LENAWEE COUNTY HAZARD MITIGATION PLAN

FEMA Review Version

ACKNOWLEDGEMENTS

LENAWEE COUNTY BOARD MEMBERS

Dawn Bales
Karol Bolton
Terry Collins
James Goetz
Nancy Jenkins-Arno
Bob Knoblauch
Dustin Krasny (2021-)
John Lapham (2020-2021)
David Stimpson
Ralph Tillotson
Chris Wittenbach

PARTICIPATING LENAWEE COUNTY MUNICIPAL REPRESENTATIVES

Dave Aungst, Lieutenant, Lenawee County Sheriff Dept, Asst Fire Chief, Village of Addison, Rollin Twp Designee
Troy Bevier, Lenawee County Sheriff
Joe Brezvai, Deputy Drain Commissioner, Lenawee County Drain Comm.
Brent Coker, Police Chief City of Tecumseh
Robin Conner, City Clerk, City of Adrian
Dave Craig, Weighmaster, Lenawee County Road Commission
Kyle Cupp, Fire Chief, Fairfield Twp (2020-2021)
Scott Damon, Fire Chief, Cambridge Twp
Irma David, Supervisor, Rollin Twp
Vince Emrick, Police Chief, City of Adrian
Jenny Escott, Drain Commissioner, Lenawee County Drain Comm.
Steve Hartsel, City Manager, City of Hudson (2020-2021)
Ron Keck, Hudson Police Dept. Sergeant (2020-2021), Police Chief (2021-)
Debra Keller, Township Clerk, Fairfield Twp
Aric Massingill, Fire Chief, City of Adrian
Cindy Merritt, Deputy Environmental Health Director, Lenawee County Health Dept.
David Mitchell, Engineer, Lenawee County Drain Comm.
Ryan Rank, Fire Chief, Madison Twp (2020-2022)/Acting Fire Chief Fairfield Twp (2021-2022)
Matt Richardson, IT Director, Lenawee County
Ed Scheffler, Deputy Drain Commissioner, Lenawee County Drain Comm.
Mike Shadbolt, Police Chief, Madison Twp
Craig Tanis, Emergency Management Coordinator, Lenawee County
Larry VanAlstine, Deputy Police Chief, City of Adrian
Charles Weir, Hudson, Police Chief (2020-2021), City Manager (2021-)
Nic Wilson, Madison Twp Fire Chief (2022-) /Acting Fire Chief Fairfield Twp (2022-)
Derrick Wilt, GIS Technician, Lenawee County
Dale Witt, Supervisor, Raisin Township

Other Contributors

Mario Bernado, Manager, Great Lake Security
Cyndy Birdwell, Director of Public Safety, Siena Heights University
Joanne Dennis, President, Signal 88 Security
Bill Ernat, Program Manager, East Michigan Council of Governments
Tina Golembiewski, Trauma and Emergency Management Coordinator, ProMedica Hospital
Mark Haag, Lenawee Schools Superintendent Lenawee Intermediate School District (LISD)
Chris Howard, LISD Safety Officer
Joe Malak, Airport Manager, Lenawee County
Jim VanDoren, Executive Director, Lenawee NOW
Jeff Yonker, District 1 Coordinator/Lt, MSP-EMHSD

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MAPS

ACRONYM

ACE	Army Corps of Engineers
ARPA	American Rescue Plan Act
BEAD	Broadband Equity Access and Deployment
CDC	Center for Disease Control
CMAS	Commercial Mobile Alert System
CMI	Crop Moisture Index
CRS	Community Rating System
DHS	United State Department of Homeland Security
EAP	Emergency Action Plan
EAS	Emergency Alert System
EF	Enhanced Fujita
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EMCOG	East Michigan Council of Governments
EMC	Emergency Management Coordinator
EMWIN	Emergency Managers Weather Information Network
EOC	Emergency Operations Center
EPZ	Emergency Planning Zone
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information System
HHS	United States Department of Health and Human Services
HMEP	Hazardous Materials Emergency Preparedness
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HSGP	Homeland Security Grant Program

HSPD	Homeland Security Presidential Directive
IPAWS	Integrated Public Alert & Warning System
IWIN	Interactive Weather Information Network
KPH	Kilometers Per Hour
LCHAC	Lenawee County Hazard Advisory Committee
LEIN	Law Enforcement Information Network
LEPC	Local Emergency Planning Committee
LPT	Local Planning Team
MDA	Michigan Department of Agriculture
MDARD	Michigan Department of Agriculture & Rural Development
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MIRIS	Michigan Resource Information System
MIWFPA	Michigan Interagency Wildland Fire Protection Association
MMR	Mobile Medical Response
MPH	Miles Per Hour
MPSC	Michigan Public Service Commission
MSP	Michigan State Police
MSP/EMHSD	Michigan State Police/Emergency Management Homeland Security Division
NA	Not Applicable
NCEI	National Center for Environmental Information
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NID	National Inventory of Dams
NIMS	National Incident Management System
NLSI	National Lightning Safety Institute
NOAA	National Oceanic and Atmospheric Administration
NRT	National Response Team
NTSB	National Transportation Safety Board
NWS	National Weather Service
OEM	Office of Emergency Management
PDD	Presidential Decision Directive
PEAS	Pollution Emergency Alerting System
RCRA	Resource Conservation and Recovery Act
RRTN	Regional Response Team Network
SARA	Superfund Amendments and Reauthorization Act
SHSP	State Homeland Security Program
SNS	Strategic National Stockpile
TBD	To Be Determined
USDOT	United States Department of Transportation
USDOT/OHMS	United States Department of Transportation, Office of Hazardous Materials Safety
USGS	United States Geological Survey
WMD	Weapons of Mass Destruction

CHAPTER 1: INTRODUCTION

Lenawee County is located in southeastern Michigan on the Ohio border. Bordered by Jackson and Washtenaw Counties to the north, Hillsdale County to the west, Lucas, and Fulton Counties (Ohio) to the south, and Monroe County to the east. Officially created by the Michigan Territory in 1822, Lenawee County was formally organized in 1826. The County encompasses approximately 761 square miles or 487,040 acres. The 2021 population estimate, as provide through ESRI for Lenawee County was 109,651, which was an increase of 9,759 from the 2010 census of 99,892. The density of Lenawee County is 144 persons per square mile. Lenawee County consists of four (4) cities, and eight (8) villages, and 22 townships for a total of 34 municipalities.

Regarded as a predominantly rural county with agricultural land occupying approximately 385,784 acres or 79 percent of the land within the County. The County ranks seventh in Michigan for crop production and third in the production of grains. [1]

North-south access is provided by M-52, which traverses through the middle of the County. East-West access is provided by M-50 in the northern portion of the County and US-223, which extends from the southeast portion of the County to the northwest portion of the county, and M-34, located in the middle of the County.

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, societal, and technological hazards. Hazard mitigation, along with preparedness, response, and recovery comprise the four phases of emergency management. There is a cyclical relationship between these four phases of emergency management: a community prepares for disaster, including hazard mitigation activities, and then responds to a disaster when it occurs. Following the response there is a transition into the recovery process, during which hazard mitigation measures can be evaluated and adopted. This in turn, improves the resilience of the community for the next incident, and so on. When successful, hazard mitigation will lessen future impacts to such a degree that succeeding occurrences will remain incidents and not become disasters.

Hazard mitigation strives to reduce the impact of hazards on people and property through the coordination of resources, programs, and authorities so that, at the very least, communities do not contribute to the increasing severity of the problem. When repairs and reconstruction are completed as quickly as possible to pre-disaster conditions, then pre-disaster conditions may simply result in a cycle of repeated damages. However, post-disaster repairs and reconstruction provide an opportunity to strengthen a community's resilience. Recovery projects can rebuild in a safe manner, informed by the lessons of past disasters, so that future disasters will not have as much of an impact.

Hazard mitigation is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction take place after damages are analyzed, and that more sound, less vulnerable conditions are produced. Through a combination of regulatory, administrative, and engineering approaches, losses

[1] 2017 Census of Agriculture

can be limited by reducing susceptibility to damage. Hazard mitigation provides the mechanism by which communities and individuals can break the cycle of damage, reconstruction, and damage again.

Recognizing the importance of reducing community vulnerability to natural and technological hazards, Lenawee County is actively addressing the issue through the development and subsequent implementation of this plan. The many benefits to be realized from this effort-protection of the public health and safety, preservation of essential services, prevention of property damage, and preservation of the local economic base, to mention just a few-will help ensure that Lenawee County remains a vibrant, safe, and enjoyable place in which to live, raise a family, and conduct business.

Under the Disaster Mitigation Act of 2000, state and local governments are required to develop individual hazard mitigation plans in order to be eligible for hazard mitigation funding from the federal government. This plan was prepared in accordance with the following Federal Emergency Management Agency (FEMA) and Michigan State Police documents: Local Mitigation Planning Handbook (FEMA) and the Local Mitigation Plan Review Guide, and the Michigan State Police Emergency Management and Homeland Security Division (MSP/EMHSD) publication 207: Local Hazard Mitigation Planning Workbook.

The Lenawee County Hazard Mitigation Plan ("Plan") serves as the foundation for hazard mitigation activities within the community. Implementation of the Plan's recommendations will assist in the reduction of injuries, loss of life, and destruction of property due to natural and technological hazards. The Plan provides a path toward continuous, proactive reduction of vulnerability to the most frequent hazards that result in repetitive and often severe social, economic and physical damage. The ideal end state would be the total integration of hazard mitigation activities, programs, capabilities, and actions into normal, day-to-day governmental functions and management practices.

The Lenawee County Emergency Management Coordinator and the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) worked with the East Michigan Council of Governments (EMCOG) and the MSP/EMHSD to develop this Plan. The intent of the Plan is to work with those most familiar with Lenawee County to describe the County, and to create an action plan to protect the health, safety, and economic interests of residents through hazard mitigation, planning, awareness, and implementation.

In the Plan, the hazard analysis section describes the hazards that impact Lenawee County and provides some additional information about hazards that have little to no impact to the residents of the County. The analysis of hazards makes use of community profile information that includes a description of community organization and potential resources. The hazards have been identified as severe weather, cyberterrorism, fires, floods/drought, hazardous material incidents, infrastructure failures, energy emergencies, invasive species, public health emergencies, transportation incidents, seasonal population shifts, civil disturbances, dam failures, nuclear power plant accidents, oil and gas well/pipeline incidents, fog, subsidence. For all of the hazards, the following is provided:

- Description of the hazard;
- An overview of significant events of the hazard;
- Explanation of how it affects the County; and
- An action plan that identifies projects to address the hazards to mitigate their impact on the County and its residents.

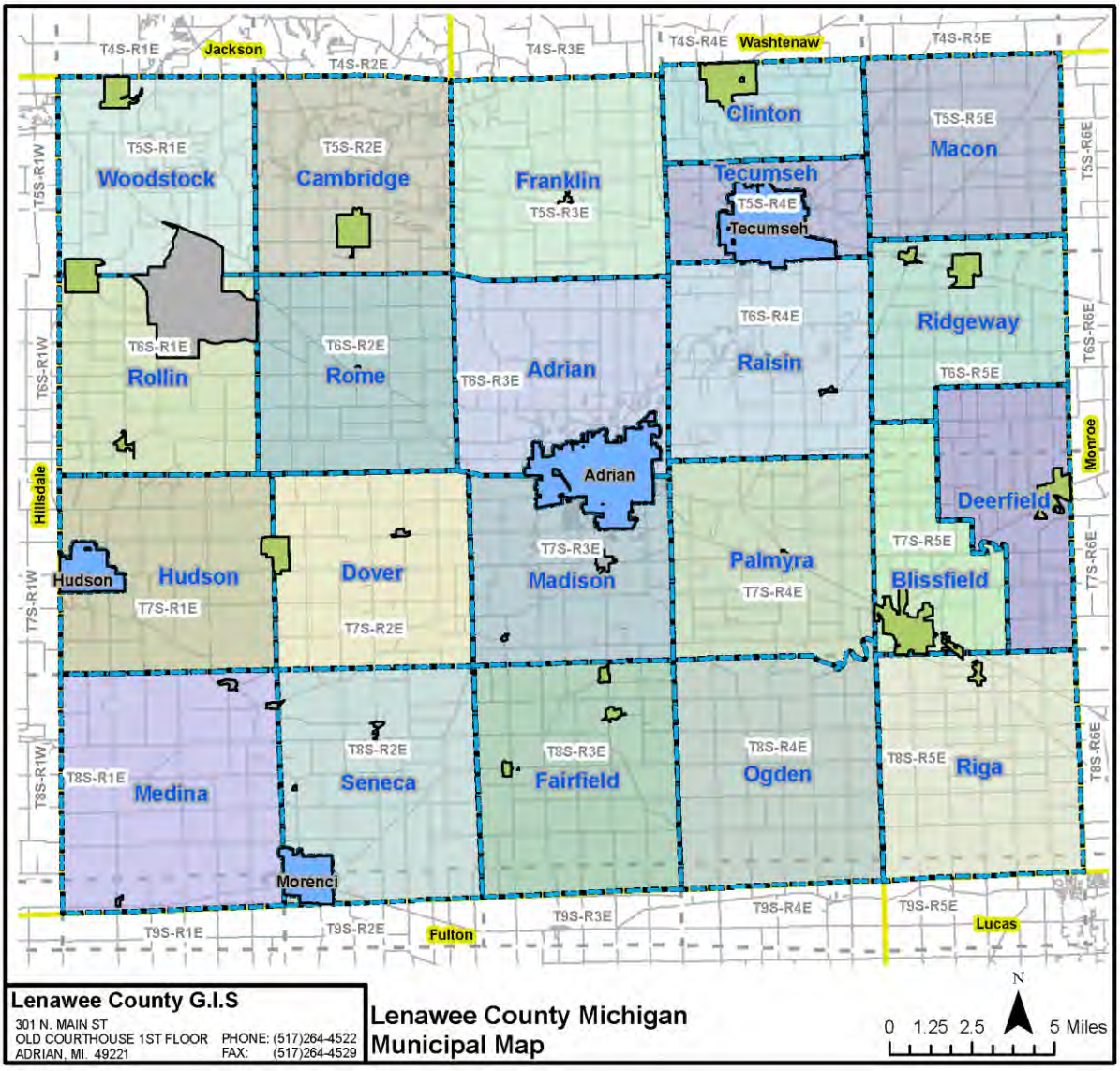
This new Plan updates the previous Lenawee County Hazard Mitigation Plan that was approved in 2012. This update process began in 2020, as FEMA requires that the Hazard Mitigation Plan be updated every five (5) years in order to be eligible for FEMA funded mitigation grants. This document has been modified so that it will be easier to utilize information contained within it. This should be helpful for stakeholders to more easily review the information that is most relevant for their jurisdictions and areas of expertise/ interest.

Certain information that is considered confidential or too sensitive for widespread public distribution has been kept out of this document and will only be distributed at the discretion of the Lenawee County Office of Emergency Management.

This Plan is the culmination of an interdisciplinary and interagency planning effort that required the assistance and expertise of numerous agencies, organizations, and individuals. Without their technical assistance and contributions of time and ideas this plan could not have been completed.

Lenawee County Municipal Government Map

MAP 1.1



Executive Summary

The Lenawee County Hazard Mitigation Plan was created to protect the health, safety, and economic interests of the Lenawee County residents and businesses by reducing the impacts of natural and technological hazards through hazard mitigation planning, awareness, and implementation. The Plan serves as the foundation for hazard mitigation activities and actions within Lenawee County. Implementation of recommendations will reduce loss of life, destruction of property, and economic losses due to natural and technological hazards. The Plan provides a path toward continuous, proactive reduction of vulnerability to hazards which result in repetitive and often times severe social, economic, and physical damage. The ideal end state is full integration of hazard mitigation concepts into day-to-day governmental and business functions and management practices.

This plan employs a broad perspective in examining multi-hazard mitigation activities and opportunities in Lenawee County. Emphasis is placed on hazards which have resulted in threats to the public health, safety, and welfare, as well as the social, economic, and physical fabric of the community. This plan addresses such hazards as floods, tornadoes, windstorms, winter storms, forest fires, structural fires, hazardous material incidents and secondary technological hazards which result from natural hazard events. Each hazard is analyzed from a historical perspective, evaluated for potential risk, and considered for possible mitigative action. The Plan also lays out the legal basis for planning and the tools to be used for its implementation.

Local Units of Government

While the Hazard Mitigation Plan was initiated by Lenawee County, it involved the participation of the communities within the County. The participating communities can be found on Table 1.1 on page 6. Lenawee County's thirty-four (34) communities consist of four cities, eight villages, and 22 Townships. The communities are listed below:

Cities

Adrian, Hudson, Morenci, and Tecumseh

Villages

Addison, Blissfield, Britton, Cement City, Clayton, Clinton, Deerfield, and Onsted

Townships

Adrian, Blissfield, Cambridge, Clinton, Deerfield, Dover, Fairfield, Franklin, Hudson, Macon, Madison, Medina, Ogden, Palmyra, Raisin, Ridgeway, Riga, Rollin, Rome, Seneca, Tecumseh, and Woodstock

Lenawee County Community Information

Table 1.1

Community Name	2010 pop.	2020 pop. (Est)	Change %	Participated in the 2012 Plan	Currently a participant in 2023 plan	NFIP participant	NFIP map date
Lenawee County	99,892	99,423	-0.5%	YES	YES		
City of Adrian	21,133	20,649	-2.3%	YES	YES	YES	8-15-19
City of Hudson	2,307	2,423	5.0%	YES	YES	YES	8-15-19
City of Morenci	2,220	2,271	2.3%			NF	
City of Tecumseh	8,521	8,673	1.8%	YES	YES	YES	8-15-19
Village of Addison	605	599	-1.0%		YES	NF	
Village of Blissfield	3,340	3,324	-0.5%	YES		YES	8-15-19
Village of Britton	586	577	-1.5%			NF	
Village of Cement City	405	379	4.7%	YES		S	
Village of Clayton	344	322	-6.4%			NF	
Village of Clinton	2,336	2,525	8.1%	YES	YES	YES	8-15-19
Village of Deerfield	898	911	1.4%		YES	YES	8-15-19
Village of Onsted	917	1,002	9.3%			NF	
Adrian Township	6,035	6,401	6.1%			YES	8-15-19
Blissfield Township	641	605	-5.6%	YES	YES	YES	8-15-19
Cambridge Township	4,816	4,722	-2.0%		YES	YES	8-15-19
Clinton Township	1,268	1,235	-2.6%	YES	YES	YES	8-15-19
Deerfield Township	670	590	-11.9%	YES	YES	YES	8-15-19
Dover Township	1,663	1,505	-9.5%	YES		NF	
Fairfield Township	1,764	1,666	-5.6%	YES		NF	
Franklin Township	3,174	3,061	-3.6%	YES		YES	8-15-19
Hudson Township	1,324	1,332	0.6%	YES	YES	YES	8-15-19
Macon Township	1,486	1,327	-10.7%	YES	YES	YES	NSFHA
Madison Township	8,621	8,455	-1.9%	YES	YES	YES	8-15-19
Medina Township	1,090	1,118	2.6%	YES	YES	NF	
Ogden Township	973	913	-6.2%	YES	YES	S	
Palmyra Township	2,076	2,016	-2.9%	YES	YES	YES	8-15-19
Raisin Township	7,559	7,896	4.5%	YES	YES	S	
Ridgeway Township	956	957	0.1%			NF	
Riga Township	1,406	1,289	-8.3%	YES	YES	S	8-15-19
Rollin Township	2,840	2,658	-6.4%	YES	YES	NF	
Rome Township	1,791	1,820	1.6%	YES		S	8-15-19
Seneca Township	1,230	1,145	-6.9%			NF	
Tecumseh Township	1,972	2,047	3.8%	YES		S	8-15-19
Woodstock Township	2,925	3,010	2.9%	YES	YES	YES	8-15-19

Population Sources: 2010 U.S. Census, 2020 U.S. Census Estimates

NFIP Participation Information

YES-Participant-agency has chosen to participate in the NFIP. Residents within the municipality can purchase flood insurance at a lower rate.

S-Sanctioned-agency has chosen not to participate in the NFIP.

NSFHA-Non-Special Flood Hazard Area-a low to moderate risk flood zone, flood insurance is available at a lower rate

NF-no flood zone is within the municipality; flood insurance is available to the residents.

CHAPTER 2: THE PLANNING PROCESS

Lenawee County Emergency Management Coordinator (EMC) Craig Tanis contacted Bill Ernat, East Michigan Council of Governments (EMCOG) Program Manager regarding the possibility of updating the Lenawee County Plan. Bill advised Craig that in Lenawee County is out of EMCOG's jurisdiction and in order to do the update, Region 2 Planning Commission would have to approve. This approval was given, and the update process began with the Lenawee County Emergency Management hosting a virtual meeting with East Michigan Council of Governments (EMCOG) staff that was open to the public. The purpose of that meeting was to advise the public and Lenawee County representatives of the need to update the 2012 Lenawee County Hazard Mitigation Plan (Plan) and the process that would be utilized. Invitations were sent out to all county municipalities, school districts, the two local universities, local businesses, and local hospitals. In addition, the meeting notices were posted on the Emergency Management and Lenawee County websites, and the bulletin board at the County Administration Building.

This update was made possible after EMCOG staff submitted a grant on behalf of the County and was awarded a grant from the Federal Emergency Management Agency (FEMA) through the Michigan State Police. EMCOG staff worked with the Craig Tanis and the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) made up of individuals representing municipalities, school districts, local universities, local businesses, and local medical officials.

To further promote the update and general participation, two surveys were made available via the internet. One survey was made available to the general public and the second survey was sent to local municipalities. The residential survey sought information on the impact of hazards to their individual properties and what actions, if any, they have taken to mitigate the impacts of the hazards. The survey and the responses can be found in Appendix D. The municipal survey sought information on the hazards and how they impacted the Municipality and sought feedback on actions to mitigate their impact. A copy of the survey and the responses are included in Appendix C.

Due to the COVID-19 pandemic all meetings for the update were done virtually. Through a series of virtual meetings that were open to the public, the EMC and EMCOG staff directed the LCHMAC through an assessment of the Plan in order to determine what changes, if any, would be necessary for the update. The LCHMAC and municipal officials were provided meeting agendas and any accompanying memos regarding the Plan update the week before each meeting, at which time the agendas were also posted on the Emergency Management website and a public bulletin board at the Lenawee County Building, located at 301 N. Main Street, Adrian, MI. The following table (Table 2.1) identifies the meeting dates, locations, and subject matter for the LCHMAC. At the end of this chapter are two tables identifying the agencies represented at the meetings (Table 2.2) and the individuals at each meeting (Table 2.3). Appendix A includes the virtual meeting attendance sheets for all the public meetings for this update.

Lenawee County Hazard Mitigation Advisory Committee Meeting Schedule/Discussion Topic

TABLE 2.1

Meeting Date	Meeting Location	Discussion Topic(s)
9-15-20	Virtual Meeting	The meeting began at 2 pm with the Craig Tanis, Emergency Management Coordinator for Lenawee County welcoming everyone and stating it was important to have public participation throughout the update process. A total of 28 persons were in attendance. He then turned the meeting over to Bill Ernat, Program Manager for the East Michigan Council of Governments, who will write the update, based on the input from the Lenawee County representatives. Bill provided an overview of the process with the advisory committee (attendees of future meetings) identifying the hazards, prioritizing them based on risk they pose, impact they have on the County, and the county's vulnerability. Bill said the Committee will also review the 2012 Lenawee County Hazard Mitigation Plan and update the goals and objectives, review the status of the previously identified projects, and develop a new list of projects. Finally, they will develop an annual review process. Once the Plan is considered complete it will be submitted to MSP EMHMD for their review and upon their approval will be submitted to FEMA for final approval. There were no questions at this time and the meeting was adjourned.
10-16-20	Virtual Meeting	Craig Tanis welcomed the advisory committee members had them introduce themselves before turning the meeting over to Bill Ernat. (It should be noted that many of the attendees also attended the public meeting in September and the project overview was not needed at this time.) Bill stressed the importance of all the municipalities participating in the update process for two reasons: the better the participation the better the information is regarding the hazards, and non-participating municipalities will not be eligible to submit hazard mitigation grant applications to FEMA. He added that participation could happen by attending the advisory committee meetings or by completing a municipal survey, which will be part of the update process. Next the members were asked to identify the hazards that could potentially impact Lenawee County. They had the list of hazards from the 2012 Plan as well as the list of hazards from the 2019 State of Michigan Hazard Mitigation Plan. The Committee chose all the state identified hazards to be considered as potentially impactful and the final decision would be based on risk/ vulnerability analysis. The committee then determined the five factors that would be considered as part of the risk analysis as well

		as the weight of each factor.
11-20-20	Virtual Meeting	Bill reminded all the attendees to submit the match forms, as they are used for the County's 25 percent match. The committee then began to complete the risk assessment using the five criteria and their assessed importance that was identified in October likelihood of occurrence (50%), potential to cause casualties (20%), capacity to cause physical damage (12%), percent of population affected (12%), and size of affected area (6%) with each hazard rated based on the five criteria. The point values were then put into the spreadsheet for review at the next meeting.
12-18-20	Virtual Meeting	The committee met and began discussing the risk assessment table results. Based on the number of occurrences, they decided that tornadoes and severe winds should be addressed separately and provided new values for the two events. They then identified hazards of low impact, which would not require any further evaluation. The other hazards were then identified as either high, medium, or moderate impact hazards, based on the risk assessment. However, several hazards were reclassified after the assessment, based on recent activities. After the discussion on risk assessment, the committee then began discussing significant recent hazardous events. A total of 18 potential events were identified. The meeting adjourned after this discussion, with a reminder that vulnerability assessment would be addressed at the next meeting.
2-19-21	Virtual Meeting	The meeting opened with an invitation to add any other significant events to occur in Lenawee County. There was some clarification to several events, but no new events were added. The committee then proceeded to work on the vulnerability assessment. The committee identified 11 hazards has having a high vulnerability factor, 6 hazards being medium, and 6 hazards being moderate. The committee then identified 5 factors to use to prioritize the importance of the hazards: risk vulnerability, likelihood to occur, capacity to harm people, vulnerability, and available resources to address hazards. This process would begin in March.
3-19-21	Virtual Meeting	The hazard prioritization process was started. Four of the criteria has already been completed, and only the resources available to address the hazards had to be identified. The three factors for this criteria were available, limited available (not sufficient to address hazard completely) and not available. The hazards were then prioritized into one of four categories: high, medium, moderate, and low priorities. The final evaluations will be reviewed at the next meeting to reassess the findings. The committee began a review of the community survey, there was one suggestion to add a signature page. The committee then agreed that a residential survey would be a good addition to the update process. Bill was to provide a draft at the next meeting.

4-16-21	Virtual Meeting	The hazard definitions were reviewed, and cyber crimes was modified to cyberterrorism. The definition was modified accordingly. The hazard prioritization table was reviewed and there were no hazards identified as moderate. It was suggested that drought, nuclear power plant failures, extreme temperatures, and seasonal population changes all be deemed as moderate rather than low hazard priorities. The committee agreed. Goals and objectives were discussed. Bill mentioned that the objectives of the 2012 Plan had no correlation to the goals. He added that FEMA wants a direct correlation between the goals and objectives. The committee then looked at the goals and identified 4 goals for the update. The remaining goals and objectives were then looked at for inclusion under one of the four goals. After completing the exercise, Bill said that he would provide examples of goals and objectives from other FEMA-approved plans for discussion at the next meeting. The Committee agreed.
6-18-21	Virtual Meeting	The goals and objectives were discussed, and examples of other FEMA-approved goals/objectives were provided. Only one additional objective was added to the list. The residential survey was then discussed, and it was determined that open ended questions should be eliminated whenever possible and replaced with multiple choice options. EMCOG will modify the survey and will submit to the Lenawee County EM staff to put out on their website. The next item agenda was the status of the 2012 Plan projects. Committee members were asked to provide an update on the status of the projects as they pertained to their agency. The last item of the meeting was a discussion on new development that have occurred in Lenawee County since 2012. No new subdivisions have been developed since 2012; however, several smaller developments have been completed since then. These will be discussed at a future meeting.
7-20-21	Virtual Meeting	The advisory committee reviewed and approved the list of invasive species as presented. (The list was prepared by Member Cindy Merritt.) The status of the projects from the 2012 Plan were reviewed and approved. Lead agencies for all the projects were identified as they were not identified in the 2012 Plan. The committee also began to identify mitigation strategies to address the hazards. They selected all the strategies from the 2012 Plan as potential strategies.
9-17-21	Virtual Meeting	The meeting opened with an addition to the invasive species list. It was suggested that the spotted lantern fly be added to the list. Even though the fly is not yet in Michigan, it is anticipated to enter the state and be destructive in nature. The next item to be discussed were alternative strategies. (This was a continuation from the July meeting.) EMCOG staff advised the committee that everyday activities should not be included as mitigation strategies. Those items were eliminated. (Craig Tanis and Bill Ernat will review the list and eliminate previously identified everyday

		activities. The next topic of discussion was municipal information that will be included in the Plan update. Several tables had been sent out as part of the agenda packet and that information was being requested. Only three municipalities were in attendance and that information was secured. Lastly, the residential surveys were discussed, and the results were shared. Bill mentioned that 14 municipalities were represented by the respondents.
10-15-21	Virtual Meeting	The mitigation strategies were proposed with the elimination of everyday activities and activities not pertinent to Lenawee County. Bill then mentioned that only eight municipalities have returned their surveys to date, and the municipal information sought for the Plan is lacking. He added that additional municipal information would be beneficial for the Plan. Using the information from the residential and community surveys as well as the initial prioritization of the hazards from the committee, the prioritizations of the hazards were slightly modified and approved.
12-17-21	Virtual Meeting	Final mitigation strategies were approved, based on the comments from previous meetings. A general discussion followed based on the hazards, strategies, and prioritization. Several projects were suggested. Committee members then asked for suggestions. Bill said he would provide suggestions at the next meeting.
1-21-22	Virtual Meeting	Project lists from the 2012 Lenawee County Plan and a list of projects from recently approved FEMA plans were presented to the committee for their review. The committee discussed the merits of each of the 2012 projects and selected those projects from the 2012 Plan that would be appropriate.
2-18-22	Virtual Meeting	The committee looked at the projects from other FEMA-approved plans and discussed the merits of those projects. They selected a number of projects that they believed would benefit Lenawee County.
4-22-22	Virtual Meeting	At this meeting, the committee was provided the revised list. Based on suggestions from both FEMA and MSP staff the list was modified, with regular maintenance items removed, and projects done in phases to accommodate an analysis phase and action phase. The attending members identified the prioritization factor for project selection to be projects based on their impact.
5-20-22	Virtual Meeting	The project information was again discussed. The advisory committee identified the probable cost for each project as well as the potential funding sources. They next determined that the priority of the projects should be based on their impact (benefit) to the community. The projects were then prioritized based on the criteria.
6-17-22	Virtual Meeting	The project priorities were discussed, with similar prioritized projects being compared based on their benefit to the community. As a result first responder training and purchase of equipment was moved from medium priority to high priority. It was determined that the Emergency Management Coordinator

		and EMCOG staff person would meet to identify the potential schedule for each project. They would then bring their recommendations to the Advisory Committee to discuss and approve.
8-22	Phone Call	Prior to the September meeting, EMCOG staff spoke with the MSP EMHSD Planner on the project information as was advised that estimates be provided for project cost and scheduling, when the exact amount or time is not known. EMCOG staff was also advised that the bullet point for schedule could be modified to time frame. This would provide a better overall source for information.
9-9-22	Virtual Meeting	EMCOG staff provided an overview of the changes to the Advisory Committee and the justification for the changes. The members then went over the cost and time frame information and made the appropriate changes. EMCOG staff then stressed the importance of the municipalities to select projects to participate in should funds be made available. Lastly, the advisory committee approved the draft of the annual review process as proposed for Chapter 7.
10-20-22	Virtual Meeting	EMCOG staff advised the attendees that the participating agencies was the last bullet point needed in the Action List information. As there only several municipal representatives present, they will send me their projects, and Craig will contact the remaining participating agencies. The attendees were then advised of what remained to do to complete the draft and the process needed to get final approval of the Plan.
12-09-22	Virtual Meeting	Rough draft of final plan presented to Advisory Committee for their final review/approval. Several changes were recommended, and the municipal tables were completed. The Committee also had several questions on the Plan, which were responded to by the Emergency Management Coordinator. The draft was approved with the changes. The Plan is tentatively planned to go before the Lenawee County Board of Commissioners on January 10, 2023, at a public hearing, which will begin the approval process.

This update process included the review of the Lenawee County Master Plan, the 2019 Michigan Hazard Mitigation Plan, county maps and studies, municipal planning documents, as well as ongoing activities. This included the review of informational sources such as: U.S. Census, National Weather Services, emergency management plans, Michigan Department of Transportation, Michigan Department of Natural Resources, and local health departments.

In July 2022, completed sections of the draft were sent out to LCHMAC members who had previously volunteered to proof draft sections. Their comments were received in July/August and the appropriate changes were incorporated into those sections. A second group of completed sections were sent out in late October to the volunteers. Their comments were returned in November. Again, all appropriate changes were incorporated into the chapters/appendices.

Chapters were proofed by several members of the LCHMAC beginning in July 2022 as they were being completed. Based on feedback from the LCHMAC members, changes were made accordingly to the chapters. At the December 2022 Advisory Committee meeting, the Committee was provided the rough draft of the updated Plan and was asked to review it and send comments to the Emergency Management Coordinator. They were also advised that the Plan would be presented to the County Board of Commissioners on January 11th.

At the County Board of Commissioners meeting, the Plan was presented, and they were advised of the approval process. They accepted the Plan and asked Emergency Management Coordinator, Craig Tanis, to proceed with the approval process and make the Plan available to the public for comment. There were no comments on the Plan at this time.

After the County Board of Commissioners accepted plan draft and approved moving forward in approving the Plan, the Emergency Management Coordinator, Craig Tanis, posted the Plan on the Emergency Management website, posted a notice in the local newspaper, and sent an email to the Emergency Management staff of the neighboring counties with a link to the Plan. Comments from the Advisory Committee were submitted. No comments from the public were received.

As a result of the notices and postings, there were three comments from the general public. Comments included a correction on the population figures, and a correct title to the Michigan Department of Health and Human Services. Additionally, several members of the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) sent in corrections on addresses of municipalities, identified a missing lightning event on the lightning map, questioned the number of sirens, and spelling and grammatical changes. All items were reviewed and corrected accordingly. There were no substantial changes identified by any party.

Lenawee County Hazard Mitigation Advisory Committee

Attendance Table

TABLE 2.2

Participating Agency or Jurisdiction	Returned Survey	Meeting Attended																			
		9-15-20	10-16	11-20	12-18	2-19-21	3-19	4-16	6-18	7-20	9-17	10-15	12-17	1-21-22	2-18	4-22	5-20	6-17	9-9	10-20	12-9
East Michigan Council of Governments		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lenawee County Emergency Management		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
City of Adrian	X	X	X	X		X	X	X		X	X	X		X	X	X	X	X	X	X	X
City of Hudson	X			X	X	X	X	X	X			X	X	X							
City of Tecumseh	X	X	X																		
Village of Addison	X		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Village of Clinton	X																				
Village of Deerfield	X																				
Blissfield Township	X																				
Cambridge Township	X		X	X		X											X				
Clinton Township	X																				
Hudson Township	X																				
Macon Township	X																				
Madison Township	X	X		X	X	X		X	X		X							X			
Medina Township	X																				

Participating Agency or Jurisdiction	Returned Survey	Meeting Attended																			
		9-15-20	10-16	11-20	12-18	2-19-21	3-19	4-16	6-18	7-20	9-17	10-15	12-17	1-21-22	2-18	4-22	5-20	6-17	9-9	10-20	12-9
Ogden Township	X																				
Palmyra Township	X																				
Raisin Township		X																			
Riga Township	X																				
Rollin Township	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Woodstock Township	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	
Lenawee County Sheriff Department		X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	X
Lenawee County Drain Commission		X	X	X	X	X	X	X	X	X	X		X	X	X			X			
Lenawee County Road Commission		X	X	X	X	X	X		X	X		X	X		X					X	X
Lenawee County Airport		X																			
Lenawee County IT			X		X	X	X	X	X	X	X		X			X				X	X
Lenawee County Health Department		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Siena Heights University		X																			
Lenawee NOW		X																			
MSP-EMHSD District 1		X	X	X	X	X		X	X				X	X	X	X	X	X		X	X
Lenawee Schools		X	X	X			X	X	X	X		X		X					X	X	
Signal 88 Security		X																			
ProMedica Hospital		X		X	X	X	X	X	X	X	X			X		X	X		X		X
Great Lakes Security				X	X	X	X	X	X		X		X		X						
FEMA Representative																X					

Lenawee County Hazard Mitigation Advisory Committee Attendance Table

TABLE 2.3

Person	Agency/Position	Number of Meetings Attended (through 9-9)
Dave Aungst	Rollin Twp Rep., Lenawee County Sheriff Dept., Addison Asst. Fire Chief	17
Mario Bernardo	Great Lakes Security Director	9
Troy Bevier	Lenawee County Sheriff	7
Cyndy Birdwell	Siena Heights University Public Safety	1
Joe Brezvai	Lenawee County Deputy Drain Commissioner	13
Brett Coker	City of Tecumseh Police Chief	2
Robin Conner	City of Adrian City Clerk	2
Dave Craig	Lenawee County Road Commission	13
Kyle Cupp	Fairfield Township Fire Chief	3
Scott Damon	Cambridge Township Fire Chief	3
Irma David	Rollin Township Supervisor	2
Joanne Dennis	Signal 88 Security	1
Vince Emrick	City of Adrian Police Chief	12
Bill Ernat	EMCOG Program Manager	20
Jenny Escott	Lenawee County Drain Commission	3
Tina Golembiewski	Pro-Medica Hospital	13
Mark Haag	Lenawee Intermediate School District	1
Steve Hartsel	City of Hudson City Manager	1
Chris Howard	Lenawee Intermediate School District	11
Ron Keck	City of Hudson Police Sergeant	5
Debra Keller	Fairfield Township Clerk	5
Joe Malek	Lenawee County Airport Manager	1
Aric Massingill	City of Adrian Fire Chief	13
Cindy Merritt	Lenawee County Health Department	19
David Mitchell	Lenawee County Drain Commission	1
Sarah Quallmalz	FEMA staff	1
Ryan Rank	Madison Township Fire Chief	6
Mike Richardson	Lenawee County IT	14
Ed Scheffler	Lenawee County Drain Commission	2
Mike Shadbolt	Madison Township Police Chief	2
Craig Tanis	Lenawee County Emergency Mgmt. Coor.	20

Person	Agency	Number of Meetings Attended
Larry VanAlstine	City of Adrian Deputy Police Chief	7
Jim Van Doren	Lenawee NOW	1
Charles Weir	City of Adrian Police Chief	5
Nic Wilson	Madison Twp Fire Chief	1
Dale Witt	Raisin Township Supervisor	1
Jeff Yonker	MSP EMHSD Lt. District 1	16

CHAPTER 3: COMMUNITY PROFILE

NATURAL FEATURES OF LENAWEE COUNTY

Lenawee County is located in the south central portion of the Lower Peninsula. It is bordered by Monroe County to the east, Jackson and Washtenaw Counties to the north, Hillsdale County to the west, and the state of Ohio to the south.

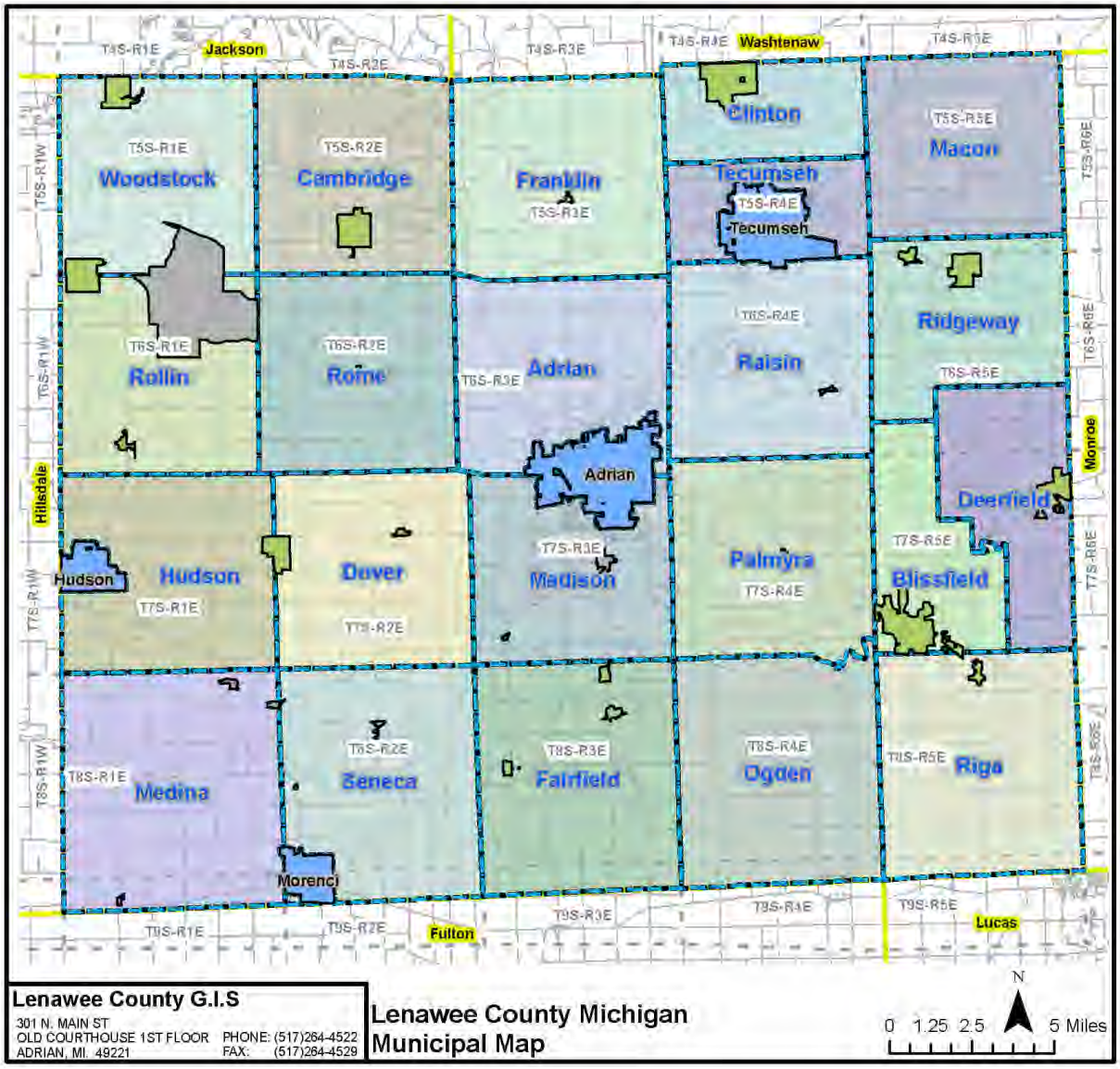
Lenawee County was originally a part of Monroe County but split off of Monroe County in 1826 and was the eighth county formally organized in the Michigan Territory. Ultimately Michigan was admitted into the Union in 1837. Lenawee County encompasses approximately 761 square miles or 487,040 acres. There is approximately 12 square miles of water within the County. According to the US Census of Agriculture, as of 2017, seventy-nine (79) percent of the land is dedicated to agricultural production. Lenawee County's top crops in acreage are soybeans and corn taking up almost two-thirds of the agricultural land.

Lenawee County contains thirty-four (34) local units of government, including twenty-two (22) townships, four (4) cities, and eight (8) villages. These communities are represented by a nine (9) member County Board of Commissioners. The City of Adrian is the county seat. The following table lists all 34 of the local units of government with their population data from the 2010 US decennial census and the 2020 US estimated population. The 2020 US estimated population of the County was 99,448, which is a loss of 444 persons or a -0.44% reduction in population.

Lenawee County is covered by District 1 of the Emergency Management & Homeland Security Division of the Michigan State Police.

Lenawee County Municipal Government Map

Map 3.1



Lenawee County Population by Municipality

5/83.1

Municipality	2020 Estimated population	2010 population	Change in population	Municipality	2020 Estimated population	2010 population	Change in population
Cities				**Townships (Cont.)**			
Adrian	20,649	21,133	-2.3%	Deerfield Township	590	670	-11.9%
Hudson	2,423	2,307	5.0%	Dover Township	1,505	1,663	-9.5%
Morenci	2,271	2,220	2.3%	Fairfield Township	1,666	1,764	-5.6%
Tecumseh	8,673	8,521	1.8%	Franklin Township	3,061	3,174	-3.6%
Villages				Hudson Township	1,332	1,324	0.6%
Addison	599	605	-1.0%	Macon Township	1,327	1,486	-10.7%
Blissfield	3,324	3,340	-0.5%	Madison Township	8,455	8,621	-1.9%
Britton	577	586	-1.5%	Medina Township	1,118	1,090	2.6%
Cement City	379	405	4.7%	Ogden Township	913	973	-6.2%
Clayton	322	344	-6.4%	Palmyra Township	2,016	2,076	-2.9%
Clinton	2,525	2,336	8.1%	Raisin Township	7,896	7,559	4.5%
Deerfield	911	898	1.4%	Ridgeway Township	957	956	0.1%
Onsted	1,002	917	9.3%	Riga Township	1,289	1,406	-8.3%
				Rollin Township	2,658	2,840	-6.4%
Townships				Rome Township	1,820	1,791	1.6%
Adrian Township	6,401	6,035	6.1%	Seneca Township	1,145	1,230	-6.9%
Blissfield Township	605	641	-5.6%	Tecumseh Township	2,047	1,972	3.8%
Cambridge Township	4,722	4,816	-2.0%	Woodstock Township	3,010	2,925	2.9%
Clinton Township	1,235	1,268	-2.6%	**LENAWEE COUNTY TOTAL**	99,423	99,892	-0.5%

Source: US Census

Lenawee County Top Employers
TABLE 3.2

Company Name	Location	# of Employees
Inteva Products LLC	Adrian	1,250
Lenawee Health Alliance Phys	Adrian	700
Walmart Supercenter	Adrian	450
97Promedica Charles-Virginia Hickman	Adrian	445
L & W Engineering Plant 4	Blissfield	400
Hi-Lex Controls	Hudson	400
Wacker Chemical Corp	Adrian	400
Pro Medica Herrick Manor	Tecumseh	350
Gus Harrison Correctional	Adrian	345
Adrian Steel Co	Adrian	301

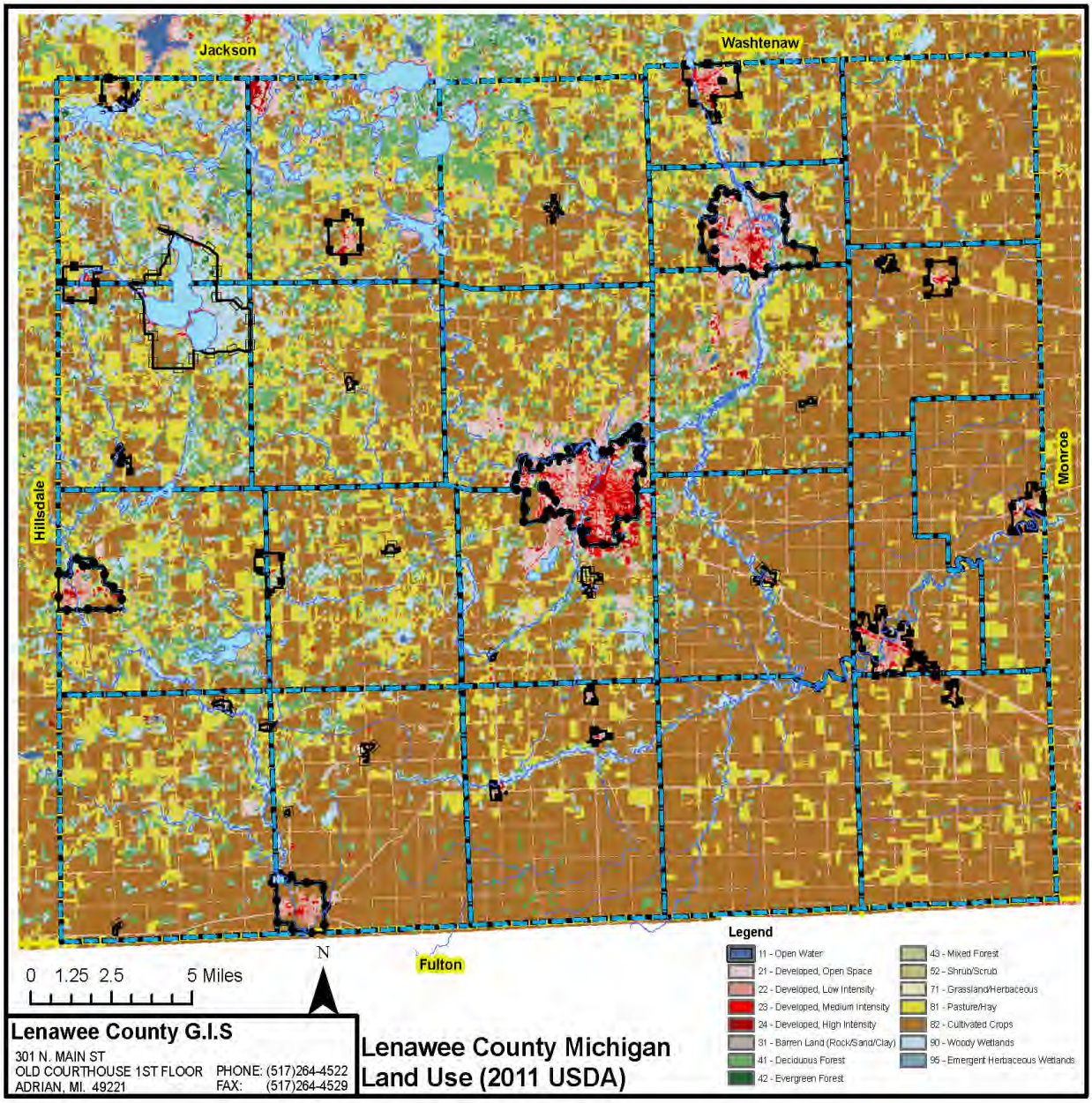
LAND USE

The 2002 Lenawee County Comprehensive Land Use Plan is the most recent Plan adopted by the County. In addition, three cities, five villages, and twelve townships have also adopted master plans. The County has identified nine land use categories: residential, industrial, commercial, transportation/ communications /utilities, open land/other, agriculture, forested land, lakes and streams, and wetlands.

