontrolled release of hazardous materials from a fixed site, capable of posing a risk to health, safety, property, and the environment. Hazardous materials are present in quantities of concern in business and industry, agriculture, universities, hospitals, utilities, and other community facilities. Hazardous materials are materials or substances which, because of their chemical, physical, or biological nature, pose a potential threat to life, health, property, and the environment if they are released. Examples of hazardous materials include corrosives, explosives, flammable materials, radioactive materials, poisons, oxidizers, and dangerous gases.

**Hazardous Substances Emergency Events Recorded for Fixed-Sites in Cass County by MDCH Division of Environmental Health:** to be included as an event in Michigan the released chemical must have resulted in some kind of agency response (e.g., hazmat, fire, public health). In addition, it must have resulted in human exposure, human injury, or an evacuation. These events are included regardless of the amount of chemical released. Second, all carbon monoxide releases/injuries are excluded, regardless of agency response, because they are being tracked in another public health surveillance system 1. Finally, since 2010 MI-HSEES has been collecting information about natural gas/propane releases/explosions that result in injuries and evacuations.

**Fixed-Sites**

| 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 5 | 2 | N/A | 0 | 0 | 3 | 0 | 0 | 0 |

**Historical Hazard impacts and Cass County**

5/4/1999 Cassopolis Anhydrous ammonia tank release, 800 gallons.

| | | |
|---|---|---|
| 6/5/2001 | Edwardsburg | Diesel fuel spill. Caused by fueling nozzle falling from the truck's tank, 15-30 gallons. |
| 7/5/2008 | Vandalia | Sewage pumped into lake, over 1,000 gallons. |
| 1/3/2009 | Dowagiac | Sewer lift station overflow, 1,000 – 2,000 gallons |

**The Problem**

Hazardous materials at fixed sites pose serious concerns, not only because of the dangers associated with the handling of hazardous materials, but because of the many "unknowns" surrounding their use and storage, that also includes their use and storage in Cass County's agricultural areas.

In many cases, hazardous materials are stored without any notification to emergency responders regarding type or quantity. Similarly, although farm operators are usually aware of the dangers of misuse, evidence suggests that hazmat handling may be less stringent than it should be in part because of the lack of training and because of a lack of awareness regarding the dangers.

**Mitigation Alternatives**

- Reduce/Eliminate the risks associated with the use and storage of agricultural chemicals, and the associated risks for emergency responders.
    - Work with community ag leaders and the ag community to identify farms where hazardous materials are stored in quantities sufficient to warrant concern.
    - Work with farm owners to establish type/quantity information and forward information through Sara Title III and via "ag tubes" to emergency responders.
    - Provide educational opportunities for farm owners to learn about the proper handling and storage of the chemicals used.
    - Provide emergency responders with the training needed to respond to ag chemical incidents safely and efficiently.
    - Exercise emergency responders to ensure a thorough understanding of safe/efficient response.
    - Update ag databases on an annual basis.

**Commercial/Industrial**

**The Problem**

Not only do fires in Commercial or Industrial facilities pose tremendous concerns over loss of life and property, but the storage of hazardous materials in many cases, poses a serious threat for firefighter – and public – safety!

Firefighter-Right-to-Know requirements help to provide area firefighters with important information on stored chemicals. However, outdated information, changes in storage locations and quantities, and several variables associated with such facilities can make the fire itself less of a danger than the peripheral hazards.

**Primary Goals**

The primary goals of the Commercial/Industrial Firefighting section of this Plan are to ensure timely updates of chemical use and storage information at all commercial and industrial sites within the county.

Additionally, efforts should include enhanced training of firefighters beyond Awareness level – to include Operations and Technical levels, and regular exercising of firefighters. Finally, educational programs designed

specifically for these audiences should be created to help ensure compliance with Right-to-Know requirements AND to protect emergency responders when called to the site.

**Mitigation Alternatives**

- Identify commercial/industrial/farm sites using and/or storing hazardous chemicals – including those not currently listed under SARA Title III.
    - Develop educational programs designed for Commercial, Industrial, and Farm facilities in the County that ensure an understanding of chemical use, storage, and reporting requirements.
    - Use this same opportunity to introduce facility owners and operators to area emergency responders; to encourage open dialogue and a relationship that supports fire prevention and rapid response.
    - Work with local businesses and members of the farm community to identify all sites currently using/storing hazardous chemicals.
    - Ensure that area responders receive accurate information on hazmat materials being stored at various business/farm sites to ensure proper response and protective measures are taken.
    - Ensure that area responders are properly trained for response to sites housing hazardous materials.
    - Ensure that area responders are properly trained for response to commercial/industrial sites – in terms of safe entry, specific site issues, accessing accurate facility diagrams, etc.
    - Work with business owners to ensure that employees are familiar with fire prevention and response procedures – i.e., emergency plans, escape routes, gathering areas, personnel tracking, etc.
    - Support area business owners in conducting in-house exercises to ensure employee familiarity with emergency response plans – including fire safety and evacuation.
- Support enhanced responder training regarding commercial/industrial fires.
    - Bring enhanced training opportunities to Cass County emergency responders to ensure at least Awareness Level Training of all responders, and to encourage Operations and Technical levels for firefighters.
    - Exercise responders to assess and enhance response capabilities.
    - Include HazMat responders from surrounding counties in exercises to ensure an understanding of the team's capabilities, response times and systems for integration with local responders.
- Continue to encourage development of a HazMat First Response Team.
    - Encourage departments to train key members to support hazmat response teams.
    - Support designated trainees through efforts to bring training to Cass County or nearby training sites.
    - Pursue funding opportunities to provide necessary equipment for HazMat support teams.

- Interoperability of radio systems between all key agencies and organizations.

## # 11 Wildfires

**The Description**

A wildfire is an uncontrolled fire in forested areas, grass, or brush lands. The most immediate dangers from wildfires are the destruction of homes and timber, wildlife, and injury or loss of life to persons who live in the affected area or who are using recreational facilities in the area. Long-term effects can be numerous and include scorched and barren land, soil erosion, landslides/mudflows, water sedimentation, and loss of recreational opportunities. Forests cover approximately one-half of Michigan's total land base. As a result, much of the state is vulnerable to wildfire. In addition, development in and around forests and grasslands is increasing rapidly, making public safety a primary consideration in wildfire mitigation and suppression efforts.

**Historical Hazard impacts and Cass County**

03/06/2000 Indian Lake Fire Department. Incident – Wildfire, location 32734 School St., Dowagiac, Silver Creek Township. 26 acres burned. Open land. Several homes endangered. Mutual aid called in 5 assisting fire departments, Cass County Road Commission, and the Department of Natural Resources out of Allegan County.

04/29/2003 Indian Lake Fire Department. Incident – Brush fire / Wildfire, location 58330 Little Smith Lake, Dowagiac, Pokagon Township. 45 acres burned. Open land. Mutual aid called in, a total of 4 apparatus, and 12 personnel.

**The Problem**

Grass fires and outbreaks in heavily wooded areas pose a very real concern for firefighters in any rural community. Difficulty in accessing response areas, plenty of dry plant material over large open areas, and teams made up of volunteer firefighters. Ensure that any outbreak has the potential to create serious problems for Cass County.

Although burning permits and open fire restrictions in municipal areas help to curb outbreaks during dry periods, the greatest impediments to wildfires in rural areas are public awareness and adequate equipment.

**Primary Goal**

The primary goal under the Wildfire section of this plan involves increased public awareness and the prevention of fires. In some cases, the purchase of additional firefighting equipment would help to improve response and minimize risks to firefighters.

**Mitigation Alternatives**

- Develop a public education campaign that goes beyond the warnings that come out only during dry periods, to teach residents how and when to burn safely, and to encourage residents to accurately assess conditions, and seek input from area firefighters, before outdoor burning.
    - Work with area firefighters to develop a campaign focused on safe burning.
    - Develop media (press releases, PowerPoint programs, information sheets, brochures, etc.) to support the campaign.
    - Make information and materials available to resident groups to encourage safe burning.
- Seek funding necessary to support the purchase of grass trucks and firefighting equipment needed to fight fires safely and efficiently in fields and wooded areas.
    - Identify equipment shortfalls in area departments.
    - Determine system of prioritization.
    - Support efforts to seek funding to support purchase of safety and firefighting equipment.
- Support firefighter training and exercising to ensure skills are honed for safe and effective firefighting.
    - Generate controlled burn exercises to support training of firefighters in proper grassfire firefighting techniques.
- Interoperability of radio systems between all key agencies and organizations.

## # 12 Public Health Emergencies

### The Description

Public health emergencies can take many forms—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, to name just a few. Public health emergencies can occur as primary events by themselves, or they may be secondary events to another disaster or emergency such as a flood, tornado, or hazardous material incident. The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, many people. Public health emergencies can be statewide, regional, or localized in scope and magnitude.

Perhaps the greatest emerging public health threat would be the intentional release of a radiological, chemical, or biological agent with the potential to adversely impact many people. Such a release would most likely be an act of sabotage aimed at the government or at a specific organization or segment of the population.
Fortunately, Michigan has not yet experienced such a release aimed at mass destruction.

### The Problem

The threat of sudden disruption in the health care system and danger to life and health on a large scale seized the attention of the public health community (and the nation) in the 1990s due to the threat of terrorism, spurred by the bombings in a parking garage at the World Trade Center and at the federal office building in Oklahoma City and a poison gas release in the Tokyo subway system. Congress responded by passing legislation that established a domestic preparedness program and broadened the mandate of the Federal Emergency Management Agency (FEMA) to include attacks by weapons of mass destruction as well as natural disasters. In 1998, the Centers for Disease Control and Prevention (CDC) established the Bioterrorism Preparedness and Response Program, which improved laboratory, surveillance, and emergency response communication capabilities. In addition, in this same year, CDC was authorized by Congress to establish a national stockpile of pharmaceuticals and vaccines. In 2000 and early 2001, simulation exercises revealed many remaining shortcomings in emergency preparedness and the ability to respond, including poor interagency and intergovernmental communication and coordination, a lack of local planning, and inadequate surge capacity—that is, the ability of medical services and facilities to respond to a large, sudden influx of patients.

Such concerns increased exponentially in the aftermath of the terrorist attacks of September 11, 2001, and the use of anthrax as a means of bioterrorism shortly thereafter. After Hurricane Katrina and the flooding of New Orleans and other areas of the Gulf Coast, and amid concerns about pandemic influenza and other infectious diseases, public health preparedness has shifted from bioterrorism to an all-hazards approach and orientation. This approach is now recognized as being central to the public health mission and has been a focal point of a massive infusion of funding, manpower, training, and other resources during the last several years at the federal, state, and local levels.

**Mitigation Alternatives**

- Enhancing public health emergency response plans, training, exercises, facilities, supplies, and equipment.
- Immunization programs to vaccinate against communicable diseases.
- Improving ventilation techniques in areas, facilities, or vehicles that are prone to crowding, or that may involve exposure to contagion or noxious atmospheres.
- Radon detection and abatement activities, to reduce concentrations of radon in homes and buildings.
- Maintaining community water and sewer infrastructure at acceptable operating standards.
- Providing back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.
- Demolition and clearance of vacant condemned structures to prevent rodent infestations.
- Free or reduced-expense community clinics and school health services.
- Brownfield and urban blight clean-up activities.
- Proper location, installation, cleaning, monitoring, and maintenance of septic tanks.
- Separation of storm and sanitary sewer systems.

## # 13 War/Nuclear Attack/WMD

Although nuclear hazard from either attack or incident rank very low on Cass County's "likelihood" scale, the impact of even a single event would create tremendous problems for this community.

Our proximity to nuclear facilities in neighboring Berrien and Van Buren counties, our position as one of the areas to which Berrien and Van Buren would evacuate during a nuclear event, and our geographic position, all warrant serious attention in terms of our ability to prepare for, respond to and recover from nuclear incidents.

**The Description**

Any hostile attack against the United States, using nuclear weapons, which results in destruction of military and/or civilian targets. All areas of the United States are conceivably subject to the threat of nuclear attack. However, the strategic importance of military bases, population centers and certain types of industries place these areas at greater risk than others. The nature of the nuclear attack threat against the U.S. has changed dramatically with the end of the "Cold War" and the conversion of previous adversaries to more democratic forms of government. Even so, the threat still exists for a nuclear attack against this country. Despite the dismantling of thousands of nuclear warheads aimed at U.S. targets, there still exists in the world many nuclear weapons capable of destroying multiple locations simultaneously. In addition, controls on nuclear weapons and weapons components are sporadic at best in the former Soviet Union, and the number of countries capable of developing nuclear weapons continues to grow despite the ratification of an international nuclear nonproliferation treaty. The possibility of nuclear materials being used in a terrorist attack is also becoming uncomfortably plausible. It appears that the threat of nuclear attack will continue to be a hazard in this country for some time in the future.

**The Problem**

Cass County does not house a nuclear facility, but concerns have risen in recent years over attacks on adjacent Counties that do house nuclear facilities.

Cass County residents and first responders may find themselves at the "receiving end" of activities over which they have little control. Immediate concerns for health and safety due to fall-out and contamination are further fueled by fear of the long-term physical ramifications of exposure as well as economic and environmental concerns.

Mitigation measures must revolve around preparedness and response in Cass County to events that will occur outside of the County, and education about nuclear power and appropriate protective measures.

This type of hazard also has a low probability of occurrence and is estimated to have a less than one percent chance of annual occurrence.

**Mitigation Alternatives**

- Review and update Cass County Emergency Action Guidelines to ensure proper local response to nuclear attack/incidents.
    - Work with nuclear facility operators and nuclear county emergency response agencies to ensure a thorough understanding of their procedures and to incorporate those procedures in Cass County's Emergency Action Guidelines.
    - Ensure Cass County Emergency Response Teams have a thorough understanding of these nuclear protocols.
    - Work with nuclear counties on inter-county exercises to ensure that the processes are adequate and well understood.
- Satisfy the needs of emergency responders as they relate to response to nuclear events.
    - Work with emergency responders to identify needs -- in terms of education, training, exercise, and equipment – as related to response to nuclear events.
    - Access educational/training programs to address responder needs.
    - Identify funding sources and support purchase of necessary equipment as related to nuclear emergencies.
    - Create exercises designed to test emergency responder preparedness and capabilities during nuclear events.
    - Update emergency action protocols and plans to address shortfalls.
- Establish a system to support the needs of vulnerable populations to receive protection during nuclear emergencies.
    - Identify populations most likely to need additional assistance – especially regarding proper sheltering and/or evacuation – during nuclear incidents.
    - Establish support systems to address care of these populations.

- Address the needs of these special populations in terms of sheltering – i.e., medical support, transportation of non-ambulatory patients, access to ventilators or other life-support equipment, etc.
- Test support systems to ensure a thorough understanding of procedures and care of these populations.
- Test communications between support teams and the EOC to ensure assistance from county, state, and Federal authorities can be accessed as needed.

- Develop site emergency plans for area schools, hospitals, factories, businesses, and other appropriate facilities.
- Interoperability of radio systems between all key agencies and organizations.

## # 14 Drought

**The Description**

A prolonged period with precipitation levels well below average, particularly during the planting and growing seasons in agricultural areas. Drought can also adversely affect urban areas—particularly those dependent on reservoirs for their water. Decreased water levels due to insufficient rain can lead to restriction of water uses and amounts. It is difficult to predict or forecast when a drought will begin, and how long it will last. Increased pumping of groundwater and surface irrigation in drought periods can result in land subsidence problems in some areas of the country. Virtually all areas of the country are subject to impact from drought - whether it be reduced agricultural outputs, reduced water supply, land subsidence, power outages caused by excessive energy use, increase in wildfires, reduced marine navigation capabilities, etc. The most vulnerable regions of the country to drought are the arid southwest and the Great Plains.

**The Problem**

Periodic drought in Cass County, although difficult to endure, is not a threat for which the county can mitigate in terms of prevention. Response and recovery efforts are similarly limited in that the areas most affected by drought are agricultural. These areas either have crops that are irrigated to minimize damage or have no irrigation and are most often written off as insured, or state/federally compensated losses.

Mitigation, therefore, must focus on preparing for drought conditions, securing as much relief as possible during long-term droughts, and ultimately accessing support programs and insurance through State and Federal programs to minimize long-term financial impacts.

Because Michigan does not have too many drought years, it is estimated that there is a five percent chance that Cass County would endure a serious drought within a ten-year period.

**Primary Goal**

The goal under the drought category is to maintain public health and safety and to minimize the damage to property.

**Mitigation Alternatives**

- Establish alert procedures regarding potential water quantity and quality problems as they pertain to drought conditions.
  - Establish a system of acquiring emergency water supplies for affected human and animal (livestock) populations – including assistance from adjoining communities, mutual aid from out-of-county sources, and contracts with potable water suppliers.
  - Establish a system for distributing emergency water supplies to affected human and animal (livestock) populations – including identification of responsible personnel, training of personnel, acquisition of necessary equipment, monitoring of distribution, etc.

- Identify collaborative team responsible for evaluation of water quantity/quality.
- Develop Standard Operating Procedures for collaborative review of water quantity, quality, availability, and accessibility.
- Establish public notification procedures.
- Activate emergency water supply system(s).
- Carryout public notification and distribution systems.
- Re-test/Re-evaluate water quantity and quality at frequent intervals.
- Continue to keep public apprised of the water situation.
- Stand down water supply program as water supplies/quality are restored.

- Pursue opportunities to purchase equipment needed to access emergency water supplies from natural sources and/or via mutual aid or contractual arrangements.
  - Identify equipment types and quantities needed to carry-out emergency water supply program(s) -- (i.e., portable pumps, tankers, sanitary containers, etc.)
  - Identify parties responsible for mass water distribution program(s) and distribute equipment accordingly.
  - Train responsible parties in proper procedures and use of equipment.
  - Establish a system of equipment maintenance to ensure maximum use of equipment.
  - Establish a system for determining the need for periodic replacement.
  - Establish an "in-house" budget to ensure equipment can be replaced as needed.
- Increase education regarding increased importance of adequate water for livestock and outdoor pets during dry periods and establish/support water hauling emergency procedures for livestock.
  - Acquire and/or generate educational materials regarding water requirements.
  - Identify farm operations with potential need for livestock water supplies.
  - Test water supply program to ensure ability to deliver water in quantities and within the time periods needed.
  - Work closely with the farm community to support delivery of water needed to provide for livestock operations when needed.
- Establish "hay hotlines" to support access to hay and feed in areas where drought has reduced local ability to replenish supplies.
  - Identify sources of large quantities of hay and feed grains.
  - Develop agreements with providers – addressing hay/feed acquisition, transportation, and payment issues.
  - Identify area farmers with potential need for hay/feed support during drought periods.
  - Develop procedures for farmers to receive hay/feed supplies – including detailed review of payment requirements (if any).
- Where feasible, seek funding for improved water systems – including upgrading of existing infrastructure and drilling of deeper wells.
  - Identify existing infrastructure in need of upgrade or replacement.
  - Prioritize findings and establish a timetable for upgrade or replacement.
  - Gather cost estimates to satisfy upgrade or replacement plan.
  - Seek funding for projects as available.
- Pursue agricultural drought recovery programs (i.e., drought property tax credit) – to supplement existing state systems.
  - Identify members of the agricultural community and establish an "Ag Network" database wherein farm owner/operator contact information and information on ag operations can be accessed and assessed.
  - Work with affected members of the agricultural community during times of drought to ensure proper application for assistance and access to all available programs.

- If needed, request/issue irrigation permits to use state waters for irrigation.
    - Work with state and local representatives to identify a system whereby state water irrigation permits can be accessed.
    - Ensure that local authorities have direct access to the system.
    - Test the system to ensure all information needed to apply for permits is readily available in the ag network database.
- Increase education of the public regarding the increased likelihood of wildfire in dry areas during drought periods.
    - Establish a system (i.e., mass media, DCC "Reverse 9-1-1 Technology" recorded messages, newsletters/bulletins to targeted communities) whereby alerts can be issued regarding drought conditions and potential for fire.
    - Develop and conduct public information programs as opportunities arise to ensure awareness of the dangers of wildfire and how they are accelerated by drought conditions.
- Interoperability of radio systems between all key agencies and organizations.

## # 15 Cyber Security

**The Description**

Cyber security, also referred to as information technology, is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage, or unauthorized access. In a computing context, security includes both cyber security and physical security.

Ensuring cyber security requires coordinated efforts throughout an information system. Elements of cyber security include:

- Application security
- Information security
- Network security
- Disaster recovery / business continuity planning
- Operational security
- End-user education

**The Problem**

One of the most problematic elements of cyber security is the quickly and constantly evolving nature of security risks. The traditional approach has been to focus most resources on the most crucial system components and protect against the biggest known threats, which necessitated leaving some less important system components undefended and some less dangerous risks not protected against. Such an approach is insufficient in the current world environment.

The threat advances quicker than it can keep up with it.

To deal with the current environment, advisory organizations are promoting a more proactive and adaptive approach. The National Institute of Standards and Technology (NIST), has issued updated guidelines in its risk assessment framework that recommended a shift toward continuous monitoring and real-time assessments.

**Mitigation Alternatives**

- Maintain an Accurate Inventory of Control System Devices and Eliminate Any Exposure of this Equipment to External Networks.
- Implement Network Segmentation and Apply Firewalls.

- Use Secure Remote Access Methods.
- Establish Role-Based Access Controls and Implement System Logging.
- Use Only Strong Passwords, Change Default Passwords, and Consider Other Access Controls.
- Maintain Awareness of Vulnerabilities and Implement Necessary Patches and Updates.
- Develop and Enforce Policies on Mobile Devices.
- Implement Employee Cyber Security Training Program.
- Implement Measures for Detecting Compromises and Develop a Cyber Security Incident Response Plan.

## # 16 Civil Disturbances

### The Description

A civil disturbance is defined as a public demonstration or gathering (such as a sports event), or an uprising in a prison or other institution, that results in some disruption of essential community functions, or in rioting, looting, arson, or other unlawful behavior. Large-scale civil disturbances rarely occur, but when they do 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 two dissenting parties; 2) high profile/controversial judicial proceedings; 3) the 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 by a particular segment of society. Areas subject to civil disturbances may encompass large portions of a community. Types of facilities that may be subject to or adversely impacted by civil disturbances may include government buildings, military bases, nuclear power plants, universities, businesses, and critical service facilities such as police and fire stations.

### The Problem

At first glance, Cass County would be considered an unlikely site for civil unrest; however, looks can be deceiving. In recent years, acts by special interest groups, even in this small rural community, resulted in serious altercations. Subsequently, no assumptions can be made regarding the likelihood of civil disturbance. Cass County remains susceptible to acts of Civil Unrest.

### Primary Goals

The primary goals of this section are to increase awareness and reporting of potential civil unrest and increase the capabilities of emergency responders – particularly law enforcement – to respond safely and effectively to incidents.

### Mitigation Alternatives

- Reduce the likelihood and incidences of Civil Disturbances on people and property.
    - Ensure that law enforcement training is current by conducting a review of training records and scheduling proper remedial training.

- Investigate the use of video recording equipment at incident scenes to aid in identification and follow-up by conducting a study and make recommendations regarding the practicality of using and/or improving the use of video recording equipment at incident scenes.
- Promote participation in the Michigan Citizen Corps Council (MCCC) and Community Emergency Response Teams (CERT) for the purpose of providing informed observers and links to law enforcement.
- Evaluate and make recommendations for the effective use of and participation in the Michigan Emergency Management Assistance Compact (MEMAC).
- Encourage structure/property insurance in risky areas by supporting a public awareness campaign for property owners/renters in areas with a history of trouble.
- Establish a repository of reports of risky events -- to establish a method to promote analysis (times of day, season, event, etc.) to identify patterns of vulnerability.
- Centralize reporting and database of events, personnel, and patterns.
- Promote completion of site emergency plans for schools, factories, office buildings, hospitals, jails, recreation areas, and other appropriate sites with the assistance of a public consortium (i.e., LEPC) to obtain, review, and report best practices relating to emergency plans, mitigation activities, and success stories.
- Review and establish safety requirements for schools, factories, office buildings, hospitals, jails, stadiums, recreation areas, etc. that take into consideration state/federal recommendations and the realities of each site to address emergency and security needs.
- Enhance awareness and participation in civil disturbance emergency planning activities through continued support and/or participate in hazard identification efforts, ongoing updates of hazard mitigation plans, and implementation/support for mitigation projects.

- Interoperability of radio systems between all key agencies and organizations.

## # 17 Flood / Excessive Rain

- **Riverine / #22 Urban**

**The Description**

Riverine flooding is defined as the periodic occurrence of overbank flows of rivers and streams resulting in partial or complete inundation of the adjacent floodplain. Riverine flooding is generally caused by prolonged, intense rainfall, snowmelt, ice jams, dam failures, or any combination of these factors. Such overbank flows are natural events that may occur on a regular basis. Riverine Flooding occurs on river systems whose tributaries may drain large geographic areas and encompass many independent river basins. Floods on large river systems may continue for several days. Many areas of Michigan are subject to riverine flooding.

