MIDLAND COUNTY HAZARD MITIGATION PLAN

OFFICE OF EMERGENCY MANAGEMENT MIDLAND
LAW ENFORCEMENT CENTER
2727 RODD STREET
MIDLAND, MICHIGAN 48640

DECEMBER 2024

Hazard Mitigation Plan

For The

County of Midland

And Localities

I certify that the attached Hazard Mitigation Plan constitutes the official Hazard Mitigation Plan for the County of Midland and is approved and current for the ensuing five (5) years unless otherwise revised prior to the end of said period.

_____ _____

James Stamas, Chairman
Midland County Board of Commissioners

Date

_____ _____

Jenifier Boyer
Emergency Management Coordinator
County of Midland

Date

Table of Contents

Section One – General Information

Preface

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. Successful mitigation lessens or eliminates the impact of subsequent incidents. This is done by coordinating resources, programs, and authorities.

The intent of hazard mitigation is to ensure that post-disaster repairs and restoration take place along with an analysis of damage and that less vulnerable conditions are created. Also, direct actions can be taken in advance of an event to build community resilience through projects that protect lives and infrastructure. Through a combination of methods, losses can be limited by reducing susceptibility to damage. Hazard mitigation provides the means by which communities and individuals can break the cycle of damage, reconstruction, and damage again. More importantly, hazard mitigation can create a safer environment, thereby reducing the risk of injury and death.

The County of Midland, City of Midland, and other local units of government who have adopted this plan acknowledge the need to make Midland County communities resilient and sustainable. It is essential to reduce community vulnerability from natural and technological hazards to the extent possible. The development and implementation of this plan is a whole community effort with the goal of ensuring that Midland County continues to be a vibrant, safe and enjoyable place.

Planning Process Description

The following describes the process for updating the 2024 Midland County Hazard Mitigation Plan.

Establishment of the Midland County Hazard Mitigation Committee

By adoption of this Hazard Mitigation Plan the County of Midland establishes a county-wide Hazard Mitigation Committee. This committee shall consist of the following members:

- Chair of the Board of Commissioners Administration & Operations Committee
- Midland County Emergency Management Coordinator
- Chair of the Midland County Fire Chiefs Association
- Midland City Fire Chief
- Midland County Drain Commissioner
- Midland County Public Health Preparedness Coordinator
- Midland County Road Commissioner
- City of Midland Water Reclamation Superintendent
- City of Midland Police Chief
- Midland County Sheriff
- Jerome Township Fire Chief
- City of Midland Director of Planning & Community Development
- Representative of each Local Jurisdiction within Midland County
- Representative of the Local Emergency Planning Committee (LEPC)
- Representative of the Four Lakes Task Force

Ex Officio Members of the Hazard Mitigation Committee include:

- Fire Officer, Michigan Department of Natural Resources Sanford Field Office
- Floodplain Manager, Michigan Department of Environmental, Great Lakes, Energy (EGLE), Saginaw Bay District

Review by Neighboring Communities, Local and State Agencies

The following organizations were contacted by Office of Emergency Management to inform them of the opportunity to review the Hazard Mitigation Plan on Midland County's website, www.co.midland.mi.us. Their comments and suggestions were invited:

- Gratiot County Emergency Management
- Isabella County Emergency Management
- Gladwin County Emergency Management
- Bay County Emergency Management
- Saginaw County Emergency Management
- Great Lakes Bay Chapter of the American Red Cross
- City of Midland Planning & Community Development

- City of Midland Utilities
- City of Midland Engineering
- City of Midland Public Services
- City of Midland Manager
- City of Midland Community Affairs
- Midland County Administrator/Controller
- Midland County Board of Commissioners
- Midland County Department of Public Health
- Midland County Parks & Recreation
- Midland County Fire Chief's Association
- Dow Chemical Company Michigan Operations, Emergency Services & Security
- Michigan Department of Environmental, Great Lakes, Energy (EGLE), Bay City Office
- Michigan Department of Natural Resources, Forest Resource Division, Sanford Office
- Detroit/Pontiac Weather Service Office, NOAA National Weather Service

Public Review, Hearings and Comment and Adoption

The Office of Emergency Management presented a review of the 2024 Hazard Mitigation Plan. The Plan was available publicly on the Midland County Emergency Management website.

The presentation consisted of the following elements:

1. An overview of Emergency Management
2. The purpose of a Hazard Mitigation Plan
3. Hazard identification and rankings
4. Current goals and objectives and their status
5. Potential new goals and objectives
6. Any other hazards that should be considered

The Emergency Management Coordinator answered questions throughout and at the end of the presentation. All in attendance were requested to provide comments and input for consideration in the updating of the plan.

The following public outreach activities were performed:

- June 27, 2023 – Presentation at City of Midland Planning Commission Meeting
- July 11, 2023 – Presentation at Village of Sanford Planning Commission Meeting
- September 25, 2023 – Midland County Local Emergency Planning Committee
- February 2, 2024, Survey for public interaction and input was sent out through social media and other channels. Survey responses can be found on page 185.
- March 5, 2024, Public hearing at the Midland County Board of Commissioners Meeting for a public hearing of the final draft of the plan and solicitation of additional public comments.

Review and Update Process by Participating Jurisdictions

Monthly, in-person, countywide meetings were held between June and October of 2023 for all local jurisdictions and subject matter experts to participate; to review each of the hazards including social vulnerability and climate change factors, conduct jurisdictional specific hazard vulnerability analysis and update mitigation goals and objectives.

- June 28, 2023 - The following hazards were reviewed with updated information and data: Severe Winds, Tornados and Winter Weather.
- July 26, 2023 - The following hazards were reviewed with updated information and data: Flooding and Dam Failure. A presentation by GEI Consultants provided a detailed overview of the Edenville and Sanford Dams in regards to their rebuild efforts and proposed redesign of the dams.
- August 23, 2023 - The following hazards were reviewed with updated information and data: Public Health Emergencies, Wildfire, and Transportation.
- September 27, 2023 - The following hazards were reviewed with updated information and data: Infrastructure Failures, Terrorism, Hazardous Materials – Fixed Site, Hazardous Materials – Transportation, Oil & Gas Wells, and Pipelines.
- October 25, 2023 – A review of the mitigation goals and actions was completed. New goals were developed as needed and additional actions were added to current goals for better alignment with identified hazards.
- February 2, 2024 – Plan was shared with neighboring counties and jurisdictions to review and provide comments.
- April 4, 2024 – Received recommended edits of the plan from the City of Midland.
- June 16, 2024 – Continued to work on mapping improvements with GIS.
- July 17, 2024 – Submitted final draft plan to State for review.
- September 16, 2024 – Received review response from State with areas that needed additional data and information to better meet requirements.
- 2025 – Resubmitted plan to the State and FEMA for review and approval.

Supporting documentation is located in the Appendices section of the plan.

Community Hazard Mitigation Resources

Midland County

Midland County has a full time Emergency Management Coordinator and Deputy Coordinator who is responsible for developing the County Emergency Operations Plan and management of the Emergency Operations Center (primary and backup) in addition to the Midland County Hazard Mitigation Plan.

City of Midland

The City of Midland has a full time staffed Planning Department and Building Department in addition to a City Manager and Assistant City Mangers to oversee building codes, zoning and planning and floodplain management efforts.

Other Local Jurisdictions

Those smaller communities within Midland County have limited to no staff support to support to oversee building codes, zoning and planning and floodplain management efforts. Many local officials still work fulltime in addition to their elected official or appointed official duties. This becomes a challenge at times to have the necessary resources to complete or take on hazard mitigation activities locally.

It is through the leadership of the County Emergency Management Coordinator collaboration with local officials to coordinate local resources to tackle mitigation actions involves organizing and optimizing the use of people, funding, materials, and information at the community level to reduce risks and prepare for or respond to emergencies or environmental threats.

Local Jurisdiction	Planning Commission	Master Plan	Zoning Ordinances	NFIP Participant	Building Official	Township Code Auth.
City of Coleman	X	X	X		X	
City of Midland	X	X	X	X	X	
Edenville Township	X	X	X	X	X	
Geneva Township	X	X	X			X
Greendale Township	X		X	X		X
Homer Township	X	X	X	X		X
Hope Township	X	X	X			X
Ingersoll Township	X	X	X	X	X	
Jasper Township	X		X	X		X
Jerome Township	X	X	X	X	X	
Larkin Township	X	X	X	X		X
Lee Township	X	X	X	X		X
Lincoln Township	X	X	X	X	X	
Midland Township	X	X	X	X	X	
Mills Township	X		X	X		X
Mt. Haley Township	X	X	X		X	
Porter Township	X	X	X	X	X	
Village of Sanford	X	X	X	X	X	
Warren Township	X		X	X	X	

2024 Midland County Hazard Mitigation Plan Update Committee

Agency and Title	Name
Chair of the Board of Commissioners A&O Committee	Jeanette Snyder
Midland County Emergency Management Coordinator	Jenifier Boyer
Midland County Drain Commissioner	Joe Sova
Midland County Health Department Preparedness Coordinator	Katie Romo
Midland County Road Commissioner	Art Buck
Midland County Sheriff	Myron Green
Midland County Fire Chief's Association	Bill Cozat
City of Midland Water Reclamation Superintendent	Jared Driscoll
City of Midland Police Chief	Nicole Ford
City of Midland Fire Chief	Josh Mosher
City of Midland Director of Planning & Community Development	Jacob Kain
City of Coleman City Manager	Steve Miller
City of Midland City Manager	Brad Kaye
Edenville Township Supervisor	Terrance Hall
Four Lakes Task Force President	Dave Kepler
Four Lakes Task Force Vice President	Dave Rothman
Geneva Township Planning Committee Chair	Steve Wegener
Greendale Township Clerk	Ruth Knapp
Homer Township Supervisor	Russ Varner
Hope Township Supervisor	Rita Goul
Ingersoll Township Supervisor	Kim Heisler
Jasper Township Supervisor	Carmen Bajena
Jerome Township Fire Chief	Jerry Cole
Larkin Township Supervisor	Maria Sandow
Lee Township Supervisor	Doug Kruger
Lee Township Clerk	Laura Dawson
Lee Township Treasurer	Heidi Pitt
Lincoln Township Supervisor	Kevin Wray
Midland Township Supervisor	Terry Holt
Mills Township Supervisor	Ron Kutchey
Mount Haley Township Supervisor	Ken Brown
Porter Township Supervisor	Tom Corbat
Village of Sanford Trustee	Carl Hamann
Village of Sanford Trustee	Terese Quintana
Warren Township Supervisor	Denny Allen

Committee Planning Meetings Held

Hazard Mitigation Plan Update Meetings Held

Local Municipalities	6/27/2023	7/26/2023	8/23/2023	9/27/2023	10/25/2023
City of Coleman					
City of Midland		X	X		
Edenville Township	X	X	X	X	
Geneva Township			X	X	
Greendale Township	X		X	X	X
Homer Township					
Hope Township		X			
Ingersoll Township					X
Jasper Township	X	X	X	X	X
Jerome Township		X	X	X	
Larkin Township			X		
Lee Township		X		X	
Lincoln Township					
Midland Township					
Mills Township	X	X	X	X	
Mount Haley Township			X		
Porter Township	X	X	X	X	X
Village of Sanford		X	X	X	X
Warren Township					X
County Agencies					
Midland County Board of Commissioners		X	X	X	
Midland County Drain Commission				X	
Midland County Emergency Management	X	X	X	X	X
Midland County Fire Chief's Association					
Midland County Health Department		X	X		
Midland County Sheriff's Office					
Midland County Road Commission		X	X	X	X
Four Lakes Task Force	X	X	X	X	X

Plan Adoption and Maintenance

Plan Adoption

Once FEMA has given approval to move forward with the updated plan, it will be presented for further public hearing before the Midland County Board of Commissioners, and the Midland City Council, as well as each additional local jurisdiction participating in the plan. The process will be as follows:

County of Midland – Public notice will be given as the law requires for the purpose of making the public aware that the hazard mitigation plan will be presented and discussed at a meeting of the Midland County Board of Commissioners. At the meeting, the Midland County Emergency Management Coordinator will give a detailed overview of the hazard mitigation plan and invite comments and suggestions from the public. At the meeting and following, comments will be taken, and if appropriate, incorporated into the plan. At a later regularly scheduled Board of Commissioners meeting, changes if any will be presented and the Board will be asked to adopt the hazard mitigation plan.

City of Midland – The hazard mitigation plan will be provided to the Planning Department, Fire Department, Police Department, Water Reclamation Department, and City Manager. After a staff review, the hazard mitigation plan will be presented in a public meeting of the City of Midland Planning Commission. At this televised meeting the Planning Commission will have an opportunity to ask questions and provide input. The Planning Commission will also invite input from the public. At the meeting and following, comments will be taken, and if appropriate, incorporated into the plan. At later regularly scheduled Planning Commission meeting, changes if any will be presented and the Commission will be asked to recommend adoption of the plan by the City Council. After this recommendation has been received, the hazard mitigation plan will be presented to the Midland City Council at a regularly scheduled meeting of the Council. The Council and citizens will have an opportunity at this time to ask questions and comment on the hazard mitigation plan. The Midland City Council will then be asked to adopt the plan for the City of Midland.

Other Local Jurisdictions – The remaining village, townships and city (18 in all) within Midland County are all rural areas with relatively small populations. All jurisdictions will be provided a copy of the plan and invited to participate in the review and update of the plan. The hazard mitigation plan will be taken to a public meeting of each of these jurisdictions for their review and consideration for adoption. Public notice will be given for each meeting as required. At each meeting, the planning process will be described and conclusions and recommended actions will be presented for adoption; a copy of a resolution adopting the plan from each jurisdiction will be included in the appendices.

G. Plan Implementation

The Midland County Emergency Management Coordinator is primarily responsible for leading the implementation of the Hazard Mitigation Plan. The Hazard Mitigation Committee will

oversee the implementation of the plan, including defining the roles of its members, establishing subcommittees, developing work plans, writing grant proposals in support of goals and objectives, monitoring progress, and evaluating the need for new goals and objectives.

The Office of Emergency Management has many responsibilities and limited staff and financial resources. Additional resources and partnerships will be needed for hazard mitigation goals and objectives to be realized. Partners include:

- Midland County Drain Commissioner
- Midland County Geographic Information Systems Department
- Michigan State University Extension
- Midland County Parks & Recreation
- Midland County Road Commission
- Michigan Department of Natural Resources, Forest Resource Division
- Michigan Department of Environment, Great Lakes and Energy
- Midland County Conservation District
- Four Lakes Task Force
- City of Midland Planning
- City and Township Fire Departments
- Township Building Code Authority

L. Plan Monitoring Methods and Schedule

The Midland County Emergency Management Coordinator is charged with convening the Hazard Mitigation Committee annually to review the Hazard Mitigation Plan and recommend changes and additions as deemed necessary. The annual review will include public notice of the review of the plan on the County website and be shared with all local jurisdictions. During this time, the public will be able to provide input and comments on the plan. The hazard mitigation plan should be considered by community planners within Midland County, when further updates and reviews of their comprehensive plans are taking place. The Midland County Hazard Mitigation Committee is responsible for monitoring the implementation of the plan. This may include reviewing reports from agencies involved in implementing projects or activities; visiting sites and attending meetings concerning mitigation project activities; and preparing reports for the Board of Commissioners and others as needed.

M. Plan Evaluation and Revision

The Midland County Hazard Mitigation Committee is responsible for evaluating the effectiveness of the plan. This is done on the required 5 year cycle, or more often if deemed necessary. The evaluation assesses whether or not:

- The goals and objectives are still valid based on current and expected conditions;
- The nature, magnitude and type of risks have changed;
- The current resources are appropriate for implementation of the plan;
- There are any obstacles to implementation;

- There have been favorable outcomes;
- Agencies and other partners are participating as expected.

During the review of the 2018 Plan, Midland County was encouraged to add additional natural hazards to the document. Severe Winds was updated to Severe Weather and additional data on thunderstorms, hail, lightning and extreme heat was added.

The Disaster Mitigation Act of 2000 requires the Midland County Hazard Mitigation Plan to be updated every five years. This may include updating the community profile, examining goals, conducting a new hazard analysis, and reviewing the goals and objectives. As goals are achieved and projects are completed, the hazard analysis will change and it is very likely that new goals and objectives will be set by the Hazard Mitigation Committee. Any revisions to the plan require:

- Opportunity for public comment;
- Board of Commissioners approval;
- Approval of local jurisdictions where projects are proposed;
- And recertification by the Federal Emergency Management Agency.

N. Public Hearings and Plan Adoption

When the plan is due for an update, the plan will be presented during a public meeting at the beginning and the end of the update process. At the public hearings, the Emergency Management Coordinator presents an explanation of the plan revisions. Public comments are heard and considered. Notice of the public hearing is published following the policy and traditional methods of the public body for scheduling a public hearing.

During the period of time that the plan is being updated, the plan is promoted on social media as being reviewed and opportunities to provide comment. A public survey is also developed highlighting the hazards in the plan and soliciting feedback from the public on all the hazards, their knowledge and any concerns regarding the hazards. Promotion of the plan review and public survey is shared through email with community stakeholders to help distribute across the community.

Once a final draft is proposed, approved by the State of Michigan and FEMA, the plan will be presented to the Midland County Board of Commissioners for adoption. Once FEMA has accepted the adoption by the Midland County Board of Commissioners, local jurisdictions will be requested to adopt the plan by resolution.

The final adopted plan will be posted on the Midland County Emergency Management website. Local municipalities will also be encouraged to post the plan on their websites or link to the county website. Contact information will be provided for any questions or comments on the plan. Annual reviews will include messaging to the public to allow for education and feedback on the plan.

Local Jurisdictions

The following is a complete list of jurisdictions within Midland County. All 19 jurisdictions were requested to participate in the review and update of the plan. All 19 jurisdictions will be requested to adopt the updated plan. The recently created Four Lakes Task Force who manages high hazard dams within Gladwin and Midland Counties, have also been requested to participate and adopt the plan. They are, in alphabetical order:

Local Jurisdiction	Participated 2008 Plan	Adopted 2008 Plan	Participated 2013 Plan	Adopted 2013 Plan	Participated 2018 Plan	Adopted 2018 Plan	Participated 2024 Plan	Adopted 2024 Plan
City of Coleman	X		X	X	X	X	X	
City of Midland	X	X	X	X	X	X	X	
Edenville Township	X	X	X	X	X	X	X	
Geneva Township	X		X	X	X	X	X	
Greendale Township	X		X	X	X	X	X	
Homer Township	X	X	X		X	X	X	
Hope Township	X		X	X	X	X	X	
Ingersoll Township	X	X	X	X	X	X	X	
Jasper Township	X		X	X	X	X	X	
Jerome Township	X	X	X	X	X	X	X	
Larkin Township	X	X	X	X	X	X	X	
Lee Township	X		X	X	X	X	X	
Lincoln Township	X	X	X	X	X	X	X	
Midland Township	X	X	X	X	X	X	X	
Mills Township	X	X	X	X	X	X	X	
Mt. Haley Township	X		X		X	X	X	
Porter Township	X		X	X	X	X	X	
Village of Sanford	X		X	X	X	X	X	
Warren Township	X		X	X	X	X	X	
Four Lakes Task Force							X	

Incorporation of Mitigation into Local Planning and Zoning Activities

Land use planning and zoning is administered at the city, village and township level of government. As part of the education and outreach efforts of the Hazard Mitigation Committee, communities are encouraged to incorporate hazard mitigation into comprehensive plans, capital improvements and zoning regulations. Local jurisdictions are invited to take an active part in implementing the goal and objectives described in this plan. Please see “Midland County Land Use Guideline” on page 76 of this plan for additional information.

Local municipalities are required to review their Community Master Plans and Zoning Plans every 5 years. During this time, municipalities will be encouraged to include hazard mitigation goals and objectives into their plans during reviews and updates. The Emergency Management Coordinator will also be stressing these updates at the Midland County Townships Association meetings which are held quarterly.

Section Two – Introduction

Hazard Mitigation Plan

Purpose

Hazard analysis is the foundation upon which emergency planning efforts are built. It provides an understanding of the potential threats facing the community. By locating the extent and magnitude of past disasters or emergency situations, and by examining knowledge of new or emerging risks, it's possible to estimate the probability of such events occurring and the vulnerability of people and property. This information, along with relevant land use, economic, and demographic information in the community profile, can help us assess how various types of incidents may impact the community. Therefore, emergency management priorities and goals can be set prior to an incident occurring. The primary goal is to prevent threats when possible. If it is not possible to eliminate a threat, then seek to minimize the vulnerability of the community to that threat. This plan contains an analysis of hazards to Midland County. The community is always changing, so the hazard mitigation plan will be updated as needed.

Definitions and Hazard Descriptions

Some key definitions used in the hazard analysis process are as follows:

Cause: The reason(s) why an event occurs. ((Is the hazard a primary hazard (storm, fire, etc), or a secondary hazard? (result of storm, like power outage, need for sheltering, etc.))

Climate Change: Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects that are synonymous with the term.

Controllability: The ease with which the harmful impacts of an event can be controlled.

Duration: The period of time an event is expected to last.

Exposure: The number, types, qualities, and monetary values of various types of property or infrastructure and life that may be subject to a hazardous event.

Frequency of Occurrence: How often an event is likely to occur. A 100 year floodplain is a 1% occurrence potential any given year. A 500 year floodplain is a 0.5% occurrence potential any given year.

Hazard: An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption to business, or other types of harm or loss.

Hazard Analysis: The process of identifying and analyzing hazards, threatening to the community.

Hazard Identification: The process of defining and describing a hazard.

Low Impact Development (LID): An approach to land development (or re-development) that works with nature to manage storm water as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat storm water as a resource rather than a waste product. Water is managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed.

Mitigation Potential: The ease with which measures can be applied to effectively reduce or eliminate long-term risk to people and property from a specific hazard and its impacts.

Predictability: The ease with which an event can be predicted, in terms of time, location, and magnitude.

Probability: The likelihood that an event will occur in any specified period of time.

Probable Spatial Extent: The area that is likely to be affected by an event, based on factors like wind direction and speed, water flow and velocity, geographic/topographic features, etc.

Risk: The predicted impacts that a hazard would have on people, services, and specific facilities and structures.

Scope of Impact/Destructive Potential: The magnitude of an event in areas impacted and the potential physical destruction of public and private infrastructure.

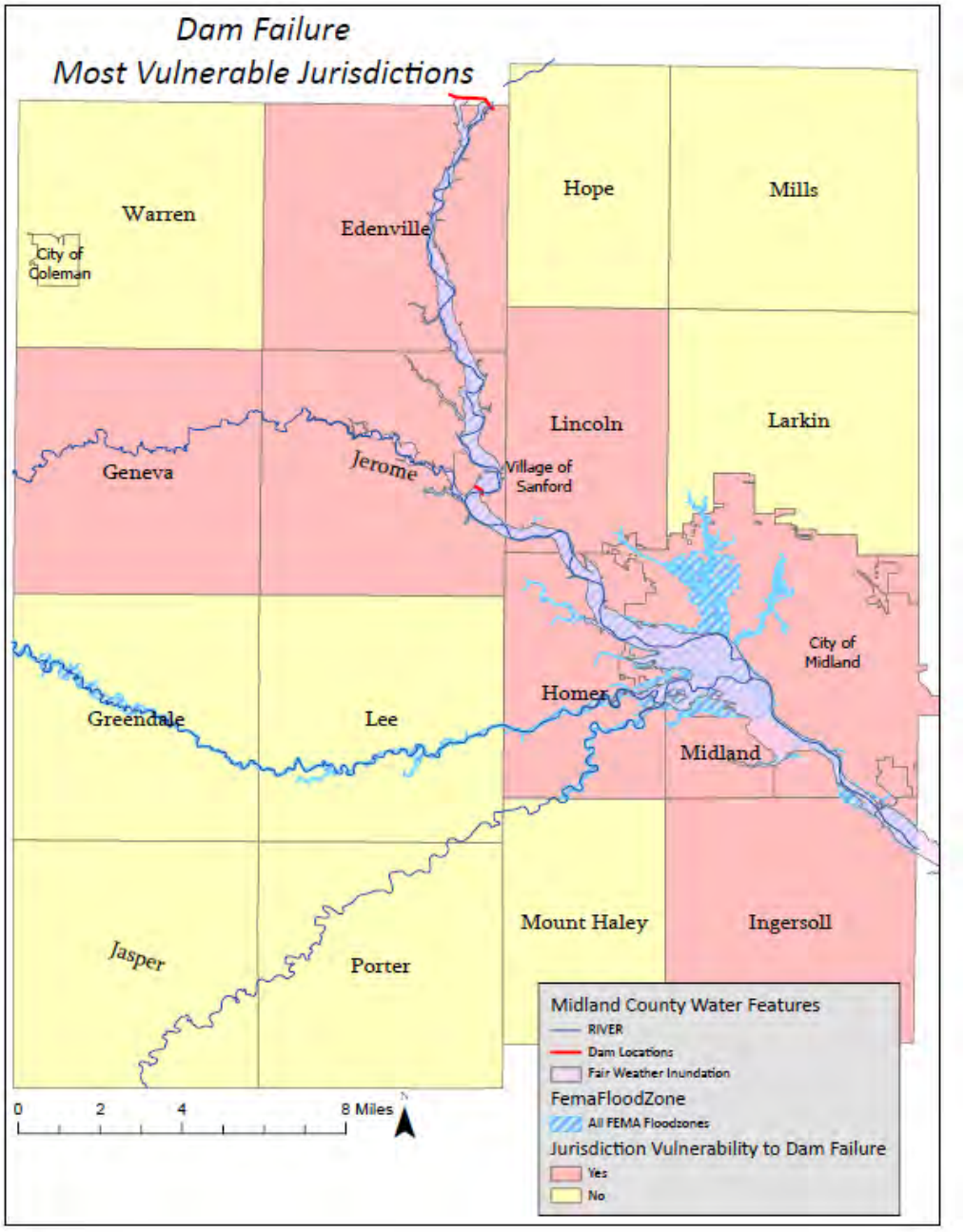
Sectoring: Dividing a community into geographic sub-parts (sectors) for the purpose of developing a more detailed, targeted hazard analysis and set of mitigation, preparedness, response and recovery strategies. Sectoring can be accomplished using known geo-political boundaries (i.e., townships in counties), or sectors can be artificially created (i.e., dividing the community into halves or quadrants).

Speed of Onset/Length of Forewarning: The amount of time it typically takes for an event to occur, and the length of time local governmental agencies typically have to warn the potentially impacted population of appropriate protective actions.

Vulnerability: The quantification of a community's risk to determine which hazards present the greatest risk to people, property, and essential services.

Hazard Descriptions and History in Midland County

Dam Failure (High Hazard Potential Dams)



Jurisdictions Most Vulnerable: *Edenville Township, Jerome Township, Village of Sanford, Lincoln Township, Homer Township, City of Midland, Midland Township and Ingersoll Township.*

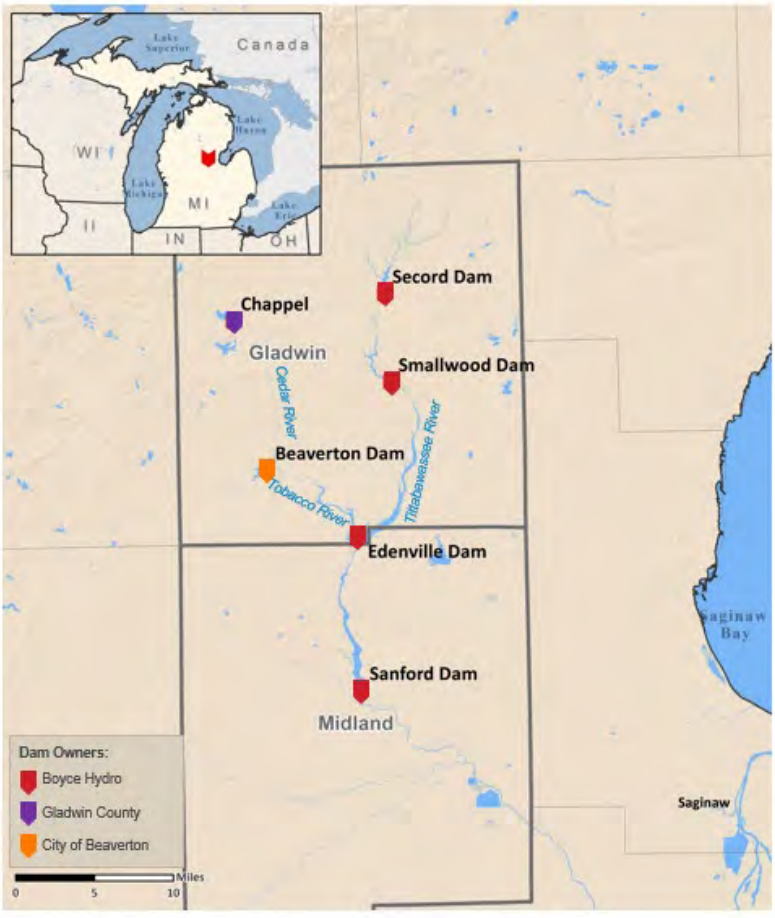
Dam Failure is the collapse or failure of an impoundment resulting in downstream flooding. Dam failures can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Failure of a dam does not only occur during flood events, which may cause overtopping of a dam. Failure can also result from poor operation, lack of maintenance and repair, and terrorism. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation. As an example, in August 2010, seepage was discovered in the earthen dike which makes up a large portion of the Sanford Dam in Midland County. As a result the Federal Energy Regulatory Commission authorized the emergency draw-down of Sanford Lake so emergency repairs could be made to the dike. The discovery of the seepage and subsequent repair of the dike mitigated a catastrophic dam failure.

Michigan has experienced over 260 dam failures in its history. There are four dams (Secord, Smallwood, Edenville, and Sanford) classified as "high hazard" on the Tittabawassee River. Three of them are in Gladwin County and one in Midland County. Michigan Department of Environment, Great Lakes and Energy (EGLE) high hazard classification is defined as failure could result in significant damage to property and loss of life downstream. Two other dams in Gladwin County, one at Wiggins Lake and one at Beaverton, could also adversely impact Midland County if they were to fail.

On June 15, 2017, FERC issued a Compliance Order according to FPA section 31(a); due to the longstanding failure to increase the project's spillway capacity to safely pass probable maximum flood flows, as well as its failure to comply with its license, and the Commission's regulations.

On September 25, 2018, FERC terminated Boyce Hydro's FERC license for the Edenville Dam. This resulted in the Edenville Dam falling under the State of Michigan Dam Safety agency oversight.

Due to community concerns because the dams owned by Boyce Hydro did not meet FERC safety requirements, Midland and Gladwin Counties pursued purchasing the four dams from Boyce Hydro, with the intent to bring them into compliance. Prior to the completion of the purchase, there was a heavy rain event in May of 2020.



The Edenville Dam failed following a historic storm, the inundation from the failure overtopped the Sanford Dam down river and it subsequently failed on May 19, 2020 as well. Governor Gretchen Whitmer declared a State of Emergency that evening and FEMA declared an Emergency Declaration EM-3525-MI on May 21, which eventually led to a Major Presidential Declaration DR-4547-MI on July 9. More than $25M in SBA (Small Business Administration) loans were issued and $20M in FEMA Individual Assistance was received in the County. The National Flood Insurance Programs received 205 claims for Midland County properties, totaling more than $16M in claim payments with average claim of $82,000.

In the days leading up to the dam failures, a large storm system brought heavy rains to the northern part of the Tittabawassee River Watershed resulting in a large river flood event. Though all dams on the Tittabawassee River were spilling at full capacity, water continued to rise in their reservoirs creating concern with dam operators and public safety partners in Gladwin County and downstream in Midland County. Gladwin County Emergency Management conducted emergency evacuations on Monday, May 18 as water levels rose in the Edenville Dam reservoir of Wixom Lake, late Monday night, Midland County Emergency Management called for an emergency evacuation of Edenville Township, Jerome Township and the Village of Sanford due to the continued rise of water and uncertainty of dam structures in the overnight hours. Areas of Hope Township around Wixom Lake were also evacuated. Early Tuesday morning, May 19 a number of Hope Township property owners returned to find their homes flooded due to the rise of Wixom Lake.

Around 5:45 pm on Tuesday, May 19, a breach formed at the toe of the Edenville Dam east of the Tittabawassee spill gates. Quickly, the breach grew and spilled water uncontrollably around the spillway and downstream through Sanford Lake, breaching the Sanford Dam by 7:25pm. This resulted in flooding in the Village of Sanford, City of Midland, Midland Township and into Saginaw County eventually carrying debris out into the Saginaw Bay in Bay City. The Tittabawassee River reached a historical crest of 35.05 feet at the gauge south of the City of Midland.

Given the state of repair of the four dams owned by Boyce Hydro, and their lack of insurance for damages, Boyce Hydro declared bankruptcy in August 2020, approximately 90 days after the Edenville and Sanford Dams failed. Midland and Gladwin Counties pursued the purchase of the four dams from Boyce Hydro through a condemnation process. Four Lakes Task Force (FLTF) contracted to manage the dams through the repair and rebuild, process, and ultimately to oversee day-to-day operations. These four dams will no longer be hydropower dams which fall under FERC licensing. The dams will adhere to the requirements of the State, regulated by EGLE Dam Safety.

The FLTF has worked with EGLE to make the emergency repairs to both Edenville and Sanford Dams. Breach areas have been repaired and water flow has been restored to the river’s original path. Permitting and construction will be ongoing for the next few years to restore Edenville and Sanford Dams to meet safety requirements, including additional spill capacity, with the intent to restore Wixom and Sanford Lakes by 2026.

FLTF is a County-Appointed Delegated Authority under Michigan State Law (Public Act 451 of 1994, Part 307). FLTF has the legal authority to operate, maintain and repair the dams and has the legal ability under Part 307 to fund its work by assessing the benefitting properties around the reservoirs. A Special Assessment District was created to source operating and maintenance funds which was approved by Midland and Gladwin County to include the operations and maintenance assessment for calendar years 2022-2024. In addition, the State of Michigan has provided grants which will help cover most costs of rehabilitating the four dams. The Special Assessment District will cover any rehabilitation costs exceeding available grants.

Impacts on Socially Vulnerable Populations

Dam failure has the potential to impact socially vulnerable populations disproportionately. In a dam failure, specific populations may face difficulty evacuating, such as the elderly, disabled, or otherwise mobility challenged. Individuals who do not speak English proficiently, or those who are hearing or visually impaired, may face challenges heeding and acting on dam evacuation warnings. Once evacuated, the elderly or infirm may have special needs for sheltering, such as access to medications or medical devices. After a failure, economically constrained households have a lower capacity to repair homes, remediate mold, and replace destroyed belongings.

The impact of the dam failure along Sanford Lake and downstream resulted in significant uninsured loses as much of the area was beyond the identified FEMA 1% floodplain. Flood insurance is only required by mortgage companies on properties within the 1% floodplain. As a result, many households that normally do not fall into a socially vulnerable population encountered financial difficulty, unable to recover or repair their homes. In addition to FEMA and SBA financial assistance programs, a community Long Term Recovery Group raised more than $5M to help offset residents' unmet needs. After more than two years, all donated funds have been allocated and many residents are still struggling to recover from the dam failure.

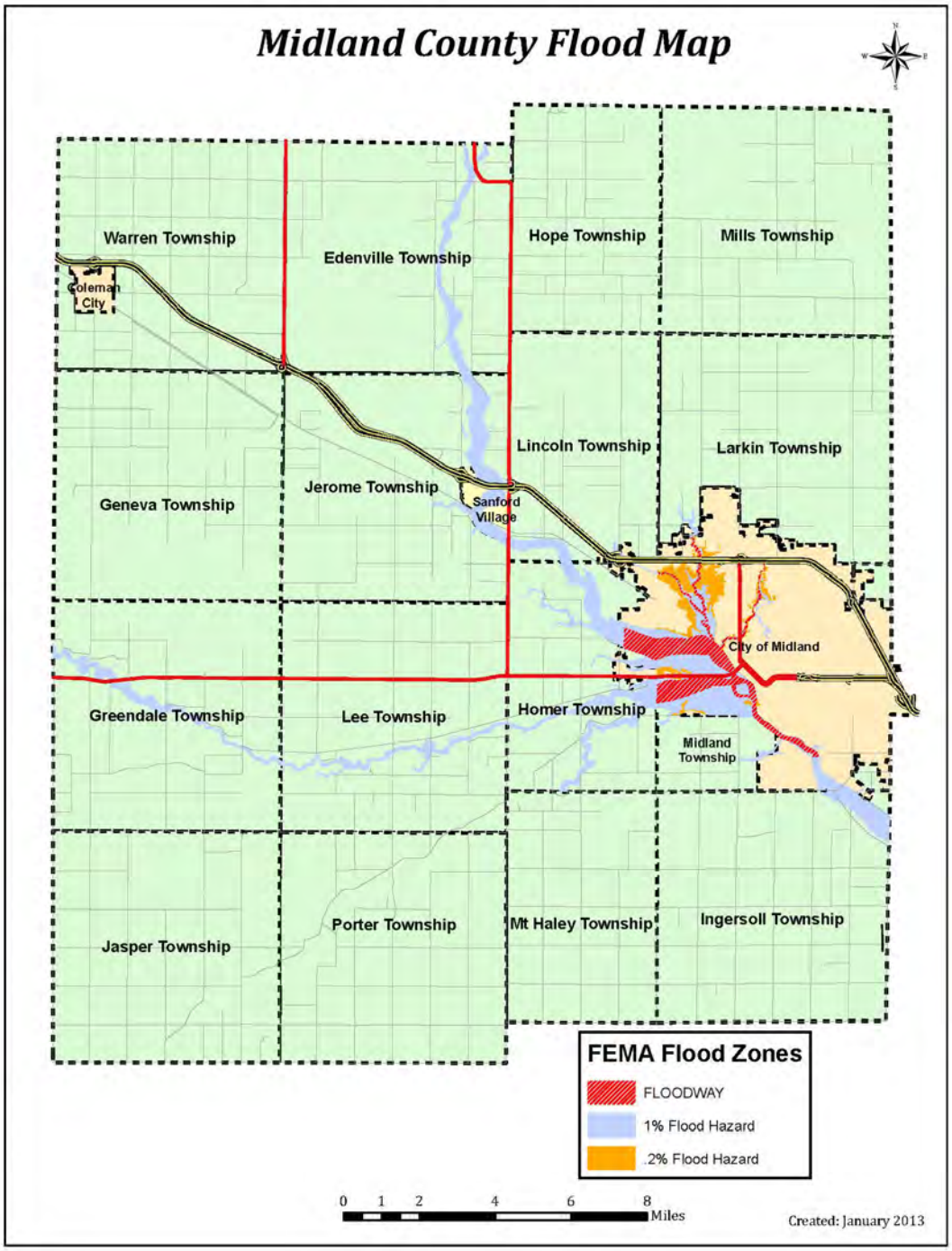
The 2020 dam failure is the first of a failure being recorded in Midland County. In going back to 1929, when the dam was constructed, the likelihood of a future dam failure is 1% chance annually. This falls in line with the annual chances of a 1% flood event.

Climate Change Impacts on Dam Failures

Climate change can have many indirect impacts on dam failure. The cause of most dam failures is flooding from prolonged periods of rainfall. In Midland, increased future precipitation, and increases in extreme precipitation events, may increase the likelihood of dam failure due to flooding or inadequate spillway capacity. Warmer temperatures resulting in decreased snow accumulations and more snow falling as rain could have a similar effect. The increase in precipitation directly led to a multi-dam failure in 2020. The sequential failures of Edenville and Sanford, in turn, led to a 0.05% flood event.

The Four Lakes Task Force is using a Risk Informed Design approach in the design of the rebuild of their dams. Through studies, it has been determined that the dams have little influence on flooding downstream, apart from a failure of a dam. So while flooding is projected to increase, the resulting impact from a dam would be incremental. The Dams are being designed to pass a 0.05% flood frequency.

Flooding



Jurisdictions Most Vulnerable to Riverine Flooding: *City of Midland, Village of Sanford, Midland Township, Homer Township and Lee Township.*

Jurisdictions Most Vulnerable to Flash Flooding: *All*

Flooding includes two types of flooding, riverine flooding and flash flooding.

Riverine flooding is defined as when streams and rivers exceed the capacity of their natural or constructed channels to accommodate water flow and water overflows the banks, spilling out into adjacent low-lying, dry land. Riverine floods are generally caused by prolonged; intense rainfall, snowmelt, ice jams, dam failures, or any combination of these factors. Such over-bank flows are natural events that may occur on a regular basis. Riverine floods occur 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. The majority of the water that comes through the river system in Midland County is the result of rain runoff north and west of the County. It is estimated that 60% of the water comes from Gladwin County and points further north, while 40% comes from Isabella and Gratiot Counties. Many areas of Michigan are subject to flooding, including areas of Midland County.

Historical Data: Tittabawassee River Flooding Moderate Flood Stage is 25 feet.		
Date	Type	Crest in Feet
3/28/1916	Flood	29.7
4/19/1933	Flood	25
6/3/1945	Flood	28
3/8/1946	Flood	28.8
3/21/1948	Flood	29.5
4/5/1950	Flood	25.8
7/10/1957	Flood	26.34
4/4/1959	Flood	27.82
4/1/1960	Flood	27.08
4/13/1965	Flood	26.98
5/18/1974	Flood	26.33
9/2/1975	Flood	27.08
3/22/1976	Flood	27.6
9/13/1986	Flood	33.89
3/13/1990	Flood	25.43
4/10/1991	Flood	25.2
4/16/1991	Flood	25.41
4/17/1991	Flood	25.4
6/19/1996	Flood	25
3/7/2004	Flood	27.45
5/25/2004	Flood	25.5
3/15/2006	Flood	26.97
4/29/2011	Flood	27.75
4/13/2013	Flood	26.8
4/20/2013	Flood	28.37
4/15/2014	Flood	28.26
6/24/2017	Flood	32.15
2/22/2018	Flood	27.52
3/16/2019	Flood	25.41
1/1/2020	Flood	25.27
5/20/2020	Flood	35.05

Moderate flooding, as defined by the National Weather Service (25'-27' crest), occurs almost every year along the Tittabawassee River in Midland and Sanford. In the past 107 years the National Weather Service has issued official Flood Warnings for the Tittabawassee River thirty (30) times.

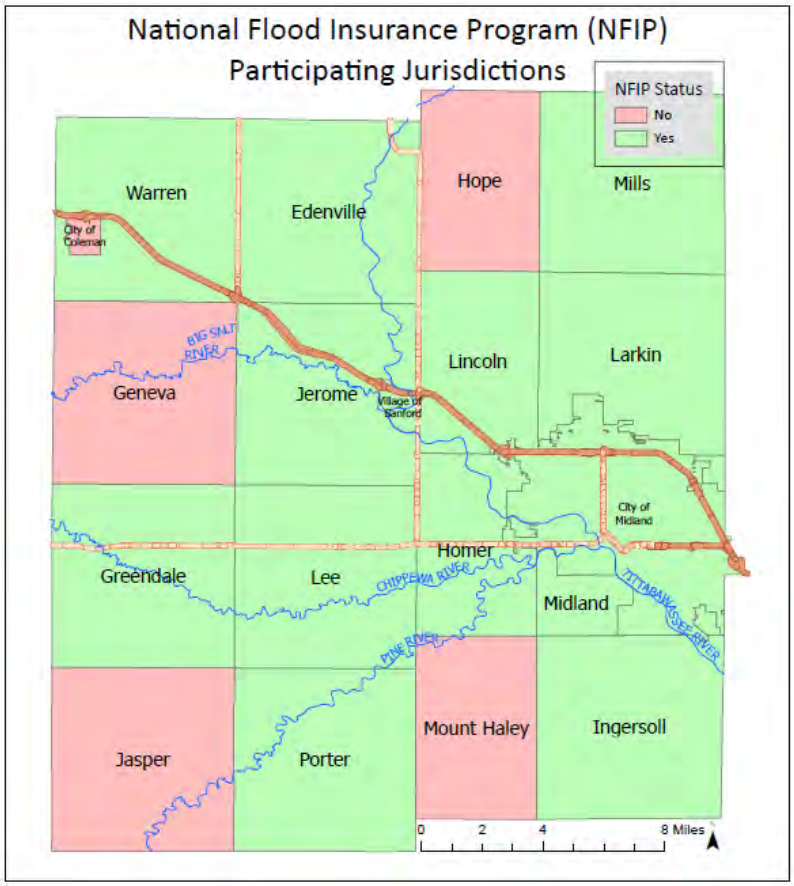
Midland County has also experienced flooding due to ice jamming. Flooding caused by an ice jam along the Pine River flooded homes in Lee and Homer Township's in February 1997. Another ice jam was experienced along the Chippewa River just north of the Pine River confluence flooding out yards and some homes in Homer Township in February of 2018.

Major flooding, as defined by the National Weather Service (28'+ crest) occurs less frequently and is usually associated with significant heavy rainfall across most of the watershed. In September 1986, a Presidential Disaster was declared for Midland County due to a 100 year flood event on the Tittabawassee River. The river rose to nearly 10 feet above official flood stage, causing damage to many homes, businesses and local infrastructure.

In April 2013 the river crested at 28.37 feet or 4.37 feet above official flood stage. The April 2013 event became part of Presidential Disaster Declaration DR-4121-MI. Over $4.8 million in Public Assistance was awarded across the State.

In June 2017, Midland County experienced its largest flood event in over 25 years. Five to eight inches of heavy rain fell over much of the Tittabawassee watershed causing flash flooding in rural ditches and drains which led to the rise of local rivers. The Tittabawassee River rose eight foot above flood stage. The June 2017 event became part of Presidential Disaster Declaration DR-4326-MI. Over $13 million in public damage was identified in the preliminary damage assessment. More than $5.5 million dollars (SBA) and $6.2 million (FEMA) of assistance was provided to homeowners and local businesses in Midland County.

In 2020, Midland County saw the highest level of flooding in the history of the county (35.05 feet) due to failures of the Edenville and Sanford dams. This flooding event led to Emergency Declaration EM-3525-MI to be declared on May 21, 2020 which lead to a Presidential Major Disaster Declaration DR-4547-MI on July 9, 2020 respectively. More than $25M in SBA loans were issued and $20M in FEMA Individual Assistance and was received in the County. The National Flood Insurance Programs received 205 claims, totaling more than $16M in claim payments with average claim of $82,000.

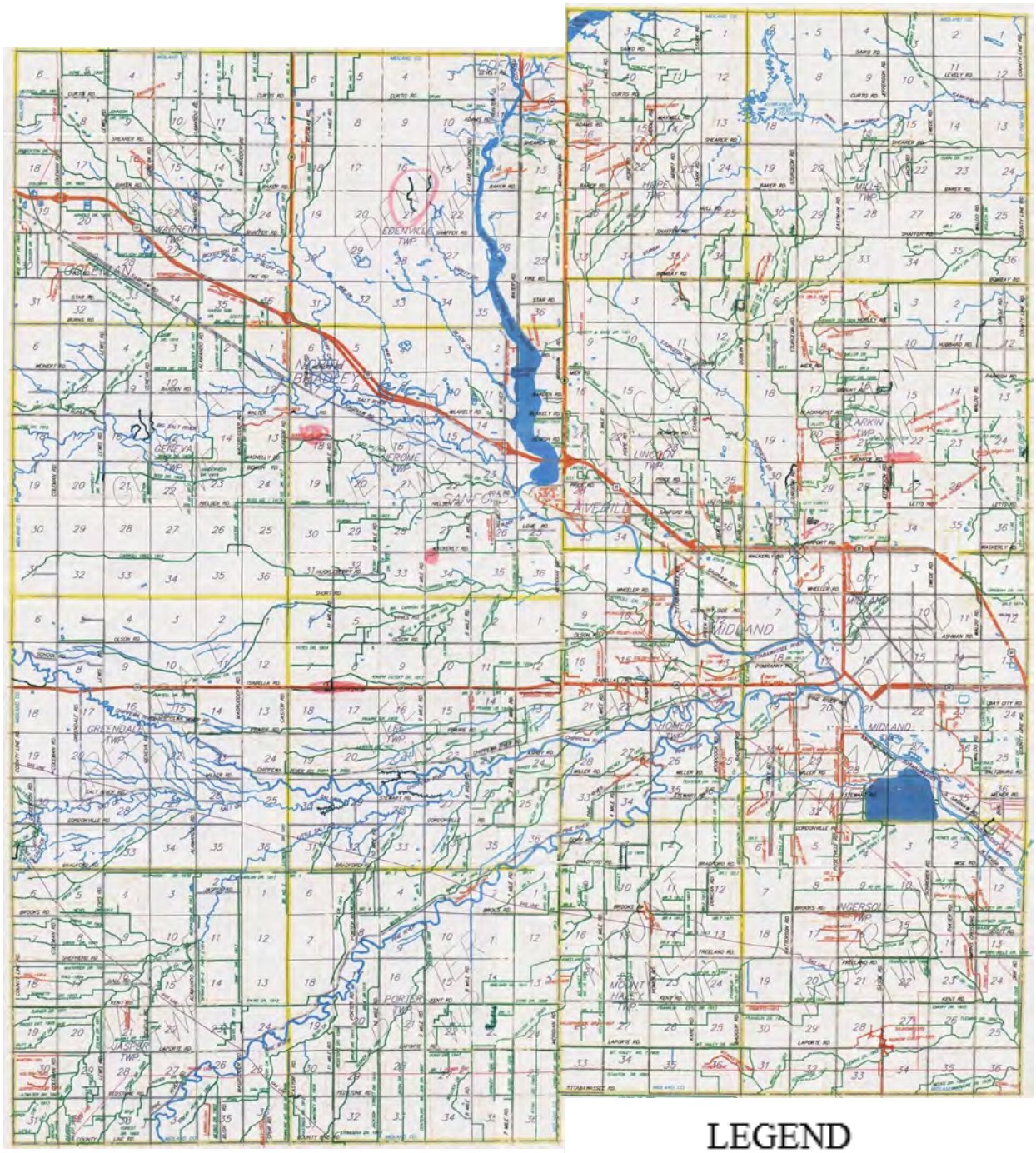


Flash flooding differs from flooding in extent and duration. Flash floods are brief, heavy, flows of water on small streams or in normally dry creeks. Flash floods are normally the result of intense thunderstorms resulting in significant rainfall and are typically characterized by high velocity water, often carrying large amounts of debris.

In June 2017, rural drains and ditches overflowed, local homes became flooded, and driveways washed out along with some local roads. A majority of the homes impacted in rural areas were well outside the 1% floodplain and lacked flood insurance.

Flash flooding in urban areas typically involves the overflow of storm sewer systems and is usually caused by inadequate drainage following heavy rainfall or rapid snowmelt. On June 21, 1996 the City of Midland and its residents experienced a flash flood that would eventually lead to a Presidential Disaster Declaration. The Federal Emergency Management Agency reported that as a result of the flash flood, 821 applicants received $1.8 million in federal assistance for flood damages to public and private property.

Midland County Drainage Map



As a result of the 2017 and 2020 flooding events, many of the same homes were impacted both times in relatively short time frames. Since the 2020 event, the City has worked with Flood Mitigation Funding completed more than 20 property acquisitions to remove homes from the floodplain. Many more residents elevated their homes to meet cost of compliancy due to flood claims in the rebuilding and recovery efforts.

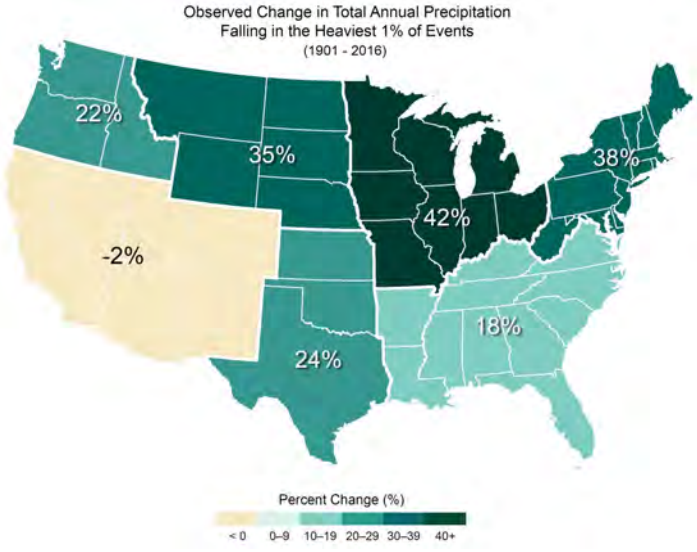
The Village of Sanford also since has completed 8 property acquisitions to remove homes from the floodplain and has taken strong measures to make changes in their community zoning and master plans to preserve these mitigation measures and build flood resiliency.

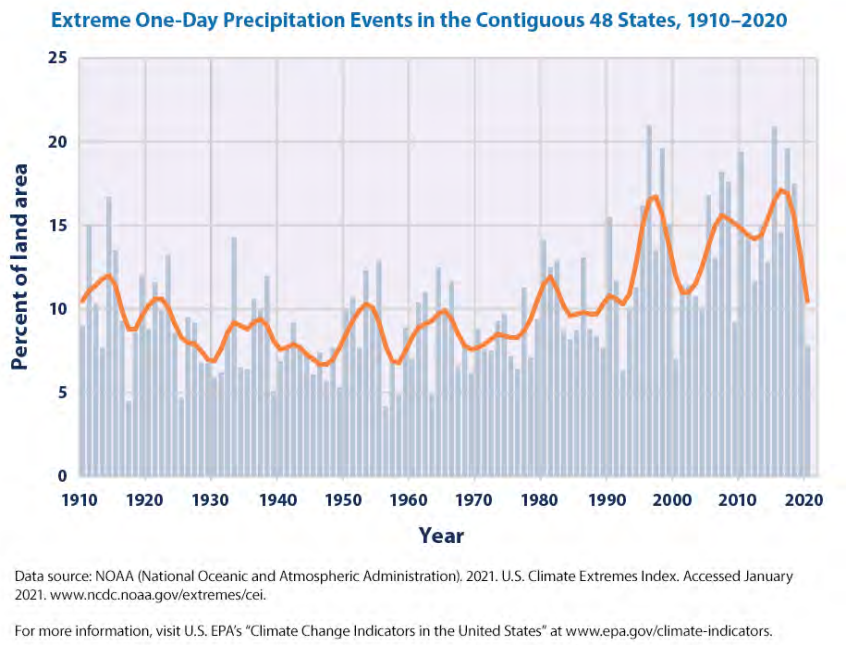
According to the National Flood Insurance Program in 2023, there are 121 repetitive loss structures, three of which are severe repetitive loss structures in Midland County. According to the FEMA Resilience & Analysis Planning Tool, only 24% of residential structure in the Special Flood Hazard Area have flood insurance. Between the repetitive loss numbers and the number of property owners having flood insurance, future flood events are going to be difficult to financially recover from.

Climate Change on Flooding

Per the 2019 Michigan Hazard Mitigation Plan, "One of the Michigan trends connected with climate change is to experience increasing amounts of precipitation. Moreover, this precipitation is considered more likely to take the form of acute (and severe) weather events. As mentioned in the winter weather sections, a larger proportion of snow precipitation occurring in snowstorm events can cause more extensive snow accumulation which, under unlucky temperature patterns, may add to the drainage burdens of the normal melting and rainfall patterns of the spring season. In short, spring flood risks are likely to worsen, as are ice jam related winter flood risks"

Measures in the relative amount of annual rainfall delivered by large, single-day precipitation events shows change over time. Extreme precipitation events are defined as days with precipitation in the top 1 percent of all days with precipitation.





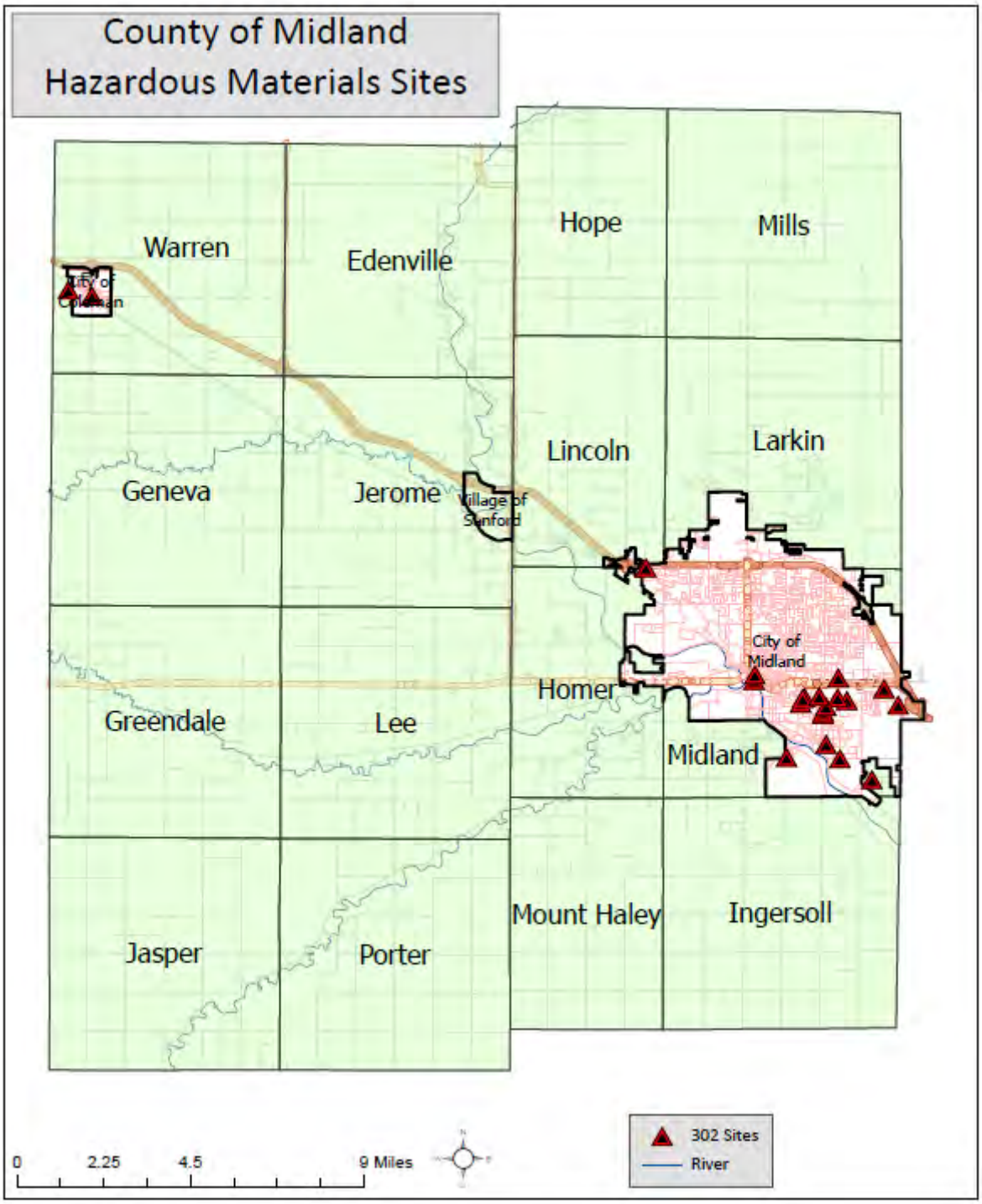
Key points to understand regarding heavy precipitation events:

- Increase in the intensity or frequency of heavy precipitation are key factors that affect the risk of floods and flash floods.
- The information presented here is relevant to decisions about retention of surface water for flood mitigation or recreation use.
- Crop selection and planting dates are influenced by the timing and frequency of heavy rains.
- The built environment, particularly culverts, dams, and reservoirs are designed specifically to accommodate the frequency and intensity of heavy precipitation.

Impacts to Socially Vulnerable Populations

Floods have the potential to disproportionately impact socially vulnerable populations. Economically constrained households (homeowners and renters) may have trouble affording flood insurance premiums and, as such, may be less likely to purchase flood insurance. In the event of a flood, these households have a diminished capacity to repair homes, remediate mold, and replace belongings destroyed in a flood. In Midland County, extreme precipitation events have caused basement flooding and sewer backups. Economically constrained households may not be able to afford preventative measures, such as backwater check valves or sump pumps. Certain populations may face difficulty evacuating during an extreme flood event, such as the elderly, disabled, or those who are otherwise mobility challenged.

Hazardous Material Incident - Fixed Site



Jurisdictions Most Vulnerable: *City of Coleman, City of Midland, Midland Township, and Warren Township.*

A hazardous materials release is defined as an uncontrolled release of hazardous material 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 substances that, 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.