Lenawee County covers approximately 760.0 square miles or 487,040 acres. Of this area, approximately 79% is devoted to agricultural production[2]. According to the 2017 US Census of Agriculture approximately 385,784 acres were devoted to agricultural activities with 65% of the land devoted to crops and 35% devoted to livestock. Lenawee County is one of the state's top dairy products producer and ranks high in the output of soybeans, corn, and wheat. Cattle, hogs/pigs, and sheep were the top livestock activities in the County.

[2] U.S. 2017 Census of Agriculture

Lenawee County Land Use
Map 3.2

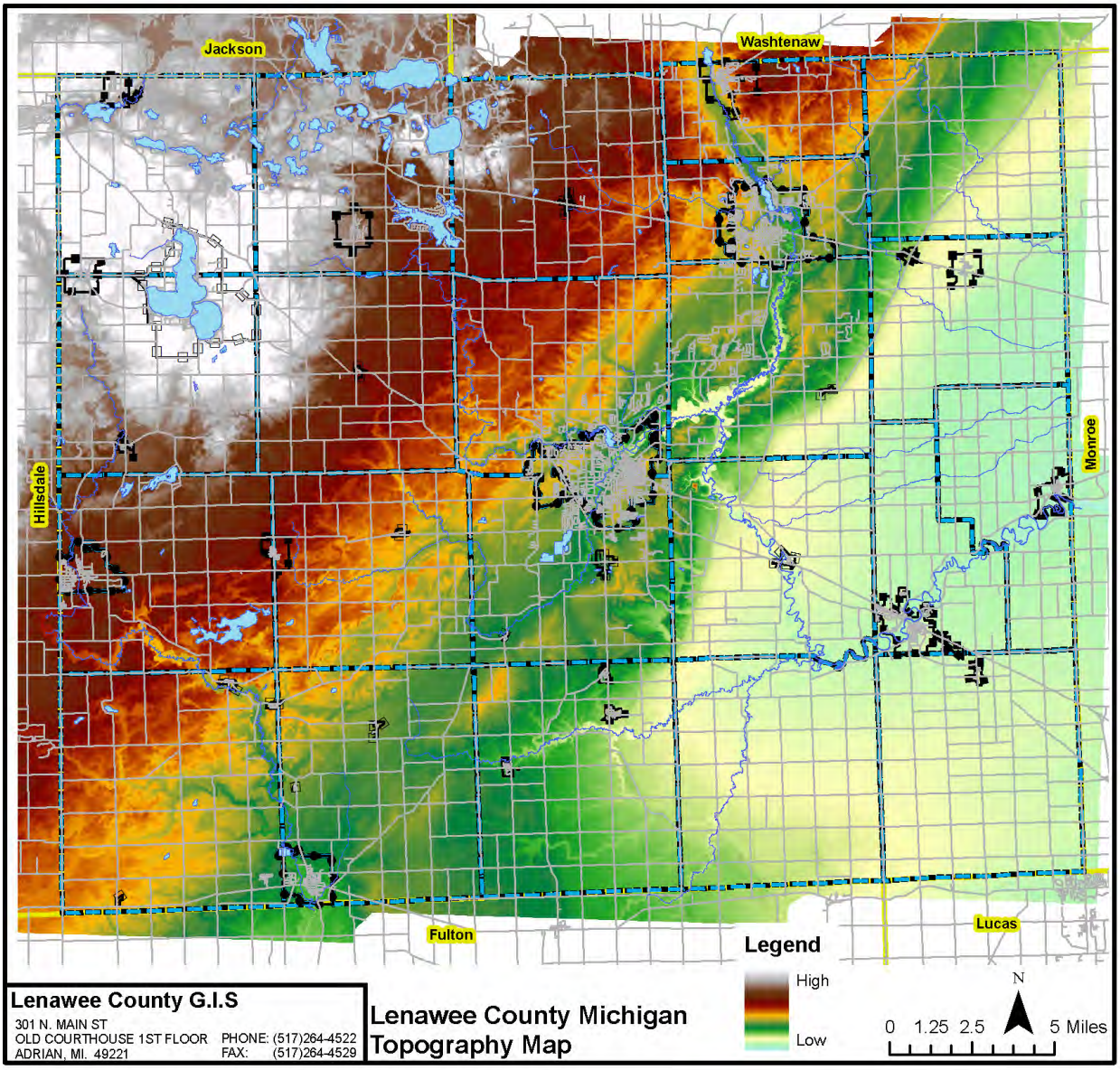


TOPOGRAPHY

Lenawee County's topography involves a total relief of about 688 feet, with the lowest points at 600 feet above sea level along the eastern portion of the County. Elevations increase when moving west towards the northwest portion of the County where the highest point is 1,288 feet above sea level. Generally speaking, the terrain in the county varies from flat areas to gently rolling or hilly areas.

Lenawee County Topographic Map

MAP 3.3



SOILS

A soil survey was completed by the United States Department of Agriculture in cooperation with the Michigan Agricultural Experiment Station in 1947. There are over 175 soils, as broken down by series and phases of that soil. These all can be found on Map 3.4 found on page 23. Rather than describing all of the soils, the top four soils, by area, are identified below and on the following page.[3]

[3] Soil survey, Lenawee County Michigan, United States Department of Agriculture

Hoytville clay loam and silty clay loam, 14 percent of the land area-these soils are dark in color and are poorly drained. The consist of silty clay or clay.

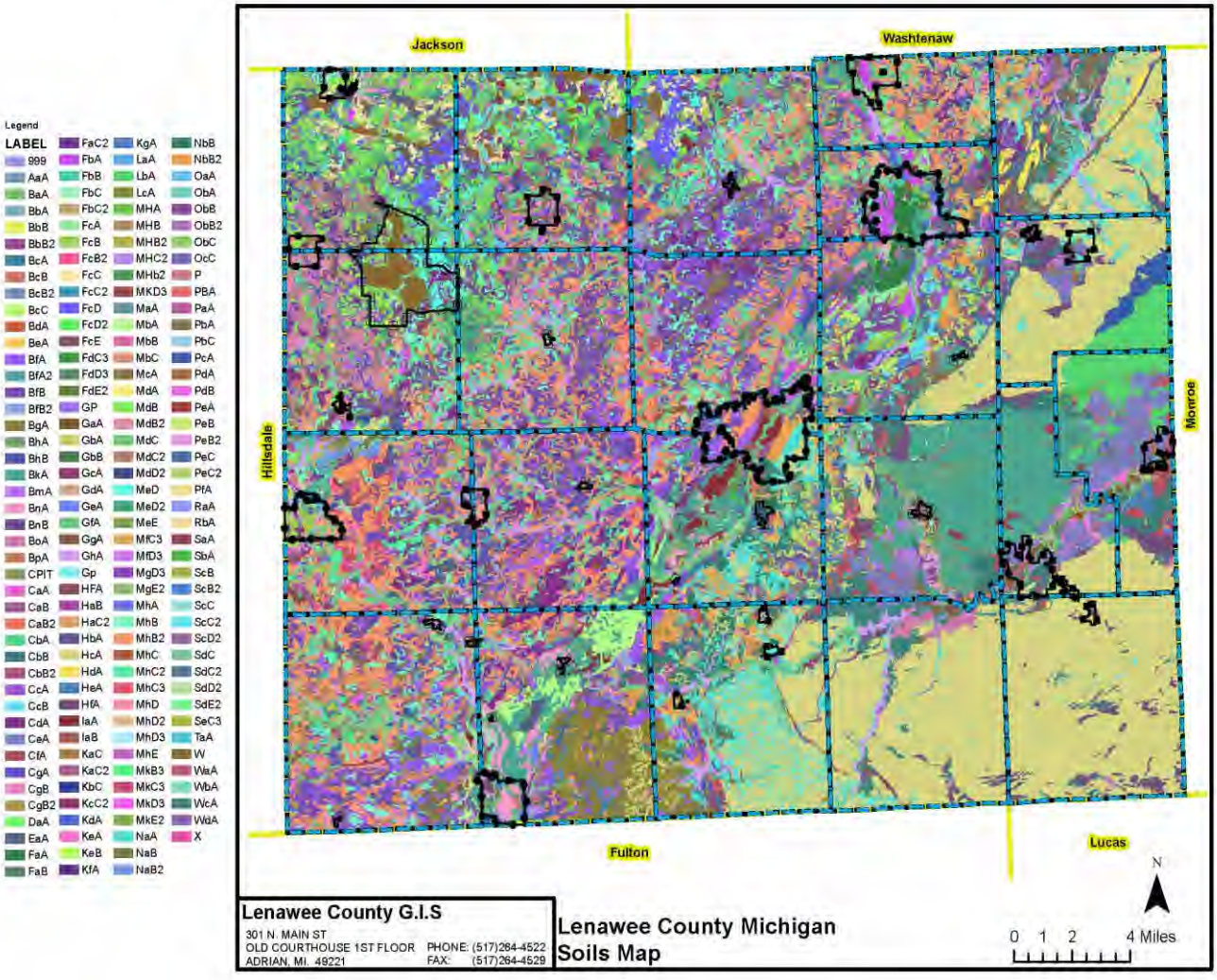
Pewamo clay loam, 5 percent of the land area-these soils are dark in color and poorly drained. They consist of silty clay loam or clay loam.

Blount loam, 9 percent of the land area-these soils are moderate in color and are imperfectly drained. They consist of silty clay loam or clay loam.

Brady and Macomb loams, 5 percent of the land area-these soils are imperfectly drained and are moderate in color. They are nearly level and consist of sandy and loam materials.

Lenawee County Soils Map

MAP 3.4



CLIMATE

Climate has a strong influence on the way of life and the activities of the people of Lenawee County. Like the rest of the State, the County has four distinct seasons that allow for a wide variety of outdoor activities. In the table below is a breakdown of the average high, daily, and low temperatures for each month, along with the monthly average precipitation and snowfalls.

Lenawee County Climate

TABLE: 3.3

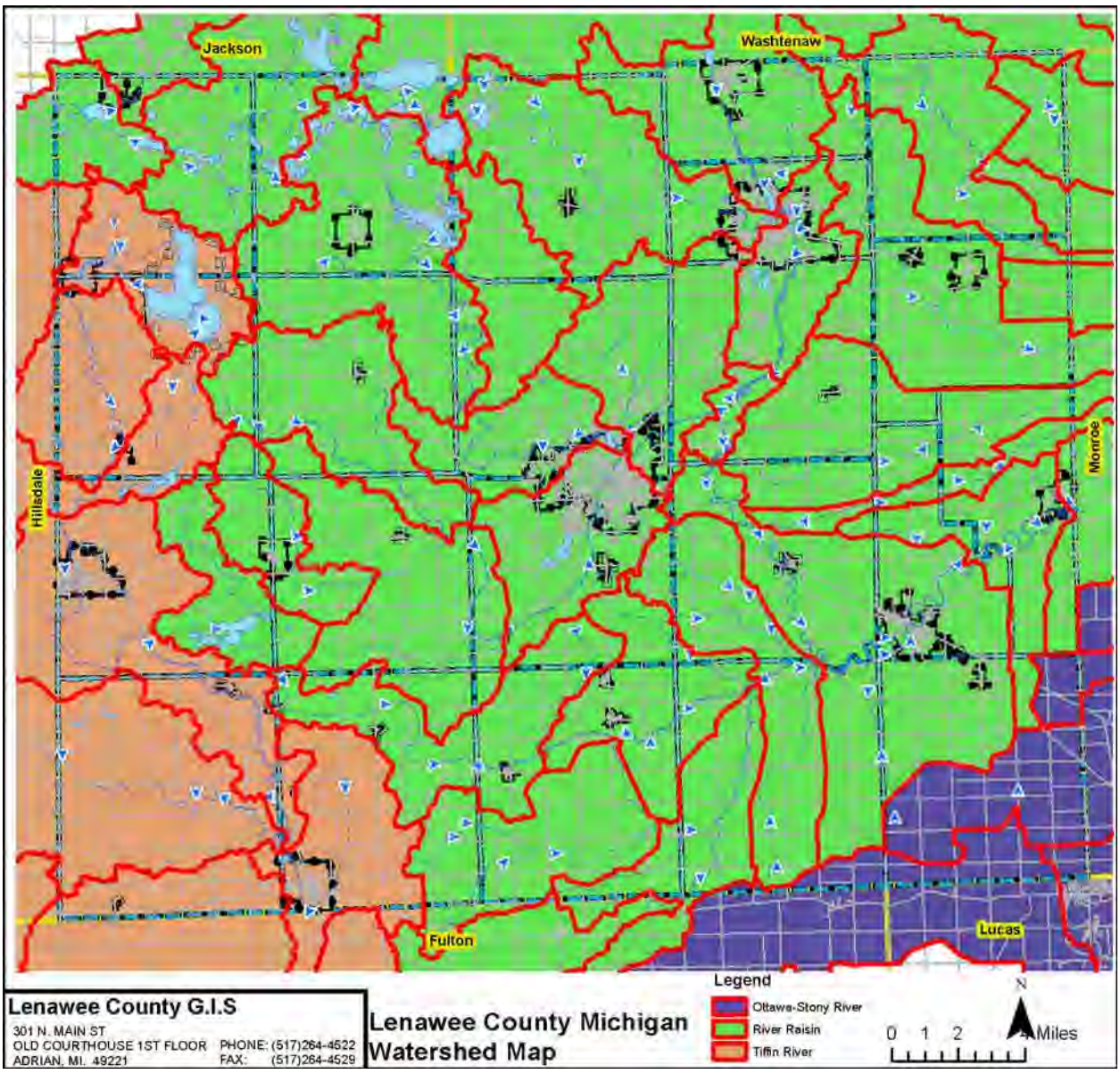
Month	Average Temperatures (in degrees)			Monthly Average Rainfall	Monthly Average Snowfall
	Daily Average	High Average	Low Average		
January	25.1	33.3	16.9	1.8”	9.0”
February	27.2	36.4	18.0	2.1”	5.8”
March	36.4	46.9	25.9	2.5”	4.1”
April	48.0	59.9	36.1	3.4”	1.0”
May	59.2	71.8	46.7	4.5”	0.0”
June	65.8	81.0	56.5	4.3”	0.0”
July	72.5	84.7	60.3	3.6”	0.0”
August	70.7	82.5	58.8	3.3”	0.0”
September	63.5	75.9	51.0	3.7”	0.0”
October	51.6	63.1	40.2	3.2”	0.0”
November	39.8	49.2	30.5	2.8”	1.3”
December	30.3	37.9	22.6	2.6”	4.8”
Annual Totals				37.8”	26.0”

Source: National Weather Service For Adrian Michigan (1991-2020)

WATER FEATURES AND WETLANDS

Lenawee County has a multitude of water resources, with three distinct drainage basins or watersheds. The River Raisin Watershed is the largest covering approximately 67 percent of Lenawee County. Tiffin River Watershed is the next largest watershed and is located along the western portion of Lenawee County. Ottawa-Stony River Watershed is third and smallest watershed. It is located in the southeastern corner of Lenawee County. A map identifying the watershed is found on the following page.

Lenawee County Watershed Inventory
MAP 3.5

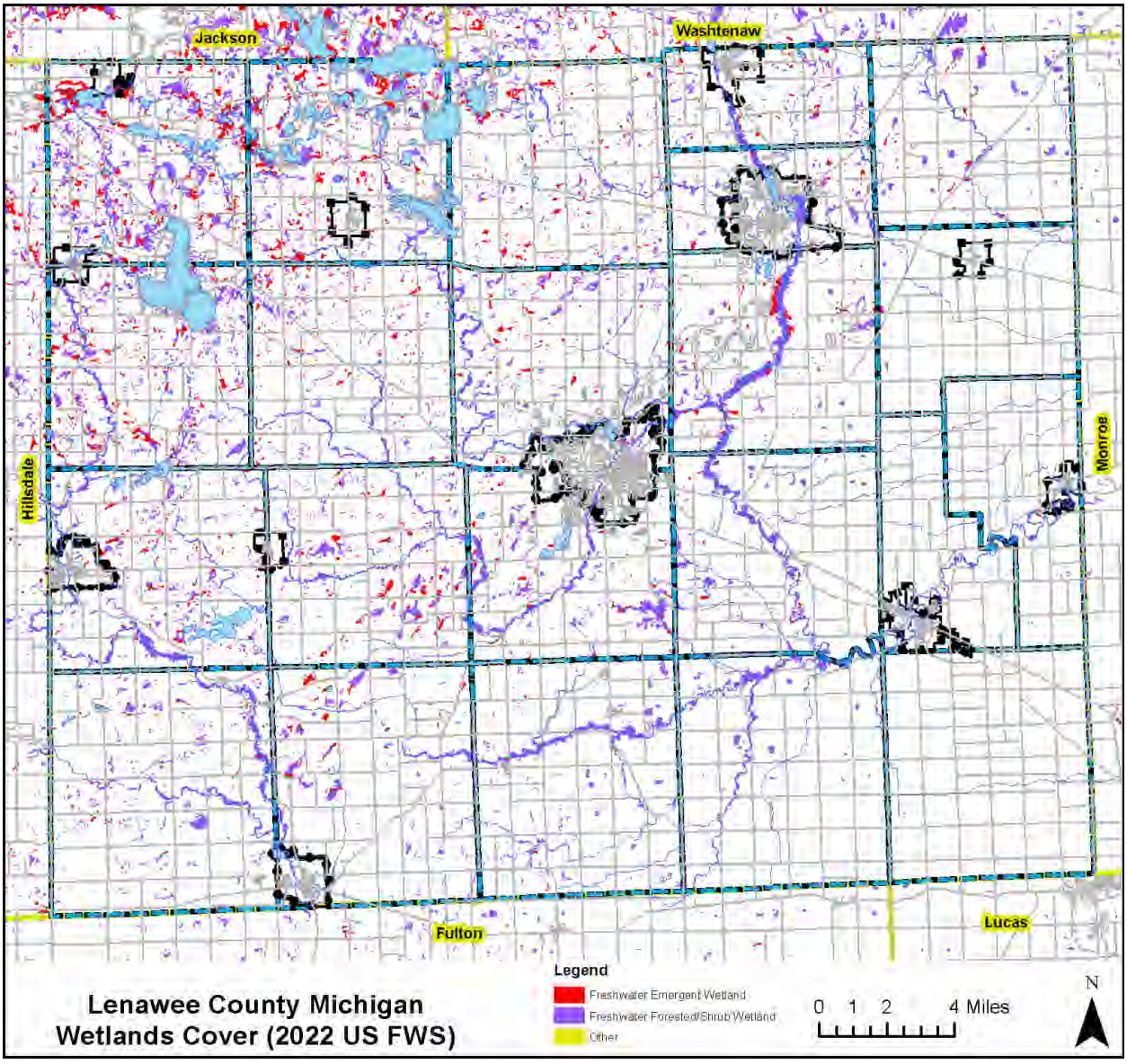


Lenawee County ("County") is the home to numerous lakes . There are 16 lakes in the County ranging in size from the 26 acre Meadow Lake to the 1,330 acre Devils Lake. These lakes are used for numerous recreational purposes and many of the lakes are home to seasonal, or secondary homes. There are also three major rivers/creeks located in the County. The largest of the rivers/creeks is River Raisin. Its headwaters are located in the northwest corner of the County and flows to the southeast, where it empties into Lake Erie. The river is approximately 140 miles long and is home to numerous fish including bluegill, walleye, and several variations of bass. Tiffin River is approximately 55 miles in length and is located in the western portion of the County. It is considered to be a tributary of the Maumee River. The third is Goose Creek, a tributary to River Raisin. Its headwaters are found in Hillsdale County, to the west

of Lenawee County and is approximately 12 miles in length. Numerous local governments participate in the National Flood Insurance Program (NFIP), including the City of Adrian, City of Hudson, City of Tecumseh, Village of Blissfield, Village of Clinton, Village of Deerfield, Adrian Township, Blissfield Township, Cambridge Township, Clinton Township, Deerfield Township, Franklin Township, Hudson Township, Macon Township, Madison Township, Palmyra Township, and Woodstock Township.

Lenawee County Wetlands

MAP 3.6

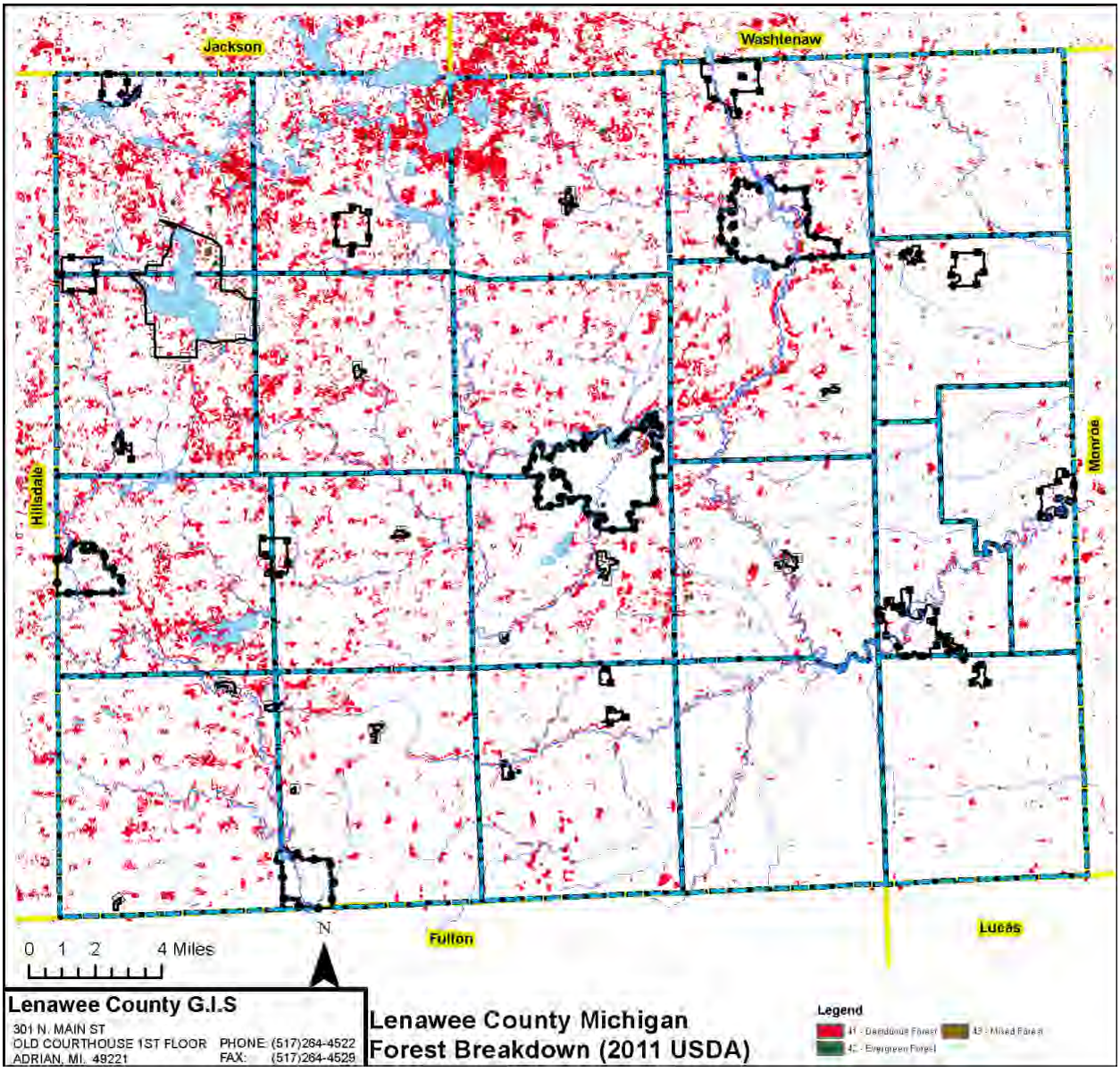


FOREST COVER

Approximately 9.0 percent of the County is forested, made up of primarily deciduous forest. Deciduous trees make up nearly 98.0 percent of the forested area, with coniferous trees making up less than one percent and mixed forested making up slightly more than 1.5 percent. Tree species vary depending upon the soils, moisture, and past activities such as logging, fires, and land clearing. The most common trees include red maple, sugar maple, silver maple, red oak, white oak, shagbark, box elder, and cottonwood.

Lenawee County Forest Cover Map

MAP 3.7



COMMUNITY ORGANIZATION AND RESOURCES FOR HAZARD MITIGATION INCLUDING COUNTY AND LOCAL COMMUNITY AGENCIES, DEPARTMENTS, AND ORGANIZATIONS POTENTIALLY RELEVANT FOR HAZARD MITIGATION.

Government Facilities

Government facilities have a large impact on how emergencies are handled. They provide services to the public such as shelter in times of natural disasters. They also serve as a way to distribute information on how to handle emergency circumstances. Each municipality within the County handles planning and zoning within their jurisdictional boundaries. Planning and zoning can be critical components of hazard mitigation.

Emergency Services

Emergency services are very important for the Hazard Mitigation Process. These services help serve the public in times of natural disasters and other emergency situations. It is crucial for the public to know where these services exist and how to reach them in times of need.

Lenawee County Office of Emergency Management

150 W. Maple Avenue
Adrian, MI 49221
Phone: (517) 264-4757

This office was established under the provisions of the Michigan Emergency Management Act, PA 390 of 1976, as amended, to ensure a coordinated public response in the event of a natural or man-made disaster. The Lenawee County Emergency Management office assesses local capabilities to respond to emergency and disaster situations, advocates emergency preparedness in both the public and private sectors and works to assure a comprehensive approach is used involving a range of public and private agencies including local police, fire and EMS agencies, the Michigan State Police Emergency Management and Homeland Security Division, the Michigan Department of Environmental Quality, the Region 1 Homeland Security Board, and the National Weather Service. Other agencies coordinating with emergency management include the American Red Cross, local and state health departments, educators, and amateur radio operators. This office tends to be central for all major threats and incidents within the County. This office also handles all Public Warning and Communications services, NOAA Weather alerts, Broadband, LEPC/LPT Boards, EOC Operations and Management, Training and Education programs, and all related Homeland Security matters. The Emergency Management also directs the Drone Pilot Team made up of personnel from local police and fire departments.

Local Emergency Planning Committees (LEPC)

One of the major provisions of SARA Title III is the establishment of Local Emergency Planning Committees (LEPCs) for designated planning districts. The LEPCs are responsible for developing emergency response plans for communities that have facilities in their jurisdiction subject to SARA Title III emergency planning requirements. The LEPC is the primary mechanism through which local SARA Title III planning, training and exercises are implemented. Michigan has 88 designated LEPCs, one for each of the 83 counties and 5 in major cities. Nearly 2,800 facilities across the state have been identified as being subject to Title III emergency planning provisions. A facility is subject to SARA Title III provisions if extremely hazardous substances (as determined by the U.S. Environmental Protection Agency) are present at the facility in

quantities at or above the minimum threshold quantities established in Section 302 of the Act or at the request of the LEPC or local Fire Department.

Government Offices and Facilities (Main Office Location) County
Lenawee County
301 N Main Street
Adrian, MI 49221
Phone: 517 264-4508

Cities

City of Adrian
135 E. Maumee Street
Adrian, MI 49221
Phone: 517 263-2161

City of Hudson
121 N. Church Street
Hudson, MI 49247
Phone: 517 448-8983

City of Morenci
118 Orchard Street
Morenci, MI 49256
Phone: 517 458-6828

City of Tecumseh
309 E. Chicago Boulevard
Tecumseh, MI 49286
Phone: 517 423-2107

Villages

Village of Addison
103 ½ W. Main Street
Addison MI 49220
Phone: 517 547-6328

Village of Blissfield
130 South Lane Street
P.O. Box 129
Blissfield, MI 49228
Phone: 517 486-4347

Village of Britton
120 College Avenue
P.O. Box 436
Britton, MI 49229
Phone: 517 451-2171

Village of Cement City
135 Main Street
P.O. Box 187
Cement City, MI 49233
Phone: 517 592-2756

Village of Clayton
P.O. Box 74
Clayton, MI 49235
Phone: 517 902-9674

Village of Clinton
119 East Michigan Avenue
Clinton, MI 49236
Phone: 517 456-7494

Village of Deerfield
P.O. Box 277
101 W. River Street
Deerfield, MI 49238
Phone: 517 447-3138

Village of Onsted
108 South Main Street
Onsted, MI 49265
Phone: 517 467-4618

Townships

Adrian Charter Township
2907 Tipton Highway
Adrian, MI 48410
Phone: 517 263-7920

Blissfield Township
PO Box 58
120 S. Lane Street
Blissfield, MI 49228
Phone: 517 486-2626

Cambridge Township
PO Box 417
Onsted, MI 49265
Phone: 517 467-2104

Clinton Township
PO Box G
Clinton, MI 49236
Phone: 517 456-6701

Deerfield Township
PO Box 176
Deerfield, MI 49238
Phone: 517 447-3000

Dover Township
4315 Whaley Highway
Clayton, MI 49235
Phone: 517-673-3211

Fairfield Township
1023 Pine Street
Jasper, MI 49428
Phone: 517 436-6400

Franklin Township
PO Box 101
3922 Monroe Road
Tipton, MI 49287
Phone: 517 431-2320

Hudson Township
14900 Carleton Road
Hudson, MI 49427
Phone: 517 448-3115

Macon Township
8320 Clinton Macon Road
Tecumseh, MI 49286
Phone: 517 451-8074

Madison Charter Township
4008 S Adrian Highway
Adrian, MI 49221
Phone: 517 263-8723

Medina Township
16399 Lime Creek Highway
Hudson, MI 49257
Phone: 517 286-6879

Ogden Township
10128 Pence Highway
Blissfield, MI 49228
Phone: 517 443-5409

Palmyra Township
6490 Palmyra Road
Palmyra, MI 49268
Phone: 517 263-7394

Raisin Charter Township
5525 S Occidental Road
Tecumseh, MI 49286
Phone: 517 423-3162

Ridgeway Township
PO Box 456
204 West Chicago Boulevard
Britton, MI 49229
Phone: 517 451-4111

Riga Township
PO Box 25
Riga, MI 49276
Phone: 517 486-4260

Rollin Township
P.O. Box 296
730 Manitou Road
Manitou Beach, MI 49253
Phone: 517 547-7786

Rome Township
9344 Forrister Road
Adrian, MI 49221
Phone: 517 605-5163

Seneca Township
5732 W Ridgeville Road
Sand Creek, MI 49279
Phone: 517 458-7801

Tecumseh Township
7750 Hendershot Highway
Tecumseh, MI 49286
Phone: 517 423-1837

Woodstock Township
6486 Devils Lake Highway
Addison, MI 49220
Phone: 517 547-6598

Participating Municipal Resources

On the following page is a complete listing of the participating municipalities' resources available to utilize in their mitigation efforts. These resources are different for each municipality and are based on their individual circumstances. Communities that have the resource or the capacity within their community have identified that resource with a Y. Those communities that do not have that resource or capacity within their community but have access to the resource through another agency have identified that resource with an asterisk (*).

Participating Municipalities' Resources

TABLE 3.4

Municipality	Resources Available													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Lenawee County	Y	Y	Y	Y		Y	Y		Y	Y	Y	*		
Adrian	Y	Y	Y	Y	Y	*	Y	*	*	Y	Y	Y		Y
Hudson	*	Y	Y	Y	Y					Y	Y		Y	Y
Tecumseh	*	Y	Y	Y	Y	*		*	*	Y	Y	Y	Y	*
Village of Addison	*	Y	Y	Y						Y	Y		Y	Y
Village of Clinton	Y	Y	Y	Y	Y	*	*	*	*	Y	Y	*	Y	*
Blissfield Township				Y	Y		Y			Y	Y		Y	
Cambridge Township		Y		Y	Y					Y	Y		Y	
Clinton Township		Y	*	Y	*	*	*	*	*	Y	Y		Y	Y
Deerfield Township				Y		*				Y	Y		Y	
Hudson Township				Y		*				Y	Y		*	
Macon Township				Y		*				Y	Y		*	
Madison Township	Y	Y	Y	Y	Y					Y	Y	Y	Y	Y
Medina Township				Y	*	*	*		*	Y	Y	*	*	*
Ogden Township				Y		*				Y	Y		*	
Palmyra Township		*	Y	*	*	*	*	*	*	Y	Y		Y	
Raisin Township		Y	Y	Y	Y		Y			Y	Y		Y	Y
Riga Township				Y		*				Y	Y		Y	
Rollin Township		*	Y	*		*	*	*	*	Y	Y		*	
Woodstock Township			Y	Y		*				Y	Y			

A-Planning staff
B-Public Works Department
C-Taxing Authority/Annual Budget
D-Building Codes
E-Local Police Department
F-County Sheriff
G-Hospital/Medical Facilities
H-Local Emergency Mgmt. Staff
I-County Emergency Mgmt. Staff
J-Land Use Regulatory Capability (Zoning Ord./Comp. Land Use Plan)
K-Ordinance Authority
L-Fulltime Fire Department
M-Volunteer Fire Department
N-Emergency Medical Services

Police

Lenawee County has 13 police departments within the County outside the Sheriff's Department. They are identified below. The County is also served by the Michigan State Police Post from Monroe. In addition to police department personnel, the Lenawee County Sheriff's Office also is in charge of the Dive Team, and Accident Rescue Team both made up of local police department personnel.

Lenawee County Sheriff's Department
405 N Winter Street
Adrian, MI 49221
Phone: 517 263-0524

Adrian Police Department
155 E Maumee
Adrian, MI 49221
Phone: 517 264-4808

Adrian Township Police Department
3967 Hunt Road
Adrian, MI 49221
Phone: 517 264-1000

Blissfield Police Department
130 S Lane Street
Blissfield, MI 49228
Phone: 517 486-4340

Cambridge Township Police Department
495 Spruce Street
Onsted, MI 49265
Phone: 517 467-4340

Clinton Police Department
322 E Michigan Avenue
Clinton, MI 49236
Phone: 517 456-4511

Department of Natural Resources
Lt. Todd Szyska
Metro Detroit Customer Service Center
1801 Atwater Street
Detroit, MI 48207
313 396-6890

Hudson Police Department
205 Railroad Street
Hudson, MI 49247
Phone: 517 448-8129

Madison Township Police Department
4008 S Adrian Highway
Adrian, MI 49221
Phone: 517 263-3130

Michigan State Police
300 Jones Avenue
Monroe, MI 48161
Phone: 734 242-3500

Morenci Police Department
118 Orchard Street
Morenci, MI 49256
Phone: 517 458-7104

Raisin Township Police Department
5525 Occidental Highway
Tecumseh, MI 49286
Phone: 517 424-4615

Tecumseh Police Department
309 E Chicago Boulevard
Tecumseh, MI 49286
Phone: 517 423-7494

Fire

There are eighteen (18) fire departments located in or serving portions of Lenawee County. The departments are identified below. There is a County-wide Mutual Aid Agreement between all of the fire departments. In addition to fire department personnel, the Lenawee County Fire Chief's Association also is in charge of the HazMat Team and Tech Rescue Team both made up of local fire department personnel. The Fire Chief's Association is also in charge of the Fire Investigation Team, made up of local firefighters and law enforcement personnel from local fire and police departments.

Addison Fire Department
319 Main Street
Addison, MI 49220
Phone: 517 547-6776

Adrian Fire Department
208 S Main Street
Adrian, MI 49221
Phone: 517 264-4879

Adrian Charter Township Fire Department
2889 Tipton Highway
Adrian, MI 49221
Phone: 517 265-1314

Blissfield Township Fire Department
299 E. Adrian Street
Blissfield, MI 49228
Phone: 517 486-3978

Cambridge Township Fire Department
103 N Main Street
Onsted, MI 49265
Phone: 517 467-2128

Clayton Fire Department
11029 Center Street
Clayton, MI 49235
Phone: 517 445-2617

Clinton Fire Department
102 N Jackson Street
Clinton, MI 49236
Phone: 517 456-4371

Deerfield Township Fire Rescue
468 Carey Street
Deerfield, MI 49238
Phone: 517 447-3365

Fairfield Township Fire Department
9965 Brown Street
Weston, MI 49289
Phone: 517 436-3440

Hudson Fire Department
121 N Church Street
Hudson, MI 49247
Phone: 517 448-2231

Madison Township Fire Department
4008 S Adrian Highway
Adrian, MI 49221
Phone: 517 265-6560

Morenci Fire Department
249 W Main Street
Morenci, MI 49256
Phone: 517 458-2301

Palmyra Township Fire Department
4276 Rouget Road
Palmyra, MI 49268
Phone: 517 263-7394

Raisin Township Fire Department
5525 Occidental Highway
Tecumseh, MI 49286
Phone: 517 423-7811

Ridgeway Township Fire Department
103 W Chicago Boulevard
Britton, MI 49229
Phone: 517 451-8264

Riga Township Fire Department
7817 Riga Highway
Riga, MI 49276
Phone: 517 486-4260

Sand Lake Volunteer Fire Department
1300 W Michigan Avenue
Tipton, MI 49287
Phone: 517 431-2800

Tecumseh Fire Department
101 E Russell Road
Tecumseh, MI 49286
Phone: 517 423-4545

Public Works/Utilities

There are 20 city/village/township departments of public works, utilities, or treatment facilities, which are all found below. These departments are critical to emergency management as they assist in the addressing infrastructure failures as well as the clean up after many hazardous events.

Lenawee County Public Works/Utility Departments

Adrian City Department of Engineering and Public Works
231 Race Street
Adrian, MI 49221
Phone: 517 264-4829

City of Adrian Department of Utilities and Wastewater Treatment
135 Maumee Street
Adrian, MI 49221
Phone: 517 264-4821

Village of Blissfield Public Works Department
130 S. Lane Street
Blissfield, MI 49228
Phone: 517 486-2550

Village of Blissfield Water Plant
1330 Beamer Road
Blissfield, MI 49228

Village of Blissfield Wastewater Treatment Plant
198 MacArthur Lane
Blissfield, MI 49228
Phone: 517 486-2740

Village of Britton Public Works Department
120 College Avenue
Britton, MI 4929
Phone: 517 451-2171

Village of Cement City Public Works Department
135 Main Street
Cement City, MI 49433
Phone: 517 592-2756

Village of Clayton Public Works Department
Clayton Municipal Building
P.O. Box 74
Clayton, MI 49325
Phone: 517 902-9674

Village of Clinton Public Works Department
119 E. Michigan Avenue
Clinton, MI 49236
Phone: 517-456-7494

Village of Deerfield Public Works Department
101 River Street
Deerfield, MI 49238
Phone: 517 447-3138

City of Hudson Public Works Department
40 Jackson Street
Hudson, MI 49247
Phone: 517 448-6101

City of Hudson Wastewater Treatment
107 Mechanic Street
Hudson, MI 49247
Phone: 517 448-5215

City of Hudson Utilities
Church Street
Hudson, MI 49247
Phone: 517 48-8983
Phone: 517 263-9313

Madison Charter Township Public Works Department
121 N.
3804 S. Adrian Highway
Adrian, MI 49221

City of Morenci Department of Public Works
118 Orchard Street
Morenci, MI 49256
Phone: 517 458-6829

Village of Onsted Public Works Department
108 S. Main Street
Onsted, MI 49265
Phone: 517 467-4618

Palmyra Township
6490 Palmyra, Road
Palmyra, MI 49268
Phone: 517 937-9050

Raisin Charter Township
5525 S. Occidental Highway
Tecumseh, MI 49286
Phone: 517 423-3162

City of Tecumseh Public Works Department
309 E. Chicago Boulevard
Tecumseh, MI 49286
Phone: 517 423-1443

Michigan Department of Transportation
2451 N. Adrian Highway
Adrian, MI 49221
Phone: 517 263-0564

Lenawee County Sheriff's Office
405 North Winter Street
Adrian, MI 49221
Phone: 517 263-0524
The Sheriff's Office provides law enforcement and services to protect the lives and property of Lenawee County citizens-enforcing State laws and local ordinances, investigating crimes, and detaining prisoners remanded to the county jail. This is accomplished in a manner that maintains the highest degree of professional excellence, integrity, and courtesy. Sheriff's Office personnel would be involved in protective actions during a serious community emergency.

Lenawee County Drain Commissioner
320 Springbrook Avenue, #102
Adrian, MI 49221
Phone: 517 264-4696
The mission of this office is to provide for the health, safety and welfare of Lenawee County citizens, the protection of surface waters and the environment, and to promote the long-term environmental sustainability of Lenawee County by providing storm water management, flood control, soil erosion control and education. The office is particularly relevant for hydrological hazards.

Lenawee County Road Commission
2461 Treat Street
Adrian, MI 49221
Phone: 517 265-6971
Currently the Lenawee County Road Commission is responsible for 489 miles of primary road, 1,040 miles of local roads and 179 county bridges. In addition to maintaining and preserving all county roads and bridges the Lenawee County Road Commission also maintains an additional 154 lane miles of US and State Trunklines through a partnership with the Michigan Department of Transportation.

Lenawee County Health Department
1040 S. Winter Street
Suite 2328
Adrian, MI 49221
Phone: 517 264-5226
The mission of the Lenawee County Health Department exists is to promote health and physical well-being

by providing preventive health care, education, and environmental safety to all members of the community, and to become recognized by the public as the local advocate in promoting, assessing and safeguarding public health, and the environment. This will be done through coordinated planning, resource development, and service delivery. The human impacts of hazards may require their involvement. Public health emergencies threatening the area would certainly involve this department.

Michigan State University Extension – Lenawee County Office
1040 S. Winter Street
Suite 2020
Adrian, MI 49221
Phone: 517 264 5300
The office is involved in various educational and outreach activities involving agriculture and health. They should be valuable in events concerning such matters, such as droughts, pandemics, etc.

Lenawee Community Foundation
Lenawee Community Foundation (Foundation) is located in the city of Adrian. It is a nonprofit organization that raises funds to annually distribute to students and to charitable organizations located within the County through grants. The Foundation offers grants for health, civic, culture, education, and human service activities.

Ambulance
Ambulances are available throughout Lenawee County, either through the local municipality or through Lenawee Community Ambulance. There are varying levels of ambulance services available. Basic Life Support is available through all the ambulance services at all the fire departments within the County. Advanced Life Support is available through the City of Adrian Fire Department, the Madison Charter Township Fire Department, the Addison Township Fire Department, Raisin Fire Department, City of Morenci, City of Hudson, and Lenawee Community Ambulance.

Health Care Facilities
ProMedica Charles and Virginia
Hickman Hospital
5840 N Adrian Highway
Adrian, MI 49221
Phone: 517 577-0000

Adrian Urgent Care
715 N. Main Street
Adrian, MI 49221
Phone: 517 577-6150

Main Street Urgent Care
905 N Main Street
Adrian, MI 49221
Phone: 517 265-1066

Tecumseh Urgent Care
501 E Chicago Boulevard
Tecumseh, MI 49286
Phone: 517 662-3144

Lenawee Walk-in Clinic
142 E Maumee
Adrian, MI 49221
Phone: 517 264-5820

After Hours Clinic and Walk-in
6869 Occidental Highway
Tecumseh, MI 49286
Phone: 517 423-8900

Local Emergency Capability:
Procedures in the Emergency Operations Plans address the unique types of problems associated with all

hazards, including specific functions such as rescue and evacuation. Communities work closely with private sector and surrounding jurisdictions to ensure a fast, coordinated response. Mitigation possibilities include the use of community zoning regulations to provide suitable open, unoccupied "buffer" areas around pipelines, storage fields, refineries and compressor stations.

Warning Sirens or System

Lenawee County has a total of 34 active Emergency Alert Sirens. The sirens have approximately a one-mile cover radius. These sirens are at the following locations: Village of Addison (2), Adrian College (1), Adrian Township (1), Village of Blissfield (1), Blissfield Township (1), Village of Britton (1), Cambridge Township (1), Village of Cement City (1), Village of Clayton (1), Village of Clinton (1), Village of Deerfield (1), Fairfield Township (2), Franklin Township (2), Gus Harrison Prison (1), City of Hudson (2), City of Morenci (1), Village of Onsted (1), Palmyra Township (1), Raisin Township (3), Ridgeway Township (1), Riga Township (1), Rollin Township (1), City of Tecumseh (4), and Woodstock Township (2).

Schools

There are eleven (11) public school districts that serve the residents of Lenawee County. There are also four (4) private schools within the County. Adrian College, Sienna Heights University, and Jackson College LISD Tech are also located within the County. Below is information on the 11 public school districts.