Urban flooding involves the overflow of storm sewer systems and is usually caused by inadequate drainage, following heavy rainfall or rapid snowmelt.

**Historical Hazard impacts and Cass County**

05/09/1996 04:30 PM Flash Flood at the South Half of Cass County: Rain totals of 2 to 4 inches flooded streets and low-lying areas and washed-out Calvin Center Road at the intersection with Calvin Hill Road.

05/10/1996 12:30 AM Flash Flood at the South Half of Cass County: Additional rains of 1 to 2 inches on top of previous day's rains of 2 to 4 inches caused flooding of village streets in Cassopolis and surrounding low-lying rural areas.

06/09/1996 10:30 PM Flash Flood at Dowagiac: Rainfall of more than 1.5 inches by 10:30 PM EST began to cause flooding of roads near Dowagiac. By 3:00 AM EST, rainfall totals were estimated between 2.0 and 3.0 inches, and the area affected reached from near Keeler through Dowagiac to Cassopolis and Union. At 1210 AM EST, a major road washout occurred at the intersection of Union Road and Chapel Hill Street.

02/21/1997 08:00 AM Flash Flood at Dowagiac.

07/16/2005 05:30 PM Flash Flood at Marcellus: Highway 40, just south of Marcellus, was flooded for several hours as 5 to 6 inches of rain fell between 430 pm and 9 pm EST. No injuries or rescues were reported due to the flooding.

08/07/2007 07:12 AM Flash Flood at Cassopolis: One foot of water was reported over Pokagon highway southwest of Cassopolis. A combination of deep moisture and slow movement of storms resulted in flash flooding in some parts of extreme southwestern Michigan.

09/13/2008 09:45 AM Flood at Barron Lake 500K in property damage: The rainfall from the remnants of Lowell and Ike continued to drop heavy rainfall into the early morning hours of the 15th. When the rain finally stopped, a total rainfall amount of 10 to 12 inches was reported from the extreme eastern parts of Niles into Edwardsburg. Numerous roads remained closed with some culverts and bridges suffering damage. No injuries were reported. No exact figures are available for the damage to the area from the flooding. Moisture from the remnants of Tropical Storm Lowell and Hurricane Ike moved into the region and interacted with a stationary boundary to bring heavy rainfall to portions of far southern lower Michigan starting on the 11th, extending into the early morning hours of the 15th. Widespread reports of 8 to as much as 12 inches of rain were received across Berrien and Cass counties. A portion of the Niles Dam suffered a breach in the earthen part. Downstream residents were evacuated as a precaution.

It is likely that a flood that has the potential of causing moderate to severe damage in Cass County will occur every 2.2 years. This estimate reflects the recorded annual occurrence.

**The Problem**

Excessive rain and associated flooding, although capable of causing potential problems for individual homeowners, has been identified as one of the least serious of Cass County's threats because of natural terrain and soil features, which tend to support water drain-off.

Sandy soil in many areas helps to move standing water away from the surface – meaning natural features throughout Cass County serve to protect from flooding. However, this same rapid movement of water through soil leads to possible contamination of groundwater.

Additionally, preventative efforts currently in place such as stringent construction standards, which attempt to prevent building in those few areas prone to flooding, provide a second line of defense against flood-related damage.

Dammed areas are carefully monitored and maintained by the Cass County Water Resources Commissioner; and water levels controlled through a series of established practices.

Interestingly, the Water Resources Commissioner has indicated that mitigation efforts would best focus on controlling water levels to ensure adequate seasonal water depth (i.e., recreational areas), as opposed to preventing flooding. Inadequate water levels pose more of an economic threat, in terms of tourism and recreational activities, than a threat to homeowners.

Excessive rainfall and higher than average water levels in wetland/boggy areas does cause difficulty for farmers in this rural community, and therefore, warrants some additional mitigation activity.

The National Flood Insurance Program (NFIP) offers flood insurance to homeowners who are located within a flood plain at a reduced rate. To be eligible, communities must participate in the NFIP. The table below identifies communities in Cass County that are mapped and are current participants of the program. The table also displays information regarding communities who are eligible, but do not participate. As result, FEMA has placed sanctions on those communities, and they are not eligible for funding. As an ongoing effort to protect property, this plan aims to encourage all communities to participate in the NFIP. Furthermore, there are no known repetitive loss properties in Cass County. Developments within flood plain areas in Cass County are outlined in Appendix I.

**Cass County – Status National Flood Insurance Program (NFIP)** **TABLE 17**

| ID | Community | Date of Entry | Date of Sanction | Current Effective Map |
|---|---|---|---|---|
| # 261124 | Calvin Township | | | 09/05/07 |
| | Howard Township | | | Not Mapped |
| # 261125 | Jefferson Township | 09/07/05 | | 09/07/05 (M) |
| # 260366 | LaGrange Township | | 10/16/98 (W) | 09/05/07 |
| | Marcellus Township | | | Not Mapped |
| # 261126 | Mason Township | | 09/05/08 (S) | 09/05/07 |
| | Milton Township | | | Not Mapped |
| | Newberg Township | | | Not Mapped |
| # 261128 | Ontwa Township | (NSFHA) | | 09/05/07 |
| # 261129 | Penn | (NSFHA) | | 09/05/07 |
| # 261129 | Pokagon Township | | 05/27/78 | 09/05/07 |
| # 261130 | Porter Township | | 09/05/08 | 09/05/07 |
| # 260369 | Silver Creek Township | 04/01/88 | | 09/05/07 (M) |
| # 261131 | Volinia Township | | 05/05/08 (S) | 09/07/05 |
| # 261132 | Wayne Township | | | 09/05/07 |
| # 260055 | City of Dowagiac | 05/25/78 | | 09/05/07 |
| # 260363 | Village of Cassopolis | 06/01/79 | | 09/05/07 (M) |
| # 260364 | Village of Edwardsburg | 04/20/79 | | 09/05/07 (M) |
| | Village of Marcellus | | | Not Mapped |
| # 260370 | Village of Vandalia | | 09/1707 (S) | 09/05/07 |

*NSFHA – No Special Flood Area W – Withdrawn M – Minimally Prone to Flooding S – Sanctioned*

**Primary Goals**

The primary goal under Excessive Rain/Flooding is to ensure continued prevention of construction in waterways -- for the protection of both homeowners AND the waterways and to encourage NFIP participation to those communities who are eligible.

Additionally, maintenance and upgrades of existing dams to ensure adequate water levels in desired areas is central to preservation of water-related activities and the economy they support.

**Mitigation Alternatives**

- Encourage those communities who are eligible to join the National Flood Insurance Program (NFIP).
- Increase awareness regarding proper construction standards and the importance of avoiding construction/activities in flood-prone areas.
    - Bring water quality experts together with local building and zoning officials to ensure a thorough understanding of the threats to property-owners posed by inappropriate zoning and construction in flood-prone areas; and to support an open dialogue between experts and those responsible for planning/zoning decisions.

    - Expand this effort by brining water quality experts, local building and zoning officials AND realtors together to ensure a solid understanding of proper planning and zoning and to encourage realtors to offer properties in ways that can be fully supported by the township.
    - Further, conduct a series of information sessions at the local and county levels to provide target audiences (farmers, developers, recreational facility owners, etc.) with specific information on the potential impact of flooding and more importantly, on the mitigation actions that they can employ to protect themselves, while also preserving water quality.
- Work closely with the local communities to identify areas most likely to benefit from flood mitigation activities, and work with environmental professionals and consultants to establish plans for reducing the degree of, or eliminating, flooding in those areas through environmentally sound practices.
    - Identify areas most likely to benefit from flood mitigation activities.
    - Establish a team – consisting of local representatives, environmental professionals, and consultants to address mitigation for each community.
    - Establish a system of prioritizing projects for each community.
    - Develop plans to mitigate each community's unique flooding issues.
    - Pursue funding to support individual mitigation projects.
- Work closely with the farm community to identify areas most likely to benefit from flood mitigation activities, and work with environmental professionals and consultants to establish plans for reducing the degree of, or eliminating, flooding in those areas through environmentally sound practices.
    - Identify and confirm flood-prone areas throughout agricultural areas.
    - Determine which areas warrant mitigation activity.
    - Work with community officials, individual farmers, environmental professionals, and consultants as needed to establish acceptable mitigation activities.
    - Establish a system of prioritization to determine the order in which mitigation activities will be addressed.
    - Develop plans to mitigate agricultural flooding issues.
    - Pursue funding to support individual mitigation projects.
- Interoperability of radio systems between all key agencies and organizations.

## # 18 Earthquakes

**The Description**

An earthquake is a sudden motion or trembling in the earth caused by an abrupt release of slowly accumulating strain which results in ground shaking, surface faulting, or ground failures. Most areas of the United States are subject to earthquakes (including parts of Michigan), and they occur literally thousands of times per year. Most earthquake occurrences are minor tremors and result in little or no damage. However, when moderate or severe earthquakes occur, the results can be devastating in terms of loss of life, property, and essential services. One of the most dangerous characteristics of earthquakes is their ability to cause severe and sudden loss. Within a couple of minutes, an earthquake can devastate an area through ground shaking, surface fault ruptures, and ground failures. Most deaths and injuries are not directly caused by the earthquake itself, but rather caused by indirect impacts.

Earthquakes are measured by their magnitude and intensity. Magnitude is a measure of the amount of energy released at the epicenter or origin of the event. The Richter Magnitude Scale is commonly used to determine earthquake magnitude. An earthquake of 5.0 is a moderate event, 6.0 characterizes a strong event, 7.0 is a major earthquake, and 8.0 is a catastrophic earthquake. Earthquake intensity is the measure of damage done at a given

location. In the U.S., the most used intensity scale is the Modified Mercalli Intensity Scale, which describes 12 increasing levels of intensity ranging from imperceptible to catastrophic.

Although earthquake risks in Michigan are generally quite low, this often means that structures or utilities (such as gas mains) may not have been built to withstand even the forces of relatively gentle seismic occurrences. Thus, although *risks* may be low, *vulnerabilities* may be moderate or high in such cases. Mitigation strategies in Michigan would mainly focus on evaluating and improving the seismic resistance of vulnerable utility systems that did not take seismic disturbances into account.

**Historical Hazard impacts and Cass County**

On August 10th, 1947, a 4.7 earthquake of magnitude 4.6 occurred near Coldwater, Michigan, about 52 miles from Cassopolis, Michigan.

On May 2nd, 2015, a 4.2 magnitude earthquake was centered five miles south of Galesburg, Michigan, about 40 miles northeast of Cassopolis, Michigan, and could be felt in parts of Ohio, Indiana, Illinois, and Wisconsin.

On June 30th, 2015, a 3.3 magnitude earthquake was centered about 7 miles northeast of Union City, Michigan, approximately 53 northeast of Cassopolis, Michigan.

The recent earthquakes with magnitudes of 3.3 and 4.2 had limited damage, such as cracked plaster and damaged chimneys. A main concern for Cass County should a major quake occur within the region would be our population centers and business districts where older two-story buildings were built with brick and mortar. Population centers would include the City of Dowagiac 5,879, the Village of Cassopolis 1,774, Village of Marcellus 1,198, and the Village of Edwardsburg 1,259.

Should there be any seismic occurrence the soundness of all Dams would be in question until inspections could be completed, thus presenting a potential risk for those populations identified in dam failure plans.

**The Problem**

Although not directly weather-related, earthquake, as a natural event, poses similar threats to those of other natural disasters in that mitigation can do little in terms of prevention, and only attention to preparedness, response and recovery can serve the community.

Similarly, response to earthquake events follows the same "all weather-hazards" approach in that individuals require education to prepare for and respond to events, support in creating/ accessing protection, and assistance with recovery. Earthquakes are not considered significant threats to Cass County in that the only events in recent history have been barely detectable and went virtually unnoticed by members of the public.

However, with proximity to one of the largest faults in the continental United States – the New Madrid Fault – centered in Southern Illinois, attention and mitigation education are warranted.

Because there has never been an earthquake near Cass County that caused any amount of significant damage, the likelihood of occurrence is less than one percent annual occurrence.

**Mitigation Alternatives**

- Identify and catalog critical infrastructures/ structures /facilities most likely to be impacted by an earthquake and establish a system for retrofitting structures/facilities – based on their vulnerability and the level of impact on Cass County operations should they be affected.
    - Identify critical structures and facilities most likely to be impacted by an earthquake.
    - Work with County building inspectors to determine the level of vulnerability of key infrastructures, structures, and facilities.
    - Work with County officials to determine a system of prioritizing the value of infrastructures, structures, facilities for the purpose of establishing a system of retrofitting.

    - Seek funding to support retrofitting of key infrastructures, structures, and facilities.
    - Although recent changes to the Building Code do require that government buildings and other key structures can withstand a minimum level of earthquake activity, it would be appropriate to increase public awareness regarding code adjustments to support the inclusion of these standards in other structures as well.
- Provide educational information on earthquakes -- as part of an all- hazards public training program.
    - Gather and disseminate educational information concerning earthquake hazards and incorporate that information into Cass County's All-Hazards training programs.
    - As noted above, offer the public key information on construction options, which would help to reinforce structures/homes against earthquakes.
- Ensure that first responders have access to information that will support response during earthquake events.
    - Gather standard procedures from earthquake-affected areas to provide local emergency responders with an understanding of the standard operating procedures used by those who have opportunities to test them.
    - Determine which of these SOPs should be included in Cass County's Emergency Action Guidelines.
    - Ensure that all first responders have access to information and suggest inclusion in regularly scheduled training.
    - Support training through inclusion of earthquake SOPs in a coordinated exercise program.
- Interoperability of radio systems between all key agencies and organizations.

## # 19 Nuclear Power Plant Accidents

**The Description**

An actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility with enough to constitute a threat to the health and safety of the off-site population. Such an occurrence, though not probable, could affect the short and long-term health and safety of the public living near the nuclear power plant, and cause long-term environmental contamination around the plant. As a result, the construction and operation of nuclear power plants are closely monitored and regulated by the Federal government. Communities with a nuclear power plant must develop detailed plans for responding to and recovering from such an incident, focusing on the ten-mile Emergency Planning Zone (EPZ) around the plant, and a 50-mile Secondary EPZ that exists to prevent the introduction of radioactive contamination into the food chain. Michigan has three active commercial nuclear power plants and one inactive plant, in addition to four small nuclear testing/research facilities located at three state universities and within the City of Midland.

**The Problem**

In the event of a nuclear power plant accident immediate concerns will be for health and safety, as well as economic and environmental concerns. The inability to exercise preventative measures results not only in an increased sense of victimization, but at times, the proliferation of erroneous beliefs and rumors.

Mitigation must revolve around preparedness, response, appropriate protective measures, and education in Cass County to the truths about nuclear power to alleviate unsubstantiated fears and allow residents and responders to focus on the realities of response.

Since recovery from such events would most likely exceed local capabilities, mitigation at that level would be limited to preparedness and response categories, while recovery would rest in great part on the support of State and Federal authorities.

Cass County should not be affected by a nuclear power plant event and therefore the annual chance of occurrence is less than one percent.

**Mitigation Alternatives**

- Educate the residents of Cass County – including the public and emergency response teams, regarding the realities of nuclear events.
    - Identify specific concerns of Cass County residents.
    - Work with nuclear facility officials to access and/or develop educational programs designed to address these concerns.
    - Develop an information campaign to inform community service groups, schools, public gatherings, intergovernmental forums, about the realities of a nuclear power incident AND the preventative measures that are in place.
- Review and update Cass County Emergency Action Guidelines to ensure proper local response to nuclear attack/incidents.
    - Work with nuclear facility operators and nuclear county emergency response agencies to ensure a thorough understanding of their procedures and to incorporate those procedures in Cass County's Emergency Action Guidelines.
    - Ensure Cass County Emergency Response Teams have a thorough understanding of these nuclear protocols.
    - Work with nuclear counties on inter-county exercises to ensure that the processes are adequate and well understood.
- Educate residents regarding the preparedness measures both in the nuclear counties (Berrien and Van Buren), and within Cass County to address our own response and recovery.
    - Develop an information campaign to educate community groups, government officials, service organizations, and other community organizations regarding Cass County's level of preparedness and ability to respond to nuclear events.
    - Encourage annual review of this information and incorporation of the program in schools, churches, and other community-based meetings to ensure widespread dissemination.
- Establish a system to support the needs of vulnerable populations to receive protection during nuclear emergencies.
    - Identify populations most likely to need additional assistance – especially about proper sheltering and/or evacuation – during nuclear incidents.
    - Establish support systems to address care of these populations.
    - Address the needs of these special populations in terms of sheltering – i.e., medical support, transportation of non-ambulatory patients, access to ventilators or other life-support equipment, etc.
    - Test support systems to ensure a thorough understanding of procedures and care of these populations.
    - Test communications between support teams and the EOC to ensure assistance from county, state and/or Federal authorities can be accessed as needed.

- Develop site emergency plans for area schools, hospitals, factories, businesses, and other appropriate facilities.
- Interoperability of radio systems between all key agencies and organizations.

## # 20 Shoreline Flooding

### The Description

For Cass County Referencing Shoreline Flooding refers to the inland lakes' shoreline around any of the 122 lakes within Cass County. Rain, wind, waves, water levels, and human activities constantly affect the properties along the shores of the many Lakes. Shoreline flooding and erosion are natural processes, occurring at high, average, and even low water levels. However, during periods of high water, flooding and erosion are more obvious, causing serious damage to properties, homes, businesses, roads, water and wastewater treatment facilities, and other structures. Long-term and seasonal variations in precipitation and evaporation rates primarily control the water levels and their fluctuations.

### The Problem

While the many lakes in Cass County make for desirable locations for residents and vacation these shorelines also present natural hazards to residents, vacationers, and to development. Heavy rain events highlight flood risk in areas around many of the lakes in Cass County.

### Historical Impacts and Cass County

September 12th-14th, 2008 the South Bend area recorded a record rainfall. The monthly rainfall total at South Bend Regional Airport was 13.92 inches in September 2008...which was 10.13 inches above normal. This shattered the record for the wettest September on record as well as the all-time wettest month on record. Nearly 80 percent of the September 2008 rainfall occurred in just 3 days from September 12th through September 14th. During this 3-day period...10.88 inches of rain fell at south bend...with 10.65 inches occurring on September 13th and 14th. This means that more rain fell in just two September days than in any other entire month of September. It also means that more rain fell in just 3 days than in any other entire month on record! The greatest 24-hour rainfall total was 6.88 inches on the 13th and 14th.

The heavy precipitation in the middle of the month was due largely to the remnants of two tropical storm systems which also interacted with a stalled front across the western great lakes. Tropical storm Lowell moved into the area from the Pacific Ocean and interacted with the stalled frontal boundary to create the first heavy rainfall event on the 12th and 13th. A brief break in the rainfall occurred before the remnants of hurricane Ike came north and moved across the region on the 14th. All this rain in a short period of time led to significant flooding across northwest Indiana and parts of southwest Lower Michigan. Some areas that had already experienced devastating flooding in January and February once again faced high water and flooding.

09/13/2008 09:45 AM Flood at Barron Lake 500K in property damage: The rainfall from the remnants of Lowell and Ike continued to drop heavy rainfall into the early morning hours of the 15th. When the rain finally stopped, a total rainfall amount of 10 to 12 inches was reported from the extreme eastern parts of Niles into Edwardsburg. Numerous roads remained closed with some culverts and bridges suffering damage. No injuries were reported. No exact figures are available for the damage to the area from the flooding. Cass County did report over 60 homes affected by flooding and reported the cost of road damage was over $566,500.00. A portion of the Niles Dam suffered a breach in the earthen part. Downstream residents were evacuated as a precaution.

08/17/2016 after several days of heavy rain Cass County's Office of Emergency Management and the Cass County Drain Commissioner issued a High Lake Level Advisory asking boaters to refrain from causing wakes while enjoying the Cass County lakes on Wednesday, August 17th through Tuesday, August 23rd, 2016. The Michigan Department of Natural Resources supported by the Cass County Sheriff's Office Marine Division, Cass County Office of

Emergency Management, District County Commissioner, Township Supervisor, Cass County Drain Commissioner, and the Painter/Christiana/Juno Lake Associations, followed-up with a posting at public accesses on Painter, Christiana, and Juno Lake:

To promote safe boating and reduce shoreline and property damage from boat wakes. “Please travel at slow no wake speed until Thursday, September 1, 2016, or until the water level recedes to a safe level where wake damage to property can be avoided.”

It is likely that a flood that has the potential of causing moderate to severe damage in Cass County will occur every 2.2 years. This estimate reflects the recorded annual occurrence.

**Mitigation Alternatives**

- Planning acceptable uses for areas prone to flooding (comprehensive planning, zoning, open space requirements, subdivision regulations, land use and capital improvements planning).
- Dry flood proofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
- Wet flood proofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
- Elevation of flood-prone structures above the 100-year flood level.
- Construction of elevated or alternative roads that are unaffected by flooding or making roads more flood resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
- Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
- Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
- Enforcement of basic building code requirements related to flood mitigation.
- Joining the National Flood Insurance Program, obtaining insurance, and participating in the Community Rating System (CRS).
- Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, wetlands protection and restoration).
- Elevating mechanical and utility devices above expected flood levels.
- Flood warning systems.
- Monitoring of water levels with stream gauges and trained monitors.
- Anchoring of manufactured homes to a permanent foundation in flood areas, but preferably these structures would be permanently relocated outside of flood-prone areas and erosion areas.
- Control and securing of debris, yard items, or stored objects in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.
- Increased coverage and use of NOAA Weather Radio.

## # 21 Scrap Tire Fire

### The Description

Any instance of uncontrolled burning at a scrap tire storage or recycling site. Each year in the U.S., an estimated 250 million vehicle tires must be disposed. Michigan alone generates 7.5-9 million scrap tires annually. Many of these scrap tires end up in disposal sites (legal or illegal), some of which may have several hundred thousand tires. Michigan currently has more than 24 million scrap tires at disposal sites scattered across the state. Tire disposal sites can be fire hazards due to the large quantity of "fuel" onsite, coupled with the fact that the shape of a tire allows air to flow into the interior of a tire pile, rendering standard firefighting practices nearly useless. Flowing burning oil released by the burning tires spreads the fire to adjacent areas. Some scrap tire fires have burned for months, creating acrid smoke and an oily residue which can leach into the soil, creating long-term environmental problems. Scrap tire fires differ from conventional fires in several respects: 1) even relatively small scrap tire fires can require significant resources to control and extinguish; 2) the costs of fire management are often far beyond that which local government can absorb; 3) the environmental consequences of a major tire fire can be significant; and 4) the extreme heat from the fire converts a standard passenger vehicle tire into about two gallons of oily residue, which can then leach into the soil or migrate to streams.

### The Problem

The disposal of scrap tires in many rural areas of Cass County is an unfortunate reality. This type of fire would not only pose a threat to the environment, but due to their location, could be difficult to access and fight. Mitigation to discourage the burning of tires would be far less effective than the elimination of these illegal dumps altogether. Therefore, efforts will focus as much on elimination of the threat, as on enhanced training of firefighters to address those fires that do break out.

### Mitigation Alternatives

- Work with township and local officials to identify illegal tire dump sites and/or improperly stored scrap tire sites.
- Support the creation of local blight ordinances prohibiting dumping of tires and hazardous debris, to enhance the ability of local communities to reduce dumping and storage of this type.
- Train and support firefighters in proper response to scrap tire fires.
- Seek opportunities to purchase equipment needed to fight scrap tire fires safely and efficiently.
- Interoperability of radio systems between all key agencies and organizations.

## # 23 Subsidence (Sink Hole)

### The Description

Subsidence is the lowering or collapse of a 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 such as those produced by the solution of limestone or other soluble materials by groundwater. Human-induced subsidence is caused principally by groundwater withdrawal, drainage of organic soils, and underground mining. Subsidence is not common in Cass County.

Cass County has several active and inactive oil/gas wells scattered across the County.

**The Problem**

Generally, subsidence poses a greater risk to property than to life. The potential for subsidence usually will go undetected until a collapse or there is substantial lowering of the land surface. Currently, broken water pipes and the improper discharge of rainwater are the most common causes of water-related subsidence in Michigan.

12/14/2015 Cass County Office of Emergency Management received a call from a Cass County Vandalia, Michigan resident concerning a sink hole on their property 17921 Wood Street, Vandalia, MI. The owner and resident of the property had lived there since 1992. The owner first noticed a soft spot in the yard where the hole developed on Sunday, December 13th, 2015. Nothing unusual for weather conditions, yard was grass covered undisturbed, solid ground. Inspection was made on a 12" x 12" hole that went down five or six feet, and over underneath the surface of the ground to the east as far as could be seen, about eight feet. After a meeting with the Village Manager to review the situation, no known reason could be determined as to why the hole would have occurred. A follow-up on the status of the hole on 12/22/2015 no change was observed.