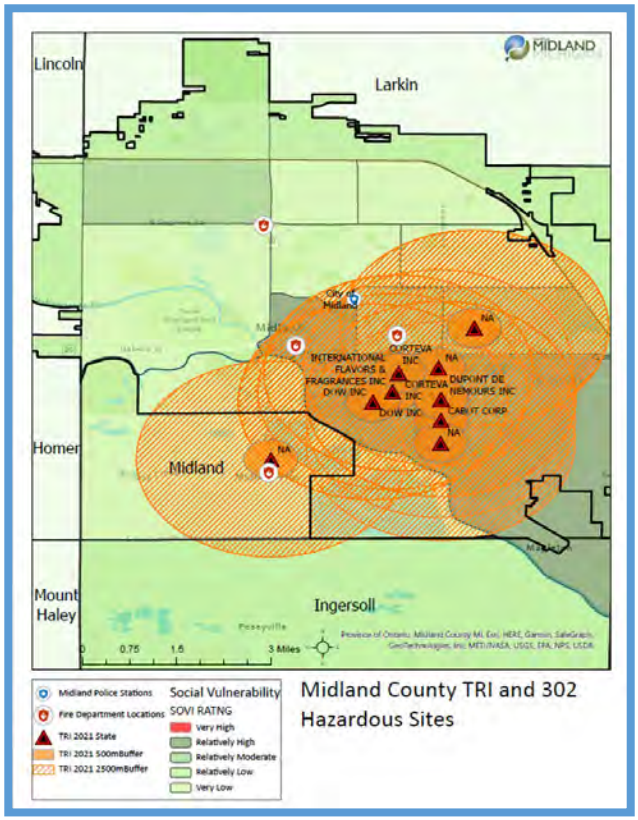
There are twenty-four facilities in Midland County that use or store reportable quantities of extremely hazardous substances under the U.S. EPA Superfund Amendment and Reauthorization Act of 1986. Midland is also the home of Dow Chemical Company which has large fixed-site chemical storage and manufacturing facilities. Midland County has experienced a history of hazardous material releases. In June 1991, there was a release of hydrochloric acid from a faulty tank at Dow Michigan Operations. This was followed by a release of the product Dow Therm in April 1992. A serious liquid propane gas fire occurred at an LP storage facility in Lee Township in April 1993, causing the evacuation of a large area in central Midland County. Dow Chemical Michigan Operations experienced a release of the chemical CMME in March 1997. A corroded pipeline at Dow Corning caused the release of hydrochloric acid vapors in August 1997.

As a result of these incidents, outdoor emergency warning sirens were installed to provide warning coverage of a hazardous material release up to 5 miles surrounding the above mentioned facilities.

Between 2015 and 2022 when Dow Chemical announced increasing its ownership of Dow Corning to 100%, a handful of additional company mergers and split offs have been completed. Today, chemical production facilities in Midland include; Cabot, Corteva, Dow, Dow Silicones, DuPont, Hemlock Semiconductor, IFF and Trinseo.

Historical Data: Hazardous Materials Release - Fixed Site		
Date	Location	Type
06/19/91	Dow Chemical	Hydrochloric Acid Release
04/06/92	Dow Chemical	Dow Therm Release
4/9/1993	Lee Towship	Liquid Propane
03/19/97	Dow Chemical	CMME Release
08/17/97	Dow Corning	Trichlorosilane Release
08/30/97	Dow Chemical	Styrene Release

In 2017, the City of Midland approved the closure of Saginaw Rd between Mark Putman Drive and Salsburg Road to allow Dow Chemical to better enclose their site. All public vehicle traffic was deverted to Waldo Road around the plant. Dow also offered opportunities to residents along Waldo Road to buy out their homes due to the increased traffic flow on Waldo Road. This inherently created a larger green space outside the facility of residential housing. This eliminated 12 homes from Waldo Road.

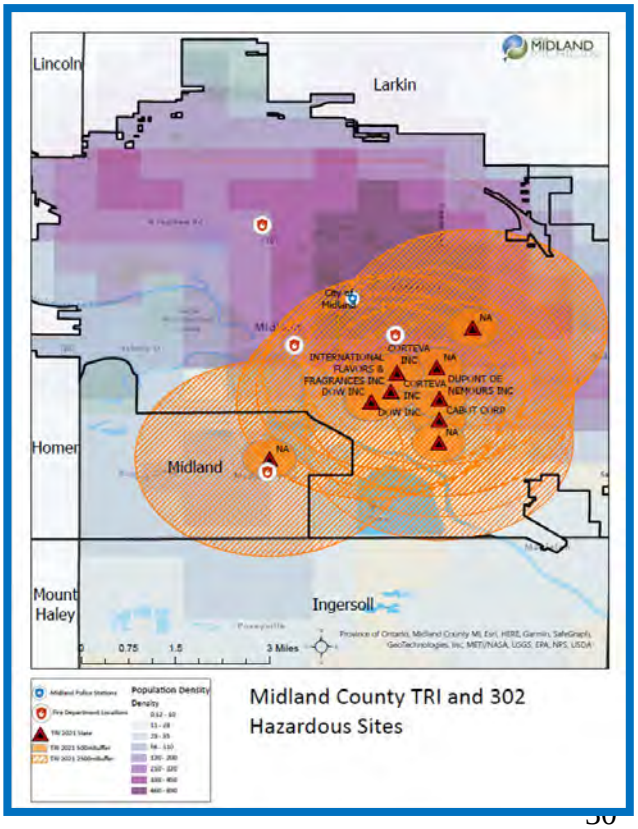


Impacts to Socially Vulnerable Populations

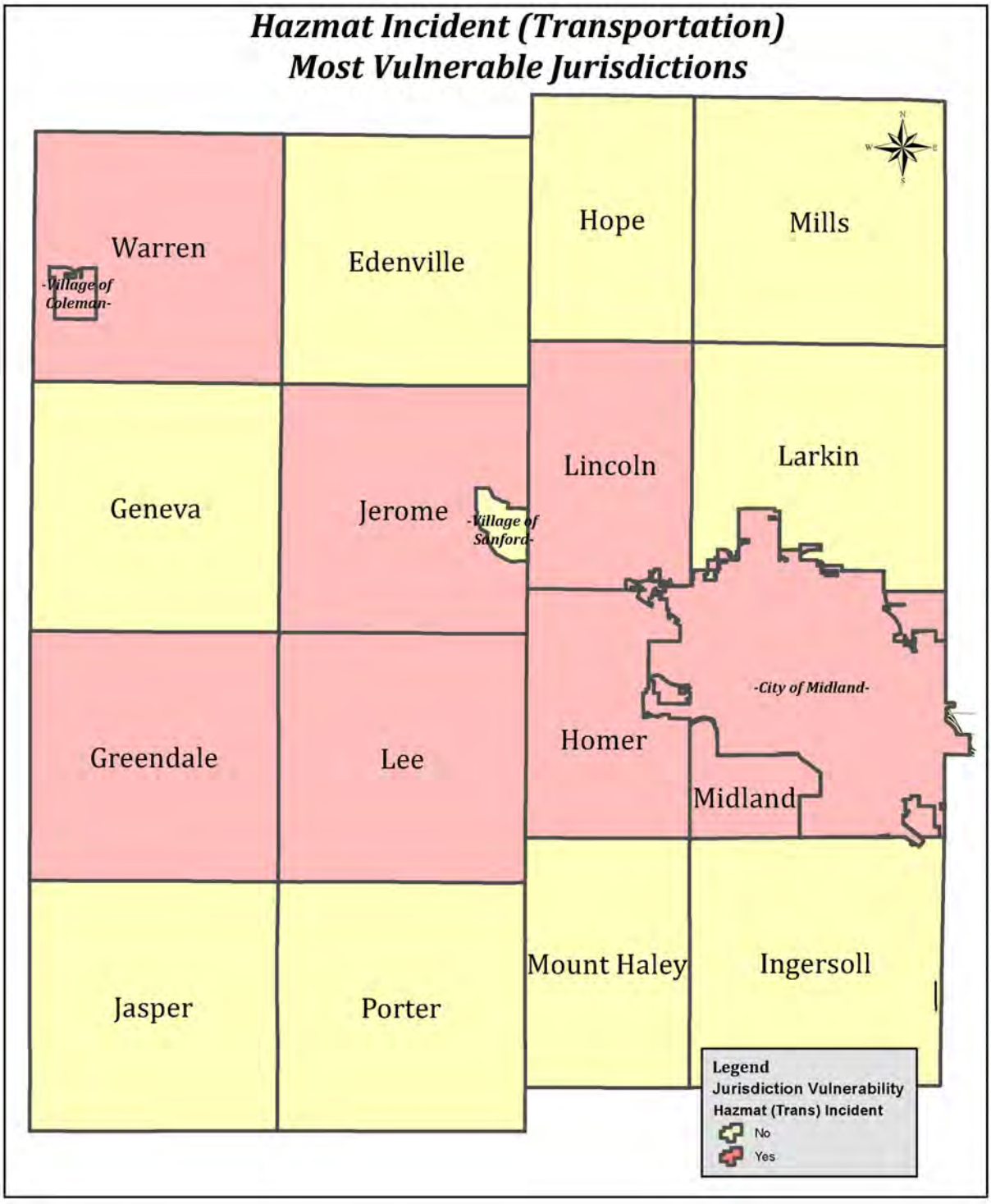
Socially vulnerable populations may be disproportionately impacted by hazardous materials releases. Low-income neighborhoods are more likely to be located near facilities with noxious uses or adjacent to railroads or large highways. Illegal dumping of hazardous materials is also more likely to occur in low-income areas relative to high-income areas. Further, appropriate response measures for hazardous materials releases are not uniform – some events may require evacuations while others may require sheltering in place. Measures may include closing windows, sealing doors, and switching off HVAC intakes. Populations without access to information, such as internet or cellular service, or individuals with limited English proficiency may face challenges acting on response measures issued by the city or county. In addition, the elderly or mobility challenged may struggle to evacuate or shelter in a timely manner. The deaf or hard of hearing may not hear audible evacuation orders or warnings. Once evacuated, deaf individuals or those reliant on medications or medical devices will require additional services and care considerations during response. Additionally, those without health insurance may delay seeking out and receiving necessary health care services or emergency care.

Climate Change

Climate change is not expected to have direct impacts on hazardous materials incidents. It is common for hazardous materials incidents (i.e., contamination) to occur as a secondary impact of flooding. Therefore, the projected increase in extreme precipitation events in Midland County may indicate a subsequent increase in hazardous material incidents. Generally, if the frequency and intensity of natural hazards increases due to climate change, the frequency of hazardous material incidents may increase as a result.



Hazardous Material Incident – Transportation



Jurisdictions Most Vulnerable: *City of Coleman, City of Midland, Greendale Township, Homer Township, Jerome Township, Lee Township, Lincoln Township, Midland Township, and Warren Township*

Hazardous Material Incident is defined as an uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property or the environment. Local modes of transportation - highway, railroad, airway, and pipeline - carry hundreds of hazardous material shipments through the community each day. A transportation accident involving any one of those hazardous material shipments could cause a local emergency affecting many people. 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.

Midland County does have a history of chemical transportation incidents in transportation. In July 1989, Midland County was affected by a release of trichlorosilane from a railcar as a result of a train derailment near Saginaw County. In August 1995, a tank truck traveling on M-20 in Greendale Township leaked hydrochloric acid. Labor Day weekend 1997 was interrupted by a leak of styrene from an over-pressurized railcar at Dow Chemical Michigan Operations. On June 10, 1998, the US-10 freeway was closed for about 14 hours after a semi-truck hauling hydrochloric acid overturned in the median just west of the City of Midland.

Historical Data: Hazardous Materials Release - Transportation			
Date	Location	Type	Chemical
7/23/1989	Freeland	Train Derailment	Trichlorosilane
9/23/1994	Midland	Truck	Hydrofluoric Acid
8/7/1995	Greendale Township	Truck	Hydrochloric Acid
6/10/1998	Lincoln Township	Truck	Hydrochloric Acid
9/15/1999	Midland	Truck	Xylene
1/29/2013	Lee Towship	Truck	Propane
1/5/2014	Midland	Truck	Cyclopolydimethysiloxane

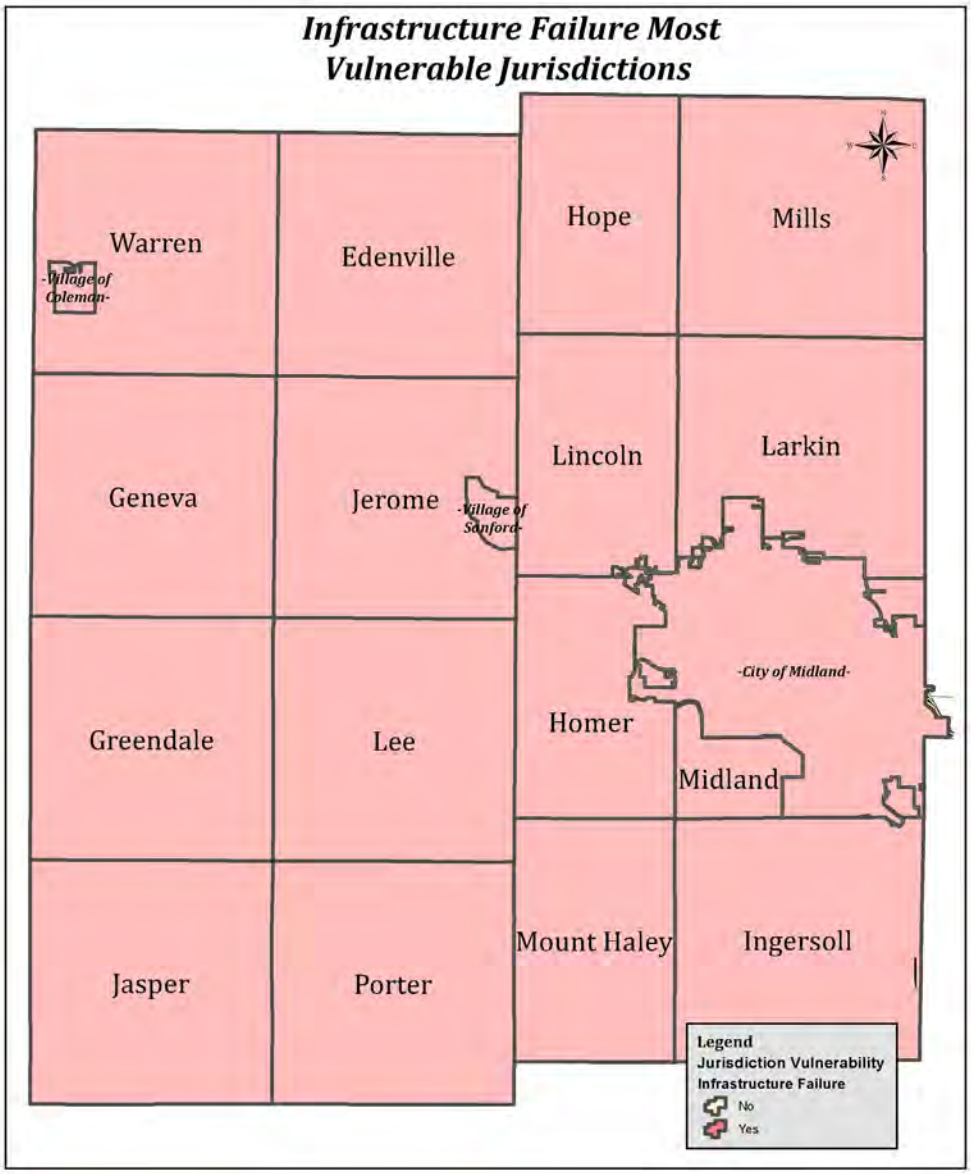
Impacts to Socially Vulnerable Populations

Socially vulnerable populations may be disproportionately impacted by hazardous materials releases. Low-income neighborhoods are more likely to be located near railroads or large highways. Illegal dumping of hazardous materials is also more likely to occur in low-income areas relative to high-income neighborhoods. Further, appropriate response measures for hazardous materials releases are not uniform – some events may require evacuations while others may require sheltering in place. Measures may include closing windows, sealing doors, and switching off HVAC intakes. Populations without access to information, such as internet or cellular service, or individuals with limited English proficiency may face challenges acting on response measures issued by the city or county. In addition, the elderly or mobility challenged may struggle to evacuate or shelter in a timely manner. The deaf or hard of hearing may not hear audible evacuation orders or warnings. Once evacuated, deaf individuals or those reliant on medications or medical devices will require additional services and care considerations during response. Additionally, those without health insurance may delay seeking out and receiving necessary health care services or emergency care.

Climate Change

Climate change is not expected to have direct impacts on hazardous materials incidents. However, hazardous materials incidents can be triggered by certain natural hazards, such as transportation incidents involving hazardous materials preempted by blinding downpours or severe winds. Therefore, the projected increase in extreme precipitation events in Midland County may indicate a subsequent increase in hazardous material incidents. Generally, if the frequency and intensity of natural hazards increases due to climate change, the frequency of hazardous material incidents may increase as a result.

Infrastructure Failures



Jurisdictions Most Vulnerable: *All*

Infrastructure failure is 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 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 inter-related systems fails due to disaster or other cause - even for a short period of time - it can have devastating consequences.

- Loss of electricity:
    - During periods of extreme heat or cold, a life-threatening risk can occur in homes due to lack of heating and cooling.
    - Roughly 10% of Medicare dependents are medically dependent on electricity.
    - Lack of emergency information from television, radio or internet.
    - During periods of heavy rains when sump pumps do not have backup power, flooding can occur in homes.
- When storm drainage systems fail due to damage or an overload of capacity, serious flooding can occur.
- Public water service disruptions have a significant impact on inter-related systems, such as fire protection, wastewater, local healthcare providers, government services, and manufacturing operations. Not to mention access to drinking water.
- Loss of communications services due to internet outage, cell phone outage or other. Society has become more reliant on technology to provide and receive critical services.

All of these situations can lead to disastrous public health and safety consequences if immediate measures are not taken. If the failure involves more than one system, or is large enough in scope and magnitude, whole communities and even regions can be negatively impacted. The electric power infrastructure in Midland County has demonstrated to be vulnerable in the past. Weather related storms have left residents and businesses without power for several days.

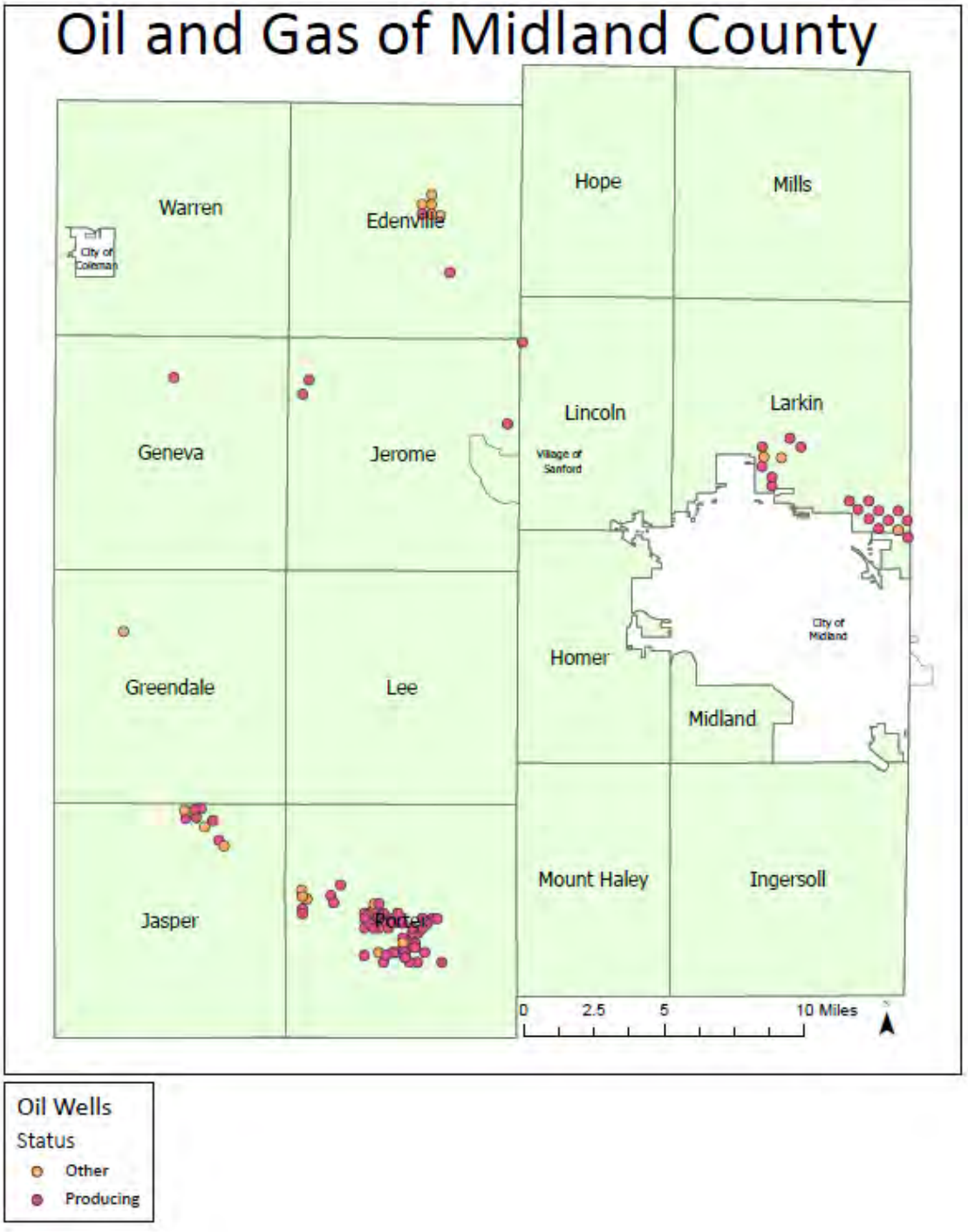
Impacts to Socially Vulnerable Populations

Certain populations are more likely to experience disproportionate impacts from cold weather and power outages. Ice Storms can cause power lines to become completely covered in ice and then break causing power outages. The elderly and very young are more susceptible to weather related illnesses, and therefore may be more vulnerable to power outages that occur during extreme weather events. Individuals reliant on medical equipment, such as oxygen pumps, motorized stair lifts, may experience a medical emergency during a power outage, especially if backup power is not available to them. Income-constrained households may experience loss of refrigeration and food spoilage more acutely than non-constrained households. In addition, households without an English-speaker may face challenges with reporting outages or receiving information regarding outage notifications and services.

Climate Change

Climate change is expected to have indirect impacts on power outages. Changing climatic conditions are expected to increase severe storm activity and tornadic activity, which could increase the frequency of power outages in Midland County. As power outages often occur during summer months when thunderstorms are more common, the increase in extreme heat days may also increase the impact of power outage events (e.g., increase the likelihood of heat-related illness during an outage). Further, warmer temperatures are expected to increase future demand for cooling, which may contribute to controlled outages or blackouts.

Oil and Gas Well Accidents



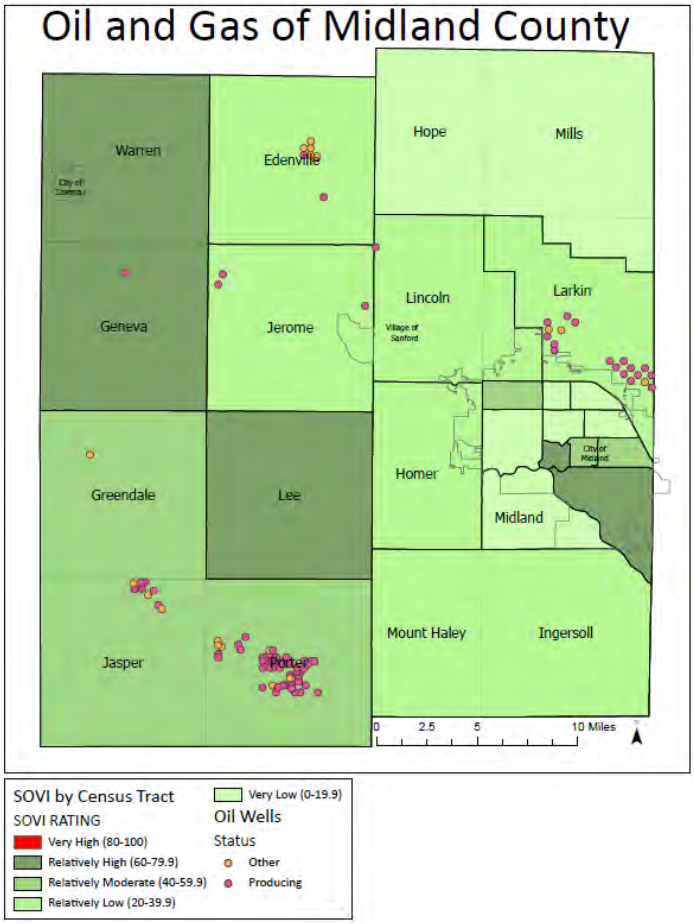
Jurisdictions Most Vulnerable: *Edenville Township, Porter Township, Jasper Township, and Larkin Township.*

Accidents can result in the uncontrolled release of oil, gas, or the poisonous by-product hydrogen sulfide, from wells. See Petroleum and Natural Gas Pipeline Accidents for hazard description. Oil and gas are produced from fields in over 60 counties in the Lower Peninsula including Midland County. Emergency responders in the county have encountered problems with oil and gas wells on occasion, but none have created a widespread emergency.

In the early 1900s there was a large amount of oil drilling across areas of the county. Hundreds of oil wells have since been remediated and returned to the grounds natural state. Greendale Township's historical records indicate numerous tragedies involving oil fields that resulted in explosions, fires, and oil spilled into local drains and the Chippewa River. Many of these incidents also resulted in the loss of life of oil workers.

Social Vulnerability Impacts

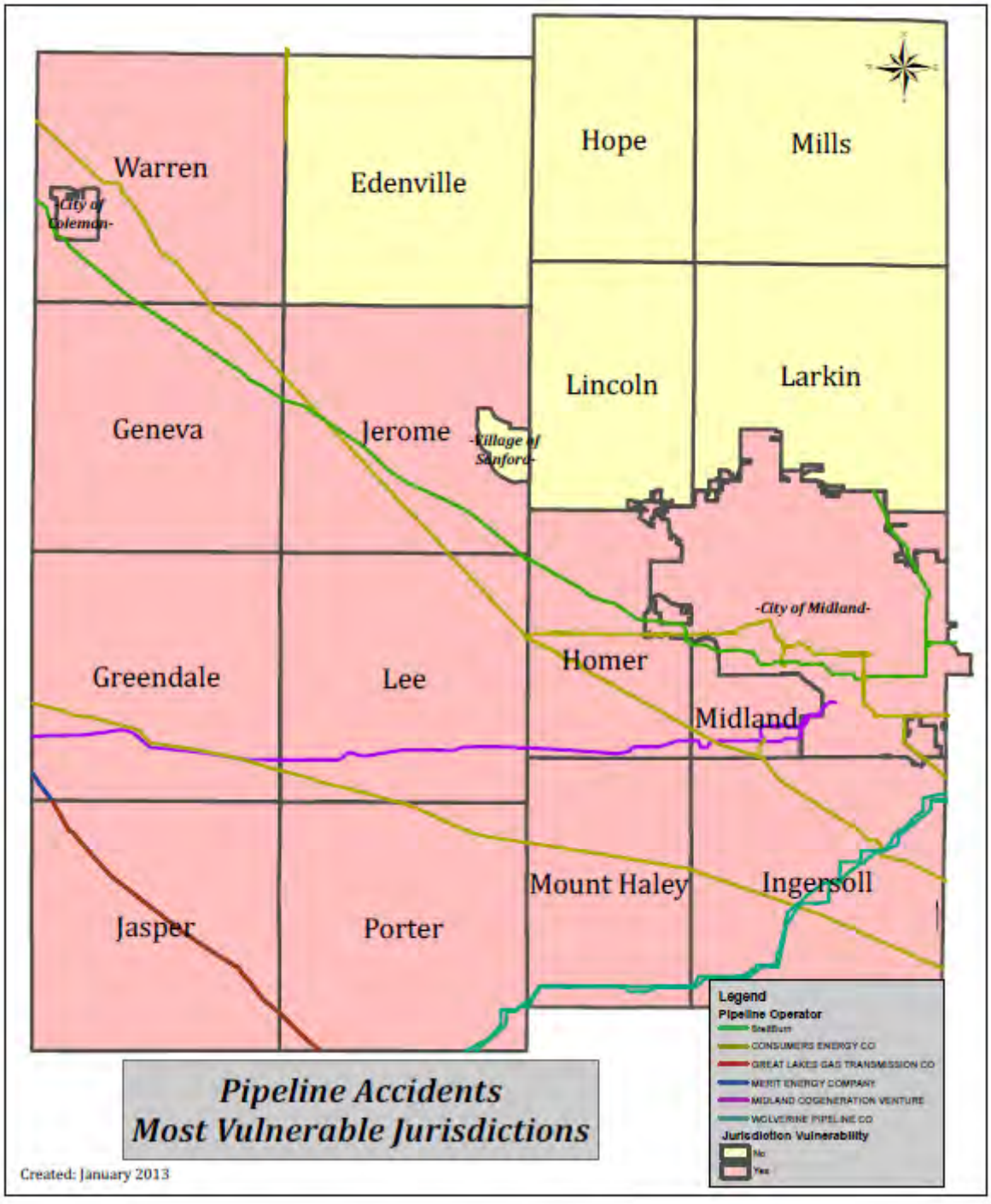
Oil spills tend to affect those who are on the higher end of the social vulnerability scale due to not having the emergency funds and or ability to relocate or rebuild their lives. Additionally, it may require the evacuation of the area which means people may be displaced for an extended period of time which can cause mental and financial strain due to not having the resources to move back.



Climate Change Impacts

As spilled oil on land prevents water absorption by the soil, spills on agricultural locations or grasslands have the effect of choking off plant life. Oil discharged into the environment can harm habitats such as wetlands. Habitat losses may alter migration patterns and disrupt life cycles of animals and result in erosion of shorelines. Many of the effects will not be seen for years so recovery efforts can be difficult.

Petroleum and Natural Gas Pipeline Accidents



Jurisdictions Most Vulnerable: *City of Coleman, Warren Township, Geneva Township, Greendale Township, Jasper Township, Porter Township, Jerome Township, Lee Township, Homer Township, Mt. Haley Township, Ingersoll Township, Midland Township, City of Midland.*

A pipeline accident is defined as 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°F 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. Many miles of pipeline, owned and operated by a variety of companies, pass through Midland County. Natural gas and an assortment of petroleum products are transported through these pipelines. Although most pipelines are in rural areas, there are residential areas, businesses and public infrastructure potentially at risk if a pipeline emergency were to occur.

An oil pipeline break happened on July 27, 2021, in Porter Township; the pipeline is owned by Miller Energy. There was contamination found on the eastern side of the Bush Drain. Miller Energy coordinated with EGLE to identify further contamination and completed cleanup efforts.

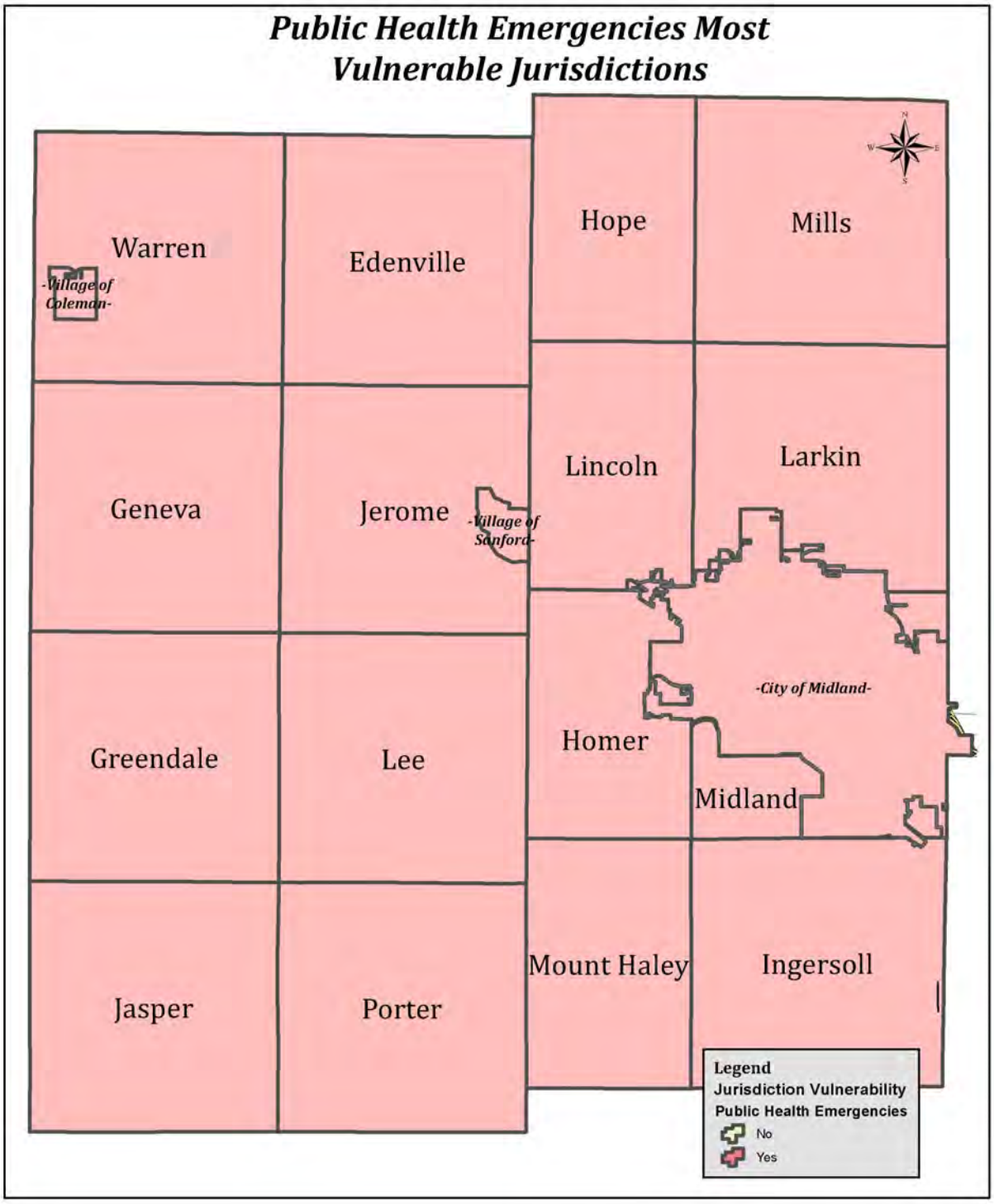
Impacts to Socially Vulnerable Populations

Studies have shown a positive correlation between pipeline density and social vulnerability. Individuals living in older buildings, substandard housing, or housing not built to code may be more likely to experience a natural gas leak due to aging or damaged infrastructure. Additionally, those individuals may not have the means or transportation to evacuate from the incident area.

Climate Change

There are no known direct impacts of climate change on the frequency and severity of petroleum and natural gas pipeline accidents.

Public Health Emergencies



Jurisdictions Most Vulnerable: *All*

A public health emergency is the occurrence or imminent threat of an event that results in negative impact to the health and wellbeing of the public.

Public health emergencies can be triggered by:

- Spread of communicable disease;
- Contamination of food or water source(s);
- Disruption in access to adequate water and/or sewer services;
- Exposure to harmful chemical, radiological, or biological agents; or
- Infestation of disease-carrying insects or rodents.

Public health emergencies can impact the public statewide, regionally, or locally. Public health emergencies can occur as primary events, or may occur secondary to another disaster or emergency (e.g. flood, tornado, or hazardous material incident). The scope and magnitude of public health emergencies can vary greatly. The Midland County Department of Public Health (MCDPH) promotes and protects the health of the public and environment through education, prevention, and monitoring programs. When a public health emergency occurs or is imminent, the MCDPH stands ready to respond and collaborate with community stakeholders to reduce negative impact to the public.

Midland County Department of Public Health response history:

Midland County took part in the fight against pandemic influenza in 1918 and against polio and tuberculosis in later years. A measles epidemic in the early 1990s posed a serious threat to public health, and was addressed by implementation of an intensive vaccination program. In 2005 there were two anthrax threats in Midland which were eventually proven to be hoaxes, however, public health responders and emergency responders collaborated to proactively manage the potential threat to community health. In 2009 the MCDPH responded to the threat of an H1N1 influenza pandemic by conducting numerous vaccination clinics. An Ebola outbreak in 2014 resulted in increased training and monitoring for disease occurrence to ensure safety of the community. In 2015, monitoring began for the Zika virus and monitoring remains ongoing. An outbreak of Hepatitis A began in Michigan in 2016, and Midland County was added as an outbreak county in 2018, resulting in increased vaccination and initiation of a public campaign to raise awareness and protect the Midland community.

In 2020, COVID-19 emerged as a public health threat, and was declared a pandemic by the World Health Organization (WHO) March 11, 2020. Midland County's first confirmed case occurred on March 17, 2020. In May 2020, shortly after the pandemic declaration, Midland County experienced a catastrophic dam failure. The dam failure resulted in a 500-year flood event, displacing ~10,000 residents from their homes and/or businesses, requiring public health staff to simultaneously coordinate response to a public health emergency caused by the COVID-19 pandemic, and a public health emergency caused by the flood event. MCDPH responded to the COVID-19 pandemic and flood event and provided: ongoing disease education (including a COVID-19 hotline), epidemiological surveillance, case investigation and contact tracing, vaccine clinics, and continuity of care for non-COVID-19 preventative health programs.

Socially Vulnerable Populations

Socially vulnerable populations may experience the negative impacts of public health emergencies at disproportionate levels compared to less vulnerable populations. Negative impacts could include: barriers to basic needs (e.g. food, water, housing, medical care, etc.), increased disease occurrence/severity, missed work, missed school, loss of income, new or worsened mental health conditions, etc.

Populations at disproportionate risk during public health emergencies include:

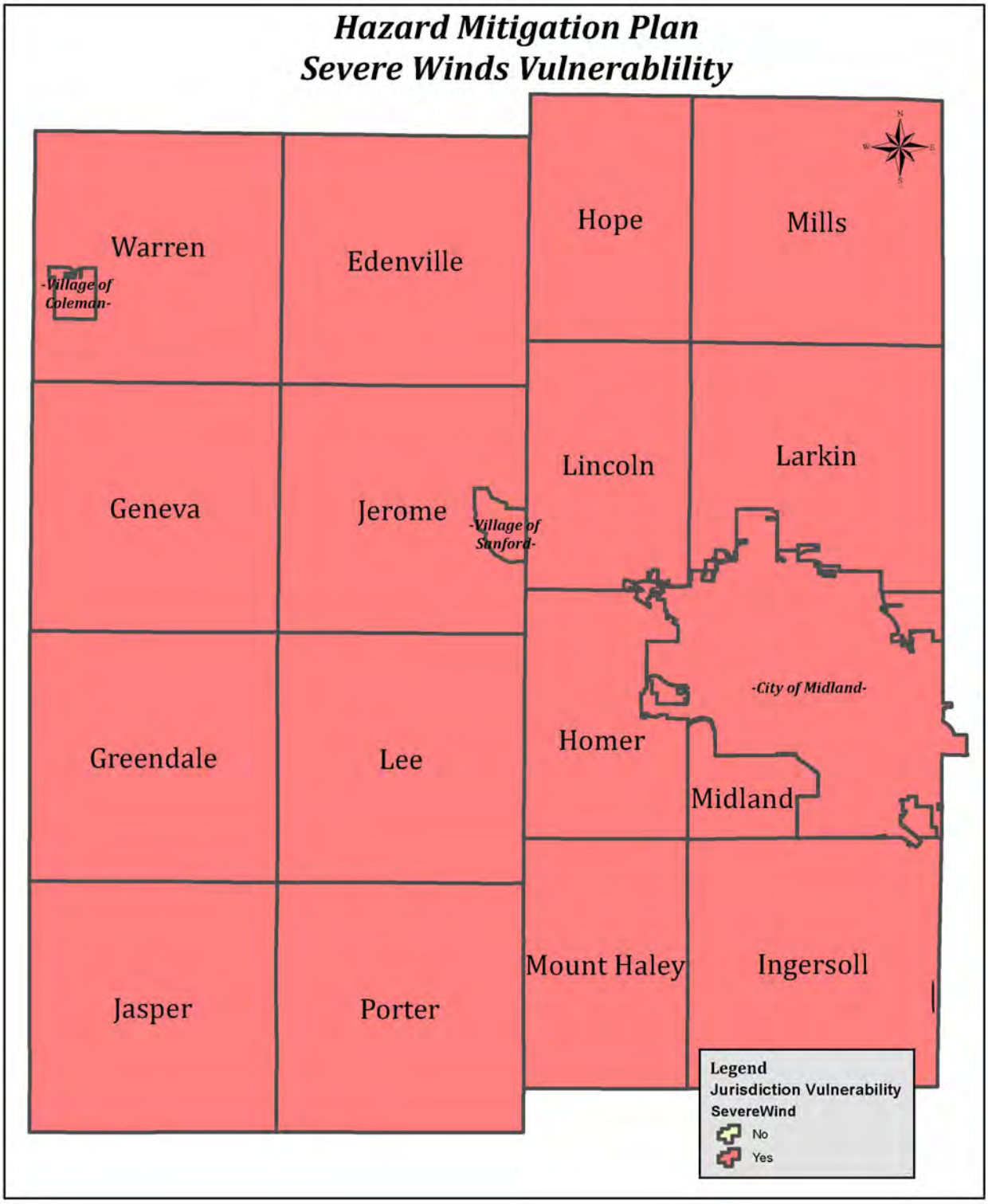
- Immunocompromised individuals (e.g. elderly, persons with co-morbidities)
- Economically disadvantaged/stressed households (e.g. living at or below poverty line)
- Mobility or transportation impaired individuals/households
- Residents living in communal living conditions
- Individuals that spend time in crowded conditions
- Single caregiver households

Climate Change

Increases in temperature, precipitation, and humidity all have impacts on public health. The impacts are dependent on each type of public health risk. For instance, warmer and wetter conditions create a more favorable environment for the growth and spread of some vector-borne infectious diseases, such as mosquito-borne viruses. Insects also have a limited range of temperatures where they can live, which may bring new insects to the area or lead to the decline of others. Conversely, warmer and more humid weather generally weakens the spread of certain respiratory illnesses, such as influenza.

Changing climate conditions may also lead to virus mutations and adaptation leading to a rise in emerging diseases. It will also shift habitats for wildlife and livestock, which may bring animals, and their diseases, closer to humans. Beyond disease, more extreme heat days and more precipitation may also deter people from outdoor exercise which may increase health conditions, such as diabetes. Another area of concern is wildfires as the amount of burned debris in the air is causing hazardous air quality. This was experienced in the 2023 Canadian Wildfires, which caused hazardous air quality levels across the northeast United States and the State of Michigan.

Severe Weather



Jurisdictions Most Vulnerable: *All*

A. Severe Thunderstorms: are officially defined as storms that are capable of producing hail that is an inch or larger or wind gusts over 58 mph. Hail this size can damage property such as plants, roofs and vehicles. Wind this strong is able to break off large branches, knock over trees or cause structural damage to trees. Some severe thunderstorms can produce hail larger than softballs or winds over 100 mph. Thunderstorms also produce tornadoes and dangerous lightning; heavy rain can cause flash flooding.

In 2021 the National Weather Service has established a Damage Threat Category for all thunderstorms with three categories Base, Considerable, and Destructive. See chart below for definitions for each category.

Thunderstorm Damage Threat (tag category)	Wind	Hail diameter	WEA?
Base (no tag; default)	58 mph (60 mph will appear in the warning)	1.00 inch (U.S. quarter)	NO
Considerable	70 mph	1.75 inch (golfball)	NO
Destructive	80 mph	2.75 inch (baseball)	YES

(WEA: Wireless Enabled Alerts)

Thunderstorm Events		
Date	Wind Speed (MPH)	Reported Property Damages
8/27/1990	61	
6/17/1992	61	
8/7/1996	60	
7/2/1997	70	$ 10,000
5/31/1998	70	$ 100,000
5/7/2001	61	
7/22/2001	65	$ 75,000
7/18/2007	70	$ 60,000
6/8/2008	61	$ 500,000
5/31/2011	71	$ 3,000

Between 1967 and 2024, there were 145 Thunderstorm events. The above table lists those that had winds of 58 mph or greater.

With 145 reported thunderstorms in 57 years, the average historic rate of occurrence for thunderstorm events across Midland County is approximately one event every two years. Only ten of the 145 reported thunderstorms were considered severe, resulting in 7% being severe.

B. High Winds: can occur during a severe thunderstorm, with a strong weather system, or can flow down a mountain. When winds are sustained at 40-50 mph, isolated wind damage is possible. Widespread significant wind damage can occur with higher wind speeds. According to the National Weather Service, winds 58 miles per hour or greater are classified as a windstorm. During strong thunderstorms, straight line wind speeds can exceed 100 mph. High winds can blow objects around and pose a significant threat to safety.

On June 17, 1992, a late afternoon wind storm knocked out power to much of the Midland area, including the Sheriff's Office Dispatch Center. Many trees and power lines were damaged. It took several days for Consumers Energy to fully restore power to the area.

On May 31, 1998, all of southern and central Lower Michigan was hit by a very severe wind storm called a "Derecho". Trees and power lines were down all over Midland County. Based on a windshield survey done by the Office of Emergency Management, it was estimated that close to thirty agricultural barns and outbuildings were damaged or destroyed by the storm in Jasper, Porter, Mount Haley and Ingersoll Townships. It took over 48 hours for power to be fully restored.

On the evening of July 17, 2007 a severe wind storm hit Midland County, blowing down trees and breaking off utility poles around the City of Midland. Many downtown businesses and City and County offices were closed July 18th due to loss of power.

With 31 reported thunderstorms in 28 years, the average historic rate of occurrence for high wind events across Midland County is approximately 1 to 2 events every year.

High Wind Events		
Date	Wind Speed (MPH)	Reported Property Damages
3/25/1996	50	$ 5,000
10/30/1996	60	$ -
2/27/1997	55	$ -
4/6/1997	70	$ 50,000
6/2/1998	35	$ -
11/10/1998	52	$ 5,000
12/4/2000	35	$ 25,000
2/1/2002	40	$ -
3/9/2002	50	$ 10,000
11/12/2003	52	$ 700,000
4/19/2004	55	$ -
10/30/2004	54	$ 200,000
11/6/2005	52	$ -
11/13/2005	52	$ 25,000
11/15/2005	48	$ 450,000
3/13/2006	52	$ -
12/28/2008	56	$ -
9/7/2010	39	$ 5,000
10/27/2010	52	$ 5,000
5/14/2011	50	$ 25,000
10/15/2011	39	$ 2,000
11/17/2013	50	$ 1,000,000
3/8/2017	56	$ 7,000,000
5/4/2018	52	$ 1,000,000
2/24/2019	52	$ 500,000
11/15/2020	52	$ 200,000
12/11/2021	52	$ 150,000
12/16/2021	52	$ 50,000
3/6/2022	52	$ -
3/31/2022	52	$ -
4/14/2022	52	$ -

Beaufort Wind Scale - One of the first scales to estimate wind speeds and the effects was created by Britain's Admiral Sir Francis Beaufort (1774-1857). He developed the scale in 1805 to help sailors estimate the winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths.

Beaufort Wind Scale in Miles per Hour (MpH), Knots & Kilometers per Hour (Km/H)				
Beaufort Scale Force	**Wind in MpH**	**Wind in Knots**	**Wind in Km/H**	**Description - Wave Heights - *Visible Conditions***
Force 0	0 - 1	0 - 1	0 - 1	Calm - 0m - *Sea looks glassy*
Force 1	1 - 4	1 - 3	2 - 6	Light Airs - 0m - *Glassy ripples on water*
Force 2	4 - 7	4 - 6	7 - 11	Light Breeze - 0.1m - *Smooth wavelets*
Force 3	8 - 12	7 - 10	13 - 19	Gentle Breeze - 0.4m Slight - *Slight waves no white horses*
Force 4	13 - 18	11 - 16	20 - 30	Moderate Breeze - 1m Slight to Moderate - *Occasional white horses*
Force 5	19 - 24	17 - 21	31 - 39	Fresh Breeze - 2m Moderate - *Consistent white horses*
Force 6	25 - 31	22 - 27	40 - 50	Strong Breeze - 3m Rough - *Large waves start to form, more extensive white foam, some blown spray*
Force 7	32 - 38	28 - 33	51 - 61	Moderate (near) Gale - 4m Rough to Very Rough - *Waves begin to heap up and streaks appear down the waves*
Force 8	39 - 46	34 - 40	62 - 74	Fresh Gale - 5.5m Very Rough to High - *Waves get longer, crests break into spindrift and streaks become more pronounced*
Force 9	47 - 54	41 - 47	75 - 88	Strong or Severe Gale - 7m High - *High waves and dense streaks of foam begin to affect visibility*
Force 10	55 - 63	48 - 55	89 - 102	Whole Gale or Storm - 9m Very High - *Very high waves with overhanging crests, lots of spray makes the sea almost white, visibility seriously affected*
Force 11	64 - 72	56 - 63	103 - 117	Violent Storm - 11m Very High - *Exceptionally high waves and a complete coverage of long white foam patches, all crests blown into froth*
Force 12	73 +	64 +	118 +	Hurricane - 14m + Phenomenal - *The air is completely filled with driving spray, visibility extremely difficult*

B. Hail: is a form of precipitation that occurs during thunderstorms when raindrops, in extremely cold areas of the atmosphere, freeze into balls of ice before falling towards the earth's surface.

Hail Events			
Date	Size of Hail (inches)	Date	Size of Hail (inches)
07/12/70	1.75	06/05/05	1.75
07/20/94	1.00	10/18/07	1.00
04/12/96	1.0 to 1.75	04/26/11	1.00
05/18/96	1.75	05/13/11	1.00
05/08/97	1.00	05/22/11	1.00
06/24/98	0.75 to 1.75	05/31/11	1.0 to 1.75
07/14/98	1.00	03/12/12	1.25 to 2.0
06/10/99	0.75 to 1.0	05/03/12	1.00
07/28/99	1.75	07/27/14	1.0 to 3.0
08/02/00	0.75 to 1.0	09/10/19	1.25
08/09/00	1.00	04/07/20	1.50
05/07/01	0.75 to 2.0	09/07/21	1.00
06/13/04	0.75 to 1.75	08/29/22	1.00

Between 1970 and 2024, there were a total of 25 events of hail reported to the National Weather Service. The above chare reflects those with hail reported as 1 inch or larger.

With 25 reported hail events in 54 years, the average historic rate of occurrence for hail events across Midland County is approximately one event every two years.

C. Lighting: is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again.

Lightning strikes the United States about 25 million times a year. Although most lightning occurs in the summer, people can be struck at any time of year. Lightning kills about 20 people in the United States each year, and hundreds more are severely injured.

With six reported lightning events in 27 years, the average historic rate of occurrence in for damaging lightning events across Midland County is approximately one event every four years. Lightning flashes and strikes are a common occurrence, though all events may not result in damage.

Lightning Events	
Date	Impacts
9/19/1997	Lighthing struck a farm near Coleman, in Midland county, killing 4 horses.
6/22/2002	
7/28/2002	A newspaper reported that lightning struck a telephone line, knocking power out to thousands of Midland County residents.
1/13/2005	A bolt of lightning struck a substation near Price Road east of Sanford around 1130 AM, knocking out power to 967 Consumers Energy customers. Power was restored after about 90 minutes.
5/30/2006	Lightning struck a house on Claremont St in Midland, sparking a fire. The fire burned along the electrical wiring and destroyed most of the home's attic. The home also sustained major damage to insulation and trusses, as well as to electrical and water systems. Total damages were estimated at $50K.
7/17/2006	Lightning struck a home, sparking a fire. Property damage was roughly estimated at $5K.

D. Extreme Heat: is a period of high heat and humidity with temperatures above 90 degrees for at least two to three days. Heat is the leading weather-related killer in the United States, resulting in hundreds of fatalities each year. Heat can be very taxing on the body and can lead to heat related illnesses or make existing health conditions worse. Everyone can be vulnerable to heat, but some more so than others. Young children, infants, older adults, people with chronic medical conditions, and pregnant women are particularly vulnerable to heat-related illness and death.

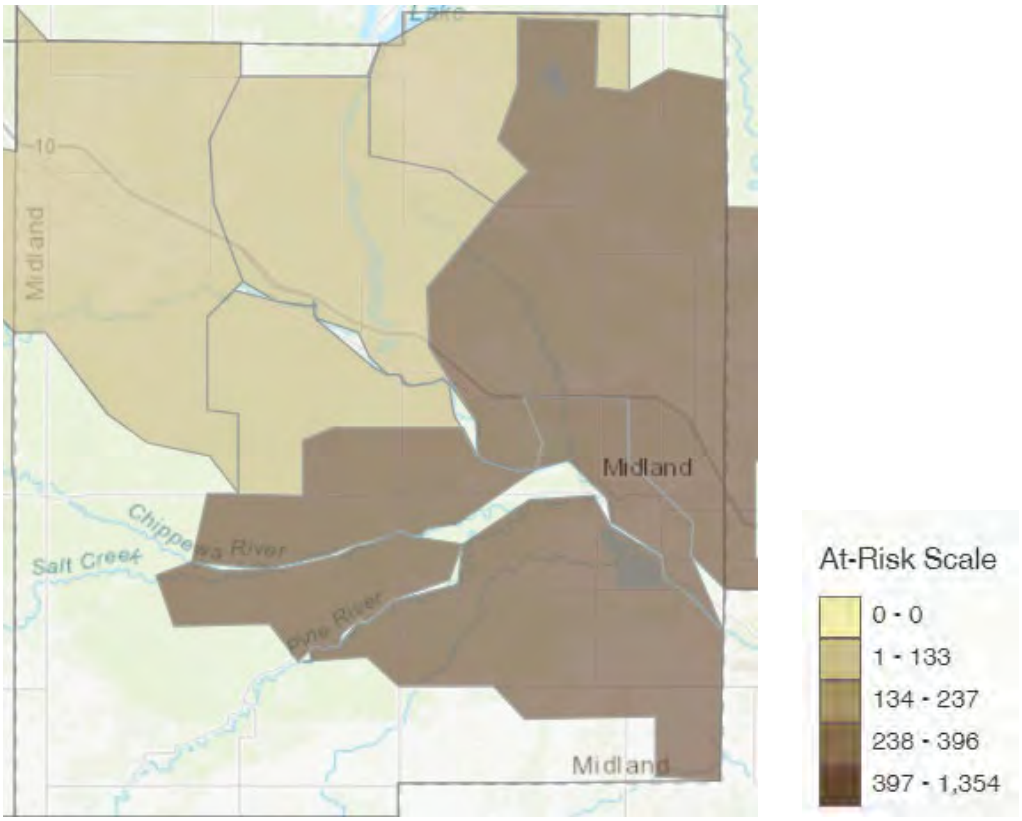
Heat Events				
Date	Event	Duration (Days)	Temp (°F)	Heat Index (°F)
2/11/1999	Heat	1	66	
7/4/1999	Heat	2	98	103
3/8/2000	Excessive Heat	5	78	
8/6/2001	Heat	4	99	105
5/29/2006	Heat	1	98	102
7/29/2006	Heat	5	90	100
7/17/2011	Excessive Heat	6	98	102
6/28/2012	Heat	1	100	105
7/1/2012	Heat	6	100	108
7/14/2013	Heat	6	94	100
6/30/2018	Heat	1	89	95

With eleven reported heat events in 25 years, the average historic rate of occurrence for heat events across Midland County is approximately one event every two years.

Impacts to Socially Vulnerable Populations

Severe wind events can disproportionally impact families living in manufactured homes or in housing built prior to modern building codes. As demonstrated by some of the previous storm events, powerful wind gusts can blow structures off their foundation. To reduce the threat of severe wind events, manufactured homes should be properly anchored. Ideally a storm shelter would be constructed for use by residents of the mobile home park, and residents should be prepared for a severe wind event. Income constrained households may face challenges repairing damages from windstorms. Severe Winds can also effect those who are socially vulnerable. When winds cause power outages, people may not have methods such as generators or solar panels, and/or means to get to shelter locations to receive the aid they require. Additionally with the loss of power those who depend on electrically powered medical devices for life sustainment would be unable to use those devices.

U.S. Health and Human Service electricity-dependent durable medical and assistive equipment (DME) and devices map.

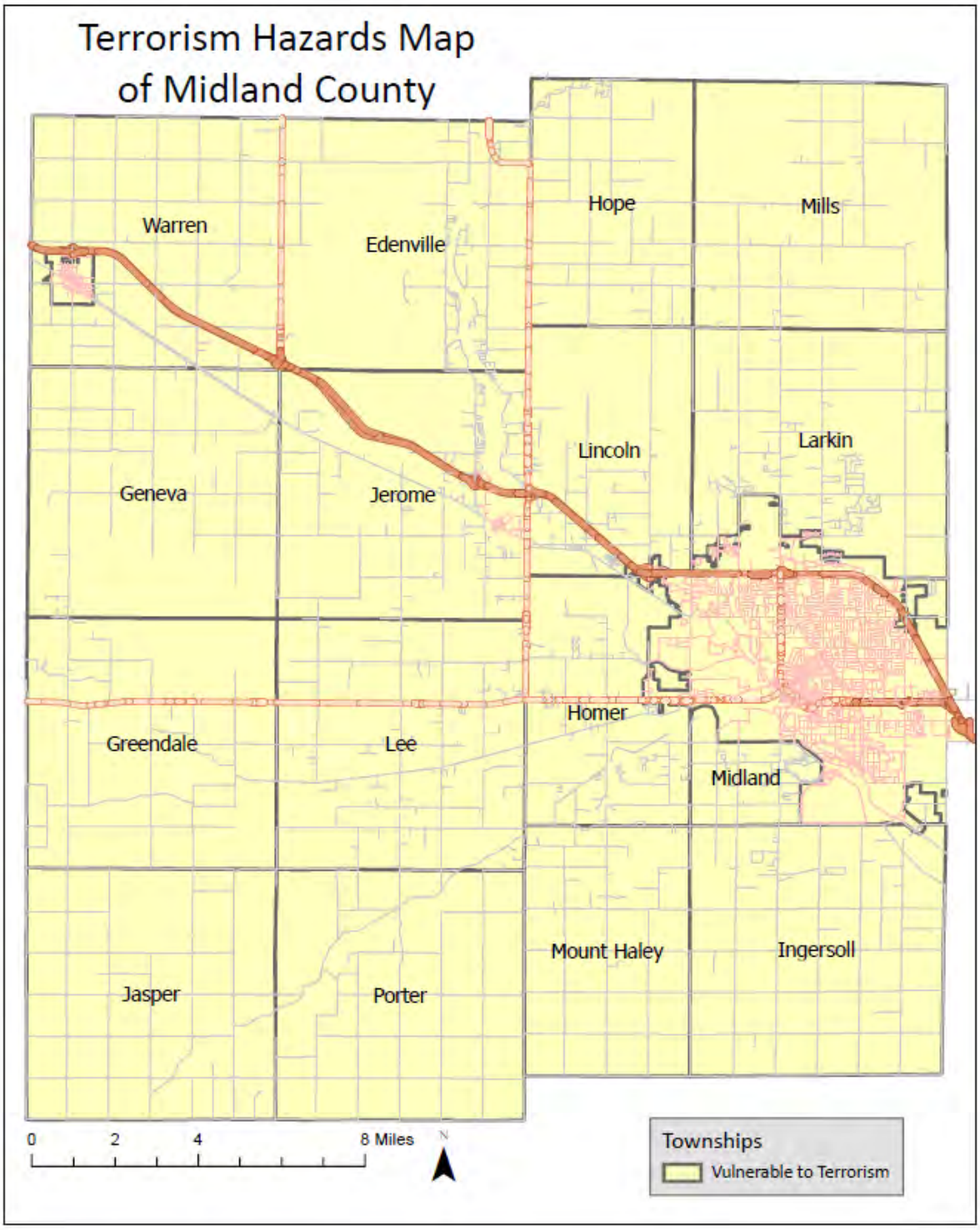


Total At-Risk Beneficiaries in Midland County: 1,052

Climate Change

Changes to severe wind intensity (extent) and frequency due to climate change are uncertain, and research is ongoing. Research cited by the National Climate Assessment indicates a projected increase in the number of days with thunderstorm environments in the Great Lakes Region (1.2 to 2.4 days per season from 2070-2099), which could lead to an increase in the frequency of thunderstorm wind events in Midland County.