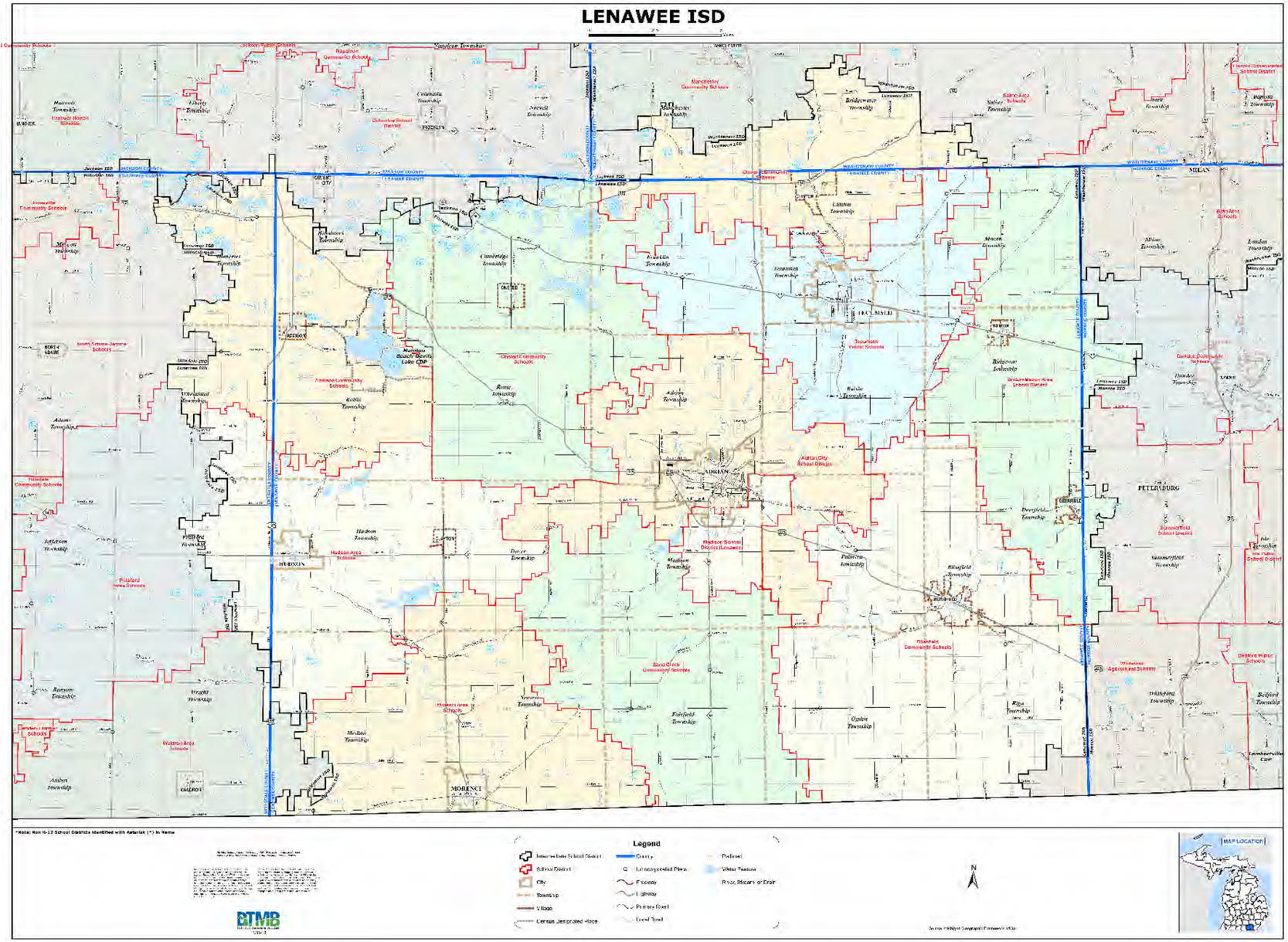
Lenawee County School Districts

TABLE 3.5

School District (address)	Number of Students (2021-22)	School District (address)	Number of Students (2021-2022)
Addison School District 219 N. Comstock Street Addison, MI 49220	732	Adrian School District 785 Riverside Avenue Suite 1 Adrian, M I 49221	2,788
Blissfield School District 630 Lane Street Blissfield Mi 49228	1,145	Britton Deerfield School District 201 College Avenue Britton Mi 49229	439
Clinton School District 341 East Michigan Avenue Clinton, Mi 49236	1,250	Hudson School District 781 N. Maple Grove Avenue Hudson, MI 49247	1,270
Madison School District 3498 Treat Highway Adrian, MI 49221	1,619	Morenci School District 517 E. Locust Street Morenci, MI 49256	593
Onsted School District 10109 See Road Onsted, MI 49265	1,284	Sand Creek School District 6518 Sand Creek Highway Sand Creek, MI 49279	782
Tecumseh School District 760 Brown Street Tecumseh, MI 49286	2,522		

Lenawee County School District Map

MAP 3.8



Utilities

Information on the utilities provided to communities within the County are essential to distribute information to the public in times of need. Also, certain locations that provide these services may be the source of emergency situations (transformer problems, gas leaks, etc.).

Electricity

Clinton BPW (Village of Clinton)
Consumers Energy
Detroit Energy
Midwest Energy Cooperative

Natural Gas

Michigan Gas Utilities
Citizens Gas
Consumers Energy

Transportation

Roads

Lenawee County has 1,040 miles of local roads, 489 miles of primary roads, and 154 miles of state trunklines.

Lenawee County is served by three (3) federal highways and four (4) all season State Trunkline Highways:
US 12-east-west highway in the northwest portion of Lenawee County
US 127-north-south highway in western Lenawee County
US 223-east-west highway from northwest to southeast Lenawee County
M 34-east-west highway from western to central Lenawee County
M 50-east-west highway from northwest to east Lenawee County
M 52-north-south highway in central Lenawee County
M 124-North-south highway in northern Lenawee County
M 156-north-south road in southwest portion of Lenawee County

Lenawee County Road Commission
2461 Treat Street
Adrian, MI 49221
(517) 265-6971

Airports

Lenawee County has five (5) public use airfields, four (4) private airfields, and two (2) private heliports.

Mass Transportation

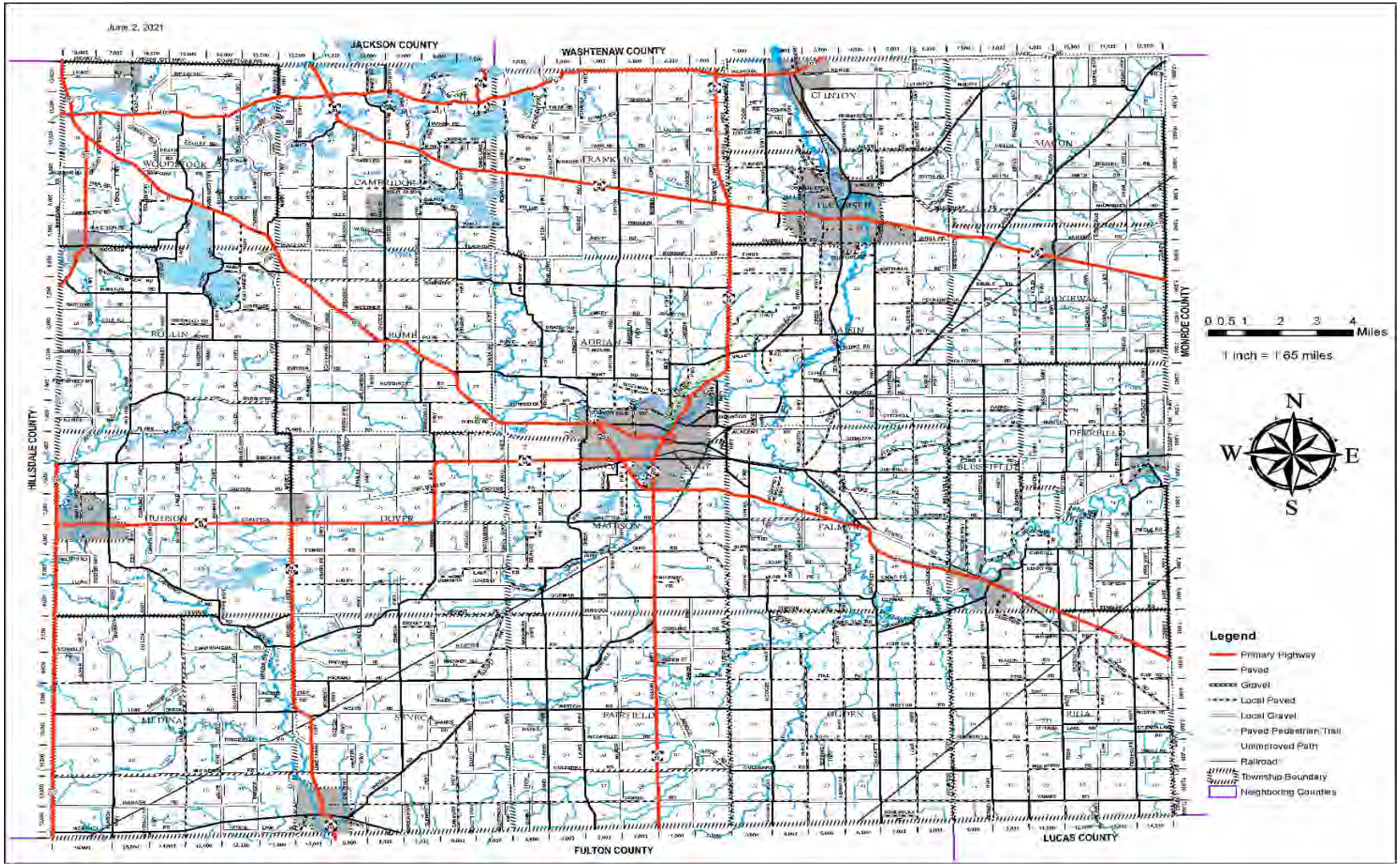
Dial-a Ride serves The City of Adrian and Lenawee Transportation Authority serves the rest of Lenawee County. They are in the process of merging, which will cover the entire County.

Railroads

Adrian & Blissfield Rail Road serves Adrian to Riga Township. The Norfolk Southern Railway runs from the southwest corner of Lenawee County to the northeast corner of Lenawee County. Both rail services are freight only at this time. Adrian & Blissfield previously operated a Murder Train Mystery Ride, but it has stopped due to COVID-19. No date to resume the service has been announced.

Lenawee County Transportation Map

MAP 3.9



AUTHORITIES, CENTERS, PROGRAMS THAT ADDRESS VARIOUS HAZARDS

Sabotage/Terrorism/Weapons of Mass Destruction (WMD)

The federal Office of Homeland Security coordinates the many counter-terrorism functions scattered across numerous federal agencies and organizations and works closely with state and local police and fire agencies, emergency response teams, and emergency management agencies in formulating and carrying out the National Homeland Security Strategy.

51st (WMD)/Civil Support Team

The Michigan National Guard, 51st Western Military District (WMD)/Civil Support Team, provides additional support for the Regional Response Team Network (RRTN). Stationed at Fort Custer (Battle Creek), the 51st WMD/Civil Support Team deploys to a Weapon of Mass Destruction or suspected Weapon of Mass Destruction incident in support of the local incident commander to assess a suspected nuclear, chemical, biological or radiological event; advise the Incident Commander on appropriate courses of action to protect the local population; assist with appropriate requests for state additional support. They also provide informational briefings, exercises, and cross training activities with state and local first responders.

The Strategic National Stockpile (SNS) Program:

Presidential Decision Directive (PDD) 62, issued by President Clinton in May 1998 ordered federal agencies to take significantly expanded and better-coordinated steps to protect against the consequences of biological and other unconventional attacks, especially potential bio-terrorism directed at civilian populations. One of the major bio-terrorism initiatives of the U.S. Department of Health and Human Services (HHS) in response to this PDD is the development of the Strategic National Stockpile – a national repository of lifesaving pharmaceuticals and medical materials that will be delivered to the site of a major medical emergency in order to reduce morbidity and mortality in civilian populations. The decision to send the SNS is a collaborative effort between local, state, and federal officials in a process whereby local health departments and emergency management officials contact the Michigan State Police Emergency Management Division, and state health officials who recommend to the Governor that a formal request for the SNS be made to the CDC.

The stockpile is activated to support a local and or state response to an emergency within the US or its territories. The two major components of the stockpile are the 12 Hour Push Pack and the Vendor Managed Inventory (VMI). Push Packs contain 50 tons of medical materiel that will treat a variety of illnesses. The VMI will re-supply the Push Pack or supplies will be sent immediately to the emergency site if the biological agent is known.

Region 1 Homeland Security Governing Board:

The United States Department of Homeland Security (DHS) has identified a number of national priorities to strengthen the preparedness of the United States to prevent and respond to threatened or actual domestic terrorist attacks, major disasters, and other emergencies, including expanded regional collaboration. Major events have a regional impact, therefore the benefit of regionalism will be most evident at the community level, when a community, as a whole, can prepare for and provide an integrated response to an incident.

The State of Michigan has been divided into eight Homeland Security Regions. Gratiot County having a recognized PA 390 program is the most northern permanent member of the Region 1 Homeland Security Planning Board. Ingham County is currently the designated fiduciary and is responsible for management and administration of the Region 1 Homeland Security Grant Program funds. The Region 1 Homeland Security Planning Board consists of voting representation from City of Lansing, Clinton County, Eaton County, Gratiot County, Hillsdale County, Ingham County, Jackson County, Lenawee County, Livingston County, and Shiawassee County. The Region 1 Planning Board also has active non-voting emergency management liaison relationships with MSP/EMHSD First District Coordinator, Michigan State University, District 1 Regional Medical Response Coalition, Delta Charter Township, Capital Region International Airport, and Delhi Charter Township. It also consists of voting representation in the area of public health from the region's Health Care Coalition.

The Region 1 Board works to achieve the following goals with funds from the Department of Homeland Security through the State Homeland Security Program and the Law Enforcement Terrorism Prevention Program.

Overarching Goals (By-Laws of the Region 1 Homeland Security Planning Board – April 2018)

- Foster, develop, facilitate and strengthen collaboration, cooperation and interoperability within and between jurisdictions in Region 1 in order to enhance both inter- and intra-regional capabilities to prevent, mitigate, protect, respond, and recover from large-scale disasters and/or catastrophic events.
- The Regional Board recognizes that catastrophic events and multi-casualty incidents often require responses that are beyond the capability of a single jurisdiction, region, or even state. Consistent with the principles of NIMS and the National Preparedness Goal, the Regional Board's primary objective is to strategically assess capabilities, identify shortfalls, and facilitate a collaborative effort on behalf of all jurisdictions within the region, and launch coordinated initiatives to address program shortfalls.

Homeland Security Presidential Directive/ HSPD-8 Subject: National Preparedness Purpose

This directive establishes policies to strengthen the preparedness of the United States to prevent and respond to threatened or actual domestic terrorist attacks, major disasters, and other emergencies by requiring a national domestic all-hazards preparedness goal, establishing mechanisms for improved responses. The National Preparedness Guidelines are contained within four documents that correlate to establish a vision for national preparedness and provide a systematic approach for prioritizing preparedness efforts across the nation for local, state, and federal governments. These four documents address capabilities-based preparedness for the full range of homeland security missions, from mitigation through recovery, and include: *The National Preparedness Vision, the National Planning Scenarios, the Universal Task List,* and *Core Capabilities*.

The purposes of the *Guidelines* are to:

- Organize and synchronize national (including Federal, State, local, tribal, and territorial) efforts to strengthen national preparedness;
- Guide national investments in national preparedness;
- Incorporate lessons learned from past disasters into national preparedness priorities;
- Facilitate a capability-based and risk-based investment planning process; and
- Establish readiness metrics to measure progress and a system for assessing the Nation's overall

preparedness capability to respond to major events, especially those involving acts of terrorism.

Using the Core Capabilities List, local jurisdictions measure their capabilities against the list, identifying shortfalls and making corrective actions. In addition, local exercises are designed around using the national planning scenarios which allow for local jurisdictions to determine required capabilities already identified using pre-developed scenarios.

FEMA Grant Programs

FEMA has several grant programs to assist in the mitigation of hazard damages. These grants are available annually or after a federally declared disaster. The grant programs are the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and Building Resilient Infrastructure and Communities (BRIC). The HMGP provides funding to state, local, tribal, and territorial governments after a presidentially declared disaster, so that they can rebuild in a way that reduces or mitigates future disaster losses. FMA is a competitive grant programs to reduce or eliminate repetitive flood damage to buildings insured by the NFIP. Grants are available to states, local communities, federally recognized tribes, and territories. BRIC is available annually to states, local municipalities, tribes, and territories to undertake mitigation projects that reduce damages resulting from hazards and natural disasters.

School Safety Information Act: 102 P.A. 1999:

In response to the rash of school shootings that occurred in the late 1990s, the Michigan Legislature passed Act 102 in July 1999 – The Michigan School Safety Information Act – which requires local school districts to meet with law enforcement officials to develop emergency plans to handle violent situations. School superintendents are then required to educate local communities about the plans. The plans spell out, among other things, how to evacuate schools, bring first aid and emergency resources to the scene, and handle parents that want to pick up their children. The law also requires the development and implementation of a statewide school safety information policy, the reporting and compiling of certain school safety information, and the expulsion of pupils for certain assaults.

H.B. 4713 – Act 12 of Public Acts of 2014

The bill amended the Fire Prevention Code to modify school drill requirements. The bill also requires the governing body of a school to adopt and implement a school cardiac emergency response plan. The bill took effect on July 1, 2014. The bill requires a K-12 school to hold a minimum of five fire drills and three lockdown drills, according to a schedule prescribed in the bill. The Code requires a K-12 school to hold at least two tornado safety drills for each school year. Under the bill, at least one tornado safety drill would have to be held in March.

The bill requires the governing body of a K-12 school to ensure that documentation of a completed school safety drill is posted on its website (or on its intermediate school district's website) within 30 days of completing the drill and maintained for at least three years. The chief administrator of a K-12 school also has to give a list of scheduled drill days to the county emergency management coordinator, who would have to provide the information to the local emergency management coordinator, if any, and certain local officials. This information is exempt from disclosure under the Freedom of Information Act. If a drill is not conducted as scheduled, it would have to be rescheduled and the chief administrator would have to notify the county emergency management coordinator of the rescheduled date. The governing body of a school that operates any of grades kindergarten through 12 would have to adopt and implement a cardiac emergency response plan for the school. The plan would have to address all of the following: use and

maintenance of automated external defibrillators (AEDs), if available; activation of a cardiac emergency response team during an identified emergency; effective and efficient communication throughout the school campus; a training plan for the use of an AED and CPR techniques, in a school with grades 9 to 12; integration of the local emergency response system and emergency response agencies with the school's plan; and an annual review and evaluation of the cardiac emergency response plan.

Michigan Office of Safe Schools:

In 1998 the Michigan Legislature established the Michigan Office of Safe Schools within the Michigan Department of Education. The Office of Safe Schools began operating in October of 1999. Its mission is to collect and distribute information about school safety. The Office of Safe Schools maintains a web site that serves as a one-stop clearinghouse for information on school safety, school bus safety, food safety and current and proposed school safety legislation.

In March 2001, the Michigan Office of Safe Schools established a toll-free School Violence Hotline to provide a means for students to anonymously report specific threats of imminent school violence or other suspicious or criminal conduct. The toll-free hotline is operational 24-hours per day, 365 days a year, at 1-800-815-TIPS.

Michigan State Agencies:

Sabotage/terrorism is being addressed on a variety of other fronts within Michigan State Government. The Michigan Department of State Police oversees, and coordinates state agency actions related to homeland security and terrorism response – including the investigation of suspected or potential criminal enterprises and activities that might involve sabotage or terrorism. In addition, the State Police (in conjunction with other state agencies as well as federal and local counterparts) continuously prepares for terrorist incidents through emergency planning, training, information sharing and exercising efforts.

Weather Hazards (General)

National Weather Service Doppler Radar:

The National Weather Service (NWS) has completed a major modernization program designed to improve the quality and reliability of weather forecasting. The keystone of this improvement is Doppler Weather Surveillance Radar, which can more easily detect severe weather events that threaten life and property. The lead-time and specificity of warnings for severe weather have improved significantly. Doppler technology calculates both the speed and the direction of motion of severe storms. By providing data on the wind patterns within developing storms, the new system allows forecasters to better identify the conditions leading to severe weather such as tornadoes, severe straight-line winds, lightning and damaging hail. This means early detection of the precursors to severe storms, as well as information on the direction and speed of storms once they form.

National Weather Service Watches/Warnings:

The National Weather Service (NWS) issues severe thunderstorm watches for areas when the meteorological conditions are conducive to the development of severe thunderstorms. People in the watch area are instructed to stay tuned to National Oceanic and Atmospheric Administration (NOAA) weather radio and local radio or television stations for weather updates and watch for developing storms. Once radar or a trained Skywarn spotter detects the existence of a severe thunderstorm, the National Weather Service will issue a severe thunderstorm warning. The warning will identify where the storm is located, the direction in which it is moving and the time frame during which the storm is expected to be in the area. Persons in the warning area are instructed to seek shelter immediately. State and local

government agencies are warned via the Law Enforcement Information Network (LEIN), NOAA weather radio and the Emergency Managers Weather Information Network (EMWIN). Public warning is provided through the Emergency Alert System (EAS), Integrated Public Alert Warning System (IPAWS). The NWS stations in Michigan transmit information directly to radio and television stations, which in turn pass the warning on to the public. The NWS also provides detailed warning information on the Internet through the Interactive Weather Information Network (IWIN).

National Weather Service Education:
The NWS issues severe thunderstorm watches and warnings when there is a threat of severe thunderstorms. However, lightning, by itself, is not sufficient criteria for the issuance of a watch or warning (every storm would require a watch or warning). The NWS has an extensive public information program aimed at educating citizens about the dangers of lightning and ways to prevent lightning-related deaths and injuries, which is facilitated by local Emergency Management Programs.

Severe Weather Awareness Week:
Each spring, the Emergency Management Division, Michigan Department of State Police, in conjunction with the Michigan Committee for Severe Weather Awareness, sponsors Severe Weather Awareness Week. This annual public information and education campaign focuses on such severe weather events as tornadoes, thunderstorms, hail, high winds, flooding and lightning. Informational materials on lightning hazards are disseminated to schools, hospitals, nursing homes, other interested community groups, facilities, and the public and internet.

Tornado National Weather Service Watches/Warnings:
The NWS issues tornado watches for areas when the meteorological conditions are conducive to the development of a tornado. People in the watch area are instructed to stay tuned to NOAA weather radio and local radio or television stations for weather updates and watch for developing storms. Once a tornado has been sighted and its existence is confirmed and reported, or Doppler Radar shows strong probability of the development or occurrence of a tornado, the NWS will issue a tornado warning. The warning will identify where the tornado was sighted, the direction in which it is moving and the time frame during which the tornado is expected to be in the area. Persons in the warning area are instructed to seek shelter immediately.

State and local government agencies are warned via the Law Enforcement Information Network (LEIN), National Oceanic and Atmospheric Administration (NOAA) weather radio and the Emergency Managers Weather Information Network (EMWIN). Public warning is provided through the Emergency Alert System (EAS), (IPAWS), and Commercial Mobile Alert System (CMAS) using wireless towers. The NWS stations in Michigan transmit information directly to radio and television stations, which in turn pass the warning on to the public. The NWS also provides detailed warning information on the Internet, through the IWIN.

Warning Systems:
Outdoor warning siren systems warn the public about impending tornadoes and other hazards. Most of these systems were originally purchased to warn residents of a nuclear attack, but that purpose was expanded to include severe weather hazards as well. These systems can be very effective at saving lives in densely populated areas where the siren warning tone is most audible. In more sparsely populated areas where warning sirens are not as effective, communities are turning to NOAA weather alert warning systems IPAWS and Nixle to supplement or supplant outdoor warning siren systems.

Michigan Office of Fire Safety:

The Michigan Department of Licensing and Regulatory Affairs' Office of Fire Safety is responsible for conducting fire safety and prevention inspections in state-regulated facilities and certain other facilities. Specific services provided include: 1) fire safety inspections of adult foster care, correctional and health care facilities, and hotels/motels; 2) plan review and construction inspections of the regulated facilities in item (1), as well as schools, colleges, universities, and school dormitories; 3) coordination of fire inspector training programs; and 4) coordination of fire alarm and fire suppression system installation in regulated facilities. These activities are important mitigation activities designed to save lives and protect property from structural fire hazards. The State Fire Safety Board, also housed within the Michigan Department of Licensing and Regulatory Affairs, Bureau of Construction Codes and Fire Safety, promulgates rules covering the construction, operation and maintenance of schools, dormitories, health care facilities, and correctional facilities. These rules are designed to protect life and property at these facilities from fire, smoke, hazardous materials and fire-related panic.

Fire Safety Rules for Michigan Dormitories

Even before the Seton Hall University dormitory fire in January 2000, the State Fire Safety Board took action to enhance the fire and life safety protection of Michigan's college and university dormitories. On December 21, 1999, two new sets of rules took effect governing the construction, operation, and maintenance of school, college and university instructional facilities and dormitories. These sets of rules were updated to meet the most current nationally recognized standards from the National Fire Protection Association. The new rules adopted the 1997 edition of NFPA 101, Life Safety Code. NFPA standards provide the minimum requirements necessary to establish a reasonable level of fire and life safety and property protection from hazards created by fire and explosion.

The new rules require, among other things, that fire sprinklers be installed in newly constructed dormitories or those undergoing major renovations. However, existing dormitories don't fall under the new rules and therefore do not have to be retrofitted unless they are being renovated.

Wildfires

Because the vast majority of wildfires are caused by human activity, the Michigan Department of Natural Resources established, in 1981, the Michigan Interagency Wildfire Prevention Group. It was the first such group in the nation (promoting wildfire prevention and awareness) that had the full involvement of the state's fire agencies. In 1993, the Michigan Interagency Wildfire Prevention Group was expanded to form the Michigan Interagency Wildland Fire Protection Association (MIWFPA). The MIWFPA promotes interagency cooperation in fire prevention, training, fire technology, and firefighting operations. Members of the MIWFPA include the: 1) MDNR Forest Management Division; 2) USDA Forest Service - Huron Manistee, Hiawatha, and Ottawa National Forests; 3) USDI National Park Service - Pictured Rocks and Sleeping Bear Dunes National Lakeshores; 4) USDI Fish and Wildlife Service – Seney National Wildlife Refuge; 5) USDI Bureau of Indian Affairs; 6) Michigan Department of State Police – fire investigation; 7) Michigan State Firemen's Association; and the 8) Michigan Fire Chief's Association. The risk of wildfires is moderate. Lenawee County can reduce its vulnerability to wildfires by participating in multi-state and interagency mitigation efforts.

Riverine and Urban Flooding

National Flood Insurance Program

For many years, the response to reducing flood damages followed a structural approach of building dams, levees and making channel modifications. However, this approach did not slow the rising cost of flood damage, plus individuals could not purchase insurance to protect themselves from flood damage. It became apparent that a different approach was needed. The National Flood Insurance Program (NFIP) was instituted in 1968 to make flood insurance available in those communities agreeing to regulate future floodplain development. As a participant in the NFIP, a community must adopt regulations that: 1) require any new residential construction within the 100-year floodplain to have the lowest floor, including the basement, elevated above the 100-year flood elevation; 2) allow non-residential structures to be elevated or dry flood proofed (the flood proofing must be certified by a registered professional engineer or architect); and 3) require anchoring of manufactured homes in flood prone areas. The community must also maintain a record of all lowest floor elevations or the elevations to which buildings in flood hazard areas have been flood proofed. In return for adopting floodplain management regulations, the federal government makes flood insurance available to the citizens of the community. In 1973, the NFIP was amended to mandate the purchase of flood insurance as a condition of any federally regulated, supervised or insured loan on any construction or building within the 100-year floodplain. The probability of flood within the standard marked floodplain is at least 1% per year. (Lesser floodplains start at a minimum of 0.2% annual flood risk probability.) To account for climate change effects, people may (should) interpret the lower floodplain as the higher 1% chance category, and the standard 1% floodplain area as probably 5% annual probability or more.

The following communities within Lenawee County are recognized by FEMA as participants in the National Flood Insurance Program: City of Adrian, City of Hudson, City of Tecumseh, Village of Blissfield, Village of Clinton, Village of Deerfield, Adrian Twp., Blissfield Twp., Cambridge Twp., Clinton Twp., Deerfield Twp., Franklin Twp., Hudson Twp., Macon Twp., Palmyra Twp., and Woodstock Twp. These communities have all had their floodplain areas officially mapped and are in compliance with the NFIP. Flood maps can be found in Appendix H, beginning on page 245.

There are eleven (11) communities that do not have floodplains within them, and six (6) communities that are not participating in the NFIP. The six communities are as follows: Village of Cement City, Ogden Township, Raisin Township, Riga Township, Rome Township, Tecumseh Township. None of the six communities were active in the update of the Plan, with three only completing the survey and the other three not participating in any manner. None of the six communities provided a reason as to why they are not participating in the NFIP.

Community Rating System

The Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Besides the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment. Technical assistance on designing and implementing some activities is available at no charge. Participating in the CRS provides an incentive to maintaining and improving a community's floodplain management program over the years. Implementing some CRS activities can help projects qualify for

certain other Federal assistance programs.

U.S. Geological Survey:
The U.S. Geological Survey (USGS) is the primary federal agency that collects and analyzes stream flow data. The agency provides an application that provides access to an assortment of Geographic Information Systems (GIS) analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. The website can be found at https://water.usgs.gov/osw/streamstats/.

Michigan Flood Hazard Regulatory Authorities:
Land Division Act, 591 P.A. 1996, as amended by 87 P.A. 1997:
The Land Division Act governs the subdivision of land in Michigan. The Act requires review at the local, County and state levels to ensure the land being subdivided is suitable for development. From a flood hazards viewpoint, a proposed subdivision is reviewed by the County Drain Commissioner for proper drainage, and for floodplain impacts by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Land and Water Management Division.

Provisions of the Act and its Administrative Rules require that the floodplain limits be defined and prescribe minimum standards for developments for residential purposes and occupancy, within or affected by the floodplain. Restrictive deed covenants are filed with the final plat which stipulates that any building used, or capable of being used, for residential purposes and occupancy within or affected by the floodplain shall meet the following conditions:

- Be located on a lot having a buildable site of 3,000 square feet of area at its natural grade above the floodplain limit. (Lots with less than 3,000 square feet of buildable area may be filled to achieve that area.)

- Be served by streets within the proposed subdivision having surfaces not lower than one foot below the elevation defining the floodplain limits. Have lower floors, excluding basements, not lower than the elevation defining the floodplain limits. Have openings into the basement not lower than the elevation defining the floodplain limits.

- Have basement walls and floors below the elevation defining the floodplain limits, watertight and designed to withstand hydrostatic pressures. Be equipped with a positive means of preventing sewer backup from sewer lines and drains serving the building. Be properly anchored to prevent flotation. Floodplain Regulatory Authority, found in Water Resources, Part 31 of the Natural Resources and Environmental Act, 451 P.A. 1994, as amended.

The floodplain regulatory portion of Act 451 restricts residential occupation of high-risk flood hazard areas and ensures that other occupations do not obstruct flood flows. A permit is required from EGLE for any occupation or alteration of the 100-year floodplain. In general, construction and fill may be permitted in the portions of the floodplain that are not floodway, provided local ordinances and building standards are met. (Floodways are the channel of a river or stream and those portions of the floodplain adjoining the channel which are reasonably required to carry and discharge the 100-year flood. These are areas of moving water during floods.) New residential construction is specifically prohibited in the floodway. Non-residential construction may be permitted in the floodway, although a hydraulic analysis may be required to demonstrate that the proposed construction will not harmfully affect the stage-discharge characteristics

of the watercourse. The Act does not apply to watersheds that have a drainage area of less than two square miles. Those small watersheds are considered to be local drainage systems, and do not fall under the Floodplain Regulatory Authority.

Soil Erosion and Sedimentation Control, Part 91 of the Natural Resources and Environmental Protection Act, 451 P.A. 1994, as amended:

This portion of the Act seeks to control soil erosion and protect the waters of the state from sedimentation. A permit is required for all earth changes that disturb one or more acres of land, as well as those earth changes that are within 500 feet of a lake or stream. The Act itself does not address flood hazards, per se. However, if sedimentation is not controlled, it can clog streams, block culverts, and result in continual flooding and drain maintenance problems.

Inland Lakes and Streams, Part 301 of the Natural Resources and Environmental Protection Act, 451 P.A. 1994, as amended:

This portion of the Act regulates all construction, excavation and commercial marina operations on the State's inland waters. It ensures that proposed actions do not adversely affect inland lakes, streams, connecting waters and the uses of all such waters. Structures are prohibited that interfere with the navigation and/or natural flow of an inland lake or stream. Though reduction of flooding is not a specific goal of this Act, minimizing restrictions on a stream can help to reduce flooding conditions.

Wetlands Protection, Part 303 of the Natural Resources and Environmental Protection Act, 451 P.A. 1994, as amended:

This portion of the Act requires a permit from the EGLE for any dredging, filling, draining or alteration of a wetland. This permitting process helps preserve, manage, and protect wetlands and the public functions they provide – including flood and storm water runoff control. The hydrologic absorption and storage capacity of the wetland allows wetlands to serve as natural floodwater and sedimentation storage areas. The Act recognizes that the elimination of wetland areas can result in increased downstream flood discharges and an increase in flood damage. Permits for wetland alterations are generally not issued unless there is no feasible alternative, and the applicant can demonstrate that the proposal would not have a detrimental impact upon the wetland functions.

Natural Rivers Program, Part 305 of the Natural Resources and Environmental Protection Act, 451 P.A. 1994, as amended:

The Natural Rivers Act was originally passed in 1970 and has been incorporated as Part 305 of the Natural Resources and Environmental Protection Act. The purpose of this program is to establish and maintain a system of outstanding rivers in Michigan, and to preserve, protect, and enhance their multi-faceted values. Through the natural rivers designation process, a Natural River District is established (typically 400 feet either side of the riverbank) and a zoning ordinance is adopted. Within the Natural River District, permits are required for building construction, land alteration, platting of lots, cutting of vegetation, and bridge construction. Not all of the zoning ordinances on the natural rivers have the same requirements, but they all have building setback and vegetative strip requirements. Although the purpose is not specifically to reduce flood losses, by requiring building setbacks (in many cases prohibiting construction in the 100-year floodplain), flood hazard mitigation benefits can be realized.

Dam Safety, Part 315 of the Natural Resources and Environmental Protection Act, 451 P.A. 1994, as amended:

The Dam Safety Unit within the Land and Water Management Division, EGLE, has the primary responsibility to ensure dam safety within the state. Following the September 1986 flood in central Lower Michigan, the current Dam Safety Act was passed to ensure that dams are built and maintained with necessary engineering and inspections for safety of the public and the environment. EGLE is required to review applications involving construction, reconstruction, enlargement, alteration, abandonment and removal for dams that impound more than five acres of water and have a height of six feet or more.

Manufactured Housing Commission Act, 96 P.A. 1987, as amended:

The Michigan Manufactured Housing Commission Act and its implementing Administrative Rules provide regulation on the placement of manufactured homes and establishes construction criteria. Manufactured homes are prohibited from being placed within a floodway, as determined by EGLE. In addition, manufactured homes sited within a floodplain must install an approved anchoring system to prevent the home from being moved from the site by floodwaters (or high winds) and be elevated above the 100-year flood elevation.

Local River Management Act, 253 P.A. 1964:

Enacted in 1964, the Local River Management Act provides for the coordination of planning between local units of government in order to carry out a coordinated water management program. Implementation of the water management program occurs via the establishment of watershed councils. These councils conduct studies on watershed problems, water quality, and the types of land uses occurring within the watershed. Watershed councils have the authority to develop River Management Districts for the purpose of acquisition, construction, operation and the financing of water storage and other river control facilities necessary for river management. The provision to allow acquisition of land adjacent to the river for the purpose of management aids in regulating development of land prone to flooding.

Floodplain Service Program:

The need to identify a flood hazard area before construction is essential to the goal of flood hazard mitigation. EGLE regularly provides floodplain information to public and private interests as part of its Floodplain Service Program under the Water Resource Division. The goal of the program is to provide 100-year floodplain information to interested parties so that informed purchase or development decisions can be made. In addition to providing floodplain information, EGLE will provide information on land and water "interface" permit requirements and on building requirements relating to construction in flood hazard areas.

Drought

U.S. Geological Survey:

The U.S. Geological Survey (USGS) is the primary federal agency that collects and analyzes stream flow data, another good index of the relative severity of drought. The agency provides a handy "Drought Watch" web site at http://waterwatch.usgs.gov/.

The site presents a map that is continually updated through an automated analysis of USGS stream gauging stations. Additional drought-related links can be accessed through the Michigan-specific web page: http://waterwatch.usgs.gov/new/index.php?m=dryw&r=mi) by clicking on the map (or proceeding directly to the specific web page at http://mi.water.usgs.gov/midroughtwatch.php).

Fixed Site Hazardous Material Incidents (including explosions and industrial accidents)
Resource Conservation and Recovery Act - 42 U.S.C. s/s 6901 et seq. (1976)
RCRA (pronounced "rick-rah") gave EPA the authority to control hazardous waste from the "cradle to grave". This includes the generation, transportation, treatment, storage and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future. The Federal Hazardous and Solid Waste Amendments are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for EPA, more stringent hazardous waste management standards and a comprehensive underground storage tank program.

Within Lenawee County, efforts are ongoing to enhance general awareness and specialized training for HAZMAT emergencies.

Hazardous Material Transportation Incidents
Superfund Amendments and Reauthorization Act (SARA), Title III:
As explained earlier, the Bhopal, India tragedy initiated a chain of events aimed at enhancing preparedness activities to minimize the potential for a similar event to occur in the United States. On October 17, 1986, the Superfund Amendments and Reauthorization Act (SARA) was signed into law. A major SARA provision is Title III (the Emergency Planning and Community Right-To-Know Act, also known as SARA Title III), which establishes hazardous material emergency planning, reporting, and training requirements for federal, state and local governments, and private industry. In Michigan, the SARA Title III program is jointly administered and implemented by two state departments—the Michigan State Police and EGLE.

Federal Hazardous Material Transportation Regulations:
The transportation, manufacturing, storage and disposal processes for hazardous materials are highly regulated by federal and state agencies in order to reduce risk to the public. At the federal level, the U.S. Department of Transportation, Office of Hazardous Materials Safety (USDOT/OHMS), is the regulating agency for all modes of hazardous material transportation. In addition to enforcing federal hazardous material transportation regulations, the USDOT/OHMS is also involved in a number of other areas aimed at improving the safety of hazardous material shipping. Those areas include: 1) research and development of improved containment/packaging and other technological aspects of hazardous material shipping; 2) interagency coordination efforts in hazardous material transportation planning and standards setting; 3) management of data information systems pertaining to hazardous material transportation; and 4) development of hazardous material safety training policies and programs.

In Michigan, the Motor Carrier Division, Department of State Police, oversees, coordinates and implements the commercial truck safety aspects of the USDOT regulations. The Michigan Department of Transportation oversees programs aimed at enhancing railroad safety and improving the rail infrastructure (which helps reduce the likelihood of a hazardous material rail transportation accident).

Hazardous Materials Transportation Uniform Safety Act:
The federal Hazardous Materials Transportation Uniform Safety Act (HMTUSA), enacted in 1990, provides

funding for the training of emergency responders and the development of emergency response plans for both fixed site facilities and transportation-related incidents. (This funding mechanism under the HMTUSA is referred to as Hazardous Material Emergency Preparedness [HMEP] grants.) In Michigan, the HMTUSA/HMEP program is coordinated and implemented by the Emergency Management Division, Department of State Police. Since the program's inception, over $326,000 in grants have been allocated to 80 Michigan communities for hazardous material planning and training activities.

Federal/State Hazardous Material Response Resources:
There are numerous groups at the federal, state and local levels and in private industry that are trained to deal with hazardous material fixed-site and transportation incidents. These groups include the National Response Team (NRT), Regional Response Teams (RRTs), and state and local hazardous material response teams. The Chemical Manufacturers Association established the Chemical Transportation Emergency Center (CHEMTREC) to provide 24-hour technical advice to emergency responders. The National Response Center (NRC), which operates much like CHEMTREC, was established to provide technical advice and coordinate federal response to a hazardous material incident.

In Michigan, a 24-hour statewide notification system called the Pollution Emergency Alerting System (PEAS) was established for reporting chemical spills to EGLE. As a companion to the PEAS, the Michigan Department of Agriculture (MDA) has established a 24-hour Agriculture Pollution Emergency Hotline for use by agrichemical users to report fertilizer and pesticide spills. Callers to the MDA hotline gain immediate access to appropriate technical assistance, regulatory guidance for remediation, and common-sense approaches for addressing the problem.

Oil and Natural Gas Well Accidents
Local Emergency Capability:
Communities that may be affected by oil or natural gas well accidents should have adequate procedures in their Emergency Operations Plans to address the unique types of problems associated with this hazard, including rescue and evacuation. Affected communities must work closely with company officials and surrounding jurisdictions to ensure compatibility of procedures for a fast, coordinated response. Mitigation possibilities include the use of community zoning regulations to provide suitable open, unoccupied "buffer" areas around refineries and compressor stations. EGLE regulations provide for buffer zones around wells and treatment and storage facilities.

Pipeline Accidents (Petroleum and Natural Gas)
MPSC Pipeline Safety Inspections:
Safety engineers from the MPSC are certified by the USDOT/OPS to conduct inspections on natural gas pipelines to ensure structural and operational integrity of the systems. If violations are found, the pipeline company can be ordered to take corrective actions; in addition, the pipeline operator may be fined. The MPSC safety engineers also respond to accidents involving natural gas pipelines (to ensure compliance with federal and state law and to offer technical assistance to emergency responders).

Protection of Underground Facilities Act / MISS DIG/ 811 Programs:
Michigan's first line of defense against pipeline and other utility line breaks from construction excavation is The "MISS DIG" / 811 Program established with the passage of Act 174 of 2014, The Protection of Underground Facilities. MISS DIG/ 811 System, Inc., is a 24-hour utility communications system that helps contractors comply with the state law (Act 174) which requires notification of utilities at least three working (but not more than 21 calendar) days before commencing excavation, tunneling, demolishing, drilling or boring procedures, or discharging explosives for a project. When properly administered and followed, the

MISS DIG/ 811 safety system does an excellent job of minimizing pipeline and utility line accidents.

Programs and Initiatives:
Pipeline jurisdiction and oversight in Michigan is complex, determined primarily by the type and function of a pipeline and its location. Agencies involved include 1) the MPSC Gas Safety Office; 2) the USDOT/OPS in Kansas City, Missouri; and 3) the Michigan Department of Environment, Great Lakes, and Energy, Geological Survey Division (EGLE/GSD). The table below is a breakdown of jurisdictional and inspection responsibilities for the various types of pipelines present in Michigan:

Pipeline Safety Regulation In Michigan

TABLE 3.6

Pipeline Type	Jurisdiction	Applicable Code	Inspected by
Inter-state natural gas	USDOT/OPS	49 CFR Part 192	MPSC Gas Safety Intrastate
Intra-state natural gas	State of MI/MPSC	Michigan Gas Safety Standards	MPSC Gas Safety
Liquid Petroleum	USDOT/OPS	49 CFR Parts 193/195	USDOT/OPS
Gathering Lines*	EGLE/GSD	Oil/Gas Administrative rules under Part 165, 1994 P.A. 451	
*Note: Gathering lines are run from a production facility (i.e., well) to a pre-processing plant (i.e., dehydration facility, separator, compression station). Source: Michigan Public Service Commission, Gas Safety Office			

Nuclear Power Plant Accidents
A portion of Lenawee County is located within the Ingestion Exposure Pathway Zone of the Enrico Fermi II Nuclear Power Plant, which has a radius of approximately 50 miles. Mitigation of nuclear power plant hazards on the local County level is primarily limited to the detection of radiation, alerting the public, and providing directions for evacuation and/or housing. Anything beyond that scope would be addressed by state and federal officials.

Infrastructure Systems
Water Infrastructure Failure
The Federal Clean Water Act regulates the discharge from community wastewater collection and treatment systems. The regulatory aspects of the Act that pertain to municipalities have been delegated to the EGLE Surface Water Quality Division for surface water discharge facilities, and the EGLE Wastewater Management Division for groundwater discharge facilities. Authority for the oversight of planning, facility design review, and construction permitting of sewerage systems collection, transportation and treatment facilities, is derived from Part 41 of the Michigan Natural Resources and Environmental Protection Act (451 P.A. 1994) and Administrative Rules promulgated under authority of Part 41. The two EGLE divisions assist communities with the development and maintenance of their wastewater collection and treatment

systems. In addition, they monitor and regulate these systems to ensure pollution abatement and health conditions are met. Although the regulatory authority vested in the EGLE is primarily aimed at preventing pollution of waters of the state, there are requirements in place under 451 P.A. 1994 regarding the design, construction, and operational integrity and reliability of wastewater collection and treatment systems.

Electrical Infrastructure Failures

Disaster-related damage to electric power facilities and systems is a concern that is being actively addressed by utility companies across the state. Detroit Edison, Consumers Energy and other major electric utility companies have active, ongoing programs to improve system reliability and protect facilities from damage by wind, snow and ice, and other hazards. Typically, these programs focus on trimming trees to prevent encroachment of overhead lines, strengthening vulnerable system components, protecting equipment from lightning strikes, and placing new distribution systems underground. The Michigan Public Service Commission (MPSC) monitors power system reliability to help minimize the scope and duration of power outages.

On August 14, 2003, a major electrical failure occurred resulting in a blackout to 50 million people in Canada and Northeast US. While Lenawee County did not lose power as a result of this blackout, the County was impacted when southeast Michigan residents fled their homes to regions of the State not experiencing the blackout. The influx of visitors resulted in food shortages throughout the County.

Telecommunications System

Like electric utility companies, telecommunications companies are concerned with the issue of protecting facilities and systems from disaster-related damage. Major telecommunications companies have programs to improve system reliability and physically protect facilities and system components from wind, snow and ice, and other hazards, utilizing many of the same techniques as the electric utility companies.

Surface Drainage Systems:

Michigan's first drain laws appeared on the books as Territorial laws – years before Michigan achieved statehood. After attaining statehood in 1837, the State passed its first drain law in 1839. Since that time, there have been 45 separate acts passed regarding drainage, up to the most recent re-codification of drain law in 1956. Since 1956, the present drain code has been amended over 200 times – an indication of how important and dynamic the issue of drainage continues to be in Michigan. The Michigan Drain Code provides for the maintenance and improvement of the vast system of intra-County (County) and inter-County drainage facilities. Each drain has a corresponding special assessment district (watershed), a defined route and course, an established length, and is conferred the status of a public corporation with powers of taxation, condemnation, ability to contract, hold, manage and dispose of property, and to sue and be sued. Drainage districts and drains are established by petition of the affected landowners and/or municipalities. County drains, with a special assessment district entirely within the County, are administered by the locally elected County Drain Commissioner. Inter-County drains, with a special assessment district in more than one County, are administered by a drainage board that consists of the drain commissioners of the affected counties and is chaired by the Director of the Michigan Department of Agriculture and Rural Development (MDARD).

Water Distribution Systems:

Michigan's public water supplies are regulated under the Federal Safe Drinking Water Act. EGLE, as a primary agency for the Federal government, provides supervision and control of Michigan's public water

supplies (including their operation and physical improvements) under the Michigan Safe Drinking Water Act (399 P.A. 1976).

The EGLE Drinking Water and Radiological Protection Division regulates, through a permit process, the design, construction and alteration of public water supply systems. Water supply construction must be conducted within the framework of the Michigan Safe Drinking Water Act, as well as the Architecture, Professional Engineering and Land Surveying Act (240 P.A. 1937, which requires professional engineering preparation of construction documents for water works construction costing over $15,000). Most communities in Michigan have, in conjunction with the EGLE, developed water system master plans that conform to the requirements of the Michigan Safe Drinking Water Act. From a hazard mitigation standpoint, which is important because it helps ensure that all new water system construction and alterations to existing systems will conform to the minimum standards set in the Act. While not making water infrastructure "disaster-proof", the standards provide at least a basic level of design, structural and operational integrity to new or renovated portions of a community's water supply system.

Public Health Emergencies

Michigan Department of Health and Human Services:

The Director of the Department of Health and Human Services, and local public health officers, have the authority (under the Michigan Public Health Code—1978 PA 368, as amended) to take those steps determined necessary and prudent to prevent epidemics and the spread of hazardous communicable diseases, or to effectively mitigate other conditions or practices that constitute a menace to public health. The Director and local public health officers can issue written orders to implement the required preventive steps and/or responses, and those orders can be enforced through the imposition of civil and criminal penalties for failure to comply. State and local health departments have detailed, written emergency operations plan that address public health emergencies.

U.S. Centers for Disease Control and Prevention:

At the national level, the U.S. Centers for Disease Control and Prevention (CDC), a branch of the Department of Health and Human Services, has the responsibility and authority to investigate public health emergencies to determine their cause, probable extent of impact, and appropriate mitigation measures. The CDC can also assist state and local public health officials in establishing health surveillance and monitoring systems/programs, and in disseminating information on prevention and treatment to the general public. The CDC announced dedicated funding for bioterrorism response, and Michigan has been strengthening its surveillance and intervention infrastructures with these funds. Since 2001, the CDC has also provided dedicated funding for public health emergency preparedness programs. In 2002, the MDCH Office of Public Health Preparedness was established to oversee these cooperative agreements. In the 2009 Influenza A (H1N1) event, CDC coordinated with numerous health departments across the country, tracked influenza cases, and provided information about outbreak trends. Tests were also performed, to verify whether the types of flu cases were being tracked.