**Mitigation Alternatives**

- Identifying and mapping old mining and well areas, and geologically unstable terrain, and limiting or preventing development in high-risk areas.
- Filling or buttressing subterranean open spaces (such as abandoned mines and wells) to discourage their collapse.
- Hydrological monitoring of groundwater levels in subsidence-prone areas.
- Insurance coverage for subsidence hazards.
- Real estate disclosure laws.

## # 24 Dam Failures

**The Description**

Dam failure is the collapse or failure of an impoundment resulting in downstream flooding. Dam failures can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Failure of a dam does not only occur during flood events, which may cause overtopping of a dam. Failure can also result from poor operation, lack of maintenance and repair, and vandalism. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation.

**Direct Impacts**

Dam failures can result in extensive downstream impacts, like floods, but typically are more devastating due to the high velocities often associated with the events. Populations can be more severely impacted if there is not adequate warning and evacuation time.

Once notice of any dam failure or potential failure is received by the Cass County 911 Dispatch, 911 Dispatch would issue alerts and warnings possible, Emergency Alert System (EAS), IPAWS, and radio dispatch. Responding units will determine on site emergency warning, such as door to door and/or bullhorn.

<u>Mottville Dam</u>

The Mottville Hydroelectric Plant is located on the St. Joseph River just north and upstream of the community of Mottville, St. Joseph County, Michigan. It is about 96 river miles upstream from the mouth of the St. Joseph River which empties into Lake Michigan at St. Joseph, Michigan.

With an average operating head of 12.5 feet, it is one of several low-head, run-of-river hydroelectric plants on the St. Joseph River. As can be seen on the following page (III-2), the Mottville Dam is the eighth dam upstream from the mouth of the St. Joseph River.

The dam was completed in 1923 and is approximately 859 feet in length and consists of a 118-foot-long integral intake powerhouse and a 237-foot-long gated concrete spillway, flanked by a 380-foot-long earth embankment on the left and a 120-foot-long earth embankment on the right. An inactive 4-foot-wide fish ladder separates the powerhouse and spillway. All principal concrete structures are supported by wood piling. A 14.5-foot-long switchboard bay on the right side of the intake bay makes the 28-foot wide by 25-foot-high brick superstructure a total of 132.5 feet long.

The 237-foot-long spillway is 20.5 feet high from the foundation to the top of the walkway and is a reinforced concrete structure of the Amberson type. Bays 1 and 2, on the right side of the spillway have a crest elevation of 758.0 feet (NGVD-1929), with 13-foot high Tainter gates. The remaining eight bays have a crest elevation of 763.5 feet with 7.5-foot high Tainter gates. All gates are 22 feet in length. Piers between gate Bays 1 and 2, and Bays 2 and 3 are 2.5 feet wide. All other piers are 1.5 feet wide. The embankment wings have design slopes of 2.5:1 upstream and 2:1 downstream, with a maximum height of about 15 feet and a crest elevation of 775.75 feet.

The Mottville Reservoir covers an area at normal pool, elevation 771.0 feet of about 378 acres. With a drainage area of approximately 1,866 square miles, the Mottville Dam watershed covers slightly less than 40% of the St. Joseph River Basin. Although the Mottville Dam is located upstream of where the St. Joseph River first enters Indiana, there are three tributaries to the St. Joseph River which have some portion of their drainage area in Indiana and enter the St. Joseph River upstream of the Mottville Dam. Approximately 130 square miles or 51% of the Fawn River Sub-Basin and slightly more than eight square miles, or about 4% of the Prairie River Sub-Basin lies in Indiana. Only 1% (approximately three-square miles) of the Coldwater River Sub-Basin lies in Indiana. Thus, slightly more than 7.5% of the Mottville Dam Watershed lies in Indiana. Of the portion of Indiana that forms part of the St. Joseph River Basin; about 85% drains in Michigan and enters the St. Joseph River above Mottville Dam.

A failure of the Mottville Dam would affect the counties of St. Joseph, Michigan; Cass County, Michigan; Elkhart County, Indiana; including the community of Mottville, Michigan and the Town of Bristol, Indiana.

The community of Mottville located ½-mile below Mottville Dam would be in the most immediate danger in the event of a dam failure. The population of Mottville is approximately 400. Most of the community is at an elevation of 780 feet or above. The normal pool elevation is approximately 771.0 feet, while the tail water or downstream normal water level is approximately 760 feet.

Cass County, Michigan has identified 33 homes along S River Road on the west side of the St. Joseph River, as the river borders the southeast corner of Cass County and the southwest corner of St. Joseph County Michigan, that would also be in immediate danger in the event of a dam failure.

Notice of a failure or potential failure of the Mottville Dam would come from the Indiana Michigan Power Columbus Operations Center to the Cass County 911 Dispatch Center. Once receiving a notice of failure or potential failure, Cass County 911 Dispatch would issue alerts and warnings, Emergency Alert System (EAS), IPAWS, and radio dispatch. Responding units will determine on site emergency warning, such as door to door and/or bullhorn.

Mottville Dam Break Computer Analysis Summary

| | | IDF DAM BREAK | | | CLEAR DAY DAM BREAK | | |
|---|---|---|---|---|---|---|---|
| LOCATION | IDF PEAK FLOOD ELEV (FT) | PEAK FLOOD ELEV (FT) | ARRIVAL TIME (HR:MIN) | PEAK TIME (HR:MIN) | PEAK FLOOD ELEV (FT) | ARRIVAL TIME (HR:MIN) | PEAK TIME (HR:MIN) |
| 0.08 | 768.2 | 768.8 | 0:12 | 0:40 | 765.0 | 0:02 | 0:36 |
| 0.53 | 767.3 | 767.9 | 0:15 | 0:57 | 763.8 | 0:07 | 1:15 |
| 1.69 | 765.3 | 765.7 | 0:27 | 1:10 | 762.0 | 0:24 | 1:42 |
| 2.53 | 762.9 | 763.0 | 0:29 | 1:53 | 760.4 | 0:25 | 1:46 |
| 3.33 | 762.2 | 762.3 | 0:31 | 11:53 | 758.0 | 0:26 | 3:40 |
| 6.11 | 760.3 | 760.4 | 0:37 | 13:26 | 752.6 | 0:30 | 5:17 |
| 7.49 | 759.0 | 759.1 | 0:40 | 13:42 | 750.7 | 0:32 | 7:13 |
| 9.69 | 756.7 | 756.8 | 0:49 | 13:54 | 748.7 | 1:08 | 8:00 |
| 12.48 | 748.3 | 748.3 | 1:00 | 14:22 | 742.7 | 2:00 | 8:06 |
| 14.95 | 743.3 | 743.3 | 4:18 | 14:22 | 742.3 | 2:00 | 8:18 |
| 18.40 | 742.4 | 742.4 | 4:18 | 14:22 | 742.2 | 2:00 | 8:35 |

(Inflow Design Flood (IDF))

1. Location are in miles below Mottville dam.

2. Arrival Time - Time elapsed from the beginning of failure to the time of 0.1-foot increase in flood elevation at the respective location.

3. Peak Time - Time elapsed from the beginning of failure to the time of maximum flood elevation at the respective location.

Adamsville Dam

Located at 70077 Adamsville Road, Edwardsburg, MI 49112, the dam is located on the NIBCO Old Mill property and services Christiana Creek. Adamsville Dam is in the very south-central part of Cass County.

67 homes have been identified in the Adamsville Dam Emergency Action Plan for dam failure or potential failure notification along Sunrise Drive and a portion of Adamsville Road.

Lower Mill Pond

Located in the southeast corner of the City of Dowagiac.

A total of 10 homes have been identified in the Lower Mill Pond Emergency Action Plan for dam failure or potential failure notification along Cass Avenue, Henry Street, S. Front Street, and S. Lowe Street, along with 203 Chestnut Street – Department of Public Services Water Treatment Plant and 501 S. Front Street – Department of Public Services, Electric Warehouse

Upper Mill Pond

Located in section 32 of Wayne Township, just to the east of the City of Dowagiac city limits.

Upper Mill Pond is a composite earth fill structure built in 1971. The spillway consists of a rectangular concrete drop inlet with wooden stop-logs on the upstream side. Flow enters the drop inlet, goes through a corrugated metal multi-plate arch pipe, over a concrete apron and into the Dowagiac Creek.

A total of 11 homes have been identified in the Upper Mill Pond Emergency Action Plan for dam failure or potential failure notification along Cass Avenue, Henry Street, S. Front Street, S. Lowe Street, E. High Street, and Spaulding Street, along with 203 Chestnut Street – Department of Public Services Water Treatment Plant.

**Indirect Impacts**

Indirect impacts examine those costs which are associated with, but not directly caused by dam failures. For example, the evacuation of nursing homes which are affected by a power outage caused by the failure of a hydroelectric dam is considered an indirect impact. Since very little data is collected on these indirect impacts it is difficult to make a statistical estimation of severity.

Dammed areas are monitored and maintained by the Cass County Drain Commissioner; and water levels controlled through a series of established practices.

Mitigation efforts would best focus on dam inspections and controlling water levels.

**Primary Goals**

Encourage NFIP participation to those communities who are eligible, additionally, maintenance and upgrades of existing dams to ensure dam safety.

Mitigation Alternatives

- Enhance dam inspection and surveillance efforts.
- Encourage those communities who are eligible to join the National Flood Insurance Program (NFIP).
- Increase awareness regarding proper construction standards and the importance of avoiding construction/activities in flood-prone areas.
    - Bring water quality experts together with local building and zoning officials to ensure an understanding of the threats to property owners posed by dam failures, inappropriate zoning and construction in flood-prone areas; and to support an open dialogue between experts and those responsible for planning/zoning decisions.
- Work with the local communities to identify areas most likely to benefit from flood mitigation activities, and work with environmental professionals and consultants to establish plans for reducing the degree of, or eliminating, flooding due to dam failure.
    - Identify areas most likely to benefit from flood mitigation activities.
    - Establish a team – consisting of local representatives, environmental professionals, and consultants to address mitigation for each community.
    - Establish a system of prioritizing projects for each community.
    - Develop plans to mitigate each community's possible dam failure issues.
    - Pursue funding to support individual mitigation projects.
- Interoperability of radio systems between all key agencies and organizations.
- Do nothing and absorb losses from hazards caused from dam failure.

## #25 Governor and Presidential Declarations

**Cass County Presidential Declarations 1977 – 2021**

| Date of incident | Type of Incident | Type of Declaration |
|---|---|---|
| March 27, 2020 | Biological | Emergency Pandemic |
| March 13, 2020 | Biological | Emergency Pandemic |
| September 07, 2005 | Hurricane evacuation | Emergency |
| June 30, 2004 | Thunderstorm flooding | Major Disaster |
| January 10, 2001 | Blizzard and snowstorm | Emergency |
| January 27, 1999 | Blizzard and snowstorm | Emergency |
| September 8, 1980 | High winds | Major Disaster |
| January 27, 1978 | Blizzard and snowstorm | Emergency |
| January 05, 1977 | Blizzard and snowstorm | Emergency |

## Cass County Governor's Declarations 1977 – 2023

| Date of incident | Type of Incident | Type of Declaration |
|---|---|---|
| January, 2020 | COVID-19 | Major Disaster |
| September, 2005 | Hurricane evacuation | Disaster |
| June, 2004 | Thunderstorm flooding | Disaster |
| July, 1992 | Tornado | Disaster |
| July, 1980 | High winds | Disaster |
| January, 1978 | Blizzard and snowstorm | Disaster |
| January, 1977 | Blizzard and snowstorm | Disaster |

## Presidential Declarations in Michigan: 1953-2021*

| Date of Incident | Type of Incident | Affected Area | Type/Federal ID Number** |
|---|---|---|---|
| 06/25/2021-06/26/2021 | Severe Storms, Flooding, and Tornadoes | 5 counties: Ionia County, Oakland County, Macomb County, Wayne County, Washtenaw County | Major Disaster (DR-4607-MI) |
| 05/16/2020-05/22/2020 | Severe Storms and Flooding | 5 counties: Midland County, Saginaw County, Arenac County, Iosco County | Major Disaster (DR-4547-MI) |
| 05/16/2020-05/22/2020 | Flooding/ Dam breach | 2 counties: Midland County, Gladwin County | Emergency (EM-3525-MI) |
| 01/20/2020–05/11/2023 | COVID-19 Pandemic | Statewide | Major Disaster (DR-4494-MI) |
| 01/20/2020-ongoing | COVID-19 | Statewide | Emergency (EM-3455-MI) |
| 06/16/2018-06/18/2018 | Severe Storms, Flooding, Landslides, and Mudslides | 3 counties: Houghton County, Gogebic County, Menominee County | Major Disaster (DR-4381-MI) |
| 06/22/2017-06/27/2017 | Major Disaster | 4 counties: Bay County, Gladwin County, Isabella County, Midland County | Major Disaster (DR-4326-MI) |
| 4/25/14 – 8/14/16 | Contaminated Water | City of Flint (Genesee County) | Emergency (EM-3375-MI) |
| 8/11/14 – 08/13/2014 | Severe Storms and Flooding | 3 counties: Macomb County, Oakland County, Wayne County. | Major Disaster (DR-4195-MI) |
| 4/16/13-5/14/13 | Flooding | 16 counties: Allegan, Baraga, Barry, Gogebic, Houghton, Ionia, Kent, Keweenaw, Marquette, Midland, Muskegon, Newaygo, Ontonagon, Osceola, Ottawa, and Saginaw Co. | Major Disaster (4121) |
| 7/14/ 08 | Thunderstorms, flooding | 12 counties: Allegan, Barry, Eaton, Ingham, Lake, Manistee, Mason, Missaukee, Osceola, Ottawa, Saginaw, and Wexford Co. | Major Disaster (1777) |
| 9/07/05 | Hurricane evacuation | All 83 counties | Emergency (3225) |
| 5/20/04-6/8/04 | Thunderstorms, flooding | 23 counties: Barry, Berrien, Cass, Eaton, Genesee, Gladwin, Ingham, Ionia, Jackson, Kent, Livingston, Macomb, Mecosta, Muskegon, Oakland, Ottawa, Saginaw, Sanilac, Shiawassee, St. Clair, St. Joseph, Washtenaw, and Wayne Co. | Major Disaster (1527) |
| 8/14-17/03 | Electric power failure | 14 counties: Calhoun, Eaton, Genesee, Hillsdale, Ingham, Kalamazoo, Lapeer, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, & Wayne Co. | Emergency (3189) |

## Presidential Declarations in Michigan: 1953-2021*

| Date of Incident | Type of Incident | Affected Area | Type/Federal ID Number** |
|---|---|---|---|
| 4/10/02-5/9/02 | Flooding | 6 counties: Baraga, Gogebic, Houghton, Iron, Marquette, and Ontonagon Co.; plus, the Keweenaw Bay Indian Community | Major Disaster (1413) |
| 12/11-31/00 | Blizzard, snowstorm | 39 counties: Allegan, Barry, Bay, Berrien, Branch, Calhoun, Cass, Clare, Clinton, Eaton, Genesee, Gladwin, Gratiot, Hillsdale, Huron, Ingham, Ionia, Isabella, Jackson, Kalamazoo, Kent, Lapeer, Livingston, Macomb, Mecosta, Midland, Montcalm, Muskegon, Oakland, Osceola, Ottawa, Saginaw, St. Clair, St. Joseph, Sanilac, Shiawassee, Tuscola, Van Buren, and Washtenaw Co. | Emergency (3160) |
| 9/10-11/00 | Urban flooding | 2 counties: Oakland and Wayne Co. | Major Disaster (1346) |
| 5/2-10/99 | Wildfire | 2 counties: Marquette and Mackinac Co.; (Grant Recipient: Michigan Dept. of Natural Resources) | Fire Suppression |
| 1/2-15/99 | Blizzard, snowstorm | 31 counties: Alcona, Allegan, Arenac, Barry, Berrien, Cass, Crawford, Ionia, Iosco, Jackson, Kalamazoo, Kent, Lenawee, Macomb, Marquette, Mecosta, Monroe, Montmorency, Muskegon, Newaygo, Oakland, Oceana, Ogemaw, Osceola, Oscoda, Otsego, Ottawa, St. Joseph, Van Buren, Washtenaw, and Wayne Co. | Emergency (3137) |
| 7/21/98 | Thunderstorms, severe winds | 2 counties: Macomb and Wayne Co. | Major Disaster (1237) |
| 5/31/98 | Thunderstorms, severe winds | 13 counties: Bay, Clinton, Gratiot, Ionia, Kent, Mason, Montcalm, Muskegon, Newaygo, Oceana, Ottawa, Saginaw, and Shiawassee Co. | Major Disaster (1226) |
| 7/2/97 | Tornadoes, flooding | 5 counties: Genesee, Macomb, Oakland, Saginaw, and Wayne Co. | Major Disaster (1181) |
| 6/21-7/1/96 | Rainstorms, flooding, tornado | 7 counties: Bay, Lapeer, Midland, Saginaw, Sanilac, St. Clair, and Tuscola Co. | Major Disaster (1128) |
| 12/93-5/94 | Underground freeze | 10 counties: Charlevoix, Cheboygan, Chippewa, Delta, Gogebic, Houghton, Mackinac, Marquette, Ontonagon, and Schoolcraft Co. | Major Disaster (1028) |
| 9/10-19/86 | Flooding | 30 counties: Allegan, Arenac, Bay, Clare, Clinton, Genesee, Gladwin, Gratiot, Huron, Ionia, Isabella, Kent, Lake, Lapeer, Macomb, Manistee, Mason, Mecosta, Midland, Montcalm, Muskegon, Newaygo, Oceana, Osceola, Ottawa, Saginaw, Sanilac, Shiawassee, Tuscola, and Van Buren Co. | Major Disaster (774) |
| 9/5-6/85 | Flooding | 6 counties: Alcona, Genesee, Iosco, Lapeer, Saginaw and Shiawassee Co. | Major Disaster (744) |
| 3/12-20/82 | Flooding | 2 counties: Berrien and Monroe Co. | Major Disaster (654) |
| 7/15-20/80 | Severe winds | 10 counties: Allegan, Berrien, Calhoun, Cass, Jackson, Ottawa, St. Joseph, Van Buren, Washtenaw, and Wayne Co. | Major Disaster (631) |
| 5/13/80 | Tornado | 2 counties: Kalamazoo and Van Buren Co. | Major Disaster (621) |
| 1/26-27/78 | Blizzard, snowstorm | Statewide | Emergency (3057) |

## Presidential Declarations in Michigan: 1953-2021*

| Date of Incident | Type of Incident | Affected Area | Type/Federal ID Number** |
|---|---|---|---|
| 3/2/77 | Drought | 44 counties: Alcona, Alger, Alpena, Antrim, Arenac, Baraga, Benzie, Charlevoix, Cheboygan, Chippewa, Clare, Crawford, Delta, Dickinson, Emmet, Gladwin, Gogebic, Grand Traverse, Houghton, Iosco, Iron, Isabella, Kalkaska, Lake, Leelanau, Luce, Mackinac, Manistee, Marquette, Mason, Mecosta, Menominee, Missaukee, Montmorency, Oceana, Ogemaw, Ontonagon, Osceola, Oscoda, Otsego, Presque Isle, Roscommon, Schoolcraft, and Wexford Co. | Emergency (3035) |
| 1/26-31/77 | Blizzard, snowstorm | 15 counties: Allegan, Barry, Berrien, Cass, Chippewa, Hillsdale, Kalamazoo, Kent, Monroe, Muskegon, Newaygo, Oceana, Ottawa, St. Joseph, and Van Buren Co. | Emergency (3030) |
| 3/20/76, 3/2-7/76 | Ice storm, tornadoes | 29 counties: Allegan, Bay, Clare, Clinton, Genesee, Gladwin, Gratiot, Ionia, Isabella, Jackson, Kent, Lapeer, Macomb, Mecosta, Midland, Montcalm, Muskegon, Newaygo, Oakland, Oceana, Osceola, Ottawa, Roscommon, Saginaw, St. Clair, Sanilac, Shiawassee, Tuscola, and Wayne Co. | Major Disaster (495) |
| 8/20/75-9/6/75 | Rainstorms, severe winds, flooding | 16 counties: Allegan, Clare, Genesee, Gratiot, Ingham, Isabella, Mecosta, Midland, Montcalm, Muskegon, Newaygo, Oceana, Osceola, Ottawa, Saginaw, and Shiawassee Co. | Major Disaster (486) |
| 4/18-30/75 | Flooding, rain, tornadoes | 21 counties: Allegan, Barry, Berrien, Calhoun, Clinton, Crawford, Eaton, Genesee, Ingham, Ionia, Kalamazoo, Kent, Lapeer, Livingston, Macomb, Oakland, Ottawa, Saginaw, St. Clair, Shiawassee, and Van Buren Co. | Major Disaster (465) |
| 4/3/74 | Tornado | 1 county: Hillsdale Co. | Major Disaster 429) |
| 4/12/73 | Severe storms, flooding | 14 counties: Arenac, Bay, Berrien, Huron, Iosco, Macomb, Menominee, Monroe, Saginaw, Sanilac, St. Clair, Tuscola, Van Buren, and Wayne Co. | Major Disaster (371) |
| 12/1/72 | Severe storms, flooding | 9 counties: Arenac, Bay, Berrien, Iosco, Macomb, Monroe, St. Clair, Tuscola, and Wayne Co. | Major Disaster (363) |
| 4/5/72 | Snowstorm, freezing rain | 9 counties: Allegan, Barry, Calhoun, Clinton, Eaton, Ingham, Ionia, Jackson, and Kalamazoo Co. | Major Disaster (330) |
| 4/11/65 | Tornadoes, severe storms | 16 counties: Allegan, Barry, Bay, Branch, Clinton, Eaton, Gratiot, Hillsdale, Kalamazoo, Kent, Lenawee, Monroe, Montcalm, Ottawa, Shiawassee, and Washtenaw Co. | Major Disaster (190) |
| 4/3/56 | Tornado | 4 counties: Benzie, Leelanau, Manistee, and Ottawa Co. | Major Disaster (53) |
| 6/8/53 | Tornado | 3 counties: Genesee, Iosco, and Monroe Co. | Major Disaster (6) |
| 5/21/53 | Tornado | 1 county: St. Clair Co. | Major Disaster (4) |
| **Totals for 1953-2023:** | **43 Incidents** | | **32 Major Disasters; 10 Emergencies; 1 Fire Suppression** |

**Notes**

*Does not include separate Secretary of Agriculture or Small Business Administration (SBA) disaster declarations, which are issued under other authorities. Declarations after 1974 were issued under PL 93-288 (Disaster Relief Act), as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act (1988) and the Disaster Mitigation Act (2000).

**Indicates federal declaration number assigned by FEMA or its predecessor agencies

## Frequency Distribution of Presidential Declarations in Michigan: 1953-2021+

| JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 0 | 3 | 9 | 7 | 5 | 4 | 3 | 4 | 0 | 0 | 3 | 43 |
| 11.6 | 0% | 6.9% | 20.9% | 16.2% | 11.6% | 9.3% | 6.9% | 9.3% | 0% | 0% | 6.9% | 100% |

**Notes**

**+**For the incident period, not the declaration date. However, the December 1993-May 1994 underground freeze declaration was assigned to the month of May (the date of the declaration). The May 2004-June 2004 thunderstorms and flooding declaration was assigned to June (the date of the declaration). The 1976-77 drought declaration was assigned to March (the date of the declaration). The April 2013-May 2013 flooding declaration was assigned to June (the date of the declaration). Percentages may not add up to 100% due to rounding.