Terrorism



Jurisdictions Most Vulnerable: City of Midland, Homer Township, Jerome Township, and Warren Township.

Terrorism can be broken down into two types, defined by the Federal Bureau of Investigation, International Terrorism, and Domestic Terrorism.

International Terrorism: Violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored).

Domestic Terrorism: Violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature.

Terrorism is carried out for a cause, not for financial gain, personal revenge, or a desire for fame. Terrorism is a long-established strategy practiced by many groups in many nations. Various terrorists' acts include: bombings, cyber-attacks, mass shootings, arson, and hijacking. Regardless of the tactics used, terrorists seek the greatest possible media exposure. The goal of terrorists is to frighten as many people as possible, not necessarily to cause the most significant damage potential. Media coverage allows terrorists to affect a much larger population than those directly attacked.

International Terrorism:
On December 25, 2009, Umar Farouk Abdulmutallab boarded a Northwest Airlines Flight 253 from the Netherlands to Detroit, Michigan with a bomb in his underwear. Umar intended to detonate it during flight, causing the plane to crash and kill the 290 passengers and crew members on board. The bomb contained PETN and TATP, two high explosives, and was designed to be detonated with a syringe containing other chemicals. As Flight 253 was on descent into Detroit Metropolitan Airport, the defendant detonated the bomb, which resulted in a fire, but otherwise did not fully explode. Passengers and flight attendants tackled the defendant and extinguished the fire. Umar Farouk Abdulmutallab was sentenced on February 15, 2012 to life in prison as a result of his guilty plea to all eight counts of a federal indictment charging him for his role in the attempted Christmas Day 2009 bombing of Northwest Airlines Flight 253.

On June 21, 2017, Amor M. Ftouhi arrived at Bishop International Airport in Flint with the intent to kill law enforcement or military personnel with a knife in his pocket. Ftouhi approached a police officer, dropped his backpack, pulled out a knife, and repeatedly stabbed the officer. The officer was saved by other officers and other Airport staff on the scene. The attacker, later identified as Amor M. Ftouhi, a 51-year-old Tunisian native who had lived for years in Canada, was immediately arrested. Ftouhi told police he worked alone, and investigators found no evidence of anyone helping him. He was convicted of terrorism charges in November 2018 and sentenced to life in prison in April 2019.

Domestic Terrorism:
Although there is no universal definition for a mass shooting, the Congressional Research Service defines a mass shooting as one in which the gunman: kills four or more people, selects victims randomly (rules out gang-related shooting and domestic violence), and the attack occurs in a public place.

Mass shooting incidents (active assailant) have risen exponentially in the United States in recent decades. From 1916 to 1966, 25 mass shootings were recorded, compared with over 150 in the following 51 years (including some of the deadliest shootings recorded).

Within Michigan, we have had three prominent active assailant events, one in 1927, one in 2021, and one in 2023.

- On May 18, 1927, the Bath School disaster happened when multiple bombs were set off at a Bath Charter Township School; 45 people were killed, 38 were schoolchildren, and 58 additional people were injured. This was the single deadliest active assailant incident in the United States.
- On November 30, 2021, the Oxford High School shooting occurred which resulted in 4 deaths and seven injured; the total time of the incident was 5 minutes.
- On February 13, 2023, a shooting happened at Michigan State University, which resulted in four deaths (including the shooter) and five people were injured.

Midland County is not immune from acts of violence or the threat of terrorism. Threats involving suspicious 'white powder substance' have been used to threaten community members at least twice in recent years, once at the Midland Daily News and once at the Ashman Court Hotel (now the H Hotel). The City of Midland is home to several industrial sites considered by the U.S. Department of Homeland Security to be Tier II and critical to the nation and potential targets for terrorism.

In addition to our industrial sites, Midland County has many facilities, events, and festivals that attract large mass gatherings that could be targeted.

Criminal acts of violence may resemble terrorist attacks but lack a political motive. These do not include daily routine crimes but crimes that impact many people. Such attacks may require resources beyond those available at the local level. Criminal acts of violence may be motivated by mental illness, financial gain, a desire for fame or revenge, or a combination of the above. Groups can commit criminal acts of violence but a single criminal often carries them out. The range of motives and lack of a formal network that characterizes these acts makes them difficult to predict.

Impacts on Socially Vulnerable Populations

Internationally, terrorism seems to be related with those that have personal struggles of finances or that have been radicalized by terrorist organizations. Recent mass shooting events are a result of individuals with mental health issues and not associated with any low economic classification.

Climate Change

Outside Eco-Terrorism motivations, there are no known climate change effects on Terrorism.

Tornado

Jurisdictions Most Vulnerable: *All*

A tornado is a violently rotating column of air extending downward to the ground from a cumulonimbus cloud. The funnel cloud associated with a tornado may have winds up to 300 miles per hour and an interior air pressure that is 10-20 percent below that of the surrounding atmosphere. The typical length of a tornado path is approximately 16 miles. Tornado path widths are generally less than one-quarter mile wide. Historically, tornadoes have resulted in the greatest loss of life of any natural hazard, with the mean national annual death toll being 111 persons. Property damage from tornadoes is in the hundreds of millions of dollars every year. Michigan averages approximately 18 tornadoes per year, most occurring in the southern Lower Peninsula. There have been fourteen (14) confirmed tornadoes in Midland County.

TORNADOS		
Date	**Event**	**F/EF Rating**
4/8/1882	Lee, Homer, Midland	F3
4/22/1925	Porter, Mount Haley and Ingersoll	F2
6/1/1939	City of Midland	F2
8/8/1939	City of Midland	F2
6/26/1951	Coleman	F1
6/3/1973	Gordonville	F0
4/14/1974	Pleasant Valley	F2
9/12/1974	City of Midland	F1
6/18/1976	Edenville	F1
5/26/1985	Near Porter	F0
6/17/1992	City of Midland	F0
5/31/1999	City of Midland	F2
7/24/2011	Sanford Lake	EF0
3/12/2012	Geneva/Warren Township	EF1

On May 31, 1999 a tornado touched down in the City of Midland causing damage to the local Holiday Inn and a nearby residential area. Fortunately there were no injuries or deaths. In the summer of 2011, an EF0 tornado touched down briefly on Sanford Lake causing damage to a dock and boatlift. On March 12, 2012, an EF1 tornado with winds estimated around 90 mph damaged out-buildings and toppled trees and power lines as it followed a track through Geneva and Warren Townships, southeast of the City of Coleman.

The Fujita (F) Scale was originally developed by Dr. Tetsuya Theodore Fujita to estimate tornado wind speeds based on damage left behind by a tornado. An Enhanced Fujita (EF) Scale, developed by a forum of nationally renowned meteorologists and wind engineers, makes improvements to the original F scale. This EF Scale has replaced the original F scale, which has been used to assign tornado ratings since 1971.

The original F scale had limitations, such as a lack of damage indicators, no account for construction quality and variability, and no definitive correlation between damage and wind speed. These limitations may have led to some tornadoes being rated in an inconsistent manner and, in some cases, an overestimate of tornado wind speeds.

Tornado Warning/Watch List by Year		
Year	**Warning**	**Watch**
2023	0	1
2022	0	0
2021	4	1
2019	3	0
2018	2	0
2016	1	0
2014	1	0
2013	0	2
2012	6	1
2011	9	3
2010	0	1
2009	0	1
2008	1	5
2007	3	1
2006	2	2
2004	3	0
2003	1	0
1996	1	0

F-Scale Number	Intensity	Wind Speed	Type of Damage Done
F0	GALE TORNADO	40–72 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE TORNADO	73–112 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT TORNADO	113–157 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE TORNADO	158–206 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING TORNADO	207–260 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
F5	INCREDIBLE TORNADO	261–318 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	INCONCEIVABLE TORNADO	319–379 MPH	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

The EF Scale takes into account more variables than the original F Scale did when assigning a wind speed rating to a tornado. The EF Scale incorporates 28 damage indicators (DIs) such as building type, structures, and trees. For each damage indicator, there are 8 degrees of damage (DOD) ranging from the beginning of visible damage to complete destruction of the damage indicator. The original F Scale did not take these details into account. The Enhanced Fujita Scale or EF Scale, which became operational on February 1, 2007, is used to assign a tornado a 'rating' based on estimated wind speeds and related damage.

Ef-Scale Number	Intensity Phrase	3 Second Gust	Type of Damage Done
EF0	GALE	65–85 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	MODERATE	86–110 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	SIGNIFICANT	111–135 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	SEVERE	136–165 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	DEVASTATING	166–200 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
EF5	INCREDIBLE	Over 200 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

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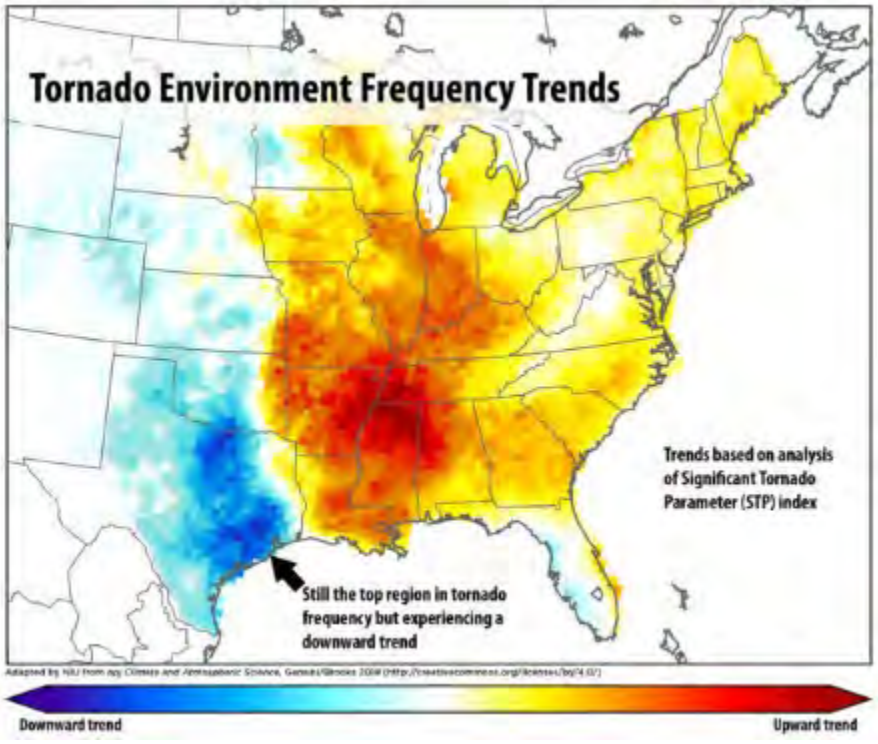
Climate Change

There is still some uncertainty as to the specific link between tornadoes and changing climatic conditions, and more research is needed to understand the full impact of climate change on tornadic activity. Due to the small scale of tornado events, observation and modeling can be challenging. Because tornadoes are usually generated from thunderstorms, trends in tornado frequency and intensity are related to trends in thunderstorm frequency and intensity. Although studies are still being performed, a recent study cited by the National Climate Assessment indicates an increase in the occurrence of atmospheric conditions conducive to severe thunderstorm formation in the United States. For the Great Lakes Region spring season, the study indicates increases of 1.2 to 2.4 days per season with severe thunderstorm environments during 2070-2099.

Another study cited by the Fourth National Climate Assessment highlighted that although the number of days with a tornado in the US has decreased; however, the number of days with multiple tornadoes has increased. This has resulted in increased variability in annual and monthly tornado trends, as well increasing variability in the start of tornado season. Additionally, a recent study published by Northern Illinois University, in partnership with the NOAA, indicates that tornado alley as we know it (e.g., Texas and the Great Plains) is shifting east, and that the frequency of tornadoes in the Southeast and Midwest regions is increasing.



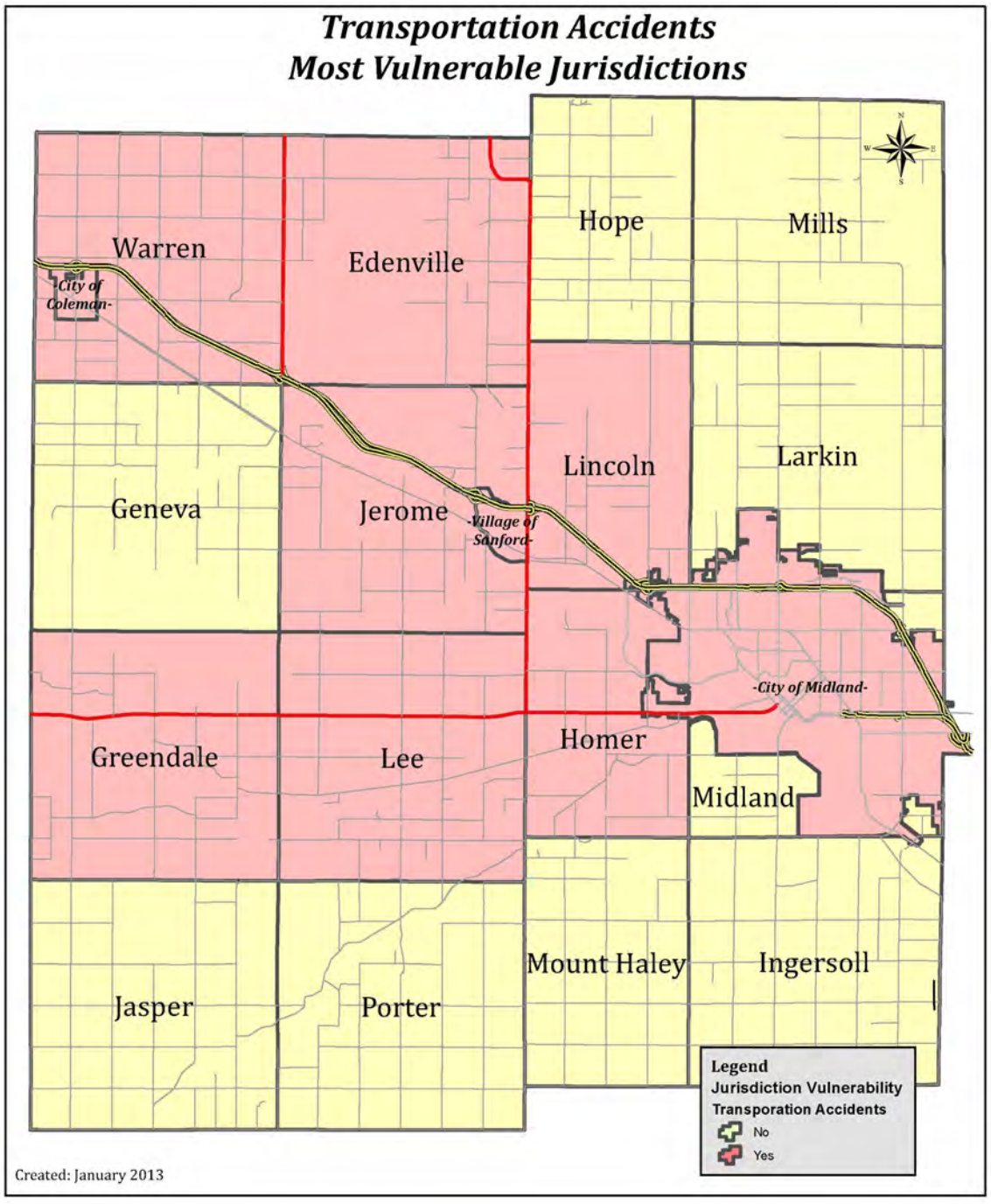
Impacts to Socially Vulnerable Populations

Tornado events can disproportionally impact certain socially vulnerable populations, such as individuals living in manufactured homes or in housing built prior to modern building codes, do

not provide proper protection from tornados. To reduce the threat of tornado events, manufactured homes should be properly anchored. Ideally a storm shelter should be constructed for use by residents who live in a mobile homes. Tornados can have devastating impacts with little warning time available; therefore, populations who are not able to quickly respond to warnings, such as those who are mobility challenged, non-English speakers, blind/sight impaired, or deaf/hard of hearing may have difficulty seeking shelter in a timely manner.

Location of all Mobile Homes Parks in Midland County (Marked by Gold Star)

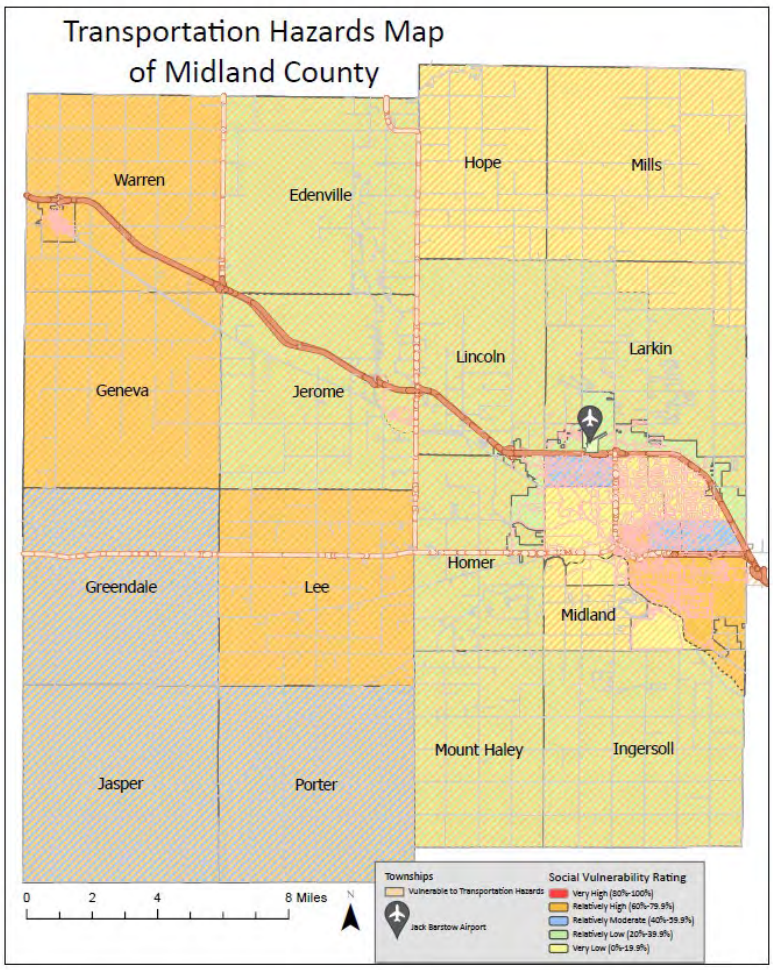
Transportation Incidents



Jurisdictions Most Vulnerable: *City of Midland, Homer Township, Lee Township, Greendale Township, Warren Township, City of Coleman, Jerome Township, Lincoln Township, Village of Sanford and Edenville Township.*

Transportation incidents are defined as involving an air, land or water-based commercial passenger carrier resulting in death or serious injury. Vulnerable areas would include: 1) communities with, or near, an airport offering commercial passenger service; 2) communities with railroad tracks on which commercial rail passenger service is provided; 3) communities in which commercial intercity passenger bus or local transit bus service is provided; 4) communities with school bus service; and 5) communities in which commercial marine passenger ferry service is provided. A serious incident involving any of the above modes of passenger transportation could result in a mass casualty incident, requiring immediate life-saving community response.

Several highly traveled roads cross Midland County, including US-10 used by vacation travelers. M-20 is traveled frequently by tour buses going to and from US-10, M-20, and M-30 for Soaring Eagle Casino in Isabella County. The potential for a mass casualty incident exists on these roadways and others within the county. Midland County is in the flight path for commercial air traffic at MBS International Airport in Saginaw County. This creates the potential for an air transportation incident in Midland County.



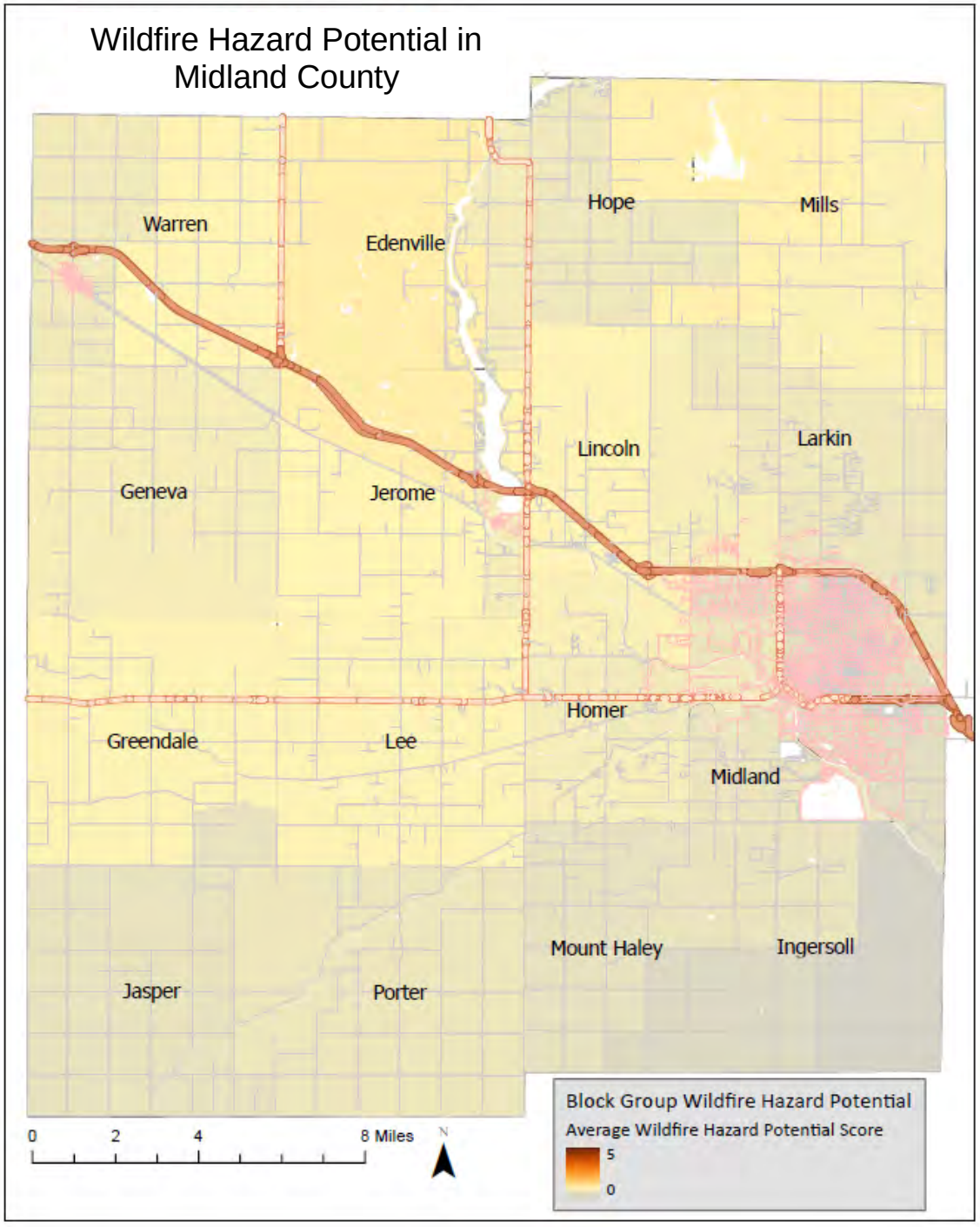
Social Vulnerably Indicators

Due to lack of personal transportation economic disadvantaged, socio-vulnerable individuals are more likely to be involved in a public transportation incident than those who own their own vehicles. Additionally those without the use of a personally owned vehicle will depend on community school buses to get their children to school increasing their risk of being in a commercial traffic incident.

Climate Change

Changed in climate has a direct impact on transportation incidents as weather is the number one impact to transportation whether its heavy rains, high winds, severe storms or winter weather. The more frequently we experience extreme weather events, the more transportation is impacted and the potential for incidents increase.

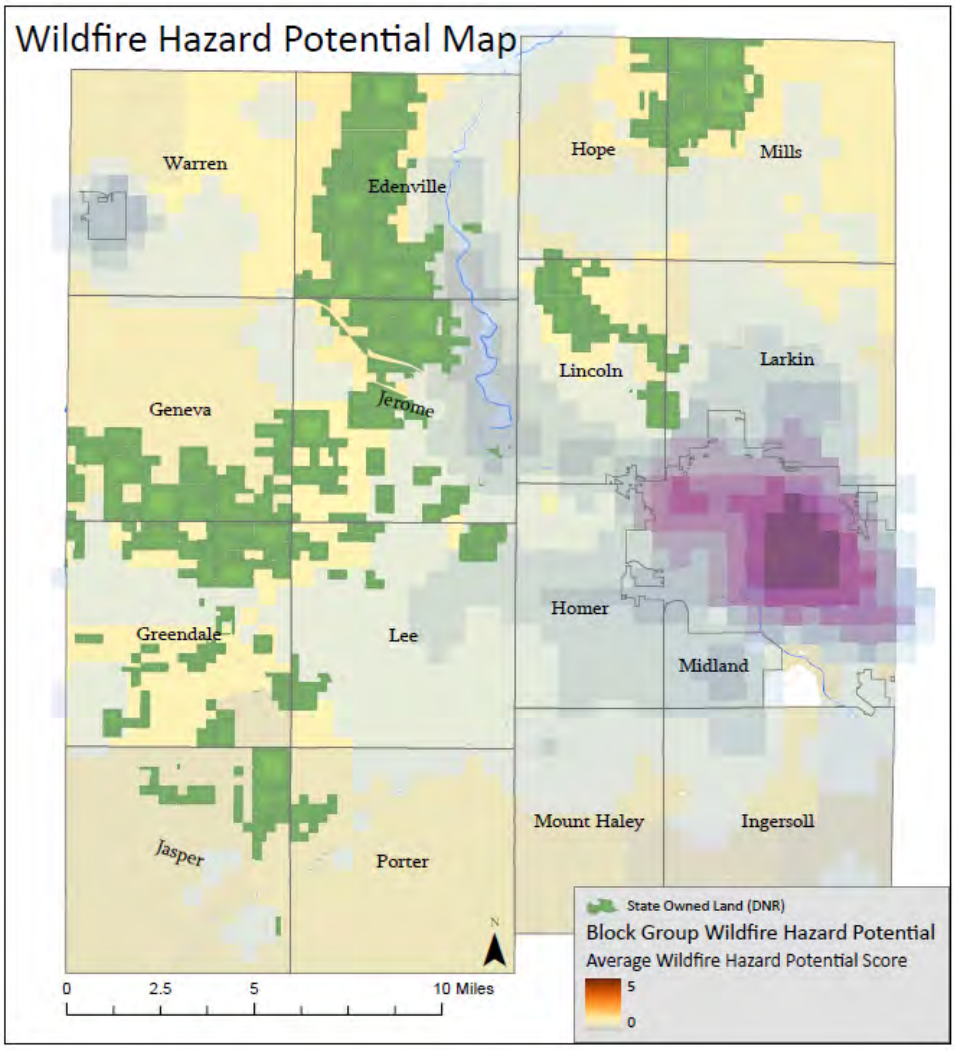
Wildfire



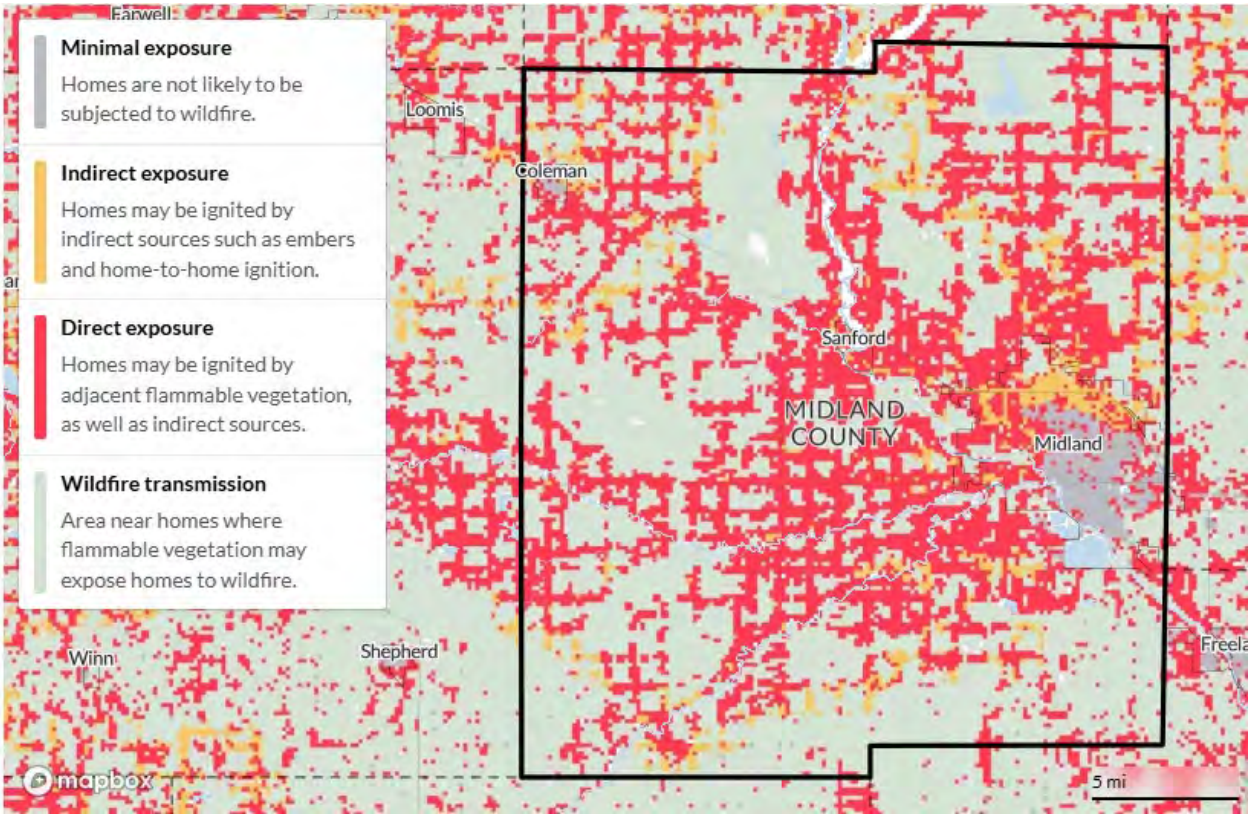
Jurisdictions Most Vulnerable: *Edenville Township, Jerome Township, Lee Township, Lincoln Township, Mills Township, Hope Township, Homer Township, Greendale Township and Warren Township.*

A wildfire is an uncontrolled fire in grasslands or forested areas. 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 and undeveloped land cover approximately half of Midland County. As a result, much of Midland County 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.

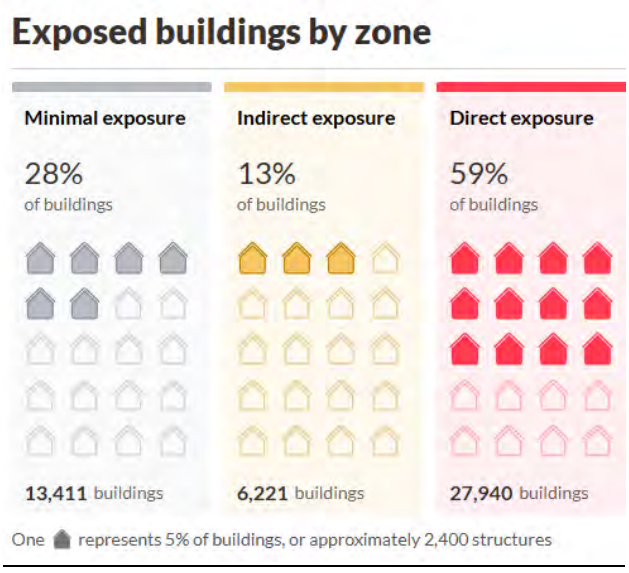
In 2000, a seventy acre wildfire in Lee Township threatened many structures. In 2003 and 2004, the largest wildfires in Michigan for those years occurred in Midland County. The 2003 fire burned a large area within the Au sable State Forest in Jerome Township near the Stockholm Village Mobile Home Park. The 2004 fire burned State owned land in Mills Township. From 1981 through mid-2012, there were 425 wildfires in Midland County according to the Michigan Department of Natural Resources. This doesn't include records for the years 1994-1998 due to the Sanford DNR Field Office being closed during that time.



Fire Risk Zones

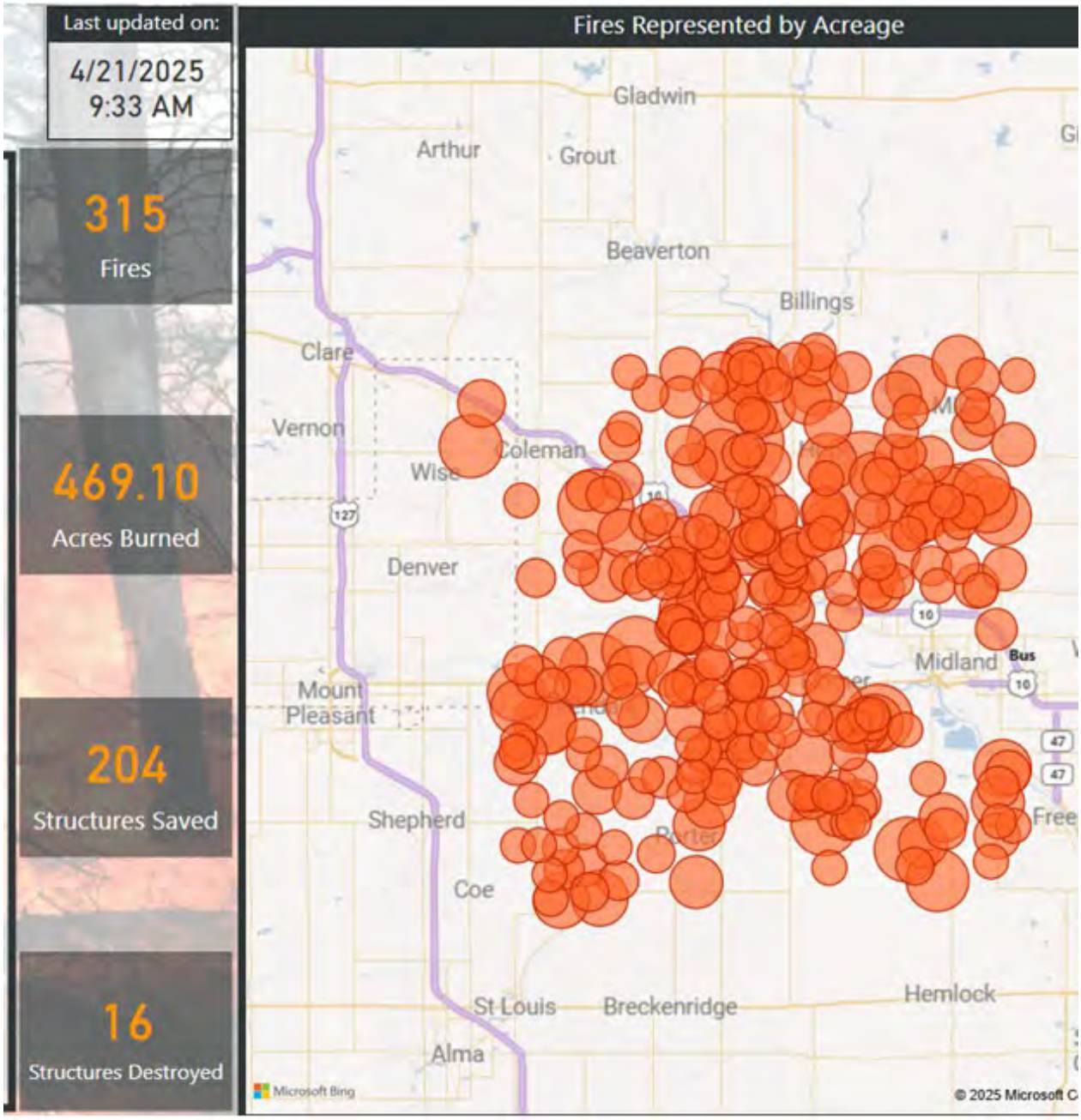


The table is an estimated calculation of potential economic impacts to buildings within the wildfire hazard area. A half mile radius was drawn around the State Owned Land to establish the wildfire hazard area. Utilizing assessed parcel value information within the hazard area, costs were calculated.



Wildfire Risk - Estimated Building Impacts		
Township	# Parcels	Building Value Total
Edenville	1,460	$173,062,610
Geneva	154	$11,376,847
Greendale	555	$42,848,168
Homer	29	$3,062,954
Hope	204	$20,451,828
Jasper	156	$12,500,961
Jerome	2,494	$298,560,440
Larkin	139	$54,379,991
Lee	365	$40,097,812
Lincoln	218	$33,420,542
Mills	144	$12,476,744
Porter	109	$8,538,969
Warren	37	$5,260,872

The below graphic shows data regarding wildfires in Midland County between 2006 (as far back as the data is available) and 2024. During this period of time, Midland County experienced an average of 22 wildfires incidents a year with an average of 1.5 acres burned per incident. Having a State Department of Natural Resources Office located in Sanford provides special resources to assist in responding to and mitigating wildfires across Midland County.



Impacts to Socially Vulnerable Populations

Socially vulnerable populations are more likely to be negatively impacted by structure fires. The U.S. Fire Administration (USFA) acknowledges that socioeconomic factors are a good predictor of fire rates at a neighborhood level. Furthermore, the USFA also highlights children under the age of 14 and adults over the age of 65 as vulnerable populations, as these populations may have difficulty evacuating a building in a timely manner. A 1992 congressional hearing cited in a recent FEMA publication states that children from low-income families are five times more likely to die in a fire. Although recent research is limited, available research indicates that housing characteristics play a key role in the likelihood of a structure fire. This includes the age of a residence, the density of vacant buildings in a neighborhood, and the installation and upkeep of smoke detectors in a residence. Other factors include a parental presence in the home and household income. The easiest and most effective method for reducing the risk of structure fires is ensuring that smoke detectors are installed and maintained. The Michigan Hazard Mitigation Plan indicated that 50 percent of fire related deaths occur in homes without working smoke detectors. Renters may have less control over the testing and replacing of smoke detectors, and those with negligent landlords may be more likely to live in housing without functioning smoke detectors. This is especially true in the Urban Wildland Interface area.

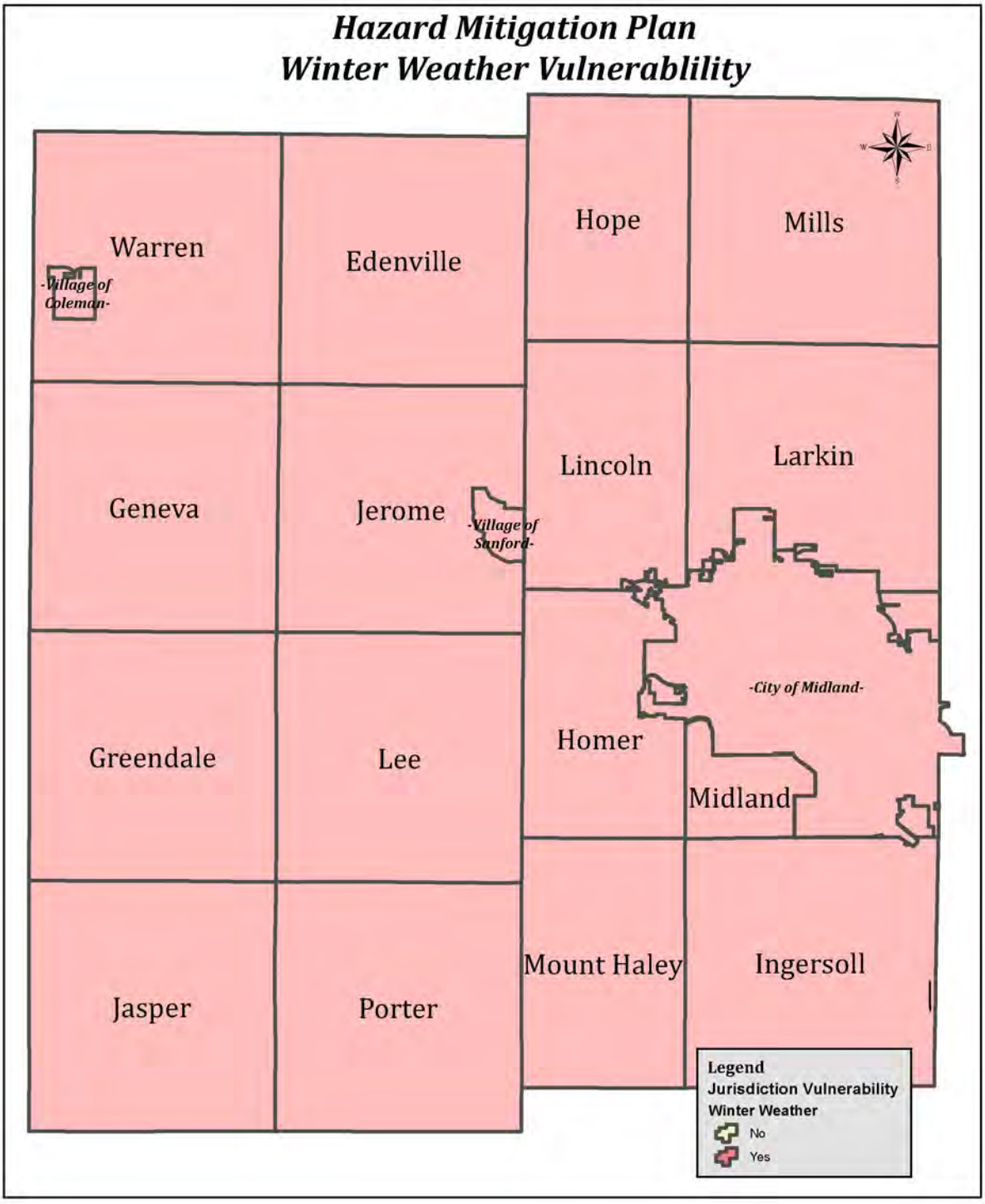
Climate Change

With the rise in temperatures throughout the world we are seeing dryer periods, Wildfire season has gotten longer and longer and damage caused from wildfires is increasing. The nation has had 20 wildfire events that caused one billion dollars of damage, from 1980 to 2020; 16 of those have happened since 2016. The United States spends routinely more than one billion dollars on fighting wildfires. Wildfires in 2017 and 2018 combined, accounted for more than forty billion dollars in damage.

With the increase in severe thunderstorms, there are increased number of potential lightning strikes, which can cause wildfires. Wildfire seasons getting longer means wildland firefighting seasons are getting longer, therefore resources such as personnel and equipment are being stressed due to personnel expecting to work a specific season and then returning to their off season employment.

Wildfires also affect the Earth’s climate. Forests in particular store large amounts of carbon. When they burn, they immediately release carbon dioxide into the atmosphere, which in turn contributes to climate change.

Winter Weather



Jurisdictions Most Vulnerable: *All*

A. Ice and Sleet Storms: A storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage. Sleet storms differ from ice storms in that sleet is similar to hail (only smaller) and can be easily identified as frozen raindrops (ice pellets) 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 surfaces, coating the ground, trees, buildings, overhead wires, etc. with ice, sometimes causing extensive damage. When electric lines are downed, inconveniences are felt in households and economic loss and disruption of essential services is often experienced in affected communities.

Midland County experienced a serious ice storm February 16-19, 2006. A coating of ice on trees and power lines caused 13,900 Consumers Energy customers in Midland County to lose power. It took four days for power to be fully restored. This was serious due to extremely cold temperatures following the storm. The American Red Cross sheltered people for the duration of the power outage.

With ten reported ice storm events in 27 years, the average historic rate of occurrence for ice storm events across Midland County is approximately one event every two years.

Date	Ice/Sleet	Amount
03/13/97	Ice Storm	0.5-1" of Ice
01/07/98	Ice Storm	Mix Precip
12/18/02	Ice Storm	0.25" of Ice
04/03/03	Ice Storm	3" Freezing Rain
02/14/05	Ice Storm	0.25-0.5" of Ice
02/16/06	Ice Storm	0.5-1" of Ice
12/01/06	Sleet	1.5" of Sleet
03/01/07	Ice Storm	0.25" of Ice
12/01/19	Ice Storm	0.25" of Ice
01/11/20	Ice Storm	0.25" of Ice

B. Snowstorms: A period 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. The cost of clearing the snow can be enormous.

Date	Event	Accumulation
01/09/97	Winter Storm	10" of heavy snow
01/02/99	Winter Storm	10" of heavy snow
01/12/99	Winter Weather	8" of heavy snow
12/11/00	Winter Storm	**Snow Emergency Declared**
03/02/02	Winter Storm	12" of snow
01/14/04	Winter Storm	8" of heavy snow
11/24/04	Winter Storm	9" of snow
02/20/05	Winter Storm	11-12" of heavy snow
03/01/05	Winter Storm	8" of heavy snow
03/02/06	Winter Storm	11" of heavy snow
02/25/07	Winter Storm	9" of snow
12/16/07	Winter Storm	8" of snow
02/06/08	Winter Storm	10" of snow

Date	Event	Accumulation
12/09/08	Winter Storm	9" of snow
12/19/08	Winter Storm	10" of snow
02/02/11	**Blizzard**	12" of heavy snow
02/20/11	Winter Storm	5-10" of heavy snow
03/22/11	Winter Storm	8" of heavy snow
02/07/13	Winter Storm	12" of heavy snow
02/24/16	Winter Storm	11" of heavy snow
03/01/16	Winter Storm	8" of heavy snow
12/11/16	Winter Storm	8" of heavy snow
01/28/19	Winter Storm	10" of snow
02/22/23	Winter Storm	5-9" of heavy snow
02/27/23	Winter Storm	8" of heavy snow
01/12/24	Winter Storm	8" of snow

There were a total of 57 Winter Storm events between 1997 and 2024. The table above lists those only with snow accumulations of 8 inches or more.

Midland County's snow emergency was December 11-12, 2000, being formally declared by the President. Midland County received 8 to 11 inches of snow with 35mph winds, resulting in blowing snow and hazardous driving conditions. In February 2011, the "Groundhog Day Blizzard" resulted in 10 to 15 inches of snow. The winds gusted in excess of 40 mph for hours which created whiteout conditions, snow drifts of 3 to 5 feet and made travel nearly impossible. In 2018 and 2019, the county government buildings were closed due to heavy snowfall and high wind causing hazardous conditions. On February 22-23, 2023, Midland County had a Winter Storm that was a combination rain, sleet, and ice storm that caused the closure of all Midland County governmental offices and many local businesses closed for the safety of their employees due to the hazardous road conditions that existed.

With 57 reported winter storm events in 23 years, the average historic rate of occurrence for winter storm events across Midland County is approximately 2 events every year. With the likelihood that 45% of these winter storms will result in 8" or more of snow.

C. Snow Squalls: Snow squalls, often associated with strong cold fronts, are a key wintertime weather hazard. They move in and out quickly, and typically last less than an hour. The sudden white-out conditions combined with falling temperatures produce icy roads in just a few minutes. Squalls can occur where there is no large-scale winter storm in progress and might only produce minor accumulations. Snow squalls can cause localized extreme impacts to the traveling public and to commerce for brief periods of time. Unfortunately, there is a long history of deadly traffic incidents associated with snow squalls. Although snow accumulations are typically an inch or less, the added combination of gusty winds, falling temperatures and quick reductions in visibility can cause extremely dangerous conditions for motorists.

The difference between a snow squall and a snowstorm is the duration of the event. Snow squalls are usually very short-lived (on the order of 30-60 minutes) and extremely intense. A snow storm could last for several hours or even days.

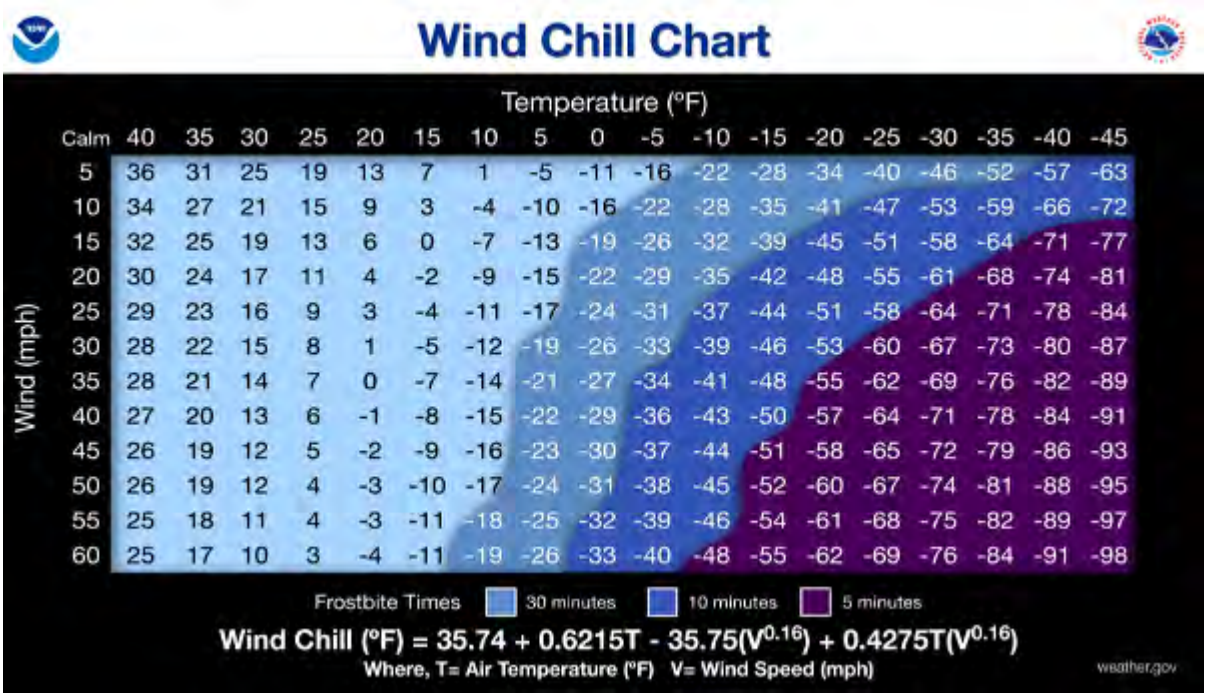
The impacts of winter weather across Midland County has little variation from one jurisdiction to another. Snow and ice storms cause hazardous driving conditions which result in closing of local schools and some community services.

Though there has been no reports of snow squalls happening in Midland County, they have happen across other parts of the State whose weather conditions are no different that that of our area.

D. Wind Chill / Extreme Cold: The wind chill temperature is how cold people and animals feel when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it FEEL much colder.

Extremely cold air comes every winter across the region. The arctic air can be dangerous. Combined with brisk winds, dangerously cold wind chill values can result. People exposed to extreme cold are susceptible to frostbite and can succumb to hypothermia in a matter of minutes.

Areas most prone to frostbite are uncovered skin and the extremities, such as hands and feet. Hypothermia occurs when the body loses heat faster than it can produce it.



Date	Event	Wind Chill (°F)
2/1/1996	Cold/Wind Chill	-11
1/17/1997	Cold/Wind Chill	-9
1/10/2003	Cold/Wind Chill	
2/3/2007	Cold/Wind Chill	-20
1/6/2014	Cold/Wind Chill	-35
1/28/2014	Cold/Wind Chill	-25
1/1/2018	Cold/Wind Chill	-25
1/29/2019	Cold/Wind Chill	-30
12/21/2000	Extreme Cold/Wind Chill	-13
1/14/2009	Extreme Cold/Wind Chill	-15
2/14/2015	Extreme Cold/Wind Chill	-25
2/19/2015	Extreme Cold/Wind Chill	-20
2/23/2015	Extreme Cold/Wind Chill	-20

With thirteen reported cold weather events in 28 years, the average historic rate of occurrence for cold weather events across Midland County is approximately one event every two years.

Rural vs Urban Impacts of Winter Events

Urban traffic congestion has been an issue due to the higher levels of traffic, with this even one incident can cause unmanageable levels of congestion. The congestion not only affects the public stuck in it, but also any equipment used for clearing the roads. Additionally, most snow clearing equipment is located in the urban city centers. Power outages from snowstorms in an

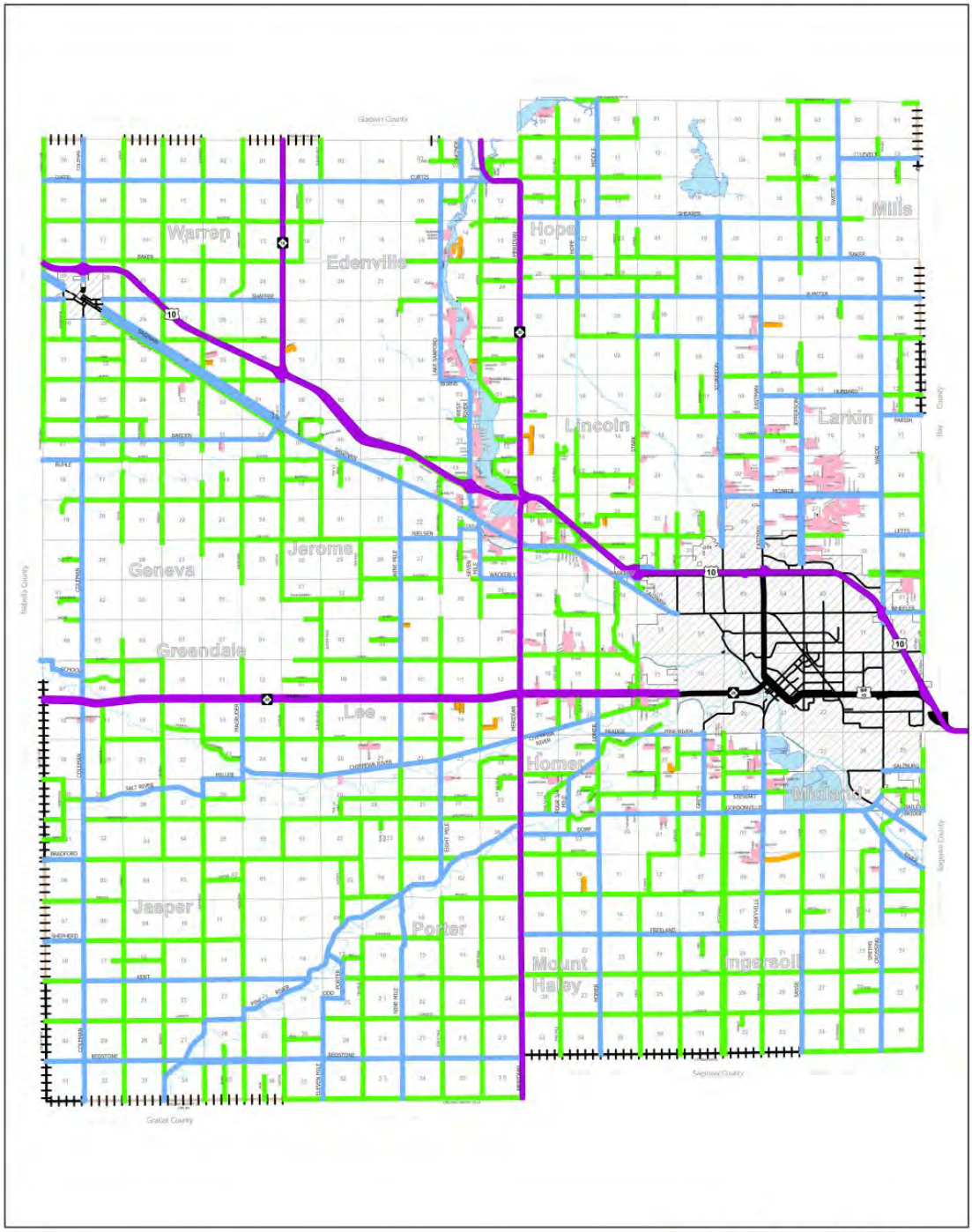
urban environment will tend to be addressed sooner due to most power companies centralizing their repair crews and equipment to those areas.

Rural challenges can include a lack of snow clearing equipment or personnel to clear roads. Additionally, the number of roads and the miles that have to be cleared take additional time. Due to amount of open spaces within a rural setting, blowing of snow across roadways causes travel and road clearing to be a continuous issue. Residents may have an unrealistic expectation of how long it will take to have roads cleared. Power outages derived from snow storms may take longer to repair due to weather risks, accessibility and out of area power crew support.

Within Midland County the priority for snow removal for roads are:

1. State Highways (US-10, M-18, M-20, M-30)
2. Primary Roads
3. Local Roads
4. Subdivisions
5. Private Road Maintenance Agreements

Midland County Road Commission
Snow Removal Priority Map



Snow Removal Priority

- STATE HIGHWAY
- COUNTY PRIMARY ROADS
- COUNTY LOCAL ROADS
- SUBDIVISIONS
- PRIVATE ROAD MAINTENANCE AGREEMENTS

MIDLAND COUNTY ROAD COMMISSION

Midland County Road Commission

2334 North Meridian Road
Sanford, Michigan 48657
Office: 989-687-9060 Fax: 989-687-9121

Name: Snow Plow Routes 2022-2023 Folder: X:\GIS_Projects\Snow Plow Routes\ArcPro\Snow Plow Routes 2022-2023\
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Climate Change

Climate change has the potential to increase the severity and frequency of extreme cold/wind chill events in Midland County. Though average temperatures are expected to increase, there is still an expectation of severe shifts in temperature for 1-2 day period both at extreme low and extreme high temperatures.

The winter season involves average temperatures in and around the winter months that are closer to the freezing point, at which ice and sleet events typically occur. Instead of winter arriving and precipitation remaining in the form of snow, Michigan winters have involved many thawing episodes, followed by refreezes which cause treacherous ice cover upon frozen surfaces, weigh down cables and tree branches, and cause infrastructure failures. Even though Michigan's winter season has been shortening a bit over time, winters remain hazardous because the increasing level of precipitation more often takes the form of major snow events, and provides increased moisture for refreezing after the warmer thawing periods have taken place

Per the 2019 Michigan Hazard Mitigation Plan: "The effect of climate change upon Michigan is expected to cause an increase in the amount of precipitation during the next few decades. Even though the length of Michigan winters has been decreasing, the season remains an intense one, and periods of deep freeze may actually become more likely as temperature differences narrow between the arctic, polar, and tropical air masses during the Northern Hemisphere's winter season. During the winter months, the increase in precipitation means that snowfall events will tend on average to be more intense. More snowfall is likely to happen at a time, in the form of significant snowstorm events (e.g. 8 or more inches, higher snowdrifts, cancelled school sessions, etc.). Michigan meteorologist Paul Gross notes that "contrary to what most would expect, the warming climate is causing an increase in snowfall in those winters where the storm track brings more frequent winter storms to the Great Lakes.""