Michigan Pandemic Influenza Plan:

In October 2009, the Michigan Department of Community Health updated the "Michigan Pandemic Influenza Plan," to provide response guidelines for an influenza pandemic affecting Michigan. Although the plan cannot eliminate the disease, it will aid in reducing the impact by enabling state and local agencies to anticipate, prepare for, and respond efficiently and effectively to the disease. The plan, which is divided into pre-pandemic, pandemic, and post-pandemic phases, details necessary activities at the state and

local level related to:

- command and management,
- crisis communications,
- surveillance,
- laboratory testing,
- community containment,
- infection control in health care facilities,
- vaccines and antivirals/medical management,
- data management,
- border/travel issues
- recovery

The Michigan Pandemic Influenza Plan is available for review and downloading at www.michigan.gov/flu.

Transportation Accidents
Air Transportation:
The Michigan Aeronautics Commission of the MDOT administers several programs aimed at improving aviation safety and promoting airport development. The Commission's safety programs include: 1) registering aircraft dealers, aircraft, and engine manufacturers; 2) licensing airports and flight schools; 3) inspecting surfaces and markings on airport runways; and 4) assisting in removal of airspace hazards at airports. The Commission's airport development program includes providing state funds for airport development and airport capital improvements – many of which contribute to overall air transportation safety. The Federal Aviation Administration (FAA) contracts with the MDOT for the inspection of the state's 238 public-use airports on an annual basis. The FAA has regulatory jurisdiction over operational safety and aircraft worthiness. The National Transportation Safety Board (NTSB) investigates all aircraft crashes that involve a fatality and publishes reports on its findings (see the NTSB section below).

Bus Safety:
School bus safety programs and initiatives generally fall into two categories: 1) driver skill enhancement, competency training and 2) physical inspections of bus mechanical and safety equipment. The Motor Carrier Division, Michigan Department of State Police, inspects all school buses and other school transportation vehicles (21,000 units) on an annual basis. In addition, all school bus drivers in Michigan must take and pass a bus driver education and training program, and then take regular refresher courses to maintain their certification to operate a school bus. School bus drivers must also pass an annual medical examination.

CHAPTER 4: HAZARD ANALYSIS

To help identify significant projects having the greatest impact to mitigate damages, the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) ranked the hazards based on the risk assessment, probable occurrence, potential to cause casualties, the vulnerability assessment, and available resources. This ranking resulted in the overall prioritization of the hazards impacting Lenawee County. Table 4.1 on page 61 was utilized in developing this hazard prioritization.

The five criteria for prioritization were risk assessment, probable occurrence, potential to cause casualties, vulnerability assessment, and available resources. The risk assessment values of high, medium, and moderate, were based on the overall risk assessment, using the following criteria: likelihood to occur, potential to cause casualties, capacity to cause damage, percent of population affected. Probable occurrence had a high value of 10 (occurring multiple times within a year) to 0 (having never occurred). Potential to cause casualties with a high value of 10 (multiple county event resulting in multiple deaths) to 0 (event within the County resulting in no deaths or injuries). Vulnerability assessment was identified by how vulnerable the residents are to impact of each hazard with high, medium, and low criteria. Available resources were the assets that could mitigate damages resulting from the hazardous event (fire equipment to address a wildfire or structural fire, or law enforcement to address civil disturbances).

Hazard Prioritization

TABLE 4.1

Event	Risk Assessment	Probable Occurrence	Potential to Cause Casualties	Vulnerability Assessment	Available Resources	Overall Priority
Cyberterrorism	Medium	10	0	High	Limited	High
Energy Emergencies	High	10	5	High	Limited	High
Hazardous Material Incidents[1]	High	10	8	High	Available	High
Infrastructure Failures	High	10	5	High	Limited	High
Public Health Emergencies	High	9	10	High	Available	High
Structural Fires	High	10	4	Low	Available	High
Transportation Accidents	Medium	10	4	High	Available	High
Wildfires	Moderate	10	5	Low	Available	High
Civil Disturbances	Medium	7	4	Medium	Limited	Medium
Dam Failures	Medium	3	5	High	Limited	Medium
Invasive Species	Medium	8	2	Low	Limited	Medium
Pipeline/Well Incidents[2]	Moderate	3	4	Medium	Limited	Medium
Riverine Flooding	Medium	10	2	Medium	Limited	Medium
Severe Weather[3]	High	10	6	High	Available	Medium
Special Events	Medium	10	2	Medium	Available	Medium
Sabotage/Terrorism	Medium	8	7	High	Limited	Medium
Severe Winds	High	10	10	High	Limited	Medium
Tornadoes	Medium	10	10	High	Limited	Medium
Drought	Medium	3	0	Medium	Limited	Medium
Extreme Temperatures	Moderate	9	5	Medium	Available	Medium
Nuclear Power Plant Accidents	Moderate	0	10	High	Not Available	Medium
Seasonal Population Changes	Moderate	10	0	Low	Available	Medium
Fog	Medium	10	6	Low	Not Available	Low
Subsidence	Moderate	6	4	Low	Limited	Low

(1) Hazardous Materials Incidents include-Hazardous Mitigation Fixed Site and Hazardous Mitigation Transportation

(2) Pipeline/Well Incidents include-petroleum and gas pipelines, oil and gas well incidents

(3) Severe Weather includes-Thunderstorms, hail, lightning, ice/sleet storms, and snowstorms

HIGH PRIORITY HAZARDS

CYBERTERRORISM

Unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives.

Hazard Description

Cyberterrorism is an attack that can result in violence against a person, or property, or at least cause enough harm to generate fear. Attacks that lead to death, or bodily injury, property damage, disruption of services, or actual/potential economic loss would be examples. Most recently cyberterrorism has expanded to mainly local governments, which has resulted in resetting their computer systems.

Cyberterrorism Events in Lenawee County

Cyberterrorism occurs daily through fraudulent phone calls or emails, generally to the elderly. To date, there have been numerous instances of individuals that have received fraudulent phone calls or emails, but local governments have not had their computer networks "hacked".

Cyberterrorism Overview

While some forms of cyberterrorism attack occur every day, cyberterrorism for county officials can be two-fold. The first concern is at the county level and is a large-scale event or events that can be inflicted on local banking or other financial/economic institution causing widespread hardship in our population. The second concern are telephone calls that use misrepresentation and prey upon the general public, specifically the elderly or lower income households. Lenawee County's demographic includes a large population of lower income and retired households. A disruption in monthly payment or replenishment would have severe financial hardships and could result in civil disobedience that could quickly overwhelm local resources. With most banking and financial transactions done electronically and are web-based, this is a threat that we have identified as a known hazard.

Recent examples that have occurred include: IRS Tax Fraud Schemes via email and telephone, Gas Credit Card and ATM Skimmer operations that have resulted in theft of credit card numbers causing misuse of credit cards, lost funds, and customer confidence issues that have resulted in lost revenue to local businesses. Lenawee County Law Enforcement, and Emergency Management and Homeland Security Division continue to monitor critical infrastructure sites and Government facilities for cyber intrusions. County Emergency Management and Homeland Security continue to educate businesses, community leaders, and general populations to all aspects of cyber related activities. This includes a recent grant awarded to further educate the senior population.

ENERGY EMERGENCIES

An actual or potential shortage of gasoline, electrical power, natural gas, fuel oil, or propane, of sufficient magnitude and duration to potentially threaten public health and safety, and/or economic and social stability.

Hazard Description

Michigan's citizens are dependent on multiple energy sources to provide the power to operate the

multiple systems in their homes or businesses, such as the lighting, cooking, and heating and cooling systems. Energy is also needed to operate motorized vehicles and allow the citizens of Michigan to move from place to place throughout the state, country, and possibly further. When one or more of these independent, yet interrelated energy sources fail even for a short period of time during a disaster, it can have devastating consequences. For example, when power is lost during periods of extreme heat or cold, people can literally die in their homes if mitigative action is not taken within sufficient time. When power is lost the water or waste treatment systems in a community are inoperable, serious public health problems arise that must be addressed immediately to prevent outbreaks of disease. When storm drainage systems fail due to damage or an overload of capacity, serious flooding can occur.

These are just some examples of the types of energy emergencies that can occur, and all of these situations can lead to disastrous public health and safety consequences if immediate mitigative actions are not taken. Typically, it is the most vulnerable members of society (i.e., the elderly, children, impoverished individuals, and people in poor health) that are the most heavily impacted by an energy emergency. If the emergency involves more than one source, or is large enough in scope and magnitude, whole communities and possibly even regions can be severely impacted, such as the gas shortages that have occurred in the past 30 years.

Energy Emergencies in Lenawee County

On 8/14/03 portions of the northeastern U.S. covering eight states suffered a power outage. The outage area included metro Detroit. While the outage did not affect Lenawee County directly, there was a major exodus from metro Detroit resulting in a large influx of visitors to the counties outside the impacted area, including Lenawee County.

Energy Emergencies Overview

Most of Lenawee County's energy emergencies are secondary hazards caused by other major events such as floods, windstorms, snow and ice storms. The main energy emergencies are power outages, which normally can be restored in a matter of hours. County EMC maintains short term shelter agreements with multiple agencies. However, when the power is out for a longer period of time, the local chapter of the American Red Cross is be called to set up temporary shelters.

HAZARDOUS MATERIAL AND INDUSTRIAL INCIDENTS-FIXED SITE

Hazardous Material Incident: an uncontrolled release of hazardous materials from a fixed site, capable of posing a risk to health, safety, property, and the environment.

Industrial Accidents-A fire, explosion, or other severe accident (especially if it involves hazardous materials) at an industrial facility that results in serious property damage, injury, or loss of life.

Hazard Description (Hazardous Material Incidents)

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

Hazardous materials are highly regulated by the government to reduce risk to the general public, property, and the environment. Despite precautions taken to ensure careful handling during the manufacture, transport, storage, use and disposal of these materials, accidental releases are bound to occur. Areas at most risk are within a 1-5-mile radius of identified hazardous material sites. Many communities have detailed plans and procedures in place for responding to incidents at these sites, but release can still cause severe harm to people, property, and the environment if proper mitigative action is not taken in a timely manner.

Hazard Description-Industrial Accidents

Industrial accidents differ from hazardous material incidents in the scope and magnitude of offsite impacts. Whereas hazardous material incidents typically involve an uncontrolled release of material into the surrounding community and environment that may require evacuations or in-place sheltering of the affected population, the impacts from industrial accidents are often confined to the site or facility itself, with minimal physical outside impacts. Nonetheless, industrial accidents, such as fires, explosions, and excessive exposure to hazardous materials, may cause injury or loss of life to workers at the facility, and significant property damage. In addition, industrial accidents can cause severe economic disruption to the facility and surrounding community, as well as significant long-term impacts on the families of the workers injured or killed.

As a major manufacturing and industrial center, Michigan has had its share of industrial explosions and/or fires that resulted in deaths or injuries. Fortunately, industrial and fire safety regulations enacted over the years have kept these types of accidents to a minimum. Although industrial accidents occur with regularity in Michigan, major incidents with mass casualties, such as the three deadly explosions that occurred in 1998 and 1999, are relatively rare.

Independence Fireworks near Osseo, MI on December 11, 1998 resulted in the death of 7 people and injuries to 13 people.

Ford Rouge Complex in Dearborn, Michigan on February 1, 1999, resulted in the death of 6 people and injuries to 14 people.

Independence Fireworks near Osseo, MI on March 29, 1999, resulted in the death of 5 people.

Superfund Amendments and Reauthorization Act (SARA), Title II

There are currently 5 Sites in Lenawee County designated SARA Title III, Section “302 Sites”. These sites are required to have an emergency plan on file with the Local Emergency Planning Commission, Fire Department, and their facility. All 5 “302 Sites” in Lenawee County have an emergency plan on file with the Local Emergency Planning Committee and their individual Fire Departments.

The meetings that were held in the county, attendees and the emergency manager expressed some concern for the safety and security of propane storage sites. The county would like to improve security and inventory the sites for the future safety of the residents. (Buffer Zones for 302 Sites are half-mile radius.)

Hazardous Material Incidents/Industrial Accidents in Lenawee County

There have been a number of hazardous material/industrial accidents in Lenawee County in recent years; however, they have not resulted in deaths or property damages.

NOTE: Nuclear research facilities can produce/use radioactive materials, as well as other hazardous substances, and therefore need to be dealt with by specially trained personnel. Caution should be exercised at these facilities, and proper radiological survey equipment should be used during a response.

Hazardous Material Overview

Even though there have not been any recent events resulting in deaths or property damages from hazardous materials, there have been a number of events. Thus, they present a major danger that could remain a concern for many years to come. As a result of the number of events, this hazard has been identified as a high priority hazard.

HAZARDOUS MATERIAL-TRANSPORTATION

Hazard material incident: an uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property or the environment.

Hazard Description

As a result of the extensive use of chemicals in our society, all modes of transportation, highway, rail, air, marine, and pipeline – are carrying thousands of hazardous materials shipments on a daily basis through local communities. A transportation accident involving any one of those hazardous material shipments could cause a local emergency affecting many people.

Michigan has had numerous hazardous material transportation incidents that affected the immediate vicinity of an accident site or a small portion of the surrounding community. Those types of incidents, while problematic for the affected community, are fairly commonplace. They are effectively dealt with by local and state emergency responders and hazardous material response teams. Larger incidents, however, pose a whole new set of problems and concerns for the affected community. Large-scale or serious hazardous material transportation incidents that involve a widespread release of harmful material (or have the potential for such a release) can adversely impact the life safety and/or health and well-being of those in the immediate vicinity of the accident site, as well as those who come in contact with the spill or airborne plume. In addition, damage to property and the environment can be severe as well. Statistics show almost all hazardous material transportation incidents are the result of an accident or other human error. Rarely are they caused simply by mechanical failure of the carrying vessel.

Hazardous Material Incidents: Transportation Overview

Although there have not been any significant hazardous materials transportation incidents, there have been many minor petroleum and hazardous materials spills throughout the years. Most major highways within the county are primarily two lanes and interstates. These routes are heavily congested in the summer months and often icy or impassable in the winter. It is certainly only a matter of time before a serious hazardous materials incident occurs on a county roadway, railway, or waterway. Because of the dangers that could arise from these accidents, they were given a high priority.

INFRASTRUCTURE FAILURES

Infrastructure failure: a failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services.

Hazard Description

Michigan's citizens are dependent on the public and private utility infrastructure to provide essential life supporting services such as electric power, heating and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation. When one or more of these independent, yet interrelated systems fail due to disaster or other cause – even for a short period of time – it can have devastating consequences. For example, when power is lost during periods of extreme heat or cold, people can literally die in their homes if immediate mitigative action is not taken. When the water or waste treatment systems in a community are inoperable, serious public health problems arise that must be addressed immediately to prevent outbreaks of disease. When storm drainage systems fail due to damage or an overload of capacity, serious flooding can occur.

These are just some examples of the types of infrastructure failures that can occur, and all of these situations can lead to disastrous public health and safety consequences if immediate mitigative actions are not taken. Typically, it is the most vulnerable members of society (i.e., the elderly, children, impoverished individuals, and people in poor health) that are the most heavily impacted by an infrastructure failure. If the failure involves more than one system, or is large enough in scope and magnitude, whole communities and possibly even regions can be severely impacted.

Communication Loss

Communication loss can be catastrophic in emergency situations in the county. Power outages or direct damage to communication equipment could mean life or death in certain situations. The population is dependent on emergency services getting to the incident site in a timely manner, and if there is damage to the equipment, the services may not reach their destination at all. The elderly population in the county is especially vulnerable to power outages and times of extreme weather, and these times are the most important to get services to them. In that case, there needs to be an alternative way of communication for the emergency services to reach their destination.

Infrastructure Failures in Lenawee County

On 03/13/97 an ice storm hit southern Michigan that resulted in heavy ice accumulations from freezing rain that ultimately changed to rain. Total precipitation in the region was 1.5 to 2.5 inches. Power outages throughout the region, including Lenawee County, resulted in power outages to over 400,000 homes in the region. In addition to the power outages, falling trees damaged homes, and cares throughout the region. Numerous homes in the region were without power for as long as four (4) days. Damages were estimated to be over $1 million.

On 02/20/11 a snowstorm dropped 5 to 10 inches of snow onto southern Michigan, which turned to ice in Lenawee County. Downed trees and powerlines occurred in Lenawee County due to ice accumulations of ½ to 1 inch. Power outages lasted in several areas of the County for four to five days. Damages were estimated at over $1.5 million.

Infrastructure Failures Overview

Most of Lenawee County's infrastructure failures are the results of other major events such as floods, windstorms, snow, and ice storms. The main infrastructure failures are power outages, which are normally restored in a matter of hours, but other infrastructure failures include communication losses, road closes, and bridge closures. Due to the impact that result from the infrastructure failures, they were given a high priority to address.

PUBLIC HEALTH EMERGENCIES

Public health emergency: a widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to or otherwise negatively impacts the general health and well-being of the public.

Hazard Description

Public health emergencies can take many forms: 1) disease epidemics; 2) large-scale incidents of food or water contamination; 3) extended periods without adequate water or sewer services; 4) harmful exposure to chemical, radiological, or biological agents; 5) large scale infestations of disease-carrying insects or rodents. Public health emergencies can occur as primary events by themselves, or they may be secondary events to another disaster or emergency, such as flood, tornado, or hazardous material incident. The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, a large number of people. Public health emergencies can be statewide, regional, or localized in scope and magnitude.

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

Occurrences of influenza and disease are common to residents, students and visitors to Lenawee County and typically impact only a small portion of the population. Although most of public health related events occur in schools and are quickly managed, the potential does exist for these events to rapidly spread to adjacent populations.

Most public health emergencies in Lenawee County impact only a small number of individuals and occur more than once annually. The potential for these events to continue is high and can be effectively managed. However, increased public awareness of potential outbreaks of influenza or other disease has also raised the real possibility that a large-scale event could occur. For this reason, development and testing of surveillance systems and integrated planning between local, state, and federal sources continues to receive much-needed attention.

Public Health Emergencies in Lenawee County

The most common type of public health emergency involves influenza that spreads through educational institutions, the workplace and other entities that experience a large volume of public traffic. Influenza typically kills between 200 and 500 individuals in Michigan alone and has the potential to change its structure and rapidly affect large populations.

In 2009, the spread of H1N1 was a threat in Lenawee County. The number of reported cases in Lenawee County was 342. There were no deaths reported as a result of H1N1. Vaccinations totaling more than 11,500 at one of the 57 vaccination clinics were provided from mid-October through mid-December in the County. There were also over 3,500 reports of flu-like illnesses from September of 2009 to December 2009.[4]

[4] Lenawee County Health Department

In early 2020, the coronavirus (COVID-19) reached pandemic proportions in the United States. The disease is an infectious disease caused by the SARS-CoV-2 virus. It is believed to have originated in China and was spread through the air. It is estimated (as of August 13, 2022) that nearly 93,000,000 people in the U.S. have had COVID-19, with over 1,000,000 people dying as a result. COVID vaccines began being administered in December 2020 but made available to the general public in the spring of 2021.

As of August 2022, in addition to the original vaccine series, there have been two additional boosters available to the general public 18 years of age and older. The number of required vaccinations for COVID-19 varied by distributor, with Pfizer and Moderna requiring two shots and Johnson and Johnson requiring one shot. After the initial vaccinations, several booster shots were made available in 2021 and 2022. The vaccinations did not fully immunize but did lessen the impact of the disease. As of November 2022, the disease was still present worldwide causing sickness and death, but deaths were reduced due to the number of people vaccinated as well as the variants of the original strain appeared to be less deadly than the original strain.

The Lenawee County Health Department completed an analysis of the impact of COVID-19. Below are several points of interest from that report for the time period of March 1, 2020, to November 27, 2022.

- 29,560 or 27 percent of the Lenawee County residents have contracted COVID-19;
- 1,003 or 3.4 percent of the persons contracting COVID-19 were hospitalized;
- 353 or 1.2 percent of the persons contracting COVID-19 died as a result;
- The hardest hit population was the 60+ age group. They were followed by the 30-39 age group and the 20-29 age group.
- The death rate fell dramatically from 2020 to 2022 going from 1.9 percent of the persons who contracted COVID-19 to 0.6 percent of those who contracted COVID-19.[5]

Public Health Emergency Overview

Michigan has had several large-scale public health emergencies in recent history, with the most recent being COVID-19. While nothing had the impact of COVID-19, other public health issues have had an impact on Lenawee County, which is why this has been deemed a high priority hazard.

STRUCTURAL FIRES

Structural fire: a fire, of any origin that ignites one or more structures, causing loss of life and/or property.

Hazard Description

In terms of average annual loss of life and property, structural fires, often referred to as the "universal hazard" because they occur in virtually every community, are by far the biggest hazard facing most communities in Michigan and across the country. Each year in the United States, fires result in approximately 5,000 deaths and 25,000 injuries requiring medical treatment. According to some sources, structural fires cause more loss of life and property damage than all types of natural disasters combined. Direct property losses due to fire exceed $9 billion per year, and much of that being the result of structural fires.

According to the Federal Emergency Management Agency's National Fire Data Center, residential fires represent 74% of all structural fires and cause 80% of all fire fatalities. Approximately 85% of those

[5] Lenawee County Health Department

fatalities occur in single- family homes and duplexes. Perhaps the most tragic statistic of all is that over 40% of residential fires and 60% of residential fatalities occur in homes with no smoke alarms.

According to statistics compiled by the Fire Marshal Division, Michigan Department of State Police for 2003 (the last year for which statewide statistics are available), nearly 19,000 structural fires occurred in Michigan, resulting in 161 deaths and 624 injuries. Dollar losses for structural fires were estimated at nearly $230 million. The Fire Marshal Division estimated that a structural fire occurred in Michigan every 28 minutes in 2003. Nationally, Michigan's fire death rates in 2007 of 15.4 persons per million (population) puts it in the upper third of all states in the nation.

Structural Fires in Lenawee County

There are numerous structural fires annually in Lenawee County. Often these fires result in the loss of a home or a business. Thus, while the County is susceptible to fires, their vulnerability in recent years has been limited to the loss of property. Even though the vulnerability is low, the risk remains high as a result of human behavior.

On 12/13/19 a fire was started at the HC4 plant, a Wacker Chemical Corporation building, located in Adrian. Although there was damage to the plant, there were no deaths or injuries resulting from the fire.

On 7/08/21 a fire just outside of Clayton resulted in the loss of 30-40 cows and a milking barn. No human injuries or deaths were reported.

On 9/14/21 a fire occurred at the old Mingus Fiberglass Boat Factory in Hudson. The building was totally destroyed due to the fire. The fire was identified as suspicious in nature.

Structural Fires Overview

Structural fires of building other than single family homes occur every year, in many communities. Three such fires have taken place in the last three years; however, this is the exception not the norm. Regardless of measures taken to reduce fires, and mitigate damages, they continue to exist, which result in damages and a concern to livestock. Because they are a major threat to the residents of Lenawee County they have been identified as a high priority hazard.

TRANSPORTATION ACCIDENTS: AIR, LAND, AND WATER

Transportation accident: a crash or accident involving an air, land or water-based commercial passenger carrier resulting in death or serious injury.

Hazard Description-Air Transportation Accidents

There are four circumstances that can result in an air transportation accident:

1. An airliner colliding with another aircraft in the air.
2. An airliner crashing while in the cruise phase of a flight due to mechanical problems, sabotage, or other cause.
3. An airliner crashing while in the takeoff or landing phases of a flight.
4. Two or more airliners colliding with one another on the ground during staging or taxi operations.

The Michigan Aeronautics Commission of the Michigan Department of Transportation administers several programs aimed at improving aviation safety and promoting airport development. The Commission's

safety programs include:

1. Registering aircraft dealers, aircraft, and engine manufacturers.
2. Licensing airports and flight schools.
3. Inspecting surfaces and markings on airport runways.
4. Assisting in removal of airspace hazards at airports.

The Commission's airport development program includes providing state funds for airport development and airport capital improvements, many of which, contribute to overall air transportation safety.

The Federal Aviation Administration (FAA) contracts with the Michigan Department of Transportation for the inspection of the state's 238 public-use airports on an annual basis. The FAA has regulatory jurisdiction over operational safety and aircraft worthiness. The National Transportation Safety Board (NTSB) investigates all aircraft crashes that involve a fatality and publishes reports on its findings.

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

1. Suppressing fires.
2. Rescuing and providing emergency first aid for survivors.
3. Establishing mortuary facilities for victims.
4. Detecting the presence of explosive or radioactive materials.
5. Providing crash site security, crowd and traffic control, and protection of evidence.

Hazard Description-Land Transportation Accidents

A land transportation accident in Michigan could involve a commercial intercity passenger bus, a local public transit bus, a school bus, passenger vehicles, or an intercity passenger train. Although these modes of land transportation have a good safety record, accidents do occur. Typically, a bus slipping off a roadway in inclement weather, or colliding with another vehicle causes bus accidents. Intercity passenger train accidents usually involve a collision with a vehicle attempting to cross the railroad tracks before the train arrives at the crossing. Unless the train accident results in a major derailment, serious injuries are usually kept to a minimum. Bus accidents, on the other hand, can be quite serious – especially if the bus has tipped over. Numerous injuries are a very real possibility in those types of situations.

School bus safety programs and initiatives generally fall into two categories:

1. Driver skill enhancement and competency training.
2. Physical inspections of bus mechanical and safety equipment.

The Motor Carrier Division, Michigan Department of State Police, inspects all school buses and other school transportation vehicles (21,000 units) on an annual basis. In addition, all school bus drivers in Michigan must a take and pass a bus driver education and training program, and then take regular refresher courses to maintain their certification to operate a school bus. School bus drivers must also pass an annual medical examination.

Local transit and intercity bus safety falls under the purview of the Michigan Department of Transportation's Bureau of Urban and Public Transportation. Generally, the issue of intercity and transit bus safety is handled on a partnership basis with the service providers, with MDOT providing oversight of the initiatives undertaken by the providers to ensure mechanical and operational safety.

The Michigan Department of Transportation is the state regulatory agency for railroad-highway grade crossing safety issues. In this role, MDOT conducts biennial, on-site crossing reviews for Michigan's 5,535 public crossings, and reports observed crossing maintenance deficiencies to the responsible railroad or roadway authority. In addition, MDOT conducts diagnostic study team reviews at selected crossings to determine whether the current level of warning device requires enhancement. At the present time, 42% of Michigan's public crossings have at least automatic side-of-street flashing light signals, and 16% have automatic gates.

In January 2001 an amendment (367 P.A. 2000) to the Michigan Vehicle Code went into effect allowing the MSP, MDOT, or specified local officials to install video cameras at railroad crossings to serve as a deterrent to motorists who might attempt to go around or through activated railroad crossing lights and gates. Although the ultimate purpose of this law is to reduce pedestrian and vehicular deaths and injuries at railroad crossings, the law will also likely reduce passenger train accidents caused by collisions with vehicles on the tracks, a major cause of many passenger train derailments.

Michigan's "Operation Lifesaver" Coalition, part of a national, non-profit education and awareness program dedicated to ending tragic collisions, fatalities, and injuries at highway-rail grade crossings and on railroad rights of way. The Program has helped reduce the number of serious crashes at railroad crossing in the state. The Operation Lifesaver Coalition in Michigan is spearheaded by the MSP and MDOT and is comprised of state and local government officials, law enforcement, and employees of the railroad companies operating in Michigan. The Operation Lifesaver program emphasizes education and enforcement, and its efforts appear to be working. Since 1996, the number of crashes, injuries, and fatalities at railroad crossing in Michigan has shown a steady decline. Any reduction in vehicle-train crashes at railroad crossings helps reduce the likelihood of a passenger transportation accident involving a train, school bus, local transit bus, or commercial intercity passenger bus.

Another MDOT program that can help improve rail safety is the Michigan Rail Loan Assistance Program. Established under Act 117, P.A. 1997, this program was initiated to help finance capital improvements on Michigan's rail infrastructure. Although the program is designed primarily to help preserve and improve rail freight service, any improvements made to the rail infrastructure that serves passenger rail service can only help improve passenger rail safety. Track rehabilitation is one of the eligible projects that can be funded under this program, and the safety value of a project is one of the primary selection criteria. The Lenawee County Transportation Map, Map 3.9 is included in Chapter 3.

Transportation Accidents in Lenawee County

On 11/21/16 a cargo tanker overturned as a result of a crash. The truck driver was killed and the driver of the other vehicle was injured.

Transportation Overview

Even though there have been no recent accidents involving commercial vehicles that have resulted in death or injury, these accidents occur, as do accidents between passenger vehicles. As such, transportation accidents were given a high priority.

WILDFIRES

Wildfire: an uncontrolled fire in grass or brushlands, or forested areas.

Hazard Description

Contrary to popular belief, lightning strikes are not a leading cause of wildfires in Michigan. Today, lightning causes only 4 percent of all wildfires, and the rest are caused by human activity. Outdoor burning is the leading cause of wildfires in Michigan. Debris burning was responsible for 32 percent of the wildfires in Michigan in 1999. Incendiary, or intentional, fires accounted for another 12 percent of the total wildfires.

Upon examination of the causes of fire, it becomes apparent that most Michigan wildfires occur close to where people live and recreate, which puts both people and property at risk. The immediate danger from uncontrolled wildfires is the destruction of timber, structures, other property, wildlife, and injury or loss of life to people who live in the affected area or who are using recreational facilities in the area.

Wildfires in Lenawee County

There have been no significant wildfires in Lenawee County in recent years, with only nine fires being reported to the DNR over the past 20 years. With the majority of the land being utilized for agricultural purposes, there is little area that has been retained as forest.

Wildfire Overview

Only nine fires have been reported over the past 20 years. This results in a 45 percent chance of a wildfire occurring in a given year. However, these fires have resulted in causing limited damage and no deaths or injuries resulting from the fires, wildfires were given a high priority to address.

MEDIUM PRIORITY HAZARDS

CIVIL DISTURBANCES

Civil disturbance: collective behavior that results in a significant level of law-breaking, perceived threat to public order, or disruption of essential functions and quality of life.

Hazard Description

Civil disturbances can be classified within the following four types: (1) acts or demonstrations of protest, (2) hooliganism, (3) riots, or (4) insurrection. Since most of these types of disturbance share similarities with each other, and the classifications presented here are not absolute and mutually exclusive, it is recommended that this entire section be studied as a whole. The descriptions that follow, while roughly organized by type of disturbance, provide information of interest in evaluating and understanding all types of civil disturbance, and therefore should not be treated as independent subsections or read in isolation from each other.

The first type, demonstrations of protest, usually contains some level of formal organization or shared discontent that allows goal-oriented activities to be collectively pursued. This first category includes political protests and labor disputes. Many protest actions and demonstrations are orderly, lawful, and peaceful, but some may become threatening, disruptive, and even deliberately malicious (on the part of at least some of those involved either in the protest itself or in reaction to the protest). It is only the latter type of event that should properly be classified as a civil disturbance. The destruction of property, interruption of services, interference with lawful behaviors of ordinary citizens and/or emergency responders, the use of intimidation or civil rights violations, and threats or actual acts of physical violence

may all occur during civil disturbance events. Actual Michigan events have included the willful destruction of property and impeded property access during labor strikes, and heated conflicts between opposing participants at political rallies or issue-driven demonstrations. Different risks and forms of disturbance are connected with the nature and perceived importance of the cause, the degree of organization among those who are active in the protest, and the amount of group cohesion among those who are involved.

The second category of civil disturbance, hooliganism, is relatively unorganized and involves individual or collective acts of deviance inspired by the presence of crowds, in which the means (and responsibility) for ordinary levels of social control are perceived to have slackened or broken down. Certain types of events, such as sporting events, "block parties," or concerts, become widely publicized and, in addition to normal citizens who merely seek entertainment, tend to also attract persons who seek situations in which anonymity, confusion, and a degree of social disorder may allow them to behave in unlawful, victimizing, or unusually expressive ways. An Example includes the disorder that has followed various championship sporting events. Although the majority of persons present are ordinary citizens (although many may have some level of intoxication), a minority of persons begin making themselves known through unlawful or extreme acts of deviance. It's from this part of the crowd that the hazard primarily stems.

Common problems include the widespread destruction of property, numerous types of assault and disorderly conduct, and criminal victimization. It should be noted that many persons who are normally law-abiding may temporarily behave in unusually aggressive ways during these events. This is often prompted by an understandably defensive anxiety about the disorder and behavior exhibited by the deviant minority, and possibly exacerbated by a level of alcoholic intoxication as well as the temptation by some to engage in appealing deviant behaviors that under normal circumstances of social control would not be selected. Many citizens remain law-abiding but may remain in the area of a civil disturbance either because they live in the area, have activities (including social and recreational ones) that they wish to continue engaging in, have legitimate business to conduct, or because they are curious or concerned and wish to observe or witness the situation as it occurs. The majority of such law-abiding citizens will leave the area in an orderly way when given clear instructions by a legally recognized authority to do so. There are cases in which hooliganism may become combined with protest, and thus complicate the situation for law enforcement personnel. In some circumstances, elements of protest are added only by a small minority of participants after the disturbances have already begun, but in other circumstances, protest activity may arise out of concerns regarding the extent and nature of pre-emptive law enforcement activities that were intended to prevent a civil disturbance.

The third type, riots, may stem from motivations of protest, but lacks the organization that formal protests include. Although legitimate and peaceful protests may spontaneously form when people gather publicly with the perception that they already share certain values and beliefs, riots tend to involve violent gatherings of persons whose level of shared values and goals is not sufficiently similar to allow their collective concerns or efforts to coalesce in a relatively organized manner. Instead, there tends to be a diffused sense of shared discontent, but relatively few norms to shape these strivings into clearly coherent action. For example, widespread discontent within a community that is sufficiently cohesive may quickly take on a set of shared leaders and clear organization, such as a march or chant that is clearly in the form of a protest or demonstration, but in an area that doesn't have the same cohesiveness and shared norms and values, a relatively chaotic form of expression may take place instead, involving assaults, intimidation, and unlawfully destructive expressions of discontent, possibly including the victimization of innocent citizens or businesses who have been selected by part of the crowd to function as scapegoats during their

expression of discontent. In addition to the sentiments of discontent that may have sparked the initial activities, elements of hooliganism may emerge and come to predominate, as certain persons may attempt to exploit the social disorder for their own individual ends. In other cases, elements of legitimate protest may also form within this type of civil disturbance, and pockets of organized protest may help to channel and contain the negative elements of hooliganism, looting, etc. that might otherwise threaten all area residents. The complexity of these events for law enforcement can be very great, demanding carefully calculated efforts to analyze the nature of the disturbance, and difficult decisions about how to approach and possibly involve the numerous types of persons, gatherings, groups, and behaviors that may have the potential to either mitigate or exacerbate the situation.

The fourth type of civil disturbance, insurrection, involves a deliberate collective effort to disrupt or replace the established authority of a government or its representatives, by persons within a society or under its authority. Some prison uprisings may fall into this category, although others may more properly be classified as riots or protests, depending upon the presence and extent of specific goals and organization, and the type of action used in achieving such goals. An insurrection has the deliberate goal of either replacing established authorities with a new distribution of power, or with the destruction of established power structures in favor of (usually temporary) anarchy or a smaller-scale set of recognized criminals (gang), ethnic, or other group networks and power structures. The latter circumstances tend to involve disturbances that exist on a relatively small scale, such as in a single local area or involving a prison network or "cult compound" (or any other similarly self-aware group or subculture with identified collective interests and a network that allows rapid communication). However, larger-scale insurrections are also possible, involving issues of class conflict or other widespread social inequalities, highly divisive political issues, or other important large-scale events that disrupt the social equilibrium because they illuminate areas in which cultural values are not sufficiently shared throughout the society or region that is experiencing the conflict, disruption, or strain. In many cases, this kind of large-scale social strain has developed gradually over time, and involves an entire series of compromises, concessions, and migrations that may temporarily relieve the disruptive social and value conflicts, only to reemerge after another period of changes and population growth has caused a breakdown in previous arrangements. This description of the causes of social discontent applies to many protests and riots, as well as insurrection. In cases involving the formation or emergence of significant subcultures or counterculture, such as during the Vietnam era, or when dominant values break down or fail to be established on important key issues or more, there is the potential for insurrection on a larger scale. The Civil War of 1861-1865 was one such instance, in which the authority of the federal government was either accepted or rejected by various states which then aligned themselves in opposition to each other. Between these two extremes (of a purely localized civil disturbance and a national civil war) are numerous other possibilities for regional, political, class, or ethnic conflicts that may involve one or more categories of citizen in conflict with others. Examples could include prisoners versus law enforcement personnel, a countercultural group versus the establishment, or a violent political activist group in conflict with selected representatives of a contrary viewpoint. (Some such actions may overlap with those of terrorism, q.v.)

Civil Disturbance in Lenawee County Overview

Civil disturbances rarely occur in Lenawee County. However, with the ever-increasing threats throughout society, this is a growing problem that may not be resolved solely at the local level. This was given a medium priority. Should a major event occur, the Michigan State Police, and possibly other law enforcement details will have to be called in to assist the local public safety personnel.

DAM FAILURES

The collapse or failure of an impoundment (water held back by a dam) resulting in downstream flooding.

Hazard Description

A dam failure can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Dam failures occur not only during flood events, which may cause overtopping of a dam, but also as a result of misoperation, lack of maintenance and repair, orvandalism.

A common form of dam failure occurs when tree roots disrupt the integrity of an earthen dam. Water can pass through the dam where the soil has been broken apart by the roots. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation.

In Michigan, all dams over 6 feet high that create an impoundment with a surface area of more than 5 acres are regulated by Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act (451 P.A. 1994), as amended. This statute requires EGLE to rate each dam as either a low, significant, or high hazard potential. This rating system is based solely on the potential downstream impact if the dam were to fail and not according to the physical condition of the dam. The National Inventory of Dams lists a total of 12 dams, with three (3) high risk dams, and five (5) significant risk dams within Lenawee County. The high risk dams are: Atles Mill Dam, in the Village of Clinton; Lake Adrian Dam, city of Adrian; Addison Mill Pond Dam, Village of Addison.

Dam Failure Flooding Overview

There were no dam failures in Lenawee County in recent years. A total of 66 dams are located in Lenawee County. Because of the number of high and significant dams (8) within the County this was given a medium priority.

DROUGHTS

Drought: a water shortage caused by a deficiency of rainfall, generally lasting for an extended period of time.

Hazard Description

Drought is the consequence of a reduction in the amount of precipitation that was expected over an extended period of time, usually a season or more in length. The severity of a drought depends not only on its location, duration, and geographical extent, but also on the water supply demands made by human activities and vegetation.

A drought can cause many severe hardships for communities and regions. Probably one of the most common and severe impacts to a community like Lenawee County would be the threat of a drop in the quantity and quality of agricultural crops. Other negative impacts that can be attributed to a drought include water shortages for human consumption, industrial, business and agricultural uses, recreation and navigation, declines in water quality in lakes, streams and other natural bodies of water, malnourishment of wildlife and livestock, increases in fires and wildfire related losses to timber, homes, and other property, increases in wind erosion, and declines in tourism in areas dependent on water-related activities.

These direct impacts can further result in indirect impacts to a community, such as reduced revenue due to income losses in agriculture, retail, tourism and other economic sectors; declines in land values due to

physical damage from the drought conditions and decreased functional use of the property, and possible loss of human life due to extreme heat, fire, and other heat-related problems.

Two common measurement tools of dry weather conditions are the Palmer Drought Indices (including the Palmer Drought Severity Index and the Palmer Hydrological Drought Index) and the Crop Moisture Index (CMI). The Palmer Drought Severity Index is a good long-term drought monitoring tool. It is a monthly index that indicates the severity of a wet or dry spell. This index is based on average temperature and rainfall information for a particular location in a formula to determine dryness. The CMI evaluates short-term moisture conditions across crop producing regions. It measures how much moisture is in the plant root zone of the soil. This index is based on the mean temperature and total precipitation that occurs each week, as well as the CMI from the previous week. The CMI changes as quickly as the weather changes. A heavy rainstorm can dramatically change the CMI for a region. Since this index changes so quickly and in response to a single weather event, the CMI is not considered a good long-term drought measurement tool.

The Palmer Drought Severity Index uses a value of 0 for the normal amount of rainfall in a particular location, and drought is shown in terms of negative numbers, for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought. Any value above 0 demonstrates that there have been above normal amounts of precipitation. This index can be used for indicating lake levels and surface water supply abnormalities but is not a good tool for monitoring climatic impacts on vegetation, especially crops.

Droughts/Drought Related Events Lenawee County

The State of Michigan has been divided into ten (10) climate divisions for drought monitoring an analyses. Lenawee County is located in Division 10, which includes the counties in southeastern Michigan.

According to the State of Michigan Hazard Analysis Appendix of the 2019 State of Michigan Hazard Mitigation Plan, From 1900 to 2019, Division 10 experienced nine lengthy droughts ranging from eight (8) months to 35 months in duration, with the most severe drought occurring in 1931. In addition, the NCEI has identified one additional drought occurring in 2001.

In 1930-31 the most extreme drought occurred when the Palmer Index reached a record low of -6.22. The drought was 17 months in duration. While drought occurs periodically, in Lenawee County, the Palmer Drought Index indicated drought conditions reached extreme severity only 3% of the time. No crop damages or other property damages, or injuries/deaths resulted from the drought events.

From 07/01/2001 to 07/31/2001 weather patterns across southeast Michigan prevented the development of widespread thunderstorms moving into the region from the west, and as a result less than ½ inch of rain fell during this stretch. Combined with a wetter than normal spring, thereby delaying the planting of crops, this drought impacted many of the crops. Even though the rains returned in August, many of the crops were not salvageable. Final tabulations were not reported to the NCEI and an estimated loss was not available.[4]

From 09/01/2002 to 09/30/2002 the weather was hot and dry. Record low rainfalls were reported throughout the region, which was worsened by the heat. Many of the communities were under water restrictions and numerous counties in the region were declared agricultural disaster areas. September

crop yields were estimated to be less than fifty percent; however, final estimates were not available.[5]

Drought Overview

There were two drought events reported in Lenawee County between 1/1/1997 and 8/31/2022, or about one every twelve and one-half years. These events have approximately 8 percent chance of occurring in any given year. As 74 percent of Lenawee County is land devoted to agricultural use, the biggest problem drought presents is the increased threat of loss of crops/livestock. Any prolonged drought could alter the quantity and quality of crops, livestock, and other agricultural activities, resulting in severe economic and social hardships throughout the County. Droughts occur over a large area and not to a specific site. All municipalities within the County are equally vulnerable to droughts. Even though there have been few droughts in recent years, because of their potential impact to the County, droughts were given a medium priority to address. The county has access to lake water for irrigation purposes, to limit the vulnerability due to drought.

EXTREME TEMPERATURES (COLD)

Extreme cold temperatures-prolonged periods of very low temperatures often accompanied by exacerbating conditions such as heavy snowfall and high winds.

Hazard Description

Extreme temperatures – whether it be extreme heat or extreme cold – share a commonality in that they both primarily affect the most vulnerable segments of society such as the elderly, children, impoverished individuals, and people in poor health. The major threats of extreme cold are hypothermia (also a major medical emergency) and frostbite.

Prolonged periods of extreme cold can pose severe and often life-threatening problems for Lenawee County's citizens. Like heat waves, periods of prolonged, unusually cold weather can result in a significant number of temperature-related deaths. Each year in the United States, approximately 700 people die as a result of severe cold temperature-related causes. This is substantially higher than the average of 170 heat-related deaths each year. It should be noted that a significant number of cold-related deaths are not the direct result of "freezing" conditions. Rather, many deaths are the result of illnesses and diseases that are negatively impacted by severe cold weather, such as stroke, heart disease and pneumonia. It could be convincingly argued that, were it not for the extreme cold temperatures, death in many cases would not have occurred at the time it did from the illness or disease alone.

Hypothermia (the unintentional lowering of core body temperature), and frostbite (damage from tissue being frozen) are probably the two conditions most closely associated with cold temperature-related injury and death. Hypothermia is usually the result of over-exposure to the cold and is generally thought to be clinically significant when core body temperature reaches 95 degrees or less. As body temperature drops, the victim may slip in and out of consciousness, and appear confused or disoriented. Treatment normally involves re-warming the victim, although there is some controversy in the medical community as to exactly how that should be done. Frostbite rarely results in death, but in extreme cases it can result in amputation of the affected body tissue.

Extreme Cold Events in Lenawee County

There have been three (3) extreme cold events reported by the NCEI for Lenawee County from 1997

through 2022. These events are widespread and not site specific. Each of these events would have impacted large areas of the entire County if not the entire County. There was no reported death due to these events and no damages to personal property were reported. Below are descriptions of several events that occurred.

On 12/21/2000 to 12/29/2000 after heavy snowfalls were recorded, temperatures dropped throughout the region. Average temperatures in the month of December were 19.3 degrees in Detroit, which were the 4th lowest on record. Combined with the heavy snowfall earlier in the month, this was one of the worst Decembers on record.

From 02/14/2015 to 02/15/2015 temperatures and wind chills were at a dangerous level. In the evening of the 14th, temperatures hovered around -5 to 5 above zero around the region. Winds blowing in from the northwest brought the temperature in the morning of the 15th to around 30 below zero. While the winds diminished, temperatures remained at 5 to 15 below zero.

Extreme Cold Overview

Three (3) extreme cold events were reported by the NCEI for Lenawee County, Michigan between 1/1/1997 and 8/31/22, or about one event every 8.33 years. The probability of a cold event occurring in a given year is about 12.5%. While there have been minimal conditions with excessive cold, cold events occur annually in Lenawee County and are a risk to the residents. Unfortunately, many of those most vulnerable to this hazard (children, elderly, homeless individuals, and the critically ill) may not have access to sufficiently heated environments. These events occur on a regional basis and such event would impact the entire County. All municipalities are equally vulnerable to these events. Excessive cold was given a medium priority to address.

EXTREME TEMPERATURES (HEAT)

Extreme warm temperatures: prolonged periods of very high temperatures often accompanied by exacerbating conditions such as high humidity and lack of rain.

Hazard Description

Extreme temperatures – whether it be extreme heat or extreme cold – share a commonality in that they both primarily affect the most vulnerable segments of society such as the elderly, children, impoverished individuals, and people in poor health. The major threats of extreme heat are heatstroke (a major medical emergency), and heat exhaustion. Extreme heat is a more serious problem in urban areas, where the combined effects of high temperature and high humidity are more intense.

Prolonged periods of extreme heat can pose severe and often life-threatening problems for Lenawee County's citizens. Extreme, uncharacteristically warm seasonal weather is characterized by a combination of very high temperatures and humid conditions. When persisting over a long period of time, this phenomenon is commonly called a heat wave.

The major threats of extreme summer heat are heatstroke (a major medical emergency), and heat exhaustion. Heatstroke often results in high body temperatures, and the victim may be delirious, or comatose. Rapid cooling is critical to preventing permanent neurological damage or death. Heat exhaustion is a less severe condition than heatstroke, although it can still cause problems involving dizziness, weakness and fatigue. Heat exhaustion is often the result of fluid imbalance due to increased

perspiration in response to the intense heat. Treatment generally consists of restoring fluids and staying indoors in a cooler environment until the body returns to normal. Other, less serious risks associated with extreme heat are often exercise-related and include heat syncope (a loss of consciousness by persons not acclimated to hot weather), and heat cramps (an imbalance of fluids that occurs when people unaccustomed to heat exercise outdoors).

Extreme Heat Events in Lenawee County

Two excessive heat events and twelve heat events were reported by the NCEI for Lenawee County, Michigan from 1997 to 2022 for a total of fourteen events. The days of the events ranged as early as February 11th to August 1st. There were no damages reported as a result of the events; however, two injuries were reported from one event.

On 05/29/2006 a major heat wave struck lower Michigan resulting in one-person suffering heat exhaustion in the County. This was a major event throughout lower Michigan and dozens of people were treated for heat exhaustion throughout the region.