## Presidential Declarations in Michigan: 1974-2021† Public and Private Damage Costs

| Date of Incident | Incident | Type of Declaration / Federal ID Number | Area Covered | Public Damage: $ millions* | Private Damage: $ millions* | Public Assistance: $ millions** | Individual Assistance: $ millions** |
|---|---|---|---|---|---|---|---|
| 4/3/74 | Tornado | Major Disaster (429) | 1 County | None | 0.1 | None | 0.1 |
| 4/18-30/75 | Flooding, rain, tornadoes | Major Disaster (465) | 21 Counties | 9.3 | 48.4 | 3.3 | 0.7 |
| 8/20/75-9/6/75 | Rainstorms, severe winds, flooding | Major Disaster (486) | 16 Counties | 1.3 | 1.4 | 0.7 | 0.1 |
| 3/20/76 3/2-7/76 | Ice storms, tornadoes | Major Disaster (495) | 29 Counties | 13.4 | 25.0 | 10.3 | 0.2 |
| 1/26-31/77 | Blizzard, snowstorm | Emergency (3030) | 15 Counties | 7.9 | 2.3 | 0.9 | None |
| 3/2/77 | Drought | Emergency (3035) | 44 Counties | N/A | None | N/A | None |
| 1/26-27/78 | Blizzard, snowstorm | Emergency (3057) | Statewide | 18.7 | 4.3 | 10.0 | None |
| 5/13/80 | Tornado | Major Disaster (621) | 2 Counties | 2.2 | 40.3 | 0.6 | 0.1 |
| 7/15-20/80 | Severe winds | Major Disaster (631) | 10 Counties | 17.2 | 134.2 | 7.3 | None |
| 3/12-20/82 | Flooding | Major Disaster (654) | 2 Counties | 2.4 | 8.6 | None | 0.1 |
| 9/5-6/85 | Flooding | Major Disaster (744) | 6 Counties | 4.8 | 41.8 | 2.4 | 3.5 |
| 9/10-19/86 | Flooding | Major Disaster (774) | 30 Counties | 67.3 | 137.9 | 14.8 | 16.0 |
| 12/93-5/94 | Underground freeze | Major Disaster (1028) | 10 Counties | 7.1 | None | 5.7 | None |
| 6/21-7/1/96 | Rainstorms, flooding, tornado | Major Disaster (1128) | 7 Counties | 10.4 | 15.3 | 7.4 | 13.8 |
| 7/2/97 | Tornadoes, flooding | Major Disaster (1181) | 5 Counties | 31.6 | 28.6 | 31.2 | 12.4 |
| 5/31/98 | Thunderstorms, severe winds | Major Disaster (1226) | 13 Counties | 35.9 | 1.1 | 36.2 | None |
| 7/21/98 | Thunderstorms, severe winds | Major Disaster (1237) | 2 Counties | 6.9 | 2.0 | 7.4 | None |
| 1/2-15/99 | Blizzard, snowstorm | Emergency (3137) | 31 Counties | 11.5 | None | 11.5 | None |
| 5/2-10/99 | Wildfire | Fire Suppression | 2 Counties | 1.0 | 13.5 | 1.0 | None |
| 9/10-11/00 | Urban flooding | Major Disaster (1346) | 2 Counties | 0.3 | 7.3‡ | (HMA only) 33.2 | 217.9‡ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12/11-31/00 | Blizzard, snowstorm | Emergency (3160) | 39 Counties | 11.7 | None | 11.7 | None |
| 4/10/02-5/9/02 | Flooding | Major Disaster (1413) | 6 Counties | 10.8 | 1.3 | 10.8 | None |
| 8/14-17/03 | Electric power failure | Emergency (3189) | 14 Counties | 20.3 | None | 5.0 | None |
| 5/20/04-6/8/04 | Thunderstorms, flooding | Major Disaster (1527) | 23 Counties | 7.4 | 13.3‡ | (HMA only) 3.1 | 82.4‡ |
| 9/7/05-2/28/06 | Hurricane evacuation | Emergency (3225) | Statewide | N/A | None | 2.1 | None |
| 6/6/08-6/13/08 | Thunderstorms, flooding | Major Disaster (1777) | 12 Counties | 19.9 | 9.2 | 17.3 | N/A |
| 4/16/13-5/14/13 | Flooding | Major Disaster (4121) | 16 Counties | 18.5 | 3.8 | 27.3 | None |
| 08/11/14-08/13/14 | Severe Storms & Flooding | Major Disaster (4195) | 3 Counties | | | | |
| 01/16/2016 | Contaminated Water | Emergency (3375) | 1 County | | | | |
| 06/22/2017 | Severe Storms and Flooding | Major Disaster (4326) | 4 Counties | 3.61 | 7.2 | None | 5.2 |
| 06/18/2018 | Severe Storms, Flooding, Landslides, and Mudslides | Major Disaster (4381) | 3 Counties | 3.6 | 2.9 | 32.9 | None |
| 01/20/2020 | Covid-19 | Emergency (3455) | Entire State | - | - | - | - |
| 01/20/202-05/11/2023 | Covid-19 Pandemic | Major Disaster (4494) | Entire State | 3.84 | N/A | 842 | 112 |
| 05/16/2020-05/ 22/2020 | Severe Storms & Flooding | Emergency (3525) | 2 Counties | - | - | - | - |
| 05/16/2020-05/22/2020 | Severe Storms & Flooding | Major Disaster (4547) | 5 Counties | 20.1 | 28 | 29.2 | 30.5 |
| 06/25/21-06/26/21 | Severe Storms, Flooding, & Tornadoes | Major Disaster (4607) | 4 Counties | 3.8 | 14.1 | 21.9 | 196.9 |
| **Totals for 1974-2021:** | **36 Incidents** | **25 Major Disaster. 10 Emergency. 1 Fire Suppression** | | **376.36** | **591.8** | **1,187.2*** ** | **691.9** |

**Table Summary:**

**Total Reported Public and Private Damage:** ..... **$964.65 Million**
**Total Federal Disaster Grants Received:** ..... **$2,571.1 Million**
**Percent of Damages Covered by Grants:** ..... **266.5%**

**Notes**

† Under PL 93-288, as amended. None = category of assistance not authorized under the declaration or category of damage not applicable; N/A = figures are not available. *Private damage totals do NOT include agricultural damage. Public and private damage totals are estimates based on initial damage assessment reports submitted to the State Emergency Operations Center **or** more refined totals from the federal/state Preliminary Damage Assessment (PDA). Some private damage costs were reimbursed by private insurance payouts. **Public and Individual Assistance totals do **NOT** include disaster loans; **ONLY** grants are included. ***Column total and individual cells Include FEMA public assistance, FHWA emergency relief assistance – if applicable, and FEMA hazard mitigation assistance – if applicable. ‡The PDA for private damage in these two disasters significantly underestimated the amount of individual assistance required. As a result, the individual assistance figures are considerably higher than the PDA private damage estimates.

## Governor's Declarations in Michigan: 1977-2023

| Date of Incident | Type of Incident | Affected Area | Type of Declaration** |
|---|---|---|---|
| **2010-present** | | | |
| 09/13/2023 | Tornados | Wayne, Monroe, Eaton, Livingston, Ingham, City of south Lyon (Oakland Co.), Kent, Ionia, City of New Baltimore, Chesterfield Twp, Macomb(Macomb Co.) | Emergency |
| 08/30/2023 | Thunderstorm | Wayne, Monroe, Eaton, Livingston, Ingham, city of South Lyon, Kent, Ionia | Emergency |
| 08/28/2023 | Thunderstorm | Wayne, Monroe, Eaton, Livingston, Ingham, City of Lansing, City of South Lyon (Oakland Co.) | Emergency |
| 08/25/2023 | Thunderstorm | Wayne, Monroe | Emergency |
| 04/14/2023 | Flooding | Gogebic, Houghton | Emergency |
| 10/06/2022 | Fire | Menominee | Emergency |
| 08/27/2022 | Energy emergency | State of Michigan | Emergency |
| 08/13/2022 | Water contamination | St. Clair County (23 communities) | Emergency |
| 07/18/2022 | Thunderstorm | Marquette | Emergency |
| 06/24/2022 | Thunderstorm | Mecosta | Emergency |
| 05/20/2022 | Tornado | Otsego | Emergency |
| 09/03/2021 | Hazardous Materials | Wayne County | Emergency |
| 08/24/2021 | Thunderstorm | Branch, St. Joseph, Hillsdale | Emergency |
| 08/24/2021 | Fire | Menominee | Emergency |
| 08/05/2021 | Thunderstorms | Arrmada Township and Village of Arrmada-Macomb County | Emergency |
| 08/02/2021 | Thunderstorms | Oakland, Macomb, Farmington Hills, Southfield city | Emergency |
| 06/26/2021 | Flooding | Wayne, Washtenaw, Huron, Ionia | Emergency |
| 03/01/2021 | Energy Emergency | Entire State | Emergency |
| 07/30/2019 | Thunderstorms | Lake | Emergency |
| 06/04/2019 | Thunderstorms | Tuscola | Emergency |
| 05/03/2019 | Thunderstorms | Wayne | Emergency |
| 02/09/2019 | Sever Winter | Kent | Disaster |
| 01/01/2019 | Extreme Cold | State of Michigan | Emergency |
| 6/18/13<br>5/7/13 | Flooding | Allegan, Baraga, Barry, Benzie, Genesee, Gogebic, Gratiot, Houghton, Ionia, Iron, Kent, Keweenaw, Marquette, Mecosta, Midland, Muskegon, Newaygo, Ontonagon, Osceola, Ottawa and Saginaw Co.; City of Grand Rapids (Kent Co.); City of Ionia (Ionia Co.) | Disaster |
| 5/25/12 | Wildfire | Luce and Schoolcraft Co. | Disaster |
| 5/11/12 | Flooding | Genesee County | Emergency |
| 5/31/11 | Thunderstorms | City of Battle Creek (Calhoun Co.); Calhoun Co. | Emergency |
| 7/27/10 | Oil pipeline spill | Calhoun Co. | Disaster |
| 6/9/10 | Thunderstorms, tornadoes | Monroe Co. | Emergency |
| **2010-present Total:** | **29 Incidents** | | |
| **2000-09** | | | |
| 7/21/09 | Tanker truck explosion, fire | Oakland Co. | Emergency |
| 6/19/08<br>6/19/08 | Thunderstorms<br>Thunderstorms | Manistee Co.<br>Wexford Co. | Emergency+<br>Emergency+ |

| | | | |
|---|---|---|---|
| 6/19/08<br>6/19/08<br>6/19/08 | Thunderstorms<br>Thunderstorms<br>Thunderstorms | Lake Co.<br>Ottawa Co.<br>Osceola Co. | Emergency+<br>Emergency+<br>Emergency+ |
| 6/13/08<br>6/13/08<br>6/13/08<br>6/13/08<br>6/13/08 | Thunderstorms<br>Thunderstorms<br>Thunderstorms<br>Thunderstorms<br>Thunderstorms | City of Saginaw (Saginaw Co.)<br>Eaton Co.<br>Allegan Co.<br>City of Lansing (Ingham Co.)<br>Mason Co. | Emergency+<br>Emergency+<br>Emergency+<br>Emergency+<br>Emergency+ |
| 8/27/07 | Tornado | City of Fenton (Genesee Co.) | Emergency |
| 8/10/07<br>8/9/07 | Wildfire | Luce Co. | Emergency |
| 7/28/06 | Thunderstorms, heavy rain | Oscoda Co. | Emergency |
| 2/27/06 | Severe winds, ice storm | Montcalm Co. | Emergency |
| 9/4/05 | Hurricane evacuation | All 83 counties | Disaster |
| 6/3/04 | Thunderstorms, flooding | Arenac, Barry, Berrien, Cass, Genesee, Gladwin, Ingham, Ionia, Jackson, Kent, Livingston, Macomb, Mecosta, Newaygo, Oakland, Ottawa, Saginaw, St. Clair, St. Joseph, Sanilac, Shiawassee, Van Buren and Wayne Co. | Disaster |
| 4/30/04 | Insect infestation (Emerald Ash Borer) | Genesee, Ingham, Jackson, Lapeer, Livingston, Macomb, Monroe, Oakland, Washtenaw and Wayne Co.; City of Allen Park (Wayne Co.); City of Ann Arbor (Washtenaw Co.); City of Birmingham (Oakland Co.); City of Dearborn (Wayne Co.); City of Dearborn Heights (Wayne Co.); City of Detroit (Wayne Co.); City of Fraser (Macomb Co.); City of Livonia (Wayne Co.); City of River Rouge (Wayne Co.); City of Romulus (Wayne Co.); City of Southfield (Oakland Co.); City of Sterling Heights (Macomb Co.); City of Trenton (Wayne Co.); City of Warren (Macomb Co.); City of Wayne (Wayne Co.); Bloomfield Township (Oakland Co.); Canton Township (Wayne Co.); Charter Township of Plymouth (Wayne Co.); Lathrup Village (Oakland Co.) | Emergency |
| 8/15/03 | Electric power failure | Macomb, Monroe, Oakland, Washtenaw, and Wayne Co. | Emergency |
| 5/15/03 | Flooding | City of Marquette, Marquette Township, and Negaunee Township (Marquette Co.) | Emergency |
| 5/10/02<br>4/30/02<br>4/16/02 | Flooding | Baraga, Houghton, Iron, Marquette, and Ontonagon Co.; City of Ironwood (Gogebic Co.) | Disaster |
| 12/29/01 | Heavy snow | Emmet Co. | Emergency |
| 10/26/01 | Severe winds | Kalamazoo Co. | Disaster |
| 3/9/01 | Flooding | Genesee Co. | Disaster |
| 9/20/00 | Urban flooding | Wayne Co. | Disaster |
| 6/7/00 | Gasoline pipeline rupture | Blackman Twp. (Jackson Co.) | Emergency |
| **2000-09 Total:** | **18 Incidents** | | |
| **1990-99** | | | |
| 8/5/99 | Subsidence (mine shaft cave-in) | Dickinson Co. | Emergency |

## Governor's Declarations in Michigan: 1977-2023 (cont.)

| Date of Incident | Type of Incident | Affected Area | Type of Declaration** |
|---|---|---|---|
| **1990-99 (cont.)** | | | |
| 7/5/99 | Tornado | Oscoda Co. | Disaster |
| 1/15/99 | Blizzard, snowstorm | City of Detroit (Wayne Co.) | Emergency |
| 9/27/98 | Severe winds | Otsego Co. | Emergency |
| 9/1/98 | Thunderstorms, severe winds | City of Niles (Berrien Co.) | Emergency |
| 7/24/98<br>7/23/98 | Thunderstorms, severe winds | Wayne Co.; City of Dearborn (Wayne Co.); City of Warren (Macomb Co.) | Disaster |
| 6/5/98<br>6/4/98<br>6/3/98 | Thunderstorms, severe winds | Bay, Clinton, Gratiot, Ionia, Kent, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Oceana, Ottawa, Saginaw, and Shiawassee Co.; Village of Armada (Macomb Co.) | Disaster |
| 4/1/98 | Flooding | Alpena Co. | Emergency |
| 7/6/97<br>7/3/97 | Tornadoes, flooding | Genesee, Macomb, Oakland and Wayne Co.; City of Detroit (Wayne Co.); Village of Chesaning (Saginaw Co.) | Disaster |
| 6/27/97 | Rainstorms, flooding | Allegan and Ottawa Co. | Disaster |
| 6/26/96<br>6/21/96 | Rainstorms, flooding, tornado | Bay, Lapeer, Saginaw, Sanilac, St. Clair, and Tuscola Co.; City of Midland (Midland Co.) | Disaster |
| 5/22/96 | Flooding | Berrien Co. | Disaster |
| 12/13/95 | Snowstorm | City of Sault St. Marie (Chippewa Co.) | Emergency |
| 7/8/94 | Flooding | Lapeer, Tuscola and Sanilac Co. | Disaster |
| 3/10/94<br>3/4/94<br>2/25/94<br>2/23/94 | Underground freeze | Charlevoix, Cheboygan, Chippewa, Delta, Gogebic, Houghton, Mackinac, Marquette, Ontonagon, and Schoolcraft Co. | Emergency |
| 4/20/93 | Flash flood | Shiawassee Co. | Disaster |
| 7/16/92 | Heavy rain | Gogebic Co. | Disaster |
| 7/14/92 | Tornado | Cass Co. | Disaster |
| 10/6/90 | Tornado | Genesee Co. | Disaster |
| 9/16/90 | Ship explosion, fire | Bay Co. | Emergency |
| 5/9/90 | Wildfire | Crawford Co. | Emergency |
| **1990-99 Total:** | **21 Incidents** | | |
| **1980-89** | | | |
| 6/8/89 | Flooding, severe winds | Branch, Kalamazoo and St. Joseph Co.; Village of Manchester (Washtenaw Co.) | Disaster |
| 6/9/88 | Fire | City of Corunna (Shiawassee Co.) | Disaster |
| 8/18/87 | Airline crash | City of Romulus (Wayne Co.) | Disaster |
| 10/28/86<br>9/15/86<br>9/12/86 | Flooding, heavy rain | Allegan, Arenac, Bay, Clare, Clinton, Genesee, Gladwin, Gratiot, Huron, Ionia, Isabella, Kent, Lake, Lapeer, Macomb, Manistee, Mason, Mecosta, Midland, Montcalm, Muskegon, Newaygo, Oceana, Osceola, Ottawa, Saginaw, Shiawassee, Tuscola, and Van Buren Co. | Disaster |
| 2/21/86 | Great Lakes flooding, wave action | Allegan, Arenac, Bay, Berrien, Grand Traverse, Iosco, Macomb, Marquette, Menominee, Monroe, Muskegon, Ottawa, Saginaw, St. Clair, Tuscola, Van Buren, and Wayne Co. | Disaster |

| | | | |
|---|---|---|---|
| 9/13/85 | Heavy rain, flash flood | Alcona Co. | Disaster |
| 9/10/85 | Heavy rain, flooding | Genesee, Lapeer, and Saginaw Co. | Disaster |
| 4/13/85 | Great Lakes flooding, wave action | Arenac, Bay, Macomb, Monroe, Saginaw, St. Clair, Tuscola, and Wayne Co. | Disaster |
| 1/15/85 | Ice storm | Allegan, Barry, Berrien, Calhoun, Eaton, Genesee, Ingham, Jackson, Kalamazoo, Lapeer, Livingston, Oakland, and Van Buren Co. | Disaster*** |
| 7/15/83 | Wildfire | Schoolcraft Co. | Disaster |
| 3/19/82 | Flooding | Berrien and Monroe Co. | Disaster |
| 7/21/80 | Thunderstorms, severe winds | Allegan, Berrien, Calhoun, Cass, Jackson, St. Joseph, Van Buren, Washtenaw, and Wayne Co.; City of Grand Haven and Village of Spring Lake (Ottawa Co.) | Disaster |
| 5/13/80 | Tornado | Kalamazoo and Van Buren Co. | Disaster |
| **1980-89 Total:** | **13 Incidents** | | |

## Governor's Declarations in Michigan: 1977-2023 (cont.)

| Date of Incident | Type of Incident | Affected Area | Type of Declaration** |
|---|---|---|---|
| **1977-79** | | | |
| 8/9/78 | Sewer main break | Macomb Co. | Disaster |
| 6/30/78 | Thunderstorms, severe winds, hail, rain | Berrien Co. | Disaster |
| 6/28/78 | Thunderstorms | Allegan Co. | Disaster |
| 1/26/78 | Blizzard, snowstorm | Statewide | Disaster |
| 12/10/77 | Snowstorm | City of Hamtramck (Wayne Co.) | Disaster |
| 4/6/77 | Tornado, severe winds | Clinton, Eaton, Kalamazoo, and Livingston Co. | Disaster |
| 1/28/77 | Blizzard | Allegan, Barry, Berrien, Cass, Chippewa, Eaton, Hillsdale, Ionia, Muskegon, Newaygo, Oceana, Ottawa, Sanilac, Shiawassee, and Van Buren Co. | Disaster |
| **1977-79 Total:** | **7 Incidents** | | |
| **Totals for 1977-2013** | **64 Incidents** | | **41 Disaster Declarations; 23 Emergency Declarations** |

**Notes**

**Declarations since 1977 were issued under 1976 PA 390, as amended (Michigan Emergency Management Act).

***A "State of Emergency" was also declared for this incident under 1945 PA 302 (Emergency Powers of Governor Act).

+Some incidents have resulted in multiple declarations for the same incident (each jurisdiction declared separately). These are counted as one declaration only for the purposes of this list.

## Frequency Distribution of Governor's Declarations in Michigan: 1977-2023*

| JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 3 | 2 | 6 | 8 | 11 | 11 | 6 | 8 | 2 | 0 | 3 | 64 |
| 6% | 5% | 3% | 9% | 13% | 17% | 17% | 9% | 13% | 3% | 0% | 5% | 100% |

**Notes**

*For the declaration date, not the incident period. Percentages may not add up to 100% due to rounding.

## Governor's and Presidential Declarations by County: 1953-2023*

| Jurisdiction | # of Governor's Declarations | Dates** | # of Presidential Declarations | Dates** |
|---|---|---|---|---|
| **COUNTIES** | | | | |
| Alcona County | 3 | 9/05; 9/85; 1/78 | 5 | 9/05; 1/99; 9/85; 1/78; 3/77 |
| Alger County | 2 | 9/05; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Allegan County | 11 | 6/13; 6/08; 9/05; 6/97; 9/86; 2/86; 1/85; 7/80; 6/78; 1/78; 1/77 | 14 | 6/13; 7/08; 9/05; 1/01; 1/99; 9/86; 7/80; 1/78; 1/77; 3/76; 9/75; 4/75; 4/72; 4/65 |
| Alpena County | 3 | 9/05; 4/98; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Amada Township | 1 | 8/21 | | |
| Antrim County | 2 | 9/05; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Arenac County | 6 | 9/05; 6/04; 9/86; 2/86; 4/85; 1/78 | 8 | 5/20, 9/05; 1/99; 9/86; 1/78; 3/77; 4/73; 12/72 |
| Baraga County | 4 | 5/13; 9/05; 4/02; 1/78 | 5 | 6/13; 9/05; 5/02; 1/78; 3/77 |
| Barry County | 6 | 5/13; 9/05; 6/04; 1/85; 1/78; 1/77 | 11 | 6/13; 7/08; 9/05; 6/04; 1/01; 1/99; 1/78; 1/77; 4/75; 4/72; 4/65 |
| Bay County | 8 | 9/05; 6/98; 6/96; 9/90; 9/86; 2/86; 4/85; 1/78 | 11 | 6/17, 9/05; 1/01; 6/98; 7/96; 9/86; 1/78; 3/76; 4/73; 12/72; 4/65 |
| Benzie County | 3 | 5/13; 9/05; 1/78 | 4 | 9/05; 1/78; 3/77; 4/56 |
| Berrien County | 10 | 9/05; 6/04; 5/96; 2/86; 1/85; 3/82; 7/80; 6/78; 1/78; 1/77 | 11 | 9/05; 6/04; 1/01; 1/99; 3/82; 7/80; 1/78; 1/77; 4/75; 4/73; 12/72 |
| Branch County | 4 | 9/05; 6/89; 1/78, 8/21 | 4 | 9/05; 1/01; 1/78; 4/65 |
| Calhoun County | 6 | 5/11; 7/10; 9/05; 1/85; 7/80; 1/78 | 7 | 9/05; 8/03; 1/01; 7/80; 1/78; 4/75; 4/72 |
| Cass County | 6 | 9/05; 6/04; 7/92; 7/80; 1/78; 1/77 | 7 | 9/05; 6/04; 1/01; 1/99; 7/80; 1/78; 1/77 |
| Charlevoix County | 3 | 9/05; 3/94; 1/78 | 4 | 9/05; 5/94; 1/78; 3/77 |
| Cheboygan County | 3 | 9/05; 3/94; 1/78 | 4 | 9/05; 5/94; 1/78; 3/77 |
| Chippewa County | 4 | 9/05; 3/94; 1/78; 1/77 | 5 | 9/05; 5/94; 1/78; 3/77; 1/77 |
| Clare County | 3 | 9/05; 9/86; 1/78 | 7 | 9/05; 1/01; 9/86; 1/78; 3/77; 3/76; 9/75 |
| Clinton County | 5 | 9/05; 6/98; 9/86; 1/78; 4/77 | 9 | 9/05; 1/01; 6/98; 9/86; 1/78; 3/76; 4/75; 4/72; 4/65 |
| Crawford County | 3 | 9/05; 5/90; 1/78 | 5 | 9/05; 1/99; 1/78; 3/77; 4/75 |
| Delta County | 3 | 9/05; 3/94; 1/78 | 4 | 9/05; 5/94; 1/78; 3/77 |
| Dickinson County | 3 | 9/05; 8/99; 1/78 | 3 | 9/05; 1/78; 3/77 |