Impacts to Socially Vulnerable Populations

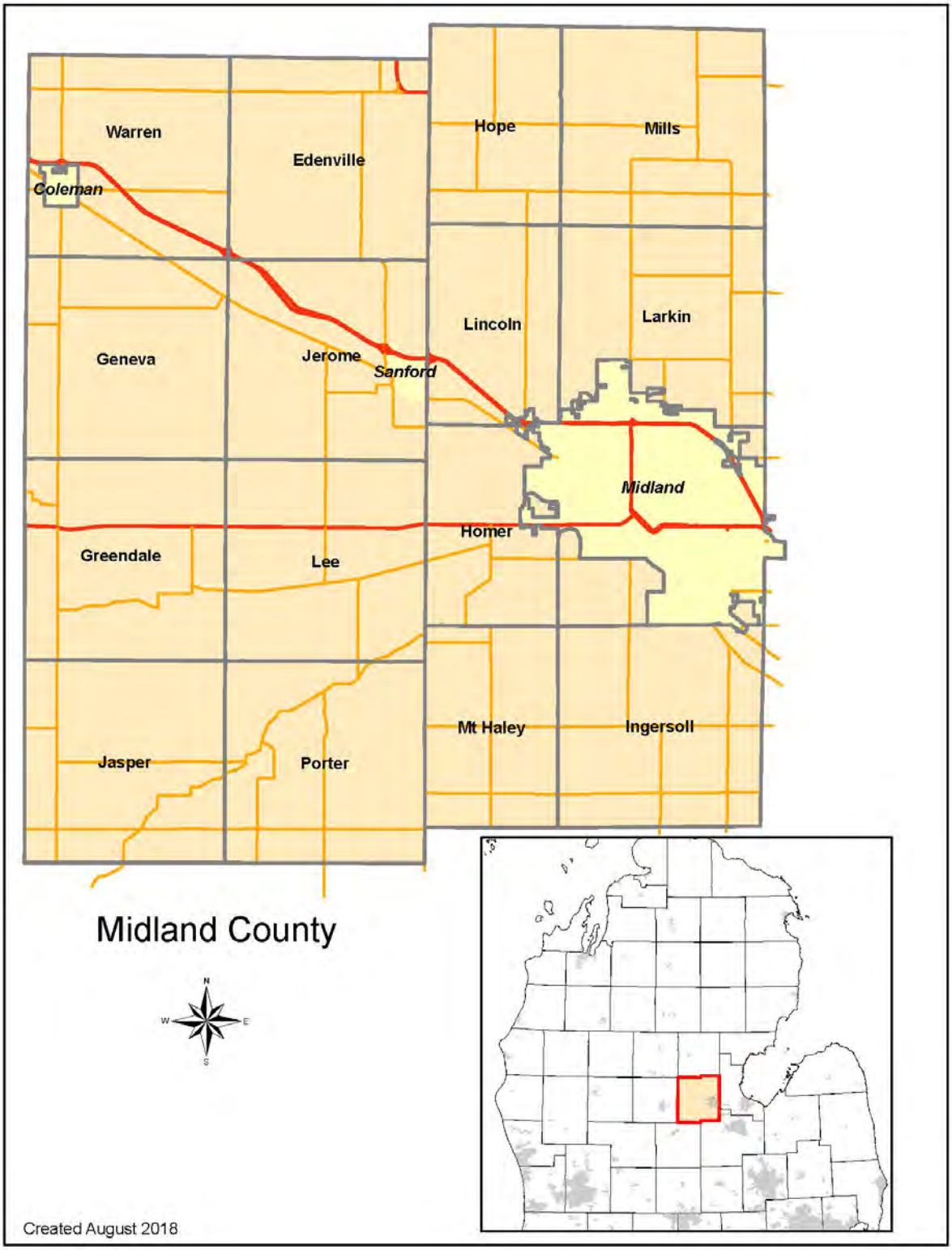
Socially vulnerable populations have high risk to extreme cold events. Economically constrained households are more likely to live in homes with inadequate heat (e.g., substandard or aging housing) and less able to find or even seek out a warm place. Further, such populations may have little to no financial buffers that would facilitate preparedness or mitigation actions such as repair or insulation of homes, purchase and installation of safe heating options, or the ability to afford a heating bill surge resulting from an extreme cold event. This often results in use of improper heat sources (such as use of a stove) which creates further dangers like carbon monoxide poisoning. The homeless population also faces increased risks and may struggle finding or traveling to a heated location.

Summary of Significant Events in Midland County Since 1986

The events listed below all required a response from the Midland County Office of Emergency Management. Not all were declared local emergencies or required activation of the emergency operations center, but all did require coordination either during and/or after they occurred. Historical data from these events was considered in the development of the hazard and vulnerability analysis found later in this document.

Significant Events Affecting Midland County		Since 1986
Event	**Location**	**Date**
Riverine Flood / Presidential Disaster Declaration	Midland	9/13/1986
Train Derailment / Hazardous Material Release	Freeland	7/23/1989
Hydrochloric Acid Release / Fixed Site	Midland	6/19/1991
Dow Therm Release / Fixed Site	Midland	4/6/1992
Severe Wind Storm	County - Wide	6/17/1992
Liquid Propane Fire	Lee Township	4/9/1993
Hydrochloric Acid Leak - Truck	Greendale Twp	8/7/1995
Flash Flood / Presidential Disaster Declaration	Midland	6/21/1996
Ice Jam Flooding	Lee & Homer Twps	2/22/1997
CMME Release / Fixed Site	Midland	3/19/1997
Trichlorosilane Release / Fixed Site	Midland / Midland Twp	8/17/1997
Styrene Release / Fixed Site	Midland	8/30/1997
Severe Wind Storm	County - Wide	5/31/1998
Hydrochloric Acid Tanker Rollover - US 10	Lincoln Township	6/10/1998
Tornado / Wackerly and Eastman	Midland	5/31/1999
Snow Emergency	County - Wide	12/12/2020
Wildfire - Ausable State Forest	Jerome Township	4/28/2003
Riverine Flooding	Midland / Sanford	3/7/2004
Anthrax/White Powder Threats (MDN & Ashman Court)	Midland	Apr & Aug 2005
Ice Storm	County - Wide	2/17/2006
Rupture of 8-inch Natural Gas Line (M-20)	Midland / Homer	2/28/2009
H1N1 Influenza	County-Wide	10/27/2009
Riverine Flooding	Midland / Sanford	4/29/2011
EF1 Tornado	Warren & Geneva Twps	3/12/2012
Nursing Home Fire	Midland	8/10/2012
Propane Truck Rollover Accident	Lee Township	1/29/2013
County-wide Flooding / Presidential Disaster Declaration	County-Wide	4/19/2013
Severe Wind Storm / 12,000 addresses without power	County-Wide	11/17/2013
Riverine Flooding	Midland / Sanford	4/15/2014
Flash Flood/ Riverine Flooding / Presidential Disaster Declaration	County-Wide	6/23/2017
Highrise Apartment Fire	Midland	7/31/2017
Ice Jam Flooding	Homer Township	2/23/2018
Snow Storm	County-wide	1/1/2019
Dam Failure/ Flooding / Presidential Disaster Declaration	County - Wide	5/16/2020
Covid-19 Pandemic / Presidential Disaster Declaration	County - Wide	01/20/2020 - 05/11/2023
Ice Storm	County - Wide	2/23/2023

Section Three – Community Profile



Historical Overview

Midland County's recorded history relates the presence of great forests of ash, basswood, elm, hemlock, linden, maple, oak and pine as well as large areas of swamp in the 339,000 acres that became Midland County. Indians were attracted to the area by waterways formed by the Chippewa, Pine, Salt, and Tittabawassee Rivers. Midland County's first permanent white settlers came in 1831. The first trading post was established at the confluence of the Tittabawassee and Chippewa Rivers, which is the current location of downtown Midland.

Following the era of hunters, fisherman and fur-traders were farmers and loggers. Midland, a small community of 65 people in 1850, became a thriving lumber camp, which reached its peak in 1880. Midland boasted the second largest sawmill in all of the Saginaw Valley. Other lumber camps upriver from Midland, such as the infamous Red Keg lumber camp, also thrived during the lumbering years.

Midland County was organized in 1850 and the City of Midland was organized in 1856. Much of the area was so swampy that high spots were chosen for important buildings such as schools, the courthouse, jail, and churches. By 1874 the Flint and Pere Marquette Railroad was serving the Midland area. By 1890, the economic existence of Midland was threatened by the clear-cutting of the forests. That year, Herbert Henry Dow rented a barn, reactivated an idle brine well nearby, and proved his new electrolytic process for extracting chemicals from brine. Potassium bromide, chlorine, sodium, calcium and magnesium are all chemicals recovered from brine. The Dow Chemical Company was formed in 1897 to make bleach from chlorine. Since that time, the Dow Chemical Company has grown into an international leader in the chemical business. The growth of the City of Midland and Midland County has paralleled the growth and success of Dow Chemical.

On a per capita basis, Midland County has more resident engineers, chemists and metallurgists than any other area in the nation. The Midland area economy is centered on its chemical manufacturing companies. Service and retail trade is also strong in the local economy. Midland County has both urban and rural components. Nearly half the county is forested and a quarter is agricultural. Farmers in Midland County produce dry beans, corn and sugar beets. The City of Midland is the urban center, situated in the east central part of the county. Other centers of population include the City of Coleman in the northwest and the Village of Sanford in the center of the county. In addition to Midland, Coleman and Sanford there are 16 townships: Warren, Edenville, Hope, Mills, Larkin, Lincoln, Jerome, Geneva, Greendale, Lee, Homer, Midland, Ingersoll, Mt. Haley, Porter, and Jasper.

Geography and Climate

Location – Midland County is located in the east central portion of Michigan's Lower Peninsula, approximately 120 miles northwest of Detroit and 70 miles northeast of Lansing. Midland County is part of the region commonly referred to as the Saginaw Valley and forms a portion of a metropolitan area including Bay and Saginaw Counties. Midland County is comprised of 528 square miles with a population of approximately 84,000.

Geology – The geological history of Midland County, as in the rest of Michigan, is dominated by the influence of glacial action and of ancient seas. Rock formations of gypsum, dolomite, sandstone, limestone and shale to a depth of 450 feet are covered with a variety of glacial deposits called drift. Throughout the county there are significant underground brine and salt deposits which were formerly tapped for industrial purposes. Currently, all mining operations have been phased out and all well sites have been closed.

When the continental glacier receded, a stagnant lake was formed in the county. It is the combination of glacial drift deposited in low areas and wave action from the lake that accounts for the lack of topographic relief in the county. Drainage from this area to Lake Huron and Saginaw Bay accounts for the rivers and their tributaries.

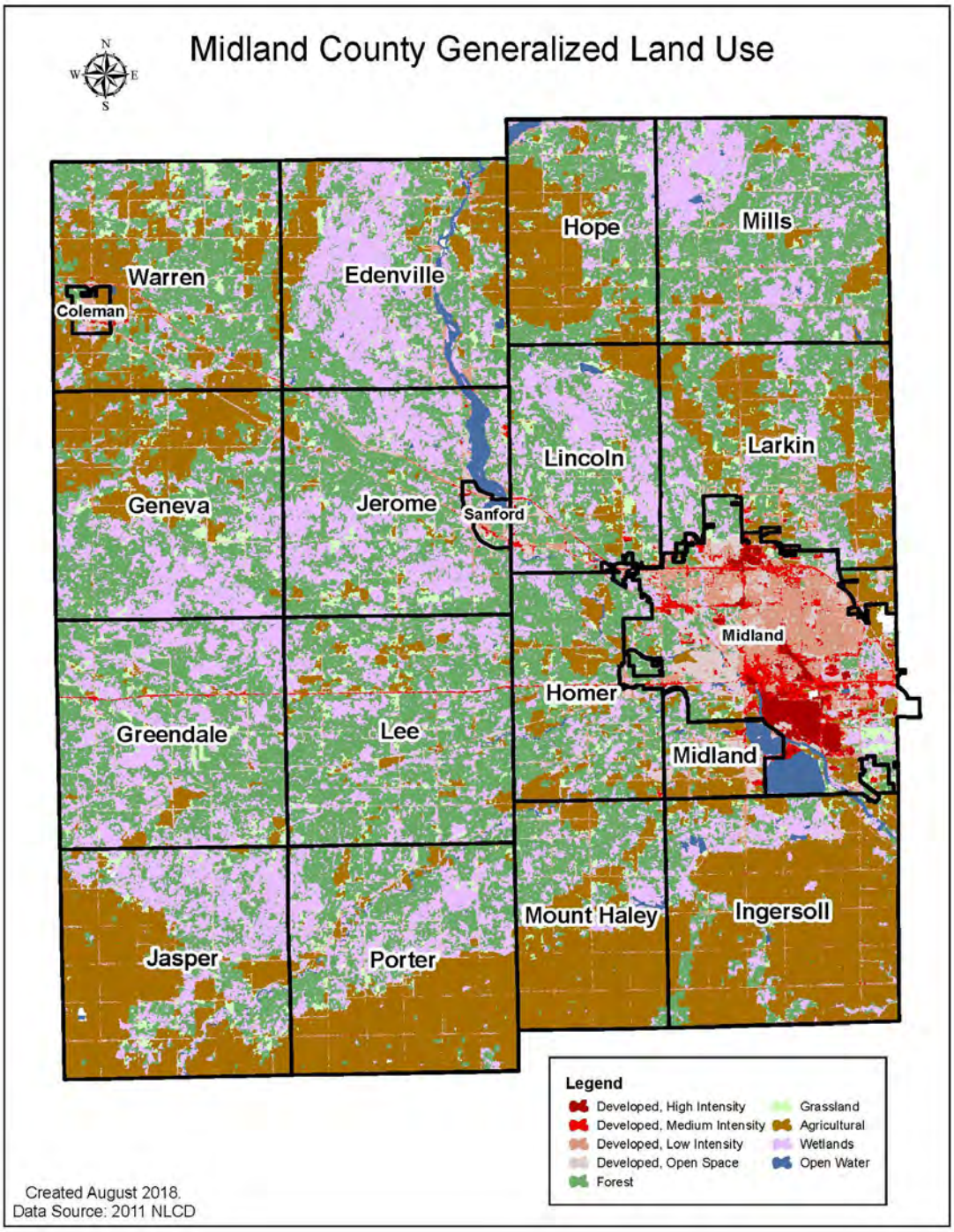
Topography and Water Resources – The topographic character of Midland County is generally level as a result of glaciations some 15,000 years ago. Major topographic change is found along the Chippewa, Pine, Salt and Tittabawassee Rivers. Some man- made features such as highway overpasses and the City of Midland's landfill also have resulted in a change in topography.

The Tittabawassee, Salt, Pine and Chippewa rivers comprise the natural water resources within Midland County. A dam on the Tittabawassee River near the center of the county at the Village of Sanford creates Sanford Lake. A dam on the Tittabawassee and Tobacco Rivers at the northern county line where Midland and Gladwin Counties meet at Edenville, create Wixom Lake, which is located in Gladwin County.

Flooding is the primary concern when planning for use of river corridor lands. Flooding could result from a breach of Sanford Dam or Edenville Dam. Flooding can also be caused by excessive rainfall, causing the rivers to flow out of their banks, even if the dams remain intact. Serious flooding has been experienced in the City of Midland, and to a lesser extent in Midland Township and Homer Township. Floods in 1986, 1996, 2013, 2017 and 2020 resulted in Disaster Declarations by the President of the United States.

Vegetation – Midland County is a mix of open agricultural land, undeveloped land, and urban areas. Over half of Midland County, including areas within the City of Midland, is forested. The Au Sable State Forest can be found west of Sanford Lake, taking up a significant portion of Edenville and Jerome Township. Some areas of the county are low-lying and swampy. The vegetation and character of the landscape is greatly impacted by the Salt, Pine, Chippewa and Tittabawassee Rivers.

Climate – Midland County's climate is one of diversity and extremes, with hot and humid summer months and cold, snowy winters. The average January temperature is 22.0 degrees Fahrenheit and the average July temperature is 71.5 degrees Fahrenheit. Total annual precipitation averages 33.7 inches of rain and snow. Average snowfall is 39 inches. The prevailing winds are from the southwest. Storms generally come from the southwest in the spring and from the northwest during the summer months.



Climate Change Effects

Climate change refers to significant changes in global temperature, precipitation, wind patterns and other measures of climate that occur over several decades or longer.

Temperatures in Michigan have risen almost 3°F since the beginning of the 20th century. Temperatures in the 2000s have been higher than in any other historical period. The year 2012 was the hottest on record, with a statewide annual average temperature of 48.4°F, 4.6°F above the long-term (1895–2020) average. Warming has been concentrated in winter and spring, while summers have not warmed substantially, a feature characteristic of much of the Midwest. A lack of summer warming is reflected in a below average number of hot days since 1990 (Figure 1a) and no overall trend in warm nights (Figure 1b). The winter warming trend is reflected in a below average number of very cold nights since 1990 (Figure 1c) and reduced ice cover in the Great Lakes. The 2000–2021 annual average maximum ice coverage was about 47%, compared to the 1973–1999 average of 58%.

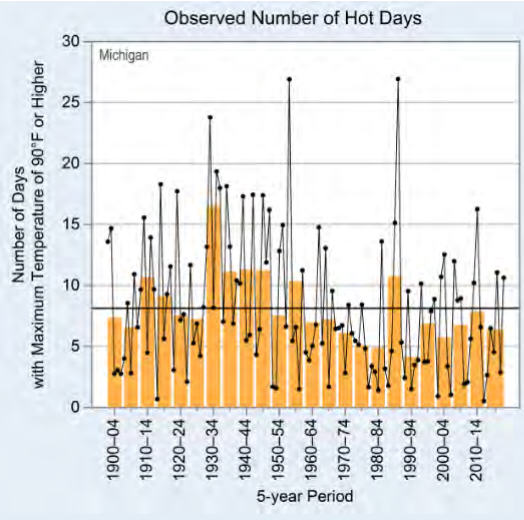


Figure 1a

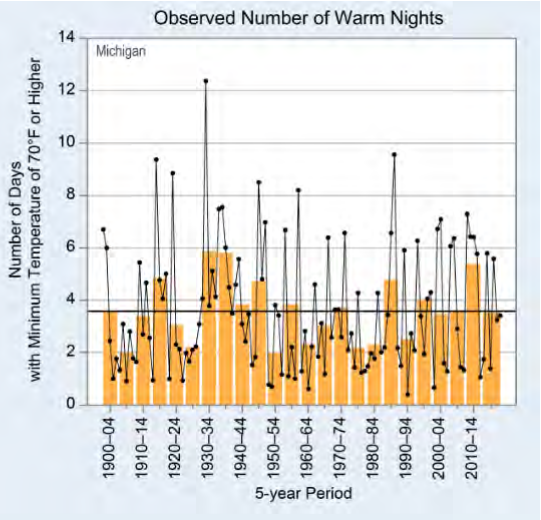


Figure 1b

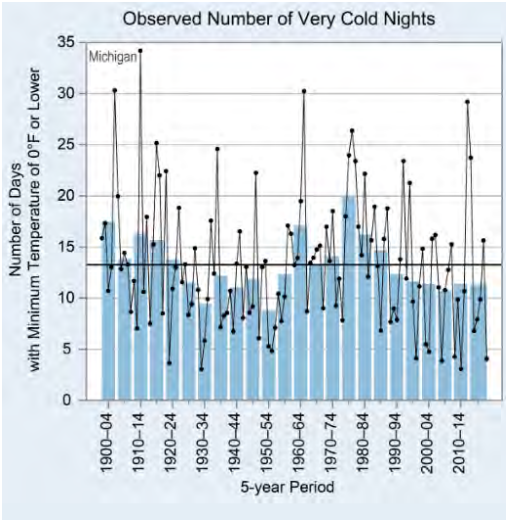


Figure 1c

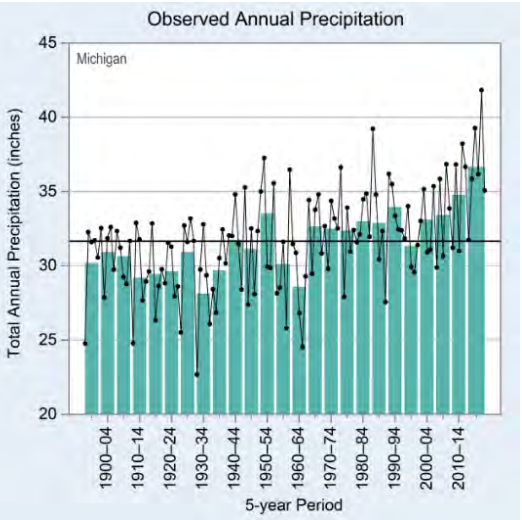
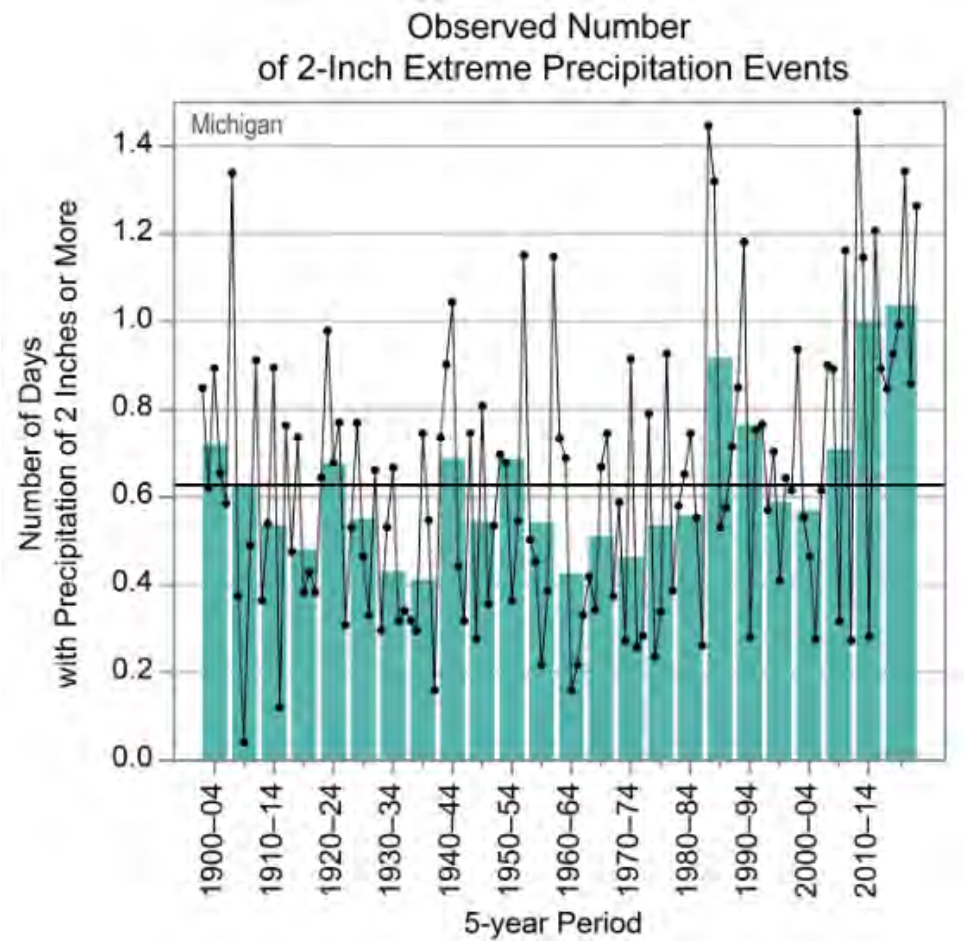


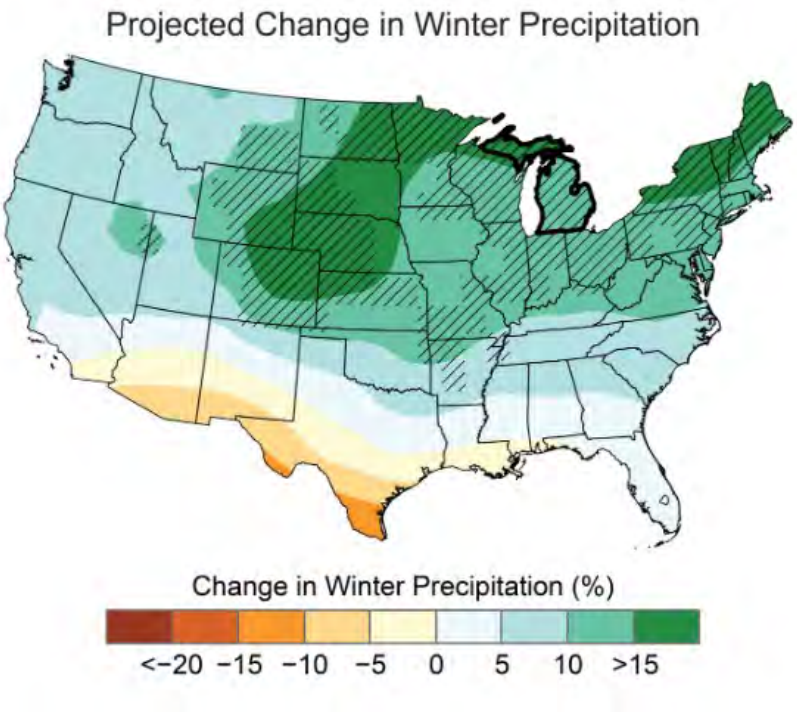
Figure 1d

Statewide annual precipitation has ranged from a low of 22.7 inches in 1930 to a high of 41.8 inches in 2019. The driest multiyear periods were in the 1930s and early 1960s and the wettest in the early 1950s, early 1990s, and 2010s (Figure 1d). The driest consecutive 5-year interval was 1930–1934, and the wettest was 2016–2020. **The frequency of extreme precipitation events has increased.** Multiyear averages for 2-inch extreme precipitation events for the 2010–2014 and 2015–2020 periods are the highest on record (Figure 2). Snowfall is common in the state but varies regionally.

Under a higher emissions pathway, historically unprecedented warming is projected during this century. Even under a lower emissions pathway, annual average temperatures are projected to most likely exceed historical record levels by the middle of this century. However, a large range of temperature increases is projected under both pathways, and under the lower pathway, a few projections are only slightly warmer than historical records. Extreme heat is a particular concern for Detroit and other urban areas, where high temperatures combined with high humidity can cause dangerous heat index values, a phenomenon known as the urban heat island effect. Higher spring temperatures will lengthen the growing season but also potentially increase the risk of spring freeze damage. In 2012, record-high March temperatures caused Michigan's fruit trees to bloom early. When temperatures dropped back down to below freezing in April, the budding fruit crop was destroyed, causing exceptionally large monetary losses in the hundreds of millions of dollars.



Increases in precipitation are projected for Michigan, most likely during the winter and spring. The frequency and intensity of extreme precipitation are also projected to increase, potentially increasing the frequency and intensity of floods. Springtime flooding, in particular, could pose a threat to Michigan's important agricultural industry by delaying planting and threatening yield losses.



The intensity of future droughts is projected to increase even if precipitation increases. Rising temperatures will increase evaporation rates and the rate of soil moisture loss. Thus, summer droughts, a natural part of Michigan's climate, are likely to be more intense in the future.

Concerns for the county include the loss of buffering wetlands which are used for runoff water. The combined effects of creating ever larger areas of concrete mixed with the grading and elimination of buffering wetland areas will cause the increased amount of water we receive from both snow and rain to increase the severity of the floods throughout the county. Additionally neighborhoods have been built in close proximity to flood zones.

The Midland Business Alliance's Advisory Committee on Infrastructure, created in 2020, coordinated with the U.S. Army Corp of Engineers to conduct a hydraulic/hydrologic study for both Midland County and the City of Midland. They are working with key conservation organizations in partnership with Midland County to find environment-based flood mitigation measures, such as wetlands, natural floodplains and conservation easements that could slow the flow rate of rivers, creeks and streams during significant rain events.

Land Use Patterns

Agricultural Land – There are over 90,000 acres of cropland in Midland County representing 26 percent of the county's land area, and more than 2,800 acres of permanent pasture comprising 0.8 percent of the county. The townships most oriented to agriculture are Warren, Geneva, Jasper, Hope, Homer, Porter, Mt. Haley, Larkin and Ingersoll. The primary agricultural use in these townships is cropland, and in most cases, these lands have been designated as agricultural by local governmental units in their land use plans and zoning ordinances.

Residential Land – In 1990, the county had a total of 18,904 acres of residential land. The City of Midland is projected to account for about one third of residential growth countywide. The majority of residential growth outside the City of Midland can be expected in Homer, Lee, Midland, Jerome and Larkin Townships due to the availability of city water and natural gas, and their proximity to transportation corridors, shopping and services.

Commercial Land – The majority of commercial land is located in the City of Midland. Additional existing and future commercial land is located along highway M-20 (east-west corridor between Midland and Mt. Pleasant), highway M-30 (north-south corridor between Sanford and Edenville), highway M-18 (north-south corridor between North Bradley and Gladwin County), around US-10 interchanges, and in the Sanford and Coleman areas.

Industrial Land – As of 1979, about 2,881 acres of land in Midland County was devoted to industrial use. Plans made in the 1990s call for the industrial base to remain primarily within existing industrial areas. By and large, it has. Growth has occurred within the City of Midland and near the City of Coleman. The majority of industrial expansion taking place since 2008 is within the existing industrial zone in the City of Midland.

Public Land – This consists of land holdings under public and quasi-public ownership, including institutional properties and lands in a natural condition. These encompass state forest and various county and other non-developed municipal holdings. The majority of the institutional acreage is located within the City of Midland. This includes Midland City Hall, Midland County Services Building, Midland County Courthouse, Midland County Jail, Midland County Juvenile Center, Midland Law Enforcement Center, Midland Public Services Center, Grace A. Dow Memorial Library and other facilities. Several senior citizen centers, community centers, schools, museums, fire stations, ambulance stations, township halls, and a wide variety of City and County parks serve the county. The majority of state forest areas are located in Edenville Township, Geneva Township, Greendale Township, Jerome Township, Lincoln Township and Mills Township.

Known Hazardous Areas – There are areas that contain hazardous materials and contaminated waste products, however, they are under controlled circumstances, handled by trained and licensed personnel and government regulations. Parts of the county are also known to be within the 1% floodplain and within the inundation area of a dam failure at Sanford or Edenville. Until the dams are back in operation, this risk has minimized. These areas only become hazardous under specific conditions.

General Development Pattern – The availability of water and sewer services has greatly influenced the development pattern in Midland County. Most of the residential, retail, commercial and industrial growth has occurred within the City of Midland and areas annexed into the City from the surrounding townships. Retail and other commercial development is primarily concentrated on the north side of the City of Midland and into Larkin Township. An additional area of expanding development is along state highway M-20 between the City of Midland and the Isabella County line (Midland County's western boundary). Development immediately west of the City of Midland in Homer Township is likely to increase significantly with the addition of city water in that area. Similarly, the addition of city water in Midland Township, just south of the City of Midland should encourage growth there as well.

The north-central section of Midland County, commercial growth is occurring along State highway M-30 between the Village of Sanford and the Gladwin County line (Midland County's northern boundary). Several public facilities are also located in the Sanford area, including a Michigan Department of Natural Resources Field Office, Midland County Mosquito Control headquarters, and the Midland County Road Commission's main facility. The U.S. 10 highway makes access to the Midland area only a matter of minutes for commuters from the Sanford, Jerome and Edenville areas. Residential development can also be found in every township, and particularly along the Pine, Chippewa and Tittabawassee rivers.

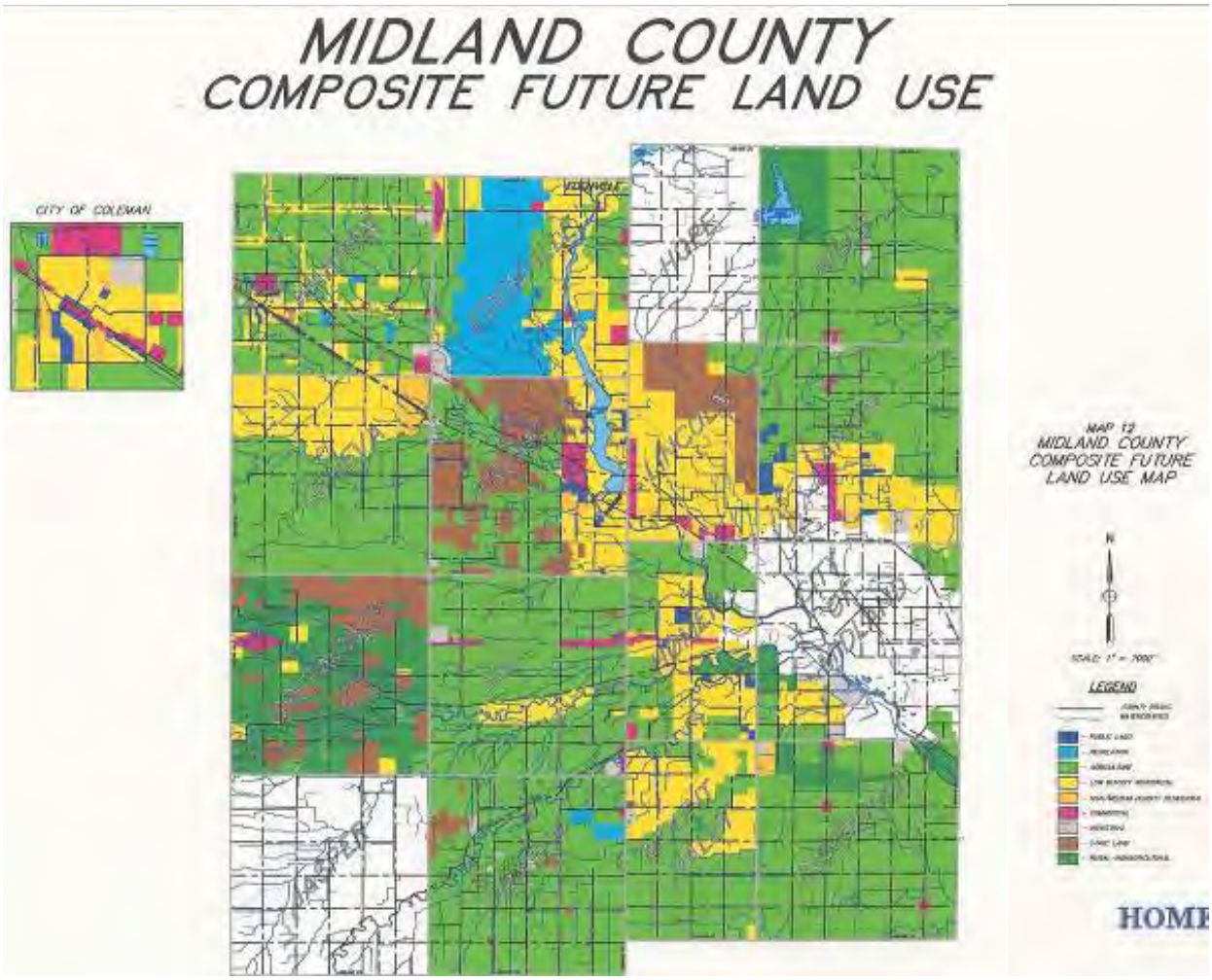
Finally, the City of Coleman in the northwest part of Midland County is an attractive area for development in a location central to Mt. Pleasant, Clare, and Midland. An industrial park was opened in 2002 at the Coleman Road and U.S. 10 interchange. The industrial park creates the potential for additional growth and economic opportunity in the Coleman area. Coleman is unique as Midland County's only small, rural city surrounded primarily by agricultural land. An industrial packaging facility owned and operated by Huhtamaki, Inc. is located just outside the Coleman city limits.

Housing Stock – A U.S. Census 2022 survey determined that 57% of the housing stock in Midland County has been built since 1970. Ninety-five percent of housing is occupied, including 80% which is owner-occupied. Roughly 75% of Midland County's housing stock consists of single-family dwellings. The remainder is made up of multi-family dwellings and mobile homes. The quality, value and age of these structures are varied. The median cost of a single family home is $186,800.

Public Infrastructure – Existing infrastructure, in most cases, is in fair to good condition.

Areas of Major Land Use Conflict – There are no major areas of land use conflict in Midland County.

Historic District – The City of Midland created the West Main Street Historic District in 1997. This district contains 24 residential dwellings and is located just west of the downtown area.



Major Measures to Minimize Hazards – In the City of Midland, land use controls for any development or redevelopment in the floodplain were incorporated into the building code in 1974 and in 1978. In 1978, after 20 years of discussion and planning, local action was taken to implement a floodplain project in Midland. The City accepted a grant of up to $500,000 from the Herbert H. & Grace A. Dow Foundation to be used for the purchase of property in the floodplain. The City matched the grant. Over 112 structures have been purchased and removed from the flood plain. Properties in the flood plain have been turned into parks, recreation facilities and open space. The City has also implemented other measures to lessen the community's vulnerability to hazards including digital mapping of the floodplain; participation in the NFIP Community Rating System; and adopting a long-term mitigation plan.

In 2019, the Village of Sanford received Flood Mitigation Funding through FEMA for 8 property acquisition projects south of the Rail-trail to mitigate future impacts of flooding on residents.

In the fall of 2020, the Midland Business Alliance stood up a Critical Infrastructure Committee which included the City of Midland and the County of Midland to better understand flooding issues and identify potential flood control or mitigation measures to help build flood resiliency in harder impacted areas. Within a year, a flood study agreement was entered into with the U.S.

Army Corps of Engineers as well as a Flood Inundation Map agreement with the U.S. Geological Survey agency. Once the flood survey was complete, a General Investigation agreement was entered with the U.S. Army Corps of Engineers to identify areas where flood mitigation projects may be successful and propose what type of projects would work.

In late 2020, Midland and Gladwin Counties purchased the Secord, Smallwood, Edenville and Sanford Dams from Boyce Hydro, a private company who owned the dams when they failed and declared bankruptcy shortly after. Four Lakes Task Force was hired by the Counties to manage the dams and begin emergency repairs and rebuilding the dams. Through the permitting and approval process with the State Dam Safety Agency, the dams have completed emergency repairs, stabilizing the structures. Engineering plans of rebuilding the dams will have emergency spill ways and be built to withstand much larger flood events than experienced in 2020.

In 2021, the City of Midland received Flood Mitigation Funding through FEMA for 21 property acquisition projects within the floodplain to reduce the impact of flooding. The Village of Sanford also applied for Flood Mitigation Funding for 5 property acquisition projects.

In 2022, Dow Chemical petitioned the City of Midland to close Saginaw Road, a 5 lane road that ran between two chemical facilities. With the approval from the City, the Road was closed and public traffic was rerouted around the site. This action reduced the risk of the public being exposed to a hazardous material release between the two facilities.

Transportation Network

Highways and Major Roads – Midland County is served by several major roadways. U.S. 10 crosses Midland County from southeast to northwest. It connects Midland County to U.S. 127 in central Michigan and Interstate 75 on the east side of the state. U.S. 10 is the main route of travel between Midland and Bay City. State highway M-20 runs east and west through central Midland County, connecting Midland County to the Mt. Pleasant area, including Central Michigan University and the Soaring Eagle Casino. State highways M-30 and M-18 run north and south in central and western Midland County, connecting with Beaverton, Gladwin, Houghton Lake and West Branch.

Airports – MBS International Airport is located eight miles southeast of the City of Midland in Saginaw County. This facility is operated jointly by the City of Midland, the City of Saginaw and Bay County. Also, the City of Midland operates Jack Barstow Airport, which is a general aviation facility.

Ports – There are no ports in Midland County, however, there is a customs port of entry located 16 miles east of Midland in Bay County.

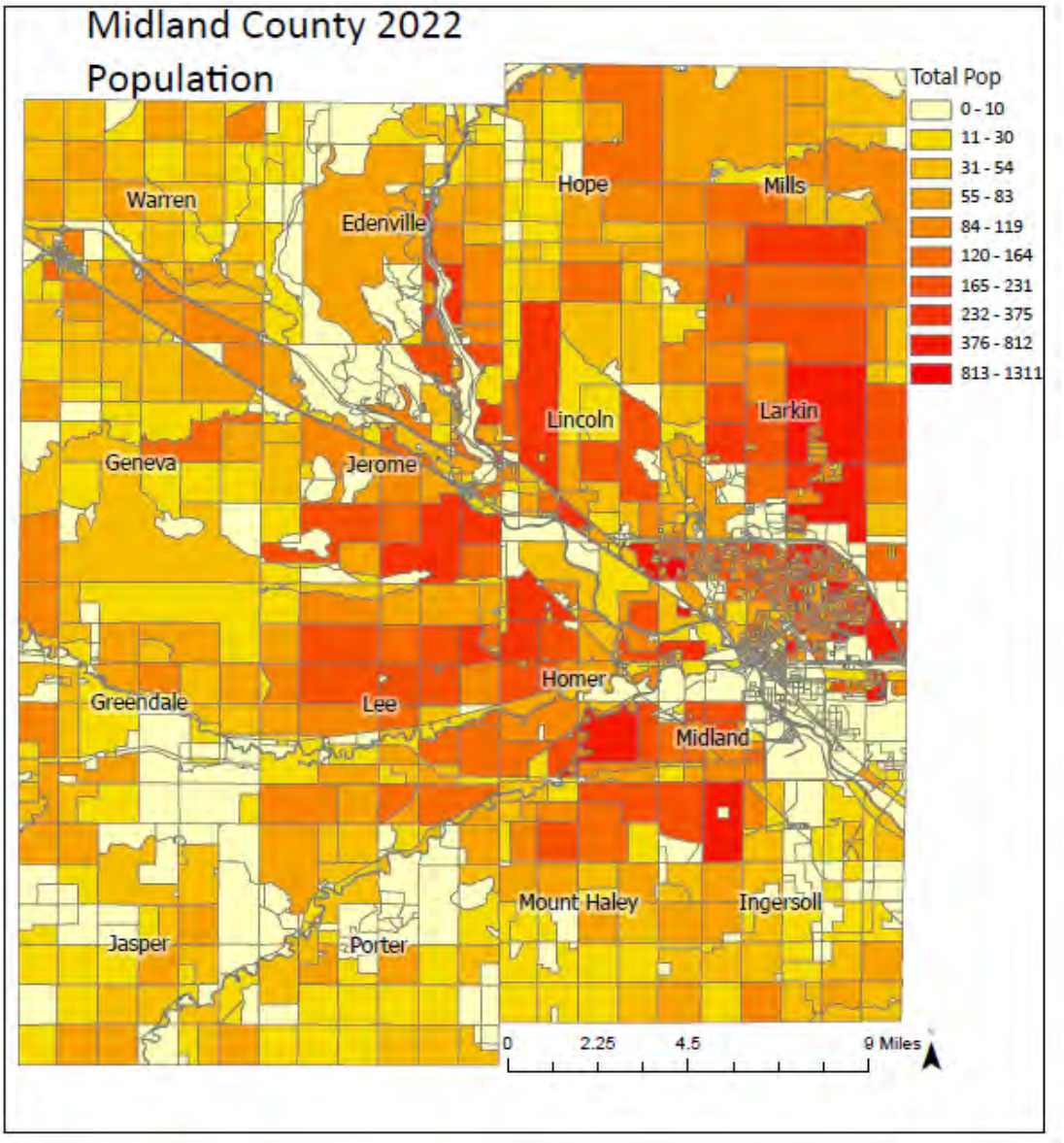
Rail Service – There are no passenger rail services in Midland County. There is rail service to the I-Park which is the location of many chemical manufactures on the southeast side of the City of Midland.

Local Transit Services – These include the City of Midland's Dial-A-Ride service and the County Connection. Both services offer handicap accessible transportation. Taxi service is also available in the Midland area.

General Condition of Roads and Bridges – Many improvements have been made to roads and bridges in Midland County by the State Department of Transportation, the County Road Commission and local units of government. Even so, some roads remain in poor condition. Transportation north and south through the center of Midland County has improved with the addition of the Meridian Road/M-30 Bridge over the Tittabawassee River at Sanford.

Population Characteristics

Current Population – The 2022 Census indicated that 83,674 people live in Midland County.



Age/Racial Breakdown – In Midland County, 93.8% of residents are Caucasian, 1.5% are African American, 0.5% are American Indian, 2.3% are Asian, 0.1% are Native Hawaiian and Other Pacific Islander alone, 3.3% are of Hispanic or Latino origin, with 1.9% of mixed race. Most of the minority population resides in the City of Midland.

Non-English Speaking Population – Of the 34,090 households in Midland County, 4.2% speak a language other than English at home. The majority of these speak English well enough to function in business and industry.

Special-Needs Populations – In 2022, the percentage of residents in Midland County 65 years old and older was 20.5%. There are many services for the elderly through Midland County Senior Services, including case/care management, counseling, support groups, energy assistance, home delivered meals, centers/dining sites, transportation and a monthly newsletter. Midland County Senior Services is the principal organization serving older adults in Midland County.

Seasonal Population - The population of Midland County does not vary significantly due to seasonal fluctuations. There are some seasonal homes on Sanford Lake, but most of the homes on Sanford Lake are year-round residences. Several small campgrounds operate in Midland County during the summer, but they are not large enough to create a significant impact on the population. As with other Michigan communities, a number of retired citizens spend winter in Southern States, but their departure does not cause a significant fluctuation to the local population.

Economic Characteristics

Employers – Large employers in Midland County have remained relatively stable, experiencing fluctuations with the economy, but remaining strong and viable.

Company	Location
MyMichigan Health	Midland
Dow Chemical Company	Midland
Midland Public Schools	Midland
DuPont	Midland
Corteva	Midland
Greater Midland	Midland
Huntington Bank	Midland
Northwood University	Midland
City of Midland	Midland
Three Rivers Construction	Midland
Walmart	Midland
County of Midland	Midland
Meijer	Midland
Huhtamaki, Inc	Coleman
Bierlein	Midland
Trinseo	Midland

The Midland area is also home to many small businesses that supply and support the larger industrial facilities. There are far too many of these to list here, however, they are an integral part of the local economy.

Unemployment - Midland County has experienced highs and lows similar to the national average over the years. In 1999, unemployment rate was 1.8% and a high in 2010 of 11.2% with the exception of February to April of 2020. Unemployment rose from 3.9% to 18.9% due to the COVID-19 pandemic that shutdown all nonessential services to prevent the spread of illness. The most recent reported state average unemployment rate in Michigan was 4.2%, while Midland County's rate stood at 3.9%.

Community Tax Revenue - Property tax is the primary source of revenue for local governments within Midland County.

Median Household Income - The median household income for Midland County, 2017 - 2021 was $67,558.

Poverty - In the 2022 Census, Midland County was shown to have 10.5% of its population living below the poverty level.

Key Community Facilities/Organizations

Community Services - Midland County residents are served in a variety of ways by county, city, village and township government. There are four law enforcement agencies, thirteen fire departments, and one emergency medical service that provide public safety services. Animal control and emergency management are also provided to residents by county government. Major services provided by the City of Midland to its residents includes police and fire protection, water and wastewater treatment facilities, adherence to a comprehensive master plan, a public library, and street maintenance. Areas of Jerome, Lincoln, Larkin, Homer, Lee, Edenville, and Midland Townships also have water services available. Other county-wide services are provided through the Sheriff's Office, Road Commission, Department of Public Health, Register of Deeds and County Clerk.

Utility Services - Natural gas and electric service for Midland County are provided by Consumers Energy. Cable television is provided by Charter Communications in the City of Midland area, Sanford and Edenville area, and in the City of Coleman. Telephone service in Midland County is provided by a number of companies, including AT&T, Verizon, and TDS Telecom. The Midland Cogeneration Venture, located in Midland, generates electricity and steam from natural gas. The City of Midland obtains its water from Lake Huron and provides water to other parts of Midland County. The City of Midland has a sanitary sewage treatment system, which includes tertiary treatment and a trickle filter sewage treatment system.

Non-Profit Organizations - There are a number of non-profit agencies in Midland County. Non-profit organizations include: United Way of Midland County, Midland County Senior Services, Affordable Housing Alliance of Midland County, Cancer Services, Big Brothers/Big Sisters of Midland County, and the Legacy Center. Open Door is a homeless shelter that has some limited

overnight capacity, however, provides meals regularly to the larger homeless population. Shelterhouse operates a shelter and provides counseling for battered women and their children. The Reece Endeavor provides permanent housing for individuals with disabilities who can function on a day-to-day basis with minimal oversight. The Salvation Army provides after-school programs, as well as literacy programs and recreational opportunities. They also provide some assistance for paying rent and utilities. They are located on the east side of Midland, along with Home to Stay and Habitat for Humanity. Home to Stay does housing rehabilitation for families and senior citizens who are very low income, and Habitat for Humanity facilitates the building of houses for very low income citizens. The Michigan Department of Human Services has an office located in the City of Midland.

Colleges and Universities - Located within Midland County are Northwood University, Davenport University, Central Michigan University Midland Center and the Delta College Midland Center. Within easy driving distance of the county are Central Michigan University in Mount Pleasant (Isabella County), Mid Michigan College (Isabella County), Saginaw Valley State University (Saginaw County), and Delta College (Bay County). Delta College is the local community college for residents of Midland County.

Other Key Facilities - The Midland area is known for its abundance of cultural and recreational activities. The Midland Center for the Arts is the cornerstone, consisting of a museum, a 1,538 seat auditorium/concert hall, a 426 seat theater, a 94 seat lecture hall, art galleries, art studios, computer education center, meeting rooms and a reception area. Dow Gardens is adjacent to the Center for the Arts. The Chippewa Nature Center is a 900 acre area bounded by the Chippewa River. There are 14 miles of hiking trails, an arboretum, naturalist programs and wildlife viewing. Other important recreation areas and facilities are:

- AuSable State Forest
- Currie Golf Course
- Dow Diamond
- Midland Country Club and Golf Course
- Midland Civic Arena
- Midland Community Center
- Midland Community Soccer Complex
- Midland Community Tennis Center
- Midland County Fairgrounds
- Midland County Historical Center
- North Midland Family Center
- Pere Marquette Rail Trail
- Pine Haven Recreation Area
- Sanford Lake Park
- West Midland Family Center
- Whiting Forest

Soaring Eagle Casino near Mt. Pleasant is not in Midland County, but impacts the county and its population. The casino is significant due to gaming, concerts and other activities it hosts

throughout the year. Midland County residents visit the casino and many people pass through Midland County on their way to and from the casino.

Social Vulnerability Index

Social vulnerability Index (SVI) refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills.

The Centers for Disease Control assesses the overall SVI through 16 factors. The 16 factors are:

1. **Poverty** - population living below the Federal poverty level
2. **Unemployment** - age 16 and over seeking work
3. **Per capita income** - (2013 inflation-adjusted $)
4. **Education** - age 25+ without a high school diploma
5. **Health insurance** - age less than 65 without insurance
6. **Children** - population age less than 18
7. **Elderly** - population age 65 and over
8. **Disability** - age five or more with a disability
9. **Single parent** - percent of households with children
10. **Minority** - Hispanic or non-white race
11. **Limited English** - age five and over who speak English less than “Well”
12. **Large apt. Bldgs.** - 10 or more housing units per building
13. **Mobile homes** - percent of housing units
14. **Crowding** - housing units with more than one person per room
15. **No vehicle** - households with no vehicle available
16. **Group quarters** - population living in group quarters

Overall Social Vulnerability combines all the variables to provide a comprehensive assessment. The CDC then presents four themed data sets which are:

- Socioeconomic status - income, poverty, employment, and education.
- Household composition - age, single parenting, and disability.
- Minority status and language - race, ethnicity.
- English Language Proficiency, housing and transportation - housing structure, crowding, and vehicle access.

Per FEMA's National Risk Index, social groups in Midland County have a very low susceptibility to the adverse impacts of natural hazards compared to the rest of the nation.

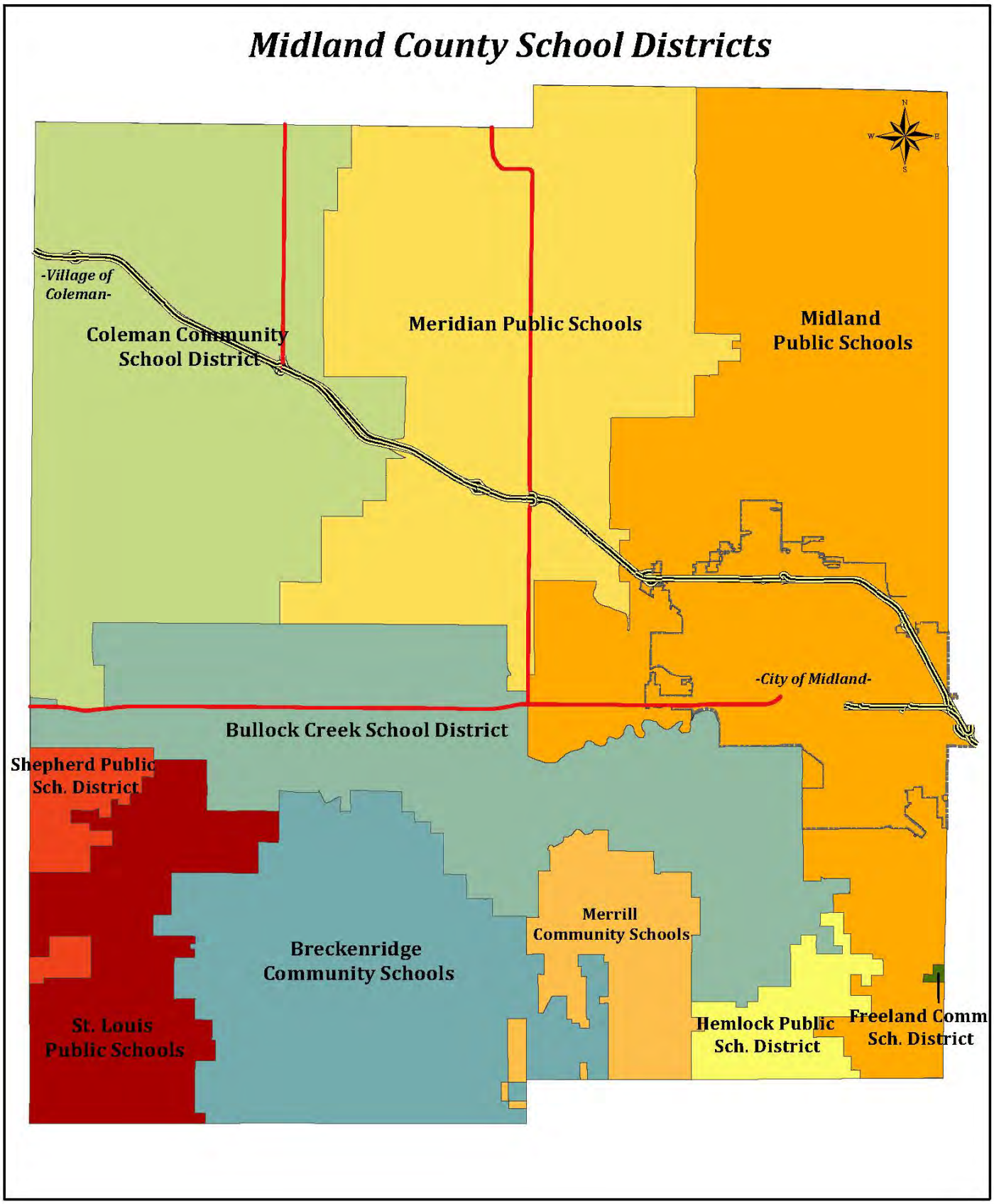
Midland County communities have a very high ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions compared to the rest of the U.S.

Other Information

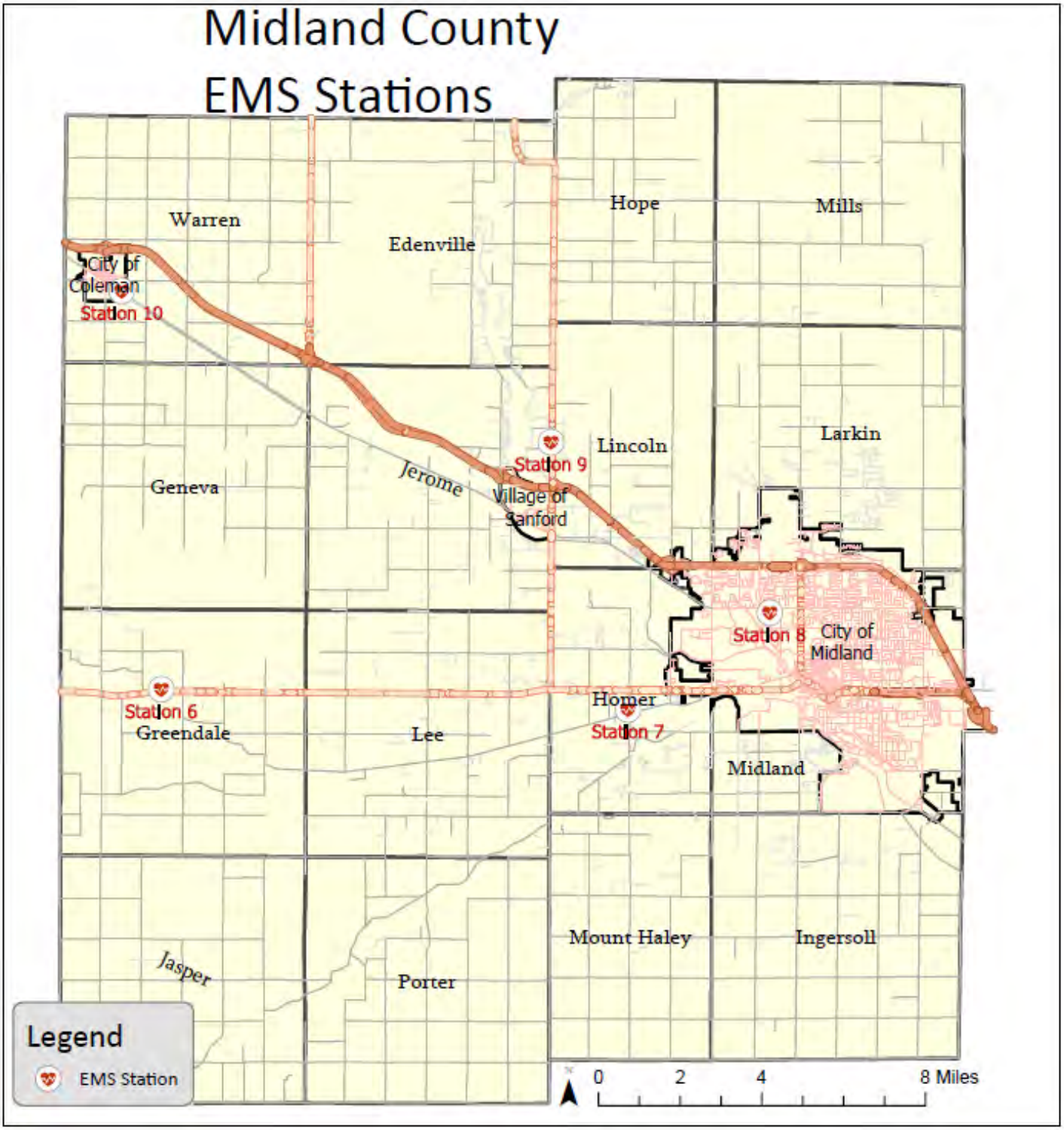
Major Events - Several major events take place in Midland, bringing more people, traffic and congestion into the community for a limited period of time.