On 07/17/2011 through 07/22/2011 another major heat wave hit lower Michigan resulting in three deaths being reported in Lower Michigan. Heat indices over 100 were reported on multiple days during this time period. No injuries or deaths were reported in Lenawee County.

Extreme Heat Overview

Fourteen (14) excessive heat and heat events were reported by the NCEI for Lenawee County, Michigan between 1997 and 2022 or about one every 1.75 years. These events have 56% chance of occurring in any year. While there have been several excessive heat/heat events, high heat events occur annually in Lenawee County and are a risk to the resident and visitors. Heat events occur over large areas and would not be restricted to Lenawee County, let alone a specific municipality. All municipalities are equally vulnerable by a heat event.

Air conditioning is probably the most effective measure for mitigating the effects of extreme summer heat on people. Unfortunately, many of those most vulnerable to this hazard (children, elderly, homeless individuals, and the critically ill) do not have access to air-conditioned environments. Excessive heat was given a medium priority to address.

FLOODING

For the purposes of this document, flooding will include both fluvial flooding (riverine) and pluvial flooding. Fluvial flooding: the overflow of rivers, streams, drains and lakes due to excessive rainfall, rapid snowmelt or ice jams and dam failures. Pluvial flooding: flooding events caused by extreme rainfall.

Hazard Description

Flooding of land adjoining the normal course of a stream or river has been a natural occurrence since the beginning of time. If these floodplain areas were left in their natural state, floods would not cause significant damage. Development has increased the potential for serious flooding because rainfall that used to soak into the ground or take several days to reach a river or stream via a natural drainage basin now quickly runs off streets, parking lots, rooftops, and through man-made channels and pipes.

Pluvial flooding is the result of heavy rains. Flooding from heavy rains can be the result of multiple causes,

several of which, include: an extremely heavy rainfall where the ground becomes saturated and can longer absorb the water; urban drainage systems are overloaded by excessive water flow; or lowlands that are inadequately drained.

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

Most riverine flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Ice jams also cause flooding in winter and early spring. Severe thunderstorms may cause flooding during the summer or fall, although these are normally localized and have more impact on watercourses with smaller drainage areas. Oftentimes, flooding may not necessarily be directly attributable to a river, stream or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall and/or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations – areas that are often not in a floodplain. That type of flooding is becoming increasingly prevalent in Michigan, as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow. Flooding also occurs due to combined storm and sanitary sewers that cannot handle the tremendous flow of water that often accompanies storm events. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns.

Ice Jams

Cold winters like those we experience in Lenawee County can produce thick river ice and the potential for ice jams. An ice jam develops when pieces of snow and ice build-up along a river. As the ice buildup increases, water passes slowly, and flooding develops behind the dam of ice. Water levels can also rise rapidly when temperatures increase resulting in snowmelt runoff or rain, thus adding more water to the river behind an ice jam.

In the spring, or when temperatures rise, the ice buildup will thaw and break up, and may unleash all of the dammed-up water in a short period of time. When this occurs, flooding can rapidly result downstream from the ice jam. The combination of ice, debris, and water released from the ice jam can cause tremendous physical damage to homes, docks, and other structures.

Monthly Mean Precipitation (Liquid Equivalent In Inches) In Lenawee County, 1991-2020

TABLE 4.2

Month	Lenawee County
	1991-2020
January	1.8”
February	2.1”
March	2.5”

April	3.4”
May	4.5”
June	4.3”
July	3.6”
August	3.3”
September	3.7”
October	3.2”
November	2.8”
December	2.6”
Annual Average	37.8”

Source: National Weather Service

Flooding in Lenawee County

The NCEI has reported that 28 floods have occurred in Lenawee County from 1997 to 2022. According to the information provided by the NCEI no deaths or injuries were reported as a result of these floods, and the damages reported were in excess of $700,000. While many of the events had no reported damages, several events did. In Table 4.3 are events with $50,000 or greater in reported damages. Following the table is more specific information on several of the more destructive floods.

Significant Flood Events In Lenawee County From 1997-2022

TABLE 4.3

Location	Date	Type	Death	Injuries	Property Damage	Crop Damage
City of Adrian	08/06/1998	Flash Flood	0	0	$50,000	$0
Southern Lenawee County	06/21/2006	Flash Flood	0	0	$150,000	$0
City of Adrian	06/21/2008	Flash Flood	0	0	$100,000	$0
Village of Addison	07/02/2008	Flash Flood	0	0	$100,000	$0
Palmyra Township	03/10/2009	Flood	0	0	$200,000	$0
Southern Lenawee County	06/27/2015	Flood	0	0	$100,000	$0

On 06/21/2006 severe thunderstorms moved across southern Lenawee County dropping more than five inches of rain. Flash floods were reported, with road washouts, and yards throughout the region having standing water and some homes having water in their first floor. Vehicle rescues were reported, and an SUV fell approximately 12 feet when a culvert washed out. Reported damages were estimated at $150,000.

On 06/21/2008 severe thunderstorms moved across southeastern Michigan during the afternoon hours. Flash flooding in the City of Adrian was reported with water up to car hoods on several local streets. Reported damages were estimated to be $100,000.

Heavy rains fell between 03/07/2009 and 03/11/2009 bringing more than three (3) inches of rain to the area and five (5) inches along to the River Raisin basin. The heavy rains caused flooding along the rivers.

Many roads and homes along the Raisin River were flooded. Damages were reported to be approximately $200,000.

On 06/27/2015 two to five inches of rain fell throughout the region during the daytime hours of the 27th. Many roads in the southern portion of the county were closed due to the flooding, with several of the roads washed out. Reported damages were estimated to be $100,000.

Flooding Overview

A total of 28 flood or flash flood incidents were reported by the NCEI for Lenawee County, Michigan between 1/1/1997 and 08/31/2022, or approximately one every year. The probability of a flood event is about 100% in any given year. Currently there are seventeen municipalities in Lenawee County that are participating in the National Flood Insurance Program (NFIP) with an additional 11 municipalities without a flood zone within their corporate boundaries. The remaining six municipalities have currently chosen not to participate in the program. The maps are effective as of August 15, 2019.

All municipalities are equally vulnerable to flash flood events resulting from heavy rainfall. However, the City of Adrian, Villages of Blissfield and Deerfield, and townships of Adrian, Blissfield, and Deerfield are all vulnerable to riverine flooding due to their proximity to River Raisin.

The County is vulnerable to flooding and as a result they have identified several measures to reduce their vulnerability to these events. There are seven properties that have reported repetitive losses resulting from floods that have repetitive flooding problems. They are all residential properties. Four of the properties are found in the Village of Blissfield, one property is located in the City of Adrian, one property is located in Deerfield Township, and the remaining property is located in the Village of Deerfield. Flooding has been given a medium priority to address.

HAIL

Hail: a condition where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that falls to the earth.

Hazard Description

Hail is a product of strong thunderstorms. Hail is formed when strong updrafts within the storm carry water droplets above the freezing level, where they remain suspended and continue to grow larger until their weight can no longer be supported by the winds. They finally fall to the ground, battering crops, denting autos, and injuring wildlife and people. As one of these thunderstorms passes over, hail usually falls near the center of the storm, along with the heaviest rain. Most hailstones range in size from a pea to a golf ball, but hailstones larger than baseballs have been reported. Large hail is a characteristic of severe thunderstorms, and it may precede the occurrence of a tornado.

Hailstorms in Lenawee County

According to the National Centers for Environmental Information (NCEI), Lenawee County, Michigan had 97 hail events on 53 days between 1997 and 2021. There were two reported events that resulted in damages, with a total of $150,000 in property damages, and $0 in crop damages. No injuries or deaths were reported from these events.

Hail Events In Lenawee County From 1997-2022

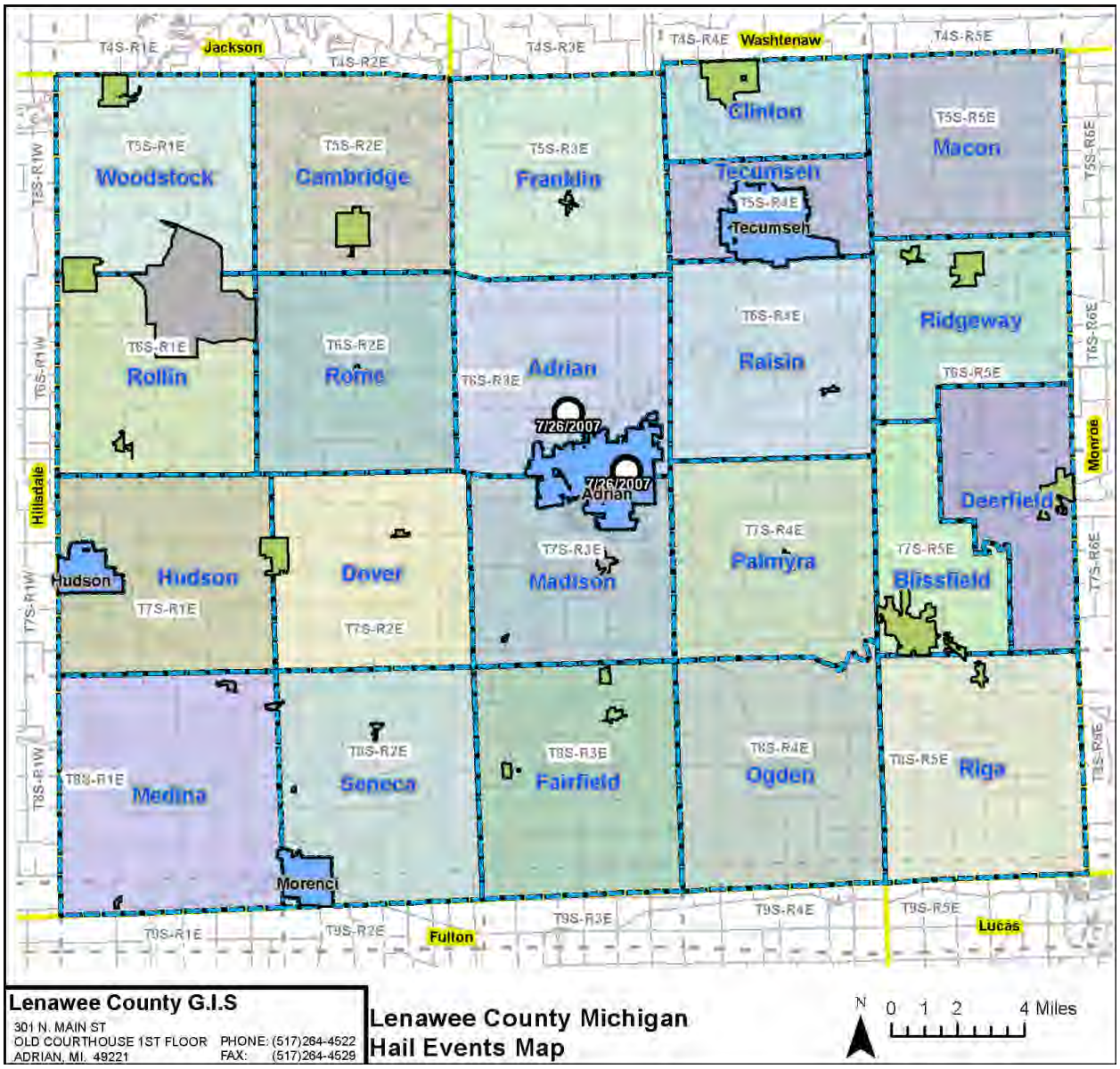
TABLE 4.4

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Adrian	07/26/2007	7:39 pm	1.75 inches	0	0	$75,000	0
Adrian	07/26/2007	7:42 pm	1.75 inches	0	0	$75,000	0

Source: National Centers for Environmental Information

Hail Events In Lenawee County From 1997- 2022

MAP 4.1



Source: National Centers for Environmental Information

On 07/26/2007, hail the size of golf balls fell on the City of Adrian denting many vehicles. Damages were approximately $75,000.

On 07/26/2007, hail the size of golf balls fell on the City of Adrian denting sheriff department patrol cars at the Lenawee County Fair. Damages were reported on other vehicles parked at the fairgrounds as well. Total damages were estimated at $75,000.

Hail Overview

From 1997 to 2021, Lenawee County had 97 hail-producing events on 53 day or about 4 events per year. Based on the above information, there is a 100% probability that a hail event would occur annually. NCEI received no specifics on the $150,000 in personal property damages resulting from the hail events. Hail events were located throughout Lenawee County during this reporting period. Only one event resulted in reported damages, however, that one event does not make Adrian more vulnerable to hail events, as damages to vehicles from hail are often not reported. All municipalities are equally vulnerable to hail.

The neighboring counties of Monroe, Washtenaw, Hillsdale, and Jackson reported damages resulting from these events, ranging from $0 to $605,000 in property and crop damages. Lenawee County is a moderate risk county for these events to be impactful; however, hailstorms are associated with thunderstorms and severe summer weather which were given a high priority to address. Lenawee County does utilize warning sirens and other storm alerts programs to provide warning for the residents of the County as the County is vulnerable to these events.

ICE/SLEET STORMS

Ice/sleet storm: a storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage.

Hazard Description

Ice storms are sometimes incorrectly referred to as sleet storms. Sleet is similar to hail only smaller and can be easily identified as frozen rain drops (ice pellets) which bounce when hitting the ground or other objects. Sleet does not stick to trees and wires, but sleet in sufficient depth does cause hazardous driving conditions. Ice storms are the result of cold rain that freezes on contact with the surface, coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. When electric lines are downed, households may be without power for several days, resulting in significant economic loss and disruption of essential services in affected communities.

Ice and Sleet Storms in Lenawee County

According to the National Centers for Environmental Information (NCEI), Lenawee County, Michigan had five ice/sleet storm events on 5 days between 1997 and 2021. Four events reported damages, totaling more than $2,500,000 in property damages, and $0 in crop damages. No injuries or deaths were reported from these events. In the table below are those events with reported damages, followed by a brief overview of the more impactful events.

Significant Ice/Sleet Storm Events In Lenawee County From 1997-2022

TABLE 4.5

Location	Date	Time	Deaths	Injuries	Property Damage	Crop Damage
Lenawee County	03/13/1997	9:00 pm	0	0	$1,000,000	$0
Lenawee County	01/30/2002	10:00 pm	0	0	$30,000	$0
Lenawee County	02/20/2011	1:30 pm	0	0	$1,500,000	$0
Lenawee County	02/12/2019	1:00 am	0	0	$25,000	$0

Source: National Centers for Environmental Information

On 03/13/1997 a major storm hit Michigan with southeastern Michigan getting a mix of ice, snow, and rain. As a result of the amount of ice, power lines were downed and over 400,000 homes in the region lost power, with some homes being without power for as long as four days. Numerous trees were downed falling on homes and automobiles. Additionally, numerous auto accidents occurred due to the icy street conditions. Up to that date, this was the longest power outage due to an ice storm. Damages were estimated at $1,000,000 in Lenawee County alone.

On 02/20/2011 a winter storm hit southeast Michigan with much of the region getting 5-10 inches of snow. In Lenawee County, the snow turned to ice with accumulations of ½ to 1 inch. Power outages lasted 4-5 days due to downed trees and power lines. Damages were estimated at $1,500,000 in Lenawee County alone.

Ice and Sleet Storms Overview

Five ice storms were reported by the NCEI from 1997 to 2022 or about one every 5 years. There is a probability of 20% that an ice/sleet storm of this magnitude could occur in any year. As these storms often extend throughout the region extending beyond county borders, all municipalities would be equally vulnerable to the impact of these events. One of the biggest problems resulting from ice and sleet storms is loss of power due to downed power lines. The weight of the ice causes power lines to snap and break. Sometimes it can take days to restore power. If this happens temporary shelters may need to be set up. The local chapter of the American Red Cross would be called. Also, with the power loss would come loss of heat, which could cause death from hypothermia especially with the elderly population. Another problem caused by ice and sleet storms would be debris cleanup. The weight of the ice could cause tree limbs to snap and break.

Approximately 87% of ice storms occur during the months of January, February, March, and April, when conditions are most conducive for the development of ice and sleet. Ice/sleet storms are considered to be severe weather events, which were given a medium priority to address. Lenawee County remains vulnerable to ice storms and their impact on damages trees, leading to power outages. One way to reduce vulnerability is to trim tree limbs away from power lines to minimize or possibly eliminate power outages due to fallen tree limbs. However, this is a very expensive undertaking due to the number of power lines located throughout the County. The utility companies have an annual program to eliminate potentially dangerous tree limbs that could down power lines.

INVASIVE SPECIES

Invasive species: a species whose introduction to a location (Michigan) causes or is likely to cause economic or environmental harm, or harm to human health, to an extent that outweighs the species' known benefits.

Hazard Description

Invasive species can be transported in many ways, such as on animals, vehicles, ships, commercial goods, produce, and clothing. Although non-native species are the foundation of U.S. agriculture, and also are used to prevent erosion, to provide fishing and hunting opportunities, and as ornamental plants and pets, occasionally a non-native organism flourishes too well and causes unwanted economic, ecological, or human health impacts. The terms "invasive" or "nuisance" are used to describe such species.

Hazard Analysis

Hundreds of new species from other countries are introduced intentionally or accidentally into the United States each year. These invasive species may arrive on our shores in a variety of ways. Transportation efficiencies that make it possible to travel around the globe in hours rather than weeks make it possible for organisms to survive transportation from one continent to another. As more adaptable and generalized species are introduced to environments already impacted adversely by human activities, native species are often at a disadvantage to survive in what was previously a balanced ecosystem.

Invasive Species in Lenawee County

Lenawee County officials have identified 37 invasive species that have been located in Lenawee County. They are as follows: Eurasian Collard Dove, Grass Carp, Brown Marmorated Stink Bug, Gypsy Moth (now known as the Spongy Moth), Japanese Beetle, Asian Clam, Zebra Mussel, Carolina Fanwort, Eurasian Watermilfoil, Curly-leaf Pondweed, Purple Loosestrife, Starry Stonewort, Water Hyacinth, Water Lettuce, Japanese Silt Grass, Phragmites, Garlic Mustard, Spotted Knapweed, Wild Parsnip, Autumn Olive, Common Buckthorn, Glossy Buckthorn, Japanese Barberry, Japanese Knotweed, Multiflora Rose, Tree of Heaven, Black Swallow-wort, Oriental Bittersweet, Oak Wilt Fungus, Narrowleaf Cattail, Redtop, Bitter Sweet Nightshade, Barnyard Grass, Common /carp, Black Knapweed, Emerald Ash Borer, and Gian Hogweed.

In addition, 13 additional species have been identified as a possible concern as they are found near Lenawee County. They are: Girdled Snail, Health Snail, Northern Snakehead, Round Goby, European Grog-bit, Rusty Crayfish, Hemlock Woolly Adelgid, Aedes aegypti, Aedes albopictus, Quagga Mussels, Sea Lamprey, Spiny Waterflea, and Fish Hook Water Flea.

Invasive Species Events in Lenawee County

In 2007 the Emerald Ash Borer (EAB) was first confirmed in Lenawee County. In 2011 Lenawee County began treating publicly-owned ash trees to stop the spread of the EAB. The County continues to treat publicly-owned trees through the Gypsy Moth Suppression Program and in 2021, 971 trees were treated.

Phragmites has infested the bodies of water/wetlands of Lenawee County. This plant first entered the United States in the late 19th century and spread through the development of roadways, railroads, and shoreline development. Phragmites engulfs shorelines and overtakes native plant species, providing little

or no food or habitat for native animals, and obscures views for landowners and visitors.

Invasive Species Overview

Lenawee County staff continues to address several invasive species such as Phragmites, Emerald Ash Borer, and Spongy Moths (gypsy moths) on a limited basis. Due to the exorbitant costs to eliminate any single species, they can only address these species in limited fashion. In addition, there is a concern that any or all of these species could be out of control at any given time, such as the case with the emerald ash borer, whose effects are still being felt.

LIGHTNING

Lightning: the discharge of electricity from within a thunderstorm.

Hazard Description

Most direct impacts from lightning are relatively site-specific in scope, and therefore do not have a tremendous impact on the community as a whole. With the temperature of a bolt of lightning approaching 50,000 degrees Fahrenheit in a split second, the most common direct damage from lightning is fire. The most common indirect effect of lightning is power outages. This indirect effect can have an impact on a much larger segment of the community, leaving hundreds and sometimes thousands of homes without electricity.

Globally, there are about 2,000 thunderstorms occurring at any given time, and those thunderstorms cause approximately 100 lightning strikes to earth each second. In the United States, approximately 100,000 thunderstorms occur each year, and every one of those storms generates lightning. It is commonplace for a single thunderstorm to produce hundreds or even thousands of lightning strikes. However, to the majority of the public, lightning is perceived as a minor hazard. That perception lingers despite the fact that lightning damages many structures and kills and injures more people in the United States per year, on average, than tornadoes or hurricanes. Many lightning deaths and injuries could be avoided if people would have more respect for the threat lightning presents to their safety.

Statistics compiled by the NCEI and the National Lightning Safety Institute (NLSI) for the period 1959-1994 revealed the following about lightning fatalities, injuries and damage in the United States:

Location of Lightning Strikes:

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

The NLSI estimates that 85% of lightning victims are children and young men (ages 10-35) engaged in recreation or work-related activities. Approximately 20% of lightning strike victims die, and 70% of survivors suffer serious long-term after-effects such as memory and attention deficits, sleep disturbance,

fatigue, dizziness and numbness.

Lightning Events in Lenawee County

Historically, the State of Michigan is near the top among U.S. states in both deaths and injuries resulting from lightning. A major cause for this is that Michigan is a destination location for outdoor, summer activities, the prime season for lightning strikes. The State has experienced large, reported property damages and multiple deaths and injuries in recent years. (According to NCEI, 313 events were reported in Michigan from 1997 through 2021, resulting in 16 deaths and 110 injuries, and over $18 million in personal property damages.) Lenawee County has had 18 reported events during this timeframe, with $880,000 in property damages and with one death and no injuries. Table 4.6 on page 88 identifies eight events with over $50,000 in damages and/or human death followed by an overview of the most significant events.

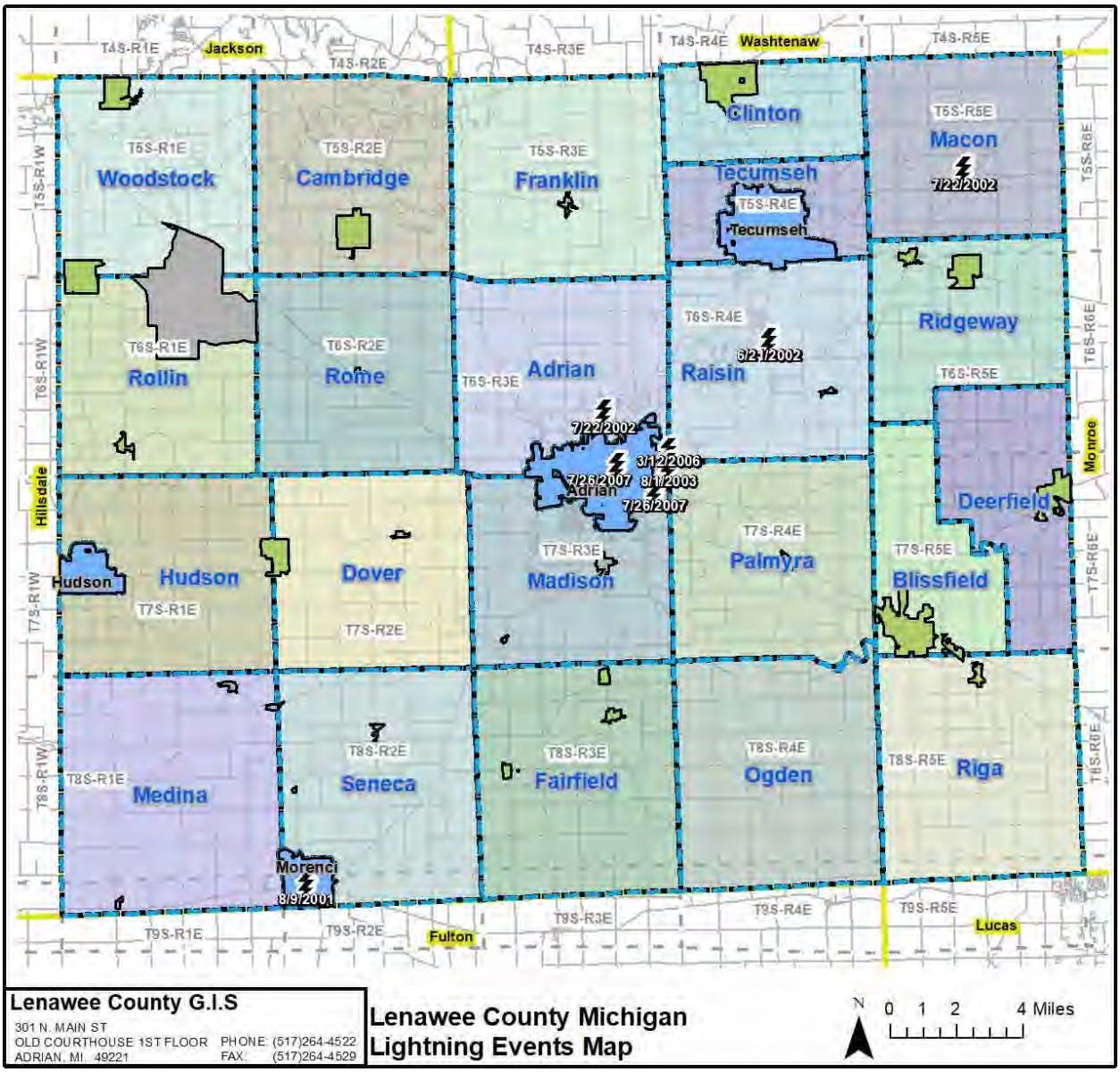
Significant Lightning Events In Lenawee County From 1997-2022

TABLE 4.6

Location	Date	Time	Deaths	Injuries	Property Damage	Crop Damage
Morenci	08/08/2001	12:35 pm	0	0	$150,000	$0
Tecumseh	06/21/2002	1:00 pm	0	0	$150,000	$0
Britton	07/22/2002	10:30 am	0	0	$100,000	$0
Adrian	07/22/2002	11:00 am	0	0	$50,000	$0
Adrian	08/01/2003	5:00 pm	1	0	$0	$0
Adrian	03/12/2006	1:39 am	0	0	$50,000	$0
Adrian	07/26/2007	7:42 pm	0	0	$250.000	$0
Adrian	07/26/2007	7:50 pm	0	0	$50,000	$0

Source: National Centers for Environmental Information

Significant Lightning Events In Lenawee County
From 1997-2022
MAP 4.2



Source: National Centers for Environmental Information

On 08/08/2001 lightning struck a barn completely destroying it and all its contents, which included a tractor, a grain truck, a travel trailer, lawn mower and some tools. The house had sustained only minor damages. Damages were estimated to be $150,000.

On 6/21/2002 lightning struck a home in Tecumseh setting it on fire. The home sustained severe damage from the fire. Damages were estimated at $150,000.

On 7/22/2002 it was reported that lightning struck a house in Macon Township, near the Village of Britton, resulting in major damage to the house in excess of $100,000.

On 08/01/2003 a woman standing in her back yard in Adrian was struck and killed by lightning.

On 07/26/2007 it was reported that over $250,000 in damages from lightning in several county buildings in downtown Adrian. Damages were to computer, radio, and telephone equipment.

Lightning Overview

According to the NCEI, there were 18 lightning events recorded in Lenawee County from 1997 to 2021, a period of 25 years, or about one damaging strike every 1.4 years. The probability of an event occurring annually is about 72%. Damages totaling approximately $880,000, with one (1) death resulted from the lightning strikes. Lenawee County is a moderate risk area for lightning events even though Statewide Michigan is considered to be a high-risk area for these events. Lightning events occurred throughout Lenawee County during the past 25 years. However, the populated areas are more vulnerable to these events, simply because there is a greater amount of structures/people in these areas.

To reduce the vulnerability of the residents, all-purpose warning sirens have been installed at various points in the County. Additionally, many of the municipalities have installed lightning protection devices at various municipal facilities to further minimize the impact of lightning strikes. However, even with those measures the County is still vulnerable to damage resulting from lightning strikes, as individual homes/barns are still susceptible to lightning. Lenawee County has experienced multiple lightning strike events in recent years, one such strike resulting in a death. As such lightning was given a medium priority to address.

NUCLEAR POWER PLANT ACCIDENTS

Nuclear power plant accidents: an actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility, in sufficient quantity to constitute a threat to the health and safety of the off-site population.

Hazard Description

Such an occurrence, though not probable, could affect the short and long-term health and safety of the public living near the nuclear power plant, and cause long-term environmental contamination around the plant. As a result, the construction and operation of nuclear power plants are closely monitored and regulated by the Federal government.

Nuclear Power Plant Failures Overview

Communities with a nuclear power plant must develop detailed plans for responding to and recovering from such an incident, focusing on the 10-mile Emergency Planning Zone (EPZ) around the plant, and a 50-mile Secondary EPZ that exists to prevent the introduction of radioactive contamination into the food chain. Michigan has 3 active and 1 inactive commercial nuclear power plants, in addition to 4 small nuclear testing/research facilities located at 3 state universities and within the City of Midland. Lenawee County does not have a nuclear power plant.

Lenawee County has a nuclear power plant located within 50 miles and is within the Secondary EPZ or

ingestion pathway zone. Thus, they are not required to have a plan in place for that zone. The closest active Nuclear Power Plant is located at the Fermi 2 Nuclear Plant in Monroe County. Portions of the Lenawee County are located within the 50-mile Secondary EPZ. Should an event occur that would impact the County, the Emergency Management Coordinator would defer to the governing agency.

OIL/GAS WELL INCIDENTS

Oil/Gas Well Incidents: an uncontrolled release of oil or gas, or the poisonous by-product hydrogen sulfide, from wells.

Hazard Description

Oil and natural gas are produced from fields scattered across 63 counties in the Lower Peninsula. Since 1925 over 44,000 oil and natural gas wells have been drilled in Michigan, of which roughly half have produced oil and gas. To date, Michigan wells have produced approximately 1.4 billion barrels of crude oil and 4 trillion cubic feet of gas.

The petroleum and natural gas industry are highly regulated and has a fine safety record, but the threat of accidental releases, fires and explosions still exists. In addition to these hazards, many of Michigan's oil and gas wells contain extremely poisonous hydrogen sulfide (H_2S) gas. Hydrogen sulfide is a naturally occurring gas mixed with natural gas or dissolved in the oil or brine and released upon exposure to atmospheric conditions. Over 1,300 wells in Michigan have been identified as having H_2S levels exceeding 300 parts per million (ppm).

As the table below indicates, at concentrations of 700 ppm, as little as one breath of hydrogen sulfide can kill. Although hydrogen sulfide can be detected by a "rotten egg" odor in concentrations from .03 ppm to 150ppm, larger concentrations paralyze a person's olfactory nerves so that odor is no longer an indicator of the hazard. Within humans, small concentrations can cause coughing, nausea, severe headaches, irritation of mucous membranes, vertigo, and loss of consciousness. Hydrogen sulfide forms explosive mixtures with air at temperatures of 500 degrees Fahrenheit or above and is dangerously reactive with powerful oxidizing materials. Hydrogen sulfide can also cause the failure of high-strength steels and other metals. This requires that all company and government responders be familiar not only with emergency procedures for the well site, but also with the kinds of materials that are safe for use in sour gas well response.

Physiological Response To H_2s

TABLE 4.7

10ppm	Beginning eye irritation
50-100 ppm	Slight conjunctivitis and respiratory tract irritation after 1-hour exposure
100 ppm	Coughing, eye irritation, loss of sense of smell after 2-15 minutes. Altered respiration, pain in the eyes and drowsiness after 15-30 minutes followed by throat irritation after 1 hour. Several hours of exposure results in gradual increase in severity of these symptoms and death may occur within the next 48 hours.
200-300 ppm	Marked conjunctivitis and respiratory tract irritation after 1 hour of exposure.

500-700 ppm	Loss of consciousness and possibly death in 30 minutes to 1 hour.
700-1000 ppm	Rapid unconsciousness, cessation of respiration and death.
1000-2000 ppm	Unconsciousness at once, with early cessation of respiration and death in a few minutes. Death may occur even if the individual is removed to fresh air at once.

Oil and Gas Well Accidents Overview

There are several hundred wells and only 14 active oil and natural gas wells in Lenawee County. This is a relatively small quantity when compared with state leader, Otsego County, with over 5700 wells. As a general rule, most gas companies prefer to respond to incidents involving their wells themselves – and in the vast majority of cases that is what happens. Because gas companies often have controlled burns, and deal with wells on a daily basis, it is impossible to ascertain how many incidents have actually occurred in the county. However, there is still the possibility that an emergency response agency could find themselves in the situation of responding to an incident at a gas well. Responders must understand the dangers associated with HS2 and must have a working knowledge of these wells that are in their areas of responsibility. Due to the small number of wells, these events were given a medium priority.

PETROLEUM AND NATURAL GAS PIPELINE INCIDENTS

Petroleum and natural gas pipeline incidents: an uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline.

Hazard Description

Though often overlooked, petroleum and natural gas pipelines pose a real threat in many Michigan communities. Petroleum and natural gas pipelines can leak or fracture and cause property damage, environmental, contamination, injuries, and even loss of life. The vast majority of pipeline accidents that occur in Michigan are caused by third party damage to the pipeline, often due to construction or some other activity that involves trenching or digging operations.

Michigan is both a major consumer and producer of natural gas and petroleum products. According to the Michigan Public Service Commission (MPSC), approximately 25% of the natural gas consumed in Michigan is produced within the state. The remaining 75% is imported by five interstate pipeline companies that have access to the major natural gas producing regions in North America. Michigan cycles more natural gas through its storage system than any other state. Michigan ranks 11th in the nation in production of natural gas and ranks 6th in consumption at 937.2 billion cubic feet. Michigan's petroleum product consumption in 1997 was 189 million barrels, ranking it 10th nationally. These figures underscore the fact that vast quantities of petroleum and natural gas are extracted from, transported through, and stored in the state, making many areas vulnerable to petroleum and natural gas emergencies. Michigan's gas and petroleum networks are highly developed and extensive, representing every sector of the two industries from wells and production facilities to cross-country transmission pipelines that bring the products to market, to storage facilities, and finally to local distribution systems.

While it is true that the petroleum and natural gas industries have historically had a fine safety record, and that pipelines are by far the safest form of transportation for these products, the threat of fires, explosions, ruptures, and spills nevertheless exists. In addition to these hazards, there is the danger of hydrogen sulfide (H2S) release. These dangers (fully explained in the Oil and Natural Gas Well Accidents

section) can be found around oil and gas wells, pipeline terminals, storage facilities, and transportation facilities where the gas or oil has a high sulfur content. Hydrogen sulfide is not only an extremely poisonous gas but is also explosive when mixed with air at temperatures of 500 degrees Fahrenheit or above.

Petroleum and Natural Gas Pipeline Accidents in Lenawee County

There have been no significant events that have occurred in recent years.

Petroleum and Natural Gas Pipeline Accidents Overview

There are several petroleum and natural gas pipelines running throughout the County. Lenawee County has several compressor stations and storage fields in the area. In the Emergency Service Office are plans and emergency contact numbers for these locations. One point that is stressed in most of these plans is for local emergency crews not to do anything on scene until a representative from the company arrives.

Because petroleum and natural gas pipeline accidents are an inevitable occurrence, affected local communities must be prepared to respond to the accident, institute necessary protective actions, and coordinate with federal and state officials and the pipeline company emergency crews to effectively manage and recover from the accident. That can best be accomplished through collaborative planning, training, and exercising of emergency procedures with all potentially involved parties. Due to the relatively small number of miles of pipelines, and lack of significant injuries, this hazard was given a medium priority to address.

SABOTAGE/TERRORISM

Sabotage/Terrorism: an intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives.

Hazard Description

Sabotage/terrorism can take many forms or have many vehicles for delivery, including: 1) bombings; 2) assassinations; 3) organized extortion; 4) use of nuclear, chemical, radiological, and biological weapons; 5) information warfare; 6) ethnic/religious/gender intimidation (hate crimes); 7) state and local militia groups that advocate overthrowing the U.S. Government; 8) eco-extremism, designed to destroy or disrupt specific research or resource-related activities; and 9) widespread and organized narcotics smuggling and distribution organizations. Because sabotage/terrorism objectives are so widely varied, so too are the potential targets of such actions. Virtually any public facility or infrastructure, or place of public assembly, can be considered a potential target. In addition, certain types of businesses engaged in controversial activities are also potential targets, as are large computer systems operated by government agencies, banks, financial institutions, large businesses, health care facilities, and colleges/universities.

One of the first acts of domestic sabotage/terrorism ever carried out occurred in Michigan on May 18, 1927, in Bath. A disgruntled taxpayer and farmer detonated 1,000 pounds of explosives under the newly constructed Bath Consolidated School killing 38 students and 3 teachers and injuring 58 others. The perpetrator then blew himself up, along with the school superintendent. As tragic as that event was, it could have been worse were it not for the fact that half of the explosives failed to detonate as planned, which certainly would have killed many more students and teachers.

Concentrated activities to prevent terrorist activities have become even more vital with the passage of time and in the wake of the 9/11 events of destruction in New York City and Washington D.C. Many more resources may anticipate being mobilized to prevent terrorist activities in the near future.

Although at first it might appear Lenawee County is an unlikely target for terrorism, it cannot be totally discounted. Potential targets include the dams, the water treatment plant, the runways at the airports, and all industrial sites in the area. Furthermore, any government building, school, or individual can become a target of domestic terrorism.

Sabotage and Terrorism include a broad range of potential hazards that affect a community from a variety of perspectives. This hazard is defined as an intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives. Sabotage/terrorism can take many forms or have many vehicles for delivery, including: 1) bombings; 2) assassinations; 3) organized extortion; 4) use of nuclear, chemical, radiological, and biological weapons; 5) information warfare; 6) ethnic/religious/ gender intimidation (hate crimes); 7) state and local militia groups that advocate overthrowing the U.S. Government; 8) eco-extremism, designed to destroy or disrupt specific research or resource-related activities; and 9) widespread and organized narcotics smuggling and distribution organizations.

Sabotage/Terrorism Overview

Even though there have not been any recently recorded sabotage/terrorism events occurring recently in Lenawee County, the Emergency Management staff has regularly scheduled training events to address these circumstances. With the ever-growing threat of local acts of terrorism, the County is working to prepare their personnel should an event occur. Because of the impact any act would create and the damages that would result, this hazard was given a medium priority to address.

SEASONAL POPULATION CHANGE

A population change for an extended time period in the county, beyond the normal level of people to which resources are allocated.

Hazard Description

As more and more people vacation to portions of Michigan, local communities in Michigan are going to find it harder to maintain levels of safety and resources to keep the population in the jurisdictions comfortable and safe. The trend of people buying summer homes or cottages is growing, and with the advent of Baby-Boomers reaching retirement age, the seasonal and permanent populations of these regions may continue to slowly grow.

Many stresses are put on local governmental agencies such as fire departments, police departments, as well as hospitals, road commissions, and ambulance services to maintain the status quo of service for their county. With more people relocating to the counties outside the Detroit Metro Area for extended periods of time, the level of staff and resources may not suffice to the needs of the population.

Seasonal Population Increases in Lenawee County

Traditionally, every summer secondary homes are occupied for extended time periods. These homes are primarily located on the numerous lakes throughout the County.

Seasonal Population Increase Overview

Seasonal population increase will continue to be a concern in Lenawee County, located along the southern border of the State of Michigan unless there are preventative measures taken to solve it. This summer population is based on numerous visitors of the campgrounds located throughout the County as well as the secondary or vacation homes. Many of the visitors stay throughout the summer, while others have varied "residence" times.

SEVERE WINDS

Severe winds: non-tornadic winds 58 miles per hour (mph) or 50.4 knots per hour (kph) or greater.

Hazard Description

Severe winds, or straight-line winds sometimes occur during thunderstorms and other weather systems and can be very damaging to communities. Often, when straight-line winds occur, the presence of the forceful winds, with velocities over 58 mph (50.4 kph) may be confused with a tornado occurrence. Severe winds have the potential to cause loss of life, property damage, and flying debris, but tend not to cause as many deaths as tornadoes do. However, the property damage from straight-line winds can be more widespread than a tornado, usually affecting multiple counties at a time. In addition to property damage to buildings, there is a risk for infrastructure damage from downed power lines due to falling limbs and trees. Large scale power failures are common during straight-line wind events.

Severe winds spawned by thunderstorms and other weather events can have devastating effects in terms of loss of life, injuries, and property damage. According to data compiled by the National Weather Service Michigan has experienced over 9,000 severe wind events (not including tornadoes) that resulted in 122 deaths and millions of dollars in damage since 1970. Severe wind events are characterized by wind velocities of 58 mph or greater, with gusts sometimes exceeding 74 mph (hurricane velocity), but do not include tornadoes.

Wind Events in Lenawee County

According to the National Centers for Environmental Information (NCEI), Lenawee County, Michigan had 247 severe wind events on 134 days between 1997 and 2022. A severe wind event was identified as either a high wind event, a strong wind event, or thunderstorm wind event. There were 65 days that had reported events that resulted in damages, with a total of $23,800,000 in property damages, and $0 in crop damages. There were also five (5) reported injuries from these events. Table 4.8 identifies those events with either $50,000+ in damages or human injuries.

Significant Severe Wind Events In Lenawee County
From 1997-2022

TABLE 4.8

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Countywide	04/06/1997	70 knots	0	0	$50,000	$0
Countywide	08/16/1997	75 knots	0	0	$50,000	$0
Countywide	07/21/1998	58 knots	0	1	$65,000	$0
Countywide	07/21/1998	65 Knots E	0	0	$100,000	$0

Countywide	07/21/1998	58 knots E	0	0	$145,000	$0
Countywide	05/09/2000	70 knots E	0	3	$960,000	$0
Countywide	05/09/2000	74 knots E	0	0	$125,000	$0
Countywide	08/04/2002	58 knots E	0	0	$50,000	$0
Countywide	11/12/2003	52 knots EG	0	0	$1,200,000	$0
Countywide	05/21/2004	55 knots EG	0	1	$0	$0
Countywide	10/30/2004	54 knots EG	0	0	$200,000	$0
Countywide	11/15/2005	48 Knots EG	0	0	$450,000	$0
Countywide	06/08/2008	56 knots EG	0	0	$60,000	$0
Countywide	12/28/2008	56 knots EG	0	0	$250,000	$0
Countywide	12/09/2009	52 Knots EG	0	0	$50,000	$0
Countywide	05/07/2010	52 knots EG	0	0	$50,000	$0
Countywide	01/19/2013	53 Knots MG	0	0	$500,000	$0
Countywide	11/17/2013	50 Knots EG	0	0	$1,000,000	$0
Countywide	04/14/2014	53 Knots EG	0	0	$50,000	$0
Countywide	11/24/2014	52 Knots EG	0	0	$50,000	$0
Countywide	03/08/2017	56 Knots EG	0	0	$15,000,000	$0
Countywide	05/04/2018	52 Knots EG	0	0	$1,500,000	$0
Countywide	02/24/2019	52 Knots EG	0	0	$500,000	$0
Countywide	11/15/2020	52 Knots EG	0	0	$300,000	$0
Countywide	12/11/2021	52 Knots EG	0	0	$200,000	$0

Source: National Centers for Environmental Information
E-Estimated
EG-Estimated Gusts
MG-Measured Gusts

On 7/28/1998, winds knocked down hundreds of trees throughout the County, damaging cars, buildings, power lines, and a radio tower. Thousands of people were without power for an extended period of time. No information on the injured person was available.

On 05/09/2000, a barn was destroyed in Hudson, in Blissfield a mobile home was overturned injuring the two occupants, another man was injured when he was struck by an electrical line, an RV was flipped, and numerous business signs were destroyed. In other parts of Lenawee County, barns were destroyed, part of an inn had its roof torn off, and many homes and vehicles were damaged as a result of fallen trees.

On 05/21/2004, trees and power lines were blown down. A tree fell on a woman who was taken to the hospital where she was treated and released.

On 03/08/2017 high winds in excess of 60 mph were recorded. Damages were reported on numerous buildings throughout the region as well as downed power lines, which resulted in in over a million DTE and Consumers Energy customers losing their power for multiple days.

Severe Winds Overview

There was a total of 247 non-tornado wind events from 1997 through 2021 or about 10.0 events per year. The probability of an event occurring in future years is 100 percent. Figures from the National Weather Service indicate that severe winds occur more frequently in the southern half of the Lower Peninsula than any other area in the State. These figures refer to winds from thunderstorms and other forms of severe weather not tornadoes. Damages have been extensive due to the winds, including five injuries, but no deaths being reported. These events occurred throughout the County, with most of the events occurring in more than one municipality. As these events extend beyond municipal boundaries, all municipalities are vulnerable to severe winds.

Damages from these events have been in the millions of dollars and often resulted in downed trees and/or power lines leading to loss of electricity in large areas. The recent trend in weather conditions has seen an increase in annual severe winds in Lenawee County, both in the number and severity of the events. Severe winds are considered to be a severe weather activity, which was given a high priority to address.

SNOWSTORMS

Snowstorm: a period of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility.

Hazard Description

As a result of being surrounded by the Great Lakes, Michigan experiences large differences in snowfall in relatively short distances. The annual mean accumulation ranges from 30 to 170 inches of snow. The highest accumulations are in the northern and western parts of the Upper Peninsula. In Lower Michigan, the highest snowfall accumulations occur near Lake Michigan and in the higher elevations of northern Lower Michigan. Lenawee County averages approximately 41 inches of snow per year.

Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds (35+ miles per hour) bearing enormous amounts of snow. Most of the snow accompanying a blizzard is in the form of fine, powdery particles that are wind-blown in such great quantities that, at times, visibility is reduced to only a few feet. Blizzards have the potential to result in property damage and loss of life. Just the cost of clearing the snow can be enormous. Snowstorms can also be dangerous, as heavy snows can shut down roads for a period of time, thereby limited access to many essential needs. If the snowfall is large enough it can also damage roofs of homes and other buildings.

Snowstorms in Lenawee County

There was a total of 51 winter storms that were identified in the NCEI database, from 1997 to 2022. All the storms were found in one of four snowstorm categories: blizzards, winter storms, winter weather, and heavy snows. Of these events, only four had damages, and no events had human-related injuries/deaths reported as a result of these storms. However, the data from these events may be incomplete as not all damages that may have occurred were reported. Below is a table that identifies the four storms that resulted in damages being reported in Lenawee County.

Significant Snowstorms In Lenawee County
From 1997-2022
TABLE 4.9

Location	Date	Time	Death	Injuries	Property Damage	Crop Damage
Lenawee County	01/12/1999	5:00 pm	0	0	$15,000	$0
Lenawee County	03/09/1999	2:00 am	0	0	$50,000	$0
Lenawee County	12/17/2000	1:00 am	0	0	$400,000	$0
Lenawee County	01/14/2007	9:00 pm	0	0	$40,000	$0

Source: National Centers for Environmental Information

Following are examples of the four different types of storms (blizzard, heavy snow, winter storm, and winter weather) that have affected Lenawee County as well as the major storms identified above

Blizzard (not cited above)-On 01/02/1999 a strong low pressure system came in from the Mississippi Valley to Lake Huron, resulting in a fluffy snow in large amounts. As much as 16 inches fell in Tecumseh, with other recorded amount in excess of ten inches reported throughout Lenawee County.

Heavy snow-On 03/09/1999 a low pressure system came up from the Ohio Valley and dropped over six inches of snow in Lenawee County. This coupled with a snowfall of six inches a few days earlier resulted in drifting snow and multiple car accidents. The roof from a roller rink collapsed due to the heavy snow. Damages from the collapsed roof were approximately $50,000.

Heavy snow-On 12/17/2000 another snowstorm hit Michigan. While the storm itself did not result in a large amount of snow, the snow, along previous snows caused a roof to collapse in Tecumseh. Additionally, numerous homes in the region experienced damage to their homes from ice dams and water seepage.