## Governor's and Presidential Declarations by County: 1953-2023* (cont.)

| Jurisdiction | # of Governor's Declarations | Dates** | # of Presidential Declarations | Dates** |
|---|---|---|---|---|
| **COUNTIES (cont.)** | | | | |
| Eaton County | 7 | 6/08; 9/05; 1/85; 1/78; 4/77; 1/77, 8/23 | 9 | 7/08; 9/05; 6/04; 8/03; 1/01; 1/78; 4/75; 4/72; 4/65 |
| Emmet County | 3 | 9/05; 12/01; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Genesee County | 12 | 5/13; 5/12; 9/05; 6/04; 4/04; 3/01; 7/97; 10/90; 9/86; 9/85; 1/85; 1/78 | 12 | 9/05; 6/04; 8/03; 1/01; 7/97; 9/86; 9/85; 1/78; 3/76; 9/75; 4/75; 6/53 |
| Gladwin County | 4 | 9/05; 6/04; 9/86; 1/78 | 9 | 5/20, 6/17, 9/05; 6/04; 1/01; 9/86; 1/78; 3/77; 3/76 |
| Gogebic County | 6 | 5/13; 9/05; 2/94; 7/92; 1/78, 4/23 | 7 | 6/18, 6/13; 9/05; 5/02; 5/94; 1/78; 3/77 |
| Gd. Traverse County | 3 | 9/05; 2/86; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Gratiot County | 5 | 5/13; 9/05; 6/98; 9/86; 1/78 | 8 | 9/05; 1/01; 6/98; 9/86; 1/78; 3/76; 4/75; 4/65 |
| Hillsdale County | 4 | 9/05; 1/78; 1/77, 8/21 | 7 | 9/05; 8/03; 1/01; 1/78; 1/77; 4/74; 4/65 |
| Houghton County | 6 | 5/13; 9/05; 4/02; 2/94; 1/78, 4/23 | 7 | 6/18, 6/13; 9/05; 5/02; 5/94; 1/78; 3/77 |
| Huron County | 4 | 9/05; 9/86; 1/78, 6/21 | 5 | 9/05; 1/01; 9/86; 1/78; 4/73 |
| Ingham County | 6 | 9/05; 6/04; 4/04; 1/85; 1/78, 8/23 | 9 | 7/08; 9/05; 6/04; 8/03; 1/01; 1/78; 9/75; 4/75; 4/72 |
| Ionia County | 9 | 5/13; 9/05; 6/04; 6/98; 9/86; 1/78; 1/77, 6/21, 8/23 | 12 | 6/21, 6/13; 9/05; 6/04; 1/01; 1/99; 6/98; 9/86; 1/78; 3/76; 4/75; 4/72 |
| Iosco County | 3 | 9/05; 2/86; 1/78 | 9 | 5/20,9/05; 1/99; 9/85; 1/78; 3/77; 4/73; 12/72; 6/53 |
| Iron County | 4 | 6/13; 9/05; 5/02; 1/78 | 4 | 9/05; 5/02; 1/78; 3/77 |
| Isabella County | 3 | 9/05; 9/86; 1/78 | 8 | 6/17, 9/05; 1/01; 9/86; 1/78; 3/77; 3/76; 9/75 |
| Jackson County | 6 | 9/05; 6/04; 4/04; 1/85; 7/80; 1/78 | 8 | 9/05; 6/04; 1/01; 1/99; 7/80; 1/78; 3/76; 4/72 |
| Kalamazoo County | 7 | 9/05; 10/01; 6/89; 1/85; 5/80; 1/78; 4/77 | 10 | 9/05; 8/03; 1/01; 1/99; 5/80; 1/78; 1/77; 4/75; 4/72; 4/65 |
| Kalkaska County | 2 | 9/05; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Kent County | 8 | 5/13; 9/05; 6/04; 6/98; 9/86; 1/78, 2/19, 8/23 | 12 | 6/13; 9/05; 6/04; 1/01; 1/99; 6/98; 9/86; 1/78; 1/77; 3/76; 4/75; 4/65 |
| Keweenaw County | 3 | 5/13; 9/05; 1/78 | 3 | 6/13; 9/05; 1/78 |
| Lake County | 5 | 6/08; 9/05; 9/86; 1/78, 7/19 | 5 | 7/08; 9/05; 9/86; 1/78; 3/77 |
| Lapeer County | 8 | 9/05; 4/04; 6/96; 7/94; 9/86; 9/85; 1/85; 1/78 | 9 | 9/05; 8/03; 1/01; 7/96; 9/86; 9/85; 1/78; 3/76; 4/75 |
| Leelanau County | 2 | 9/05; 1/78 | 4 | 9/05; 1/78; 3/77; 4/56 |
| Lenawee County | 2 | 9/05; 1/78 | 4 | 9/05; 1/99; 1/78; 4/65 |
| Livingston County | 7 | 9/05; 6/04; 4/04; 1/85; 1/78; 4/77, 8/23 | 6 | 9/05; 6/04; 8/03; 1/01; 1/78; 4/75 |

| Jurisdiction | # of Governor's Declarations | Dates** | # of Presidential Declarations | Dates** |
|---|---|---|---|---|
| Luce County | 4 | 5/12; 8/07; 9/05; 1/78 | 3 | 9/05; 1/78; 3/77 |
| Mackinac County | 3 | 9/05; 2/94; 1/78 | 4 | 9/05; 5/94; 1/78; 3/77 |
| Macomb County | 11 | 9/05; 6/04; 4/04; 8/03; 7/97; 9/86; 2/86; 4/85; 8/78; 1/78, 9/23 | 14 | 6/21, 9/05; 6/04; 8/03; 1/01; 1/99; 7/98; 7/97; 9/86; 1/78; 3/76; 4/75; 4/73; 12/72 |
| Manistee County | 4 | 6/08; 9/05; 9/86; 1/78 | 6 | 7/08; 9/05; 9/86; 1/78; 3/77; 4/56 |
| Marquette County | 7 | 5/13; 9/05; 4/02; 2/94; 2/86; 1/78, 7/22 | 7 | 6/13; 9/05; 5/02; 1/99; 5/94; 1/78; 3/77 |
| Mason County | 5 | 6/08; 9/05; 6/98; 9/86; 1/78 | 6 | 7/08; 9/05; 6/98; 9/86; 1/78; 3/77 |
| Mecosta County | 7 | 5/13; 9/05; 6/04; 6/98; 9/86; 1/78, 6/22 | 9 | 9/05; 6/04; 1/01; 1/99; 9/86; 1/78; 3/77; 3/76; 9/75 |
| Menominee County | 5 | 9/05; 2/86; 1/78, 8/21, 10/22 | 5 | 6/18, 9/05; 1/78; 3/77; 4/73 |
| Midland County | 4 | 5/13; 9/05; 2/86; 1/78 | 10 | 5/20, 6/17, 6/13; 9/05; 1/01; 7/96; 9/86; 1/78; 3/76; 9/75 |
| Missaukee County | 2 | 9/05; 1/78 | 4 | 7/08; 9/05; 1/78; 3/77 |
| Monroe County | 9 | 6/10; 9/05; 4/04; 8/03; 2/86; 4/85; 3/82; 1/78, 8/23 | 10 | 9/05; 8/03; 1/99; 3/82; 1/78; 1/77; 4/73; 12/72; 4/65; 6/53 |
| Montcalm County | 5 | 2/06; 9/05; 6/98; 9/86; 1/78 | 8 | 9/05; 1/01; 6/98; 9/86; 1/78; 3/76; 9/75; 4/65 |
| Montmorency County | 2 | 9/05; 1/78 | 4 | 9/05; 1/99; 1/78; 3/77 |
| Muskegon County | 7 | 5/13; 9/05; 6/98; 9/86; 2/86; 1/78; 1/77 | 11 | 6/13; 9/05; 6/04; 1/01; 1/99; 6/98; 9/86; 1/78; 1/77; 3/76; 9/75 |
| Newaygo County | 7 | 5/13; 9/05; 6/04; 6/98; 9/86; 1/78; 1/77 | 9 | 6/13; 9/05; 1/99; 6/98; 9/86; 1/78; 1/77; 3/76; 9/75 |
| Oakland County | 10 | 7/09; 9/05; 6/04; 4/04; 8/03; 7/97; 1/85; 1/78, 8/21, 8/23 | 11 | 6/21, 9/05; 6/04; 8/03; 1/01; 10/00; 1/99; 7/97; 1/78; 3/76; 4/75 |
| Oceana County | 5 | 9/05; 6/98; 9/86; 1/78; 1/77 | 9 | 9/05; 1/99; 6/98; 9/86; 1/78; 3/77; 1/77; 3/76; 9/75 |
| Ogemaw County | 2 | 9/05; 1/78 | 4 | 9/05; 1/99; 1/78; 3/77 |
| Ontonagon County | 5 | 5/13; 9/05; 4/02; 2/94; 1/78 | 6 | 6/13; 9/05; 5/02; 5/94; 1/78; 3/77 |
| Osceola County | 5 | 5/13; 6/08; 9/05; 9/86; 1/78 | 10 | 6/13; 7/08; 9/05; 1/01; 1/99; 9/86; 1/78; 3/77; 3/76; 9/75 |
| Oscoda County | 4 | 7/06; 9/05; 7/99; 1/78 | 4 | 9/05; 1/99; 1/78; 3/77 |
| Otsego County | 4 | 9/05; 9/98; 1/78, 5/22 | 4 | 9/05; 1/99; 1/78; 3/77 |
| Ottawa County | 10 | 5/13; 6/08; 9/05; 6/04; 6/98; 6/97; 9/86; 2/86; 1/78; 1/77 | 16 | 6/13; 7/08; 9/05; 6/04; 1/01; 1/99; 6/98; 9/86; 7/80; 1/78; 1/77; 3/76; 9/75; 4/75; 4/65; 4/56 |
| Presque Isle County | 2 | 9/05; 1/78 | 3 | 9/05; 1/78; 3/77 |

## Governor's and Presidential Declarations by County: 1953-2023* (cont.)

| Jurisdiction | # of Governor's Declarations | Dates** | # of Presidential Declarations | Dates** |
|---|---|---|---|---|
| **COUNTIES (cont.)** | | | | |
| Roscommon County | 2 | 9/05; 1/78 | 4 | 9/05; 1/78; 3/77; 3/76 |
| Saginaw County | 10 | 5/13; 9/05; 6/04; 6/98; 6/96; 9/86; 2/86; 9/85; 4/85; 1/78 | 16 | 5/20, 6/13; 7/08; 9/05; 6/04; 1/01; 6/98; 7/97; 7/96; 9/86; 9/85; 1/78; 3/76; 9/75; 4/75; 4/73 |
| St. Clair County | 7 | 9/05; 6/04; 6/96; 2/86; 4/85; 1/78, 8/22 | 11 | 9/05; 6/04; 8/03; 1/01; 7/96; 1/78; 3/76; 4/75; 4/73; 12/72; 5/53 |
| St. Joseph County | 6 | 9/05; 6/04; 6/89; 7/80; 1/78, 8/21 | 7 | 9/05; 6/04; 1/01; 1/99; 7/80; 1/78; 1/77 |
| Sanilac County | 6 | 9/05; 6/04; 6/96; 7/94; 1/78; 1/77 | 8 | 9/05; 6/04; 1/01; 7/96; 9/86; 1/78; 3/76; 4/73 |
| Schoolcraft County | 5 | 5/12; 9/05; 2/94; 7/83; 1/78 | 4 | 9/05; 5/94; 1/78; 3/77 |
| Shiawassee County | 7 | 9/05; 6/04; 6/98; 4/93; 9/86; 1/78; 1/77 | 11 | 9/05; 6/04; 1/01; 6/98; 9/86; 9/85; 1/78; 3/76; 9/75; 4/75; 4/65 |
| Tuscola County | 7 | 9/05; 7/94; 9/86; 2/86; 4/85; 1/78, 6/19 | 8 | 9/05; 1/01; 7/96; 9/86; 1/78; 3/76; 4/73; 12/72 |
| Van Buren County | 9 | 9/05; 6/04; 9/86; 2/86; 1/85; 7/80; 5/80; 1/78; 1/77 | 10 | 9/05; 1/01; 1/99; 9/86; 7/80; 5/80; 1/78; 1/77; 4/75; 4/73 |
| Washtenaw County | 6 | 9/05; 4/04; 8/03; 7/80; 1/78, 6/21 | 8 | 6/21, 9/05; 6/04; 8/03; 1/01; 1/99; 7/80; 1/78; 4/65 |
| Wayne County | 15 | 9/05; 6/04; 4/04; 8/03; 9/00; 7/98; 7/97; 2/86; 4/85; 7/80; 1/78, 5/19, 6/21, 9/21, 8/23 | 13 | 6/21, 9/05; 6/04; 8/03; 10/00; 1/99; 7/98; 7/97; 7/80; 1/78; 3/76; 4/73; 12/72 |
| Wexford County | 3 | 6/08; 9/05; 1/78 | 4 | 7/08; 9/05; 1/78; 3/77 |

## Governor's Declarations by Municipality: 1977-2023

| Jurisdiction | # of Governor's Declarations | Dates* |
|---|---|---|
| **MUNICIPALITIES** | | |
| City of Grand Rapids (Kent County) | 1 | 5/13 |
| City of Ionia (Ionia County) | 1 | 5/13 |
| City of Battle Creek (Calhoun County) | 1 | 5/11 |
| City of Saginaw (Saginaw County) | 1 | 6/08 |
| City of Lansing (Ingham County) | 2 | 6/08, 8/23 |
| City of Fenton (Genesee County) | 1 | 8/07 |
| City of Allen Park (Wayne County) | 1 | 4/04 |
| City of Ann Arbor (Washtenaw County) | 1 | 4/04 |
| City of Birmingham (Oakland County) | 1 | 4/04 |
| City of Dearborn Heights (Wayne County) | 1 | 4/04 |
| City of Farmington Hills (Oakland County) | 1 | 8/21 |
| City of Fraser (Macomb County) | 1 | 4/04 |
| City of Livonia (Wayne County) | 1 | 4/04 |
| City of River Rouge (Wayne County) | 1 | 4/04 |
| City of Southfield (Oakland County) | 2 | 4/04, 8/21 |
| City of South Lyon (Oakland County) | 1 | 8/23 |
| City of Sterling Heights (Macomb County) | 1 | 4/04 |
| City of Trenton (Wayne County) | 1 | 4/04 |
| City of Wayne (Wayne County) | 1 | 4/04 |
| Armada Township (Macomb County) | 1 | 8/21 |
| Bloomfield Township (Oakland County) | 1 | 4/04 |
| Canton Township (Wayne County) | 1 | 4/04 |
| Charter Township of Plymouth (Wayne County) | 1 | 4/04 |
| Chesterfield Township (Macomb County) | 1 | 9/23 |
| Lathrup Village (Oakland County) | 1 | 4/04 |
| Negaunee Township (Marquette County) | 1 | 5/03 |
| Marquette Township (Marquette County) | 1 | 5/03 |
| City of Ironwood (Gogebic County) | 1 | 4/02 |
| Blackman Township (Jackson County) | 1 | 6/00 |
| City of New Baltimore (Macomb County) | 1 | 9/23 |
| City of Niles (Berrien County) | 1 | 9/98 |
| City of Warren (Macomb County) | 2 | 7/98; also 4/04 |
| City of Dearborn (Wayne County) | 2 | 7/98; also 4/04 |
| Village of Armada (Macomb County) | 2 | 6/98, 8/21 |
| City of Detroit (Wayne County) | 3 | 7/97; also 4/04, 1/99 |
| Village of Chesaning (Saginaw County) | 1 | 7/97 |
| City of Midland (Midland County) | 1 | 6/96 |
| City of Sault Ste. Marie (Chippewa County) | 1 | 12/95 |
| City of Marquette (Marquette County) | 2 | 2/94; also 5/03 |
| City of Negaunee (Marquette County) | 1 | 2/94 |
| City of Ishpeming (Marquette County) | 1 | 2/94 |
| Powell Township (Marquette County) | 1 | 2/94 |
| Village of Manchester (Washtenaw County) | 1 | 6/89 |
| City of Corunna (Shiawassee County) | 1 | 6/88 |
| City of Romulus (Wayne County) | 2 | 8/87; also 4/04 |
| City of Grand Haven (Ottawa County) | 1 | 7/80 |
| Village of Spring Lake (Ottawa County) | 1 | 7/80 |
| City of Hamtramck (Wayne County) | 1 | 12/77 |

*Many municipal declarations issued concurrent with a county declaration.

## State Disaster Contingency Fund Grants: 1994-2013
## (1976 Public Act 390, as amended, MCL 30.419)

| Year* | Jurisdiction(s) | Type of Incident | Number of Grants | Total Paid ($) |
|---|---|---|---|---|
| 1994 | Lapeer, Sanilac, and Tuscola Co. | Flooding | 28 | 363,982 |
| 1997 | Allegan and Ottawa Co. | Flooding | 12 | 125,213 |
| 1997 | Oakland Co. | Tornadoes | 5 | 87,419 |
| 1998 | Alpena Co. | Flooding | 8 | 160,308 |
| 1998 | Mecosta Co.; Village of Armada | Thunderstorms | 4 | 60,809 |
| 1998 | City of Niles | Thunderstorms | 1 | 30,000 |
| 1998 | Otsego Co. | Severe winds | 4 | 78,946 |
| 1999 | Oscoda Co. | Tornado | 2 | 36,910 |
| 2001 | Genesee Co. | Flooding | 1 | 14,637 |
| 2002 | Kalamazoo Co. | Severe winds | 9 | 218,461 |
| 2006 | Oscoda Co. (and state agency response) | Thunderstorms | 1 | 50,000 |
| 2010 | Monroe Co. | Tornadoes | 6 | 134,627 |
| 2011 | Calhoun Co. (and state agency response) | Thunderstorms | 5 | 241,387 |
| 2012 | Genesee Co. | Flooding | 3 | 90,000 |
| 2018 | Houghton County | Flooding | 1 | 600,000 |
| 2018 | Kalamazoo County | Water Contamination | 1 | 804,790 |
| 2019 | Upper Peninsula | Flooding | 1 | 2,124,971 |
| 2019 | Tuscola Co. | Flooding | 1 | 554,187 |
| 2020 | Midland Co. | Flooding | 1 | 180,163 |
| **TOTALS:** | | | **89** | **1,692,699** |

*Indicates year in which payments were made.

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## 4.4 Climate Change Considerations

Earth's average temperature increased by 1.8 degrees Fahrenheit from 1901 to 2016. Along with the rest of the world, the Midwest's climate is changing. The region has gotten warmer and wetter since 1900. In Michigan, the average yearly temperature has increased by two to three degrees Fahrenheit across most of the state. Current climate forecasts show extreme weather patterns will increase through the 21st century. Extreme weather like extreme heat and precipitation are influencing planning and response activities across sectors in Michigan. Cass County will coordinate with local partners in increasing mitigation planning, awareness, and implementation on climate change. Cass County will seek information, training, seminars, and conferences that will further our knowledge and preparation for climate change while including this issue in current committees and groups within the county.

Long-term planning and mitigation are being undertaken by agencies that deal specifically with long-term environmental and ecological issues, and the MSP/EMHSD has continued to coordinate with these agencies about the climate change issue, becoming an active member of the Michigan Climate Coalition as part of its coordination and outreach on the subject. Cass county will closely observe the MSP/EMHSD's actions and follow suit however possible.

# 5. Hazard Priorities and Mitigation

***Per requirement 44 CFR Part 201.6 (c) (3) (i): [The hazard mitigation strategy shall include: a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.***

### *5.1 Local Hazard Mitigation Goals, Objectives, and Strategies*

Cass County community representatives identified goals, objectives, and strategies to mitigate priority hazards.

This section of the plan looks at mitigation goals, objectives and strategies that help to mitigate the major hazards identified in the Cass County Hazard Mitigation Plan. Mitigation strategies reviewed the challenge of implementation, political obstacles, community support, cost benefit analysis and the ability to acquire the appropriate funding sources. Each of the mitigation strategies was given a priority level, a lead agency, a timeline, and a funding source.

**Goal #1: Life Safety**

- To minimize disaster related injuries and loss of life through public education, hazard analysis, and early warning.

**Goal #2: Reduce Property Loss / Damage**

- To include mitigation measures in land use planning, development, and management, and to promote and build disaster-resistant structures.

**Goal #3: To Build Community Disaster Resilience**

- To mitigate, prevent, prepare, respond, and recover from hazards that we face quicker, stronger, and better prepared.

There are five basic hazard mitigation strategies that can reduce or prevent the harmful interaction between hazards, people, and development that results in a disaster:

**Strategy #1: Modification of the Hazard**

The first strategy involves modification of the hazard itself, which involves removing or eliminating the hazard, reducing its size or amount, or controlling the rate of release of the hazard. In the right circumstances, this strategy can be successful, but it is often difficult to do. Examples of this strategy include cloud seeding, slope planting to prevent erosion, and stream widening or modification to improve water flow. These measures can be cost-effective, but their application is normally limited and therefore not always as effective as other strategies in reducing or eliminating damage on a wide scale.

The four remaining mitigation strategies involve modification of the people and structures portion of the disaster equation.

**Strategy #2: Segregating the Hazard**

Segregating the hazard, attempts to *"keep the hazard away from people."* This is often accomplished in flood-prone areas through the construction of structural protection measures such as dams, levees, floodwalls, debris basins and other public works projects designed to redirect the impacts of a flood away from people and development. This strategy can be highly effective, but it can also be expensive and in some cases can cause (or worsen) environmental problems. Also, history has shown that structural protection measures constructed to protect one community can increase problems in other communities (e.g., levees that channel and increase the velocity of floodwaters, causing severe flooding downstream). Economics and limited effectiveness may make this a marginal strategy in many situations and locations.

**Strategy #3: Preventing or Limiting Development**

Prevent or limit development in locations where people and development would be put at risk. This approach is based on *"keeping the people away from the hazard"* and includes a variety of land use planning and development regulation tools, such as comprehensive planning, zoning, floodplain management ordinances, capital improvements planning, disclosure laws, and acquisition and relocation of hazard prone properties.

This approach attempts to reduce or eliminate community hazard vulnerability through wise and prudent land use and development decision-making. When properly applied, this strategy can be highly effective in promoting safe, sustainable development.

**Strategy #4: Altering Design or Construction**

The fourth strategy involves alteration of the design or construction of development to make it less vulnerable to disaster damage. This strategy, commonly known as *"interacting with the hazard,"* allows the hazards to interact with human systems that have been designed and planned to withstand potentially destructive impacts. Examples of this strategy include elevating structures, employing wet and dry flood-proofing to improve flood damage resistance, managing vegetation buffer zones in urban/wildland intermix areas, using wind bracing to improve wind damage resistance, and insulating water and sewer lines to prevent ground freeze damage. This strategy allows development in hazard prone areas but requires that the development meet stringent disaster resistant performance criteria. In many situations, this approach balances the dual needs of enhancing a community's economic base while at the same time reducing community hazard vulnerability. History has shown that the two goals are not mutually exclusive. When careful and prudent development decisions are made that consider the reduction of hazard vulnerabilities, the result is safe and sustainable community development.

**Strategy #5: Early Warning and Public Education**

This strategy seeks to ensure that the public is aware of the hazards it faces, and that proper warning and communication systems and practices are in place to save lives and protect property. This strategy should be applied in all communities, as it is typically the last line of defense against serious disaster related injury or loss of life.

**Priority Levels**

All the proposed mitigation strategies were given a priority level of high or medium, depending on the amount of risk that each hazard poses for the community.

An explanation of each priority is as follows:

**High** -This priority is given to mitigation actions that help reduce the effects of the most threatening hazards as defined either by a catastrophic outcome or a relatively high level of occurrence.

**Medium** - Mitigation actions which reduce the effects of hazards that have a less threatening outcome or a lower level of occurrence.

**Low** - Appointed to mitigation strategies that present lesser damages or risks.

**Lead Agencies**

Each mitigation strategy is assigned a lead agency responsible for project oversight and implementation. Although these agencies will act as the main contact and project organizer, they are not solely responsible for the project. Many of the listed mitigation strategies will have various involved key players to ensure full completion and implementation of the project. The lead agency is shown as bolded under the implementing agency.

**Available Resources**

Cass County Critical Infrastructure and Key Resource Listing, Cass County Master Plan, Cass County Emergency Action Guidelines, Cass County Hazard Mitigation Plan revised in 2018 (expired), Townships, City, and Villages Master Plans and Zoning Ordinances.

**Funding Sources**

Potential funding sources have been identified for each proposed mitigation strategy. Federal grant programs provide either most or in some cases all the funding needed for a mitigation project, along with matched funds from non-Federal and local sources. The funding sources listed for each strategy are not already obligated to a specific project; it is merely a suggested funding source and will be more clearly identified later, upon a formal application for project approval and funding.

The following Federal programs are potential funding sources for mitigation projects:

Hazard Mitigation Grant Program (HMGP) – Funding that is made available to state or local governments upon a federally declared disaster in which a portion of the funds are set aside for mitigation projects. In this category the standard match is 75% federal and 25% non-Federal or local. For a community to be considered for HMGP funding, a Federally approved all hazards mitigation plan must be in place for all requesting counties or communities.

Pre-Disaster Mitigation Program (PDMP) – National funding that is awarded on a competitive basis for mitigation projects prior to a disastrous event, usually on an annual basis.

Flood Mitigation Assistance Program (FMAP) – Funding is made available for the development of a detailed flood analysis within an all-hazards mitigation plan. Project funds are also available for elevation, acquisition, or relocation of NFIP-insured structures.

Repetitive Flood Claims (RFC) – Funding is made available annually to reduce economic loss for insured properties that have been prioritized by FEMA as having more than one flood claim to the National Flood Insurance Program (NFIP). FEMA has created a national list of eligible properties.

Severe Repetitive Loss (SRL) – Funding made available for the prevention of long- term risks associated with the most severe repetitive loss properties that are insured by the NFIP. FEMA has a select criterion for properties that fall with this category and has placed them on a national list.

Homeland Security Grant Program (HSGP) – Funding made available for the enhancement of State, local, and tribal governments to prepare, prevent, respond to, and recover from terrorist attacks and other disasters.