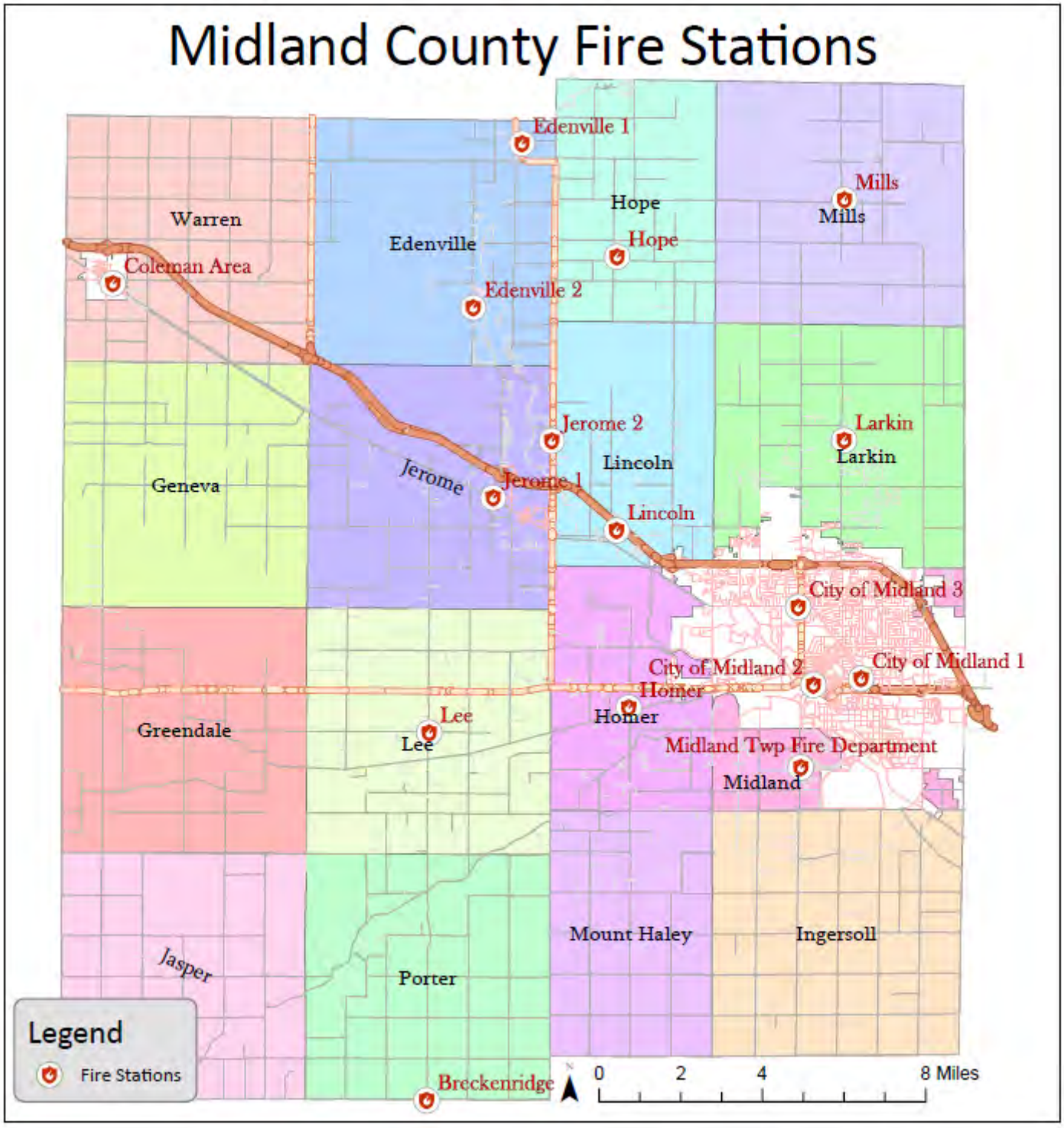
- Midland County Fair
- Michigan Antique & Collectibles Festival
- Midland Art Fair
- Softball Tournaments
- Downtown River Days Festival
- Loon's Baseball Games
- Northwood University International Auto Show
- Midland Fourth of July Concert and Fireworks
- Soccer Tournaments
- Midland Community Center / Dow Run/Walk
- Great Lakes Bay Marathons
- Tennis Classic
- Great Lakes Bay Invitational Woman's Professional Golf League
- Outdoor Music Concerts

Midland County School Districts




Medical Facilities
Lincoln
Larkin
Homer
Ingersoll
Mount Haley
Dublin
Saginaw
Eastman
Jefferson
Wheeler
Sugnet
Ashman
Main
-City of Midland-
Bay City
Legend
Mid-Michigan Medical Center Campus
Other Medical Facilities
0 0.5 1 2 3 4
Miles
Created January 2015


Midland County
EMS Stations
Warren
Edenville
Hope
Mills
City of
Coleman
Station 10
Lincoln
Larkin
Station 9
Geneva
Jerome
Village of
Sanford
Station 8
City of
Midland
Station 6
Greendale
Lee
Homer
Station 7
Midland
Mount Haley
Ingersoll
Jasper
Porter
Legend
EMS Station
0
2
4
8 Miles


Midland County Fire Stations
Edenville 1
Mills
Hope
Warren
Edenville
Hope
Mills
Coleman Area
Edenville 2
Jerome 2
Larkin
Larkin
Lincoln
Geneva
Jerome
Jerome 1
Lincoln
City of Midland 3
City of Midland 2
City of Midland 1
Homer
Homer
Lee
Greendale
Lee
Midland Twp Fire Department
Midland
Mount Haley
Ingersoll
Jasper
Porter
Legend
Fire Stations
Breckenridge
0
2
4
8 Miles


Midland County Police Coverage
Warren
Edenville
Hope
Mills
Lincoln
Larkin
Geneva
Jerome
Village of Sanford
City of Midland
Homer
Greendale
Lee
Midland
Jerome
Mount Haley
Ingersoll
Porter
Legend
Police Coverage
Coleman Police
City Police
Midland Sheriffs Zone
N
0
2
4
8 Miles

Section Four –Vulnerability Assessment

After identifying potential hazards to the community the next step is to analyze the potential impact of those hazards which includes determining who and what is vulnerable (at risk). A variety of criteria can be used to complete this assessment. The Midland County Office of Emergency Management, with the input of public and private community partners, chose to complete its vulnerability assessment based on six factors explained below. Each factor was rated on a scale of 0 to 10 for each hazard and assigned a weight as a percentage of the total equaling 100%. Each hazard is evaluated mathematically, scored and ranked. Note that in some cases scores are quite close.

Factor No. 1: *Likelihood of Occurrence*
Emergency management is based on preparing for things that are likely to occur. It only makes sense that the likelihood of an event occurring should be highly considered in vulnerability assessment and receive more priority than an event less likely or unlikely to occur. Therefore, *likelihood of occurrence* was weighted at twenty-five percent.

Factor No. 2: *Size of the Area Affected*
The size of the geographic area potentially affected by a hazard may or may not be a significant factor. Significance is determined somewhat by the characteristics of the hazard being analyzed, and also by what (or who) is vulnerable within the geographic area being considered. For example, flooding of a large floodplain is of little consequence if it is a natural area with no improvements and no population. Flooding of a small floodplain containing a high concentration of people and property improvements would have more consequence. So because *size of the area affected* is a consideration, but may vary widely in its overall importance, it was weighted at only five percent. As you will see, *capacity to cause physical damage* and *population vulnerable* were weighted more heavily.

Factor No. 3: *Capacity of the Hazard to Cause Physical Damage*
Physical damage refers to the impact of a hazard on private property and public infrastructure. It's the destruction we commonly see in news reporting after hurricanes, wildfires, tornadoes and earthquakes. Damage to homes, businesses and infrastructure can have short, medium, and long-term effects on a community. After a disaster, much effort goes into the damage assessment process because of its significance in determining the types and number of aid programs that may be made available to property owners and municipalities. However, not all hazards create physical damage, or the damage they create is limited in scope and easily recoverable. Hazards *can* be deadly without causing great physical harm to property and infrastructure. With these things in mind, this factor was weighted at twenty percent.

Factor No. 4: *Percentage of the Population Vulnerable*
The percentage of vulnerable or potentially vulnerable population by a hazard is very important in evaluating its severity. By definition a disaster's impact is *widespread*, meaning much of the population could be vulnerable. Hazards existing in an area of concentrated population must be evaluated based on the potential exposure of that population. Other hazards, such as pandemic influenza or those related to weather, have the potential to adversely impact the entire population

of the county. Still other hazards, such as dam failure or river flooding can affect people in a defined area, but broadly distributed geographically and crossing many municipal and demographic boundaries. In the vulnerability assessment, this factor was weighted twenty percent.

Factor No. 5: *Economic Vulnerability of the Community*
The loss of jobs is a serious issue for a community no matter what the cause. Some hazards have the potential to cause significant damage to business and industry. Hazards also can negatively impact infrastructure or natural resources that business and industry depend upon. Permanent and temporary job losses can result. The economic stability of the community can be threatened. A full economic recovery after a disaster can take years. So a hazard can have a measurable and long-term effect on the local economy. The vulnerability assessment recognizes this by weighting this factor at twenty percent.

Factor No. 6: *Duration of the Event*
The duration of an event may or may not be significant as a vulnerability assessment factor. Certainly it is important, but not necessarily *defining.* Some hazards can have a huge impact in an instant. Others develop greater effects over time. So this factor was weighted at ten percent.

Hazard Ranking

Rank	Hazard	Score
1	Flooding	6
2	Severe Winds	5.75
3	Winter Weather	5.75
4	Wildfires	5.6
5	Infrastructure Failure	5.45
6	Public Health Emergencies	5.3
7	Terrorism	4.9
8	Tornadoes	4.8
9	Dam Failure	4.7
10	Hazmat - Fixed Site	4.55
11	Transportation Incident	3.15
12	Hazmat - Transportation	3.1
13	Oil & Gas Well Incident	1.25
14	Pipeline Incident	1.25

Note: Red indicates a large change of score since the 2018 hazard analysis.
SCALE: from 0 (poses the least threat) to 10 (poses the greatest threat)

The Hazard Mitigation Committee reviewed the types of hazards (Celestial Impact, Earthquake, and Subsidence) that fall under “Natural Geological Hazards” and determined that they had little to no impact to Midland County. Due to this determination, they have not been listed above as a potential hazard.

Review and Incorporation of Existing Plans and Technical Information

A variety of references were used in the development of the vulnerability assessment and ultimately in the development of the entire hazard mitigation plan.

Federal Resources

- Census data on Midland County, Michigan from the United States Census Bureau
- Federal Emergency Management Agency, Flood Insurance Study, Midland County, Michigan (All Jurisdictions) Initial Countywide FIS Number 26111CV000A, Effective May 4, 2009. FIS Number 26111CV000B Revision Date: January 16, 2013
- Federal Emergency Management Agency National Flood Insurance Program Flood Insurance Rate Maps (See detail in next section)
- FEMA Local Mitigation Plan Review Guide, April 19, 2023
- FEMA Local Mitigation Planning Handbook, April 11, 2025
- NOAA National Centers for Environmental Information
- U.S. Global Research Exchange, Fourth National Climate Assessment Report, 2017
- FEMA Resilience Analysis & Planning Tool (RAPT)

State of Michigan Resources

- Local Hazard Mitigation Planning Workbook, Michigan State Police PUB 207, Revised February 2003
- Michigan Hazard Analysis, Michigan State Police MSP/EMHSD-PUB 103, 2024.
- Michigan Damage Assessment Handbook, PUB 901, December 2018

Local Resources

- Midland County Hazard & Vulnerability Analysis
- Midland County / City of Midland Emergency Operations Plan
- Four Lakes Task Force Emergency Action Plans
- Midland County Wildfire Standard Operating Procedures
- Exercise and Event After Action Reports
- Midland County Significant Events List
- Midland County Land Use Guidelines

The following section outlines what types of information was pulled from these resources and how it was used.

Census Data

Information from the United States Census Bureau was used in the development of the community profile, and provided the basis for vulnerability analysis in each local jurisdiction within Midland County. Population data from the U.S. Census Bureau assisted in determining approximate number of people who would be vulnerable in areas prone to flooding and wildfires. It also provided focus for where outdoor warning sirens and other warning devices can be the most effective.

FEMA Flood Insurance Study and Flood Insurance Rate Maps

The FEMA Flood Insurance Study (FIS) for Midland County includes all jurisdictions within the county and provides both detailed and approximate flood profile analysis of streams including the Chippewa River, Snake Creek, State Drain, Sturgeon Creek, Tittabawassee River, Pine River, and Tobacco River. Flood Insurance Rate Maps identify the floodplain throughout Midland County, including:

- Edenville Township 260850
- Greendale Township 260870
- Homer Township 260989
- Ingersoll Township 260851
- Jerome Township 260853
- Larkin Township 260854
- Lee Township 260855
- Lincoln Township 260856
- Midland, City of 260140 (Enrolled in the Community Rating System)
- Midland Township 260857
- Sanford, Village of 260859

The vulnerability of people, homes and infrastructure within the one percent chance floodplain is analyzed using these FEMA resources. FIS and FIRM information was essential in the development of the vulnerability assessment. The Midland County FIS has provided focus to flood mitigation efforts as no flood hazard areas were identified in the following communities:

- City of Coleman 260861
- Geneva Township 260869
- Hope Township 260871
- Jasper Township 260852
- Mills Township 260872
- Mount Haley Township 260873
- Porter Township 260858
- Warren Township 260874

City of Midland Floodplain Management Program and Activities

Prior to May 2009, the only community in Midland County with Flood Insurance Rate Maps was the City of Midland. The City of Midland is the largest and most urban community in Midland County. For these reasons, Midland has a well developed flood management program, including participation in the NFIP Community Rating System. In December 1974, the City began participation in the National Flood Insurance Program. In April 2009, the City adopted Article IX of Chapter 5 of the Code of Ordinances titled “Floodplain Management” (copy attached). This article requires that the City take certain actions reducing flood hazards to persons, reducing property damage, reducing public expenditures, and providing for the availability of flood insurance and federal funds or loans within the corporate limits of the City of Midland.

The City encourages NFIP training for employees who can assist residents with questions about floodplains, flooding and developing areas near or in the floodplain. The City currently employs two Certified Floodplain Managers and associated support staff. There are currently 185 flood insurance policies in the City of Midland. There have been 483 flood claims totaling more than 244 million dollars since the City began flood plain management in 1978.

The City of Midland participates in FEMA's Community Rating System (CRS), which reduces the cost of flood insurance for homes within the City of Midland. The City is currently rated as a level 5 on the CRS scale, which saves residents 25% on their flood insurance premiums. As part of the CRS process, FEMA completes an annual audit of the City's floodplain management procedures and is rated by the Insurance Services Organization (ISO) to maintain the City's CRS certification.

The City has designated all properties in the Special Flood Hazard Area (SFHA) and logs all building permits and the value of improvements to homes in these areas. Once a property has made substantial improvements or repairs to a structure that value over 50 % of the home value, no more permits can be issued without full conformance with all floodplain development regulations.

Activities:

- Annually send letters to all property owners in the floodplain advising them of the NFIP and advantages of flood insurance and floodplain management. The current FIRMs identify 470 structures in the floodplain and 1,300 parcels partially within the floodplain. The letters also advise residents of the dangers of flooding.
- Maintain and update floodplain information on the City of Midland Geographic Information System (GIS) as a method for property owners to access information on floodplain status of properties within the City.
- Special edition of city-wide newsletter "At Your Service" sent to all residents of the City. This newsletter is titled "Flooding: What You Need to Know" and includes information on flood hazard areas, flood safety, property protection measures, construction in the floodplain, floodplain permit requirements, substantial improvement damage, flood insurance and natural, drainage system maintenance and beneficial functions of floodplains.
- Clear brush from the banks of open drains and streams throughout the City. This is an on-going program and helps increase the capacity of the open drainage system. Press releases are placed in the local newspaper every spring and fall to remind residents not to dump yard waste in open ditches as this can limit carrying capacity of the open drains and plug pipes.
- Flushing the storm sewer system throughout the City helps to maintain the capacity of the carrying pipe and helps to prevent street and yard flooding.
- Enforcement and oversight of the city storm water management ordinance. This ordinance requires all new development to limit the discharge of storm water from their sites to a predetermined rate of flow. The ordinance helps prevent flooding by slowing the discharge of storm water from developed property by storing the storm water on-site and discharging at the allowed rate.

- Enforcement of the Michigan Building Code pursuant to floodways and flood plains. Having staff and building inspectors that are familiar with state and federal regulations on building or earth changes in the floodplain areas aids property owners in knowing what is allowed in these protected areas.
- Soil Erosion and Sedimentation Control (SESC) permits are issued by the City building department. This also includes enforcement and education of state requirements pertaining to SESC. Keeping soil out of streams and storm sewers is a great way to assure that the storm system will be available to transport storm water when needed and keeps soil out of the receiving waters.
- Use existing NOAA gauge board readings to advise the public of the level of the Tittabawassee River during flood events. This information is also used by the City Staff to know which streets need to be barricaded at certain water levels to keep the public from driving into the flood waters. This information is also utilized to let affected property owners know when to evacuate their homes in the flood hazard areas that will be affected by certain river levels.
- Encourage "Adopt a Catch Basin" program. Property owners are requested to clear debris from curb catch basins to minimize street flooding during rain events.
- The City works closely with the Michigan Department of Environment, Great Lakes and Energy (EGLE) Floodplain Engineer to discuss proposed work in the floodplain areas of the City. EGLE is the main source for information whenever unusual situations are encountered.

Floodplain Management in Other Communities

Per the map on page 21, those with identified floodplains participate in the NFIP. All have enrolled in the NFIP, adopted a local floodplain ordinance and identified a floodplain administrator. Each of these communities enforce the Michigan Building Code (which meets or exceeds floodplain requirements) to floodplain management through building inspectors. Also, in Michigan, we have a state floodplain law. This law applies to floodplains regardless of if they are mapped by FEMA or not. The EGLE administers the state floodplain law, referred to as the Floodplain Regulatory Authority, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 31). These efforts are supported by the local EGLE Floodplain Engineer. The current Emergency Management Coordinator assists local communities, realtors, and citizens with questions about NFIP and the floodplain within Midland County. NFIP zones A and AE for all of Midland County are mapped and available electronically to the public as layers of data in the Midland County Geographic Information Systems Interactive Map at www.midlandcountymi.gov.

The National Flood Insurance Program and its related rules and regulations have many complexities. Taking this into consideration it can be understood that most communities in Midland County, with floodplains only having been mapped in 2009, do not have floodplain management programs as developed as the City of Midland, which has been in NFIP since 1974.

Repetitive-Loss Structures

As of January 4, 2024, the National Flood Insurance Program has identified 121 properties within Midland County as having suffered repetitive flood damages within recent years, and therefore meriting higher-priority flood mitigation efforts. These "repetitive loss properties" are

located within City of Midland (108), Homer Township (4), Midland Township (2) and the Village of Sanford (7). A total of $14,214,560.25 in claims were made from the 2017 and 2020 flood events. During each of these recent flood events, an average of $86,000 in structural damage was done to each of these at-risk homes. These damages show that the expense of flood mitigation is likely to be justified in terms of the amount of damage that such actions are likely to prevent. The properties should be prioritized for flood mitigation activities in the near future. (Please refer to the list of hazard mitigation actions proposed later in this plan.)

FEMA Local Mitigation Planning Policy Guide, April 19, 2023
FEMA released this guide to present guidance for the Implementation of Climate Change and Social Vulnerability Index information into County/Multi-Jurisdictional Hazard Mitigation Plans

Local Hazard Mitigation Planning Workbook
This workbook provided the fundamental guidance for gathering data and structuring it in a logical manner, as well as assisting in defining the hazard mitigation planning process.

Michigan Hazard Analysis
Hazard data from the Michigan State Police provided the background for Midland County to begin its own hazard analysis. The State data also gave us a broader perspective on hazards, and demonstrated how our county and our region could be affected in certain situations.

Damage Assessment Handbook
Knowledge of damage assessment classifications (affected, minor, major, and destroyed), coupled with knowledge of vulnerabilities in the community, provided the basis for determining the physical and economic impacts of specific hazards. The capacity of a hazard to cause major physical damage was a significant consideration in the hazard assessment process.

Midland County Hazard Analysis
The analysis of hazards is a continuous process. A review of the most recent local hazard analysis provided a foundation for updating the Midland County Hazard Mitigation Plan.

Midland County / City of Midland Emergency Operations Plan
The ability to limit the impact of a hazard through emergency and disaster response is a valid consideration in developing a hazard mitigation plan. Response policies and capabilities are defined and explained in the EOP. These response capabilities were considered in the development of hazard mitigation priorities (e.g. inability to warn the population in specific geographic areas).

Four Lakes Task Force Emergency Action Plan
Though Edenville and Sanford Dams are under restoration, Four Lakes Task Force has continued to provide updates on reconstruction activities and updates to the dam Emergency Action Plans as needed. The Edenville Dam is expected to finish its reconstruction in 2027, there is no planned construction end date for Sanford, as it is still going through the bidding process at the time of the development of this plan. Sanford Lake is expected to be returned to previous levels by the spring of 2026, Wixom Lake is expected to begin refilling in the spring of 2027. All

rehabilitation and construction of the dams is being reviewed and through EGLE's Dam Safety permitting process within the State of Michigan.

Midland County Wildfire Standard Operating Procedures

Procedures for wildfire response were developed cooperatively with the Michigan Department of Natural Resources Forest Resource Division. Maps and data defining forest and undeveloped land are contained within the document. It also outlines the threat to people and structures in the urban – wild land interface. This background information supported the need for applying the mitigation principles of the FireWise program.

Midland County Land Use Guideline

On behalf of Midland County, the Spicer Group compiled a variety of data concerning Midland County and compiled it into a document called the 2003-2006 Midland County Land Use Guideline. This was used primarily to identify existing and future land use. Land use maps can be found within this plan.

The Midland County Land Use Guideline is arguably the single most important planning document for the sixteen townships in Midland County, the Village of Sanford, and the City of Coleman. It is of lesser importance to the City of Midland as it has a well-developed planning process of its own, which does include facets of hazard mitigation.

The Midland County Land Use Guideline contains Land Use Goals and Community Planning Principles. Although some of the planning principles include elements of hazard mitigation, it is not specifically addressed as a goal or a building block of good community planning. The Land Use Guideline was published before Flood Insurance Rate Maps became effective in most of Midland County in May 2009. At a minimum, the Land Use Guideline should be expanded to include flood hazard mitigation as a goal and/or principle of planning in Midland County.

Expansion of the Land Use Guideline to include factors related to other types of mitigation should also be considered. Mitigation principles related to the wildland – urban interface, public warning, and emergency vehicle access would improve the accomplishment of hazard mitigation in Midland County as its rural areas increase in population.

It is the responsibility of local municipality to ensure the incorporation of hazard mitigation strategies into their community plans.

Since the development of the Land Use Guideline, there have been not updates or changes to land use or vulnerabilities in at risk areas.

Section Five – Mitigation Goals and Objectives

Goal Number 1: Enhance public protection from weather hazards.

This plan has well documented the history of weather hazards in Midland County. The top five of fourteen hazards in the risk assessment are weather related. Improving public safety as it is linked to weather is a logical priority and the number one goal.

Objective No. 1: (Flooding) Encourage the enrollment of more local jurisdictions in the National Flood Insurance Program (NFIP). **2013 Update:** Since the original adoption the hazard mitigation plan in 2008, FEMA has completed the map modernization process for Midland County. As a result of map modernization, Midland County has seen an increase in jurisdictions participating in NFIP from three (3) to (11) eleven. All local jurisdictions within the county that have identified floodplains are enrolled in NFIP. **2018 Update:** During the recovery efforts from the 2017 Flood event, it was determined to promote NFIP participation countywide due to the number of residents that were impacted by flash flooding. At this time, fourteen (14) jurisdictions now participate in the National Flood Insurance Program (NFIP). **2024 Update:** There were plans after the 2020 Flood event to have NFIP staff hold a training for local officials, however that was canceled. There is continued encouragement to four townships (Geneva, Jasper, Hope and Mount Haley) to participate in the National Flood Insurance Program (NFIP). Therefore, Objective No. 1 - Is Ongoing.

Description of Action. Over the years it has become evident that most elected officials, residents and property owners are unfamiliar with NFIP and therefore don't understand how it works. Decision-makers must be educated about NFIP so they understand how it works for property owners and what is required to enroll. The Office of Emergency Management in cooperation with the Michigan Department of Environmental, Great Lakes, and Energy (EGLE) will meet with local jurisdictions and provide information about NFIP, including the documents needed for enrollment.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Attend local government meetings as often as practicable to update officials on NFIP. Continue to encourage and promote the benefits of NFIP enrollment in jurisdictions that are not participating. The project is ongoing until all jurisdictions have enrolled.

Sources of Assistance. State EGLE Floodplain Management Program, FEMA NFIP staff, and the Michigan Storm Water-Floodplain Manager's Association

Sources of Financial Assistance. State and local funding.

Objective No. 2: (Flooding) Facilitate training for local building inspectors and building code authorities concerning the enforcement of the Michigan Building Code pursuant to floodways and flood plains. **2013 Update:** The Midland County Office of Emergency Management contracted with Spicer Group and W.A. Wilson Consulting Service to conduct a floodplain management workshop for local building inspectors and building code authorities. The workshop was successfully completed at the Homer Township Public Safety and Fire Training Facility. **2024 Update:** Given the amount of turnover in the last 10 years of building officials and the flood events in the last 6 years, local coordination with FEMA NFIP Staff to hold future training is a priority. Floodplain Management trainings should be held regularly to provide necessary guidance and resources to local building officials. Additionally, encourage building officials and local floodplain managers to attend the annual Michigan Stormwater-Floodplain Association Conference. Therefore, Objective No. 2 - Is Ongoing.

Description of Action. Gather and distribute information to building officials by meeting with them and working through the City of Midland and the Midland County Township Officer's Association. Facilitate training for local building inspectors and building code authorities concerning the enforcement of the Michigan Building Code. It is important that building officials understand their obligations pursuant to flood elevations and Michigan Building Code enforcement.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Every few years, hold training to help keep building officials up to date on building codes and enforcement issues.

Sources of Assistance. Michigan Department of Labor and Economic Development and EGLE Floodplain Management

Sources of Financial Assistance. State and local funding.

Objective No. 3: (Flooding) Add gauging equipment for monitoring river flow and stage data, which is used in computer models to predict the flood-crest of the Tittabawassee River in Midland. **2024 Update:** Emergency Management Coordinator, through a $400,000 grant from NOAA engaged with Michigan State Uiversity Enviroweather, the Four Lakes Task Force and the US Geological Survey (USGS) in 2020 and installed additional river gages in the following locations:

1. Chippewa River at S Homer Road near Midland
2. Tittabawassee River at Saginaw Road Bridge in Sanford, MI.
3. Salt River upstream of confluence with the Tittabawassee River in Sanford, MI.
4. Tittabawassee River downstream of Secord Dam.

All four gages are upstream of Midland. The gages are currently calibrated and reporting data through the USGS National Water Information System. Another 20 rain gauges were installed across the Tittabawassee Watershed (8 Counties) upstream from the City of Midland to collect timely information during heavy rain or long-term rain events. Therefore, Objective No. 3 Completed.

Objective No. 4: (Severe Winds and Tornado) Develop a public education program addressing safety preparations before a storm and response during and after a storm. **2024 Update:** The Emergency Management Office partners with the National Weather Service to hold SKYWARN training annually in-person as available. Since 2021, the National Weather Service holds SKYWARN training virtually, annually. The training is free and open to the public. The County has been approved as a National Weather Service Weather Ready Nation Ambassador, with the purpose of encouraging further outreach to the community, as well building a closer relationship with our local NWS office. In 2024 the Office of Emergency Management with community partners developed a severe weather video to educate the community of what actions residents should take during severe weather. The video is posted on local websites as well as promoted through social media with several community partners. Participating local governments: All. Therefore, Objective No. 4 is Ongoing.

Description of Action. Utilize existing resources, and develop new ones as necessary, to educate local citizens about storm hazards and how to prepare for them. This includes the use of community television, newspapers, direct mailing of printed materials, billboards, special meetings, cable television, the internet, and social media. When possible, place information in community newsletters, and in other local, unique publications.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Annually, emphasizing program in early spring and summer when storms are most prevalent

Sources of Assistance. National Weather Service, Federal Emergency Management Agency, Michigan Department of State Police, Midland Daily News, and Midland Community Television

Sources of Financial Assistance. Local foundations and agency budgets.

Objective No. 5: (Winter Hazards) Develop a public education program addressing safety preparations for blizzards, ice storms and other winter hazards. **2024 Update:** Public education for severe weather is ongoing. New tools are being utilized to reach the public with information. The most effective of these has been Facebook. The Emergency Management Office partners with the National Weather Service to hold Winter Hazard Awareness training every three years in-person. Since 2021, the National Weather Service holds Winter Hazard Awareness training virtually on the annual basis. The training is free and open to the public. Participating local governments: All. Therefore, Objective No. 5 is Ongoing.

Description of Action. Utilize existing resources, and develop new ones as necessary, to educate local citizens about winter hazards and how to prepare for them. This includes the use of community television, newspapers, direct mailing of printed materials, billboards, special meetings, cable television, the Internet, and social media. When possible, place information in community newsletters, and in other local, unique publications.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Annually, emphasizing program in late autumn and early winter

Sources of Assistance. National Weather Service, Federal Emergency Management Agency, Michigan Department of State Police, Midland Daily News, and Midland Community Television

Sources of Financial Assistance. Local foundations and agency budgets.

Objective No. 6 (NEW): Develop a "Safe Shelter" program for those living in mobile or modular homes. Local leaders will reach out to the State Housing Commission (who oversees the licensing of mobile home parks) to advocate for storm shelters requirements for future park developments. For those with mobile homes on property outside of parks, work with building safety officials to provide Storm Shelter guidance to current property owners.

Description of Action. Reach out to the State Housing Commission to develop conversation around storm shelter requirements for mobile home parks. The goal would be to get requirements added to future licenses and inquire about current licenses.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Fall of 2027

Sources of Assistance. Local building officials. Local elected officials. State Housing Commission

Sources of Financial Assistance. State and private funds

Goal Number 2: Improve and expand public warning capabilities.

Emergency public warning is a challenging task. It is important to improve and expand warning methods and implement new technologies when possible with the goal of reaching more people wherever they may be.

Objective No. 1: Expand outdoor warning siren coverage to include local jurisdictions with the greatest population density and populations near or above 4,000 people. This includes Homer Township, Jerome Township, Larkin Township and Lee Township. Expansion may also include areas of significant outdoor population density during festivals and sporting events. **2024 Update:** No outdoor warning sirens have been added in Midland County since this objective was established. Sirens are still considered viable tools for outdoor warning. Therefore, Objective No. 1 Status Unchanged.

Description of Action. Develop an outdoor warning siren system implementation plan in cooperation with local officials to include additional jurisdictions across the County. The plan should outline potential locations for sirens in areas of the most population.

Project Coordinator. Emergency Management Coordinator

Project Schedule. Project planning to take place as soon as funding becomes available. Implementation is to occur within 18 months of approval.

Sources of Assistance. Manufacturers of warning equipment.

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding.

Objective No. 2: Promote the use of NOAA Weather Radios. Provide radios to organizations needing them but with inadequate funds to purchase them. **2024 Update:** The promotion of NOAA Weather Radios (sometimes called All Hazards Radios) is ongoing. The use of the radios by individuals, organizations, and businesses has expanded in the past five years. There are alternative ways to receive warning information available to those with wireless devices. Continued education on ways to receive emergency alerts and information is necessary. Participating local governments: All. Therefore, Objective No. 2 is Ongoing.

Description of Action. Utilize existing resources, and develop new ones as necessary, to educate local managers and operators of public and private facilities about the benefits of NOAA weather radios as well as alternative emergency alerts. When possible, provide the radios to facilities with limited resources.

Project Coordinator. Emergency Management Coordinator

Project Schedule. This is an ongoing project that can be coupled with other public awareness campaigns. Although emphasis may typically be in the spring of the year, it has the potential of a year-round campaign.

Sources of Assistance. Warning Coordination Meteorologist, Detroit-Pontiac Weather Service Office

Sources of Financial Assistance. County general fund, federal grants, and grants from private foundations.

Objective No. 3: Improve the ability to quickly activate the Emergency Alert System (EAS). **2013 Update:** Midland County has the capability to activate the EAS system through an approved agreement with FEMA and the Michigan State Police to participate in the Integrated Public Alert and Warning System (IPAWS). Therefore, Objective No. 3 Completed.

Objective No. 4: Develop an Internet based list serve system providing a means for people to sign up to receive text messages when warnings are issued. **2013 Update:** Midland County uses a web service called Nixle. Residents sign up through nixle.com to receive emergency alert messages from Midland County 911. Through IPAWS the County is able to send messages to cell phones equipped to receive Wireless Emergency Alerts (WEA). As people transition to new devices a significant percentage of the population will be reachable via WEA. Therefore, Objective No. 4 Completed.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

Objective No. 1: Partner with the Michigan Department of Natural Resources and Michigan State University to introduce the FireWise Communities program in several communities as a pilot project in Midland County. **2024 Update:** Partnership with MSU and MDNR depends on the availability of their staff to work with Midland County. Both organizations have seen funding and staffing cuts in the past five years. Resource material will be provided for distribution. Participating local governments: Edenville Township, Jerome Township, Hope Township, Mills Township and Lee Township. Therefore, Objective No. 1 Status Unchanged.

Description of Action. The federal government has developed a program called "FireWise" that is designed to help communities and individual property owners protect themselves from wildfire. The implementation of FireWise requires the acquisition and distribution of educational materials in high-risk areas of Midland County.

Project Coordinator. Emergency Management Coordinator will coordinate with local Fire Departments.

Project Schedule. Introduce FireWise and continue as an ongoing program in 2027.

Sources of Assistance. Michigan Department of Natural Resources (DNR), National Interagency Fire Center, U.S. Forest Service, National Wildland/Urban Interface Program, and Michigan State University Extension.

Sources of Financial Assistance. Community Wildfire Defense Grant (DWDG) through the State of Michigan Department of Natural Resources (DNR), potential local funding.

Objective No. 2: Facilitate training for local planning boards on how to design zoning and building standards to protect life and property from wildfire. Participating local governments: Edenville Township, Jerome Township, Hope Township, Mills Township and Lee Township **2024 Update:** Due to lack of staffing resources, the Sanford DNR Office was closed from 2019-2023 resulting in lack of local resources. Objective No. 2 Status Unchanged.

Description of Action. Utilize FireWise program to present workshop to local zoning board and building officials.

Project Coordinator. Michigan State University Extension and the Michigan DNR Forest Resource Division Fire Officer will do primary coordination and direction of the project. Local fire departments and the Emergency Management Coordinator will provide support.

Project Schedule. Present the workshop in 2027.

Sources of Assistance. Emergency Management Coordinator will coordinate with local Fire Departments.

Sources of Financial Assistance. Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA), Community Wildfire Defense Grant (DWDG) through the State of Michigan Department of Natural Resources (DNR), potential State funding and local match funding.

Objective No. 3: Develop partnerships with local nurseries and landscapers to promote the use of fire resistant plant varieties and landscaping. Participating local governments: Edenville Township, Jerome Township, Hope Township, Mills Township and Lee Township. **2024 Update:** Objective No. 3 Status Unchanged.

Description of Action. Utilize FireWise programs to present a workshop to owners and operators of local nurseries, greenhouses, and landscaping companies. The purpose of the workshop is to provide information about fire resistant landscaping and encourage businesses to support it with product availability.

Project Coordinator. Emergency Management Coordinator.

Project Schedule. Present workshop in 2027

Sources of Assistance. Michigan Department of Natural Resources, National Interagency Fire Center, U.S. Forest Service, National Wild land/Urban Interface Program, and MSU Extension.

Sources of Financial Assistance. Federal and local grants

Objective No 4 (**NEW**): Working with community partners and the Midland County Public Health Department, develop an ongoing public awareness campaign to reach all age groups with air quality information, including how to protect yourself during unhealthy air quality conditions due to wildfires. Participating local governments: All

Description of Action. Utilize existing resources, and develop new ones as necessary, to educate the community about potential air quality issues associated with wildfires. Provide special focus to those with health issues who are likely more vulnerable to air quality issues.

Project Coordinator. Midland County Health Emergency Preparedness Coordinator.

Project Schedule. This is an ongoing project that can be coupled with other public awareness campaigns. Although emphasis may typically be in the spring of the year, it has the potential of a year-round campaign

Sources of Assistance. Midland County Public Health Department

Sources of Financial Assistance. Midland County Public Health Department

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community. (All NFIP Participating Communities)

Objective No. 1: Develop partnerships between local units of government, the drain commissioner, the road commission, property owners, land conservancies, local dams, state agencies, local industry, and others as appropriate to develop and implement erosion control projects along rivers, creeks, streams and drains for the purpose of reducing and/or eliminating damage from floodwaters. **2024 Update:** Shortly after the 2020 flood and dam breaches, FLTF began work with the Natural Resources Conservation Service (NRCS, branch of US Department of Agriculture) under the NRCS Emergency Watershed Protection program. Under this program, FLTF stabilized 3 miles of reservoir shoreline that were at risk of significant erosion in future flood events. FLTF also stabilized Tittabawassee River shorelines between Sanford Dam and the Saginaw Road Bridge in Sanford. In addition, FLTF worked with NRCS to remove tons of flood debris from the drained bottoms of the Edenville and Sanford reservoirs. Funding for this work came primarily from the NRCS with matching funds obtained by FLTF from the State of Michigan. The Drain Commissioner has also been working to maintain drains by removing debris and vegetation and expanding water flow capacity. Therefore, Objective No. 1 – Is Making Progress.

Description of Action. Using accepted engineering practices, implement erosion control projects in areas of significant and/or repetitive damage.

Project Coordinator. The project coordinator will vary depending on where the project is taking place and who has jurisdiction. In the City of Midland the City Engineer will have a lead role in implementing flood strategies. Throughout the county, the Midland County Drain Commissioner will provide leadership on any project involving county drains.

Project Schedule. Projects will be scheduled and work begun as soon as practicable after funding is received.

Sources of Assistance. The Michigan Department of Environmental, Great Lakes, and Energy (EGLE) Floodplain Engineer, the Federal Emergency Management Agency, and other local partners

Sources of Financial Assistance. Federal funding, State funding and local funds.

Objective No. 2: Encourage low impact design and green technology in development projects to limit and/or reduce runoff. Participating local governments: City of Midland. **2024 Update:** Objective No. 2 Status Unchanged.

Description of Action. Create incentives for developers to use low impact development design. Provide fact sheets, reports and other information on how to use so-called green infrastructure in community development.

Project Coordinator. The project coordinator will vary depending on where development is taking place and who has jurisdiction. The Emergency Management Coordinator will provide support.

Project Schedule. Ongoing

Sources of Assistance. The Michigan Department of Environment, Great Lakes and Energy, Environmental Protection Agency, Federal Emergency Management Agency, Association of State Floodplain Managers, Michigan Stormwater-Floodplain Association, and other local partners

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding.

Objective No. 3: Promote flood mitigation that homeowners can do such as adding sump pumps, cleaning drainage tiles and conducting other maintenance to prevent basement flooding, and retrofitting sewer lines with valves that prevent backflow. **2018 Update:** In November of 2017, a Flood Insurance workshop was hosted by the Emergency Management Office and the City of Midland. Presentations were given on the National Flood Insurance Program, Floodplain Management within the City and the Army Corps of Engineers presented on mitigation actions for homeowners to reduce their flood hazard around their homes. Therefore, Objective No. 3 Completed.

Objective No. 4: Provide information to the community about areas at-risk of flooding. **2024 Update:** The Emergency Management Office through the use of social media has posted information and links to the online flood hazard maps located on both the City of Midland and County of Midland websites. Participating local governments: Edenville Township, Homer Township, Jerome Township, Midland Township, City of Midland and Village of Sanford. Objective No. 4 is Ongoing.

Description of Action. Provide homeowners with information through a variety of sources about flood risk and what they can do to protect themselves, their homes and personal property.

Project Coordinator. The Emergency Management Coordinator

Project Schedule. Ongoing throughout the lifetime of the plan

Sources of Assistance. The Michigan Department of Environment, Great Lakes and Energy, Michigan State Police, FEMA, Michigan Stormwater-Floodplain Association

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding

Objective No. 5: Promote Community Master Plans to create a zoning category that identifies current floodplains and rezone these areas to reflect the natural floodplain. This "flood zone" would limit future building and work with current property owners to flood proof or eliminate current structures. **2024 Update:** The Village of Sanford is currently working to meet this objective. Objective No. 1 – Is Ongoing.

Description of Action. Promote the Midland County Hazard Mitigation Plan regularly to local jurisdiction so mitigation actions can be addressed locally as able.

Project Coordinator. The Emergency Management Coordinator

Project Schedule. Ongoing throughout the lifetime of the plan

Sources of Assistance. Michigan State Police, FEMA, and Michigan Stormwater-Floodplain Association

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

Objective No. 1: Work with community partners and the Local Emergency Planning Committee to develop an ongoing public awareness campaign to reach all age groups with hazardous material safety information, including how to shelter-in-place during a chemical emergency. Participating local governments: County of Midland and City of Midland. **2024 Update:** In 2024 the Office of Emergency Management with community partners developed a hazardous material release video to educate the community of what actions residents should take during a hazardous material release. The video is posted on local websites as well as promoted through social media with several community partners. Objective No. 1 Status Ongoing.

Description of Action. Provide residents with information through a variety of sources about chemical emergencies and what they can do to protect themselves.

Project Coordinator. The Emergency Management Coordinator

Project Schedule. Ongoing for the lifetime of the plan

Sources of Assistance. Local chemical manufacturing companies and the Local Emergency Planning Committee

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding.

Objective No. 2 (**NEW**): Work with community partners and the Local Emergency Planning Committee develop an ongoing public awareness campaign regarding the potential hazards of batteries in electric vehicles.

Description of Action. Provide residents with information through a variety of sources regarding the hazards of batteries in electric vehicles and what they can do to protect themselves.

Project Coordinator. The Emergency Management Coordinator

Project Schedule. Ongoing for the lifetime of the plan

Sources of Assistance. Local Emergency Planning Committee and Electric Vehicle Manufacturing Companies

Sources of Financial Assistance. FEMA Hazard Mitigation Assistance (HMA) funding, Post Disaster Management (PDM) funding, potential State funding and local match funding.

Goal Number 6: (NEW) Improve Public Awareness of High Hazard Dams in the Community.

Objective No 1: Provide information to the community about areas at risk of flooding due a failure of Edenville and Sanford dams. Information is posted on social media linking residents to the dam failure inundation maps on the County website and promotion of May 31st Dam Safety Awareness Day. Participating local governments: Edenville Township, Jerome Township, Village of Sanford, City of Midland, Midland Township and the FLTF. See Appendices (page 118) for further information on the rehabilitation and ongoing management of the dams.

Description of Action. Provide residents with information through a variety of sources about the risks of high hazard dams.

Project Coordinator. The Four Lakes Task Force

Project Schedule. Ongoing for the lifetime of the plan

Sources of Assistance. Internal and external resources as required

Sources of Financial Assistance. FEMA Rehabilitation of High Hazard Potential Dam (HHPD) funding.

Goal Number 7 (NEW): Improve Public Awareness of Public Health Emergencies.

Objective No 1: Collaborate with community partners to continue and expand preparedness education/outreach efforts to aid in community preparedness and resilience for hazard events: drills, exercises, committees, brochures, website/social media communication, etc.

Description of Action. Provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.

Project Coordinator. Emergency Preparedness Coordinator

Project Schedule. Ongoing for the lifetime of the plan

Sources of Assistance. Internal and external resources as required

Sources of Financial Assistance. Federal, State and local grants

Objective No 2: Continue programs and services offered by the Midland County Department of Public Health (MCDPH): community health clinics/immunizations, community health education, communicable disease monitoring, maternal infant health program, permitting and inspection of water wells, permitting and inspection of septic systems, inspection and licensing of food service establishments. Ensure that county residents, particularly vulnerable populations, have access to public health services. Continue collaboration with MDHHS for information and guidance on new or emerging disease threats.

Description of Action. Provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.

Project Coordinator. Emergency Preparedness Coordinator

Project Schedule. Ongoing for the lifetime of the plan

Sources of Assistance. Internal and external resources as required

Sources of Financial Assistance. Federal, State and local grants

Midland County Hazard Mitigation Goals Participation Chart

	Goal Number #1						Goal Number #2				Goal Number #3				Goal Number #4					Goal Number #5			Goal Number #6			Goal Number #7		
Objective #	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**5**	**1**	**2**			**1**		**1**	**2**	
City of Coleman	X	O		O	O	O		O				O		O	X		X		O	O	O					O	O	
City of Midland	X	O		O	O	O	O	O				O		O	O	O	X	O	O	O	O			O		O	O	
Edenville Township	X	O	X	O	O	O		O			O	O	O	O	O		X	O	O	O	O			O		O	O	
Geneva Township	O	O		O	O	O		O				O		O	O		X	O	O	O	O					O	O	
Greendale Township	X	O		O	O	O		O			O	O	O	O	O		X	O	O	O	O					O	O	
Homer Township	X	O		O	O	O	O	O				O		O	O		X	O	O	O	O			O		O	O	
Hope Township	O	O		O	O	O		O			O	O	O	O	O		X		O	O	O					O	O	
Ingersoll Township	X	O		O	O	O		O				O		O	O		X	O	O	O	O			O		O	O	
Jasper Township	O	O		O	O	O		O			O	O	O	O	O		X		O	O	O					O	O	
Jerome Township	X	O	X	O	O	O	O	O			O	O	O	O	O		X	O	O	O	O			O		O	O	
Larkin Township	X	O		O	O	O	O	O				O		O	O		X	O	O	O	O					O	O	
Lee Township	X	O	X	O	O	O		O			O	O	O	O	O		X		O	O	O					O	O	
Lincoln Township	X	O		O	O	O	O	O			O	O	O	O	O		X	O	O	O	O			O		O	O	
Midland Township	X	O		O	O	O	O	O				O		O	O		X	O	O	O	O			O		O	O	
Mills Township	X	O		O	O	O		O			O	O	O	O	O		X		O	O	O					O	O	
Mt. Haley Township	O	O		O	O	O		O				O		O	O		X		O	O	O					O	O	
Porter Township	X	O		O	O	O		O				O		O	O		X		O	O	O					O	O	
Village of Sanford	X	O	X	O	O	O		O				O		O	O		X	O	X	O	O			O		O	O	
Warren Township	X	O		O	O	O		O				O		O	O		X		O	O	O					O	O	
Four Lakes Task Force			X												O									O				
Midland County		O	X	O	O	O	O	O	X	X		O	O	O	O		X	O		O	O			O		O	O	

X - Completed O - Ongoing

Progress on Goals: Progress Made

Since the adoption of the Hazard Mitigation Plan in 2019, progress has been made in the areas of meeting goals and objectives regarding flooding, dam failure, severe weather and hazardous material release. These activities have been accomplished when the appropriate resources and support of community partners came together. A lot of work across the community has been done to identify mitigation solutions and build resiliency through education and hazard analysis studies.

Local jurisdictions have adopted local planning Master Plans, Comprehensive Land Use Plans, building codes and zoning ordinances. These are reviewed every 5 years. Over the next 5 years, during these reviews, local jurisdictions will be encouraged to include hazard mitigation goals and objectives in their plans.

Setting Mitigation Priorities

In the previous section, Goals and Objectives, the projects were listed in general order of priority. Several considerations were made in developing the relative priority of each recommended mitigation action. These considerations include:

- Ranking within the vulnerability assessment of the hazard addressed
- Overall impact of the resulting condition if the hazard is not mitigated
- Funding needed to implement the action
- Resources available at federal, state and local level to implement the action
- Perception that the mitigation goal or objective can receive the necessary political and community support to be accomplished
- Potential benefit to the community weighed against the effort needed to implement the action

Priorities will remain flexible. If an opportunity, funding or needs change, priorities will be adjusted as needed.

Section Six - Appendices

List of Acronyms

High Hazard Dam Appendix

City of Midland Floodplain Ordinance

Local Jurisdiction Information
(In alphabetical order)

Hazard Mitigation Plan Presentations

Meeting Sign-In Sheets

Public Survey Responses

Resolution to Adopt the Update

List of Acronyms

EGLE –Michigan Department of Environment, Great Lakes, Energy

FEMA – Federal Emergency Management Agency

FERC – Federal Energy Regulatory Commission

FLTF – Four Lakes Task Force

HVAC – Heating Ventilation and Cooling

MCDPH - Midland County Department of Public Health

SBA – Small Business Administration

SVI – Social Vulnerability Index

USACE – United States Army Corps of Engineers

USGS – United States Geological Survey

USFA – United States Fire Administration

Four Lakes Task Force High Hazard Dams

Midland and Gladwin Counties are co-owners of the four dams (formally owned by Boyce Hydro) on the Tittabawassee River. The Secord Dam (Gladwin County), Smallwood Dam (Gladwin County), Edenville Dam (Gladwin and Midland County) and Sanford Dam (Midland County). The Counties have hired the Four Lakes Task Force (FLTF) to manage the repair, rebuild and day to day operation of the dams. The FLTF has worked with the State of Michigan Dam Safety Agency throughout the permitting and redesign process of the dams. FLTF has also worked closely with both Midland County Emergency Management and Gladwin County Emergency Management in the review and update of their Emergency Action Plans as repairs are made. Midland County Emergency Management has a long ongoing relationship working with the State Dam Safety Agency.

The Four Lakes Task Force is using a Risk Informed Design approach in the design of the rebuild of their dams. Through studies, it has been determined that the dams have little influence on flooding downstream, apart from a failure of a dam. So while flooding is projected to increase, the resulting impact from a dam would be incremental. The Dams are being designed to pass a 0.05% flood frequency. The FLTF is responsible for implementing the below mitigation strategies associated with the high hazard dams.

Four Lakes Task Force High Hazard Dam Mitigation Strategies

The following mitigation strategies are listed based on the potential for loss of life. Mitigation actions will be taken throughout the construction phase to reduce the likelihood of the structure failing.

Hazards During Construction Period of Edenville and Sanford Dams

1. **Hazard**- Edenville or Sanford Dam embankment could fail by the same mechanism that caused failure of the Edenville Dam (static liquefaction due to water seeping through the dam embankments from upstream).
    a. **Mitigation**-
        i. Both dam reservoirs are almost completely drawn down due to the May 2020 dam breaches. A sunny day breach of embankments at either dam would result in very minor flooding downstream.
        ii. A new steel sheet pile cutoff wall has already been installed in the Sanford earth embankment. A soil/cement/bentonite cutoff wall will be installed in the Edenville Dam earth embankment ahead of beginning the overall reconstruction project. Cutoff walls greatly reduce the amount of water seeping through the dam embankments.
        iii. An improved seepage drain system will be installed in the dam embankments to safely remove any residual seepage water.
    b. **Monitoring**- Both dams have monitoring wells that are regularly inspected by FLTF operators for any increased rate of seepage.

2. **Hazard**- While spillways are under demolition and reconstruction, lost spillway capacity will increase the risk of flooding on the reservoir and overtopping failure of the dam.
    a. **Mitigation**-
        i. The original gates were removed and the spillway bays partially demolished. Spill capacity of the formerly gated spillways is now significantly greater than the pre-flood spillways.
        ii. Further spillway work is not scheduled to take place prior to Jan. 27, 2024 on either dam.
        iii. A new passive auxiliary spillway (permanent) will be constructed on each dam before any further gated spillway work begins.

3. **Hazard**- heavy construction equipment operating on the earth embankments will cause collapse of the embankments, leading to a dam breach and uncontrolled release of the reservoir.
    a. **Mitigation**-
        i. This hazard has already been recognized by FLTF's design engineers. The engineers plan for an adequate safety factor during each stage of the construction process.
        ii. The reader is directed to **Hazard 8, Mitigation** for discussion of the impact of the almost completely drained reservoirs behind the dam embankments.
    b. **Monitoring**- During the construction process, contractors will be required to have a quality assurance program to make certain critical safety factors are not exceeded.

4. **Hazard**- Demolition and construction of the concrete spillways will result in a failure of the concrete structures, leading to uncontrolled release of the reservoir.
    a. **Mitigation**-
        i. This hazard has already been recognized by FLTF's design engineers. The engineers plan for an adequate safety factor during each stage of the construction process.
        ii. The reader is directed to **Hazard 8, Mitigation** for discussion of the impact of the almost completely drained reservoirs behind the dam embankments.
    b. **Monitoring**- During the construction process, contractors will be required to have a quality assurance program to make certain critical safety factors are not exceeded.

5. **Hazard**- Replacement/repairs to the embankment seepage drain systems will lead to an embankment failure, leading to release of the reservoir contents.
    a. **Mitigation**-

i. This hazard has already been recognized by FLTF's engineers. The engineers plan for an adequate safety factor during each stage of the construction process.
ii. The reader is directed to **Hazard 8, Mitigation** for discussion of the impact of the almost completely drained reservoirs behind the dam embankments.

b. **Monitoring**- During the construction process, contractors will be required to have a quality assurance program to make certain critical safety factors are not exceeded.

6. **Hazard**- The dam embankments will fail by the same mechanism that caused the May 2020 failure of the Edenville Dam (static liquefaction due to water seeping through the dam embankments).
    a. **Mitigation**-
        i. New cutoff walls will be installed in the dams' embankments. A soil-cement-bentonite wall will be installed at Edenville. A steel sheetpile wall has been installed at Sanford. Cutoff walls greatly reduce the amount of water seeping through the dam embankments.
        ii. The reader is directed to **Hazard 8, Mitigation** for discussion of the impact of the almost completely drained reservoirs in the event of an embankment failure.
        iii. An improved seepage drain system will be installed in the dam embankments to safely remove any residual seepage water.

7. **Hazard-** A large flood during construction will exceed the spillway capacity of the dam and overtop the embankments, resulting in breach of the dam and uncontrolled release of the reservoir. This will create a flash flooding hazard for properties downstream of the dam, with the possibility of property damage and danger to human life.
    a. **Mitigation-**
        i. The dams and reservoir levels will be subject to constant monitoring during the construction period. In the event of a developing large flood, FLTF will put the Emergency Action Plan (EAP) into action. County emergency managers will be advised of developing flood conditions and the conditions of the dams.
        ii. The reader is directed to **Hazard 8, Mitigation** for discussion of the impact of the almost completely drained reservoirs behind the dam embankments.

8. **Hazard-** Increased seepage through dam embankments will weaken the embankments, leading to embankment failure and an uncontrolled loss of the reservoir.
    a. **Mitigation**- Operators will regularly monitor seepage drains and monitoring wells, plus visually inspect earth embankments for evidence of increased seepage through the embankments, as required by the ODSP.

b. During construction, reservoir water levels in Edenville and Sanford reservoirs will remain greatly reduced from normal/planned levels due to the dam breaches. This creates safety advantages:
    i. The danger of an embankment failure leading to uncontrolled release of the reservoir is greatly reduced by the small amount of remaining reservoir behind both dams.
    ii. The risk of increased seepage is greatly reduced, due to the greatly reduced water pressure on the upstream side of the dams. This is due to the small amount of remaining reservoir behind both dams.
    iii. The mostly empty reservoirs can absorb considerably more flood water than full reservoirs could do without flooding shoreline properties.
    iv. The mostly empty reservoirs would reduce the amplitude of the flood wave hydrograph in the event of failure of dams further upstream, reducing the flood hazard to properties downstream of Sanford Dam.
    v. The mostly empty reservoirs provide a temporary safety advantage. If one or both of Secord and Smallwood dams fail, the capacity of the empty Edenville and Sanford reservoirs is capable of absorbing the flood volume from the upstream dams, blunting the flood damage effect on properties downstream of Sanford Dam. Note- this is strictly a temporary benefit until Wixom and Sanford lakes are refilled. For reference, the following information is the normal water volumes of the four reservoirs.
        1. Secord Lake water volume- 15,000 acre-feet at normal lake level
        2. Smallwood Lake water volume- 6,000 acre-feet
        3. Edenville reservoir (Wixom Lake) water volume- 40,000 acre-feet
        4. Sanford Lake water volume- 14,000 acre-feet

Edenville and Sanford dams were breached in the May 2020 flood and the reservoirs were drained. A partial reservoir remained on the Tobacco River side of Edenville Dam after the flood and was further drained during the dam stabilization project. The remaining reservoir contains less than 10% the volume of water in the Tobacco River side of the reservoir prior to the flood. The Tittabawassee River side of the reservoir was drained all the way down to the original river channel. Overall, the amount of water behind Edenville Dam is only slightly more than the original volume of the pre-dam rivers.

Midland County Inundation Maps

Inundation maps for the interim dam re-construction period have not been developed for Midland County. The dams themselves, and thus the inundation zones, will be in a constant state of change due to construction activity, which is expected to extend into 2027. Keeping published, FEMA-approved inundation maps up to date is impractical. Final inundation maps will be modeled after all construction plans have been approved and permitted.

During the interim dam re-construction period, the Edenville and Sanford reservoirs will remain almost fully drained through 2025. Failure of both Secord and Smallwood dams, whether or not the failure led to washed out embankments on Edenville and Sanford, would release less than half the volume of water experienced in the May 2020 flood (when Edenville and Sanford reservoirs were full and both dams failed). Thus, the inundation map on page 22 of the 2018 Midland County HMP represents “beyond worst case” conditions.

City of Midland Ordinance

ORDINANCE NO. 1677

AN ORDINANCE TO AMEND THE CODE OF ORDINANCES, CITY OF MIDLAND, MICHIGAN, BY ADDING A NEW ARTICLE IX OF CHAPTER 5 THEREOF.

The City of Midland Ordains:

Section 1. Article IX of Chapter 5 is hereby added to read as follows:

ARTICLE IX. FLOODPLAIN MANAGEMENT

Sec. 5-33. Purpose. The purpose of this article is to participate in the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) by complying with the program's applicable statutory and regulatory requirements for the purposes of significantly reducing flood hazards to persons, reducing property damage, reducing public expenditures, and providing for the availability of flood insurance and federal funds or loans within the corporate limits of the city of Midland.

Sec. 5-34. Declaration of Intent. The City of Midland shall, in the enforcement and administration of this ordinance, perform the following actions:

a. Obtain, review, and reasonably utilize flood elevation data available from federal, state, or other sources pending receipt of data from FEMA to identify the flood hazard area and areas with potential flooding.
b. Ensure that all permits necessary for development in floodplain areas have been issued, including a floodplain permit, approval, or letter of no authority from the Michigan Department of Environmental Quality under the floodplain regulatory provisions of Part 31, "Water Resources Protection," of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.
c. Review all permit applications to determine whether the proposed building sites will be reasonably safe from flooding. Where it is determined that a proposed building will be located in a flood hazard area or special flood hazard area, the construction code act enforcing agent shall implement the applicable codes according to their terms.
d. Review all proposed subdivisions to determine whether such proposals are reasonably safe from flooding and to ensure compliance with all applicable floodplain management regulations.
e. Assist in the delineation of flood hazard areas; provide information concerning uses and occupancy of the floodplain or flood-related erosion areas; maintain flood proofing and lowest floor construction records; and cooperate with other officials, agencies, and persons for floodplain management.
f. Advise FEMA of any changes in community boundaries, including appropriate maps.
g. Maintain records of new structures and substantially improved structures concerning any certificates of flood proofing, lowest flood elevation, basements, flood proofing and elevations to which structures have been flood proofed.
h. Review, on an ongoing basis, all amended and revised FHBSs and Flood Insurance Rates Maps (FIRMs) and related supporting data and revisions

thereof and revisions of 44 CFR, Part 60, Criteria for Land Management for Use, and to make such revisions in its floodplain management regulations as may be necessary to continue to participate in the program.

Sec. 5-35. Definitions. The NFIP requires that floodplain management regulations must be present and enforced in participating communities and utilize the following definitions which also apply for the purposes of this article:

Flood or Flooding means:

a. A general and temporary condition of partial or complete inundation of normally dry land areas from 1) The overflow of inland or tidal waters, 2) the unusual and rapid accumulation or runoff of surface waters from any source, or 3) mudflows; and
b. The collapse or subsidence of land along the short of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding, as defined in paragraph (a) (1) of this definition.

Flood Hazard Boundary Map (FHBM) means an official map of a community, issued by FEMA, where the boundaries of the flood, mudslide (i.e., mudflow) related erosion areas having special hazards have been designed as Zone A, M, and/or E. (This is to be included only if FEMA has issued a FHBM for the community.)

Floodplain means any land area susceptible to being inundated by water from any source (See definition of flooding).

Floodplain Management means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and floodplain management regulations.

Floodplain Management Regulations means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a floodplain ordinance, grading ordinance and erosion control ordinance), and other applications of police power that provide standards for the purpose of flood damage prevention and reduction.

Structure means a walled and roofed building that is principally above ground, gas or liquid storage facility, as well as a mobile home or manufactured unit.