Winter storm (not cited above)-On 12/11/2000 a powerful storm system dumped heavy snow, freezing rain, and sleet in Lenawee County. Adrian had over 5 ½ inches of snow along with freezing rain. Hudson had snow and freezing rain, resulting in missed mail delivery for the first time since the blizzard of 1978. No damages were reported as a result of the event.

Winter weather-On 01/12 to 01/14/1999 in addition to the snowstorm on January 2nd and 3rd another big snowstorm hit beginning on the 12th. The snow, along with extremely cold temperatures, did not allow for the melting of the snow, causing the ground snow to swell to over two feet. This also resulting in numerous ice dams, and water damages throughout the region. Damages in the County were estimated at $15,000.

Winter Weather-On 01/14/2007 a low pressure system developed in the Plains and tracked eastward. The storm included snow and ice, which resulted in downed trees throughout the region. A downed tree in Hudson crushed a vehicle. No injuries were reported, but damages in the County were reported at $40,000.

Snowstorms Overview

There has been a total of 51 events in the snowstorm category (blizzards, winter storms, winter weather, and heavy snows) from 1/1/1997 to 05/31/2022. This is approximately two snowstorms per year. Based on the number of storms, there is a 100% probability that a winter storm event will occur in any given year. Severe snowstorms affect every Michigan community. While the number of events has not resulted in any reported deaths/injuries in Lenawee County, due to the nature of these events snowstorms are considered to be severe weather events, which were given a medium priority to address. Snowstorms are wide ranging events, often extending beyond multiple counties, if not states. Because of their size, snowstorms impact multiple municipalities, making all municipalities equally vulnerable.

With the advancement of weather predicting programs, the residents can be given notice ahead of these storms allowing adequate time to take shelter. However, due to the nature of these events, the County is still vulnerable to the impacts of these events (power outages, road closures, school/business closings).

SPECIAL EVENTS

Entertainment-based activities that attract people from outside the immediate area.

Hazard Description

Lenawee County is home to the Michigan International Speedway (MIS) and three colleges in Adrian, Adrian College, Siena Heights University, and Jackson College LISD Tech. MIS hosts two annual events (NASCAR and Faster Horses, a country music festival over a weekend) with attendances of approximately 30,000 and 80,000 persons. The combined enrollment of the two colleges is approximately 4,000 students and have a combined total of 57 athletic teams, which results in hundreds of events of various sizes annually. In addition to the MIS and colleges, there are several major annual events that bring in 10,000+ people. The Lenawee County Fair has 30,000-40,000 people over a span of a week, the Clinton Fall Festival, the Appleumkin Festival, and the Fiver Raisin Festival also have 10,000+ people over a weekend.

All these events at MIS, the colleges, and the festivals will bring in thousands of vehicles above the normal daily traffic count. This often results in bringing in additional first responders (police, fire, and medical response) from other jurisdictions to assist. The events at the MIS utilize Michigan State Police personnel as well as personnel from other counties. The local festivals utilize first responders from throughout the County. The added vehicles for these major events at MIS also can have an adverse impact on the roads, as they are not designed to handle the additional automobiles.

Large Venue Planned Events in Lenawee County

On 07/26/1998 three (3) race fans were killed, and six fans were injured during a NASCAR event at MIS when a car crash resulted in having a tire was propelled into the stands. No drivers were injured from this crash.

On 7/22/2018 a pedestrian was killed at the Faster Horses music festival when she was run over by a vehicle after the final concert of the event.

On 07/17/2021 three (3) people died and two people were critically injured of carbon monoxide poisoning in their camper and a fourth person's death was ruled an accident at the Faster Horses music festival. The carbon monoxide poisonings were the result of a misplaced generator.

Special Events Overview

Over the past 25 years there have been five reported deaths and over a hundred assaults and criminal sexual conduct reports at the Faster Horses music festival, three deaths and six injuries at the NASCAR races. In addition to these two major events, there are events that attract thousands of people over a period of time such as the Lenawee County Fair or Clinton Fall Festival, and numerous events at both colleges that attract hundreds if not thousands of people for a single event such as a football game or graduation. Subsequently, with the number of events that occur annually and the number of reported incidents, this project was given a medium priority.

TORNADOS

Tornado: a violently whirling column of air extending downward to the ground from a cumulonimbus cloud.

Hazard Description

Tornadoes in Michigan are most frequent in spring and early summer when warm, moist air from the Gulf of Mexico collides with cold air from the Polar Regions to generate severe thunderstorms. These thunderstorms often produce tornadoes. A tornado may have winds up to 300 miles per hour and an interior air pressure that is 10 to 20 percent below that of the surrounding atmosphere. The typical length of a tornado path is approximately 16 miles but tracks up to 200 miles have been reported. Tornado path widths are generally less than one-quarter mile wide. Historically, tornadoes have resulted in tremendous loss of life, with a national average of 111 deaths per year. Property damage from tornadoes is in the hundreds of millions of dollars every year in the United States.

Tornado Intensity

Tornado intensity is measured on the Fujita Scale, which examines the damage caused by a tornado on homes, commercial buildings, and other man-made structures. The Enhanced Fujita Scale rates the intensity of a tornado based on damage caused, not by its size. It is important to remember that the size of a tornado is not necessarily an indication of its intensity. Large tornadoes can be weak, and small tornadoes can be extremely strong. It is very difficult to judge the intensity and power of a tornado while it is occurring. Generally, that can only be done after the tornado has passed. See Table 4.10 for Enhanced Fujita Scale of Tornado Intensity for more specific information on intensity.

The Enhanced Fujita Scale Of Tornado Intensity

TABLE 4.10

F-Scale Number	Intensity Description	Wind Speed (mph)	Type/Intensity of Damage
EF-0	Gale tornado	65-85 mph	**Light damage**. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1	Moderate Tornado	86-110 mph	**Moderate damage.** The lower limit is the beginning of hurricane wind speed; roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

EF-2	Strong Tornado	111-135 mph	**Considerable damage.** Roofs torn off well-constructed houses; foundation of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3	Severe Tornado	136-165 mph	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; foundations blown away some distance.
EF-4	Devastating tornado	166-200 mph	**Devastating damage.** Whole frame houses, well-constructed houses and whole frame houses completely leveled; cars thrown, and small missiles generated.
EF-5	Incredible Tornado	200 mph+	**Incredible damage**. Strong frame houses lifted off foundations and carried considerable distances; automobile sized missiles fly through the air in excess of 100 meters; high-rise buildings have significant structural deformation; incredible phenomena will occur

Source: Storm Prediction Center

Tornado Events in Lenawee County

Five (5) tornadoes were reported in Lenawee County, Michigan between 1997 and 2022. All of these events resulted in $15,000 or more in personal damages, with no crop damages being reported. No deaths or injuries were reported during this time period. Of these five tornadoes, four had an F1 or EF1 rating, with the other tornado having an F0 rating.

Tornado Events In Lenawee County From 1997-2022

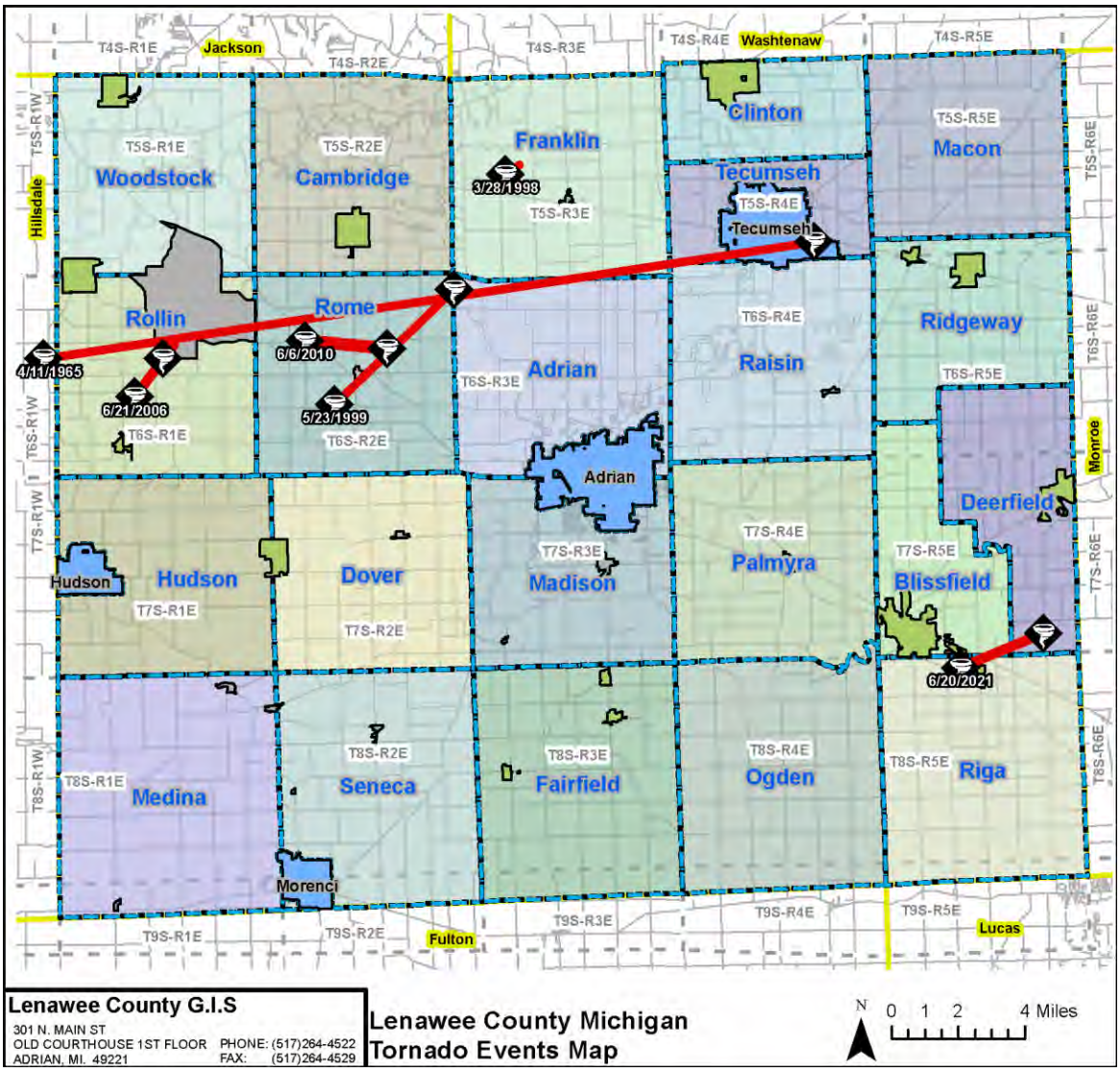
TABLE 4.11

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Tipton	03/28/98		F1	0	0	$25,000	$0
Rome Center	05/23/99		F1	0	0	$15,000	$0
Addison	06/21/06		F0	0	0	$40,000	$0
Rome Center	06/06/10		EF1	0	0	$500,000	$0
Riga	06/20/21		EF1	0	0	$250,000	$0

Source: National Centers for Environmental Information

Tornado Events In Lenawee County From 1997-2022

MAP 4.3



Source: National Centers for Environmental Information

Prior to the reporting period, on 4/11/65, two F4 tornados 45 minutes apart touched down in the Tipton areas killing 9 persons and injuring over 80 persons. Damages were estimated in excess of $25,000,000. This is the most destructive tornado that has hit Lenawee County since reporting of the events has occurred

On 3/28/98 an F1 tornado hit northern Lenawee County, destroying a farmhouse and barn, damaging another barn, and taking two silos off their foundation. No persons were injured and damages were estimated to be $25,000.

On 5/23/99 an F1 tornado moved northeast across Rome Township. The tornado destroyed a metal shed, blowing debris approximately one-quarter mile away. No injuries were reported and damages were estimated to be $15,000.

On 6/21/06 an F0 tornado touched down in Rollin Township. The tornado's path was approximately two miles in length and 100 feet in width. Several homes experienced minor damages, but most of the damage was to trees in the path of the tornado. There were no reported injuries and damages were estimated to be $40,000.

On 6/06/10 an EF1 tornado touched down in Lenawee County. The tornado's path was 2.5 miles in length and 250 feet in width in western Lenawee County. Several buildings were destroyed, and numerous trees were downed. There were no reported injuries and damages were estimated to be $500,000.

On 6/20/21 an EF1 tornado touched down in southeast Lenawee County. The tornado's path was approximately 2.7 miles in length and 125 feet in width. Five homes were damaged, as were four outbuildings, three barns, and multiple trees. There were no reported injuries and damages were estimated to be $250,000.

Tornadoes Overview

Lenawee County has experienced five tornadoes from 1997 to 2022 or about one event every five years. The probability of a tornado event occurring would be 20% in any given year. Tornadoes are considered to be a severe weather activity, which was given a high priority to address. To reduce the vulnerability of tornados, multiple warning systems are in use in Lenawee County. While this may decrease death/injuries, the County is still vulnerable to the physical damages that result from tornadoes. The tornadoes have been located in the north half and the southeast corner of Lenawee County. While there is no predicting when tornadoes will occur, these two areas have been more vulnerable to tornadoes in the recent past.

LOW PRIORITY HAZARDS

FOG

Fog: condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.

Hazard Description

Fog forms near the ground when water vapor condenses into tiny liquid water droplets that remain suspended in the air. Many different processes can lead to the formation of fog, but the main factor is saturated air. Two ways that air can become saturated are by cooling it to its dew point temperature or by evaporating moisture into it to increase its water vapor content. Although most fog, by itself, is not a hazard because it does not actually apply destructive forces, the interaction between humans and fog can be a dangerous situation, sometimes resulting in disastrous consequences.

Hazard Analysis

In considering severe and high-impact meteorological events, attention can easily become focused on the more dramatic storms. Tornadoes and hurricanes for example, are readily recognized by the general public and the meteorological community alike for their devastating consequences. Fog, on the other hand, does not lend itself as readily to this categorization. Fog can be very dangerous because it reduces visibility. Although some forms of transport can penetrate fog using radar, road vehicles have to travel slowly and use more lights. Localized fog is especially dangerous, as drivers can be caught by surprise. Fog is particularly hazardous at airports, where some attempts have been made to develop methods (such as

using heating or spraying salt particles) to aid fog dispersal. These methods have seen some success at temperatures below freezing.

Fog Events in Lenawee County

There were no dense fogs in Lenawee County from 1997 to 2022, as reported by the NCEI.

Fog Overview

One major event occurred in Lenawee County in the 25-year reporting period from 1997 to 2022, that one occurring in 2000. The probability of a future event occurring is approximately 4% in any given year. According to the Michigan State Hazard Mitigation Plan, one major fog event is estimated to occur in Michigan approximately every two years. Property damage can be significant for vehicles, although real property and structures are usually unaffected. Thus, while there has not been a number of fog events impacting the residents of Lenawee County in recent years, it is not unforeseeable that fog could become more prevalent in Lenawee County in the future. Fogs can be small in nature or extending regionally. All municipalities are equally vulnerable to these events, even though there is little impact as a result of the events. Fog is not considered to be a severe weather event and was not given a high priority to address, residents and visitors are vulnerable to dense fog, as it limits visibility and precautions must be made accordingly.

SUBSIDENCE

Subsidence: the lowering or collapse of the land surface caused by natural or human-induced activities that erode or remove subsurface support.

Hazard Description

Subsidence is the lowering or collapse of the land surface due to loss of subsurface support. It can be caused by a variety of natural or human-induced activities. Natural subsidence occurs when the ground collapses into underground cavities produced by the solution of limestone or other soluble materials by groundwater. Human- induced subsidence is caused principally by groundwater withdrawal, drainage of organic soils, and underground mining. In the United States, these activities have caused nearly 17,000 square miles of surface subsidence, with groundwater withdrawal (10,000 square miles of subsidence) being the primary culprit. In addition, approximately 18% of the United States land surface is underlain by cavernous limestone, gypsum, salt, or marble, making the surface of these areas susceptible to collapse into sinkholes.

Generally, subsidence poses a greater risk to property than to life. Nationally, the average annual damage from all types of subsidence is conservatively estimated to be at least $125 million.

Mine Subsidence

In Michigan, the primary cause of subsidence is underground mining. Although mine subsidence is not as significant a hazard in Michigan as in other parts of the country, many areas in Michigan are potentially vulnerable to mine subsidence hazards. Mine subsidence is a geologic hazard that can strike with little or no warning and can result in very costly damage. Mine subsidence occurs when the ground surface collapses into underground mined areas. In addition, the collapse of improperly stabilized mine openings is also a form of subsidence. About the only good thing about mine subsidence is that it generally affects very few people, unlike other natural hazards that may impact a large number of people. Mine subsidence can cause damage to buildings, disrupt underground utilities, and be a potential threat to human life. In

extreme cases, mine subsidence can literally swallow whole buildings or sections of ground into sinkholes, endangering anyone that may be present at that site. Mine subsidence may take years to manifest. Examples of collapses occurring decades after mines were abandoned have been documented in several areas of the country.

Michigan's Mining Experience

Michigan's rich mining heritage has played a significant role in the State's development into a world economic power. Due to its diverse geology, Michigan has a wide variety of mineral resources, most notable of which are copper ore, iron ore, coal, sand, gravel, gypsum, salt, oil, and gas. It is not surprising then that underground mining has occurred on a significant scale throughout Michigan's history. The principal types of underground mining that occurs, or has occurred in Michigan, include coal mining, metallic mineral mining, salt mining, gypsum mining, and solution mining.

Copper Mining

Copper mining, in particular, put Michigan on the map as a major mining area. Although native copper ore occurs in other parts of the world, at one time the quantity of Michigan's native ore was unsurpassed. From the mid to late 1800s, Michigan's Keweenaw Peninsula mines produced more native copper ore than any other mining area in North America. As those resources became depleted, copper mining began near White Pine in Ontonagon County. The target strata in the White Pine mining operations were on an anticline that was mined both at depths as shallow as 100 feet and as deep as 2900 feet. Over-mining of pillars in shallow parts of the mine caused collapse and subsidence at the surface, on mine property, during the 1980s. The "Copper County" area generally crosses Ontonagon, Houghton, and Keweenaw Counties.

Salt/Solution Mining

Michigan also has one of the world's largest underground salt accumulations. The thickest salt beds lie under most of the Lower Peninsula. These formations are, in some places, over 3,000 feet thick and composed of layers of salt and other minerals. Michigan ranked first or second in national salt production from 1880 to the late 1920s. The bulk of the salt production was from natural brines pumped from six salt formations. Salt was also produced from artificial brines that were derived by injecting freshwater into salt formations and retrieving the resulting brines (called solution mining). The old Detroit salt mine produced rock salt using the "room and pillar" method until 1983. (The room and pillar method involves creating large underground expanses [rooms] in which to mine, supported by pillars [natural or artificial structural members] that held in place the roofs of these rooms.) The Detroit salt mine was approximately 1,100 feet below ground and encompassed approximately 1,100 acres of subsurface land. The room and pillar method is being used only by the Detroit Salt Company, which has an excellent safety record. Salt is also being produced from brines extracted at various locations within the state.

Gypsum Mining

Gypsum has been mined in Michigan since 1841. In the Grand Rapids area, gypsum is mined by the "room and pillar" method. Open pit mining is used in the Alabaster region (Iosco County). In both of these areas, gypsum beds directly underlie thin layers of glacial drift. Closed topographic lows observed in both areas are believed to be due to groundwater solution of the gypsum and subsequent collapse of the overlying material.

Coal Mining

Michigan also once supported a thriving coal mining industry. Records indicate that over 165 different coal mines operated in Michigan's coal-bearing region, which includes 31 counties in the south-central portion of the lower Peninsula. Over 100 of the 165 known coal mines in the state were located in the Saginaw Bay area. Coal was first discovered in Michigan in 1835 in Jackson County. From that discovery, several small underground and surface coal mines were opened in that area of the state. In 1861, coal was discovered near Bay City, and in 1897 commercial coal mining began in Lenawee County. That led to the establishment of numerous additional mines in Saginaw, Tuscola, and Genesee counties, which tended to be larger, deeper and more extensive mines. That was the start of Michigan's coal mining industry.

The state's underground coal mines were an average of 110 feet deep and were worked by the "room and pillar" method. Michigan had continuous coal mining from 1897 to 1952, when the last underground coal mine near St. Charles, Saginaw County, closed. From 1860 (the year mine records were first kept) until 1975 (the year the last surface coal mine closed), the 165 commercial coal mines produced a total output of over 46 million tons of coal. The maximum coal output was achieved in 1907, when Michigan's 37 operating coal mines produced two million tons per year - enough to supply 16% of Michigan's total demand for coal.

Mine Subsidence Problem in Michigan

The legacy of underground mining can be felt in numerous locations across the state. Many of the underground mining areas, whether active or abandoned, are vulnerable to subsidence in some form. Unfortunately, records of abandoned mines are often sketchy and sometimes non-existent. Therefore, it is often difficult to determine exactly where the mines were located. Many areas of Michigan may have developed over abandoned mines and may not even be aware of it. Oftentimes, the only way a community or home/business owner becomes aware of a potential hazard is when subsidence actually occurs and damage or destruction results.

Subsidence Overview

Lenawee County has not experienced any cases of subsidence on record. However, with the number of mines that exist and have been abandoned, it could be possible for a future occurrence(s) of subsidence to occur in the County. This was identified as a low priority and was not addressed as a priority.

NO IMPACT HAZARDS

CELESTIAL IMPACTS

Celestial Impact: An impact or threatened impact from a meteorite, asteroid, comet, satellite, space vehicle, space debris, or similar objects that may cause physical damages or other disruptions**.**

Hazard Description

It has been estimated that a serious impact from an object upon the Earth occurs approximately once every 50 to 100 years. Approximately 70 percent of the Earth is covered by water, with the oceans accounting for over 90 percent of the earth's water. Therefore, it is more likely that such an event would more likely fall into an ocean. However, due to the ever growing population on the Earth, the impact on man for such an event continuously increases.

Lenawee County Celestial Impact Overview

Celestial impacts occur in many shapes and sizes; however, none have been reported in recent history in Lenawee County. While such an event could occur, it is not likely to Michigan, let alone within Lenawee County.

EARTHQUAKES

Earthquake: a shaking or trembling of the crust of the earth caused by the breaking and shifting of rock beneath the surface.

Hazard Description

Earthquakes range in intensity from slight tremors to great shocks. They may last from a few seconds to several minutes or come as a series of tremors over a period of several days. The energy of an earthquake is released in seismic waves. Earthquakes usually occur without warning. In some instances, advance warnings of unusual geophysical events may be issued. However, scientists cannot yet predict exactly when or where an earthquake will occur. Earthquakes tend to strike repeatedly along fault lines, which are formed where large plates of the earth's crust below the surface constantly push and move against one another. Risk maps have been produced which show areas where an earthquake is more likely to occur. Earthquake monitoring is conducted by the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, and universities throughout the country.

The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Most casualties result from falling objects and debris. Disruption of communications systems, electric power lines, gas, sewer and water mains can be expected. Water supplies can become contaminated by seepage around water mains. Damage to roadways and other transportation systems may create food and other resource shortages if transportation is interrupted. In addition, earthquakes may trigger other emergencies such as fires and hazardous material spills, thereby compounding the situation.

Earthquake Overview

No severely destructive earthquake has ever been documented in Lenawee County. However, several mildly damaging earthquakes have been felt since the early 1800s. The exact number is difficult to determine, as scientific opinion on the matter varies. With most of these earthquakes, damage, if any, was limited to cracked plaster, broken dishes, damaged chimneys, and broken windows.

NUCLEAR ATTACK

Nuclear attack: A hostile action taken against the United States which involves nuclear weapons and results in destruction of property and/or loss of life.

Hazard Description

Any hostile attack against the United States, using nuclear weapons, which results in destruction of military and/or civilian targets. All areas of the United States are conceivably subject to the threat of nuclear attack. However, the strategic importance of military bases, population centers and certain types of industries place these areas at greater risk than others. The nature of the nuclear attack threat against the U.S. has changed dramatically with the end of the “Cold War” and the conversion of previous adversaries to more democratic forms of government. Even so, the threat still exists for a nuclear attack against this country. Despite the dismantling of thousands of nuclear warheads aimed at U.S. targets,

there still exists in the world a large number of nuclear weapons capable of destroying multiple locations simultaneously. In addition, the number of countries capable of developing nuclear weapons continues to grow despite the ratification of an international nuclear non-proliferation treaty. It seems highly plausible that the threat of nuclear attack will continue to be a hazard in this country for some time in the future.

At this point, attack-planning guidance prepared by the Federal government in the late 1980s still provides the best basis for a population protection strategy for Michigan. That guidance has identified 25 potential target areas in Michigan, and 4 in Ohio and Indiana that would impact Michigan communities, classified as follows: 1) commercial power plants; 2) chemical facilities; 3) counterforce military installations; 4) other military bases; 5) military support industries; 6) refineries; and 7) political targets. For each of these target areas, detailed plans have been developed for evacuating and sheltering the impacted population, protecting critical resources, and resuming vital governmental functions in the post-attack environment.
+----------

Nuclear weapons are explosive devices that manipulate atoms to release enormous amounts of energy. Compared to normal chemical explosives such as TNT or gunpowder, nuclear weapons are far more powerful and create harmful effects not seen with conventional bombs. A single nuclear weapon is able to devastate an area several miles across and inflict thousands of casualties. Although nuclear attack is an unlikely threat, the severe damage that would be caused by even one weapon requires the danger to be taken seriously.

The threat of nuclear attack has primarily been associated with the Cold War between the United States and the Soviet Union in the last half of the 20th Century. Although the Cold War is over, there remains a threat of nuclear attack. More nations have developed nuclear weapons and there is also the possibility that terrorists could use a nuclear weapon against the United States.

Hazard Analysis

Understanding Nuclear Weapons

The following information about nuclear weapons is important for understanding the threat of nuclear attack: (1) types of nuclear weapons, (2) measures of weapon power, (3) forms of attack, and (4) types of delivery systems.

Nuclear weapons have been built in a wide variety of types for several different purposes. The first weapons relied on nuclear fission, or the splitting of heavy atoms to release energy and create an explosion. Later, new weapons were invented that used a combination of fission and fusion, which involves the creation of heavier atoms from lighter ones. Fusion bombs are also referred to as hydrogen bombs or H-bombs. For emergency planning purposes, the important differences are that (1) fusion bombs are more difficult to build and (2) that they can be much more powerful. Otherwise, all types of nuclear weapons create the same types of effects.

The power of nuclear weapons is measured by comparing the energy released by the weapon to the energy released by large amounts of conventional high explosive. The strengths of smaller weapons are measured in kilotons (or thousands of tons) of TNT explosive. A twenty-kiloton bomb produces as much energy as twenty thousand tons of TNT exploded all at once. The strength of larger weapons is measured in megatons, or millions of tons of TNT. A two-megaton bomb produces as much energy as two million

tons of high explosive.

Smaller nuclear weapons are generally designed to be used against military targets on the battlefield. These are called tactical nuclear weapons. Larger devices designed to attack cities, infrastructure, and military bases are called strategic nuclear weapons.

Bombs can be set off at varying heights above the target. If the bomb is set off high in the air, its effects are spread out over a wider area and generally more damage is done. This is called an air burst. A bomb that is set off at or near the Earth's surface level wastes much of its energy against the ground. This is called a ground burst. Ground bursts have some specific military uses and terrorists may use ground bursts because they are unable to lift their weapons high enough to create an air burst.

Like any weapon, a nuclear device must be carried to its target by a delivery system. The first nuclear weapons were bombs dropped out of aircraft. Later, tactical weapons were made small enough to fire out of cannons or carry in large backpacks. Intercontinental ballistic missiles (ICBMs) are rockets that can carry one or more nuclear weapons across thousands of miles in less than an hour. Terrorists may lack sophisticated missiles, but they could create effective delivery systems by transporting a nuclear weapon in the back of a truck, aboard a cargo plane, or within a shipping container.

Effects of Nuclear Weapons

The effects of nuclear weapons are more complicated than those of conventional explosives. Nuclear devices cause damage through six major effects: (1) thermal pulse, (2) blast, (3) prompt radiation, (4) electromagnetic effects, (5) mass fire, and (6) residual radiation.

THERMAL PULSE is an intense flash of light and heat released within the first few seconds of a nuclear explosion. The damage from thermal pulse is almost instantaneous and covers a wide area. People and animals exposed to the pulse can be badly burned. Flammable objects such as buildings, vehicles, and trees may be set on fire. The flash is strongest close to the bomb and becomes weaker with distance. Even people located far away from the explosion may still be blinded by the intense light of the pulse.

BLAST is a powerful wave of force that moves out from the center of the explosion through the air and the ground. The farther the blast travels, the weaker it becomes. Very close to the bomb, the blast will destroy even the most strongly built buildings and will kill everyone not hidden deep underground. Farther away, buildings may survive, but with severe damage, and people will be injured by being picked up and smashed against objects. At still greater ranges, buildings will be less damaged, and injuries will largely result from shattered glass and thrown debris. At all distances, a powerful wind follows the initial blast wave and adds to the destruction. The blast from a ground burst will dig a large crater into the ground, but this cratering will not occur with an air burst.

PROMPT RADIATION is the harmful blast of high energy radiation given off at the same time as the thermal pulse. Prompt radiation includes gamma rays and neutron radiation. This radiation is capable of killing or injuring living beings by damaging tissues and organs. Prompt radiation is quickly absorbed by the atmosphere and does not impact as wide an area as other nuclear weapons effect. In most instances, a person close enough to receive a harmful dose of prompt radiation is also close enough to be immediately killed by the explosion's thermal pulse or blast. However, in unusual cases, some people who survive the immediate effects of the bomb may sicken or die days later, from radiation poisoning.

ELECTROMAGNETIC EFFECTS occur immediately after a nuclear explosion and may damage communications equipment, computers, and electronics. Radios, cell phones, and power lines are especially vulnerable. In most cases, the effects are limited to an area near to the explosion. Some equipment may recover after a period of time, while other devices will need to be replaced. One special type of nuclear attack might cause more widespread electromagnetic effects: a very large nuclear weapon carried high into the atmosphere by a missile is capable of damaging communications and electronics over a very large area.

MASS FIRE results from the ignition of thousands of individual fires by a bomb's thermal pulse, combined with widespread destruction from its blast. Over a period of hours, small fires merge and feed on damaged buildings and debris. Controlling these fires would be very difficult, due to damaged water mains, destroyed fire-fighting equipment, and blocked roads. The result is an extremely intense fire that can spread quickly and reach very high temperatures. Mass fire may significantly expand the area devastated by a bomb, destroying areas that might otherwise be only lightly damaged by other types of effects.

RESIDUAL RADIATION is unlike prompt radiation in that it lasts well after the nuclear explosion has ended. The ground immediately underneath the center of the explosion will be dangerously radioactive for several days due to "induced radiation." There will also be some radioactive dust and debris that will drift downwind of the explosion. This radioactive dust is called "fallout." Fallout will be a minor problem in the case of an air burst explosion but will be very intense in the case of a ground burst attack. Regardless of the type of attack, the danger from fallout will tend to be greatest close to the site of the attack. The cloud of fallout will weaken the longer it lasts and the farther it travels.

Note that the effects of a nuclear attack will depend on the size of the weapon. A larger bomb will cause damage over a wider area. The importance of different types of damage will also vary with the weapon. Large strategic nuclear weapons will create most of their damage though thermal pulse and mass fires, while with small tactical bombs the blast effect and prompt radiation will be relatively more important.

<u>Hazard Mitigation Alternatives for Nuclear Attack</u>

- Designated fallout shelters and public warning systems.
- Construction of concrete safe rooms (or shelters) in houses, trailer parks, community facilities, and business districts.
- Using laminated glass, metal shutters, structural bracing, and other hazard-resistant, durable construction techniques in public buildings and critical facilities.
- Increased coverage and use of NOAA Weather Radio (which can provide notification to the **c**ommunity during any period of emergency, including enemy attack).

<u>Nuclear Attack Overview</u>

Nuclear attack is an unlikely hazard, but even a single weapon could cause death and destruction on a massive scale. Nuclear weapons inflict damage over a wide area and through a variety of effects, including thermal pulse, blast, fire, and radiation. Despite the end of the Cold War, nuclear attack by foreign nations remains a real possibility, and this danger has been joined by the threat of terrorist nuclear attack. It makes sense to continue to prepare for the nuclear attack hazard as part of an overall emergency management strategy. (Note: Should a nuclear attack occur, the mitigation activities will be supervised by the Department of Homeland Security.)

SCRAP TIRE FIRES

Scrap tire fire: a large fire that burns scrap tires being stored for recycling/re-use.

Hazard Description

Michigan generates some 7.5 to 9 million scrap tires each year. Although responsible means of disposal have become more common, tire dumps prior to 2010 could present environmental and safety hazards that will last into the foreseeable future, if not addressed. By 2001, the State of Michigan had identified in excess of 24 million scrap tires in disposal sites scattered around the state. By 2010, these sites were all reported as removed from the county.

The Scrap Tire Regulatory Program is implemented by the Material Management Division of EGLE, under the authority of Part 169 of the Natural Resources and Environmental Protection Act (1994, P.A. 451), as amended. Policies and regulations established under this law provide the basis for EGLE to implement and administer an effective scrap tire management program per the following initiatives: 1) a compliance and enforcement program was implemented; 2) a scrap tire policy recycling hierarchy was established; 3) special uses of scrap tires were approved; and 4) a grant program was established to address abandoned tires.

In 1997, Part 169 was amended to require that a statewide emergency response plan be put into place to address response to fires at collection sites.

Scrap Tire Fires in Lenawee County

Lenawee County has not had a significant tire fire in recent memory.

Scrap Tire Overview

With the elimination of scrap tire sites within Lenawee County, this hazard has been greatly reduced and was given a no impact hazard. Hazards identified as having no impact to the residents of Lenawee County have not been addressed in this plan.

CLIMATE CHANGE OVERVIEW

Definition-A change in global or regional climate patterns, in particular a change apparent from the late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

As identified in the weather-related hazards, a majority, if not all, of multiple events have occurred in the past 20 years. Not only has the number increased, but the intensity of the events has also increased. Thunderstorms causing flooding has resulted in “100-year floods” occurring annually if not more often. These events can be attributed to Climate Change and are anticipated to continue, if not worsen, in the near future. Subsequently, communities should prepare for more events and as well as more intense weather-related events.

HAZARD IMPACT/VULNERABILITY

The tables on the following pages identify how the participating municipalities are potentially impacted by each of the hazards as well as how vulnerable they could be should a natural weather event occur.

In **Table 4.12 Hazard by Impact**, each of the participating municipalities were asked how an event could impact that municipality should it occur. High impact events could be events that resulted in multiple deaths and extensive property damage, medium impact events could be events that resulted in a death and/or injuries to multiple persons and moderate property damage, and moderate impact events could be events that resulted in injuries with minimal property damage.

In **Table 4.13, Asset Vulnerability**, vulnerable assets (facilities and people) for the participating municipalities were identified for the natural (weather-related) events. Those assets that could be vulnerable during an event, are identified in the appropriate column. (For example: should a hailstorm occur in the City of Brown City, the assets that would be vulnerable to damage or injury are identified in that cell.) Earthquakes have been table, as they are not significant for this part of Michigan. Even when they occur, and that is infrequently, often times they are not even felt by people.

HAZARDS BY IMPACT FOR LENAWEE COUNTY MUNICIPALITIES

Table 4.12

Community	High Impact Hazards	Medium Impact Hazards	Moderate Impact Hazards	No Impact Hazards	Community	High Impact Hazards	Medium Impact Hazards	Moderate Impact Hazards	No Impact Hazards
Lenawee County	A,B,D,F,G,O,X	C,E,H,I,J,K,P,Q,U,V	L,M,R,T	N,S,W	Hudson Township	B,C,D,E,F,M,N,Q,R,S,T	A,G,X	H,I,L,O,P,V,W	J,K,U
City of Adrian	A,B,D,F,G,H,I,O	C,J,L,M,P,R,U,X	E,K,N,Q,V	S,T,W	Macon Township	A,D,G,H,K,O,R	B,F,I,J,M,P,S,T,U,V,W,X	C,E,L,N,Q	
City of Hudson	B,C,D,E,N,R	A	F,G,H,I,L,P,Q,S,T,W,X	J,K,M,O,U,V	Madison Township	A,B,D,F,G,H,I,J,K,L,O,P,R,T,U,X	C,M,N,Q,S,V,W		E
City of Tecumseh	A,D	B,E,J,K,U,V	C,F,G,H,I,L,O,P,Q,T,W,X	M,N,R,S	Medina Township		F	A,B,D,G,H,I,J,L,M,O,P,Q,R,S,T,U,W,X	C,E,K,N,V
Village of Addison	A,B,D,E,F,G,I,J,X	C,H,O,P	K,L,M,Q,T,U,V,W	N,R,S,	Ogden Township	Q,T	A,D,K,L,M,O,P,S,X	B,C,F,G,H,I,J,U,V,W	E,N,R
Village of Clinton	A,B,I,K,U	C,D,E,F,G,H,J,L,M,O,T	N,P,Q,R,S,V,W,X		Palmyra Township	A,C,D,G,I,L,M,T,X	B,F,H,J,K,R,S	O,P,Q,U,V,W	E,N
Blissfield Township	I,L	A,C,D,G,K,O,P,X	B,F,H,J,M,N,Q,S,T,U,V,W	E,R	Raisin Township	A,D,G,H,I,X	C,F,L,O,P,Q,R,T	B,E,J,K,M,S,U,W	N,V
Cambridge Township	E,F,G,I,M,N,O,V,X	A,B,D,H,J,K,L,Q,U,W	C,P,R,S,Y		Riga Township		A,D,G,K,L,T,X	B,C,F,H,I,J,M,O,P,Q,R,S,U,V	E,N,R,W
Clinton Township	C,D,G,H,I,R,U	A,F,L,O,P,Q,T,X	B,J,K,M,N,S,V,W	E	Rollin Township	I	N,O,P,X	A,B,C,D,F,G,H,J,K,L,M,Q,T,U,V	E,R,S,W
Deerfield Township		A,C,D,O,S,T,X	B,E,F,G,H,I,J,K,L,M,N,P,U,V,W	Q,R	Woodstock Township	C,N,R,	B,D,E,F,G,H,L,P,Q	A,I,K,M,O.S,T,W,X	J,U,V

HAZARDS: A-Energy Emergencies; B-Infrastructure Failure; C-Riverine Flooding; D-Severe Weather; E-Dam Failures; F-Cyberterrorism; G-Hazardous Material Incidents; H-Terrorism/Sabotage; I-Tornadoes; J-Transportation Accidents; K-Well/Pipeline Incidents; L-Extreme Temperatures; M-Invasive Species; N-Seasonal Population Changes; O-Public Health Emergencies; P-Structural Fires; Q-Wildfires; R-Nuclear Power Plant Failures; S-Fog; T-Drought; U-Civil Disturbances; V-Special Events; W-Subsidence; X-Severe Winds

ASSET VULNERABILTY
FOR LENAWEE COUNTY MUNICIPALITIES

Table 4.13

Community	Hail	Lightning	Severe Winds	Tornados	Extreme Heat	Ice/Sleet Storms	Snowstorms	Extreme Cold	Flooding	Drought	Fog
Lenawee County	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D,E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
City of Adrian	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
City of Hudson	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
City of Tecumseh	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
Village of Addison	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
Village of Clinton	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
Blissfield Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Cambridge Township	A.B.E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Clinton Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Deerfield Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Hudson Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Macon Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Madison Township	A,B,C,D, E,F	A,B,C,D, E,F	A,B,C,D, E,F	A,B,C,D, E,F	A	A,B,C,D, E,F	A,B,C,D, E,F	A,B,C,D, F	A,B,C,D, F	A,D	A
Medina Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Ogden Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Palmyra Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Raisin Township	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A	A,B,C,D, E,F,G	A,B,C,D, E,F,G	A,B,C,D, F,G	A,B,C,D, F,G	A,D	A
Riga Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Rollin Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A
Woodstock Township	A,B,E	A,B,E	A,B,E	A,B,E	A	A,B,E	A,B,E	A,B,E	A,B,E	A	A

Assets: A-People; B-City/Village/Township Hall; C-Police Station; D-Fire Station; E-Warning Siren; F-School; G-Health Care Facility

CHAPTER 5: ANALYSIS OF ALTERNATIVE ACTIONS (2012 PLAN)

Prior to the development of the mitigation strategies, Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) developed goals and objectives. Below are the mission statement goals and objectives and the mitigation strategies as determined for the 2012 Hazard Mitigation Plan. Revised goals and objectives for the 2023 Plan, as determined by the LCHMAC members, will appear in Chapter 6: Action Plan.

Goals are general guidelines that describe a future vision that the community would like to achieve. They are usually long-term and represent global visions such as "to protect public health and safety".

Objectives define strategies to reach the identified goals. They tend to be specific and address the details of who will do what and when to reach the goals.

GOALS:

1. Prevent the loss of life and property damages a result of the hazards that affect Lenawee County.
2. Improve response and recovery for man-made and natural disasters.
3. Enhance early warning systems.
4. Maintain essential public services.
5. Enhance public awareness.
6. Protect public, health, safety, and welfare.
7. Reduce losses from man-made and natural disasters.
8. Protect the environment.
9. Make hazard mitigation a part of day-to-day community activities.
10. Develop a collaborative to manage resources and secure additional resources in the event of an emergency.

OBJECTIVES:

1. Amend zoning ordinances to incorporate hazard mitigation measures into site plan review, special land use procedures, and supplemental provision sections of the zoning ordinance.
2. Enhance coordination between response agencies.
3. Increase warning siren coverage and weather radio.

4. Provide resources to ensure provision of essential services.

5. Provide opportunities for public education including web sites, alerts, and social networking sites.

6. Provide additional storm shelters.

7. Enhance early warning systems and education of all hazards.

8. Enhance warning systems and notifications for special populations.

9. Support the continuing implementation of the MEMAC (Michigan Emergency Management Assistance Compact), and MABAS-MI (Mutual Aid Box Alarm System) programs.

10. Encourage and promote continued and expanded compliance with the NFIP, through map use and consideration in the regulation of new construction and seeking to implement flood mitigation measures (especially through the application of r FEMA flood Mitigation funding).

The next steps in the 2012 hazard mitigation planning process were to identify mitigation strategies suitable to the community, evaluate the effect the actions will have on the specified mitigation objective and prioritize actions to decide in what sequence or order these actions should be pursued. However, it should be noted that not all the projects were prioritized. This step will also be utilized in the 2023 Plan and will be located in Chapter 6: Action List.

In addition to the strategies found on pages 117-123, multiple communities within Lenawee County also addressed activities in their Master Plans/Comprehensive Land Use Plans to reduce flooding. Several of these are listed below.

- The City of Adrian in their 2022 Comprehensive Plan identified a special flood hazard area restricting development.
- The City of Morenci in their 2016 Master Plan addressed storm runoff to help reduce flooding in residential areas.
- The Village of Blissfield in their 2017 Comprehensive Plan limited development, which would reduce flooding due to runoff.
- Rollin Township in their 2022 Master Plan included an environmental policy, prohibiting development in ecological sensitive areas and required a “Wetland Delineation Report” to ensure the safety and protection of local wetlands.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
EXTREME TEMPERATURES						
1.	Develop an outreach program intended specifically to connect with vulnerable populations during periods of extreme temperatures. Establish and construct accessible heating and cooling centers in the county.	Low		Ongoing	Red Cross	Red Cross has identified centers. Centers that are used include private centers and senior centers.
2.	Inform vulnerable residents of help available for payment of utility bills.	Medium		Not Started	Utilities	Confidentiality issues and HIPAA regulations have resulted in limited access to information preventing the development of a current list of residents. Agencies serving those vulnerable residents do maintain a list to work with the individuals.
SNOWSTORMS						
1.	Identification of local schools and other public buildings throughout the County which could be designated as shelters for stranded motorists and others. Once identified a public awareness campaign should be initiated to inform citizens of the availability of these shelters	Medium	Medium	Ongoing	Red Cross	Calls directed to Red Cross.
2.	Maintain adequate road clearing capabilities.	Low		Ongoing	MDOT, LCRC	Road clearance responsibilities identified and are being carried out.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
3.	Identification of roads that are subject to snow drifts. Use of vegetation to limit blowing of snow over critical road segments.	Low		Ongoing	MDOT, LCRC	Road clearance responsibilities identified and are being carried out.
INFRASTRUCTURE FAILURES						
1.	Availability of emergency generators, especially when need for critical emergency services.	Low		Started	LEMC	The LEMC secured several grants to purchase back-up generators. In addition, the LCDC has purchased generators for their critical infrastructure.
2.	Burying electrical and phone lines to resist damage.	Medium		Started	Utilities	Since 2000 all new subdivisions have buried utility lines.
3.	Redundancies in utility and communication systems, especially lifeline systems.	Medium		Started	Utilities Private	9-1-1 phone system has a back-up system in place.
4.	Program/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.	Medium		Started	9-1-1	Information has been sent to 9-1-1 and they can send out alerts to the elderly. (Not all elderly are registered.)
5.	Regular infrastructure maintenance and equipment checks.	Medium		Ongoing	9-1-1	Public safety notification system has new hand-held and stationary radios. Road improvements made throughout the County.
6.	Tree-trimming programs to protect utility wires.	Medium		Ongoing	Utilities, LCRC	Utilities and Red Cross both trim trees.
7.	Increasing public awareness and widespread use of the Miss Dig utility damage prevention service.	Medium	Medium	Ongoing	Utilities Private	Health Dept., Building Dept., billboards, and radio advertising all promote “Miss Dig”.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
			ICE AND SLEET STORMS			
1.	Building maintenance to prevent roof damage and wall damage from ice dams.	Medium		Ongoing	Utilities, Local Municipalities	Roofs are maintained.
2.	Burying electrical and phone lines to resist damage.	Medium		Started	Utilities	Since 2000 all new subdivisions have buried utility lines.
			LIGHTNING			
1.	Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines.	Medium		Ongoing	Utilities, LCRC	Utilities and Red Cross both trim trees.
2.	Buried and protected power and utility lines.	Medium		Started	Utilities	Since 2000 all new subdivisions have buried utility lines.
3.	Install lightning protection devices on the community's communications infrastructure.	High	Medium	Started	Local Building Departments	County installed lightning rods, pers state statute on new/major remodeled buildings.
			HAIL			
1.	Use of structural bracing, window shutters, laminated glass in window panes, and hail-resistant roof shingles to minimize damage to structures.	Low		Not Started	Local Municipalities, Private Sector	Low priority, funds not available.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
		SEVERE WINDS				
1.	Use of appropriate wind engineering measures and construction techniques.	Medium		Started	Local Municipalities	Several townships require hurricane straps on rafters.
2.	Proper anchoring of manufactured homes and exterior structures such as carports and porches.	High		Ongoing	Local Municipalities	State statute.
3.	Securing loose materials, yard, and patio items indoors or where the winds cannot blow them about.	Medium		Ongoing	Private Sector	Advertised through public awareness programs.
4.	Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.	Low		Not Started	LEMC	Low priority, insufficient funds to complete.
		STRUCTURAL FIRES				
1.	Local building, heating, and mechanical code enforcement.	High	Medium	Ongoing	Local Municipalities	Local municipalities enforce through building codes.
2.	Installation and maintenance of smoke detectors and fire extinguishers.	High	Top	Ongoing	Local Municipalities	Purchased through grant program. Program on hold as grant program expired.
3.	Improved and continuous training for emergency responders, and provision of equipment for them.	Medium		Ongoing	Local Municipalities, LCSD	County has training academy, school programs, and departmental training.
4.	Retrofit older buildings with sprinkler systems.	Low		Ongoing	LEMC	When remodel is a major remodel.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
			RIVERINE FLOODING			
1.	Accurate identification and mapping of flood-prone areas.	High	Top	Complete	Local Municipalities	FEMA updated maps in 2019.
2.	Identify all structures in the floodplain.	Medium	Medium	Started	Local Municipalities	FEMA has provided list of properties to the County.
3.	Adopt and enforce local regulations to prevent development within a floodplain.	Medium		Started	Local Municipalities	Some municipalities have adopted ordinances.
4.	Retrofit existing structures within a floodplain.	Low		Not Started	Local Municipalities	No funding secured.
5.	Encourage additional communities to consider joining the National Flood Insurance Program (NFIP).	Medium	Medium	Started	Local Municipalities	Many municipalities have joined.
6.	Encourage current NFIP member communities in their continued compliance with the NFIP, through the use and application of map information in the regulation of floodplain developments, and through the seeking of FEMA grant funds for flood mitigation projects, to address properties that may currently be vulnerable to flooding in identifiable risk areas.	Medium	Medium	Started	Local Municipalities	Many municipalities are participating.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
7.	Wetland and lakes act as natural retention basins, temporarily storing runoff and releasing it slowly. Local units of government will consider the importance of wetlands and lakes in this process and they prepare and implement local land use plans.	High	Top	Ongoing	Local Municipalities	State regulations through EGLE.
DROUGHT						
1.	Storage of water for use in drought events, especially for human needs during extreme temperatures.	Low		Started	Local Municipalities	City of Adrian has program in place.
2.	Water rationing if necessary to control water use, especially when needed to fight fires.	Medium	Medium	Started	Local Municipalities	All municipalities have rationing system in place.
3.	Agricultural insurance.	Medium		Ongoing	Private Sector	Personal choice for farmers.
TORNADOES						
1.	Use of appropriate wind engineering measures and construction techniques.	Medium		Started	Local Municipalities	Several townships require hurricane straps on rafters.
2.	Proper anchoring of manufactured homes and exterior structures such as carports and porches.	High		Ongoing	Local Municipalities	State statute.
3.	Securing loose materials, yard, and patio items indoors or where the winds cannot blow them about.	Medium		Ongoing	Private Sector	Advertised through public awareness programs.
4.	Construction of concrete safe rooms in homes and shelter areas in mobile	Low		Not Started	LEMC	Low priority, insufficient funds to complete.