Emergency Management Performance Grants (EMPG) - The EMPG program provides resources to assist State and local governments to sustain and enhance all-hazards emergency management capabilities. States can use EMPG funds to further strengthen their ability to support emergency management activities while simultaneously addressing issues of national concern as identified in the National Priorities of the National Preparedness Guidelines. EMPG has a 50 percent Federal and 50 percent State cost-share cash or in-kind match requirement.

Hazardous Materials Emergency Preparedness Grants (HMEP)

## Cass County Mitigation Priority

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding |
|---|---|---|---|---|---|---|
| All Hazards | High | Enhance early warning systems. Continue to improve alert, broadcast, & warning systems. | **Cass County 9-1-1 Dispatch**<br>Cass County Emergency Management | Cass County Storm Ready Plan, EAS Plan, & EAG | Implement IPAWS by 12/31/2018. Annual updates by Sept. 30th | Local, HSGP, HMPG |
| ***Implemented / Completed –*** Progress: October 31st, 2019, finalized the installation of IPAWS in the Cass County 911 EMnet system.<br>November 22, 2019, submitted draft IPAWS Operational Plan for review to regional and state ECC members for review, corrections, and comments.<br>January 1st, 2020, implemented the Cass County IPAWS / EAS / WEA "Local Operational Plan." | | | | | | |
| All Hazards | High | Increase public awareness on all community hazards and protective measures to be taken, such as shelter-in-place & evacuation. | **Cass County Emergency Management**<br>Cass County Sheriff's Office<br>Community Partners | Cass County Local Planning Committee | Monthly campaigns on social media, flyers, Email, and in person Annual updates by Sept. 30th | Local |
| ***Implemented / Completed –*** *Progress: Annual and Monthly preparedness campaigns on social media, flyers, Email, and in person have been implemented 03/01/2019:<br>February Severe Winter Weather, Flooding, and Pipeline Safety Training<br>March National Weather Service Weather Spotter Training, Michigan Statewide Tornado Drill<br>April Severe Weather Awareness<br>June See Something / Say Something<br>August Severe Weather, Thunderstorms<br>September National Preparedness Month<br>November & December Winter Awareness and Preparedness<br>These campaigns along with the National Drug Take Back, Cybersecurity, do 1 Thing, current hazard awareness, and many others have been implemented. | | | | | | |
| All Hazards | Medium | Continued development and support of the Cass County Community Emergency Response Team (CERT). | **Cass County Emergency Management**<br>Cass County Sheriff's Office<br>Community Partners | Cass County EAG, and Local Planning Committee | Annually September CERT Classes are offered | HSGP, Local |
| Progress: Over a period of ten years Cass County has trained over 350 Community Emergency Response Team (CERT) members. In September of 2017 Cass County Emergency Management implemented an annual September CERT training program.<br>06/06/2019 two new instructors completed the E0428 Community Emergency Response Team (CERT) Train-the-Trainer Course.<br>March of 2020 Student CERT Class that had been started was discontinued due to COVID-19. All CERT Trainings for 2020 was canceled.<br>Planning to re-start the CERT program has begun in 2023. Scheduling the Train-the Trainer course and identifying potential instructors is underway. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding |
|---|---|---|---|---|---|---|
| All Hazards | High | Conduct Hazard, Threat, and Risk Assessments | **Cass County Emergency Management** | Cass County EAG, Community & School Plans | December 31st, 2024 | Local |
| Progress: 12/15/2020 48 Hazard Assessments completed for Critical Infrastructure / Key Resources, Cass County Townships, Villages, & City of Dowagiac. | | | | | | |
| All Hazards | High | Establish a system to support the needs of vulnerable populations during major emergencies or disaster. | **Cass County Emergency Management**<br>Department of Human Services<br>Area Region on Aging<br>Public Health | Cass County EAG | December 31st, 2024 | Local |
| Progress: Initial planning stages of Functional Needs database coordination between responsible parties. Draft County Functional Needs Registry plan completed for review. | | | | | | |
| All Hazards | High | Develop site emergency plans for area schools, hospitals, factories, businesses, critical infrastructure, and other appropriate facilities. | **Cass County Emergency Management**<br>**Schools Districts** of Cassopolis, Dowagiac, Edwardsburg, & Marcellus<br>**Long Term Care: Cass County Medical Care Facility and The Timbers of Cass County** | Each entity has their own specific emergency plan | Annually by September 30th | Local |
| ***Implemented / Completed –*** Progress: All school districts within Cass County maintain their own school emergency plan, Cass County's Office of Emergency Management works with all school districts annually to maintain and exercise their plans. Borgess-Lee Memorial Hospital, Cass County Medical Care Facility, and the Timbers of Cass County maintain and exercise emergency plans. Cass County's Office of Emergency Management maintains the County Emergency Action Guidelines, and has four facilities off-site response plans on file, along with plans on file for the Dams of Adamsville, Lower Mill Pond, Mottville Dam, and Upper Mill Pond. | | | | | | |
| Thunderstorm Hazards | High | Promote and support Storm Ready Program through planning, education, & awareness. | **Cass County Emergency Management**<br>Southwestern Michigan College | Cass County Storm Ready Plan | Bi-Annual renewal required by NWS | Local, HMPG |
| ***Implemented / Completed –*** *Progress: Cass County Michigan along with Southwestern Michigan College in Cass County have maintain designation as "Storm Ready" communities by the National Weather Service of Northern Indiana since September 9th, 2016, and was renewed in 2023. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding Sources |
|---|---|---|---|---|---|---|
| Thunderstorm Hazards | Medium | Encourage the inclusion of protective rooms/areas in residential building codes. | **City of Dowagiac**, **Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. | Local Building Code | December 31st, 2024 | Local |
| Progress: This "Action Item" was downgraded from high priority in 2010 to medium priority in 2018 due to lack of funding at the local level. No progress has been made, but a local Boy Scout Camp is pursuing grant funding to install storm shelters on the campgrounds. Having an approved Hazard Mitigation Plan is a requirement for the grant funding. | | | | | | |
| Thunderstorm Hazards | High | Promote emergency generators for public service departments, special needs facilities and community shelters. | **City of Dowagiac**, **Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. **Cass County Emergency Management** | Local Building Code | December 31st, 2024 | Local |
| ***Implemented / Completed –*** Progress: Facilities with generator backup are Cass County 911 Dispatch, Cass County Sheriff's Office, Borgess-Lee Memorial Hospital, Cass County Medical Care Facility, Timber of Cass County, Cass County Council on Aging, Edwardsburg Ambulance, Marcellus EMS, Fire Departments of Central Cass, Dowagiac, Edwardsburg, Howard Twp, Indian Lakes, Marcellus, Niles Charter Twp, SEPSA, Sister Lakes, Wayne Twp, and Public Works Departments of City of Dowagiac, Cass County Road Commission, and the Village of Cassopolis. | | | | | | |
| Thunderstorm Hazards | High | Promote weather spotter training and increase NOAA weather radio coverage. | **Cass County Emergency Management** National Weather Service Northern Indiana | Cass County Storm Ready Plan, LEPC | Annually by April 1st | Local |
| ***Implemented / Completed –*** Progress: Weather spotter training and increase NOAA weather radio coverage is promoted each by the National Weather Service and the Cass County Office of Emergency Management. Cass County's Weather Spotter Training is conducted bi-annual by the National Weather Service. In 2017 29 Cass County residents attend Spotter Training held at Southwestern Michigan College (SMC). On 02/18/2020 20 persons attend the weather spotter training held at SMC, and virtual spotter training was held on 10/14/2020. Skywarn Training was held at SMC on 03/06/2023. Over the past 10 years Cass County has supplied 191 NOAA weather radios to schools, government offices, facilities that serve special populations, public safety facilities, campgrounds, mobile home parks, the general population, and others through funding received from Homeland Security Grant Programs. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding Sources |
|---|---|---|---|---|---|---|
| Thunderstorm Hazards | Medium | Continue scheduled tree trimming. | Midwest Energy & Communications<br>Indiana Michigan Power<br>Cass County Road Commission | Utilities & Road Commission Policies | Annually by December 31st | Local |
| ***Implemented / Completed –*** Progress: Tree trimming is maintained annually as needed by the responsible parties; crews are also available for emergency service calls. | | | | | | |
| Winter Weather Hazards | High | Increase public awareness on winter weather hazards and the potential impact, especially for vulnerable populations. | Cass County Emergency Management<br>Dept. of Health & Human Services<br>Cass County Council on Aging | Cass County Storm Ready Plan, LEPC | Annually by November 15th | Local |
| Progress: Annual and Monthly preparedness campaigns on social media, flyers, Email, and in person are conducted. Current actions are identifying methods/systems to identify, engage, and register vulnerable populations. | | | | | | |
| Structural Fires | High | Ensure adherence to fire codes. | **City of Dowagiac**, **Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia<br>**Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne.<br>Fire Departments of Cassopolis, Dowagiac, Edwardsburg, Howard, Indian | Michigan Fire Prevention Code | Annually by December 31st | Local |
| Progress: Unknown, progress tracking for this action item will be a priority for 2024. | | | | | | |
| Structural Fires | High | Replace or obtain needed fire department equipment. | **Fire Departments** of Cassopolis, Dowagiac, Edwardsburg, Howard, Indian Lake, Marcellus, Newberg, Niles Charter Twp, Penn, Pokagon, SEPSA, Sister Lakes, and Wayne | Annual Fire Departments Budgets | Annually by September 30th | Local, HSGP |
| ***Implemented / Completed –*** Progress: Fire Departments continue to maintain, and purchase equipment as needed, updated Fire Department NIMS type resource listings are update in coordination with the Cass County Office of Emergency Management and listed in the Michigan Critical Incident Management System (MI CIMS), updates are due by September 30th of each year. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding Sources |
|---|---|---|---|---|---|---|
| Extreme Temperatures (Hot & Cold) | High | Secure emergency generators for public service departments, special needs facilities and community shelters. | **City of Dowagiac**, **Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. **Cass County Emergency Management** | Local Building Codes | December 31st, 2024 | Local |
| ***Implemented / Completed*** Progress: Facilities with generator backup are Cass County 911 Dispatch, Cass County Sheriff's Office, Borgess-Lee Memorial Hospital, Cass County Medical Care Facility, Timber of Cass County, Cass County Council on Aging, Edwardsburg Ambulance, Marcellus EMS, Fire Departments of Central Cass, Dowagiac, Edwardsburg, Howard Twp, Indian Lakes, Marcellus, Niles Charter Twp, SEPSA, Sister Lakes, Wayne Twp, and Public Works Departments of City of Dowagiac, Cass County Road Commission, and the Village of Cassopolis. | | | | | | |
| Hazardous Material Incidents (Transportation) | Medium | Increase responder awareness regarding materials being transported by road and rail through Cass County and provide training. | Cass County Emergency Management | Cass County Training & Exercise Plan | Annually by September 30th | Private Sector, Local, HSGP |
| ***Implemented / Completed –*** Progress: Hazardous Materials training conducted from 2012 to 2020 include – Inserv TLC Rail Tank Car Awareness, annual Pipeline Safety Training, TRIPR Rail Incident Response, Ethanol Emergency Response Seminar, and Hazardous Material Awareness. The Michigan State Police Emergency Management Homeland Security Training Center is promoted and conducts annual training on hazardous materials planning, response, and cleanup. | | | | | | |
| Hazardous Material Incidents (Transportation) | Medium | Improve maintenance and signage/signals at railroad crossings. | Canadian National Railway | Cass County Railway Hazmat Incident Plan | December 31st, 2024 | Private Sector, Local, Federal |
| Progress: Information pending report from Canadian National Railway. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding Sources |
|---|---|---|---|---|---|---|
| Pipeline Accidents (Oil/Gas) (new for 2018 HMP) | Medium | Increase awareness of pipeline hazards in Cass County and promote pipeline training. | **BP/Amoco, ANR/TransCanada, Enbridge, Wolverine, Westside/Enbridge**<br>**SEMCO Energy**<br>**Cass County Emergency Management** | Cass County Pipeline Incident Guidance | Annually by April 1st | Private Sector, Local, HSGP |
| ***Implemented / Completed –*** Progress: Annually Pipeline Safety Training is promoted by the Pipeline Companies and Cass County Office of Emergency Management. Cass County has many first responders, public officials, and private entities that attend the annual Pipeline Safety Training and meet with pipeline company officials annually. Pipeline Companies are invited annually to present to the Cass County Local Emergency Planning Committee and provide preparedness material. | | | | | | |
| Infrastructure Failure | High | Develop policies, procedures, and funding sources to ensure existing and new infrastructure is maintained and improved to meeting current and future demands. | **City of Dowagiac**, **Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. | City, Villages, and Townships Master Plan | December 31st, 2024 | Local, Private |
| Progress: Unknown, progress tracking for this action item will be a priority for 2024. | | | | | | |
| Infrastructure Failure | Medium | Encourage exercising at the local level to test local capabilities to handle infrastructure emergencies (i.e. long-term power outages, system failures, etc.). | **Cass County Emergency Management** | Cass County Training & Exercise Plan | Annually by September 30th | Local, Private |
| Progress: In 2018 Cass County Office of Emergency Management participated in two Allegan County Palisades Exercises based on the failure of Palisades Nuclear Plant. In 2017 Cass County Emergency Management participated in the Indiana Michigan Power Constantine and Mottville Dam Failure multi-state exercise. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding |
|---|---|---|---|---|---|---|
| Hazardous Material (FS – Fixed Site) (new for 2018 HMP) | High | Increase awareness of fixed hazardous material sites in Cass County and promote hazardous material training & exercising. | **Cass County Emergency Management**<br>**Fire Departments** of Cassopolis, Dowagiac, Edwardsburg, Howard, Indian Lake, Marcellus, Newberg, Niles Charter Twp, Penn, Pokagon, SEPSA, Sister Lakes, and Wayne | Cass County Training & Exercise Plan<br>Cass County LEPC | Annually by September 30th | Local |
| ***Implemented / Completed –*** Progress: Cass County's Local Emergency Planning Committee meets monthly and agenda items consist of fixed hazardous material sites in Cass County, along with hazardous materials training and exercising. The Michigan State Police Emergency Management Homeland Security Training Center is promoted and conducts annual training on hazardous materials planning, response, and cleanup. | | | | | | |
| Hazardous Material (FS – Fixed Site) (new for 2018 HMP) | High | Develop Off-Site Response Plans for all sites with Extremely Hazardous Substances (EHS). | **Cass County Emergency Management**<br>**Fire Departments** of Cassopolis, Dowagiac, Edwardsburg, Howard, Indian Lake, Marcellus, Newberg, Niles Charter Twp, Penn, Pokagon, SEPSA, Sister Lakes, and Wayne | Integration into each specific Off-Site Plan | December 31st, 2024 | Local |
| Progress: Cass County's Office of Emergency Management has Off-Site Response Plans for Frontier Dowagiac Facility, ICM Products, Midwest Timber, & Sustainable Recycling | | | | | | |
| Flood Hazard | High | Encourage communities to join the National Flood Insurance Program (NFIP). | **Cass County Emergency Management** | Cass County Emergency Action Guidelines | December 31st, 2024 | Local |
| ***Implemented / Completed –*** Progress: Cass County communities in the National Flood Insurance Program are – Calvin Twp, Jefferson Twp, LaGrange Twp, Mason Twp, Ontwa Twp, Penn Twp, Pokagon Twp, Porter Twp, Silver Creek Twp, Volinia Twp, Wayne Twp, Village of Cassopolis, City of Dowagiac, Village of Edwardsburg, and Village of Vandalia. Cass County communities not participating are Howard Twp, Marcellus Twp, Milton Twp, Newberg Twp, and Village of Marcellus | | | | | | |
| Flood Hazard | High | Identify all structures in the Floodplain. | **Cass County Emergency Management**<br>**City of Dowagiac, Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia<br>**Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. | City, Villages, and Townships Master Plans<br>Cass County Emergency Action Guidelines | December 31st, 2024 | Local, FMAP, HMGP, PDMP |
| Progress: Enhanced floodplain maps have improved our capability to identify structures in floodplain areas as detailed within the updated 2018 Cass County Hazard Mitigation Plan. From January 1st, 2019, to December 31st, 2024, site reviews will be conducted compiling one primary Floodplain database with address of structures identified. Currently identified structures are in fragmented data files. | | | | | | |

| Hazard | Priority | Action Items | Primary Responsibility | Integration or Part Of | Timeline | Potential Funding Sources |
|---|---|---|---|---|---|---|
| Flood Hazard | High | Encourage acquisition projects where needed. | **Cass County Emergency Management**<br>**City of Dowagiac, Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. | City, Villages, and Townships Master Plan | December 31st, 2024 | Local, FMAP, HMGP, PDMP |
| Progress: As of December 31st, 2017, no acquisition projects have been identified. | | | | | | |
| Flood Hazard<br>(new for 2018 HMP update) | High | Identify and make water-control improvements, such as to include, but not limited to, culverts, bridges, waterways, floodwalls, drainage systems, and Dams. | **Cass County Road Commission**<br>**Cass County Drain Commission**<br>**Cass County Emergency Management**<br>**City of Dowagiac, Villages** of Cassopolis, Edwardsburg, Marcellus, & Vandalia. **Townships** of Calvin, Howard, Jefferson, LaGrange, Marcellus, Mason, Milton, Newberg, Ontwa, Penn, Pokagon, Porter, Silver Creek, Volinia, & Wayne. | City, Villages, and Townships Master Plan | December 31st, 2023 | Local, HMGP |
| Progress: New project identified for 2018 HMP.<br>04/02/2019: March of 2019 Calvin Township identified a project of replacing and up sizing the culvert on Mt. Zion Street to mitigation the potential of future damage like what was caused during the flash flood incident on June 9th, 2018, when an estimated 5 inches of rain fell when in a few hours resulting in severe flash flooding across the south-central portion of Cass County. The culvert on Mt. Zion Street failed, causing part of Bethel Cemetery to wash out exposed cemetery vaults. It was determined the project would not meet the requirements of Hazard Mitigation Grant Program funding as the project does not include any NFIP-insured properties. | | | | | | |

## 2018 HMP Projects Realigned in the 2024 HMP:

**War/Nuclear Attack/WMD Hazard – And – Nuclear Attach Hazard:** Covered under 2024 HMP in planning for "Terrorism and Other Criminal Activity".

**Nuclear Attack Hazard:** Covered under 2024 HMP in planning for "Terrorism and Other Criminal Activity".

**Terrorism and Other Criminal Activity Hazard –** Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for terrorism and other criminal activity. Covered under "All Hazards" Conduct Hazard, Threat, and Risk Assessments.

**Winter Weather Hazard** Scheduled tree trimming: Covered under "Thunderstorms" Continue Tree Trimming

**Hazmat – Transportation Hazard Increase public warning systems and networks:** Covered under 2024 HMP "All Hazards."

**War/Nuclear Attack/WMD Hazard –And- Nuclear Attack Hazard** Establish a system to support the needs of vulnerable populations. Covered under "All Hazards" Establish a system to support the needs of vulnerable populations.

**Terrorism and Other Criminal Activity Hazard:** Develop site emergency plans for area schools, hospitals, factories, businesses, and other appropriate facilities. Covered under "All Hazards" Develop site emergency plans for area schools, hospitals, factories, businesses, critical infrastructure, and other appropriate facilities.

**Infrastructure Failure Hazard:** Collaborate with all County jurisdictions to develop emergency plans for critical infrastructure including area schools, hospitals, factories, and other appropriate community sites. Covered under "All Hazards" Develop site emergency plans for area schools, hospitals, factories, businesses, critical infrastructure, and other appropriate facilities.

**Extreme Temperatures Hazard:** Increase public awareness regarding protective measures available during extreme weather – specifically heat and cold. Covered under "All Hazards" Increase public awareness on all community hazards and protective measures to be taken.

**Extreme Temperatures Hazard:** Establish and support Community Emergency Response Team (CERT) programs. Covered under "All Hazards" Continued development and support of the Cass County Community Emergency Response Team (CERT).

## Hazards not included in the 2024 HMP that were completed under the 2018 HMP are:

**Winter Weather Hazard - Increased NOAA weather radio coverage:** Project completed, from 2008 to 2023 Cass County Office of Emergency Management issued 237 NOAA weather radios within the community to schools, critical facilities, special population facilities, and general population through funding received from Homeland Security Grant Programs.

**All Hazards – Interoperability of radio systems:** Project completed, Cass County upgraded all Law Enforcement to the state MPSCS 800 MHz radio system and enhanced the Cass County Sheriff's Office radio tower for the 800 MHz radio coverage. Fire Services primarily utilize VHF frequencies but do have limited 800 MHz capability.

**Structural Fire Hazard:** Establish a program for public education on fire safety. Project completed, Cass County Fire Department have established regular public education for fire safety using social media, public safety fairs, community events, training events, smoke trailer, and much more. Improvements have continued after 2018.

**Extreme Temperatures Hazard:** Establish Community Shelter sites, within each local jurisdiction. Project completed, sites were identified and coordinated across Cass County to complete this action item. Sites identified were most Township and Village Halls, Libraries throughout the County, Cass County Council on Aging, and some fire departments. Updates and adjustments continued after 2018 with a current update planned for 2023-2024.

**Terrorism and Other Criminal Activity Hazard:** Monitoring of organizations and activities that may threaten the community. Project completed, Law Enforcement working within the community have established tip lines, social media campaigns such as see something say something, community outreach, and many other activities to address this action item and engage the public's help. Improvements and updates continued after 2018 to the present time.

## Projects not included in the 2024 HMP that were in the 2018 HMP are:

***Project Removed*** **Thunderstorm Hazard – Designated community tornado shelter** in all Mobile Home Parks, Camping and RV Parks, and areas of high commerce population: The project was removed due to lack community urgency and financial support, but all were encouraged to identify severe weather sheltering areas and to have emergency plans in place. This subject is still in discussion, however, funding, or other options have not been identified.