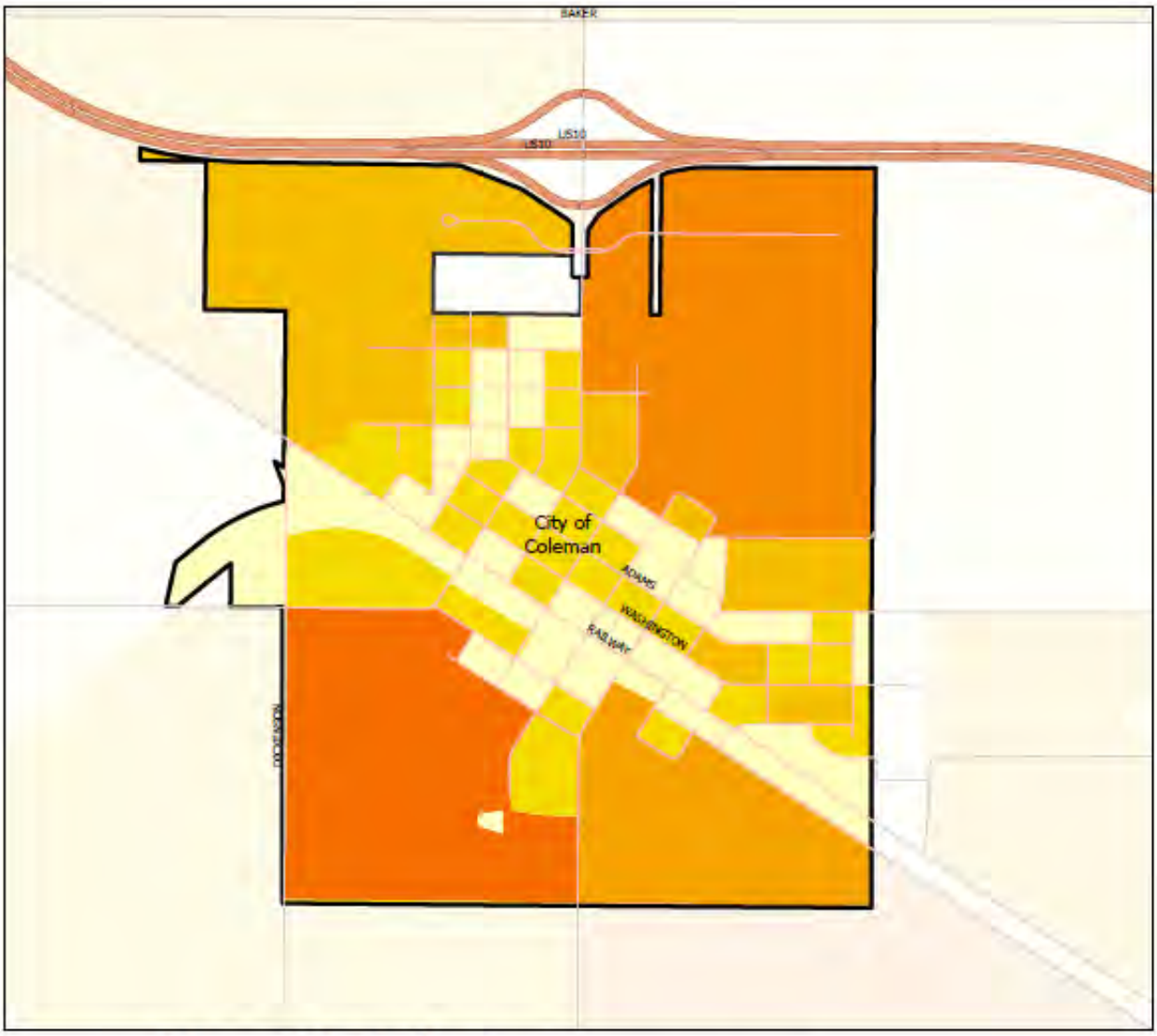
Sec. 5-36. Agency Designated. Pursuant to the provisions of the state construction code (The Stille-Derossett-Hale Single State Construction Code Act, Act No. 230 of the Public Acts of 1972, along with its authorization of the state construction code composed of the Michigan Residential Code and the Michigan Building Code), and in accordance with Section 8b(6) of Act 230, the Public Acts of 1972, as amended, the Building Official of the City of Midland is hereby designated as the enforcing agency to discharge the responsibility of the City of Midland under Act 230, of the Public Acts of 1972, as amended, State of

Michigan. The City of Midland assumes responsibility for the administration and enforcement of said Act throughout its corporate limits.

Sec. 5-37. Code Appendix Enforced. Pursuant to the provisions of the state construction code, in accordance with Section 8b(6) of Act 230, of the Public Acts of 1972, as amended, Appendix G of the Michigan Building Code shall be enforced by the enforcing agency within the City of Midland.

Sec. 5-38. Designation of Regulated Flood Prone Hazard Areas. The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) Entitled County of Midland and dated May 4, 2009 and the Flood Insurance Rate Map(s) (FIRMS) panel number(s) of 26111C; 0162E, 0164E, 166E, 0168E, 0169E, 0188E, 0252E, 0256E, 0257E, 0276E, 0278E, 0279E and 0283E and dated May 4, 2009 are adopted by reference for the purposes of administration of the Michigan Construction Code, and declared to be a part of Section 1612.3 of the Michigan Building Code, and to provide the content of the “Flood Hazards” section of Table R301.2(1) of the Michigan Residential Code.

Section 2. This ordinance shall take effect upon publication. (Ordinance ADOPTED.)



City of Coleman

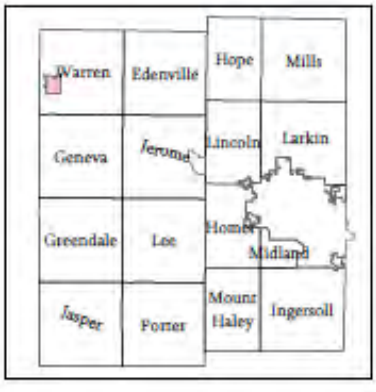
Population Density Map

0 0.17 0.35 0.7 Miles

August 2023

Population by Census Block

- 0 - 10
- 11 - 30
- 31 - 54
- 55 - 83
- 84 - 119
- 120 - 164
- 165 - 231
- 232 - 375
- 376 - 812
- 813 - 1311



City of Coleman 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	8	10	5	10	3	2	6.3
Winter Weather	8	10	5	10	3	2	6.3
Infrastructure failures	3	7	7	7	4	4	5.1
Public Health Emergencies	3	7	1	7	7	7	4.8
Tornadoes	4	2	8	2	4	1	4
Hazmat - Transportation	8	2	2	2	1	1	3.2
Pipeline accidents	2	2	8	2	2	1	3.1
Flooding	3	3	3	3	3	1	2.8
Transportation Accidents	8	1	1	1	1	1	2.75
Hazmat - Fixed Site	3	2	1	1	1	1	1.55
Oil & gas well accidents	2	1	1	1	1	1	1.25
Dam failures	3	0	0	0	0	0	0.75
Wildfires	3	0	0	0	0	0	0.75
Terrorism	1	0	0	0	0	0	0.25

City of Coleman Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

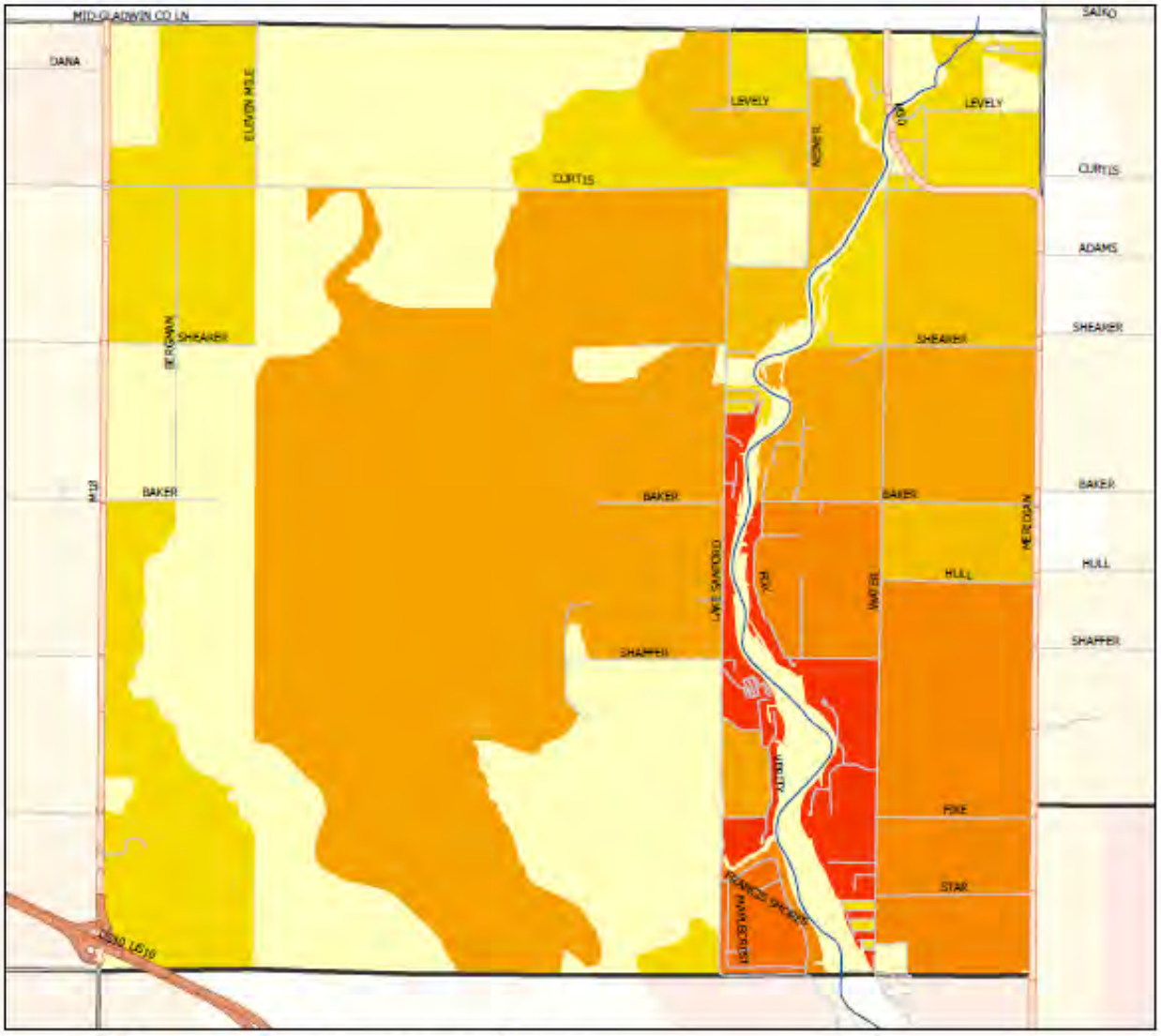
- The City is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The City will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The City is considering a social media platform to share hazard information to residents.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The City will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The City will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles.

Goal Number 7: Improve public awareness of public health emergencies.

- The City will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.

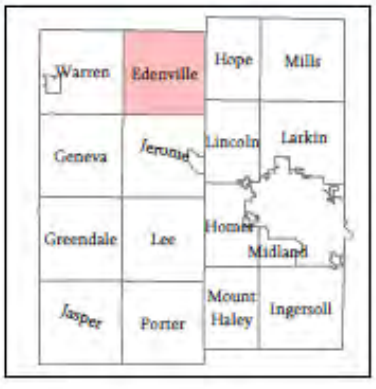


Edenville Township

Population Density Map

0 0.5 1 2 Miles

August 2023



Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311

Edenville Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Winter Weather	10	10	2	10	1	5	6.1
Wildfires	2	7	9	9	5	2	5.65
Dam failures	3	4	9	7	3	3	5.05
Public Health Emergencies	6	10	1	5	3	5	4.3
Infrastructure failures	2	10	1	10	2	2	3.8
Flooding	6	4	4	5	1	1	3.8
Severe Winds	10	2	2	2	1	1	3.7
Tornadoes	3	1	4	3	1	1	2.5
Oil & gas well accidents	2	2	2	1	2	2	1.8
Hazmat - Transportation	1	1	4	1	1	1	1.6
Hazmat - Fixed Site	1	1	4	1	1	1	1.6
Terrorism	1	1	2	1	2	1	1.4
Pipeline accidents	1	1	1	1	1	1	1
Transportation Accidents	1	1	1	1	1	1	1

Edenville Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.

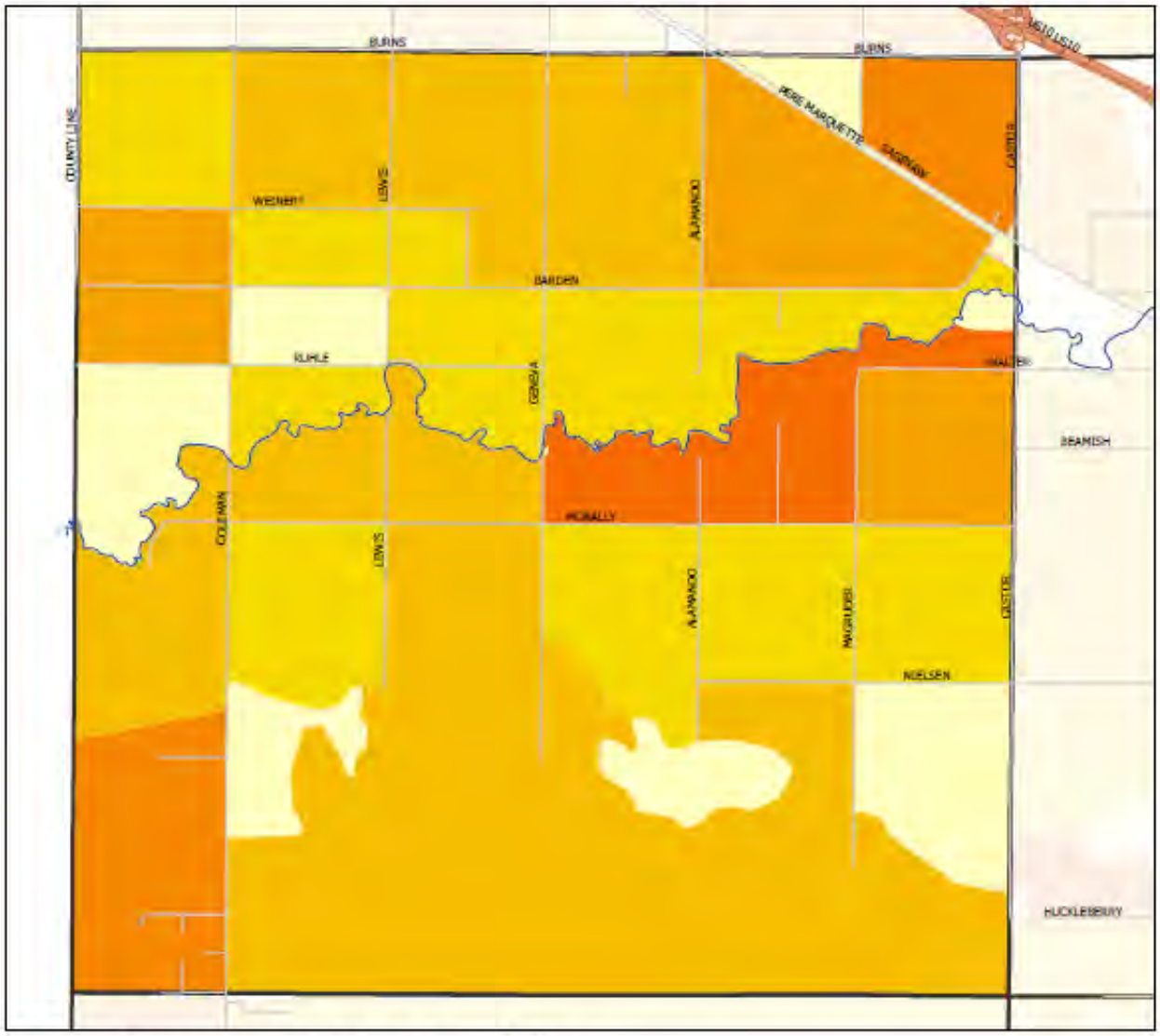
- The Township's Master Plan was adopted in 2016 and expires in 2025. Update of the plan is currently underway and appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map will be completed once plan is complete.
- The Township participates in the National Flood Insurance Program.
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Expand and increase capacity of water flow in the Curtis Intercounty Drain.

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The Township will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville Dam.
- Information can be shared through the Township web page or the Fire Department social media page by linking to the online dam failure inundation maps.
- Another option is to inform residents through the use of mailings.



Geneva Township

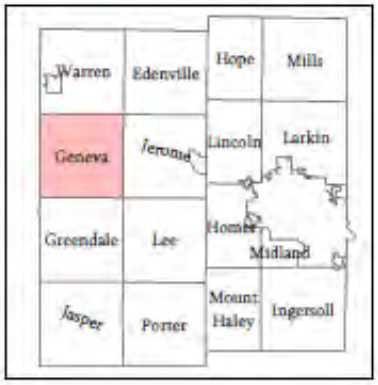
Population Density Map

0 0.5 1 2 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Geneva Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	7	6	5	7	7	4	6.25
Infrastructure failures	8	4	4	6	6	8	6.2
Wildfires	5	7	6	3	3	6	4.6
Flooding	5	4	5	2	2	8	4.05
Transportation Accidents	6	5	3	1	2	2	3.15
Hazmat - Transportation	2	2	3	5	3	3	3.1
Winter Weather	4	4	3	3	2	2	3
Public Health Emergencies	4	4	3	2	2	2	2.8
Hazmat - Fixed Site	1	2	3	3	2	3	2.25
Pipeline accidents	2	3	2	2	2	3	2.15
Terrorism	2	2	2	1	1	1	1.5
Tornadoes	1	3	3	1	1	1	1.5
Dam failures	1	0	1	1	2	2	1.25
Oil & gas well accidents	1	1	1	1	1	1	1

Geneva Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

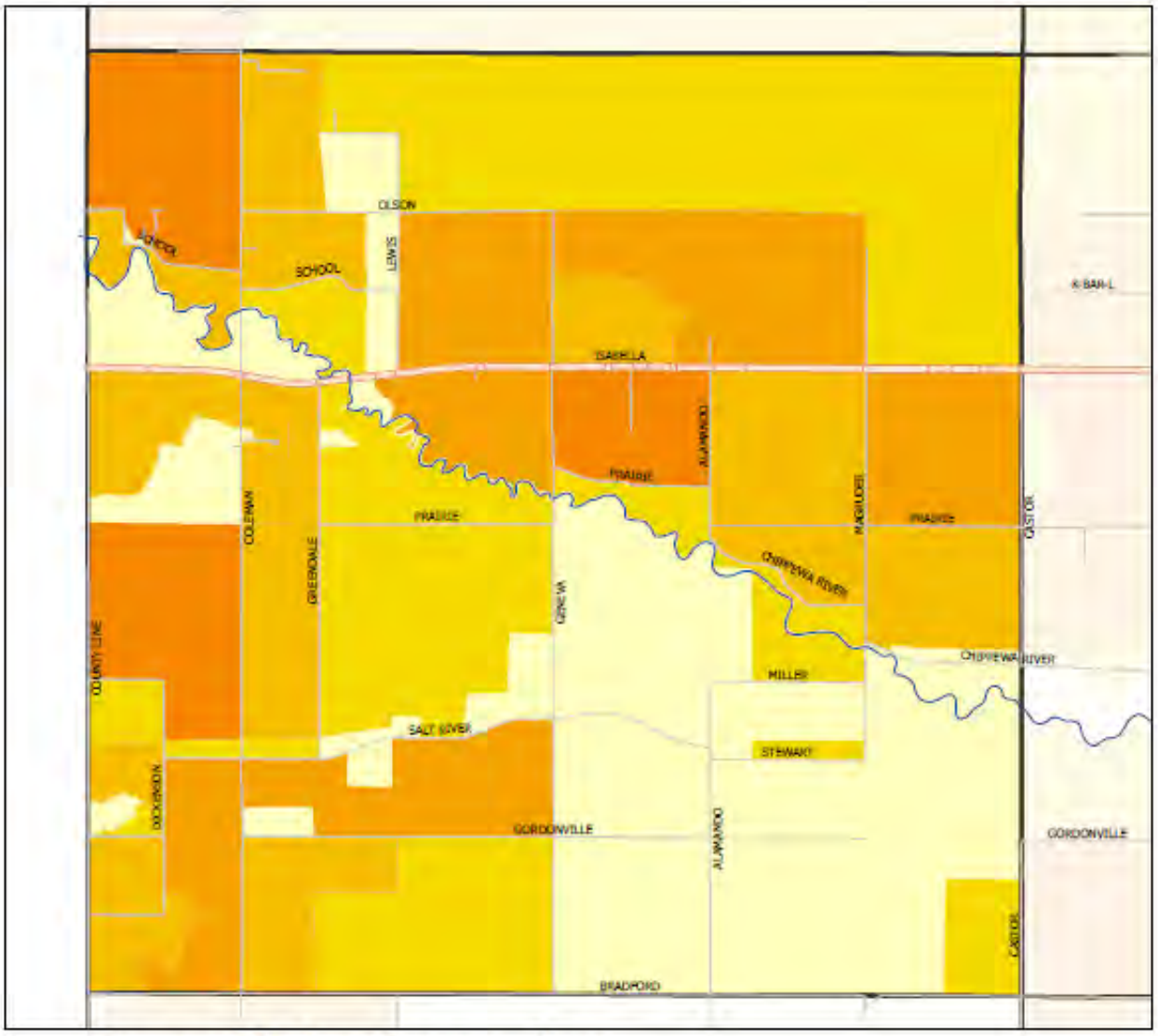
- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- Geneva Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our roads and waterways.



Greendale Township

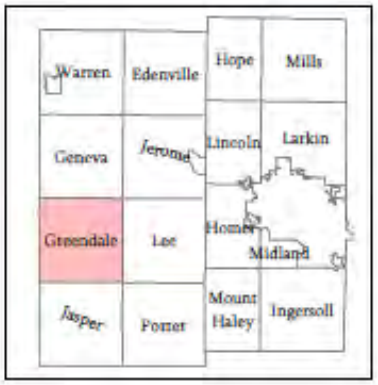
Population Density Map

0 0.5 1 2 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Greendale Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Winter Weather	8	10	3	9	5	6	6.5
Infrastructure failures	4	10	2	9	3	2	4.5
Flooding	6	10	2	5	3	3	4.3
Public Health Emergencies	5	8	1	5	4	2	3.85
Severe Winds	6	10	4	2	1	1	3.5
Wildfires	5	6	3	3	1	2	3.15
Hazmat - Transportation	1	1	4	1	1	1	1.6
Pipeline accidents	1	1	3	1	1	1	1.4
Terrorism	1	1	2	2	1	1	1.4
Tornadoes	1	1	2	1	2	1	1.4
Transportation Accidents	1	2	1	1	2	1	1.25
Oil & gas well accidents	1	1	1	1	1	1	1
Dam failures	0	0	0	0	0	0	0
Hazmat - Fixed Site	0	0	0	0	0	0	0

Greendale Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

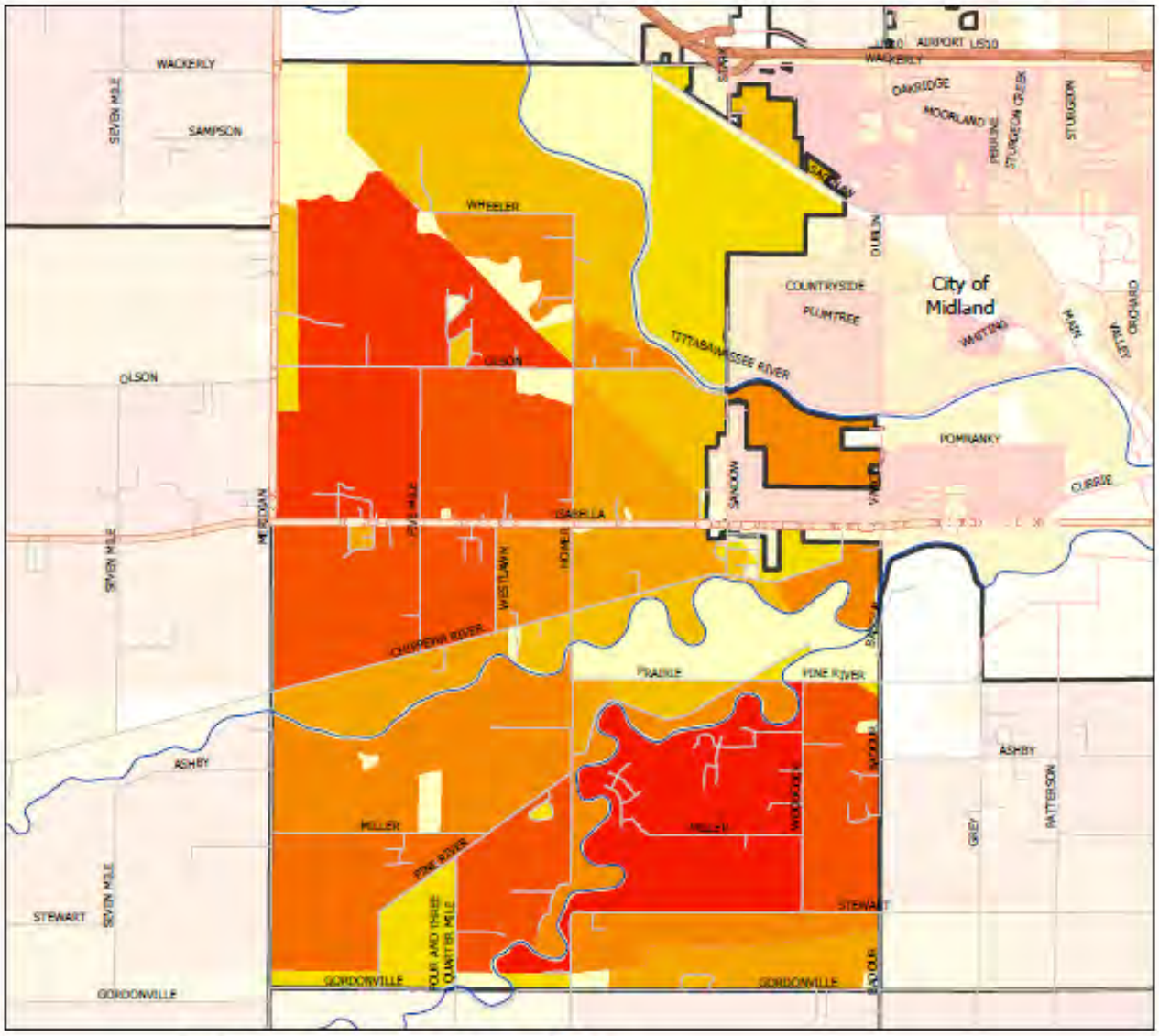
Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- Greendale Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our roads and waterways.

- The Township’s Master Plan was adopted in 2018 and expires in 2027. The next expected review and update is 2026 and at that time, appropriate hazard mitigation goals and objects will be considered being added to the plan.
- Update: 2021 Bridge on Coleman Rd over the Chippewa River was replaced to allow higher flow.
- Replace bridge on Alamando Rd over the Salt Creek to meet 100 year rain event. Cost: $400,000.



Homer Township

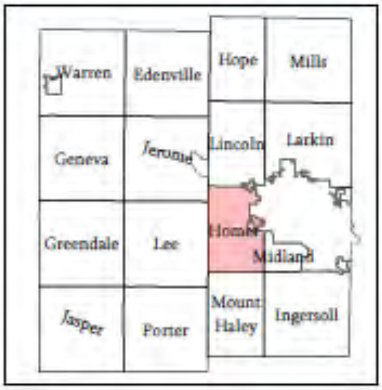
Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Homer Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	10	10	8	8	6	5	7.9
Winter Weather	10	10	8	10	5	2	7.8
Tornado	5	5	5	5	5	2	4.7
Flooding	8	4	4	4	2	2	4.4
Hazmat Accident - Trans	8	2	4	2	2	2	3.9
Public Health Emergencies	3	5	0	8	4	4	3.8
Transportation Accidents	8	2	2	3	2	1	3.6
Wildfire	5	4	4	4	2	1	3.55
Oil & Gas Well Accidents	2	2	4	4	4	4	3.4
Pipeline Accidents	2	2	4	4	4	4	3.4
Dam Failure	4	4	4	4	2	2	3.4
Infrastructure Failure	4	4	1	2	2	5	2.7
Terrorism	2	2	0	2	0	0	1
Hazmat Accident – Fixed Site	1	1	1	1	1	1	1

Homer Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- Homer Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- Homer Township participates in the National Flood Insurance Program. There have been 16 flood insurance claims totaling $772,000.

- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Expand and increase capacity of water flow in the Dice No. 1 Drain.
- Replace bridge on Meridian Road over Chippewa River to meet 100 year rain event standards. Cost: $400,000
- Replace bridge on Homer Road over Chippewa River to meet 100 year rain event standards. Cost: $200,000
- Replace bridge on Woodcock Road over Bullock Creek to meet 100 year rain event standards. Cost: $270,000

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

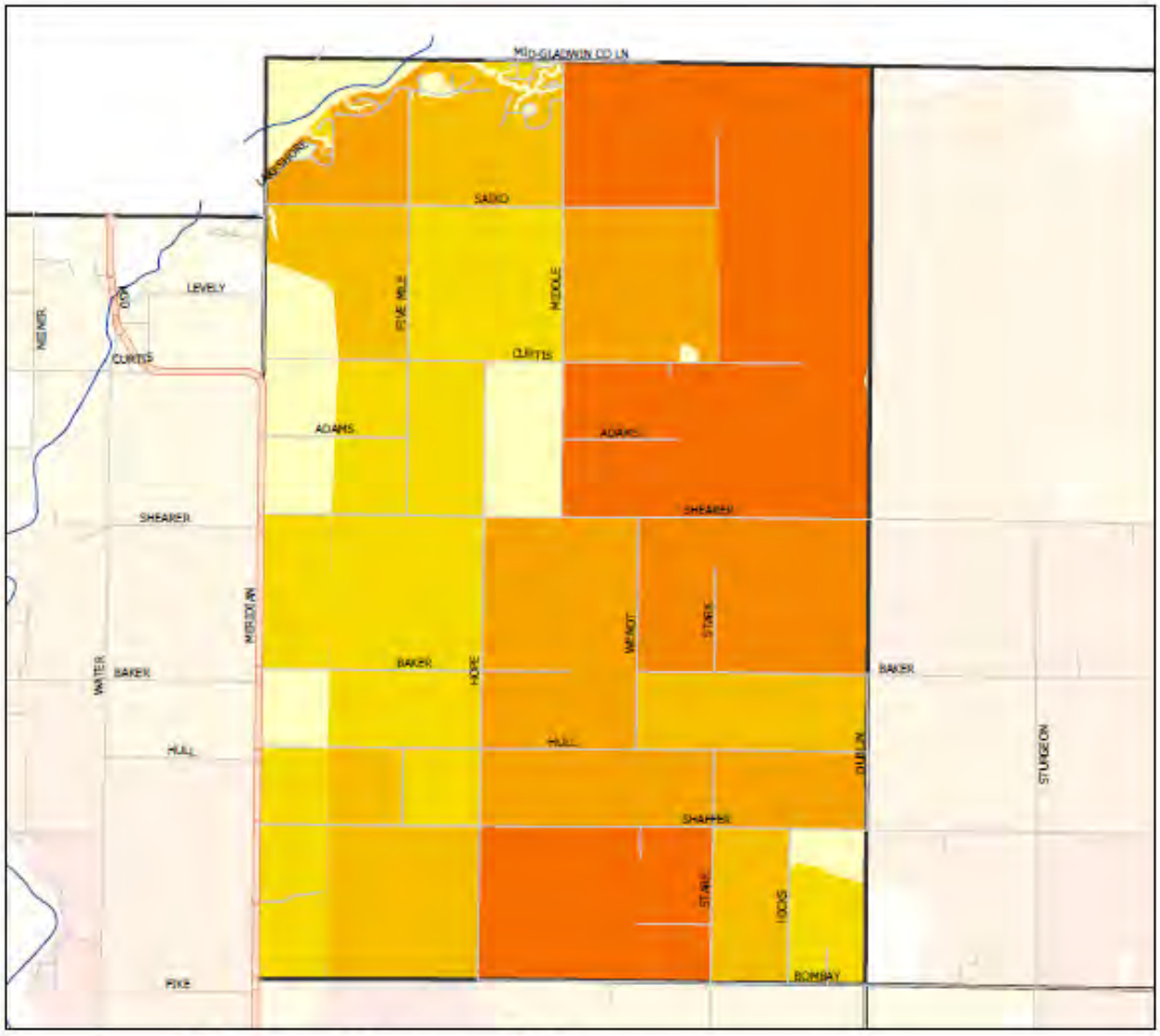
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles.

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The Township will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville and Sanford dams.
- Information can be shared through the Township web page or the Fire Department social media page by linking to the online dam failure inundation maps.
- Another option is to inform residents through the use of mailings.

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Hope Township

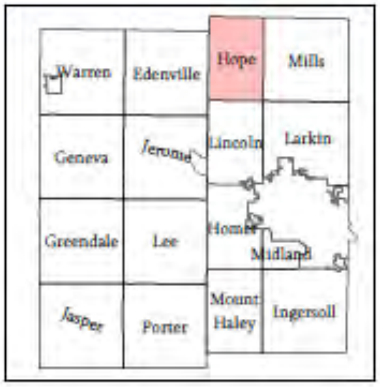
Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

- 0 - 10
- 11 - 30
- 31 - 54
- 55 - 83
- 84 - 119
- 120 - 164
- 165 - 231
- 232 - 375
- 376 - 812
- 813 - 1311



Hope Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Wildfires	5	5	3	2	4	3	3.6
Severe Winds	3	3	3	3	3	2	2.9
Tornadoes	2	2	3	3	3	1	2.5
Winter Weather	3	2	2	2	3	1	2.35
Infrastructure failures	3	2	1	2	2	2	2.05
Flooding	3	1	2	1	2	1	1.9
Transportation Accidents	2	2	2	2	2	1	1.9
Dam failures	2	2	2	1	2	2	1.8
Hazmat - Fixed Site	3	1	1	1	1	1	1.5
Public Health Emergencies	2	1	1	1	1	1	1.25
Terrorism	1	1	1	1	1	1	1
Hazmat - Transportation	1	1	1	1	1	1	1
Pipeline accidents	0	0	0	0	0	0	0
Oil & gas well accidents	0	0	0	0	0	0	0

Hope Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

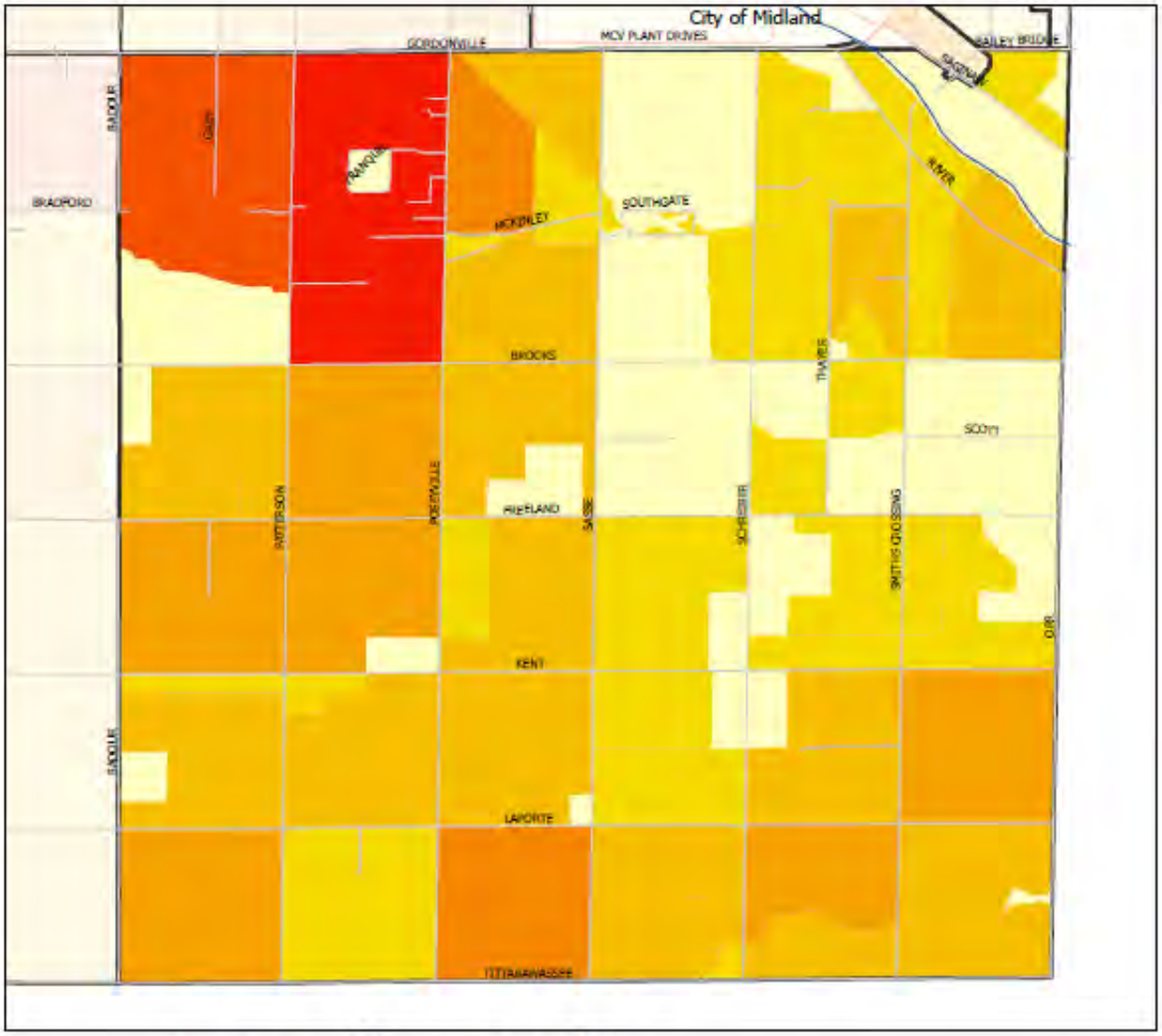
- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township's Master Plan was adopted in 2017 and expires in 2026. The plan is expected to be updated in 2026 with a potential completion date of 2027. Appropriate hazard mitigation goals and objects will be considered being added to the plan.
- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.



Ingersoll Township

Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
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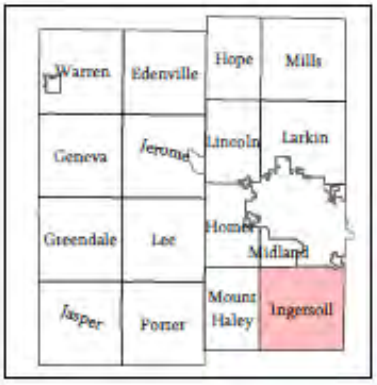

Ingersoll Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	6	8	8	5	5	3	5.8
Hazmat - Transportation	6	5	6	8	5	2	5.75
Tornadoes	5	8	8	5	5	3	5.55
Pipeline accidents	5	6	6	8	4	2	5.35
Transportation Accidents	5	6	7	5	5	3	5.25
Public Health Emergencies	5	5	0	8	8	5	5.2
Winter Weather	6	6	4	5	5	4	5
Infrastructure failures	5	6	4	8	4	2	4.95
Flooding	5	2	3	5	4	2	3.95
Hazmat - Fixed Site	5	5	3	5	1	1	3.4
Dam failures	4	1	1	1	1	1	1.75
Wildfires	2	1	1	1	1	1	1.25
Terrorism	1	1	1	1	1	1	1
Oil & gas well accidents	1	1	1	1	1	1	1

Ingersoll Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

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Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Township participates in the National Flood Insurance Program.

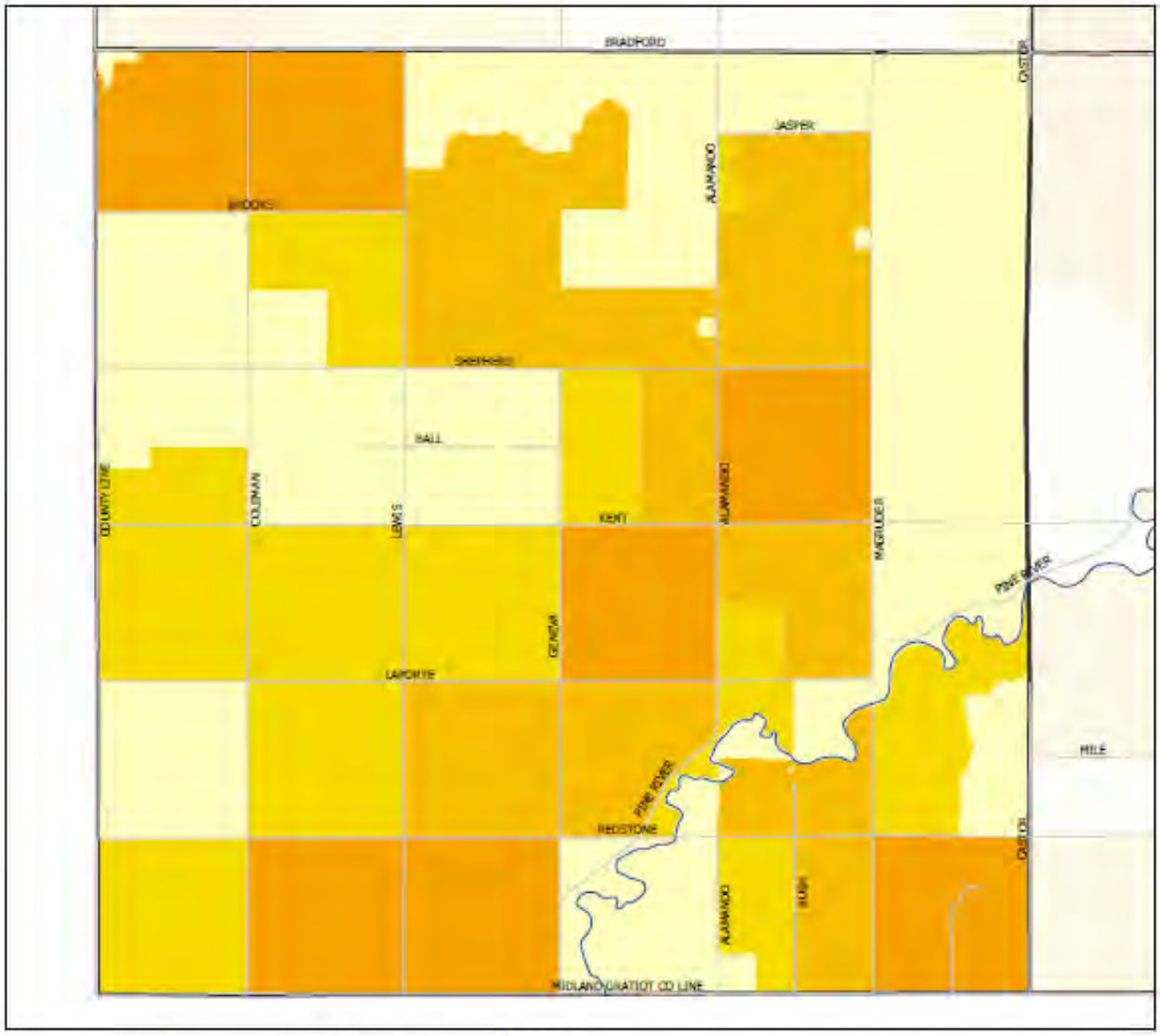
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Update: 2019 Bridge on Orr Road at Weeks Drive was replaced to allow higher flow.
- Expand and increase capacity of water flow in the Swan Creek Drain.
- Replace bridge on Brooks Road over Bullock Creek to meet 100 year rain event standards. Cost: $260,000
- Replace bridge on Schreiber Road over Jo Drain to meet 100 year rain event standards. Cost: $290,000

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Jasper Township

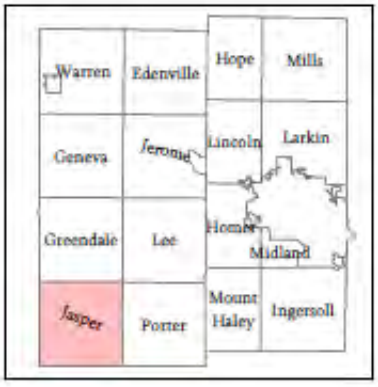
Population Density Map

0 0.5 1 2 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Jasper Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Wildfires	7	5	3	6	8	2	5.6
Winter Weather	8	10	4	7	2	3	5.4
Severe Winds	7	10	5	6	2	1	4.95
Oil & gas well accidents	3	3	5	3	3	2	3.3
Flooding	3	1	2	3	4	2	2.8
Infrastructure failures	4	2	2	2	2	2	2.5
Public Health Emergencies	3	5	1	1	4	2	2.4
Tornadoes	2	1	3	2	2	1	2.05
Pipeline accidents	1	4	3	2	2	2	2.05
Hazmat - Fixed Site	2	1	2	2	1	1	1.65
Hazmat - Transportation	1	2	2	2	1	2	1.55
Dam failures	2	1	1	2	1	1	1.45
Terrorism	2	1	1	2	1	1	1.45
Transportation Accidents	1	2	1	1	1	1	1.05

Jasper Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Township participates in the National Flood Insurance Program.

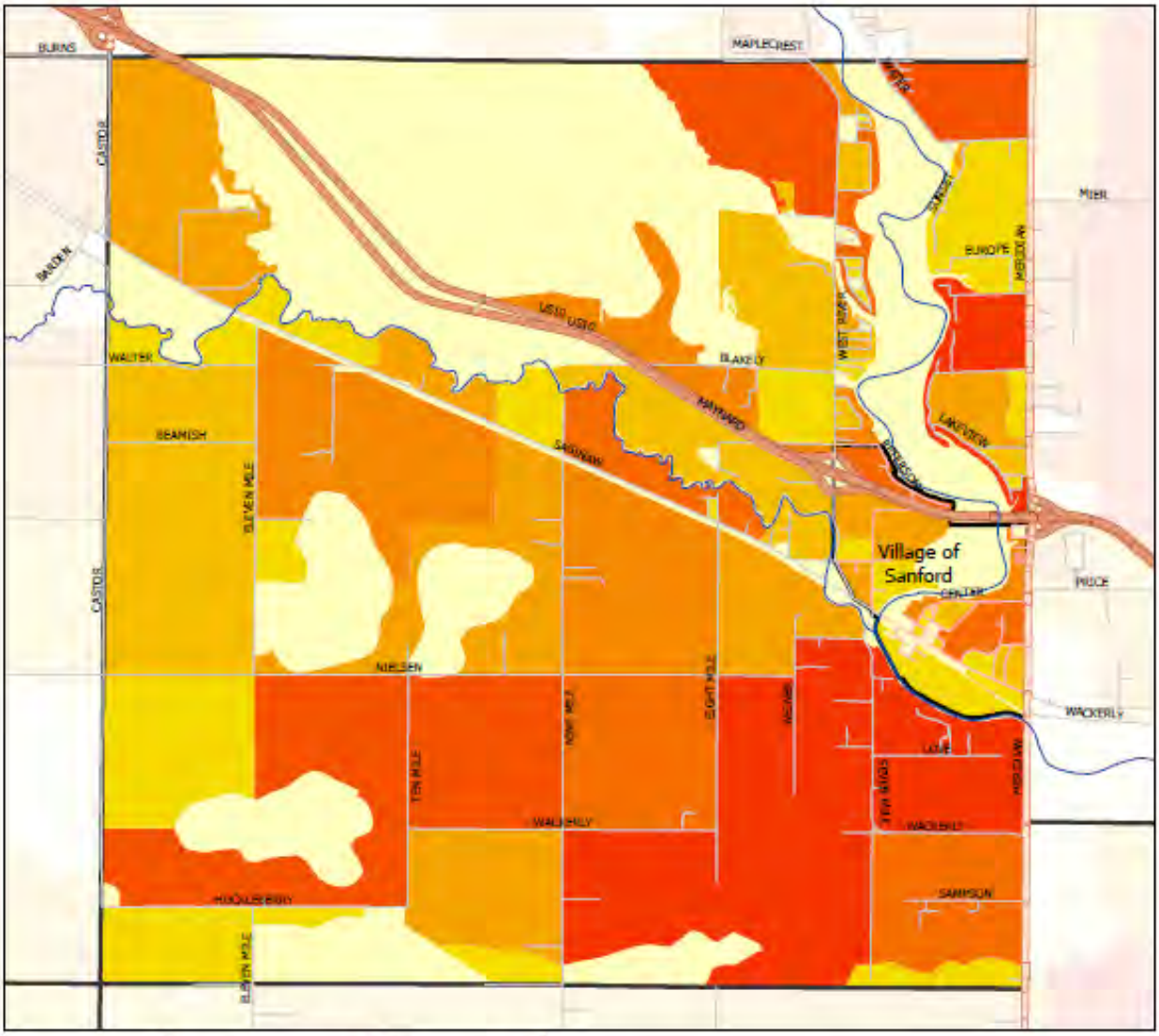
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- The Township's Zoning and Land Development Ordinance was revised in 2014. At the next review, appropriate hazard mitigation goals and objects will be considered being added to the plan.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Expand and increase capacity of water flow in the Davis Drain.
- Expand and increase capacity of water flow in the Hanley Drain.
- Expand and increase capacity of water flow in the Townline Interounty Drain.
- Update: 2020 Bridge on Redstone Road over Bush Creek replaced to allow higher flow.
- Replace bridge on Bradford Road over Little Salt River to meet 100 year rain event. Cost: $500,000

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Jerome Township

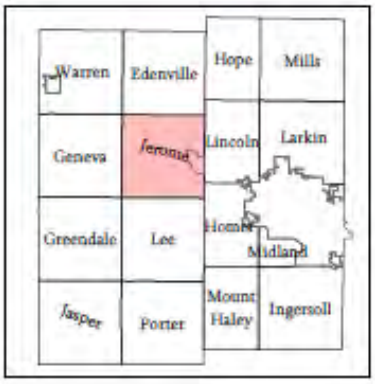
Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Jerome Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Dam failures	9	9	9	10	10	6	9.1
Infrastructure failures	9	9	2	9	8	4	6.9
Wildfires	9	6	8	4	6	4	6.55
Hazmat - Fixed Site	7	6	7	6	4	4	5.85
Flooding	8	4	8	4	4	4	5.8
Public Health Emergencies	6	7	0	7	7	6	5.25
Terrorism	7	6	2	7	5	2	5.05
Tornadoes	6	5	4	4	3	6	4.55
Hazmat - Transportation	6	6	3	4	3	3	4.1
Severe Winds	4	5	4	4	3	2	3.65
Winter Weather	3	10	3	4	3	2	3.45
Transportation Accidents	3	1	2	1	1	1	1.7
Oil & gas well accidents	2	2	1	2	0	2	1.4
Pipeline accidents	2	2	1	2	0	2	1.4

Jerome Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Township participates in the National Flood Insurance Program. There have been 6 flood insurance claims totaling $295,000.

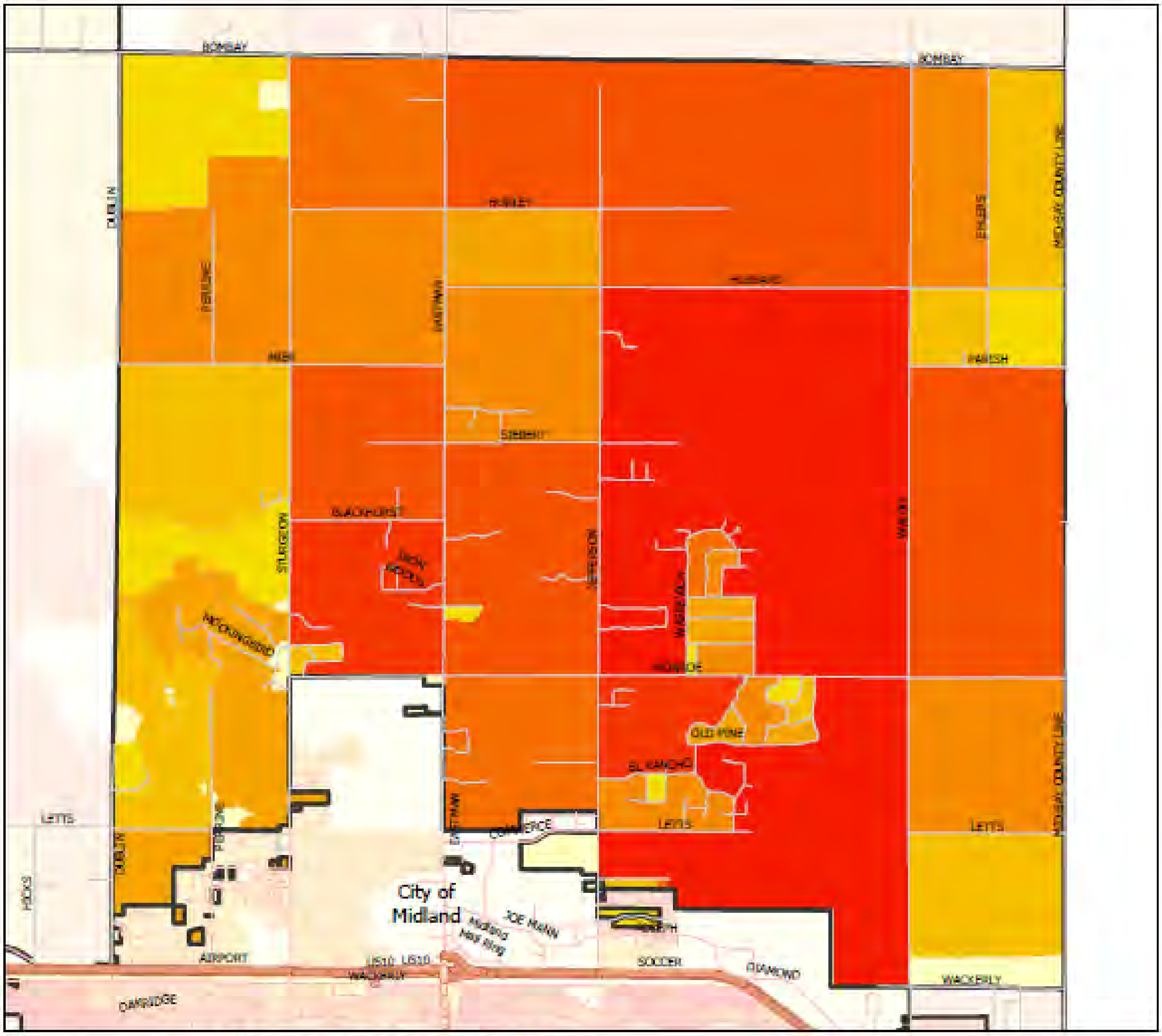
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- The Township's Master Plan was adopted in 2014 and expires in 2034. The next expected review and update is 2026. At that time, appropriate hazard mitigation goals and objects will be considered being added to the plan.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Expand and increase capacity of water flow in the Sanford Tile Drain.
- Replace bridge on Castor Road over Big Salt River to meet 100 year rain event standards. Cost: $750,000

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The Township will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville and Sanford dams.
- Information can be shared through the Township web page or the Fire Department social media page by linking to the online dam failure inundation maps.
- Another option is to inform residents through the use of mailings.

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Larkin Township

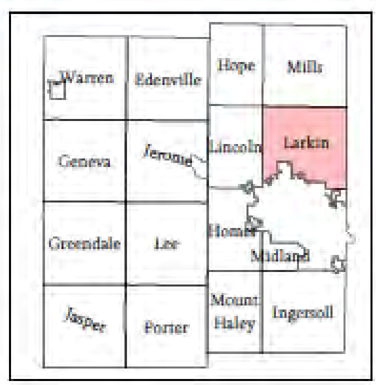
Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Name of Jurisdiction: Larkin Charter Township

From the list of hazards below, please identify the top 5 hazards that impact your jurisdiction. Assign #1 to the highest hazard threat and #5 to the lowest.

Identified Hazards	Identify Top 5	Rank Top 5	Example
Winter Weather	X	2	#2
Public Health Emergencies			
Terrorism			
Dam Failure			#4
Wildfire			
Hazardous Materials (fixed site)			
Severe Winds	X	4	#1
Hazardous Materials (transportation)			
Pipeline Accident			
Flooding	X	1	#3
Oil & Gas Well Accident			
Infrastructure Failure	X	3	
Tornado	X	5	#5
Transportation Accident			
Any threats not listed above			

Signed: Maria Sandow Date: _____

Print Name: MARIA SANDOW

Larkin Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 2: Improve and expand public warning capabilities.

- The Township will look into the addition of a warning siren(s) within the community for high density population areas. Estimated costs are $30,000 per siren.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

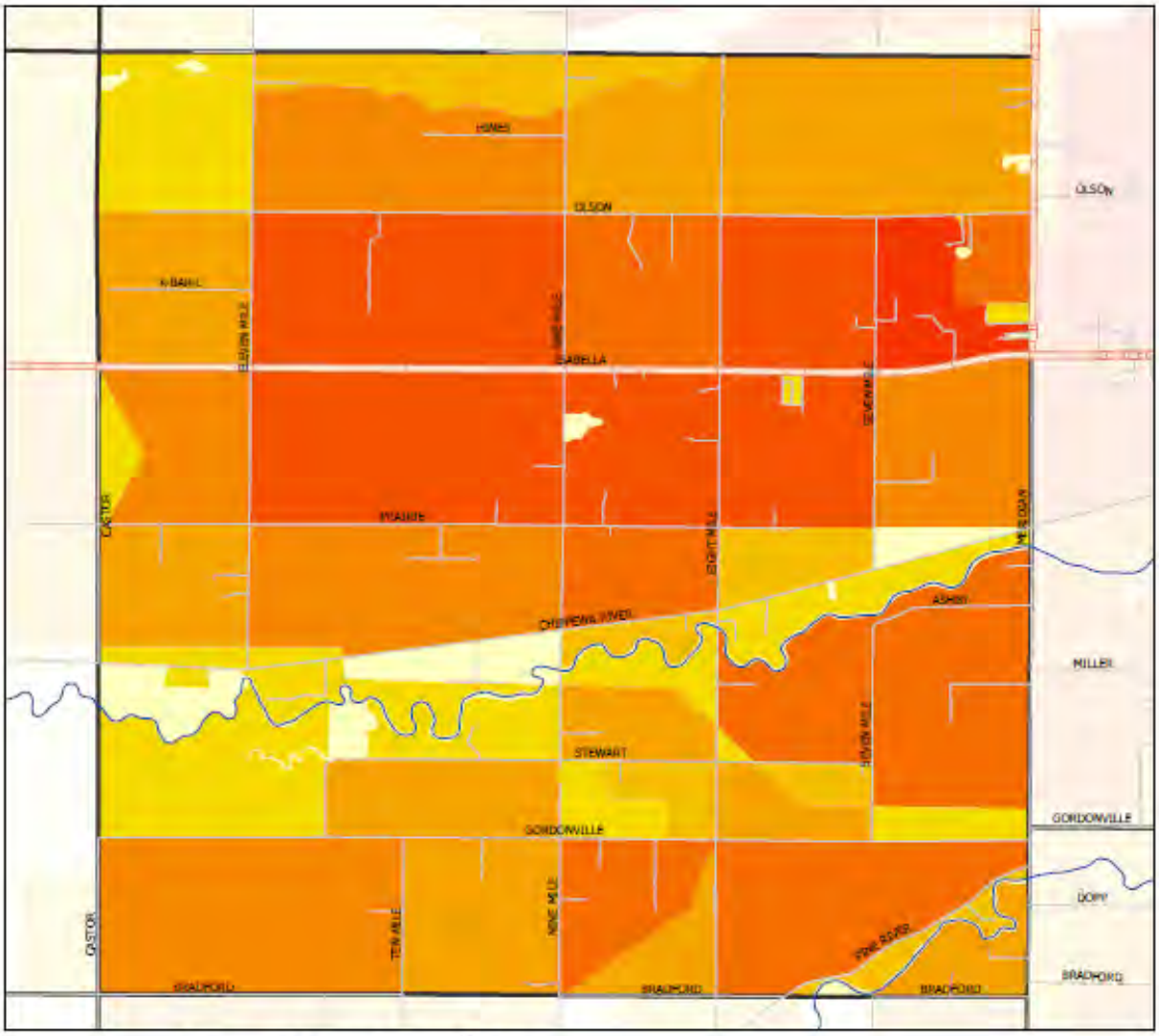
- The Township's Master Plan was adopted in 2025 and expires in 2034. The next expected review and update is 2030. At that time, appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map was updated in 2025.
- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Township participates in the National Flood Insurance Program.
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- The Waldo Inter-County Drain expansion completed in 2023. This drain impacts 30% of the Township.
- Update: 2019 Bridge on Sturgeon Road at Newell Drove replaced to allow higher flows.
- Update: 2020 Bridge on Monroe Road at Newell Drive replaced to allow higher flows.
- Update: 2019 Culvert installed on Letts Road at Waldo Drive to allow higher flows.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Lee Township

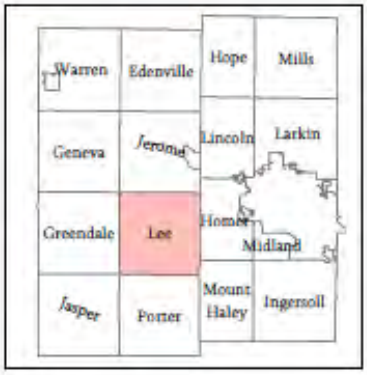
Population Density Map

0 0.5 1 2 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Lee Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Flooding	7	6	7	6	7	3	6.35
Wildfires	5	4	6	5	5	3	4.95
Winter Weather	6	6	5	5	4	3	4.9
Public Health Emergencies	6	4	1	5	6	6	4.7
Infrastructure failures	3	7	1	7	6	6	4.5
Pipeline accidents	4	3	5	3	5	6	4.35
Dam failures	1	6	3	7	3	2	3.35
Severe Winds	2	4	5	3	3	3	3.2
Hazmat - Transportation	3	2	5	4	2	1	3.15
Tornadoes	1	3	5	3	3	3	2.9
Terrorism	2	2	2	3	2	1	2.1
Oil & gas well accidents	1	1	2	2	3	3	2
Transportation Accidents	2	2	2	2	2	1	1.9
Hazmat - Fixed Site	1	1	1	1	1	1	1

Lee Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

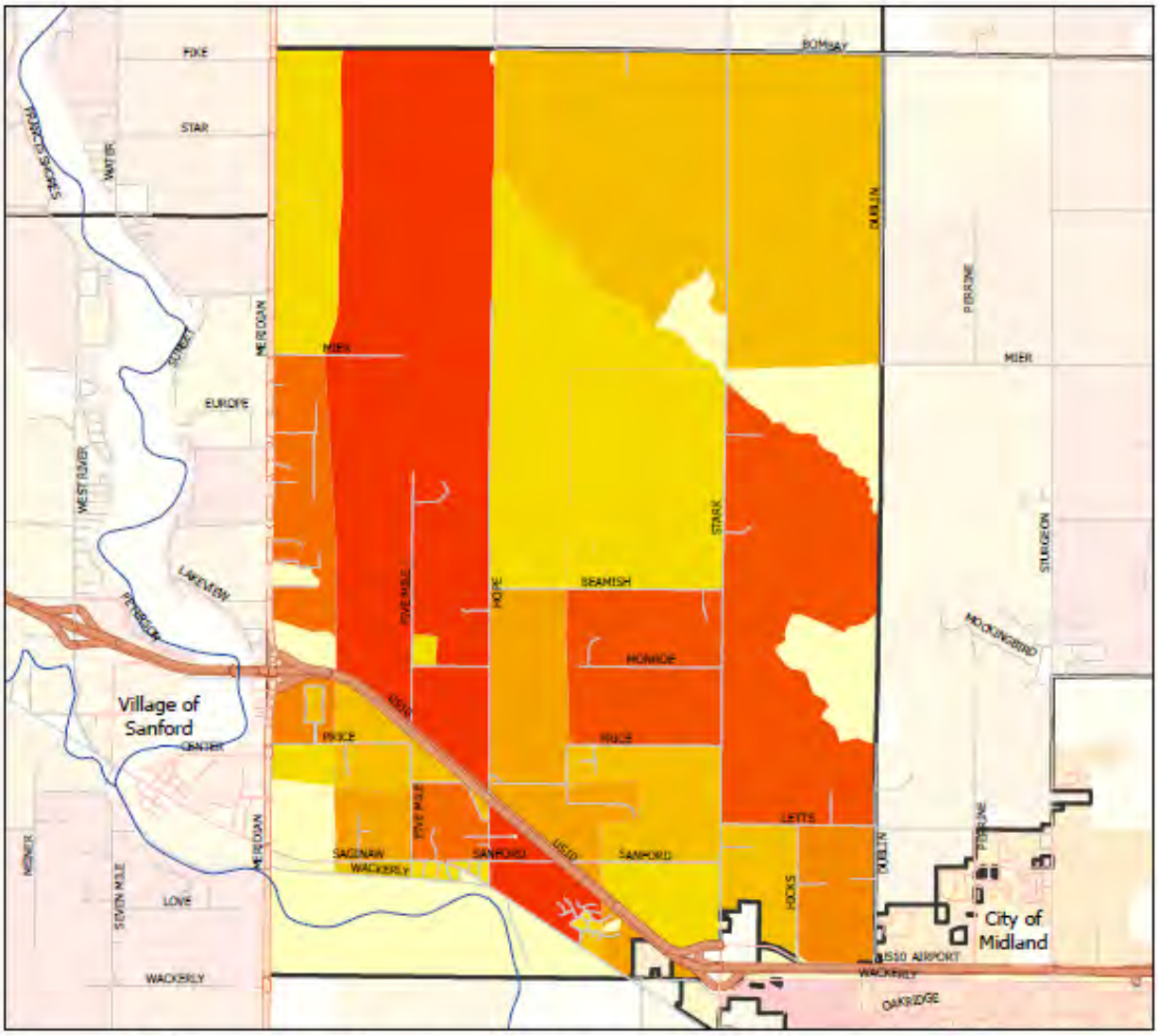
- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township's Master Plan was adopted in 2014 and expires in 2034. The next expected review and update is expected 2025-26 and at that time, appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map was updated in 2024.
- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Township participates in the National Flood Insurance Program. There have been 5 flood insurance claims totaling $423,000.
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- The Knapp Cutoff Drain expanded and completed in 2020.
- Expand and increase capacity of water flow in the Lawson Drain.
- Expand and increase capacity of water flow in the Wilson Drain.
- Replace bridge on Meridian Rd over the Pine River to meet 100 year rain event. Cost: $2,500,000

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Lincoln Township

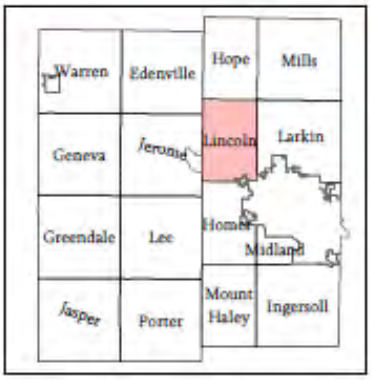
Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
55 - 83	232 - 375
	376 - 812
	813 - 1311



Lincoln Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	8	10	7	10	7	2	7.5
Public Health Emergencies	7	10	4	8	8	8	7.05
Infrastructure failures	5	4	8	8	8	8	7.05
Winter Weather	9	10	6	8	4	3	6.65
Tornadoes	4	3	10	4	8	1	5.65
Flooding	4	4	6	8	6	3	5.5
Wildfires	5	5	9	3	3	4	4.9
Terrorism	1	2	8	4	8	2	4.55
Transportation Accidents	10	2	4	1	3	1	4.3
Hazmat - Transportation	8	2	5	2	2	1	4
Dam failures	1	2	8	2	2	4	3.15
Hazmat - Fixed Site	3	1	2	3	3	1	2.5
Pipeline accidents	2	1	2	1	2	4	1.95
Oil & gas well accidents	2	1	2	1	2	4	1.95

Lincoln Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township's Master Plan was adopted in 202025 and expires in 2029. The next expected review and update 2029. At that time, appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map was updated in 2025.
- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks,

drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.