LENAWEE COUNTY IMPLEMENTATION STRATEGY TABLE: 2012-2022						
Item Number	**Implementation Measure/ Strategy**	**Implementation Potential**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
	home parks, fairgrounds, shopping malls, or other vulnerable public areas.					
PIPELINE ACCIDENTS						
1.	Continued training for police and fire personnel and first responders.	Medium	Medium	Ongoing	Local Municipalities	Pipeline Management Safety Agency offers training annually.
2.	Locating pipelines away from dense developments, critical facilities, special needs populations, and environmentally vulnerable areas whenever possible.	Medium		Ongoing	Local Municipalities	Maps available at County Complex.
HAZARDOUS MATERIALS INCIDENTS-FIXED SITE AND TRANPORTATION						
1.	A mutual aid memorandum of understanding (MOU) in place to provide mitigation of hazardous material incidents.	High		Complete	Lenawee County HAZMAT Team	Lenawee County has a local HAZMAT Team and has MOU's with the Jackson Co. Team and the Washtenaw Co. Team as well as the Region 1 HAZMAT Team
2.	Continued training for police and fire personnel and first responders.	High	Medium	Ongoing	Local Municipalities	County Haz-Mat team trains annually.
3.	Local adoption of hazardous spills expense recovery ordinances.	High	Top	Ongoing	Local Municipalities	Local municipal zoning ordinances.
4.	Update hazardous materials inventory.	High	Top	Ongoing	LEMC	Through annual Sara III reports.

LCSD-Lenawee County Sheriff's Department
MDOT-Michigan Department of Transportation
LCRC-Lenawee County Road Commission
LEMC-Lenawee County Emergency Management Coordinator

CHAPTER 6: ACTION PLAN

Through a systematic process, that included the review of all action items identified in the Lenawee County 2012 Hazard Mitigation Plan (2012 Plan) and the possible mitigation strategies as identified in the 2003 Local Hazard Mitigation Planning Workbook (Workbook), the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) was able to identify the following actions to be the most effective strategies for hazard mitigation for Lenawee County 2023 Hazard Mitigation Plan. The actions include mitigation actions identified in the 2012 Plan that are ongoing or have not been completed and are still considered to be relevant, as well as new strategies that have been identified by the LCHMAC.

The LCHMAC initiated the selection process with a review of the goals and objectives as identified in the 2012 Plan and modified them to fit the needs of Lenawee County in 2023 and beyond. These goals and objectives are identified below.

The action plan items from the 2012 Plan were then evaluated and those items that were deemed complete or no longer applicable were eliminated from this plan (see review of all 2012 items in Chapter 5). The LCHMAC then began review of the possible mitigation strategies as identified in the 2019 State of Michigan Hazard Mitigation Plan. After reviewing and identifying over 300 possible mitigation strategies, the LCHMAC was able to reduce the number of possible strategies to 54. The selected list of 54 mitigation strategies is found in Appendix E. The list of original strategies is found in Appendix F.

The LCHMAC was then asked to identify hazard mitigation projects/processes to address hazards, thereby creating projects for the action plan. The projects/processes that address hazards that could result in having a high impact and projected to be the most cost effective have been given a high priority. Projects/processes items that could have a medium impact and were identified as being cost effective have been identified as a medium priority. Projects/processes that had a lower impact and were given a lower priority.

Lenawee County municipalities were asked to identify those high priority projects (FEMA-eligible) that they would participate in should the project be funded, and local funds be available. Table 6.1 on page 140 identifies those projects.

GOALS AND OBJECTIVES

GOAL 1: Prevent the loss of life and property damage

OBJECTIVES

- Reduce losses from all man-made and natural disasters
- Provide additional shelters
- Enhance warning systems and notifications for special populations

GOAL 2: Maintain essential public services

OBJECTIVES

a. Improve response and recovery for all man-made and natural disasters
b. Develop a collaborative to manage resources and secure additional resources for use during ~~an~~ any emergency
c. Provide resources to ensure provision of essential services
d. Support the continuing implementation of the Michigan Emergency Management Assistance Compact (MEMAC) and Mutual Aid Box Alarm System (MABIS-MI) programs

GOAL 3: Protect public health, safety, and welfare

OBJECTIVES

a. Enhance early warning systems
b. Enhance public awareness
c. Make hazard mitigation a part of day-to-day community activities
d. Protect the environment
e. Provide opportunities for public education including web sites, alerts, and social networking sites

GOAL 4: Manage growth/development

OBJECTIVES

a. Amend zoning ordinances to incorporate hazard mitigation measures into site plan review procedures, special land use procedures, and supplemental provision sections of the zoning ordinance
b. Encourage and promote continued and expanded compliance with the National Flood Insurance Program (NFIP), through map use and consideration in the regulation of new construction and seeking to implement flood mitigation measures (especially through the application for FMEA flood mitigation funding)
c. Integrate hazard mitigation planning into land use planning documents

HIGH PRIORITY PROJECTS

Item 1

Continue tree trimming program to protect utility wires

Action: Continue tree trimming program to protect utility wires.

- Location: County-wide
- Lead Agency: Consumers Energy, DTE, and Midwest Energy
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All weather hazards, infrastructure failures, and energy emergencies
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $100,000 annually (Estimate)
- Potential Funding Source(s): Consumers Energy, DTE, and Midwest Energy
- Time Frame: This is an ongoing and continuous process by the utility companies, as they annually budget tree trimming to help reduce power outages due to fallen tree limbs.
- Priority: High
- Benefit(s): Reduction in number of events and duration of power loss due to severe weather conditions.

Item 2

Purchase and distribute smoke detectors

Action: Promote the purchase of maintenance-free smoke detectors.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 annually (Estimated cost of smoke detectors)
- Potential Funding Source(s): Lenawee County Fire Chiefs Association
- Time Frame: This is an ongoing and annual program.
- Priority: High
- Benefit(s): Mitigate the loss of property/lives due to structural fires.

Item 3

Floodplain Structure Analysis

Phase I: Identify and evaluate structures within floodplains

Action: Identify and evaluate structures within floodplains**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 4, objective b
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): OEM budget
- Time Frame: Anticipated to occur in 2024.
- Priority: High
- Benefit(s): Target the removal/retrofit existing structures in floodplains subject to flood damage.

Phase II: Demolish/relocate/retrofit structures within floodplains per Phase I

Action: Secure funding to demolish/relocate/retrofit structures located in floodplains based on the assessment completed in Phase I**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 4, objective b
- Project Costs: $2,000,000 (Estimate)
- Potential Funding Source(s): Federal Emergency Management Agency (FEMA) grants, United States Department of Agriculture (USDA) grants
- Time Frame: 2025 (Estimated)
- Priority: High
- Benefit(s): The demolition/removal/retrofit existing structures in floodplains will mitigate damages resulting from floods.

Item 4 (NEW)

Promote emergency evacuation plans/disaster awareness/emergency planning in County

Action: Continue promotion of emergency evacuation planning/disaster awareness and emergency planning in Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Mitigate losses from hazards through public education.

Item 5 (NEW)

Continue program for educating public on responding to hazards

Action: Continue to educate the public on hazard response, including the development of Family Disaster Plans and Family Disaster Kits.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Better educated public on hazard response, thereby mitigating injuries and possibly deaths due to hazardous events.

Item 6 (NEW)

Promote annual Evacuation Day

Action: Encourage citizens, businesses, and organizations to participate in an Annual Evacuation Day event.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Anticipated to occur in the Annual Severe Weather Week beginning in 2023 or 2024.
- Priority: High
- Benefit(s): Better educated public on evacuation processes during emergency/hazardous events.

Item 7 (NEW)

Waterway Assessment/Improvements

Phase I: Assess all waterways for potential shoreline erosion and algal bloom concerns

Action: Identify and prioritize all shoreline concerns/algal blossoms on rivers, streams, creeks, ditches, ponds, lakes, and wetlands within the County.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $200,000 (Estimate)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2025 or 2026.
- Priority: High
- Benefit(s): Drinking water is protected, and bodies of water are properly maintained.

Phase II: Complete necessary improvements to waterways in Lenawee County as identified in Phase I on the flooding matters

Action: Work on bodies of water as identified in Phase I to limit erosion.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $100,000 (Estimated, subject to change per the assessment)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2028.
- Priority: High
- Benefit(s): Preservation of waterways and preserving public recreation areas. Improvements will also mitigate damages resulting from flooding.

Phase III: Complete necessary improvements to waterways in Lenawee County as identified in Phase I to eradicate algal blooms

Action: Work on bodies of water as identified in Phase I to eradicate algal blooms within Lenawee County.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergency
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $100,000 (Estimate, subject to change per the assessment)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2028.
- Priority: High
- Benefit(s): The eradication of algal blooms will improve the potable water throughout Lenawee County, as well as the safety of pets.

Item 8 (NEW)

Recruitment of first responders

Action: Recruitment of first responders.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs' Association, Lenawee County Police Chiefs' Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $3,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Fire Chiefs' Association, Lenawee County Police Chiefs' Association
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Increased response personnel for all hazards within Lenawee County, which should provide improved coverage.

Item 9

Provide equipment/training for first responders and specialty teams

Action: Provide required equipment/training for first responders and specialty teams.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $150,000 annually (Estimate)
- Potential Funding Source(s): Homeland Security Grant Program, fire grants, fireworks tax, local budgets
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Improved response capability for all hazard events.

MEDIUM PRIORITY PROJECTS

Item 10

Encourage municipalities to join the National Flood Insurance Program (NFIP) and to adopt/enforce local regulations for floodplain development

Action: Work with non-participating municipalities in Lenawee County to join the NFIP, which includes the adoption/enforcement of regulations limiting development within floodplains.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal, 4, objective b
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Reduction in number of claims for losses due to floods.

Item 11 (NEW)

Installation of Dry Hydrants

Phase I: Assess locations adjacent to natural water bodies to install dry hydrants for use during firefighting emergencies

Action: An assessment shall be made to identify potential locations for the installation of dry hydrants.

- Location: County-wide
- Lead Agency: Fire Chief's Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $1,000-estimated
- Potential Funding Source(s): Fire Chief's Association, local budgets
- Time Frame: Anticipated to begin in 2023 and completed in 2023/2024.
- Priority: Medium
- Benefit(s): The identification of sites to install dry hydrants would be beneficial for firefighting purposes.

Phase II: Install dry hydrants for use during firefighting emergencies

Action: Municipalities to install dry hydrants as identified In Phase I

- Location: County-wide
- Lead Agency: Fire Chief's Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $7,500 per hydrant-estimated
- Potential Funding Source(s): Fire Chief's Association, local budgets

- Time Frame: Anticipated to begin upon the completion of the assessment and securement of funding. The number of dry hydrants will determine the length of time to complete the project.
- Priority: Medium
- Benefit(s): The installation of dry hydrants would be beneficial during rural fires, when using standing water as sources for firefighting the structural fires.

Item 12

Live Snow Trees

Phase I: Assess roads subject to drifting snow.

Action: Working with Michigan Department of Transportation (MDOT), complete an assessment of roads in Lenawee County that are subject to drifting snow.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission (LCRC)
- Participating Agencies: MDOT, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Transportation accidents, snowstorms
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): MDOT
- Time Frame: Anticipated to be in 2024.
- Priority: Medium
- Benefit(s): With the identification of problems areas for drifting snow, an emphasis to reduce or eliminate the drifting can be concentrated on these areas.

Phase II: Plant living snow fences as identified in Phase I

Action: Working with MDOT, plant living snow fences on roads in Lenawee County that are subject to drifting snow.

- Location: County-wide
- Lead Agency: LCRC
- Participating Agencies: MDOT, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Transportation accidents, snowstorms
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $100,000 (Estimate)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Anticipated to be completed in 2025.
- Priority: Medium
- Benefit(s): Drifting snow on roads should be reduced as the live snow fences grow, thereby mitigating the number of accidents that result from the drifting snow.

Item 13

Promote the retrofit of older buildings with sprinkler systems

Action: Promote the installation of sprinkler systems in all older buildings.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural fires
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)

- Potential Funding Source(s): Lenawee County Fire Chiefs Association budget
- Time Frame: Ongoing and continuous in Adrian. The rest of the County anticipated to begin in 2023.
- Priority: Medium
- Benefit(s): Public awareness of need for sprinkler systems and potential to mitigate losses resulting from fires.

Item 14 (NEW)

Warning Siren Assessment Program

Phase I: Assess all-purpose warning sirens throughout the County

Action: Complete an assessment of all warning sirens throughout Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000
- Potential Funding Source(s): OEM
- Time Frame: Completed in 2022.
- Priority: Medium
- Benefit(s): Effectiveness of warning sirens is identified.

Phase II: Repair/replace/upgrade sirens to the 800 MHz system as identified in Phase I

Action: Based on the assessment in Phase I, repair/replace/upgrade all non-conforming sirens to meet the 800 MHz requirement.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $1,500,000 (Estimated-dependent upon the assessment)
- Potential Funding Source(s): USDA, Homeland Security Grant Program (HSGP), local municipalities
- Time Frame: Anticipated to occur in 2025, but dependent upon funding.
- Priority: Medium
- Benefit(s): Improved warning system for the residents of Lenawee County.

Item 15 NEW)

Purchase portable electronic message boards

Action: Purchase portable electronic message boards to be used strategically throughout Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Road Commission, Sheriff's Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $100,000 (Estimate)
- Potential Funding Source(s): LCRC, MDOT, USDA

- Time Frame: Anticipated to occur in 2024, but dependent upon funding.
- Priority: Medium
- Benefit(s): Improve public notification of hazardous situations/locations.

Item 16 (NEW)

Intelligent Transportation System (ITS) Analysis/Installation

Phase I: Assess the use of Intelligent Transportation System (ITS) for potential use in Lenawee County

Action: Assess the feasibility of using ITS for installing permanent electronic message board(s) in Lenawee County.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Anticipated to begin in 2025
- Priority: Medium
- Benefit(s): Determine the location for permanent electronic message boards in Lenawee County.

Phase II: Install permanent electronic message boards in Lenawee County as identified in Phase I

Action: Based on the assessment in Phase I, install electronic message boards in Lenawee County to better inform transportation network users.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $500,000/sign (estimate)
- Potential Funding Source(s):
- Time Frame: Anticipated to occur in 2026 but is dependent upon funding.
- Priority: Medium
- Benefit(s): Use of ITS will keep make better, safer use of the County's transportation systems.

Item 17

Purchase and install generators/battery packs for critical municipal infrastructure and facilities

Action: Coordinate the funding for the purchase and installation of generators and battery packs.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $1,000,000 (Estimate)
- Potential Funding Source(s): United States Department of Agriculture (USDA) grants
- Time Frame: Anticipated to occur by 2027, but is dependent upon funding
- Priority: Medium

- Benefit(s): Facilities can remain operational during power outages, thereby allowing critical services to remain available.

Item 18 (NEW)

Dam Repair Program

Phase I: Assess all dams within the County

Action: Coordinate with qualified engineering firms, the inspection of all dams and develop work program to upgrade/repair dams within Lenawee County.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Dam failures, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Dams properly assessed in order to be maintained/repaired, which would reduce dam failures.

Phase II: Work with dam owners to upgrade/repair dams within the County as identified in Phase I

Action: After completing Phase I, work with dam owners and begin work program to upgrade/repair dams within Lenawee County in a timely manner.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Dam failures, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $500,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): Dam owners, special assessments
- Time Frame: Ongoing and continuous.
- Priority: Medium
- Benefit(s): The number of dam failures and subsequent flooding will be mitigated as a result of the upgrades/repairs to the dams.

Item 19 (NEW)

Promote livestock emergency planning

Action: Promote livestock community planning

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: MSU-Extension, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): MSU-Extension
- Time Frame: Ongoing and continuous
- Priority: Medium

- Benefit(s): Farmers advised on emergency planning methods addressing livestock.

Item 20 (NEW)

Promote Internet Security Programs

Action: Advise public of property internet security protocols and fraud/scam activities.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County IT Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: cyberterrorism
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM/IT budgets
- Time Frame: New program anticipated to begin in 2023/4.
- Priority: Medium
- Benefit(s): Public better informed on property internet protocols, thereby reducing the number of individuals/businesses negatively impacted by cyberterrorism.

Item 21

Encourage municipalities to update/enforce zoning and land use regulations, and floodplain management

Action: Encourage municipalities to update/enforce zoning and land use regulations, and floodplain management.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Planning Commission, The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: flooding, weather events
- Goal/Objective Addressed: goal, 4, objective a
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Reduced loss of life/property due to weather events/flooding.

Item 22 (NEW)

Develop program to educate public on underground water supply and wellhead protection programs

Action: Develop program to educate public on underground water supply and wellhead protection programs.

- Location: County-wide
- Lead Agency: Lenawee County Health Department
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Public Health Department
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Public provided information on maintaining potable water.

Item 23 (NEW)

Maintain inventory of first response municipal equipment and personnel

Action: Maintain inventory of first response municipal equipment and personnel**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective b
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Decreased response times from assisting agencies through a more efficient mutual aid process.

Item 24 (NEW)

Encourage the inclusion of hazard mitigation into other planning documents

Action: Encourage the inclusion of hazard mitigation in other planning documents**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: Goal 4, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Upon adoption/approval of the Lenawee County Hazard Mitigation Plan, this is anticipated to begin in 2023.
- Priority: Medium
- Benefit(s): Land use planning and hazard mitigation goals would be consistent, thereby reducing loss of live/property due to hazardous events

Item 25 (NEW)

Sewer Analysis Program

Phase I: Assess the status of combined storm and sanitary sewers

Action: Complete an assessment to identify all combined storm and sanitary sewer systems.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, Lenawee County Health Department
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): EGLE, Lenawee County Health Department
- Time Frame: Anticipated to begin in 2024.
- Priority: Medium
- Benefit(s): Combined storm/sanitary sewers can result in contaminated drinking water as well as flooding due to overloads in the system.

Phase II: Separate combined storm and sanitary sewers as identified in Phase I

Action: Separate combined storm and sanitary sewer systems.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, Lenawee County Health Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $2,500,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): EGLE
- Time Frame: Upon completion of the study and availability of funds, this is anticipated to begin in 2026.
- Priority: Medium
- Benefit(s): Separating the two sewer systems can reduce flooding resulting from overloaded sewer systems. Separation can also eliminate potential contaminated water due to overloaded water treatment facilities.

Item 26 (NEW)

Sewer Capacity Program

Phase I: Assess existing water/sewer capacity

Action: Assess existing water and sewer capacity levels.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): EGLE, special assessment areas
- Time Frame: Anticipated to begin in 2025.
- Priority: Medium
- Benefit(s): Identify potential areas of concerns with water and sewer/septic systems.

Phase II

Expand water/sewer capacity per recommendation of Phase I

Action: Update existing water/sewer systems to improve capacities.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: public health emergencies
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): EGLE, special assessment areas
- Time Frame: Dependent upon study but anticipated to begin in 2027. Number of improvements will determine the length of the program.
- Priority: Medium
- Benefit(s): Update of the existing water and sewer systems can eliminate sewer/septic failure potentially impacting the drinking water.

Item 27 (NEW)

Use GIS to develop map layers for the storage of hazardous materials

Action: Use GIS to develop map layers for the storage of hazardous materials.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: GIS Department
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Anticipated to begin in 2023, be on to manage updates.
- Priority: Medium
- Benefit(s): Hazardous materials identified county-wide on one map.

Item 28 (NEW)

Use GIS to develop map layers for the location of critical infrastructure

Action: Use GIS to develop map layers for the location of critical infrastructure**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: GIS Department
- Hazards Addressed: All hazards
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Anticipated to begin in 2023, will be ongoing for updates.
- Priority: Medium
- Benefit(s): Critical infrastructure identified on layered infrastructure map, allowing quicker responses to infrastructure failures.

Item 29 (NEW)

Infested Tree Program

Phase I: Identify and assess dead/infested trees along county roads due to invasive species

Action: Identify and assess dead/infested trees along roads due to invasive species to determine which trees should be eliminated along with the order in which they should be cut down.

- Location: County-wide
- Lead Agency: Michigan Department of Transportation (MDOT), Lenawee County Road Commission (LCRC)
- Participating Agencies: Michigan Department of Natural Resources, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Invasive species, weather related events
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Anticipated to begin in 2025.
- Priority: Medium
- Benefit(s): Identifying and assessing the Infested/dead trees would prioritize their removal as well as mitigate the number of infested trees.

Phase II: Cut down dead/infested trees as identified in Phase I

Action: Cut down dead/infested trees along roads due to invasive species based on the results of the assessment completed in Phase I**.**

- Location: County-wide
- Lead Agency: Michigan Department of Transportation (MDOT), Lenawee County Road Commission (LCRC)
- Participating Agencies: Michigan Department of Natural Resources, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Invasive species, weather related events
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $2,500,000 (Estimate, dependent upon assessment)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Results of the study will determine when the program begins. Anticipated to begin in 2027.
- Priority: Medium
- Benefit(s): Infested/dead trees can be removed before they cause damage from falling naturally or infesting other trees.

LENAWEE COUNTY HAZARD MITIGATION MUNICIPAL PARTICIPATION CHART

Table 6.1

Community	Projected Municipal Project Participation List
Lenawee County	1,3-10,12,13,15-24,27-37,39-43
City of Adrian	2-11,13,14,17,18,20-34,36,38,40-43
City of Hudson	1,2,3,5,7-11,14,17,23,25,26,29,31,32,38
City of Tecumseh	1,2,3,5,7-11,14,17,23,25,26,29,31,32,38
Village of Addison	1,2,5,8-11,13-17,21-28,31-34,38,42,43
Village of Clinton	1,2,3,5,7-11,14,17,23,25,26,29,38
Blissfield Township	2,3,5,7-11,14,19,22,23
Cambridge Township	1,2,3,5,7-11,14,17,19,22,23,31,32
Clinton Township	2,3,5,7,8,11,14,19,22,23
Deerfield Township	2,3,5,7-11,14,19,22,23
Hudson Township	2,3,5,7,8,11,14,19,22,23
Macon Township	2,3,5,7,11,14,19,22,23
Madison Township	1,2,3,5,7,10,11,14,17,19,22,23,31,32
Medina Township	2,3,5,7,8,11,14,19,22,23
Ogden Township	2,3,5,7,11,14,19,22,23
Palmyra Township	2,3,5,7-11,14,17,19,22,23
Raisin Township	1,2,3,5,7-11,14,17,19,22,23,31,32
Riga Township	2,3,5,7,9,10,11,14,19,22,23
Rollin Township	1,2,5,8-11,13-17,19,21-28,30,31-34,38,42,43
Woodstock Township	1,2,5,8-11,13-17,19,21-28,30,31-34,38,42,43

The complete list of projects can be found in Appendix G beginning on page 220.

CHAPTER 7: FOLLOW-UP

The follow-up for Lenawee County is an important part of the planning process. Follow-up is the process in which the plan will be monitored, evaluated, and updated within a five-year cycle. When updated, the plan will be reviewed, revised, and resubmitted to the Michigan State Police, Emergency Management and Homeland Security Division for approval by Federal Emergency Management Agency (FEMA). As appropriate, the plan will also be evaluated after a disaster, or after unexpected changes in land use or demographics in or near hazard areas. The Lenawee County Hazard Mitigation Advisory Committee (LCHMAC) will also be kept apprised of a change in federal regulations, programs, and policies, such as a change in the allocation of FEMA's funding for mitigation grant programs. These evaluations will be addressed in the plan and may affect the action items for mitigation goals and activities. The hazard mitigation plan should be considered by community planners within Lenawee County, when future updates of their comprehensive plans are taking place.

The LCHMAC will continue to monitor the status and track the progress of the plan elements on an annual basis. The LCHMAC will oversee the progress made on the implementation of the identified action items and update the plan as needed to reflect changing conditions. Representatives will also meet annually to evaluate plan progress and recommend updates. The Lenawee County Emergency Management Director will facilitate the meetings.

Evaluation of the plan will not only include checking the implementation status of mitigation action items, but also assessing their degree of effectiveness and assessing whether other natural hazards needs to be addressed and added to the plan. This will be accomplished by reviewing the benefits (or avoided losses) of the mitigation activities that were in place within each jurisdiction and the County. These will be compared to the goals the Plan has set to achieve. The LCHMAC will also evaluate whether mitigation action items need to be discontinued or modified in light of new developments or changes within the County.

During the annual reviews, municipalities will be encouraged to include hazard mitigation goals and objectives when they update planning documents, Master Plans and Comprehensive Land Use Plans, as well as building codes and zoning ordinances. The Emergency Management Director will also be stressing these updates at the Michigan Township Association (MTA) meetings he attends.

As required, this plan will be updated within five (5) years of the date of FEMA's approval of the plan. The plan may be updated earlier, at the discretion of the LCHMAC and its jurisdictions. The SCHMAC's ability to update the mitigation process by adding new data and incorporating it into the mitigation plan will allow for the efficient use of available resources, staff, and programs. They will meet to discuss the plan and document data collected including hazard events, completed mitigation activities, new mitigation activities, and FEMA grant application efforts. The information will be used for the five (5) year update. The Lenawee County Emergency Management Coordinator will coordinate the annual meeting and keep records of the participants and information received.

In order to have continued public support of the mitigation process, it is important that the public be involved not only in the preparation of the initial plan, but also in any modifications or updates to the plan. The public is invited to the annual meetings, in compliance with the Public Meetings Act.

To ensure that public support is maintained, the following actions may be taken by LCHMAC:

- Updates to the plan.
- The Lenawee County plan has been posted on the county website along with contact information that allows any citizen to read it and provide feedback.
- Develop informational mailings to be distributed to the public about mitigation efforts in the county and updates made to the plan.
- Develop mitigation flyers or mailings that contain mitigation activities and action items that promote reducing damages and risks of natural hazards.

APPENDIX A
LOCAL PLANNING TEAM MEETING SIGN-IN SHEETS

Lenawee County Attendance Sheet

December 9th, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Nic Wilson	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	X
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police – EMHSD	X
Chief Aric Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	

Lenawee County Attendance Sheet

Oct. 21, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Nic Wilson	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	

Lenawee County Attendance Sheet

Sept. 9, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Nie Wilson	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	

Lenawee County Attendance Sheet

June 17, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Nie Wilson	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	X
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police- EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	

Lenawee County Attendance Sheet

May 20, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriffs Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	X
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	

Lenawee County Attendance Sheet

April 22, 2022

Person	Agency	In Attendance
Bill Ernat	**EMCOG**	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
J		
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriffs Office & Rollin Twp.	
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	
Sarah Quellmalz	FEMA	X

Lenawee County Attendance Sheet

February 18, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriffs Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	X

Sgt. Ron Keck	Hudson Police Dept.	

Lenawee County Attendance Sheet

January 21, 2022

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
	Rollin Twp. Supervisor	
Irma David		
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	x
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriffs Office & Rollin Twp.	X
Chief Scott Damon	Cambridge **Twp.** FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	X

Lenawee County Attendance Sheet

December 17, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police- EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	X
Sgt. Ron Keck	Hudson Police Dept.	X

Lenawee County Attendance Sheet

October 15, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police - EMHSD	
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriffs Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	X

Lenawee County Attendance Sheet

September 17, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	X
Sgt. Ron Keck	Hudson Police Dept.	

Lenawee County Attendance Sheet

July 20, 2021

Person	Agency	In Attendance
Bill Ernat	**EMCOG**	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriffs Office & Rollin Twp.	
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriffs Office	
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	
Sgt. Ron Keck	Hudson Police Dept.	

Lenawee County Attendance Sheet

June 18, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriff's Office & Rollin Twp.	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X
Chief Charles Weir	Hudson Police Dept.	
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	X
Sgt. Ron Keck	Hudson Police Dept.	X

Lenawee County Attendance Sheet

April 16, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	X
Chris Howard	Lenawee Intermediate School District	X
Dave Aungst	Addison FD & Private Citizen Rollin Township	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriffs Office	
Chief Charles Weir	Hudson Police Dept.	X
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	X

Lenawee County Attendance Sheet

March 19, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriffs Office	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriffs Office	X
Chief Charles Weir	Hudson Police Dept.	X
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	X

Lenawee County Attendance Sheet

February 19, 2021

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	X
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	X
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office	X
Chief Scott Damon	Cambridge Twp. FD	X
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X
Chief Charles Weir	Hudson Police Dept.	X
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	X

Lenawee County Attendance Sheet

December 18, 2020

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Kyle Cupp	Fairfield Fire Dept.	X
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	X
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joanne Dennis	Signal 88 Security	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	X
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	
Chris Howard	Lenawee Intermediate School District	
Lt. Dave Aungst	Lenawee County Sheriff's Office	X
Chief Scott Damon	Cambridge Twp. FD	X
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	X
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	
Mario Bernardo	Great Lake Security	X

Lenawee County Attendance Sheet

November 20, 2020

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Kyle Cupp	Fairfield Fire Dept.	
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joanne Dennis	Signal 88 Security	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	
Matt Richardson	Lenawee County IT	
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	X
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriff's Office	X
Chief Scott Damon	Cambridge Twp. FD	
Sheriff Troy Bevier	Lenawee County Sheriff's Office	
Chief Charles Weir	Hudson Police Dept.	X
Deputy Chief Larry VanAlstine	City of Adrian Police Dept.	X
Mario Bernardo	Great Lake Security	X

Lenawee County Attendance Sheet

October 16, 2020

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	
Chief Kyle Cupp	Fairfield Fire Dept.	X
Chief Ryan Rank	Madison Twp. Fire Dept.	
Irma David	Rollin Twp. Supervisor	
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	
Joanne Dennis	Signal 88 Security	
Joe Malak	Lenawee County Airport Manager	
Jenny Escott	Lenawee County Drain Commission	
Chief Mike Shadbolt	Madison Twp. Police Dept.	X
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	
Chief Vince Emrick	City of Adrian Police Dept.	
Steve Hartsel	City of Hudson Manager	
Dale Witt	Raisin Twp. Supervisor	
Chief Brett Coker	City of Tecumseh Police Dept.	X
David Mitchell	Lenawee County Drain Commission	
Ed Scheffler	Lenawee County Drain Commission	
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	X
Chris Howard	Lenawee Intermediate School District	X
Lt. Dave Aungst	Lenawee County Sheriff's Office	X
Chief Scott Damon	Cambridge Twp. FD	X
Sheriff Troy Bevier	Lenawee County Sheriff's Office	X

Lenawee County Attendance Sheet

September
15, 2020

Person	Agency	In Attendance
Bill Ernat	EMCOG	X
Craig Tanis	Lenawee County Emergency Management	X
Jim VanDoren	Lenawee Now	X
Chief Kyle Cupp	Fairfield Fire Dept.	X
Chief Ryan Rank	Madison Twp. Fire Dept.	X
Irma David	Rollin Twp. Supervisor	X
Cyndy Birdwell	Siena Heights University Dir. Of Public Safety	X
Joanne Dennis	Signal 88 Security	X
Joe Malak	Lenawee County Airport Manager	X
Jenny Escott	Lenawee County Drain Commission	X
Chief **Mike** Shadbolt	Madison Twp. Police Dept.	X
Matt Richardson	Lenawee County IT	X
Robin Conner	City of Adrian Clerk	X
Joe Brezvai	Lenawee County Drain Commission	X
Tina Golembiewski	ProMedica Hospital	X
Lt. Jeff Yonker	Michigan State Police - EMHSD	X
Chief Arie Massingill	City of Adrian Fire Dept.	X
Dave Craig	Lenawee County Road Commission	X
Mark Haag	Lenawee Intermediate School District	X
Chief Vince Emrick	City of Adrian Police Dept.	X
Steve Hartse!	City of Hudson Manager	X
Dale Witt	Raisin Twp. Supervisor	X
Chief Brett Coker	City of Tecumseh Police Dept.	X
David Mitchell	Lenawee County Drain Commission	X
Ed Scheffler	Lenawee County Drain Commission	X
Cindy Merritt	Lenawee County Health Dept.	X
Debra Keller	Fairfield Twp. Clerk	X
Chris Howard	Lenawee Intermediate School District	X

APPENDIX B
VOLUNTEER MATCH DOCUMENTATION

Volunteers contribute* $187.7 billion *to the United States through their time, talent, and effort in 2019

(WASHINGTON, July 20, 2020) –Today, Independent Sector, with the Do Good Institute, announces that the latest value of a volunteer hour is $27.20 – up 7% from the previous year. Estimated from data collected in 2019, the figure shows the valuable contributions volunteers make to support our communities and country.

According to the most recent figures released in 2018 by the Corporation for National and Community Service, about 77.4 million people in the United States volunteered about 6.9 billion hours of their time, talent, and effort to improve and strengthen their communities. With the new Value of Volunteer Time, these community champions are contributing approximately $187.7 billion to our nation.

The latest value was calculated by the University of Maryland's Do Good Institute and recent graduate of the School of Public Policy, Michael Sousane. The figure is calculated with hourly earnings released by the U.S. Bureau of Labor Statistics, using a new method to adjust the hourly value for fringe benefits. Learn more about the methodology, developed by DGI senior researcher Nathan Dietz and Sousane, at independentsector.org/value-volunteer-time-methodology.

"We know intuitively and through the Value of Volunteer Time that volunteers' selfless work is a valuable asset that enables nonprofits to extend even further critical services they provide in communities nationwide," said Independent Sector president and CEO Dan Cardinali. "But during this extraordinary time of challenge caused by COVID-19, when many organizations are struggling economically to maintain mission-critical operations, the contributions of volunteers are more important than ever, and often a critical linchpin that enables nonprofit organizations to continue to provide needed services to help communities endure and survive the pandemic."

"Volunteering not only helps nonprofit organizations better support the people and communities they serve around the country, but also promotes civic participation, helping to strengthen the ties that bind communities together," said Robert T. Grimm, Jr., director of the Do Good Institute. "Our nation is full of people whose time and talents make a positive difference in the lives of so many individuals, and the data just proves even further what a valuable asset volunteers are in building stronger and more equitable communities."

In addition to the national number, Independent Sector also provides the state-level value of volunteer time for all 50 states, the District of Columbia, and Puerto Rico. State level values range from $13.74/hour for Puerto Rico to $48.67/hour for the District of Columbia.

For more on the Value of Volunteer Time, the methodology, and to explore historical national and state-level data, visit independentsector.org/volunteer_time.

###

Independent Sector is the only national membership organization that brings together a diverse community of changemakers, nonprofits, foundations, and corporations working to strengthen civil society and ensure all people in the United States thrive.

*The **Do Good Institute**, housed in the School of Public Policy at the University of Maryland, provides education, programs, research and resources to develop the next generation of nonprofit leaders, social innovators and civic-minded students.*

Media Contact:

Bradley Wong
202-467-6122
media@independentsector.org

(WASHINGTON, April 20, 2021) – Today, Independent Sector, with the Do Good Institute, announces that the latest value of a volunteer hour is $28.54 – up 4.9% from the previous year. Estimated from data collected in 2020, the figure shows the valuable contributions volunteers make to support our communities and country.

According to the Value of Volunteer Time, and using data from AmeriCorps on volunteer hours, volunteers typically contribute nearly $200 billion to our communities. However, there is evidence that the number of hours volunteered by Americans in 2020 has decreased due to the COVID-19 pandemic. While it will take some years to assess the full extent of impact from COVID-19, a recent study by Fidelity Charitable found that 66% of volunteers have decreased the amount of time they volunteer or stopped entirely due to the pandemic.

The latest value, calculated by the University of Maryland's Do Good Institute, is measured based on hourly earnings released by the U.S. Bureau of Labor Statistics. And while the pandemic certainly had an impact on volunteerism, wages in 2020 for the employed actually increased leading to an increased Value of Volunteer time rate. Learn more about the methodology here.

"As we celebrate our volunteers during National Volunteer Week, we should know just how much value these tireless individuals contribute to creating a healthier and more equitable nation," said Daniel J. Cardinali, president and CEO of Independent Sector. "As we work through our second year of a global pandemic when people, organizations, and communities continue to suffer, the contributions of volunteers have been an often life-saving and critical component to us enduring and rebuilding for future generations to come."

"The incredible challenges presented over the last year have been met time and time again by passionate, motivated, and generous people who are ready to help their neighbors and communities," said Nathan Dietz, senior researcher, Do Good Institute and the researcher responsible for calculating the findings. "All across the country, every day, these volunteers are offering their time and expertise to implement solutions, provide services, and help rebuild communities – but their value is often overlooked or often times is incalculable. This year's Value of Volunteer Time calculations go to show the immensity of their contributions on our nation."

In addition to the national number, Independent Sector also provides the state-level value of volunteer time for all 50 states, the District of Columbia, and Puerto Rico. State level values range from $13.74/hour for Puerto Rico to $48.67/hour for the District of Columbia.

For more on the Value of Volunteer Time, the methodology, and to explore historical national and state-level data, visit independentsector.org/volunteer_time.

###

Independent Sector is the only national membership organization that brings together a diverse community of changemakers, nonprofits, foundations, and corporations working to strengthen civil society and ensure all people in the United States thrive.

*The **Do Good Institute**, housed in the School of Public Policy at the University of Maryland, provides education, programs, research and resources to develop the next generation of nonprofit leaders, social innovators and civic-minded students.*

Media Contact:

Bradley Wong
202-467-6122
media@independentsector.org

INDEPENDENT SECTOR

Independent Sector Releases New Value of Volunteer Time of $29.95 Per Hour

As National Volunteer Week is celebrated, new data shows communities benefited from billions contributed through volunteerism despite pandemic challenges in 2021

April 18, 2022 13:30 ET I Source: Independent Sector

Bellevue, April 18, 2022 (GLOBE NEWSWIRE) -- (WASHINGTON, April 18, 2022) - Independent Sector, with the DoGood Institute, announced today that the latest value of a volunteer hour is estimated to be $29.95, which is a 4.9% increase over 2020. Estimated from data collected in 2021, the figure illustrates the valuable contributions volunteers make to support our communities and nation.

According to the Value of Volunteer Time, and using data from AmeriCorps on volunteer hours, volunteers typically contribute nearly $200 billion to our communities. There is evidence that the number of hours volunteered by people in the United States in 2021 has decreased due to the COVID-19 pandemic. While it will take some years to assess the full extent of impact from COVID-19, a study Y- FidelitY- Charitable found that 66% of volunteers have decreased the amount of time they volunteer or stopped entirely due to the pandemic.

Bureau of Labor Statistics. While the pandemic certainly had an impact on volunteerism, wages in 2021 for the employed actually increased, possibly due to inflation, leading to an increased Value of Volunteer time rate. Learn more about the methodology: here.

"The essential contributions made by our nation's volunteers to lift up, strengthen, and restore communities to make them healthy and equitable for people are always deeply appreciated, but never more so than during the pandemic," said Daniel J. Cardinali, President and CEO of Independent Sector. "Despite COVID-19's devastating impact, which began in 2020 and continues through today, our country's volunteers continued to show up, virtually and in person, with their compassion, skills, and abilities. They often put their own lives at risk. They are the threads that connect us as a nation, constantly reinforcing the foundation of civil society and helping build pathways so we all can thrive."

"The formidable challenges presented by the pandemic that persisted throughout 2021 only served to redouble the resolve of our country's volunteers to be a source of comfort and strength for neighbors in communities nationwide," said Nathan Dietz, senior researcher, Do Good Institute, who is responsible for calculating the findings. "While the immensity of the value of their contributions can never truly be calculated, the value of Value of Volunteer Time serves to provide a measure of the significance of the support and

services they provide when our communities and neighbors are in need."

In addition to the national number, Independent Sector also provides the state-level value of volunteer time for all SO states, the District of Columbia, and Puerto Rico. State level values range from $14.11/hour for Puerto Rico to $50.48/hour for the District of Columbia.

For more on the Value of Volunteer Time, the methodology, and to explore historical national and state-level data, visit indei:2endentsector.org/value-of-volunteer-time-2022.

brings together a diverse community of changemakers at nonprofits, foundations, and corporate giving programs working to ensure all people in the United States thrive. Learn more at independentsector.org.

The Do Good Institute, housed in the School of Public Policy at the University of Maryland, provides education, programs, research, and resources to develop the next generation of nonprofit leaders, social innovators and civic-minded students.

APPENDIX C
LENAWEE COUNTY LOCAL COMMUNITY SURVEY RESPONSES

All local communities were encouraged to participate in the update of the Hazard Mitigation Plan ("Plan") update. Their input was requested on two different levels, participation in the Plan itself, and the submittal of a survey that addressed the issues of that particular community.

Participation in the Plan update included attending any of a number of meetings of the Lenawee County Hazard Mitigation Advisory Committee (LCHMAC), which was used in advisory capacity for the Lenawee County data. The LCHMAC scheduled monthly meetings to complete the Plan in a timely manner. The second means to participate was the completion of a community survey. A copy of the email sent to all the municipalities along with the survey are found on the following pages, with the results of the survey found immediately following the sample survey.

Below is a list of the participating communities and their local representatives.

Lenawee County: Dave Aungst, Lieutenant Sheriff Department; Troy Bevier, Lenawee County Sheriff; Joe Brezvai, Deputy Drain Commissioner; Dave Craig, Lenawee County Road Commissioner; Jenny Escott, Drain Commissioner; Cindy Merritt, Deputy Environmental Health Director, Lenawee County Health Department; Dave Mitchell, Lenawee County Drain Commission Engineer; Matt Richardson, IT Director; Ed Scheffler, Deputy Drain Commissioner; Craig Tanis, Emergency Management Coordinator; Derrick Wilt, GIS Technician
City of Adrian: Robin Conner, City Clerk**;** Vince Emrick, Police Chief; Aric Massingill, Fire Chief; Larry VanAlstine, Deputy Police Chief
City of Hudson: Steve Hartsel, City Manager; Ron Keck, Police Sergeant; Charles Weir, Police Chief
City of Tecumseh: Brent Coker, Police Chief; Daniel Swallow, City Manager
Village of Addison: Dave Aungst, Assistant Fire Chief
Village of Clinton: Tony Cuevas, Police Chief
Blissfield Township: Adolio Navarro, Township Supervisor
Cambridge Township: Scott Damon, Fire Chief
Clinton Township: Basil Greenleaf, Township Supervisor
Deerfield Township: Ronald Cousino, Township Supervisor
Hudson Township: Jerry Tanners, City of Hudson, Fire Chief (the Hudson Fire Dept., covers the Township.)
Macon Township: Julia DeJonghe, Township Clerk
Madison Township: Ryan Rank, Fire Chief (2020-2022); Mike Shadbolt, Police Chief; Nic Wilson, Fire Chief (2022-); Janet Moden, Township Clerk
Medina Township: Jason Root, Township Supervisor
Ogden Township: Richard Marks, Supervisor

Palmyra Township: Christine Whited, Township Clerk
Raisin Township: Dale Witt, Township Supervisor; Jim Hannah, Fire Chief
Riga Township: Natalie Thompson, Township Clerk
Rollin Township: Dave Aungst, Designated Attendee; Irma David, Township Supervisor
Woodstock Township: Matthew SeGraves, Township Supervisor

EMCOG
EMAIL

Bill Ernat <bernat@emcog.org>

Lenawee County Hazard Mitigation Survey

1 message

Craig Tanis <Craig.Tanis@lenawee.mi.us> Wed, May 12, 2021 at 9:50 AM
To: "City, Adrian Clerk" <rconnor@adrianmi.gov>, "City, Adrian Mayor (Heath)" <aheath@adrianmi.gov>, "City, Hudson Clerk" <clerk@ci.hudson.mi.us>, "City, Hudson M (Carmel Camp)" <wccamp1960@hotmail.com>, "City, Hudson Manager" <manager@ci.hudson.mi.us>, "City, Morenci A" <michael.sessions@cityofmorenci.org>, "City, Morenci M" <jeff.bell@cityofmorenci.org>, "City, Tecumseh (Clerk)" <tmiller@tecumseh.mi.us>, "City, Tecumseh Mayor" <jbaker@tecumseh.mi.us>, "City, Tecumseh Mngr" <dswallow@tecumseh.mi.us>, "Greg Elliott (GElliott@adrianmi.gov)" <GElliott@adrianmi.gov>
Cc: "Bill Ernat (bernat@emcog.org)" <bernat@emcog.org>

Lenawee County Emergency Management staff is working with the East Michigan Council of Governments staff in updating the Lenawee County 2012 Hazard Mitigation Plan. In order to have a better understanding of the hazards that impact each community within Lenawee County, we ask that you complete the survey located at https://form.jotform.com/211242933756153 no later than June 30th.

The survey identifies each of the hazards that were identified as potential threats to the citizens/businesspersons/visitors of Lenawee County. Please indicate the potential impact of these events should they occur in your community. For all of these hazards, your response should be based on a larger-scaled event, not just an everyday occurrence. Also, for your convenience a definition of the hazards can be found at the end of the survey.

We ask that the survey questions are answered to the best of your ability. It is important that we get the most accurate, truthful information possible. Therefore, if you are unsure of an answer, please contact the person most knowledgeable on the subject for your community to respond to the questions(s). It is most critical that the information is accurate, and not descriptive of dangerous situations, when they do not exist.

The successful update of the Lenawee County Hazard Mitigation Plan is dependent upon getting the best, most recent information to include in the Plan. Your response is greatly appreciated.

If you have any questions on the survey or the status of the Hazard Mitigation Plan update process, please contact Craig Tanis at craig.tanis@lenawee.mi.ust<mailto:manzr@baycounty.net> or Bill Ernat at bernat@emcog.org<mailto:bernat@emcog.org>.

Sincerely,

Craig Tanis
Emergency Management Coordinator
Lenawee County
150 W. Maple Ave.
Adrian, MI 49221

517-264-4756 Office
517-204-6808 Cell

craig.tanis@lenawee.mi.us<mailto:craig.tanis@lenawee.mi.us>
twitter.com/LenaweeEM<https://twitter.com/LenaweeEM>

www.LenaweeAlerts.com<http://www.lenaweealerts.com/>

[Emergency Mgmt Logo (540 x 540)]

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Local Municipality

Hazard Mitigation Community Survey

Hazard	High Impact	Medium Impact	Moderate Impact	No Impact
Energy Emergencies				
Infrastructure Failures				
Riverine Flooding				
Severe Weather				
Dam Failures				
Cyberterrorism				
Hazard Materials Incidents				
Terrorism/Sabotage				
Tornadoes				
Transportation Accidents				
Well/Pipeline Incidents				
Extreme Temperatures				
Invasive Species				
Seasonal Population Changes				
Public Health Emergencies				
Structural Fires				
Wildfires				
Nuclear power Plant Failures				
Fog				
Drought				
Civil Disturbances				
Special Events				
Subsidence				
Severe Winds				

extreme temperatures-extreme cold and extreme heat;
hazard material incidents-hazardous material fixed site and transportation;
well/pipeline incidents-oil/gas well incidents and petroleum/natural gas pipelines; and
severe weather-hail, lightning, severe winds, thunderstorms, ice/sleet storms and snowstorms

1. FEMA is well aware that municipal resources vary with each municipality. Please identify those resources below that are available to your community.