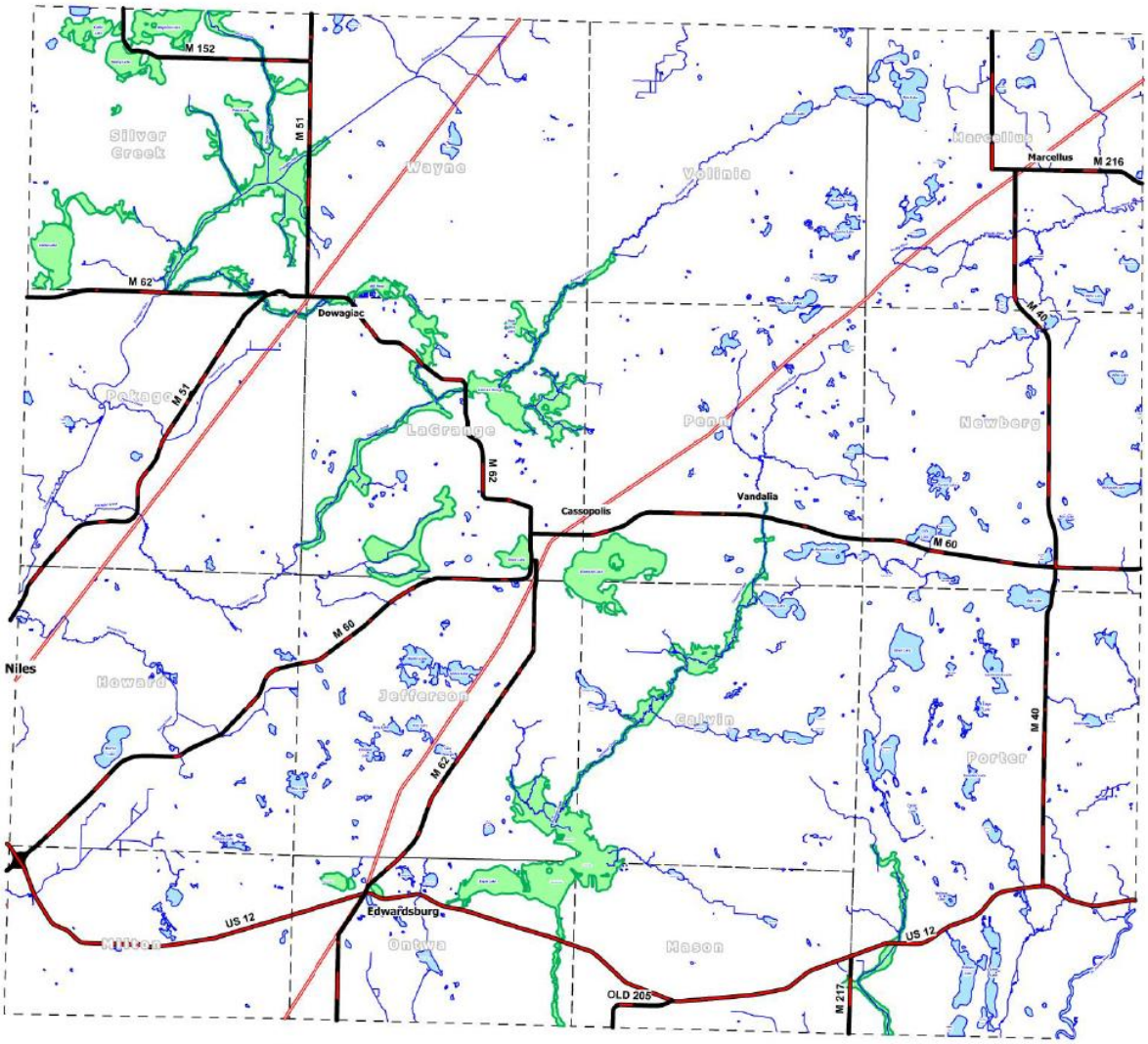
***Project Removed*** **Hazmat – Transportation Hazard** Evacuation plans and community awareness of them. Cass County has general evacuation plans in its Cass County Emergency Action Guidelines. Transportation Hazards are subject to numerous variables, specific evacuation plans per incident would need to be determined by the Incident Commander.

| Mitigation Strategies<br>H = High Priority<br>M = Medium Priority | Calvin Township | Howard Township | Jefferson Township | LaGrange Township | Marcellus Township | Mason Township | Milton Township | Newberg Township | Ontwa Township | Penn Township | Pokagon Township | Porter Township | Silver Creek Township | Volinia Township | Wayne Township | City of Dowagiac | Village of Cassopolis | Village of Edwardsburg | Village of Marcellus | Village of Vandalia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **All Hazards** | | | | | | | | | | | | | | | | | | | | |
| Increase public awareness on all community hazards and protective measures to be taken, such as shelter-in-place & evacuation. | H | H | H | H | L | L | H | H | H | L | H | H | M | H | H | H | L | H | H | H |
| Continued development & support of the Cass County Community Emergency Response Team (CERT). | M | M | M | M | M | L | M | M | M | L | M | M | M | M | M | M | L | M | M | H |
| **Thunderstorm Hazard** | | | | | | | | | | | | | | | | | | | | |
| Enhance early warning systems. | H | M | H | H | L | L | H | H | H | L | H | H | M | H | H | H | L | H | H | L |
| Promote and support Storm Ready program. | H | M | H | H | L | L | H | H | H | L | H | H | L | H | H | M | L | H | H | H |
| Encourage the inclusion of protective rooms/areas in residential building codes. | M | | - | - | L | L | | | M | L | | | L | M | M | - | L | M | M | H |
| Promote emergency generators for public service departments, special needs facilities and community shelters. | H | H | H | H | L | L | H | H | H | L | | H | L | H | H | H | M | H | H | H |
| Promote weather spotter training and Increase NOAA weather radio coverage. | H | M | H | H | L | L | H | H | H | L | H | H | L | H | H | M | L | H | H | H |
| Scheduled tree trimming. | M | | H | - | M | M | | M | M | M | M | M | NA | M | M | | L | M | M | H |
| **Winter Weather Hazard** | | | | | | | | | | | | | | | | | | | | |
| Increase public awareness on winter weather hazards & the potential impact, especially for vulnerable populations. | H | | - | H | L | L | H | H | H | L | H | H | M | H | H | M | L | H | H | L |
| **Structural Fire Hazard** | | | | | | | | | | | | | | | | | | | | |
| Ensure adherence to existing fire codes. | H | H | H | H | M | L | H | H | H | L | H | H | NA | H | H | H | M | H | H | L |
| Replace or obtain needed fire department equipment. | H | H | H | H | M | M | H | H | H | M | H | N/A | NA | N/A | H | H | NA | H | H | L |
| **Extreme Temperatures Hazard** | | | | | | | | | | | | | | | | | | | | |
| Emergency generators and power supply for public service departments, special needs facilities and community shelters. | H | H | H | H | M | M | | H | H | L | H | H | L | H | H | H | M | H | H | NA |

| **Mitigation Strategies** (continued) | Calvin Township | Howard Township | Jefferson Township | LaGrange Township | Marcellus Township | Mason Township | Milton Township | Newberg Township | Ontwa Township | Penn Township | Pokagon Township | Porter Township | Silver Creek Township | Volinia Township | Wayne Township | City of Dowagiac | Village of Cassopolis | Village of Edwardsburg | Village of Marcellus | Village of Vandalia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hazmat – Transportation Hazard** | | | | | | | | | | | | | | | | | | | | |
| Increase public warning systems and networks. | | M | H | H | L | L | H | | H | L | | H | L | H | H | H | L | H | H | NA |
| Increase responder awareness regarding materials being transported by road and rail through Cass County and provide training. | M | M | H | M | L | L | M | M | M | L | M | M | L | M | M | H | L | H | M | NA |
| Improve maintenance and increased signage/signals at railroad crossings. | | M | M | M | M | L | N/A | | M | L | M | N/A | L | M | M | M | L | M | M | NA |
| **Pipeline Accidents (Oil/Gas)** | | | | | | | | | | | | | | | | | | | | |
| Increase awareness of pipeline hazards in Cass County and promote pipeline training. | M | H | M | M | L | L | H | M | M | L | M | M | L | M | M | - | NA | - | - | L |
| **Infrastructure Failure Hazard** | | | | | | | | | | | | | | | | | | | | |
| Develop policies, procedures, and funding sources to ensure existing and new infrastructure is maintained and improved to meeting current and future demands. | H | H | H | H | M | L | H | | H | L | H | H | M | H | H | M | M | H | H | L |
| Encourage exercising at the local level to test local capabilities to handle infrastructure emergencies (i.e. long-term power outages, system failures, etc.). | M | M | M | M | L | L | M | | M | M | M | M | L | M | M | M | L | M | M | NA |
| **Terrorism/Other Criminal Activity** | | | | | | | | | | | | | | | | | | | | |
| Develop site emergency plans for schools, hospitals, factories, businesses and other appropriate facilities. | | H | H | H | L | L | H | | H | L | H | H | L | H | H | H | L | H | H | NA |
| **Hazmat – Fixed Site** | | | | | | | | | | | | | | | | | | | | |
| Increase awareness of fixed hazardous material sites and promote hazardous material training & exercising. | H | M | H | M | L | L | H | | H | M | | H | L | H | H | H | L | H | H | NA |
| Develop Off-Site Response Plans for all sites with Extremely Hazardous Substances (EHS) | H | M | H | H | L | L | H | H | H | L | H | H | L | H | H | H | L | H | H | NA |
| **Flood Hazard** | | | | | | | | | | | | | | | | | | | | |
| Encourage communities to join and participate in the National Flood Insurance Program (NFIP). | H | | M | M | L | L | | H | H | M | H | H | L | H | H | | L | M | H | L |
| Identify all structures in the Floodplain. | H | | M | H | L | L | | | H | L | H | H | L | H | H | | L | M | H | L |
| Encourage acquisition projects where needed. | H | | M | - | L | L | | | H | M | | H | L | H | H | | L | M | H | L |

# Appendix A – Floodplain Map

(FEMA Flood Maps can be found at https://msc.fema.gov)




**FLOODPLAIN LEGEND**

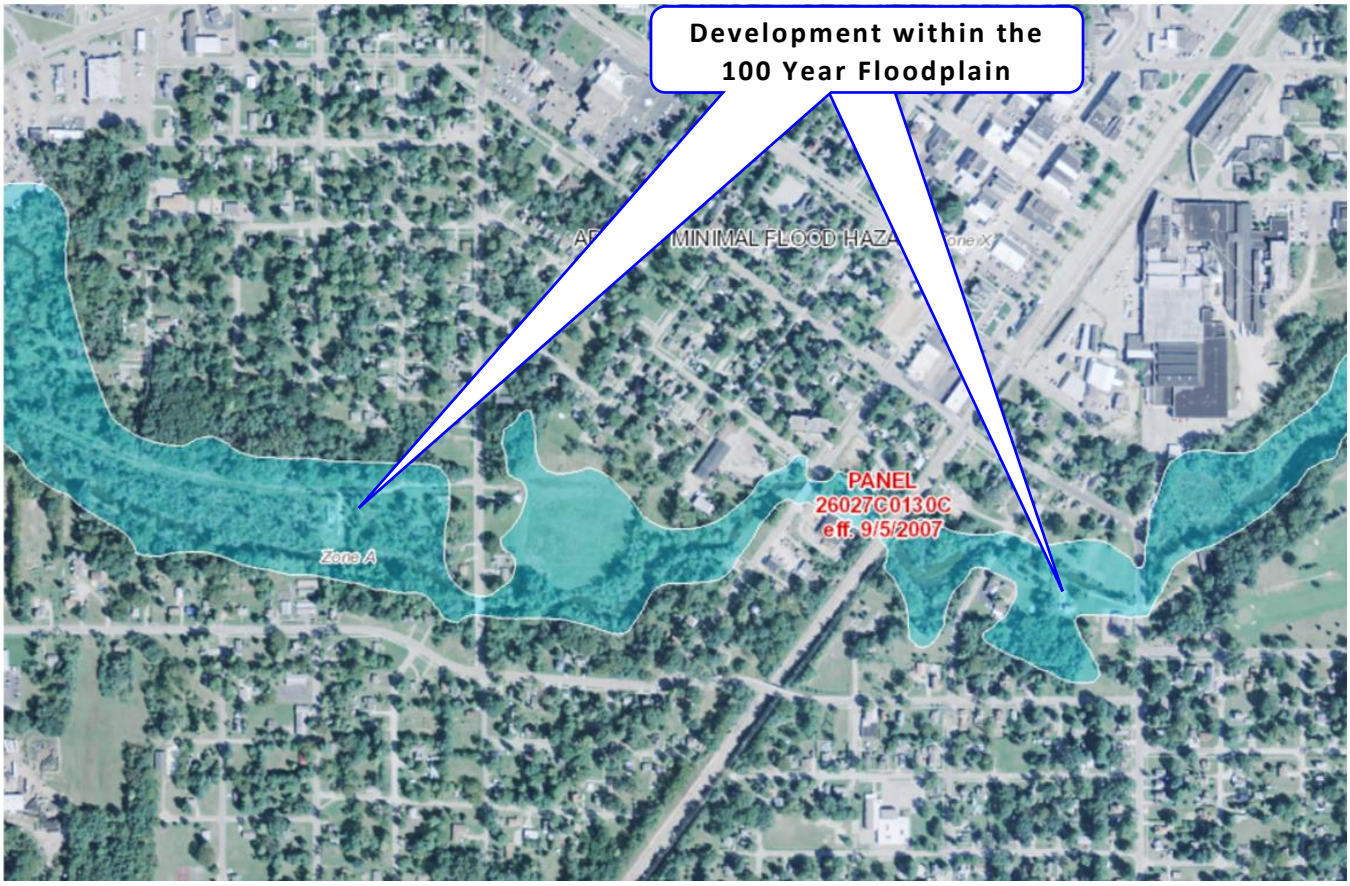
Rivers and Streams not within FEMA-designated 100 Year Floodplain

Lakes and Ponds not within FEMA-designated 100 Year Floodplain

FEMA-designated 100 Year Floodplain including lakes, ponds and streams contained within

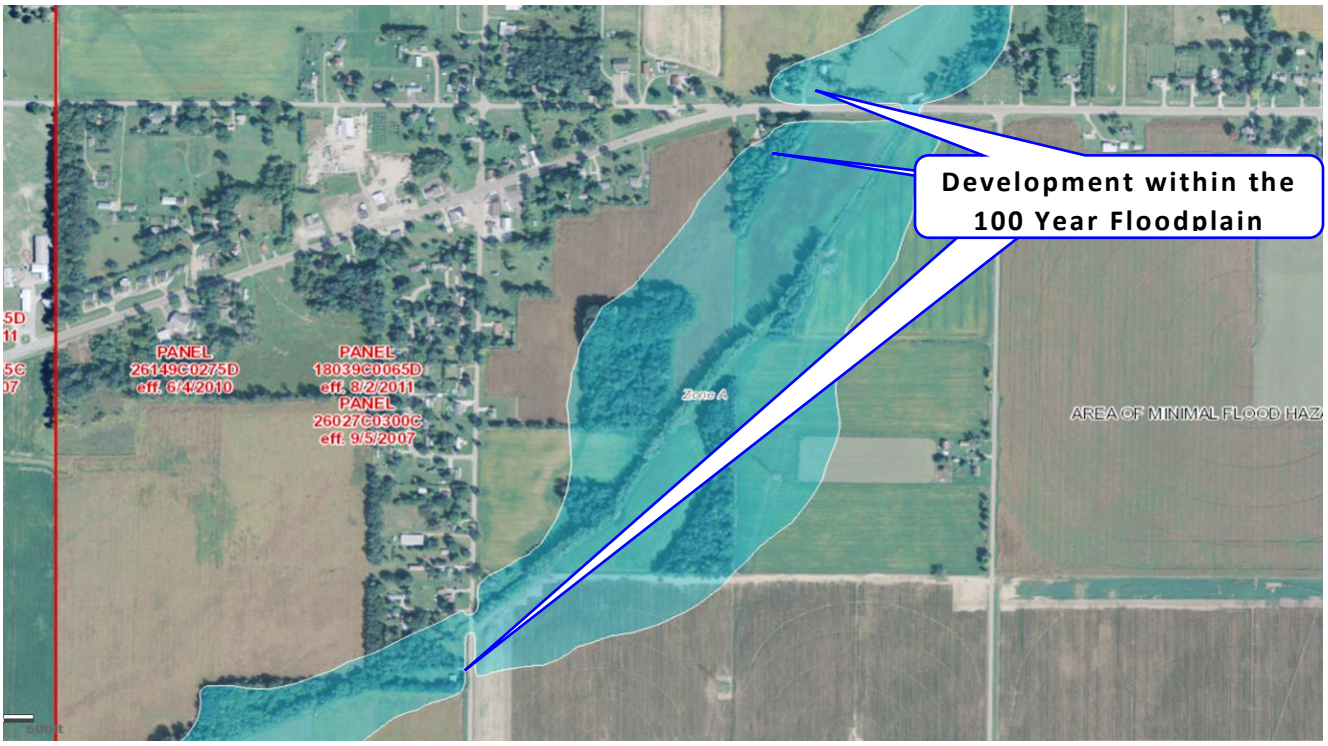
July 1, 2014
Data Source: FEMA

City of Dowagiac, Walnut St, and Cass Ave.

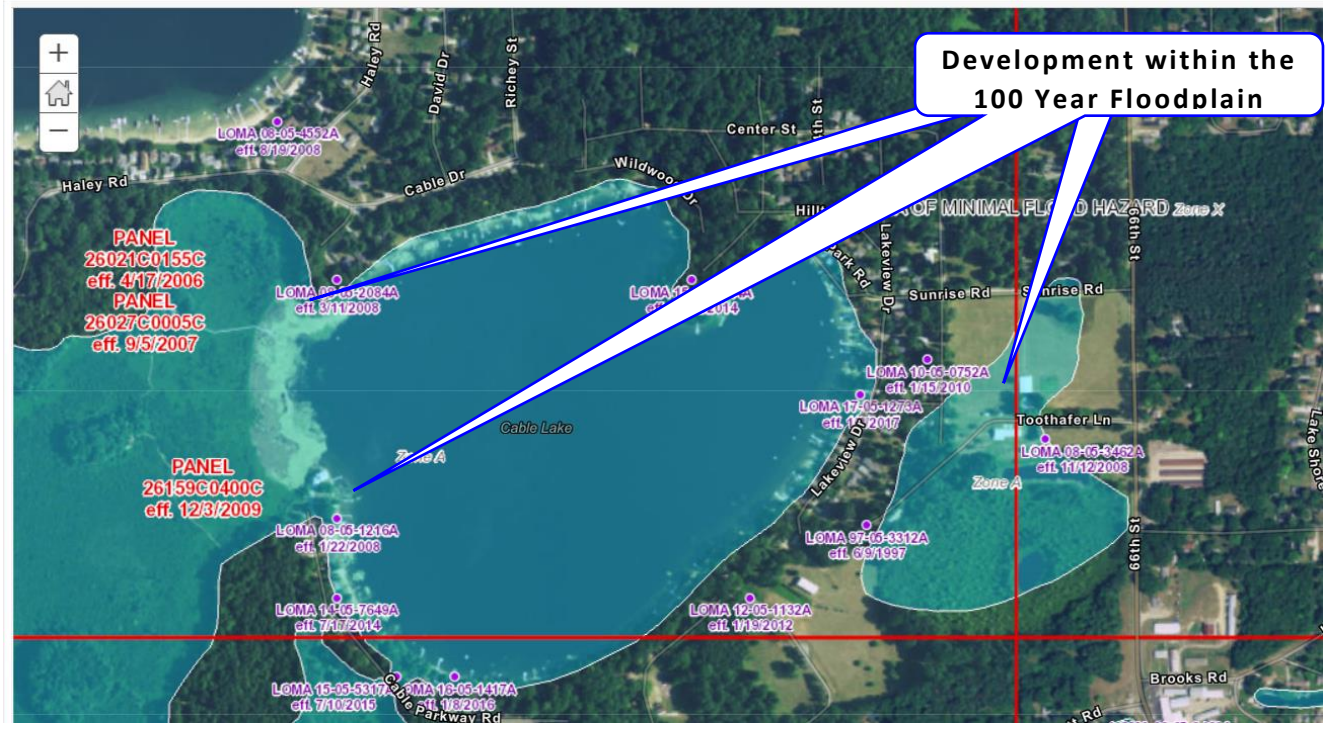



Jefferson Township east half of section 36

Porter Township section 7 and section 18



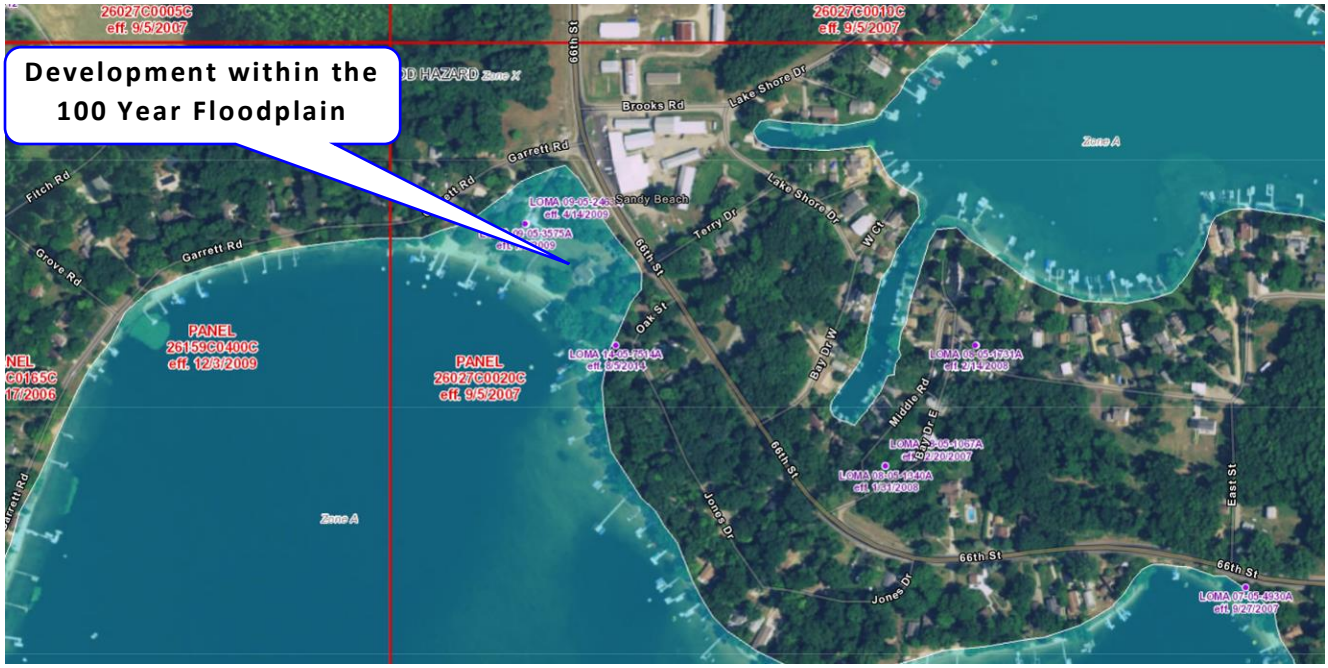

Silver Creek Township



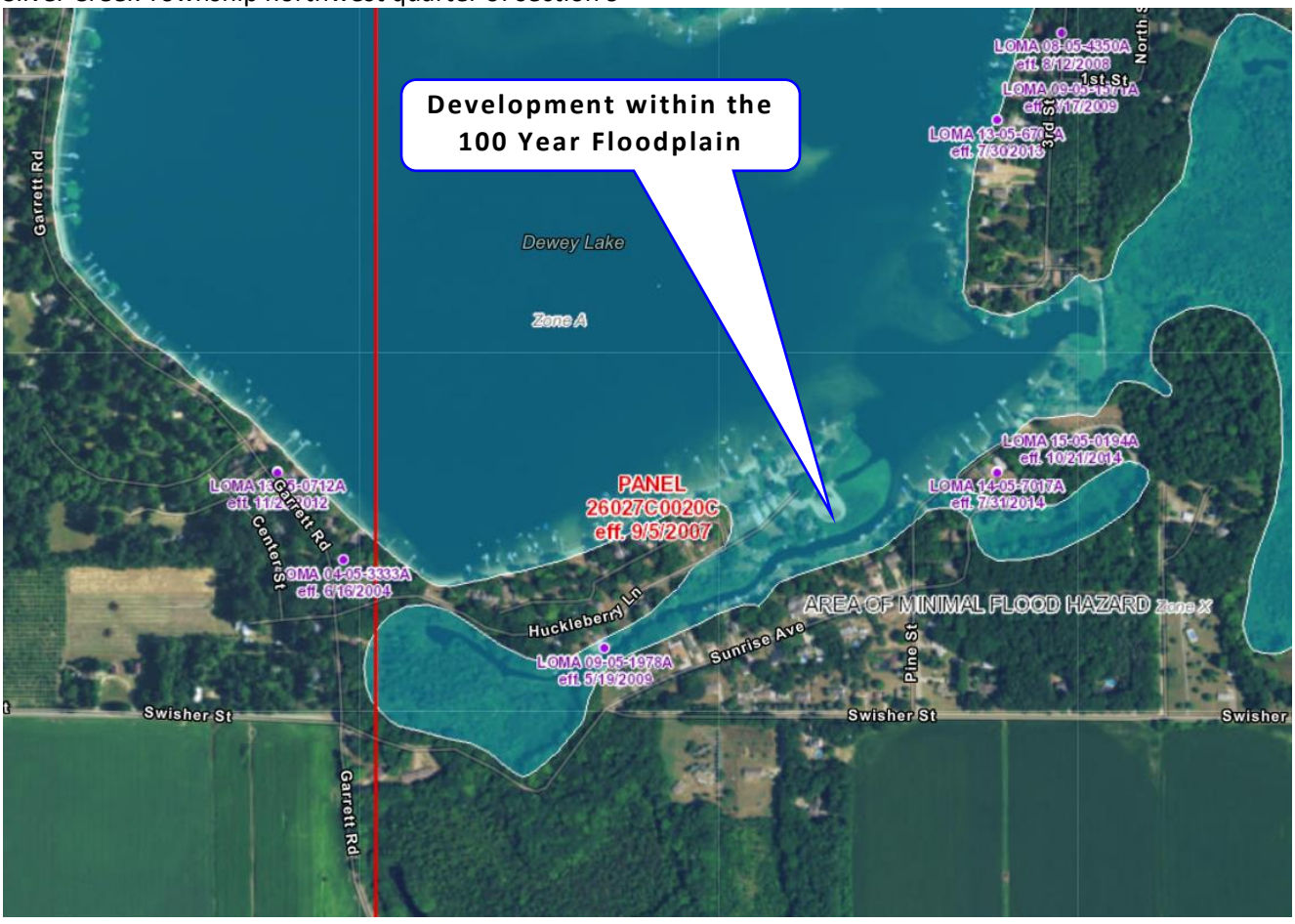

Silver Creek Township southeast quarter of section 4


Silver Creek Township south half of section 30


Silver Creek Township southeast quarter of section 5 and the southwest quarter of section 4