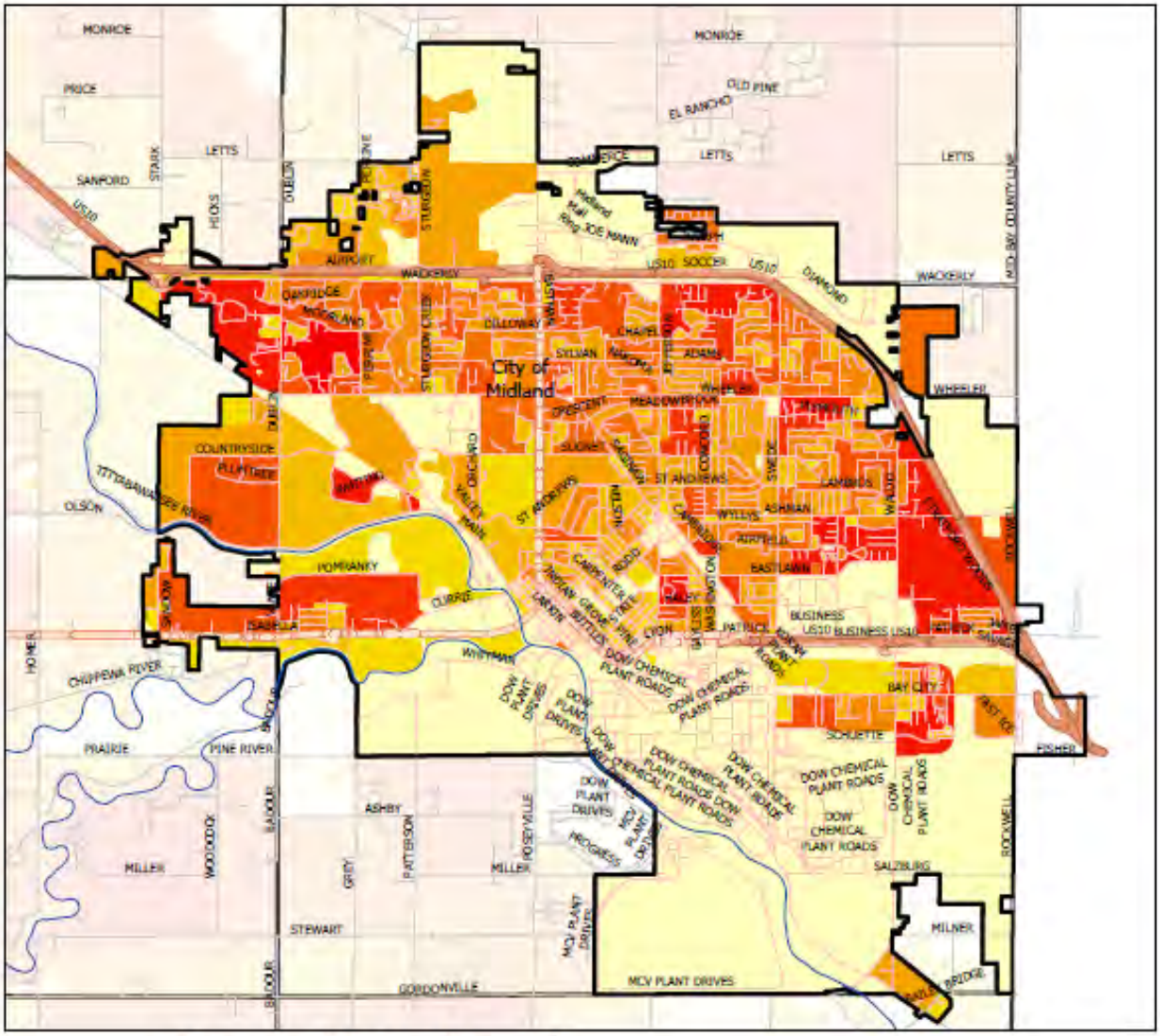
- The Township participates in the National Flood Insurance Program.
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Expand and increase capacity of water flow in the Clark Drain.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



City of Midland

Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

0 - 10	84 - 119
11 - 30	120 - 164
31 - 54	165 - 231
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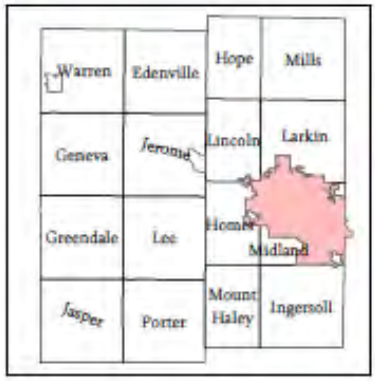


City of Midland 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Dam failures	2	4	8	4	8	9	5.6
Hazmat - Fixed Site	7	5	5	5	5	5	5.5
Hazmat - Transportation	6	5	5	5	5	5	5.25
Terrorism	7	2	2	7	2	4	4.45
Severe Winds	6	7	6	4	2	1	4.35
Winter Weather	3	9	3	9	2	2	4.2
Public Health Emergencies	5	2	1	7	4	2	3.95
Flooding	7	2	2	2	4	2	3.65
Infrastructure failures	7	2	1	3	2	1	3.15
Tornadoes	3	1	6	2	2	1	2.9
Wildfires	3	3	4	2	1	1	2.4
Pipeline accidents	3	1	2	1	1	1	1.7
Transportation Accidents	3	1	1	1	1	1	1.5
Oil & gas well accidents	1	0	0	0	0	0	0.25

City of Midland Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The City is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The City will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings and their social media platform to share hazard information to residents.
- The City will continue to promote trainings provided by the National Weather Service for weather hazards.

Goal Number 2: Improve and expand public warning capabilities.

- This City is committed to sustaining the outdoor siren system. The City plans to update the siren system in the next few years and will look at additional warning tools given the availability of updated technologies for improvement.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The City's Master Plan was adopted in 2024. The City has included flood resiliency and other hazard mitigation goals and objectives in their plan.
- The City of Midland participates in the National Flood Insurance Program and maintains a Class 5 rating within the Community Rating System (CRS). There have been 483 flood claims totaling 244 million dollars within the City.

- In 2021, the City received federal funding to acquire properties within the floodplain to demo and return to green space. 15 properties were acquired through the program; funding also supported new housing and mitigate flood risks in the community. The City completed the Sylvan Pump Station Detention Basin Project in 2023.
- Ensure continued enforcement of the Michigan Building Code pursuant to floodplains and floodways by the City Building Department.
- The City is currently in the middle of the "Concept 5 Sewer Improvement Plan" that is a 5 year infrastructure project totaling $48 million. The Concept 5 Sewer Improvement Plan project is designed to address sewer and lift station capacities during wet weather events in the city. This project will allow for the system to convey flows during a design rain event of a 25-year, 24-hour event, ultimately reducing the risk of surcharging sewers and basement backups. The work done through Concept 5 will not mitigate overland flooding or basement flooding from non-sewer sources.
- The City has also applied for Disaster Recovery funding to support additional infrastructure improvements to work towards flood resiliency.
- The City is currently participating in a United States Army Corps of Engineer Flood Study to identify potential mitigation projects to reduce flood impacts to residents and businesses.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

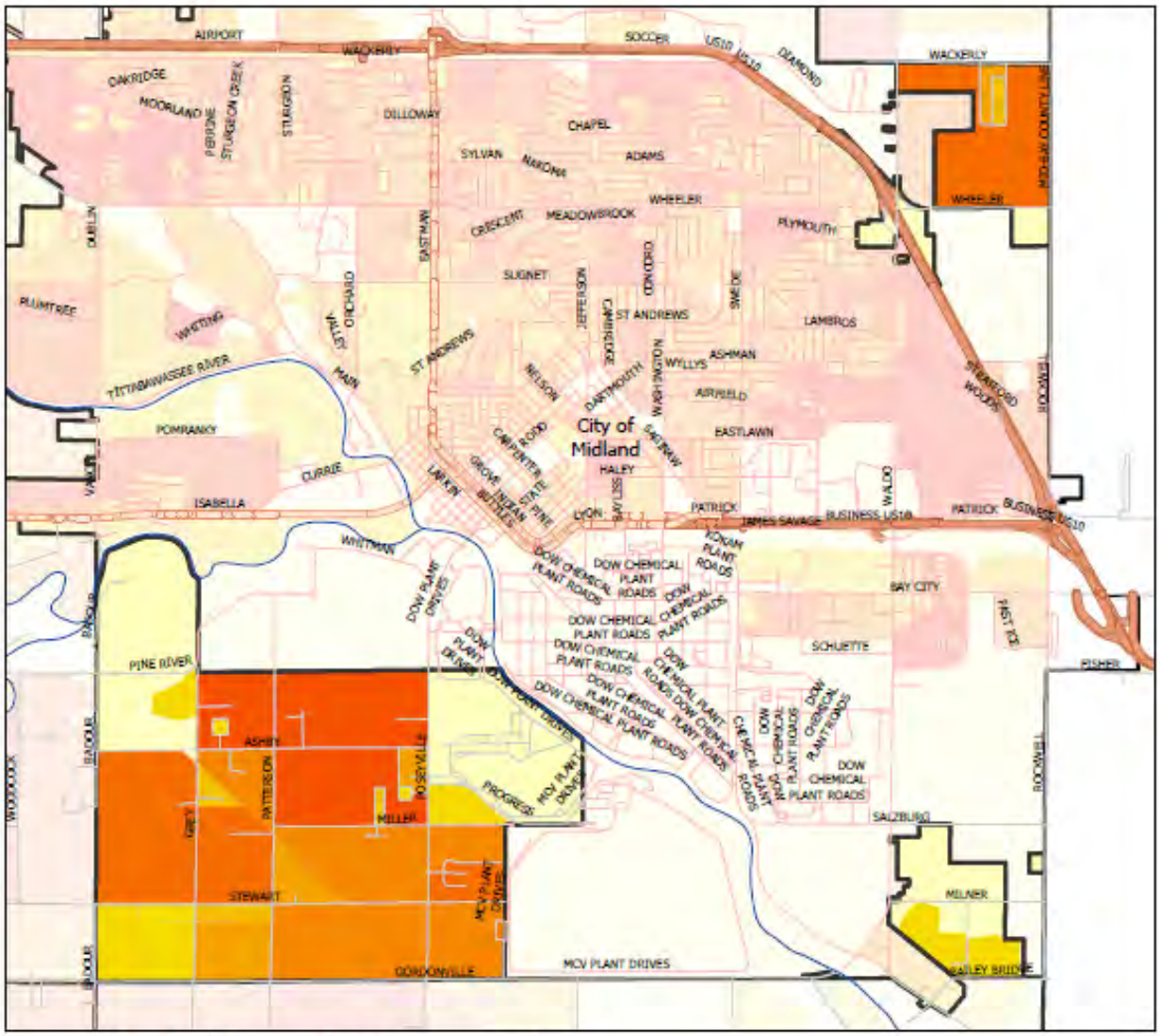
- The City will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The City will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles.

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The City will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville and Sanford dams.
- Information can be shared through the City web page or social media page by linking to the online dam failure inundation maps.

Goal Number 7: Improve public awareness of public health emergencies.

- The City will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Midland Township

Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

- 0 - 10
- 11 - 30
- 31 - 54
- 55 - 83
- 84 - 119
- 120 - 164
- 165 - 231
- 232 - 375
- 376 - 812
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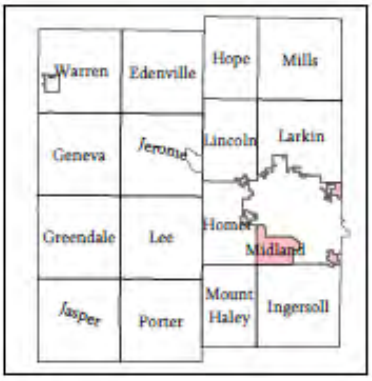


Midland Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Severe Winds	5	10	9	10	5	5	7.05
Winter Weather	7	10	5	9	6	7	6.95
Flooding	5	4	8	3	8	5	5.75
Hazmat - Fixed Site	5	5	5	7	5	2	5.1
Dam failures	1	4	8	3	8	5	4.75
Tornadoes	1	5	10	5	5	2	4.7
Terrorism	1	2	5	10	5	2	4.55
Wildfires	5	3	5	5	2	2	4
Public Health Emergencies	1	10	0	10	5	0	3.75
Hazmat - Transportation	7	2	2	2	2	2	3.25
Infrastructure failures	2	2	5	3	3	4	3.2
Pipeline accidents	2	2	4	3	4	2	3
Transportation Accidents	1	3	2	2	2	2	1.8
Oil & gas well accidents	0	0	0	0	0	0	0

Midland Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
- The Township will work to develop relationships with the Department of Natural Resources to provide informational programs to the residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks,

drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.

- The Township's Master Plan was adopted in 2015 and expires in 2035. The next expected review and update is 2030 and at that time, appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map was updated in 2018.
- The Township participates in the National Flood Insurance Program. There have been a total of 7 flood insurance claims totaling $230,000.
- Encourage homeowners to purchase flood insurance to help protect against flash flooding incidents.
- Ensure that building inspectors for the Township enforce the Michigan Building Code pursuant to flood plains and floodways.
- Update: Bridge on Gray Road over Bullock Creek replaced to allow higher flows.
- The Township can promote the use of NOAA Weather Radios.

After the 1986 Flood, Midland Township built a flood pump/dike system across Poseyville Road to prevent flood water from reaching Midland Township residents and businesses. The dike was constructed during the 2013 and 2017 flood events which saved millions of dollars in damages.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

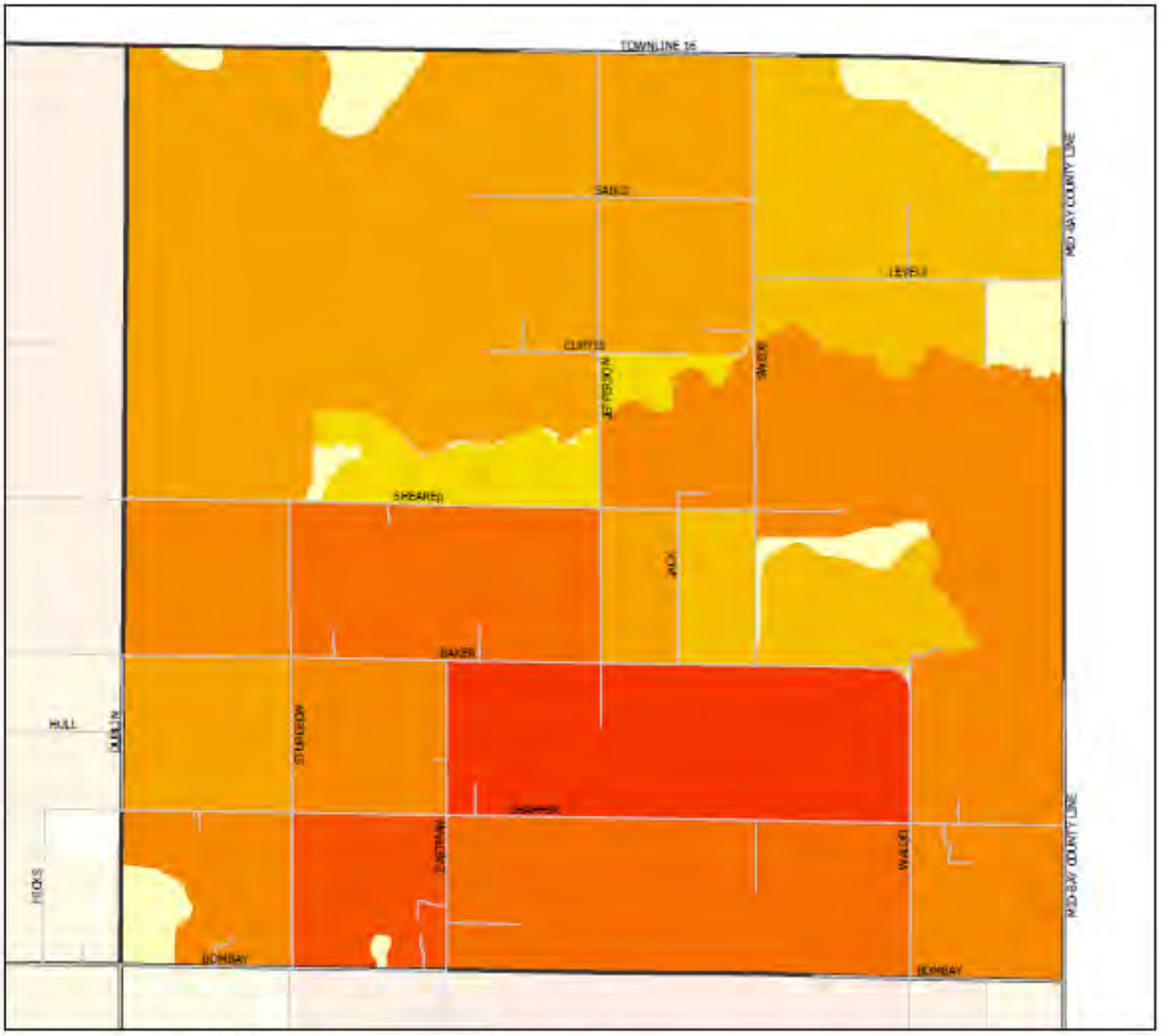
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The Township will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville and Sanford dams.
- Information can be shared through the Township web page or social media page by linking to the online dam failure inundation maps.

Goal Number 7: Improve public awareness of public health emergencies.

- The Township will collaborate with the County Health Department to provide residents with information through a variety of sources about public health risks and steps they can take to protect themselves.



Mills Township

Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

- 0 - 10
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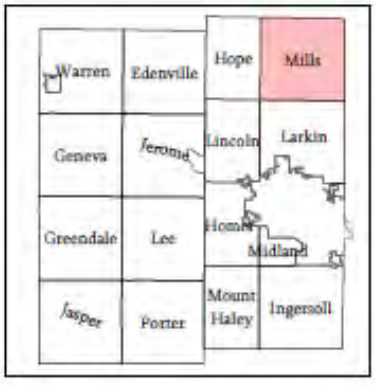

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Hazard:	25%	5%	20%	20%	20%	10%	100%
Winter Weather	9	10	2	10	2	9	6.45
Infrastructure failures	8	7	7	8	2	4	6.15
Severe Winds	8	10	4	3	3	2	4.7
Flooding	1	2	9	4	7	2	4.55
Dam failures	1	2	9	4	7	2	4.55
Public Health Emergencies	3	7	2	7	5	4	4.3
Wildfires	4	4	8	2	2	2	3.8
Tornadoes	2	1	7	1	2	1	2.65
Transportation Accidents	4	1	1	1	1	1	1.75
Hazmat - Transportation	1	2	2	2	2	2	1.75
Terrorism	1	1	3	1	2	1	1.6
Hazmat - Fixed Site	1	1	2	1	1	1	1.2
Pipeline accidents	0	0	0	0	0	0	0
Oil & gas well accidents	0	0	0	0	0	0	0

Mills Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
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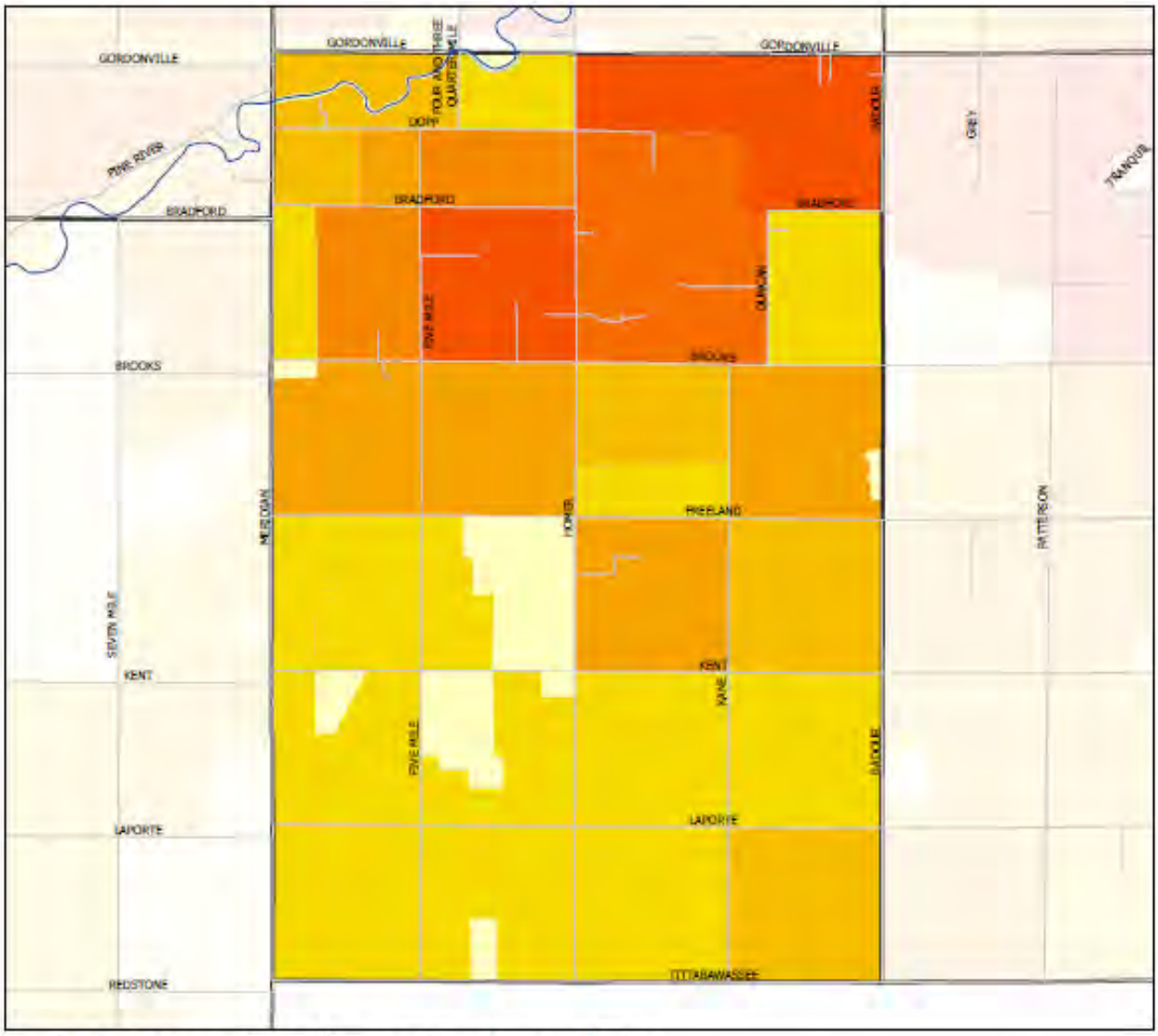

Mount Haley Township

Population Density Map

0 0.75 1.5 3 Miles

August 2023

Population by Census Block

- 0 - 10
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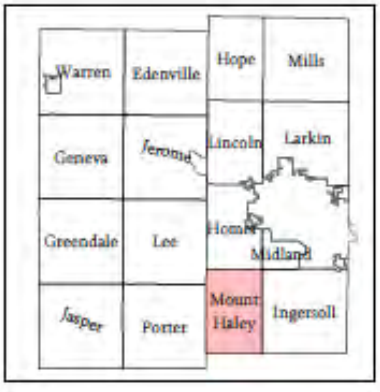

Mt. Haley Township 2023 Hazard Assessment Total Rating Table

ALL NUMBERS IN TABLE SHOW HOW EACH HAZARD RATES ON A SCALE FROM 0 TO 10.	Likelihood of Occurrence	Size of Affected Area	Capacity to Cause Physical Damage	Percentage of Population Affected	Economic Impact	Duration of Event	Total Score
Hazard:	25%	5%	20%	20%	20%	10%	100%
Winter Weather	9	9	5	9	4	1	6.4
Severe Winds	9	9	5	9	4	1	6.4
Public Health Emergencies	3	5	4	7	7	7	5.3
Infrastructure failures	9	1	1	7	1	9	5
Transportation Accidents	8	1	7	1	1	1	3.95
Wildfires	1	3	3	3	3	8	3
Hazmat - Transportation	1	2	6	1	1	5	2.45
Flooding	2	2	2	2	2	5	2.3
Hazmat - Fixed Site	1	2	5	1	1	5	2.25
Terrorism	1	1	1	1	1	5	1.4
Oil & gas well accidents	1	1	1	1	1	1	1
Tornadoes	1	1	1	1	1	1	1
Pipeline accidents	1	1	1	1	1	1	1
Dam failures	0	0	0	0	0	0	0

Mount Haley Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Township's Master Plan was adopted in 2014 and expires in 2034. The next expected review and update is expected 2025-26 and at that time, appropriate hazard mitigation goals and objects will be considered being added to the plan. The current zoning map was updated in 2024.

Goal Number 5: Improve public awareness of hazardous material emergencies and related safety procedures.

- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign about hazardous material safety information, including how to shelter-in-place during a chemical emergency.
- The Township will work with the Midland County L.E.P.C to promote a public awareness campaign regarding the potential hazards of batteries in electric vehicles

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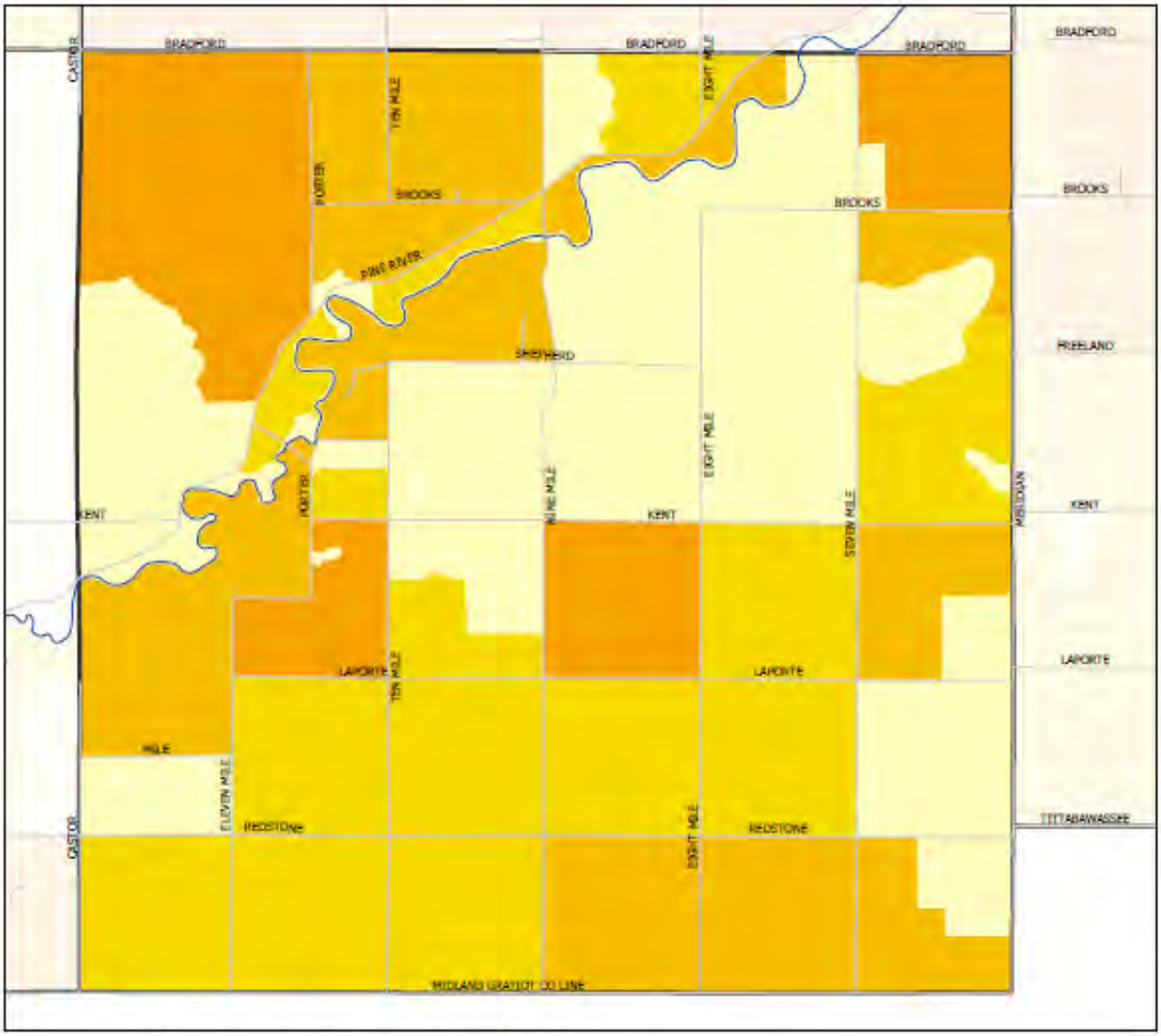

Porter Township

Population Density Map

0 0.5 1 2 Miles

August 2023

Population by Census Block

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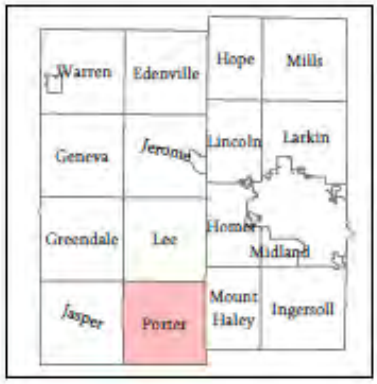

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Hazard:	25%	5%	20%	20%	20%	10%	100%
Wildfires	8	7	7	7	6	5	6.85
Winter Weather	8	8	4	4	5	5	5.5
Severe Winds	7	10	8	4	3	2	5.45
Public Health Emergencies	6	4	3	3	4	4	4.1
Oil & gas well accidents	5	4	4	3	2	1	3.35
Flooding	3	3	2	2	4	2	2.7
Infrastructure failures	3	3	2	2	2	2	2.3
Hazmat - Transportation	3	2	2	2	2	2	2.25
Tornadoes	2	1	2	2	2	1	1.85
Pipeline accidents	3	2	1	1	1	1	1.55
Dam failures	1	1	1	1	1	1	1
Transportation Accidents	1	1	1	1	1	1	1
Terrorism	1	1	1	1	1	1	1
Hazmat - Fixed Site	1	1	1	1	1	1	1

Porter Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

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- The Township's Master Plan was adopted in *2020.* The next expected review and update is *2025* and at that time, appropriate hazard mitigation goals and objects will be considered being added to the plan.

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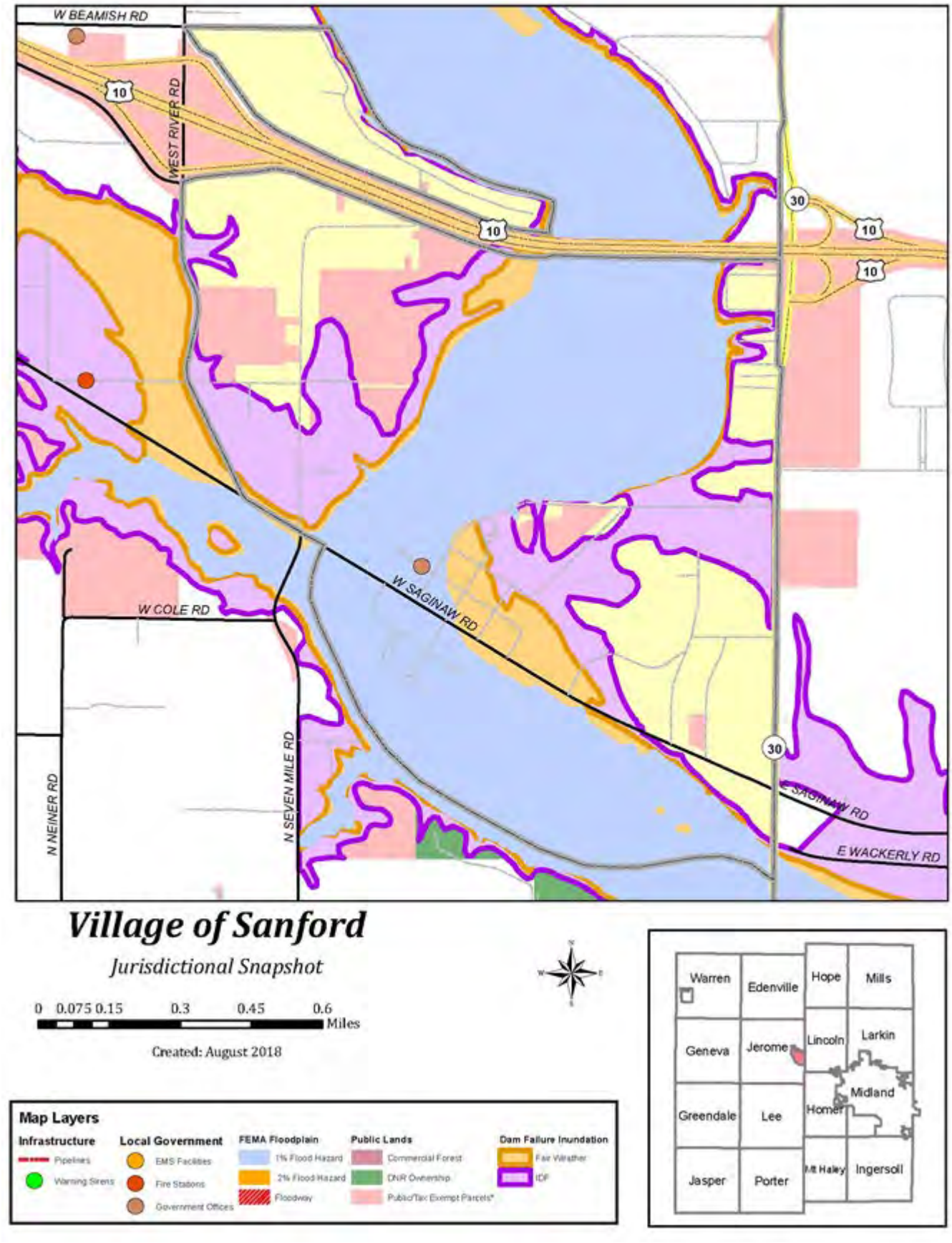
W BEAMISH RD
WEST RIVER RD
10
30
W COLE RD
W SAGINAW RD
N NEINER RD
N SEVEN MILE RD
E WACKERLY RD
Village of Sanford
Jurisdictional Snapshot
0 0.075 0.15 0.3 0.45 0.6
Miles
Created: August 2018
Map Layers
Infrastructure
Pipelines
Warning Sirens
Local Government
EMS Facilities
Fire Stations
Government Offices
FEMA Floodplain
1% Flood Hazard
2% Flood Hazard
Floodway
Public Lands
Commercial Forest
DNR Ownership
Public/Tax Exempt Parcels*
Dam Failure Inundation
Fair Weather
IDF
Warren
Edenville
Hope
Mills
Geneva
Jerome
Lincoln
Larkin
Midland
Greendale
Lee
Homer
Jasper
Porter
Mt Haley
Ingersoll

Village of Sanford 2023 Hazard Assessment Total Rating Table

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Flooding	10	10	10	10	10	4	9.4
Infrastructure failures	10	10	10	10	10	1	9.1
Dam failures	8	10	10	10	10	2	8.7
Severe Winds	10	10	10	10	5	2	8.2
Winter Weather	9	10	9	9	5	5	7.85
Wildfires	4	10	10	10	10	2	7.7
Tornadoes	7	3	10	5	4	1	5.8
Public Health Emergencies	5	7	0	5	10	5	5.1
Terrorism	2	2	5	4	7	2	4
Hazmat - Transportation	5	1	5	1	1	1	2.8
Hazmat - Fixed Site	4	3	5	1	1	1	2.65
Transportation Accidents	2	1	3	1	1	1	1.65
Oil & gas well accidents	0	0	0	0	0	0	0
Pipeline accidents	0	0	0	0	0	0	0

Village of Sanford Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Village is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Village will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Village is considering a social media platform to share hazard information to residents.

Goal Number 4: Protect public infrastructure and facilities from flooding and implement strategies to increase flood resiliency across the community.

- The Village is committed to continuing and developing relationships between local units of government such as the drain commissioner, road commissioner, and property owners to ensure development of erosion control projects alongside our river, creeks, drains and streams for the purpose of reducing and/or eliminating damage from floodwaters.
- The Village participates in the National Flood Insurance Program. There have been more than 28 Flood Insurance Claims in the Village totaling 1.4 million dollars.
- Encourage homeowners to purchase flood insurance to help protect flooding incidents.
- The Village is working to include mitigation activities within its Master Plan to include a “Flood Zone” that would work to remove or eliminate building from area through zoning when opportunities are provided. Since 2015, the Village has acquired 7 properties within the floodplain through Hazard Mitigation funds to demo and return to green space.

Currently, the Village is in the process of acquiring another 8 properties as a result of the 2020 Dam Failure through Hazard Mitigation funds.

- Replace Saginaw Road Bridge over Tittabawassee River to increase flow capacity beyond a 1% flood event.

Goal Number 6: Improve public awareness of high hazard dams in the community.

- The Village will work with FLTF to provide information to the community about areas at risk of flooding due to the potential failure of Edenville and Sanford dams.
- Information can be shared through the City web page or social media page by linking to the online dam failure inundation maps.

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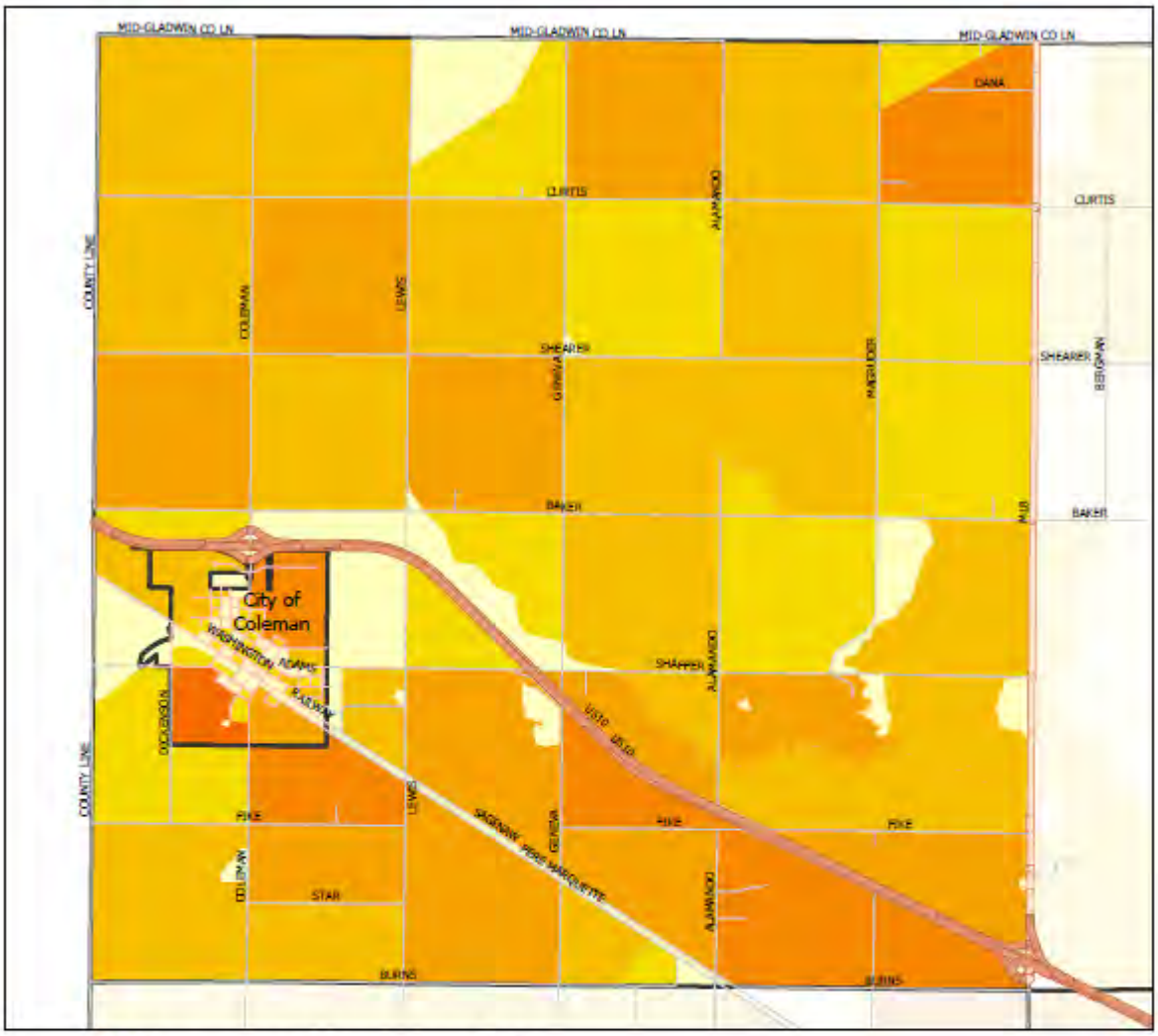

Warren Township

Population Density Map

0 0.5 1 2 Miles

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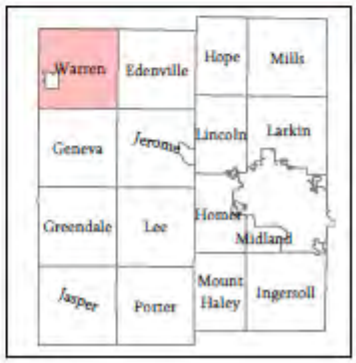

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Severe Winds	10	10	10	10	9	10	9.8
Tornadoes	8	9	9	8	8	8	8.25
Public Health Emergencies	6	6	7	7	7	6	6.6
Winter Weather	7	7	6	6	6	7	6.4
Infrastructure failures	5	5	5	5	5	5	5
Wildfires	4	4	4	4	4	4	4
Oil & gas well accidents	4	4	4	4	4	4	4
Pipeline accidents	4	4	4	4	4	4	4
Terrorism	3	3	3	3	3	3	3
Hazmat - Fixed Site	3	3	3	3	3	3	3
Transportation Accidents	3	3	3	3	3	3	3
Flooding	3	3	3	1	1	1	2
Hazmat - Transportation	2	2	2	2	2	2	2
Dam failures	1	1	1	1	1	1	1

Warren Township Mitigation Actions

Goal Number 1: Enhance public protection from weather hazards.

- The Township is committed to developing a system to inform residents of safety preparations for weather hazards. Public education for weather hazards is ongoing.
- The Township will encourage residents to use NOAA weather radios and signup for emergency weather alerts through Midland County 911. Another option is to inform residents through the use of mailings. The Township is considering a social media platform to share hazard information to residents.

Goal Number 2: Improve and expand public warning capabilities.

- The Township will look into the addition of a warning siren(s) within the community for high density population areas. Estimated costs are $30,000 per siren.

Goal Number 3: Promote wildfire protection with an emphasis on the areas of the county where urban development interfaces with wild land and forest.

- The Township will promote wildfire protection throughout the community.
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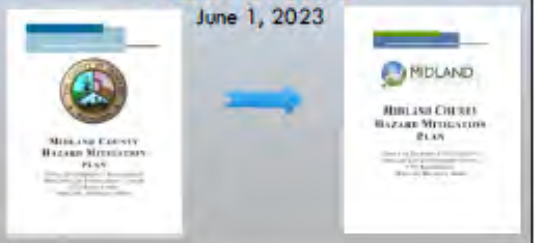
Midland County Township Officer's Association Meeting 06/01/23

COUNTY OF
MIDLAND
OFFICE OF EMERGENCY MANAGEMENT

JENIFER BOYER
MIDLAND COUNTY
EMERGENCY MANAGEMENT COORDINATOR
(989) 264-4247

2023 MIDLAND COUNTY HAZARD MITIGATION PLAN UPDATE

June 1, 2023



COMPREHENSIVE EMERGENCY MANAGEMENT

WHAT IS HAZARD MITIGATION?

- HAZARD MITIGATION IS ANY ACTION TAKEN BEFORE, DURING, OR AFTER A DISASTER TO PERMANENTLY ELIMINATE OR REDUCE THE LONG-TERM RISK TO HUMAN LIFE AND PROPERTY FROM NATURAL AND TECHNOLOGICAL HAZARDS.

WHY?

- LAND USE PLANNING NOW WITH THE INTEGRATION OF COMMUNITY HAZARD VULNERABILITY CAN HELP MITIGATE FUTURE DISASTERS IMPACT TO COMMUNITY.
- REQUIRED TO BE ELIGIBLE FOR HAZARD MITIGATION FUNDS.
  - ANNUAL FUNDING AVAILABLE – PRE-DISASTER PROJECTS
  - DISASTER FUNDING AVAILABLE – POST-DISASTER PROJECTS

LOCAL PROJECTS

- 2014 GRANT – CITY OF MIDLAND 4D PROJECT $687,300
- 2016 GRANT –SANFORD SENIOR CENTER $261,140
- 2017 – DISASTER DECLARATION $766,373
  - VILLAGE OF SANFORD – PROPERTY ACQUISITION $254,630
- 2020 – DISASTER DECLARATION $9,000,000 (STATE)
  - VILLAGE OF SANFORD – PROPERTY ACQUISITION $2,000,000
  - CITY OF MIDLAND – PROPERTY ACQUISITION $4,200,000
- 2021 – HIGH HAZARD POTENTIAL DAM $400,000
- 2022 – HIGH HAZARD POTENTIAL DAM $300,000

TIMELINE

- APRIL – MAY 2023
  - UPDATING DATA FOR EACH HAZARD.
  - MAKING SURE FEMA REQUIREMENTS ARE MET.
    - REORGANIZING INFORMATION
    - ADDING CLIMATE CHANGE
    - ADDING SOCIAL VULNERABILITY
    - ADDING HIGH HAZARD DAM AUDIT
- JUNE 2023
  - ROLLING OUT THE HAZARD MITIGATION PLAN UPDATE TO LOCAL JURISDICTIONS AND STAKEHOLDERS.
  - IDENTIFY POINTS OF CONTACT FOR EACH JURISDICTION.
  - SCHEDULE REGULARLY HELD MEETINGS
  - DEVELOP AT PUBLIC OUTREACH CAMPAIGN.

TIMELINE (CONT'D)

- JULY – SEPT 2023
  - DISPERSE AND COLLECT SURVEY'S AND INFORMATION FROM LOCAL JURISDICTIONS.
  - IMPLEMENT PUBLIC OUTREACH CAMPAIGN.*
- OCT 2023
  - COMPILE FEEDBACK FROM LOCAL JURISDICTIONS INTO PLAN.
  - BEGIN WORK ON A FINAL DRAFT.
- NOV 2023
  - ACQUIRE "PRE-APPROVAL" FROM STATE OF PLAN
  - ACQUIRE "PRE-APPROVAL" FROM FEMA OF PLAN.
- JAN 2024
  - COLLECT PLAN ADOPTIONS FROM ALL JURISDICTIONS.

NEED PARTICIPATION FROM TOWNSHIPS

- COMMUNITY PROFILE
- PARTICIPATE IN REGULARLY SCHEDULED MEETINGS.
- HAZARD RANKINGS
- SHARE INFORMATION WITH RESIDENTS. *
- ADOPT FINAL PLAN
- IMPLEMENT MITIGATION ACTIVITIES LOCALLY

WHAT'S IN A HAZARD MITIGATION PLAN?

- PLANNING PROCESS
- HAZARD IDENTIFICATION
- RISK ANALYSIS
- MITIGATION GOALS AND STRATEGIES
- PLAN MAINTENANCE
- PLAN ADOPTION
- HIGH HAZARD DAMS

IDENTIFIED MIDLAND COUNTY HAZARDS

- WHAT MAY THREATEN THE COMMUNITY?
- WHO AND WHAT IS AT RISK?

- SEVERE WINDS
- WINTER STORMS *
- RIVER FLOODING *
- DAM FAILURE *
- TORNADO
- PUBLIC HEALTH EMERGENCY *
- WILDFIRES
- INFRASTRUCTURE FAILURE
- TERRORISM / ACTS OF VIOLENCE
- PIPELINE ACCIDENT *
- HAZARDOUS MATERIALS RELEASE
- OIL & GAS WELL

GOALS OF EXISTING PLAN

#1 ENHANCE PUBLIC PROTECTION FROM WEATHER HAZARDS
#2 IMPROVE AND EXPAND PUBLIC WARNING CAPABILITIES
#3 PROMOTE WILDFIRE PROTECTION IN THE URBAN/WILD LAND INTERFACE
#4 PROTECT PUBLIC INFRASTRUCTURE AND FACILITIES FROM FLOODING AND IMPLEMENT STRATEGIES TO MAKE THE WHOLE COMMUNITY FLOOD RESILIENT.
#5 IMPROVE PUBLIC AWARENESS OF HAZARDOUS MATERIAL EMERGENCIES AND RELATED SAFETY PROCEDURES.

POTENTIAL NEW GOALS OR STRATEGIES

EXAMPLE:

HAZARD: TORNADO

GOAL: IMPROVE PROTECTION AND WARNING.

STRATEGY:

- BUILD COMMUNITY STORM SHELTERS.
- ADD ADDITIONAL WARNING SIRENS ACROSS THE COMMUNITY.
- CREATE A PUBLIC OUTREACH CAMPAIGN TO ENCOURAGE HOME OWNERS TO HAVE A NOAA WEATHER RADIO AND SIGN UP FOR MASS NOTIFICATION ALERTS (NIXLE) THROUGH 911.

HAZARD MITIGATION COMMITTEE

- MIDLAND COUNTY BOARD OF COMMISSIONER'S REPRESENTATIVE
- MIDLAND COUNTY EMERGENCY MANAGEMENT COORDINATOR
- MIDLAND COUNTY FIRE CHIEF'S ASSOCIATION REPRESENTATIVE
- MIDLAND CITY FIRE CHIEF
- MIDLAND COUNTY DRAIN COMMISSIONER
- CITY OF MIDLAND UTILITIES DIRECTOR
- CITY OF MIDLAND DEPUTY DIRECTOR OF PLANNING
- REPRESENTATIVE FROM EACH TOWNSHIP, VILLAGE, AND CITY
- MIDLAND COUNTY ROAD COMMISSION REPRESENTATIVE
- MIDLAND COUNTY SHERIFF'S OFFICE
- FOUR LAKES TASK FORCE REPRESENTATIVE
- DNR – SANFORD FIRE OFFICER

NEXT STEPS

- REGULAR MEETINGS WILL BE SCHEDULED AND COMMUNICATED TO EACH LOCAL JURISDICTION. REGULAR ATTENDANCE AT MEETINGS BY EACH JURISDICTION IS REQUIRED.
  - HAZARDS WILL BE PRESENTED
  - HAZARDS WILL BE EVALUATED AND RANKED
  - MITIGATION GOALS AND STRATEGIES WILL BE REVIEWED AND DEVELOPED FOR EACH HAZARD.
- PUBLIC INVOLVEMENT
  - SURVEY
  - LOCAL PRESENTATIONS
  - TOWNSHIP NEWSLETTER/WEBSITE/OTHER PROMOTIONS

THANK YOU

CONTACT INFORMATION

JENIFER BOYER
EMERGENCY MANAGEMENT COORDINATOR
2727 ROOD STREET
MIDLAND, MICHIGAN 48640
(989) 832-6750
JBOYER@COMIDLANDMI.US

COUNTY OF MIDLAND
OFFICE OF EMERGENCY MANAGEMENT

2023 Midland County Hazard Plan Update Presentation
Midland County Township Officer's Association

June 1, 2023

	Please Print Name	Please Print Jurisdiction & Position
1	ART BUCK	Midland County Road Commission
2	MaryEllen Keel	Ingersoll Township - Clerk
3	Jessica Gilkins	Midland County BOC - Admin.
4	[illegible]	County Commissioner - District 4
5	John A [illegible]	Homer Trustee
6	Joy Sczepanski	Lincoln Twp Treasurer
7	Teresa Quintana	Village of Sanford Planning Commission
8	Brett Fales	Lincoln Twp. Trustee
9	Brian Van Wert	Homer Twp Trustee
10	Karen Carey	Edenville Twp Treasurer.
11	RUSS VARNER	HOMER supervisor
12	Jim Spealia	Edenville Twp Trustee
13	Crystal Stankey	Edenville Twp Trustee
14	Pam Garcia	Porter Treasurer
15	Marianne Corbat	Porter Twp Clerk
16	Deric Wright	Jasper Twp, trustee
17	Duane Wager	Porter Twshp, Trustee
18	Luke Derheim	Luke Derheim, Rep Schuette's office
19	Myron Green	Sheriff - Midland Co.
20	RON KUTCHEN	Mills Twp Supervisor
21	Sara Pichl	Mills Twsp Treas
22	Clyde Hoover	Mills Twp
23	TERRANCE [illegible]	EDENVILLE Twp Supervisor

Sign In

2023 Midland County Hazard Plan Update Presentation
Midland County Township Officer's Association

June 1, 2023

24	Trish Thayer Kniviva	My Mid. EMS
25	Ruth Knapp	Greendale Twp Clerk
26	Juanita Seckinger	Greendale Twp - Treasurer
27	John Dybes	Warren
28	Lyndsy Bock	Warren
29	Glenn Rowley	Bangor Township, Bay Co
30	Gil Bernier	Jerome Township
31	Steve Rice	Jerome Township
32	Linda Anthony	Warren Township
33	Mark Trinklein	Lincoln Township
34	Denny Allen	Warren Township
35	Kevin Wray	Lincoln Township
36	Amy Hoover	Mills Township
37	Kim D. Heisler	Ingersoll Township
38	Jon Myers	Midland Co. Road Commission
39	Jim Hyatt	MCRC " " "
40	Kim Sweet	Mills Township
41	Alan Wendt	Mills Twp.
42	Carol Wendt	Mills Twp.
43		
44		
45		
46		
47		
48		

From: Jenifier Boyer
To: Jeanette Snyder ; Chief Bill Coast; Chief Joshua Mosher; Joseph Sova; Art Buck; Jared Dracoli; Chief Nicole Ford; "Sheriff Myron Greene"; Chief Jerry Cole; Jacob Kain; "City of Coleman"; "City of Midland - Brad Kaye"; "Coleman - Tammy Goffnett"; "Doug Kruger"; "Edenville Twp - Terry Hall"; "Geneva - Carole Murray "; "Greendale - James Levere"; "Homer Twp - Russ Varner"; "Hope Twp - Rita Gouz"; "Ingersoll Twp - Kim Hellner"; "Jasper Twp - Carmen Balena"; "Larkin - Maria Sandow"; "Lincoln - Kevin Wray"; "Midland Twp - Terry Holt "; "Mike Wood"; "Mills Twp - Ron Kutchey"; "Mt Haley Twp - Kenneth D. Brown"; "Sanford - Dolores Porte"; "Thomas Corbat "; "Warren Twp - Denny Allen"
Cc: Jeffrey Gray; Joy Brooks ; Bridgette Gransden; Dick Rioke; Thomas E. Matzke; David Kepler; "David Rothman"; "Fred Yanoski"
Bcc: Angela Martin; "Edenville Clerk"; "Homer Clerk"; "Hope Clerk"; "Jerome Clerk"; Larkin Clerk; Laura Dawson; "Lincoln Clerk"; Linda Anthony; Lisa Benter Rich ; "Midland Twp Clerk"; Ruth Knapp; "Sanford Clerk"
Subject: Midland County Hazard Mitigation Plan Update Process - Need your participation
Date: Friday, June 16, 2023 5:39:00 PM
Attachments: image001.png
Importance: High

Greetings,

Believe it or not, it has been 5 years since we last updated the Midland County Hazard Mitigation Plan. Since then we have experienced a few winter storms, a global pandemic and a catastrophic dam failure. The Hazard Mitigation Plan is one that requires FEMA approval and makes our local communities eligible for different federal grants, pre and post disaster. As we hear more about building community resiliency, this plan will eventually likely be required for application to Community Block Grants (CDBG), Building Resilient Infrastructure and Communities Grants (BRIC) and Fire Assistance Grants.

In April of 2023, new planning requirements were implemented by FEMA. For the most part, our current plan meets these requirements. This update will require the addition of Climate Change, Social Vulnerability and a High Hazard Dam Section. The two largest changes is the reformatting of the document to better meet requirements and the required amount of local jurisdiction and community participation in the planning process.

Our office has already dived into updating information and data in the plan to support the update and new requirements. To help meet the local jurisdiction participation in the planning process, our office as schedule 5 meetings (at this time) over the next few months in which each jurisdiction will need to have a representative attend and participate in the update process. It is preferred the same person attend all of the meetings, however we understand that there may be times when an alternate representative will need to attend. It is perfectly acceptable to have more than one representative from your jurisdiction attend, just please let us know.

Meetings will be held the 4th Wednesday of the month at the American Legion in Sanford at 7pm. The dates are as follows:
June 28th, July 26th, August 23rd, September 27th and October 25th.

To keep from having multiple group meetings, the once "Hazard Mitigation Planning Committee" will be part of the above meetings to have a "whole community" review and discussion of the Plan. So if you are not a local jurisdiction elected official, then your expertise was part of the "Committee" and is asked to regularly attend and provide representation.

If any local jurisdiction would like me to present this to their Planning Commission or Board, please let me know (This will not get you out of attending the 5 meetings, but will score you Brownie points with the Emergency Management Coordinator). I am also looking to be out in the community as much as possible so if you have any events coming up that I could have a table at, please let me know. If you are part of any local clubs or groups that I could present to, that would also be great.

You can review the current plan here:
https://midlandcountymi.gov/corecode/uploads/document6/uploaded_pdfs/corecode/2018%20Hazard%20Mitigation%20Plan%20FINAL%20Reduced_581.pdf

American Legion
2080 N. Meridian Road
Sanford, MI 48657

Please provide my office with who(s) planning to represent your jurisdiction/agency by June 25th. If you have any questions, please feel free to contact my office.

Sincerely,

Jenifier Boyer
Emergency Management Coordinator
Office of Emergency Management
P:(989) 832-6750

MIDLAND MICHIGAN

"Success has nothing to do with what you gain in life or accomplish for yourself. It's what you do for others." - Danny Thomas

AGENDA

REGULAR MEETING OF THE MIDLAND CITY PLANNING COMMISSION
TUESDAY, JUNE 27, 2023 AT 7:00 P.M.
COUNCIL CHAMBERS, CITY HALL, MIDLAND, MICHIGAN

1. **Call to Order**
2. **Pledge of Allegiance to the Flag**
3. **Roll Call**
4. **Approval of the Minutes**
   a. Regular Meeting – June 13, 2023
5. **Public Hearings**
   a. **Site Plan No. 423** – initiated by R.E. Kennedy Construction to permit a 1,870 square foot addition to Nash Dermatology located at 2711 W. Wackerly Street.

   Public Hearing Process
   1. Staff presentation and overview of petition
   2. Petitioner presentation
   3. Public comments
   4. Opportunity for petitioner rebuttal and final comments
   5. Closing of public hearing
   6. Deliberation and possible decision by Planning Commission
6. **Old Business**
7. **Public Comments (unrelated to items on the agenda)**
8. **New Business**
   a. Midland County Hazard Mitigation Plan
   b. Schools in the COM Community zoning district
9. **Communications**
10. **Report of the Chairperson**
11. **Report of the Planning Director**
    a. Items for Next Agenda – July 11, 2023
12. **Adjournment**

Notice of Intent to Prepare a Master Plan

6/23/2023

From: Village of Sanford Planning Commission

This notice is to inform you that the Village of Sanford Planning Commission is updating its existing master plan.

In accordance with Section 39 of the Michigan Planning Enabling Act, Public Act 33 of 2008, MCL 125.3839, this notice is to inform our neighboring local governments, planning entities, and any public utilities/railroad companies of the Village of Sanford's intent to amend our master plan.

A Master Plan is a document that helps communities create a vision for future development. Our existing master plan is outdated and much has changed since the dam failure and resultant flood. The Village of Sanford Planning Commission welcomes your comments and cooperation as we define our Master Plan to continue to rebuild our community.

- If you would like to receive an electronic copy of the draft master plan, please submit an email request to clerk@villageofsanford.com and include the email address of where the plan should be sent.
- If you would prefer to receive a paper copy, please contact the Village Clerk at 1-989-488-4578 EXT. 11 or clerk@villageofsanford.com and provide your mailing address.
- The draft master plan will also be posted and available free of charge on the Village of Sanford website at: https://www.villageofsanford.com/Master%20Plan%202023%20Draft%20vs%203.pdf
- Please submit your comments via email to: clerk@villageofsanford.com
- Comments must be received by: Aug. 22nd, 2023
- Public attendance and comments are also welcome at the next Village of Sanford Planning Commission Meeting on July 11th, 2023 at 6pm at Jerome Township Hall - 737 W. Beamish Rd. Sanford MI 48657.
- Jenifier Boyer (Midland County Emergency Manager) will also review the Midland County Hazard Mitigation Plan at this meeting.

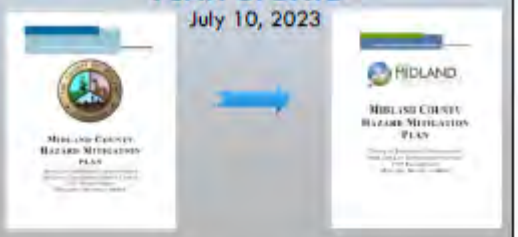
Under MCL 125.3841(2)(f), each public utility company and railroad company owning or operating a public utility or railroad within the local unit of government, and any government entity that registers its name and address for this purpose with the secretary of the planning commission, shall reimburse the township for any copying and postage costs incurred in receiving a hard copy of the proposed master plan or final master plan.

COUNTY OF
MIDLAND
OFFICE OF EMERGENCY MANAGEMENT

JENIFER BOYER
MIDLAND COUNTY
EMERGENCY MANAGEMENT COORDINATOR
(989) 264-4247

2023 MIDLAND COUNTY HAZARD MITIGATION PLAN UPDATE

July 10, 2023



COMPREHENSIVE EMERGENCY MANAGEMENT

WHAT IS HAZARD MITIGATION?

- HAZARD MITIGATION IS ANY ACTION TAKEN BEFORE, DURING, OR AFTER A DISASTER TO PERMANENTLY ELIMINATE OR REDUCE THE LONG-TERM RISK TO HUMAN LIFE AND PROPERTY FROM NATURAL AND TECHNOLOGICAL HAZARDS.

WHY?

- LAND USE PLANNING NOW WITH THE INTEGRATION OF COMMUNITY HAZARD VULNERABILITY WILL HELP MITIGATE FUTURE DISASTER'S IMPACT TO COMMUNITY.
- REQUIRED TO BE ELIGIBLE FOR HAZARD MITIGATION FUNDS.
  - ANNUAL FUNDING AVAILABLE – PRE-DISASTER PROJECTS
  - DISASTER FUNDING AVAILABLE – POST-DISASTER PROJECTS

$ $ $

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  - DISASTER FUNDING AVAILABLE – POST-DISASTER PROJECTS

$ $ $

WHAT'S IN A HAZARD MITIGATION PLAN?

- PLANNING PROCESS
  - HAZARD IDENTIFICATION
  - RISK AND VULNERABILITY ANALYSIS
  - MITIGATION GOALS AND STRATEGIES
- PLAN MAINTENANCE
- PLAN ADOPTION
- MITIGATION ACTIVITIES IMPLEMENTED LOCALLY

LOCAL PROJECTS

- 2014 GRANT – CITY OF MIDLAND 4D PROJECT $687,300
- 2016 GRANT –SANFORD SENIOR CENTER $261,140
- 2017 – DISASTER DECLARATION $766,373
  - VILLAGE OF SANFORD – PROPERTY ACQUISITION $254,630
- 2020 – DISASTER DECLARATION $9,000,000 (STATE)
  - VILLAGE OF SANFORD – PROPERTY ACQUISITION $2,000,000
  - CITY OF MIDLAND – PROPERTY ACQUISITION $4,200,000
- 2021 – HIGH HAZARD POTENTIAL DAM $400,000
- 2022 – HIGH HAZARD POTENTIAL DAM $300,000

TIMELINE

- APRIL – MAY 2023
  - UPDATING DATA FOR EACH HAZARD.
  - MAKING SURE FEMA REQUIREMENTS ARE MET.
    - REORGANIZING INFORMATION
    - ADDING CLIMATE CHANGE
    - ADDING SOCIAL VULNERABILITY
    - ADDING HIGH HAZARD DAM ANNEX
- JUNE 2023
  - ROLLING OUT THE HAZARD MITIGATION PLAN UPDATE TO LOCAL JURISDICTIONS AND STAKEHOLDERS.
  - IDENTIFY REPRESENTATIVES FOR EACH JURISDICTION.
  - SCHEDULED REGULARLY HELD MEETINGS
  - DEVELOP AT PUBLIC OUTREACH CAMPAIGN.

TIMELINE (CONT'D)

- JULY – SEPT 2023
  - MONTHLY MEETINGS WITH LOCAL JURISDICTIONS
  - IMPLEMENT PUBLIC OUTREACH CAMPAIGN.*
- OCT 2023
  - COMPILE FEEDBACK FROM LOCAL JURISDICTIONS INTO PLAN.
  - BEGIN WORK ON A FINAL DRAFT.
- NOV 2023
  - ACQUIRE "PRE-APPROVAL" FROM STATE OF PLAN
  - ACQUIRE "PRE-APPROVAL" FROM FEMA OF PLAN.
- JAN 2024
  - COLLECT PLAN ADOPTIONS FROM ALL JURISDICTIONS.

NEED ENGAGEMENT FROM VILLAGE

- COMMUNITY PROFILE
- PARTICIPATE IN REGULARLY SCHEDULED MEETINGS.
  - HAZARD RANKINGS
  - RISK AND VULNERABILITY ANALYSIS
- SHARE INFORMATION WITH RESIDENTS. *
- ADOPT FINAL PLAN
- IMPLEMENT MITIGATION ACTIVITIES LOCALLY

IDENTIFIED MIDLAND COUNTY HAZARDS

- WHAT MAY THREATEN THE COMMUNITY?
- WHO AND WHAT IS AT RISK?

- SEVERE WINDS
- WINTER STORMS *
- RIVER FLOODING *
- DAM FAILURE *
- TORNADO
- PUBLIC HEALTH EMERGENCY *
- WILDFIRES
- INFRASTRUCTURE FAILURE
- TERRORISM / ACTS OF VIOLENCE
- PIPELINE ACCIDENT *
- HAZARDOUS MATERIALS RELEASE
- OIL & GAS WELL

GOALS OF EXISTING PLAN

#1 ENHANCE PUBLIC PROTECTION FROM WEATHER HAZARDS
#2 IMPROVE AND EXPAND PUBLIC WARNING CAPABILITIES
#3 PROMOTE WILDFIRE PROTECTION IN THE URBAN/WILD LAND INTERFACE
#4 PROTECT PUBLIC INFRASTRUCTURE AND FACILITIES FROM FLOODING AND IMPLEMENT STRATEGIES TO MAKE THE WHOLE COMMUNITY FLOOD RESILIENT.
#5 IMPROVE PUBLIC AWARENESS OF HAZARDOUS MATERIAL EMERGENCIES AND RELATED SAFETY PROCEDURES.

POTENTIAL NEW GOALS OR STRATEGIES?

EXAMPLE:

HAZARD: TORNADO

GOAL: IMPROVE PROTECTION AND WARNING.

STRATEGY:

- BUILD COMMUNITY STORM SHELTERS.
- ADDRESS LOCAL ORDINANCES REGARDING MOBILE HOME STRUCTURES TO REQUIRE STORM SHELTERS.
- ADD ADDITIONAL WARNING SIRENS ACROSS THE COMMUNITY.
- CREATE A PUBLIC OUTREACH CAMPAIGN TO ENCOURAGE HOME OWNERS TO HAVE A NOAA WEATHER RADIO AND SIGN UP FOR MASS NOTIFICATION ALERTS (NIXLE) THROUGH 911.

HAZARD MITIGATION COMMITTEE

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- MIDLAND CITY FIRE CHIEF
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- REPRESENTATIVE FROM EACH TOWNSHIP, VILLAGE, AND CITY
- MIDLAND COUNTY ROAD COMMISSION REPRESENTATIVE
- MIDLAND COUNTY SHERIFF'S OFFICE
- FOUR LAKES TASK FORCE REPRESENTATIVE
- DNR – SANFORD FIRE OFFICER

WHY IS THIS IMPORTANT TO YOU?

VILLAGE OF SANFORD IS ZONE A

VILLAGE OF SANFORD IS ZONE A

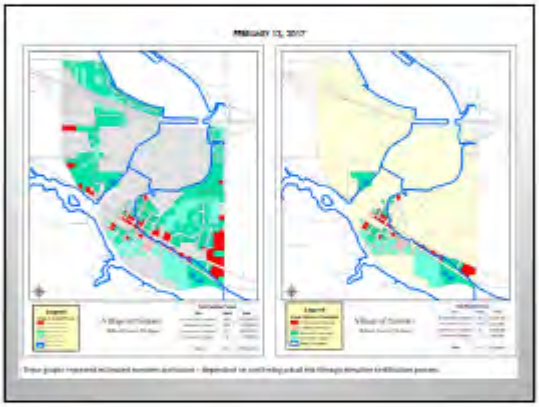
VILLAGE OF SANFORD RESIDENTIAL AND COMMERCIAL IMPACTS

- APPROXIMATE IMPACT
  - RESIDENTIAL IMPROVED (35) $3,129,400 = 9%
  - RESIDENTIAL VACANT (18) $257,000 = 16%
  - COMMERCIAL IMPROVED (30) $3,89 1,000 = 30%
  - COMMERCIAL VACANT (12) $165,800 = 80%

OVERALL 15% OF PROPERTIES ARE IMPACTED.

$ = CURRENT MARKET VALUE, % = OF TOTAL MARKET VALUE

WORST CASE SCENARIO



POWER OF CHANGE

- LOCAL PLANNING COMMISSIONS
  - LOCAL ZONING
  - LOCAL ORDINANCES
  - THE ABILITY TO SHAPE THE GROWTH OF YOUR COMMUNITY WHILE PROVIDING PROTECTION OR MITIGATION EFFORTS FOR RESIDENTS AND BUSINESSES.
- ACTIONS TAKEN TODAY CAN MAKE POSITIVE IMPACTS FOR THE NEXT 5, 10, 20 YEARS AND BEYOND.

Questions?

Thank You!

FOUR LAKES

County board signs letter of support

By Isabelle Pasciolla STAFF WRITER

Isabelle Pasciolla/Midland Daily News

Emergency Management Coordinator Jenifier Boyer presents a draft of the updated Hazard Mitigation Plan to the Midland County Board of Commissioners on Tuesday in the County Services Building.

The Midland County Board of Commissioners agreed to sign a letter of support for the Four Lakes Task Force financing plan — including the Special Assessment District — at a meeting on Tuesday morning in the County Services Building.

The resolution authorizes Chair Mark Bone to sign the letter on behalf of the entire board. The letter, which was written by the Four Lakes Task Force, states that the board supports the Four Lakes Task Force as the "delegated authority to acquire, repair and operate the Secord, Smallwood, Wixom and Sanford dams."

The letter also shows the board's support for the planned path forward and the financing plan that was presented and approved by the Midland and Gladwin County Boards of Commissioners during a joint meeting at Dow Diamond on Feb. 6.

"We further support FLTF in their efforts to continue to manage costs to the lowest level possible, seek additional funding and restore the lakes. These lakes provide value and improve the quality of life to our

communities. We support the return of the lakes and ask that you support the Four Lakes Task Force in their funding request to help alleviate the cost burden to the local community," the letter reads.

Administrator/Controller Bridgette Gransden explained after the meeting that the letter of support will be included in applications as the Four Lakes Task Force pursues other funding sources to lessen the burden of the Special Assessment District.

"Currently the federal government is approaching next year's budget cycle so FLTF is gathering letters of support from key stakeholders so it can provide them to our congressional representatives to advocate for allocations during the federal budgeting process," Four Lakes Task Force explained in an email statement.

As a result of the Heron Cove Association's recent appeal of the Four Lakes Special Assessment, the Four Lakes Task Force announced Monday that it is suspending restoration work on the four dams in the coming months.

Four Lakes Task Force explained in an email that the letter of support will be used in applications for appropriations that could reduce the financial burden of the Special Assessment District, but that the letter has no connection to Heron Cove's appeal.

At the end of the letter were spaces for signatures by the Midland County Board of Commissioners; the Gladwin County Board of Commissioners; Gladwin County's Secord Township, Clement Township, Bourret Township, Hay Township, Billings Township and Tobacco Township; and Midland County's Village of Sanford, Jerome Township, Edenville Township and Hope Township.

Hazard Mitigation

Plan

The Board hosted a presentation of the updated Hazard Mitigation Plan draft from Emergency Management Coordinator Jenifier Boyer.

Boyer explained that hazard mitigation is any action taken before, during or after a disaster to reduce or eliminate the longterm risk to people and their property.

This plan is updated every four to five years. The last update was in 2018.

Having this plan helps local jurisdictions with planning and zoning in a way that mitigates hazards and future disasters.

"Mitigation is done at the local level with planning, zoning, those types of things," Boyer said. "Most of the ability to mitigate hazards is done at that level where you can have ordinances on how far it can be from the floodplain, you can have more strict ordinances and rules than maybe what the state and the feds provide."

The plan also makes local jurisdictions eligible for certain funding for both pre-disaster and post-disaster projects. Since 2014, jurisdictions in the county have received funding for multiple projects, including for disaster declaration, property acquisition and high-hazard potential dams.

"We've really taken advantage of that funding over the last 10+ years given our flooding and some of the other hazards we've had," Boyer said. "Having this plan and keeping this plan up to date every four or five

years of the last 12-lus years has really paid off to help local jurisdictions in mitigating some of the flooding issues."

Identified hazards in Midland County were listed as severe winds, winter storms, river flooding, dam failure, tornadoes, public health emergency, wildfires, infrastructure failure, terrorism/acts of violence, pipeline accidents, hazardous materials releases, and oil and gas wells.

Goals of the 2018 plan were to enhance public protection from weather hazards, improve and expand public warning capabilities, promote wildfire protection, protect public infrastructure and facilities from flooding and implement strategies to make the whole community flood-resilient, and improve public awareness of hazardous material emergencies and related safety procedures.

The new plan will add two more goals to that list: improve public awareness of high-hazard dams and improve public awareness of public health emergencies. Public comments on the draft plan have presented additional concerns for hazardous materials and sheltering in place education.

The draft will go to the State of Michigan and the Federal Emergency Management Authority for approval before returning to be approved by the County and other local jurisdictions.

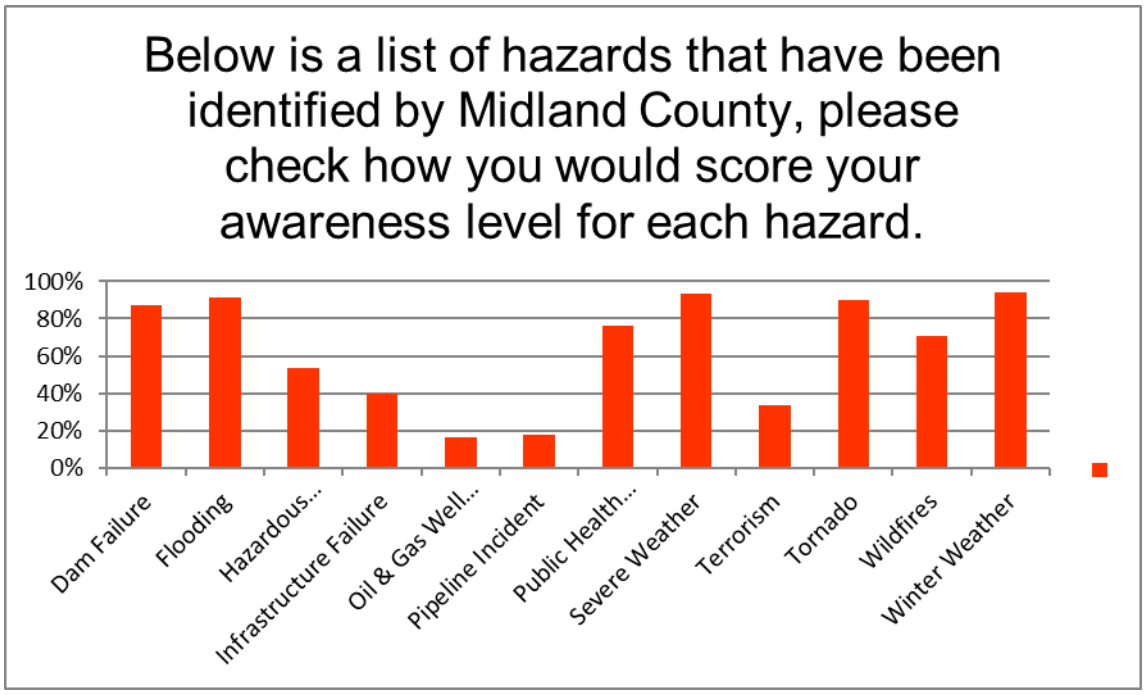
"(The Hazard Mitigation Plan) is a lot of effort, it takes up a lot of space on a desk, but when things are happening and people are looking for, 'Where do we go and what do we do when the wolf is coming?' it's nice to have that plan in place and knowing that there are dedicated people working to safeguard," Commissioner Steve Glaser said.

Public Survey Results

COUNTY OF MIDLAND MICHIGAN
OFFICE OF EMERGENCY MANAGEMENT

2024 Midland County Hazard Mitigation Plan Update

1. Below is a list of hazards that have been identified by Midland County, please check how you would score your awareness level for each hazard.



2. Please list any other hazards that Midland County should consider in the Hazard Mitigation Plan.

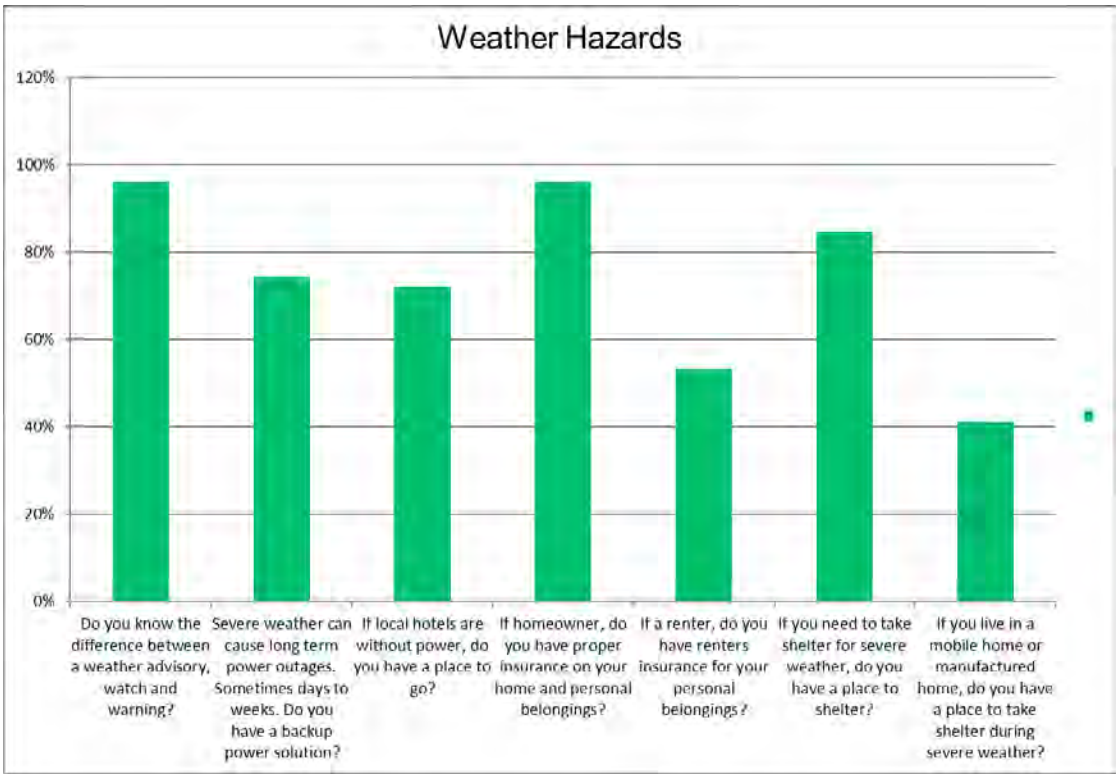
- Extended power outages
- If the proposed BESS (Battery Energy Storage System) is approved in Midland Township, safety regarding potential fire and lithium gas release should be addressed.
- Agriculture chemicals
- How to inform those without cell service or with hearing loss (on the case of tornado sirens).
- More planning with Dow Emergency Services.
- Illegal Immigrants
- Effects of Dow chemical on local watershed
- Dow chemical releases...be more upfront and inform residents in a timely manner
- Over the road chemical hazmat incidents
- Dow Chemical releases
- Any Dow chemical release. Gas leaks, contamination of water or pipeline break near your home.
- Frequent power failures- consumers issue……

3. Below is a list of existing mitigation goals and objectives. Are there any other goals or objectives you think should be considered in review or update of the plan?

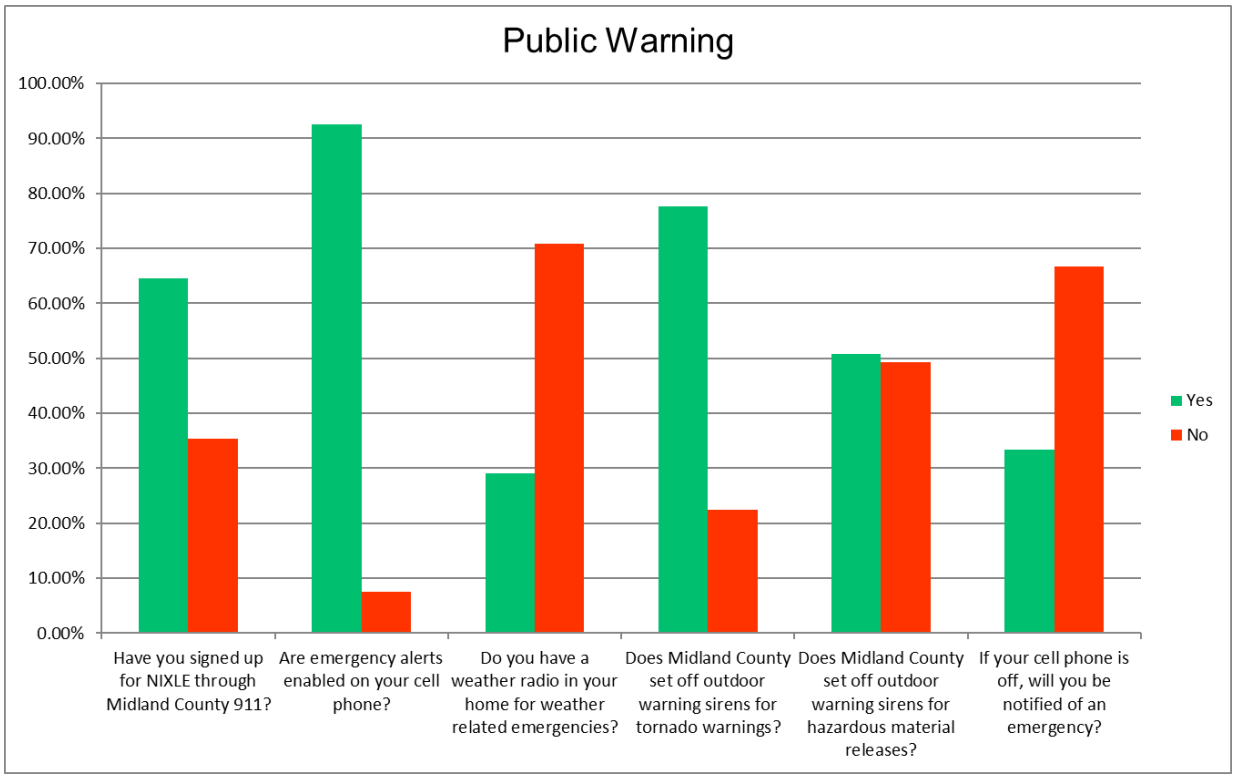
#1 Enhance public protection from weather hazards.
#2 Improve and expand public warning capabilities.
#3 Promote wildfire protection in the urban/wild land interface.
#4 Protect public infrastructure and facilities from flooding and implement strategies to make the whole community flood resilient.
#5 Improve public awareness of hazardous material emergencies and related safety procedures.
#6 Improve public awareness of high hazard dams in the community.
#7 Improve public awareness of public health emergencies.

- Perhaps #7 covers this, but Dow CHEMICAL is a potential huge hazard should there be an explosion there. Think of all the pipelines in that place. What do residents do in the unlikely event of an explosion?
- #4 & #7
- Given the locale, Number 5 needs to be at the top.
- #8 Where large #s people shelter in place.
- Improve and expand public warning capabilities, Improve public awareness of hazardous material emergencies and related safety procedures.

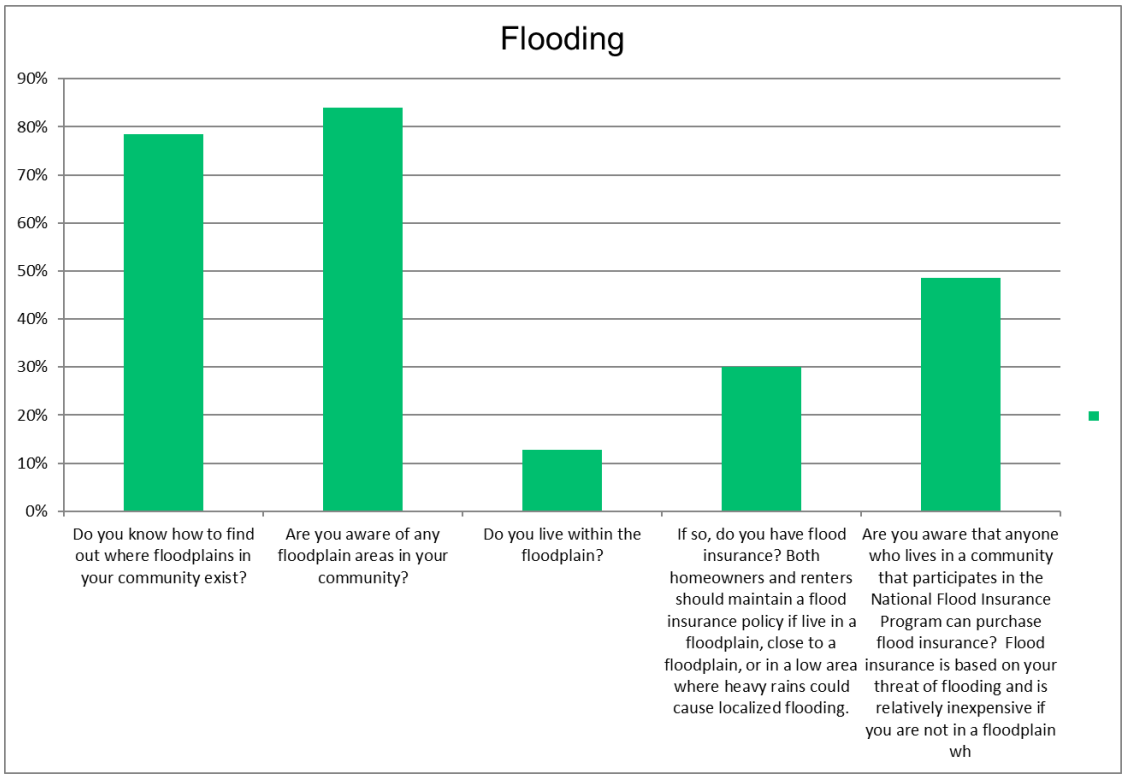
4.


Weather Hazards
120%
100%
80%
60%
40%
20%
0%
Do you know the difference between a weather advisory, watch and warning?
Severe weather can cause long term power outages. Sometimes days to weeks. Do you have a backup power solution?
If local hotels are without power, do you have a place to go?
If homeowner, do you have proper insurance on your home and personal belongings?
If a renter, do you have renters insurance for your personal belongings?
If you need to take shelter for severe weather, do you have a place to shelter?
If you live in a mobile home or manufactured home, do you have a place to take shelter during severe weather?

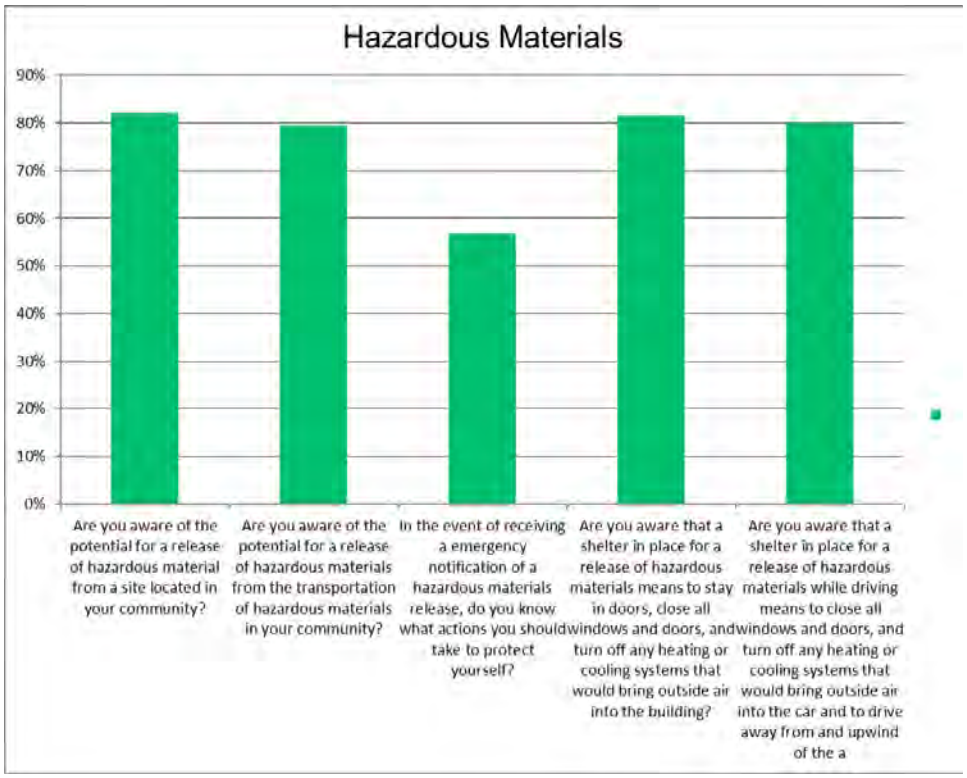
5.


Public Warning
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Have you signed up for NIXLE through Midland County 911?
Are emergency alerts enabled on your cell phone?
Do you have a weather radio in your home for weather related emergencies?
Does Midland County set off outdoor warning sirens for tornado warnings?
Does Midland County set off outdoor warning sirens for hazardous material releases?
If your cell phone is off, will you be notified of an emergency?
Yes
No

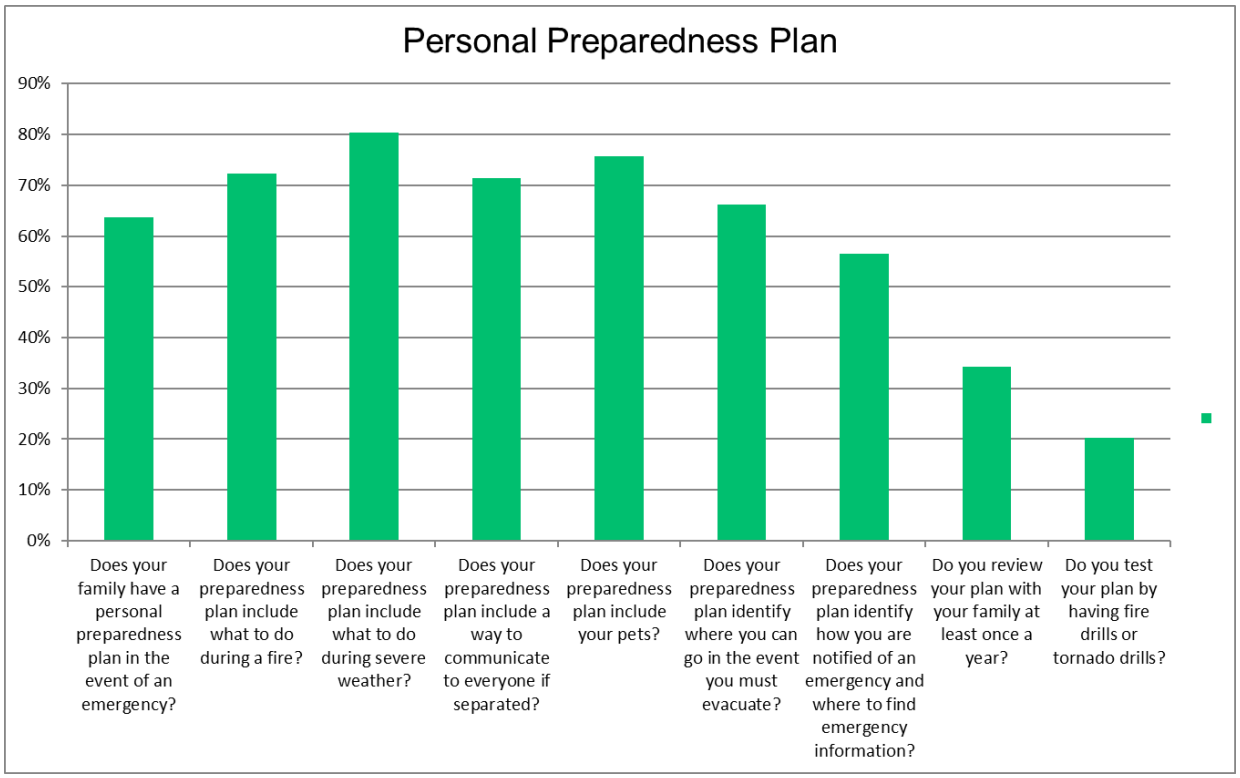
6.


Flooding
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Do you know how to find out where floodplains in your community exist?
Are you aware of any floodplain areas in your community?
Do you live within the floodplain?
If so, do you have flood insurance? Both homeowners and renters should maintain a flood insurance policy if live in a floodplain, close to a floodplain, or in a low area where heavy rains could cause localized flooding.
Are you aware that anyone who lives in a community that participates in the National Flood Insurance Program can purchase flood insurance? Flood insurance is based on your threat of flooding and is relatively inexpensive if you are not in a floodplain wh

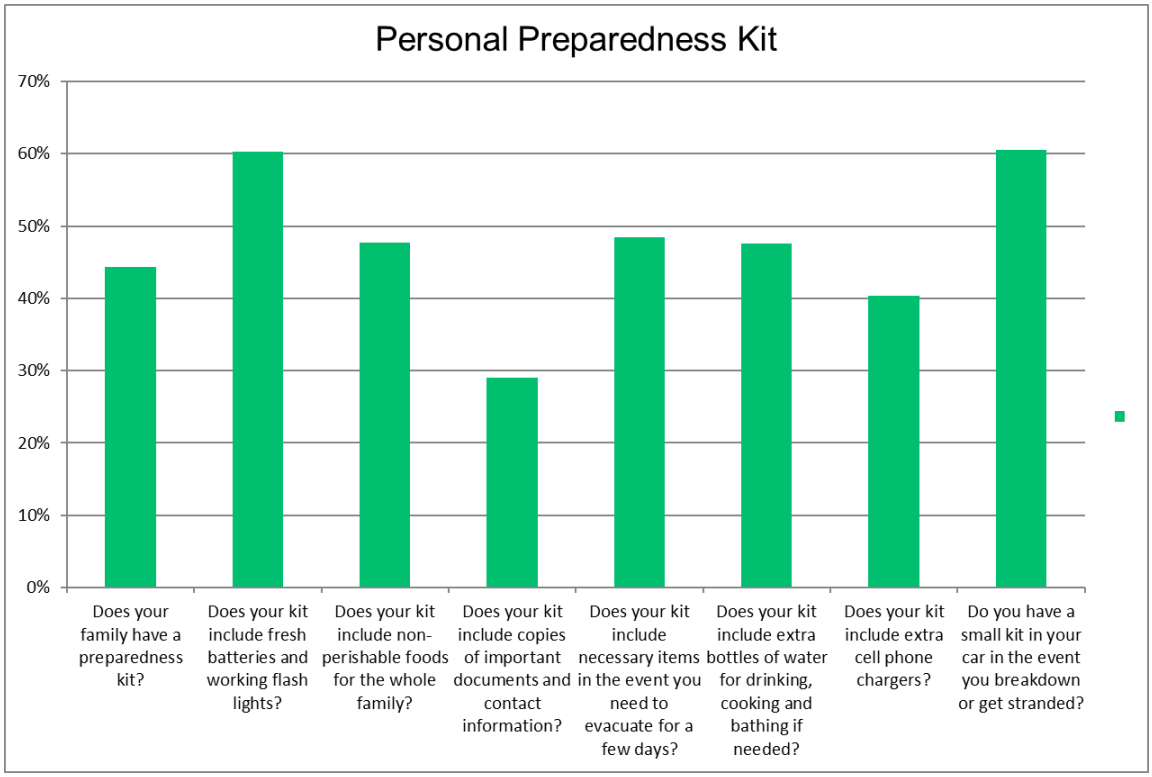
7.


Hazardous Materials
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Are you aware of the potential for a release of hazardous material from a site located in your community?
Are you aware of the potential for a release of hazardous materials from the transportation of hazardous materials in your community?
In the event of receiving a emergency notification of a hazardous materials release, do you know what actions you should take to protect yourself?
Are you aware that a shelter in place for a release of hazardous materials means to stay in doors, close all windows and doors, and turn off any heating or cooling systems that would bring outside air into the building?
Are you aware that a shelter in place for a release of hazardous materials while driving means to close all windows and doors, and turn off any heating or cooling systems that would bring outside air into the car and to drive away from and upwind of the a

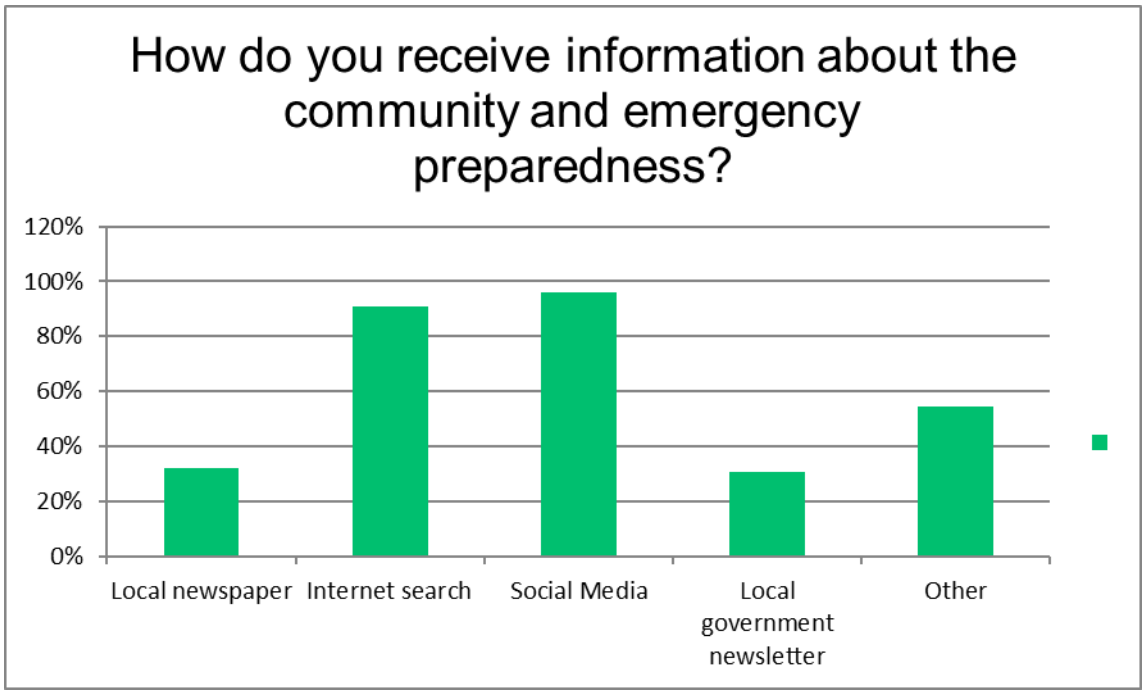
8.


Personal Preparedness Plan
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Does your family have a personal preparedness plan in the event of an emergency?
Does your preparedness plan include what to do during a fire?
Does your preparedness plan include what to do during severe weather?
Does your preparedness plan include a way to communicate to everyone if separated?
Does your preparedness plan include your pets?
Does your preparedness plan identify where you can go in the event you must evacuate?
Does your preparedness plan identify how you are notified of an emergency and where to find emergency information?
Do you review your plan with your family at least once a year?
Do you test your plan by having fire drills or tornado drills?

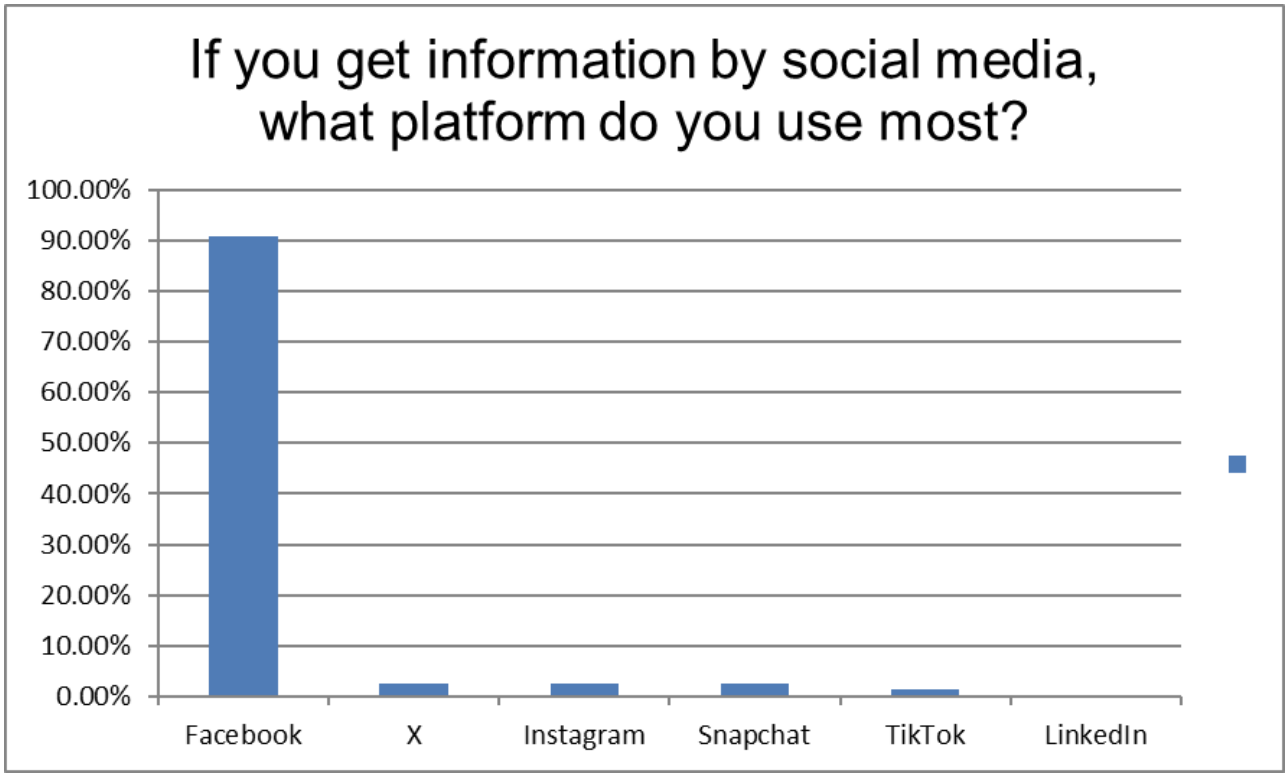
9.


Personal Preparedness Kit
70%
60%
50%
40%
30%
20%
10%
0%
Does your family have a preparedness kit?
Does your kit include fresh batteries and working flash lights?
Does your kit include non-perishable foods for the whole family?
Does your kit include copies of important documents and contact information?
Does your kit include necessary items in the event you need to evacuate for a few days?
Does your kit include extra bottles of water for drinking, cooking and bathing if needed?
Does your kit include extra cell phone chargers?
Do you have a small kit in your car in the event you breakdown or get stranded?

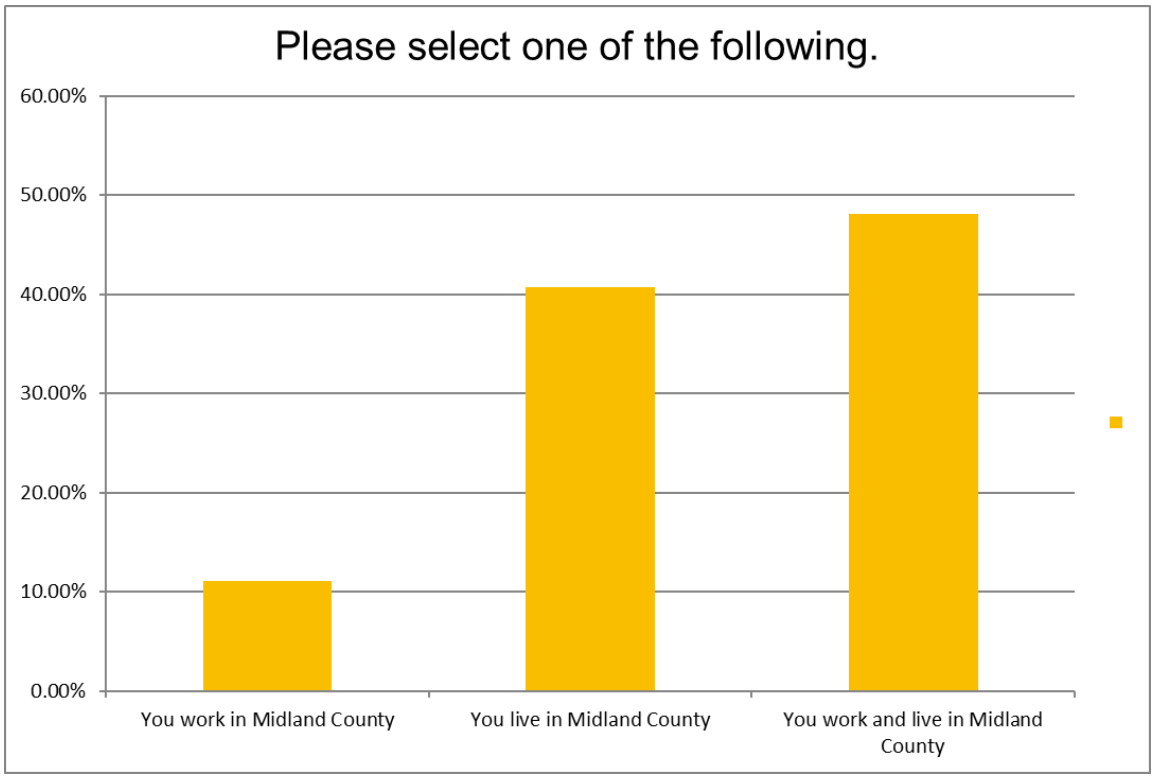
10.


How do you receive information about the community and emergency preparedness?
120%
100%
80%
60%
40%
20%
0%
Local newspaper
Internet search
Social Media
Local government newsletter
Other

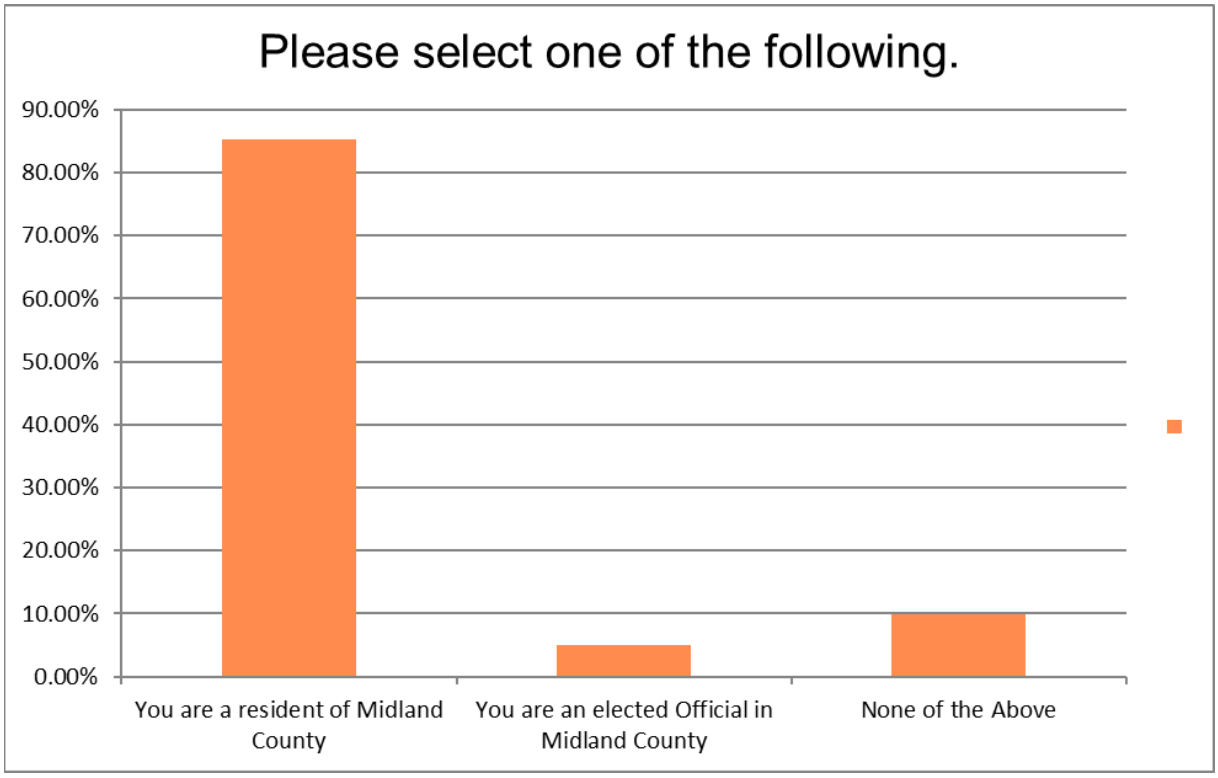
11.


If you get information by social media, what platform do you use most?
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Facebook
X
Instagram
Snapchat
TikTok
LinkedIn

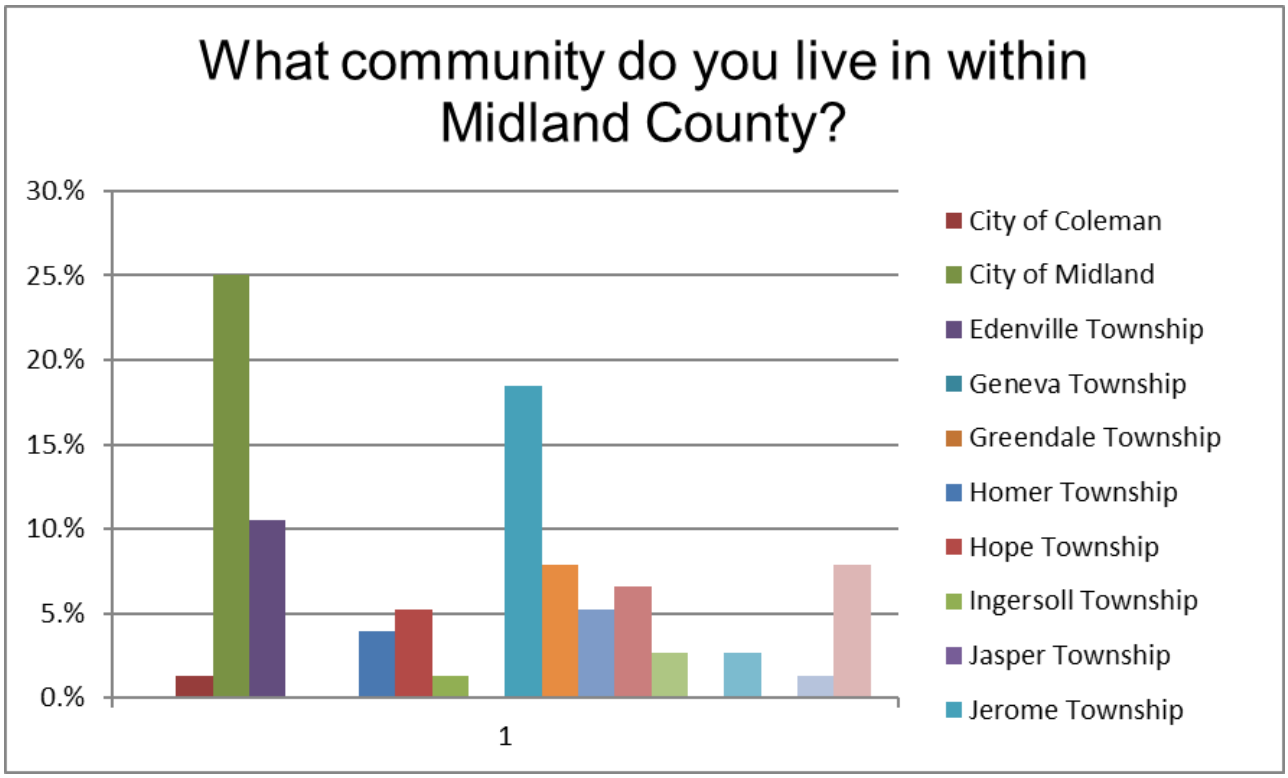
12.


Please select one of the following.
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
You work in Midland County
You live in Midland County
You work and live in Midland County

13.


Please select one of the following.
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
You are a resident of Midland County
You are an elected Official in Midland County
None of the Above

14.


What community do you live in within Midland County?
30.%
25.%
20.%
15.%
10.%
5.%
0.%
1
City of Coleman
City of Midland
Edenville Township
Geneva Township
Greendale Township
Homer Township
Hope Township
Ingersoll Township
Jasper Township
Jerome Township

MIDLAND COUNTY
2023 HAZARD MITIGATION PLAN UPDATE
ADOPTION RESOLUTION

WHEREAS, Midland County, Michigan has experienced disasters that have damaged commercial, residential and public properties; displaced citizens and businesses, closed streets and bridges, and threatened the health and safety of the general public; and

WHEREAS, the County of Midland has reviewed and updated the Hazard Mitigation Plan on the five-year cycle as required; and

WHEREAS, the updated Hazard Mitigation Plan that outlines options to reduce overall damage and impact from natural hazards; and

WHEREAS, opportunities to review and comment on Hazard Mitigation Plan have been provided to the public, and local, State and Federal agencies; and

WHEREAS, the Midland County Hazard Mitigation Plan dated May 2024 was adopted by the Midland County Board of Commissioners on September 3, 2024 and has received official approval from the Federal Emergency Management Agency,

NOW, THEREFORE, BE IT RESOLVED THAT,

The MIDLAND COUNTY HAZARD MITIGATION PLAN is hereby adopted this _____ day of _____ 2024 as and official plan of Midland County, Michigan.

_____
Ann Manary, County Clerk

_____
James Stamas
County Board of Commissioners, Chairperson