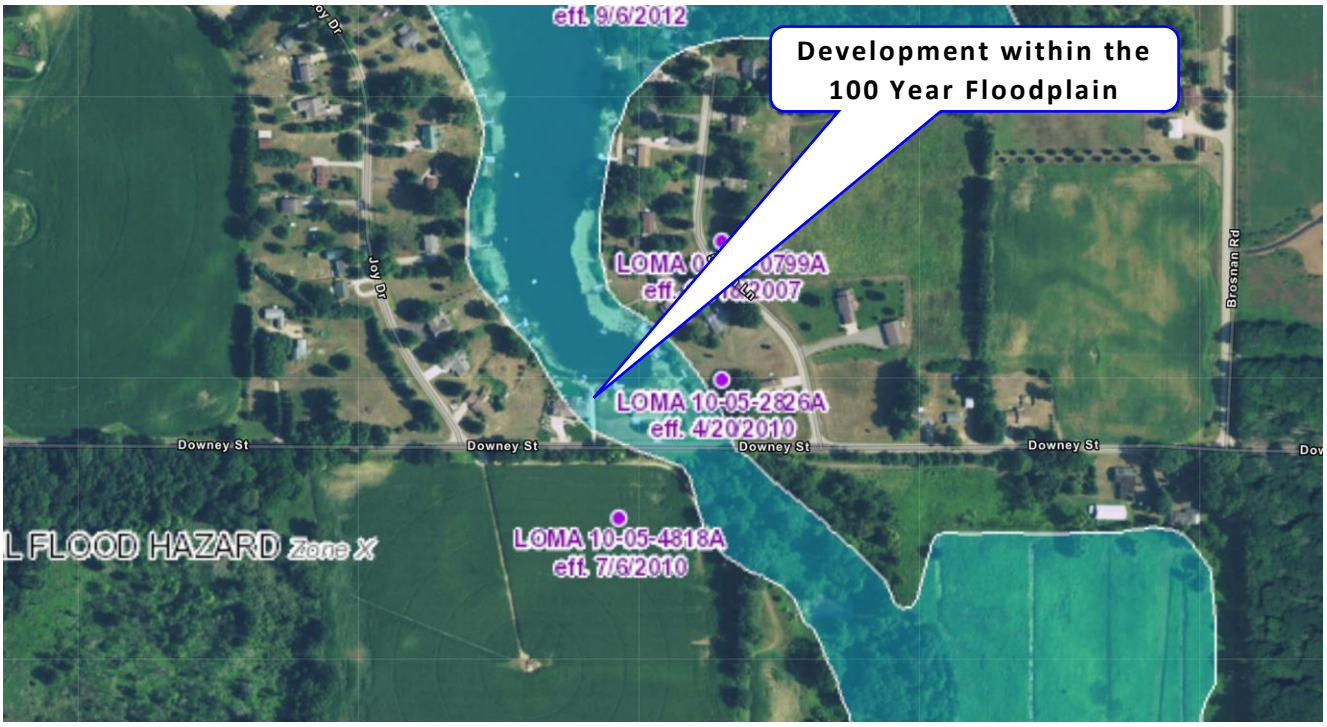



Silver Creek Township northwest quarter of section 9



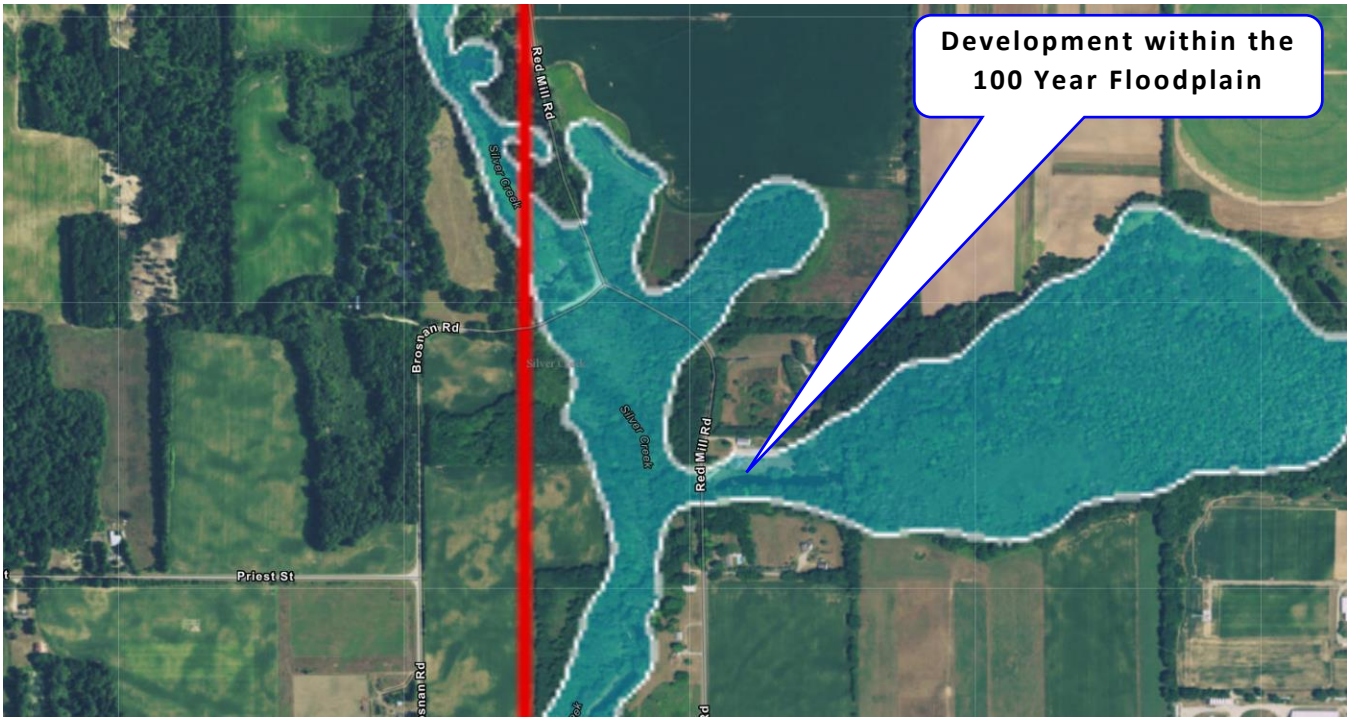

Silver Creek Township northeast quarter of section 11


Silver Creek Township center middle section of section 14

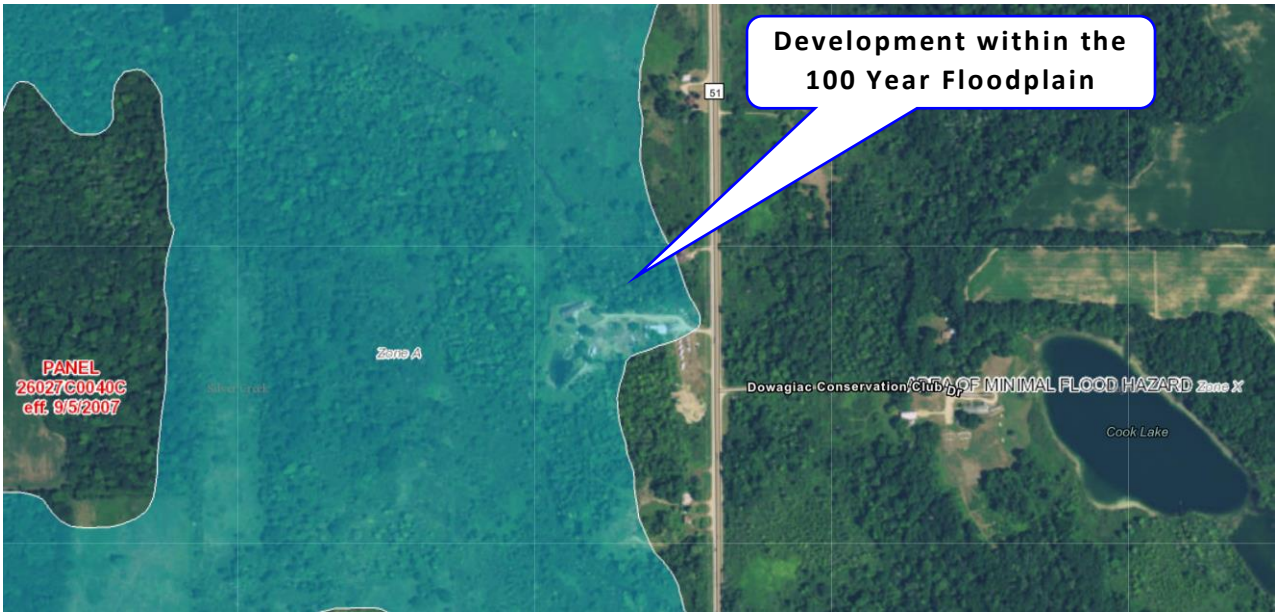



Silver Creek Township west side center section of section 14

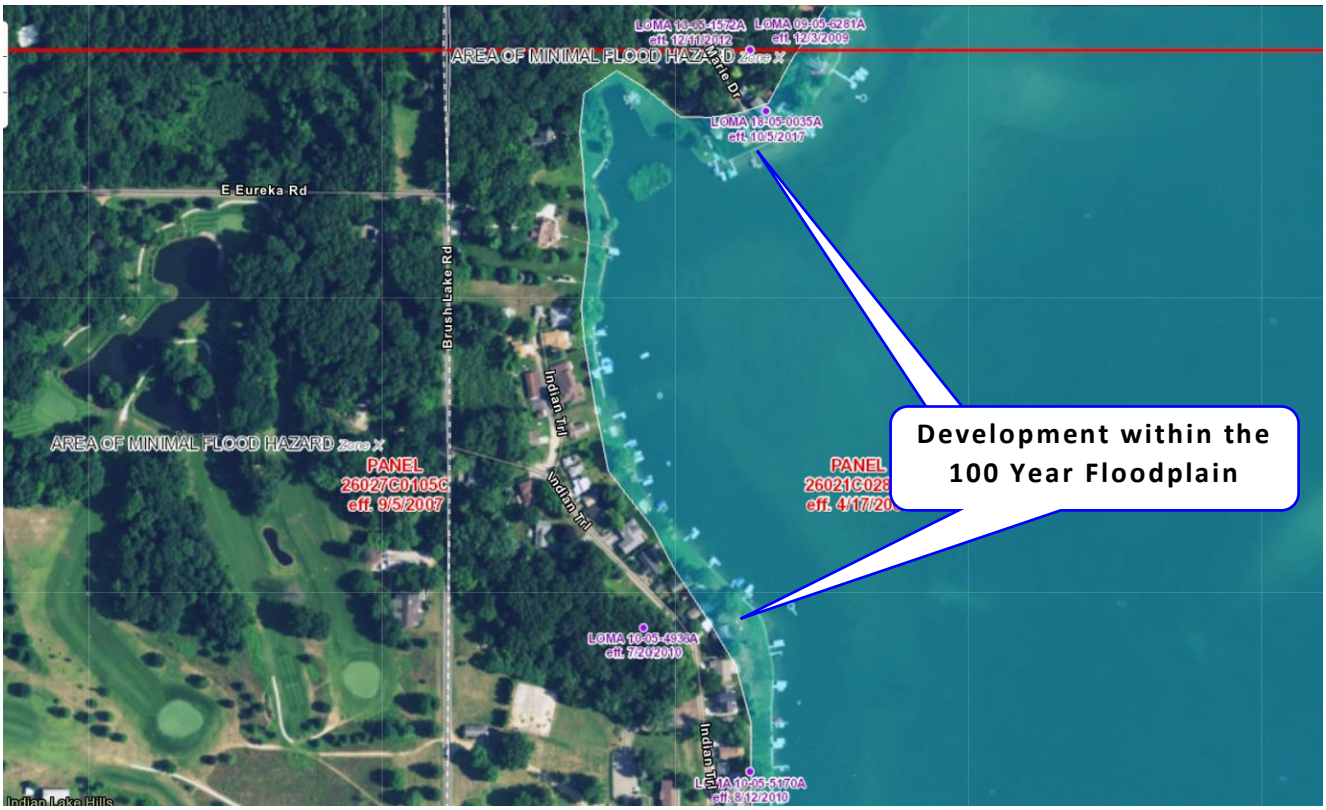

Silver Creek Township northwest quarter of section 12




Silver Creek Township northeast quarter of section 25



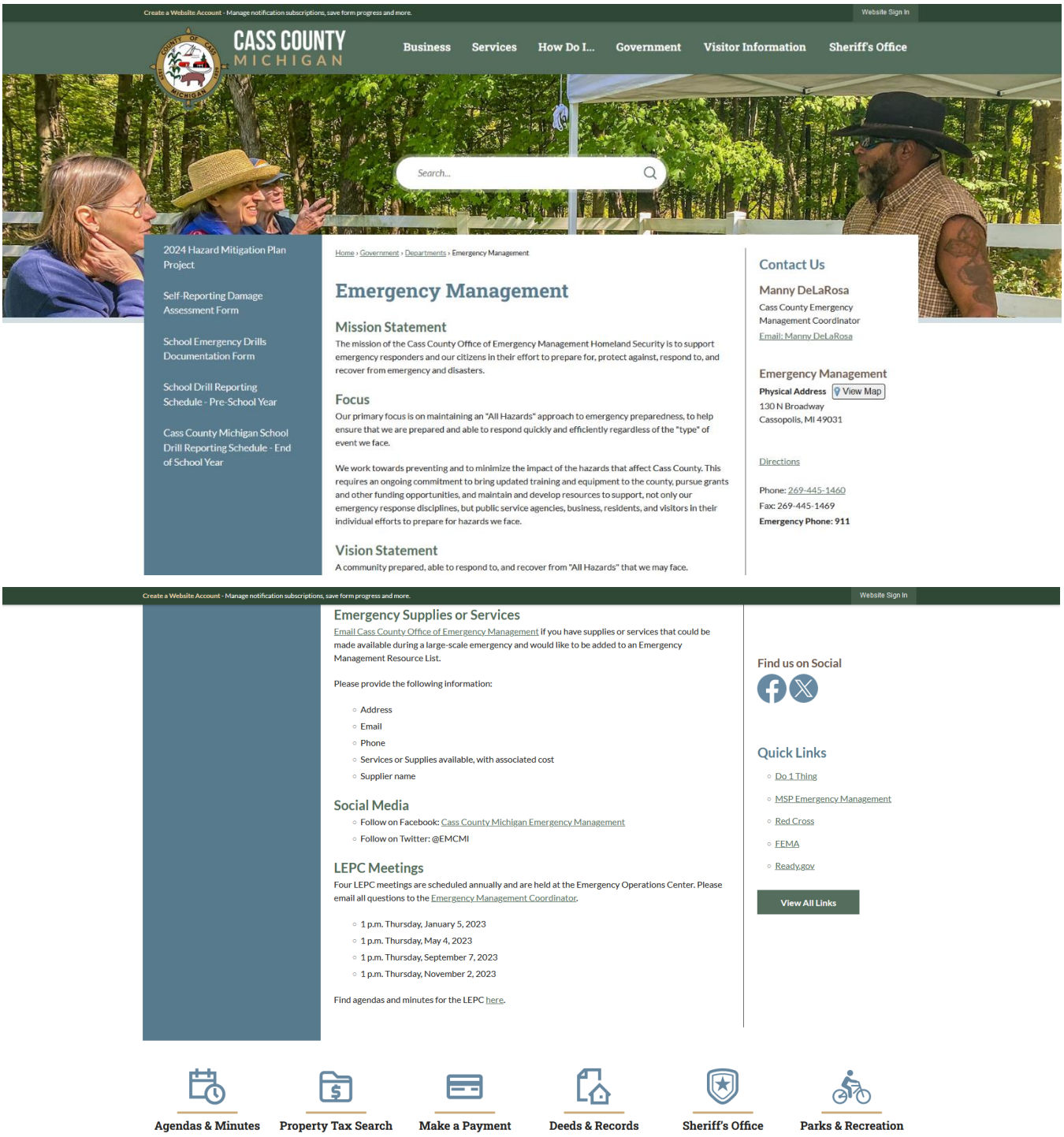

Silver Creek Township southwest corner of section 30 and the northwest quarter of section 31

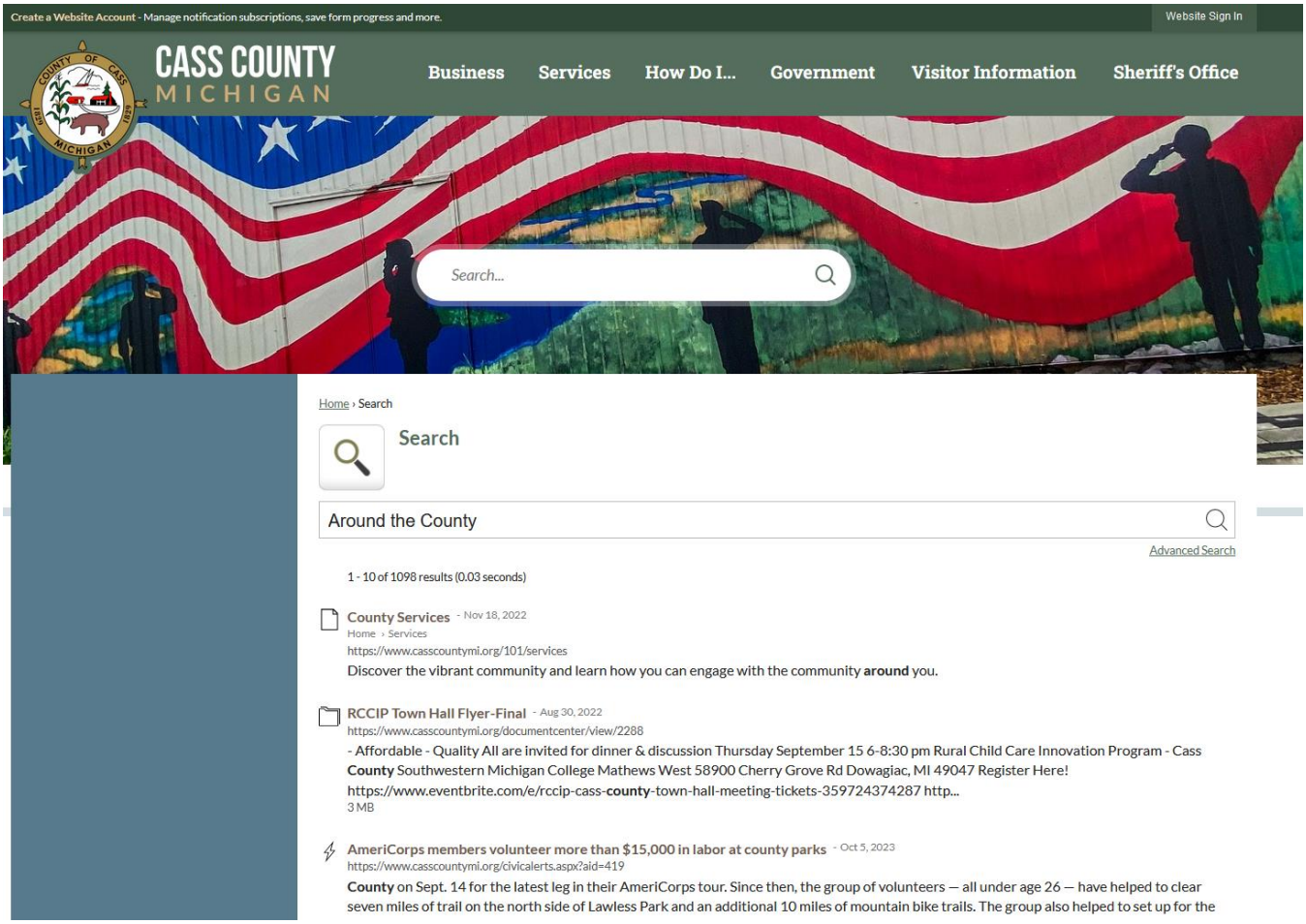



Silver Creek Township southeast quarter of section 31


Development within the 100 Year Floodplain
PANEL 26027C0105C eff. 9/5/2007
Zone A
AREA OF MINIMAL FLOOD HAZARD Zone X
Indian Lake Rd

# Appendix B – Evidence of Public Involvement / Public Notification




Create a Website Account - Manage notification subscriptions, save form progress and more.
Website Sign In
CASS COUNTY
MICHIGAN
Business
Services
How Do I...
Government
Visitor Information
Sheriff's Office
Search...
Home › Search
Search
Around the County
Advanced Search
1 - 10 of 1098 results (0.03 seconds)
County Services - Nov 18, 2022
Home › Services
https://www.casscountymi.org/101/services
Discover the vibrant community and learn how you can engage with the community around you.
RCCIP Town Hall Flyer-Final - Aug 30, 2022
https://www.casscountymi.org/documentcenter/view/2288
- Affordable - Quality All are invited for dinner & discussion Thursday September 15 6-8:30 pm Rural Child Care Innovation Program - Cass County Southwestern Michigan College Mathews West 58900 Cherry Grove Rd Dowagiac, MI 49047 Register Here!
https://www.eventbrite.com/e/rccip-cass-county-town-hall-meeting-tickets-359724374287 http...
3 MB
AmeriCorps members volunteer more than $15,000 in labor at county parks - Oct 5, 2023
https://www.casscountymi.org/civicalerts.aspx?aid=419
County on Sept. 14 for the latest leg in their AmeriCorps tour. Since then, the group of volunteers — all under age 26 — have helped to clear seven miles of trail on the north side of Lawless Park and an additional 10 miles of mountain bike trails. The group also helped to set up for the

# 2024 Hazard Mitigation Plan Project

## Description

The Cass County Hazard Mitigation Plan is currently being updated for the March 2024 official update. Elements and activity related to this project will be published on this webpage to encourage community involvement. This page will be updated as we move forward to our March 2024 goal.

## Receiving Notifications About this Project

As a convenience, when substantive changes are made to this page, the Emergency Management office will send out a Twitter notification *(Cass County, MI EMC @EMCMI)* and post a notice on the Emergency Management County Website.

## Current Hazard Mitigation Plan

Cass County Hazard Mitigation Plan 2018

## LEPC Meeting Dates 2023

- 01/05/2023, Thursday @ 1pm
- 05/04/2023, Thursday @ 1pm
- 09/07/2023, Thursday @ 1pm
- 11/02/2023, Thursday @ 1pm

Four LEPC meetings are scheduled annually and are held in person with Zoom as an option until further notice. Please email all questions to the Emergency Management Coordinator Manny DeLaRosa at MannyD@cassco.org

## Project Status

**Thursday, April 7th, 2022**

LEPC meeting - Hazard Mitigation Plan 2018

Cass County EM spoke about the Cass County Hazard Mitigation Plan, revised 2019. Manny mentioned that the planning for the revision began in January 2016 and brought up options on when the committee should begin planning for the next revision which will be due in March 2024. A few options were discussed on whether we should begin planning this year, beginning of next, or if he should continue to gather more information to get a better idea of when to start the planning on the revision. It was decided to continue gathering information to make the best decision.

## Hazard Mitigation Planning Meetings

### Project Status

**Thursday, April 7th, 2022**

LEPC meeting - Hazard Mitigation Plan 2018

Cass County EM spoke about the Cass County Hazard Mitigation Plan, revised 2019. Manny mentioned that the planning for the revision began in January 2016 and brought up options on when the committee should begin planning for the next revision which will be due in March 2024. A few options were discussed on whether we should begin planning this year, beginning of next, or if he should continue to gather more information to get a better idea of when to start the planning on the revision. It was decided to continue gathering information to make the best decision.

**Thursday, January 5th, 2023**

Local Planning Team - Hazard Mitigation Plan 2018

Cass County EM explained that the Hazard Mitigation Plan will expire on March 2024. After conducting some research, he found that the Grant Application process will take at least 9 months and hiring a company to update our plan, the company would need a year to a year and a half to complete the plan. This will most likely run past our expiration date. Manny will begin the Grant Application process; however, we will still need to update our own plan for 2024. We will need to decide if we are going to create a subcommittee and begin this process as quickly as possible.

**Meeting March 2, 2023**

The plan is currently being updated with a deadline of March 2024. The plan is approximately 167 pages with current updates up to page 49. The EM explained the different sections such as Population changes, Wetlands maps, Census 2020 data and updates needed throughout the plan. The EM stated that the 2016 Hazard Mitigation plan is posted on the Cass County Emergency Management webpage found on the Cass County website. There is also a timeline of all updates being made on the current plan – 2024. The EM will also begin work with IT and attempt to get the 2024 Hazard Mitigation Plan on a share drive where all members can view and participate in the updates. The EM shared a couple pages from the Plan – Critical Assets and requests all members to review and submit any updates to him.

**Meeting May 4, 2023**

The EM pulled up the Cass County Website and explained how to reach the Emergency Management page, and then the link to the Hazard Mitigation Plan 2018. The EM then explained what was on the page and how it tracks the updating process for the new 2024 plan. The EM stated that he may be reaching out to some people in the group if he comes across sections in the plan that pertain to them. He will only send those specific pages and request any updates or changes.

**Meeting July 6, 2023**

The EM spoke on the latest updates to the Cass County Hazard Mitigation Plan. The plan is valid for 5 years and required to be updated and reviewed this year. The EM spoke on the current method of creating our High Hazard Vulnerability Assessment and other methods that may serve us better. The EM went over several slides showing what we currently have in the plan, what needs to be updated and options to replace old data. The EM then walked through the Emergency Management website explaining where to find our current plan and other information.