Planning Staff	_____	Emergency Management Staff	_____
Public Works Department	_____	Taxing Authority	_____
County Emergency Management Staff	_____	Zoning Ordinance/Land Use Plan	_____
Building Codes	_____	Ordinance Authority	_____
Local Police Department	_____	Fulltime Fire Department/Equipment	_____
County Sheriff	_____	Volunteer Fire Department/Equipment	_____
Hospital/Medical Facilities	_____	Emergency Medical Services	_____

2. Since 2000, what hazardous events have resulted in damaged or loss of property and/or injury/death of human lives in your community? Please include the date and results of the event.

3. Does your community have large seasonal shifts in population?

Are there a significant number of seasonal homes in the community?

What is the reason for the large influx of population? Does the influx of population create a threat to your community, and if so why?

4. Are there any annual events held in the community that attract large numbers of people? If so, describe the event, location, date, and approximate attendance.

What extra measures are required by the community?

5. Does your staff utilize data back-up systems and anti-virus software for the municipality's computers? If no, why not?

6. Has your community installed lightning protection devices on the community's infrastructure? If no, why not?

7. Does your staff utilize surge protectors on critical electronic equipment? If no, why not?

8. What hazard from the first page do you feel your community is best prepared to mitigate? Why?

9. What hazard from the first page do you feel your community is least prepared to mitigate? Why?

10. Does your community utilize a warning siren to alert the residents of a storm or other weather event? If you have more than one, how many do you have?

11. Would you prefer another warning system in addition to the sirens to alert you of any major hazardous event?

12. What types of initiatives, improvements, or efforts do you think could be implemented that would help reduce your community's vulnerability to specific hazards?

13. Are you aware of any properties that have experienced flood damage to their homes on multiple occasions as a result of flood waters?

_____ _____

Person Completing Survey Date

_____

Local Municipality

HAZARDOUS EVENT DEFINITIONS

CIVIL DISTURBANCES-Collective behavior that results in a significant level of law-breaking, perceived threat to public order, or disruption of essential functions and quality of life.

CLIMATE CHANGE - A non-random change in climate that is measured over several decades or longer. The change may be due to natural or human-induced causes.

CYBER CRIMES-Criminal offenses committed via the Internet or otherwise aided by various forms of computer technology, such as the use of online social networks to bully others or sending sexually explicit digital photos with a smart phone.

DAM FAILURES-The collapse or failure of an impoundment (water held back by a dam) resulting in downstream flooding.

DROUGHT-A water shortage caused by a deficiency of rainfall, generally lasting for an extended period of time.

EARTHQUAKES-A shaking or trembling of the crust of the earth caused by the breaking and shifting of rock beneath the surface**.**

ENERGY EMERGENCIES-An actual or potential shortage of gasoline, electrical power, natural gas, fuel oil, or propane-of sufficient magnitude and duration to potentially threaten public health and safety, and/or economic and social stability.

EXTREME TEMPERATURES (COLD)-Prolonged periods of very low temperatures often accompanied by exacerbating conditions such as heavy snowfall and high winds.

EXTREME TEMPERATURES (HEAT)-Prolonged periods of very high temperatures often accompanied by exacerbating conditions such as high humidity and lack of rain.

FOG-Condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.

HAIL-Condition where atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that falls to the earth.

HAZARDOUS MATERIAL INCIDENTS/FIXED SITE AND PROPANE STORAGE SITES-Hazardous Material Incident-An uncontrolled release of hazardous materials from a fixed site, capable of posing a risk to health, safety, property, and the environment.

HAZARDOUS MATERIAL INCIDENTS/TRANSPORTATION-An uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property or the environment.

ICE/SLEET STORMS-A storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage**.**

INFRASTRUCTURE FAILURES-A failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services.

LIGHTNING-The discharge of electricity from within a thunderstorm**.**

NUCLEAR ATTACK-A hostile action taken against the United States which involves nuclear weapons and results in destruction of property and/or loss of life.

NUCLEAR POWER PLANT ACCIDENTS-An actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility, in sufficient quantity to constitute a threat to the health and safety of the off-site population.

OIL/GAS WELL INCIDENT-An uncontrolled release of oil or gas, or the poisonous by-product hydrogen sulfide, from wells.

PETROLEUM AND NATURAL GAS PIPELINE ACCIDENTS-An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline.

POPULATION CHANGES/SPECIAL EVENTS-A population change for an extended time period, in the county, beyond the normal level of people to which resources are allocated.

PUBLIC HEALTH EMERGENCY-A widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to or otherwise negatively impacts the general health and well- being of the public.

RIVERINE (FLUVIAL) FLOODING-The overflowing of rivers, streams, drains and lakes due to excessive rainfall, rapid snowmelt, ice, or high winds.

TERRORISM AND SABOTAGE-An intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives.

SCRAP TIRE FIRES-A large fire that burns scrap tires being stored for recycling/re-use.

SEVERE WINDS-Non-tornadic winds 58 miles per hour (mph) or 50.4 knots per hour (kph) or greater.

SHORELINE INCIDENTS-Flooding, shoreline erosion, and wind-blown ice floes impacting the shoreline properties along Lake Huron.

SNOWSTORMS-A period of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility.

STRAIGHT-LINE WINDS- Damaging winds are often called "straight-line" winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Damaging winds are classified as those exceeding 50-60 mph. Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

STRUCTURAL FIRES-A fire, of any origin that ignites one or more structures, causing loss of life and/or property.

SUBSIDENCE-The lowering or collapse of the land surface caused by natural or human-induced activities that erode or remove subsurface support.

SURFACE (PLUVIAL) FLOODING-the accumulation of water in low-lying and inadequately drained areas, following heavy precipitation events, including structural or power failures in municipal sewage systems, causing water to flood or back-up into houses, other structures, and infrastructure. caused when heavy rainfall creates a flood event independent of an overflowing water body.

TORNADOES-A violently whirling column of air extending downward to the ground from a cumulonimbus cloud. (The wind speed of tornadoes is 65 mph or greater.)

TRANSPORTATION ACCIDENTS: AIR, LAND, AND WATER-A crash or accident involving an air, land or water-based commercial passenger carrier resulting in death or serious injury.

WILDFIRES-An uncontrolled fire in grass or brushlands, or forested areas.

WIND-BLOWN ICE FLOE-An ice floe driven on shore by winds in the Saginaw Bay.

Community Responses Hazard Mitigation Community Survey

Hazard	High Impact	Medium Impact	Moderate Impact	No Impact
Energy Emergencies	1,2,4,5,6,12,13,16, 17	3,7,8,9,10,11,15,18	14,19,20	
Infrastructure Failures	1,2,3,5,6,11,13	4,8.12,16,20	7,9,10,14,15,17, 18,19	
Riverine Flooding	3,9,11,16,20	1,2,5,6,7,10,13,17	4,8,12,15,18,19	14
Severe Weather	1,2,3,4,5,9,11,12, 13,16,17	6,7,8,10,15,18,20	14,19	
Dam Failures	3,5,8,11	1,4,6,20	2,10,12,17	7,9,13,14,15, 16,18,19
Cyberterrorism	1,2,5,8,11,13	3,6,9,12,14,16,17,20	4,7,10,15,18,19	
Hazardous Material Incidents	1,2,5,8,9,12,13,16, 17	3,6,7,11,18,20	4,10,14,15,19	
Terrorism/Sabotage	2,9,12,13,17	1,3,5,6,8,16,20	4,7,10,11,14,15, 18,19	
Tornadoes	2,5,6,7,8,9,13,16, 17,19	1,3,12	4,10,11,14,15,18, 20	
Transportation Accidents	5,13	1,2,4,6,8,12,16	7,9,10,14,15,17, 18,19	3,11,20
Well/Pipeline Incidents	6,12,13	1,4,7,8,15,16,18	2,5,9,10,17,19,20	3,11,14
Extreme Temperatures	7,13,16	2,6,8,9,15,17,18,20	1,3,4,5,10,11,12, 14,19	
Invasive Species	8,11,16	2,6,12,13,15	1,5,7,9,10,14,17, 18,19,20	3,4
Seasonal Population Change	3,8,11,20	13,19	2,6,7,9,10,12	1,4,5,14,15,16, 17,18
Public Health Emergencies	1,2,8,12,13	5,6,7,9,10,15,17,19	4,11,14,16,18,20	3
Structural Fires	13	1,2,5,7,9,12,15,17,19, 20	3,4,6,8,10,11,14, 16,18	
Wildfires	11,12,15	1,8,9,13,17,20	2,3,4,5,6,7,12,14, 16,18,19	10
Nuclear Power Plant Failures	3,9,11,13,20	2,12,16,17	1,6,8,14,18	4,5,7,10,15,19
Fog	11	10,12,13,15,16	3,6,7,8,9,14,17, 18,20	1,2,4,5,19
Drought	11,13,15,16	6,9,10,12,17,18	1,3,4,5,7,8,14,19, 20	2
Civil Disturbances	6,9,13	1,2,4,8,12	5,7,10,14,15,16, 17,18,19	3,11,20
Special Events	8	1,4,12,13	2,5,6,7,9,10,11, 15,16,18,19	3,14,17,20
Subsidence		8,12,13	3,4,5,6,7,9,10,11, 14,15,16,17,20	1,2,18,19

Severe Winds	1,5,8,13,16,17	2,7,9,10,11,12,15,18, 19	3,4,6,14,20	

1-Lenawee County
2-City of Adrian
3-City of Hudson
4-City of Tecumseh
5-Village of Addison
6-Village of Clinton
7-Blissfield Township
8-Cambridge Township
9-Clinton Township
10-Deerfield Township
11-Huson Township
12-Macon Township
13-Madison Township
14-Medina Township
15-Ogden Township
16-Palmyra Township
17-Raisin Township
18-Riga Township
19-Rollin Township
20-Woodstock Township

1. FEMA is well aware that municipal resources vary with each municipality. Please identify those resources below that are available to your community.

   Answers to this question can be found in Table 3.4 on page 55.

2. Since 2000, what hazardous events have resulted in damaged or loss of property and/or injury/death of human lives in your community? Please include the date and results of the event.

Municipality	Comments
City of Adrian	COVID-19
Madison Charter Township	Covid-19
Clinton Township	
City of Tecumseh	Severe weather events, strong thunderstorms and ice storms, structural fires, public health emergencies
Village of Clinton	Electric power outage in 2002.
Palmyra Township	
Medina Township	High winds causing damage to buildings in 2010.
Rollin township	Major ice storm that caused electrical outage and downed trees in 2008, high winds causing property damage, COVID-19
Woodstock Township	Power outages damages to property, severe weather-loss of power, automobile accident-loss of life.
City of Hudson	2021-large hail damaging roofs, one person hospitalized after being struck by large hailstone.
Hudson Township	2021-hail, straightline winds, transportation accidents, structural fires

Macon Township	
Blissfield Township	

Riga Township	2021-tornado in June. Transportation accidents, structural fires, wildfires, and high winds causing damages, all occurring on multiple occasions.
Raisin Township	2019-in March there was a house fire resulting in a double fatality.
Deerfield Township	
Ogden Township	
Cambridge Township	
Village of Addison	On Sept. 12, 2022, a semi rolled over in the middle of town taking down power lines. School was canceled. Thousands of gallons of milk were leaked into the waterway. Problematic road, with a sharp curve.

3. Does your community have large seasonal shifts in population?
Yes-Rollin Township, Woodstock Township, Hudson Township, Cambridge Township.

No-City of Adrian, Madison Charter Township, Clinton Township, City of Tecumseh, Village of Clinton, Palmyra Township, Medina Township, City of Hudson, Macon Township, Blissfield Township, Riga Township, Raisin Township, Deerfield Township, Ogden Township, Village of Addison

Are there a significant number of seasonal homes in the community?

Yes-Rollin Township, Woodstock Township, Hudson Township, Cambridge Township.

No-City of Adrian, Madison Charter Township, Clinton Township, City of Tecumseh, Village of Clinton, Palmyra Township, Medina Township, City of Hudson, Macon Township, Blissfield Township, Riga Township, Raisin Township, Deerfield Township, Ogden Township, Village of Addison

What is the reason for the large influx of population? Does the influx of population create a threat to your community, and if so why?

Rollin Township, Woodstock Township, Hudson Township, Cambridge Township all have seasonal homes causing the influx. The influx has not caused a threat to the community(ies).

4. Are there any annual events held in the community that attract large numbers of people? If so, describe the event, location, date, and approximate attendance. What extra measures are required by your community?

Municipality	Comments
City of Adrian	4th of July celebration
Madison Charter Township	Faster Horses, NASCAR race
Clinton Township	Clinton Summerfest and Antiques Tractor Show. 800-1200 people. Police and Fire Department presence are required for the event.

City of Tecumseh	Apple Pumpkin Festival Downtown area, mid-October 30,000-50,000 people. Extra Police and Emergency Medical staff are required.
Village of Clinton	Clinton Fall Festival, September 24-26 approximately 50,000 people, Summerfest, June 12th, approximately 5,000 people, Christmas in the Village , December, approximately 500 people. Fall festival committee staffs the event.
Palmyra Township	Memorial Day Parade. Permit is needed from MSP as the event is on US 223.
Medina Township	
Rollin township	Multiple small events, Art Festival draws about 5,000 people. Project plans must be submitted prior to the event.
Woodstock Township	Faster Horses in July, Michigan International Speedway (MIS) Races-June/August, July 4th Fireworks. Project (site) plans for the event must be submitted prior to the event.
City of Hudson	
Hudson Township	MIS is 22 miles away and it hosts multiple large events annually. Both primary and secondary roads are utilized. Annual fireworks draw about 1,000 to 1,200 people. Posey Lake also has fireworks and draws about the same number of people. Hudson Twp. fire department provides pre-planning and fire protection coverage for fireworks.
Macon Township	
Blissfield Township	Annual River Raisin Festival the second week of July. A two-day event, Blissfield Township requires fire department presence.
Riga Township	Annual Riga Day/Fire Dept Open House in August. Draws less than 1,000 people, no extra measures taken.
Raisin Township	Apple festival at Kapnick Orchard in October. Brings in about 2,000 people. There are soccer and little league games/tournaments all summer long, some tournaments can have as many as 2,000 people.
Deerfield Township	American Legion has a festival in mid-March which brings in about 2,000 people.
Ogden Township	
Cambridge Township	
Village of Addison	

5. Does your staff utilize data back-up systems and anti-virus software for the municipality's computers? If no, why not?
   Yes-City of Adrian, Madison Charter Township, Clinton Township, City of Tecumseh, Village of Clinton, Palmyra Township, Medina Township, Rollin Township, Woodstock Township, City of Hudson, Hudson Township, Macon Township, Blissfield Township, Riga Township, Raisin Township, Deerfield Township, Ogden Township, Village of Addison

   No-Cambridge Township

6. Has your community installed lightning protection devices on the community's infrastructure? If no, why not?

Yes-Madison Charter Township, City of Tecumseh, Village of Clinton, Palmyra Township, Medina Township, City of Hudson, Hudson Township, Raisin Township, Ogden Township, Village of Addison

No-City of Adrian, Clinton Township (equipment is on hand, but yet to be installed), Rollin Township, Woodstock Township, Macon Township, Blissfield Township (No infrastructure), Riga Township, Deerfield Township, Cambridge Township

7. Does your staff utilize surge protectors on critical electronic equipment? If no, why not?
Yes-City of Adrian, Madison Charter Township, Clinton Township, City of Tecumseh, Village of Clinton, Palmyra Township, Medina Township, Rollin Township, Woodstock Township, City of Hudson, Hudson Township, Macon Township, Blissfield Township, Riga Township, Raisin Township, Deerfield Township, Ogden Township, Village of Addison

No-Cambridge Township

8. What hazard from the first page do you feel your community is best prepared to mitigate (lessen the impact)? Why?

Municipality	Comments
City of Adrian	Fog-nothing to do to reduce impact.
Madison Charter Township	Public Health Emergencies
Clinton Township	Weather
City of Tecumseh	Civil Disturbances, well-trained, full-time Police Department
Village of Clinton	Utility outages, as they have a utility department. Also prepared for weather-related events as they have their own public safety agencies.
Palmyra Township	Structural fires and wildfires. All first responders have to be certified, and the department is properly equipped.
Medina Township	Severe weather events, as the township deals with various weather events throughout the year, such as storms, flooding, snows, etc.
Rollin township	Events that can be handled by Fire and EMS personnel.
Woodstock Township	Fires-outstanding Fire/EMS personnel for several decades
City of Hudson	Structural Fires and Transportation Accidents because of Police/Fire/EMS personnel. Some weather events because of Public Works Dept.
Hudson Township	Structure Fires, Transportation Accidents. Through training and planning the fire department has developed guidelines and practices to best help mitigate these incidents.
Macon Township	Dam Failures
Blissfield Township	Structural Fires, the Fire Department is well-funded and trained
Riga Township	Storm/weather damage that is not major, clearing roadways from limbs, etc.
Raisin Township	Structural Fires, weather and transportation accidents, first responders have trained for those events.
Deerfield Township	River flooding, severe winds

Ogden Township	Fire and rescue, the Township has a contract with Madison Charter Township.
Cambridge Township	None
Village of Addison	Structural Fires, the Village has a mutual aid agreement with the surrounding communities.

9. What hazard from the first page do you feel your community is least prepared to mitigate (lessen the impact)? Why?

Municipality	Comments
City of Adrian	Nuclear Power Plant Failure, has not happened.
Madison Charter Township	Dams, there are very few
Clinton Township	Nuclear Power Plant Failure in Monroe County
City of Tecumseh	Public Health Emergency, no hospital, limited training for staff
Village of Clinton	Large scale Civil Disturbance, limited public safety personnel
Palmyra Township	Drought and Invasive Species
Medina Township	Cyberterrorism, crimes are becoming more sophisticated, and it is hard to keep up.
Rollin township	The Township does not have staff, communications systems, etc
Woodstock Township	Major flooding, not an issue we generally have to manage on a large scale. Terrorist attack NA so far.
City of Hudson	Energy and Infrastructure Failures.
Hudson Township	Tornadoes and other weather related emergencies. These are often fast approaching and widespread, and our resources are stretched thin in responding to them. Hazardous Material Incidents, as the Fire Department is not fulltime and does not have a large budget to send staff to technician level training or to purchase that level appropriate gear.
Macon Township	Energy Emergencies, DTE power has gone out multiple times since 2021 for no apparent reasons, and the citizens are not happy about it.
Blissfield Township	Civil disturbances, there is no police department.
Riga Township	Not prepared to mitigate anything disastrous that impacted more than one household at any given time, ie tornado, or pipeline explosion. The fire department is excellent, but these would be beyond their scope of personnel.
Raisin Township	Flooding, no way to control water flow in the Township and there are numerous bridges that could be affected.
Deerfield Township	Nuclear emergencies
Ogden Township	Nuclear power, no fallout shelters
Cambridge Township	
Village of Addison	A hazardous materials event, as the Village does not have the resources to address it immediately. Closest resources are about an hour away.

10. Does your community utilize a warning siren to alert the residents of a storm or other weather event? If you have more than one, how many do you have?

Municipality	Comments
City of Adrian	Yes
Madison Charter Township	Unknown
Clinton Township	Yes
City of Tecumseh	Yes, three
Village of Clinton	Yes, three
Palmyra Township	Yes
Medina Township	No
Rollin township	Yes, the Woodstock and Addison sirens can also be heard
Woodstock Township	Yes, two
City of Hudson	Yes
Hudson Township	Yes, two
Macon Township	No
Blissfield Township	Yes
Riga Township	Yes
Raisin Township	Yes, three
Deerfield Township	Yes
Ogden Township	No
Cambridge Township	Yes
Village of Addison	Yes, two

11. Would you prefer another warning system in addition to the sirens to alert you of any major hazardous event?

Municipality	Comments
City of Adrian	Yes, Code Red
Madison Charter Township	Sure
Clinton Township	System that alerts residents through the radio or television
City of Tecumseh	Yes, text or other mobile devise alerts
Village of Clinton	Most residents receive RAVE alerts or are participants in Smart 911
Palmyra Township	Yes
Medina Township	No
Rollin township	No
Woodstock Township	Not necessarily
City of Hudson	Possibly
Hudson Township	Residents can and have also subscribed to the Code Red warning system to also be alerted of the incoming severe weather and other area alerts.
Macon Township	No

Blissfield Township	Text or phone message
Riga Township	The text/phone alerts are excellent, but only if individuals subscribe. I don't think there is any other reasonable solution for our sparse, spread out population.
Raisin Township	Yes. We encourage our residents to use the county smart 911 and RAVE.
Deerfield Township	Majority have it on their cell phones
Ogden Township	Cell phone alerts
Cambridge Township	None
Village of Addison	A siren with voice capability would be nice.

12. What types of initiatives, improvements, or efforts do you think could be implemented that would help reduce your community's vulnerability to specific hazards?

Municipality	Comments
City of Adrian	Better warning system to alert residents of oncoming hazards.
Madison Charter Township	Not sure.
Clinton Township	Not sure.
City of Tecumseh	Better communication strategies with public and other agencies, based on specific events.
Village of Clinton	Planning for large scale hazardous material release caused by commercial truck accident.
Palmyra Township	I think that continuous updates and improvements to infrastructure and warning systems is crucial in reducing communities' vulnerability to specific hazards.
Medina Township	None
Rollin township	Don't know
Woodstock Township	NA
City of Hudson	Training and equipment
Hudson Township	If money was available to the Community to replace the 1970's Weather Warning siren that would help with weather warnings. Also if there was a project to build retention ponds for storm water and runoff and large permanent pumps in place to pump the water far away from the low areas. The Electrical Supply Company is Consumers Energy and each storm we have multiple neighborhoods that lose power as the lines come down with poles and trees. If money was invested into grid redundancies and tree trimming and perhaps moving some lines to underground that could help our Community.
Macon Township	Unsure
Blissfield Township	More communication between agencies.
Riga Township	Having 100 percent participation in alert system.
Raisin Township	Additional warning sirens
Deerfield Township	Not sure
Ogden Township	
Cambridge Township	None
Village of Addison	Better equipment and more resources

13. Are you aware of any properties that have experienced flood damage to their homes on multiple occasions as a result of flood waters?

Municipality	Comments
City of Adrian	No
Madison Charter Township	No
Clinton Township	No
City of Tecumseh	No
Village of Clinton	No
Palmyra Township	No
Medina Township	Yes
Rollin township	Not really, lots of flooding this past spring due to heavy rains. Drainage problems have increased in the past 20 years with new developments and additions, patios, and concrete driveways.
Woodstock Township	No, not on a large scale.
City of Hudson	No
Hudson Township	Yes. In the 200 block of Church St. in Hudson as well as along US-127 highway have flooded numerous times over the years when we have had big rain events and the pumps can't move the water away fast enough.
Macon Township	No
Blissfield Township	Yes
Riga Township	No
Raisin Township	No
Deerfield Township	Yes
Ogden Township	No
Cambridge Township	None
Village of Addison	No

APPENDIX D
LENAWEE COUNTY RESIDENTIAL SURVEY

Lenawee County Residential Survey

Lenawee County is in the process of updating the Hazard Mitigation Plan, which will be used to identify measures to reduce the impacts of hazards impacting the residents of Lenawee County. This Plan will also qualify the County and the participating communities for pre-disaster and flood mitigation funds through FEMA. This questionnaire has been developed to identify the awareness and concerns of the public on hazards as well as getting your information to the Committee as they develop projects to address the hazards. Your participation in completing this survey is voluntary and is greatly appreciated. All information will be kept confidential.

1. Please identify the community in which you live. _____

2. Do you own or rent your home? Yes _____ No _____

3. How long have you lived at your current residence? _____

4. The Hazard Mitigation Advisory Committee has determined that there are 28 hazards that could impact the residents of Lenawee County. (Definitions for these events can be found at the end of the survey.) Please indicate how concerned you are with each hazard using the following rating system:
   0=Not Concerned 1=Slightly Concerned 2=Moderately Concerned 3=Very Concerned

Hazard	0	1	2	3	Hazard	0	1	2	3
Energy Emergencies					Public Health Emergency				
Infrastructure Failures					Structural Fires				
Riverine Flooding					Wildfires				
Ice/Sleet Storm					Nuclear Power Plant Failure				
Dam Failures					Fog				
Cyberterrorism					Drought				
Hazardous Material- Fixed Site Incident					Civil Disturbances				
Terrorism Sabotage					Special Events				
Tornadoes					Subsidence				
Transportation Accidents					Severe Winds				
Oil/Gas Well Incidents					Hazardous Materials-Transportation Incident				
Extreme Temperatures					Oil/Gas Pipeline Incident				
Invasive Species					Hail				
Seasonal Population Changes					Lightning				

5. Are there any hazards not identified that you are concerned with? If so, please identify them below.
   _____
   _____
   _____

6. How are you currently notified when there is a disaster or emergency?

Warning Sirens _____	NOAA Weather Radio _____
Mobile Alert _____	Other: _____
Landline _____	Not Notified _____
Radio/Television _____	

7. Is this notification system effective? Why or why not?
_____
_____
_____

8. Do you have flood insurance?

Yes _____ No _____ Not Required _____

9. Have you taken actions to make your home/property more resilient to disasters?

Yes _____ No _____ Not Sure _____

10. If so, what are they?
_____
_____
_____

11. Does your family have a Family Disaster Emergency Kit?
Yes _____ No _____

12. Would your family be willing to attend a public education course or courses to develop a Family Disaster Emergency Kit and to become better prepared for future events?

Yes _____ No _____

If yes, please indicate the time that you and/or your family members could attend.

Weekday Mornings _____	Weekday Afternoons _____	Monday Evenings _____
Tuesday Evenings _____	Wednesday Evenings _____	Thursday Evenings _____
Friday Evenings _____	Saturday Mornings _____	Saturday Afternoons _____

Sunday Mornings _____ Sunday Afternoons _____

13. Do you or any member of your family have special needs that would require assistance during a disaster? If so, what are those needs?

_____
_____
_____

HAZARDOUS EVENT DEFINITIONS

BLIZZARDS-includes strong winds (0ver 35 mph), drifting snow, low temperatures, and blowing snow that reduces visibility.

CELSTIAL IMPACT-An impact or threatened impact from a meteorite, asteroid, comet, satellite, space vehicle, space debris, or similar objects that may cause physical damages or other disruptions**.**

CIVIL DISTURBANCES-Collective behavior that results in a significant level of law-breaking, perceived threat to public order, or disruption of essential functions and quality of life.

CYBERTERRORISM-Unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives.

DAM FAILURES-The collapse or failure of an impoundment (water held back by a dam) resulting in downstream flooding.

DROUGHT-A water shortage caused unusual hydraulic conditions such as a deficiency of rainfall, and generally lasting for an extended period of time.

EARTHQUAKES-A shaking or trembling of the ground (or earth's crust) caused by tectonic activity or other seismic forces.

ENERGY EMERGENCY-An actual or potential shortage of gasoline, electrical power, natural gas, fuel oil, or propane-of sufficient magnitude and duration to potentially threaten public health and safety, and/or economic and social stability.

EXTREME TEMPERATURES (COLD)-Prolonged periods of very low temperatures often accompanied by exacerbating conditions such as heavy snowfall and high winds.

EXTREME TEMPERATURES (HEAT)-Prolonged periods of very high temperatures often accompanied by exacerbating conditions such as high humidity and lack of rain.

FOG-Condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.

HAIL-Lumps of ice that form in weather systems such as thunderstorms and then fall to earth as solid precipitations.

HAZARDOUS MATERIAL INCIDENTS/FIXED SITE AND PROPANE STORAGE SITES- -An uncontrolled release of hazardous materials from a fixed site, capable of posing a risk to health, safety, property, and the environment.

HAZARDOUS MATERIAL INCIDENTS/TRANSPORTATION-An uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property, or the environment.

ICE/SLEET STORMS-A storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage.

INFRASTRUCTURE FAILURES-A failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services.

INVASIVE SPECIES-A species whose introduction to Michigan causses or is likely to cause economic or environmental harm, or harm to human health, to an extent that outweighs the species,' known benefits.

LIGHTNING-The discharge of electricity from within a thunderstorm.

NUCLEAR ATTACK-A hostile action taken against the United States which involves nuclear weapons and results in destruction of property and/or loss of life.

NUCLEAR POWER PLANT ACCIDENTS-An actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility, in sufficient quantity to constitute a threat to the health and safety of the off-site population.

OIL/GAS WELL INCIDENT-An uncontrolled release of oil or gas, or the poisonous by-product hydrogen sulfide, from wells.

PETROLEUM AND NATURAL GAS PIPELINE ACCIDENTS-An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline.

PLUVIAL AND URBAN FLOODS—The accumulation of water in low-lying and inadequately drained areas, following heavy precipitation events, including structural or power failures in municipal sewage systems, causing water to flood or back-up into houses and other structures , and infrastructure.

PUBLIC HEALTH EMERGENCIES-A widespread and/or severe epidemic, incident of contamination, or other situation that presents a danger to or otherwise negatively impacts the general health and well-being of the public.

RIVERINE (FLUVIAL) FLOODING-The overflowing of rivers, streams, and channels-due to inadequate drainage capacity, drainage system failures, ice or log jams, accumulated sediments, erosion, or meandering, that results in nearby property damage, safety issues, disruption of infrastructure function and services, and/or decreased quality of life.

SABOTAGE (TERRORISM)-An intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, or religious objectives.

SCRAP TIRE FIRES-A large fire that burns scrap tires being stored for recycling/re-use.

SEASONAL POPULATION INCREASE-A population change for an extended time period, in the county, beyond the normal level of people to which resources are allocated.

SEVERE WINDS-Non-tornadic winds 58 miles per hour (mph) or greater.

SHORELILNE HAZARDS-water -level fluctuations, current and wave actions, and other conditions in the Great Lakes that cause flooding or erosion, or otherwise threaten life, health , and property in shoreline areas, including harmful algal blooms, ice surges, storms surges, meteotsunamis, rip currents, shoreline erosion and recession.

SNOWSTORMS-A period of rapid accumulation of snow often accompanied by high winds, cold temperatures, and low visibility.

SPECIAL EVENTS-An attraction or series of attractions that result in the increase of visitors to an area that exceeds the normal population base.

STRUCTURAL FIRES-A fire, of any origin that ignites one or more structures, causing loss of life and/or property.

SUBSIDENCE-The lowering or collapse of the land surface caused by natural or human-induced activities that erode or remove subsurface support.

THUNDERSTORM-Weather systems accompanied by strong winds (at least 56 mph), lightning, heavy rain (that could cause flooding), hail, (at least ¼" in diameter), or tornadoes.

TORNADOS-An intense rotating column of wind that extends from the base of a severe thunderstorm to the ground.

TRANSPORTATION ACCIDENTS: AIR, LAND, AND WATER-A crash or accident involving an air, land or water-based commercial passenger carrier resulting in death or serious injury.

WILDFIRES-An uncontrolled fire in grass or brushlands, or forested areas.

Lenawee County Residential Survey Results

Lenawee County is in the process of updating the Hazard Mitigation Plan, which will be used to identify measures to reduce the impacts of hazards impacting the residents of Lenawee County. This Plan will also qualify the County and the participating communities for pre-disaster and flood mitigation funds through FEMA. This questionnaire has been developed to identify the awareness and concerns of the public on hazards as well as getting your information to the Committee as they develop projects to address the hazards. Your participation in completing this survey is voluntary and is greatly appreciated. All information will be kept confidential.

1. Please identify the community in which you live.

Municipality	Responses	Municipality	Responses	Municipality	Responses
City of Adrian	15	Adrian Township	5	Ogden Township	1
City of Hudson		Blissfield Township		Palmyra Township	
City of Morenci		Cambridge Township	2	Raisin Township	4
City of Tecumseh	5	Clinton Township	1	Ridgeway Township	
Village of Addison		Deerfield Township		Riga Township	1
Village of Blissfield	4	Dover Township	2	Rollin Township	3
Village of Britton		Fairfield Township		Rome Township	2
Village of Cement City		Franklin Township	3	Seneca Township	1
Village of Clayton	2	Hudson Township	1	Tecumseh Township	1
Village of Clinton	1	Macon Township	1	Woodstock Township	1
Village of Deerfield		Madison Township	3		
Village of Onsted		Medina Township			

2. Do you own or rent your home?

Ownership Status	Responses
Own	57
Rent	2

3. How long have you lived in your current residence?

Number of years	sponses	Number of years	sponses
Less than 1 year		16-20 years	
1-5 years		21-25 years	
6-10 years		26-30 years	
11-15 years		31+ years	

4. The Hazard Mitigation Advisory Committee has determined that there are 28 hazards that could impact the residents of Lenawee County. (Definitions for these events can be found at the end of the survey.) Please indicate how concerned you are with each hazard using the following rating system:
   0=Not Concerned 1=Slightly Concerned 2=Moderately Concerned 3=Very Concerned

zard					zard				
Energy Emergencies					Public Health Emergency				
Infrastructure Failure					Structural Fires				
Riverine Flooding					Wildfires				
Ice/Sleet Storms					Nuclear Power Plant Failure				
Dam Failures					Fog				
Cyberterrorism					Drought				
Hazardous Materials Fixed-site Incident					Civil Disturbances				
Terrorism/Sabotage					Special Events				
Tornadoes					Subsidence				
Transportation Accidents					Severe Winds				
Oil/Gas Well Incidents					Hazardous Materials-Transportation Incident				
Extreme Temperatures					Oil/Gas Pipeline Incident				
Invasive Species					Hail				
Seasonal Population Changes					Lightning				

5. Are there any hazards not identified that you are concerned with? If so, please identify them below.

Hazards caused by blight and abandoned properties including contamination (groundwater and soil) rodents, etc
The unknown grow operations around and security.
Air quality
Crime
general public safety... safety against people who are repetitive in crime
Prisoner escape from the county jail or state prison.
Not sure if this is a hazard but farms spreading of manure and not tilling it up caused a huge fly infestation in our neighborhood last year, so much so that the health dept had to get involved.
Lack of high speed internet access.
Loose livestock, pesticide/chemical overspray from farm equipment and crop dusters
Sink holes.
I just want to clarify that I'm concerned about domestic terrorism from Qanon/militia types. They're already interfering with common sense public health guidelines.
PFAS, mercury in fish
High crime
Drought
Road conditions
Ground water contamination
Nuclear power plant failures: The Fermi II lab in Detroit is too far away to be real threat
Amber alerts
Radon
Nearby river gas pipeline leaks, explosions or fire
Snowstorms/blizzards, earthquakes, and sink holes
Snowstorms/blizzards
Food security, need to return to farming community that produces food not commodity crops
Lots of gun nuts and militia folks and pro-Capitol attack people
EMP

6. How are you currently notified when there is a disaster or emergency?

Notification system	Responses
Warning Sirens	31
Mobile Alert	42
Landline	9
Radio/Television	27
NOAA Weather Radio	7
Other: Internet/Social media	3
Not notified	2*

*-In the not notified category, one household identified mobile alert and not notified.

7. Is this notification system effective? Why or why not?

Responses
Yes, easy to obtain access. (warning siren; mobile alerts)
Sometimes, seems like Adrian East has more notice to prepare. (warning siren; mobile alert; radio/television)
If I am paying attention, yes. (warning siren; mobile alert; radio/television)
Yes, it just needs to give the specific time that warning ends. (mobile alerts)
I think the text notification is the most effective because I don't have the tv or radio on unless the weather looks questionable. (warning siren; mobile alert; radio/television; NOAA weather radio)
Only when phone works and the signal is not good. We can't hear siren during a storm over the wind and rain. (mobile alerts)
The voice is often garbled, the call comes after the storm has passed, and it's not descriptive WEATHER ALTER LENAWEE ok how about some details? (warning siren; mobile alert; radio/television)
Yes, because of the sound from the siren or the phone ringing. (warning siren; landline)
Yes, rapid notification. (mobile alert; landline; radio/television; internet)
Total infrastructure is lacking, built for summer and that is it. (mobile alerts)
During the day, yes. At night, no because it doesn't override my Do Not Disturb setting on my mobile phone and I don't get the notification. (mobile alerts; radio/television)
Yes, but sometimes the weather seems to be a bit behind. For instance, by the time a severe weather alert rings in, we are already experiencing bad weather, or it's almost done. (mobile alert; landline; NOAA weather radio)
No, it doesn't always work. I'm signed up for the Lenawee Smart 911 and it doesn’t work. (warning siren; mobile alerts)
Mobile alerts are relevant and timely. (warning siren; mobile alerts)
Yes, because I can hear the sirens from Morenci when there is a weather emergency. (warning siren mobile alerts; radio/television)
No, it's easier to find information online/Facebook but since we live rural we don't have the most reliable internet accessibility. (radio/television)
Yes. I receive the info even when we are in Florida. (mobile alert; radio/television)
Mostly. Weather warning expiration added to mobile alerts would be useful. (warning siren; mobile alert; radio/television)
Effective, I get most alerts on mobile phone, such as weather warnings. (warning siren; mobile alerts)
Yes, mobile alerts are very effective and high-speed internet helps to fill the gaps. (warning sirens; mobile alerts; NOAA Weather Radio)
It is reasonably effective. Tornado sirens don't seem to work. The issue a year or two ago when the Governor helped the Gas company ask residents to turn down their thermostats a bit via an emergency phone message was great. Amber alerts are great. SMS is tricky to find a service to sign up for that is the right service and not some spam service in disguise. A note on a well-known webpage hosted on the city government website would be a great resource to have. (warning siren; mobile alert; NOAA Weather Radio; social media)
Sometimes. (warning sire; mobile alert; radio/television)

Lenawee Alerts is effective, but sometimes annoying when multiple calls and texts come over and over again for the same thing (only happened once, a few months ago) (warning siren; mobile alert; landline; radio/television)
Yes, it seems to be effective. I have always been notified when severe weather is imminent. (Warning Siren; Mobile Alert)
It seems inconsistent (warning siren, mobile alert)
Not really accurate with the tornado warning. (mobile alert)
Yes, I am aware of the situation immediately. (mobile alert, landline)
Sure, as long as it happens BEFORE the incident (mobile alert)
The warning siren is totally ineffective, you cannot hear it period. I have told public safety of this, and no correction has been made. (mobile alert)
I am unaware there is a system. (not notified)
Yes (mobile alert, radio/television)
Yes, always have my phone with me, television on when home. (mobile alert, radio/television)
Would like more, perhaps email or text. One could sign up. (warning siren)
Yes, it's effective because people are always on social media (mobile alert, radio/television, internet social media)
Yes (Warning Siren; Mobile Alert; Radio/Television)
Yes. Receive most weather alerts in a timely manner through the County's alert system. (mobile alert)
Yes. (Mobile Alert; Radio/Television)
The siren can barely be heard from my house in Adrian. The mobile alert works as long as there is a cell phone signal. (Warning Siren; Mobile Alert; Radio/Television)
Yes (Warning Siren; Landline; Radio/Television)
It is to a point, though signed up to alerts I don't always seem to get them. The warning siren I guess would be nice if you don't have land line and shut your phone off at night. Though I think I would sleep through it as the train that goes by. I have become accustom to its horn. (Warning Siren; Mobile Alert; Radio/Television)
Only if my cell phone is not muted. (Mobile Alert; Radio/Television)
It has been effective so far. (mobile alert)
Mostly. (Mobile Alert; Landline)
Yes. (Warning Siren; Mobile Alert; Radio/Television; NOAA Weather Radio)
Yes and no. Sometimes I've been alerted in other ways prior to getting the text. (Warning Siren; Mobile Alert)
Not always reliable. (Warning Siren; Mobile Alert)
No. I never hear sirens where I'm at. If I don't get a message by phone, I'd never know. (Mobile Alert; Not Notified)

8. Do you currently have flood insurance?

Yes	5	No	19	Not required	35

9. Have you taken actions to make your home/property more resilient to disasters?

Yes	24	No	24	Not sure	11

10. If so, what are they?

Generator
Tying down structures that may dislodge in the wind and rain. Flood alarms, fire alarms, fire extinguishers
Cutting down dead trees
Keep trees trimmed, wood heat, back up generator, emergency kits.
We have cut down beautiful tree's. Now we are taking more out that are damaged.
We have emergency supplies of water and food, smoke alarms and fire extinguishers, cell phone, battery banks, the means to defend ourselves, we have plans and supplies to install a sump pump, emergency contacts, papers and photos ready to go. etc.
Preparing for food and medical needs in the event of stay at home orders. Emergency kits and supplies. Temporary alternative energy sources
Steel roof, and make sure important things are put up if it looks like we may get a flood.
Updates to roof, siding, and basement.
Multiple basement sump pumps. Little hard surface landscaping to avoid flooding issues.
New Roof on House, Security Cameras, House has been inspected and meets all Building Code Requirements, Basement for Shelter during Storms, Bottled Water and Extra Groceries, Land Line, Generator.
New roofing, gutters, newer storm windows.
Purchased a generator.
Generator, batteries, first aid kit, emergency contact list,
preparations
New roof going on.
Try to keep damaged, bug infested trees trimmed up or removed. Difficult to get a licensed/bonded tree service at this time. Maintain buildings/structures, etc.
New roof-underground drainage tubes to pull water away from structures
Yes. We've cut down old trees, maintain smoke detectors, installed a sump pump in the basement.
containment ponds/ditches
Updated all windows, doors, removed dying trees, updated HVAC, looking into buying hardwired generator.

11. Does your family have a Family Disaster Emergency Kit?

Yes	22
No	37

12. Would your family be willing to attend public education course or courses to develop a Family Disaster Emergency Kit and to become better prepared for future events?

Yes	31
No	28

If yes, please indicate the time that you and/or your family members could attend.

Time	Responses	Time	Responses	Time	Responses
Weekday Mornings	5	Wednesday Evenings	9	Saturday Afternoons	12
Weekday Afternoons	9	Thursday Evenings	8	Sunday Mornings	0
Monday Evenings	11	Friday Evenings	6	Sunday Afternoons	
Tuesday Evenings	11	Saturday Mornings	15		

13. **Do you or any member of your family have special needs that would require assistance during a disaster? If so, what are those needs?**

Mobility limitations.
Not at the moment, we are seniors.
Autism, physical mobility, senior
Adult with autism and an adult with dementia
Access to medications
Medicine
Elder 78+
Asthma
Yes, one resident requires a cane and/or walker. Another resident is visually impaired.
Husband has mobility issues
Myself, I have damaged knees, shoulders and back. Can't walk very far or climb. No pulling, pushing or lifting.
Yes, assistance with walker
Heart issues & diabetic
Yes, handicapped in wheelchairs and on oxygen
Would prefer a virtual/remote/online meeting or ability to attend virtually
I have a disabled daughter. She is capable of being home alone but is not legally allowed to drive at this time. If no one were home and all the neighbors were gone she would be stuck.

APPENDIX E -
LENAWEE COUNTY FINAL MITIGATION STRATEGIES

1. Increased coverage and use of NOAA Weather Radio.
2. Public early warning systems and networks.
3. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Family Disaster Supplies Kit.
4. Use of structural bracing, window shutters, laminated glass in windowpanes, and hail-resistant roof shingles to minimize damage to structures, including public facilities.
5. Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
6. Anticipation of potential drought conditions, and preparation of drought contingency plans.
7. Water rationing if necessary to control water use, especially when needed to fight fires.
8. Farmer preparedness to address livestock needs/problems.
9. Keep handy household items that can be used as fire tools; a rake, axe, hand/chainsaw, bucket, and shovel. Install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each floor of buildings and homes. Test monthly and change the batteries two times each year. Teach family members how to use the fire extinguisher.
10. Post fire emergency telephone numbers.
11. Residents should plan several escape routes away from their homes - by car and by foot.
12. Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).
13. Constructing emergency access roads to dams.
14. Floodplain/coastal zone management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
15. Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
16. Wet floodproofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
17. Elevation of flood-prone structures above the 100-year flood level.
18. Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
19. Public awareness of the need for permits (MDEQ Part 31) for building in floodplain areas.
20. Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
21. Farmland and open space preservation.
22. Elevating mechanical and utility devices above expected flood levels.
23. Training for local officials on flood fighting, floodplain management, floodproofing, etc.

24. Purchase or transfer of development rights – to discourage development in floodplain areas.
25. Identify all structures in the floodplain.
26. Encourage current NFIP member communities in their continued compliance with the NFIP, through the use and application of map information in the regulation of floodplain developments, and through the seeking of FEMA grant funds for flood mitigation projects, to address properties that may currently be vulnerable to flooding in identifiable risk areas.
27. Wetlands and lakes act as natural retention basins, temporarily storing runoff and releasing it slowly. Local units of government will consider the importance of wetlands and lakes in this process as they prepare and implement local land use plans.
28. Anti-terrorist/sabotage/civil disturbance measures.
29. Improved design, routing, and traffic control at problem roadway areas.
30. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
31. Use of ITS (intelligent transportation systems) technology.
32. Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.
33. Use of generators for backup power at critical facilities.
34. Awareness of hydrogen sulfide gas dangers and personal protection actions for these dangers.
35. Using buffer strips to segregate wells, storage tanks, and other production facilities from transportation routes and adjacent land uses, in accordance with state regulations, and consistent with the level of risk.
36. Contingency plans for worker and public protection, including the inclusion of rescue and evacuation procedures for well hazard areas in the local emergency operations plan.
37. Demolition and clearance of vacant condemned structures to prevent rodent infestations.
38. Brownfield and urban blight clean-up activities.
39. Pollution control, enforcement, and cleanup; proper disposal of chemicals and scrap materials.
40. Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a sabotage/terrorism/WMD attack.
41. Greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings.
42. Consistent use of computer data back-up systems and anti-virus software.
43. Incident anticipation and planning, and video documentation of events for later study and use.
44. It is possible that design, management, integration, and lowered density of poor or blighted areas may reduce vandalism, crime, and some types of riot events. Crime Prevention Through Environmental Design (CPTED) is a field of planning that deals with this.
45. Code existence and enforcement.
46. Designs that include the use of firewalls and sprinkler systems (especially in tall buildings, dormitories, attached structures, and special facilities).
47. Family members and residents should know how to use a fire extinguisher.
48. of electric and "space" heaters (placed at least 3 feet from objects, with space near hot elements free of combustibles).
49. Education and practice of safe cigarette handling and disposal (also candles, fireworks, campfires, holiday lights).
50. Condominium-type associations for maintaining safety in attached housing/building units or multi-unit structures.

51. Retrofit older buildings with sprinkler systems.
52. Proper awareness of, training on, and implementation of radiological emergency procedures (to include both primary and secondary Emergency Planning Zones, as appropriate).
53. Community awareness of designated shelters and accident warning systems.
54. Commercial operator training and skill enhancement programs.

APPENDIX F
POSSIBLE MITIGATION STRATEGIES

Thunderstorm Hazards

1. Increased coverage and use of NOAA Weather Radio.
2. Producing and distributing family emergency preparedness information relating to thunderstorm hazards.
3. Public education and awareness of thunderstorm dangers.
4. Training and increased use of weather spotters.
5. Public early warning systems and networks.
6. Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
7. Buried/protected power and utility lines.
8. Inclusion of safety strategies for severe weather events in driver education classes and materials.
9. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
10. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds.)
11. Using structural bracing, window shutters, laminated glass in window panes, and hail-resistant roof shingles to minimize damage to public and private structures.
12. Pre-planning for debris management staging and storage areas. (Debris is usually vegetation such as tree branches that have fallen under the impact of hail, or broken power or phone lines that had frozen or been weighted down by ice or fallen branches.)
13. Using surge protectors on critical electronic equipment.
14. Installing lightning protection devices on the community's communications infrastructure.
15. Using appropriate wind engineering measures and construction techniques (e.g. structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced entry and garage doors, window shutters, waterproof adhesive sealing strips, and interlocking roof shingles) to strengthen public and private structures against severe wind damage.
16. Proper anchoring of manufactured homes and exterior structures such as carports and porches.
17. Establishing safe and appropriate locations for temporary debris disposal sites.
18. Securing loose materials, yard, and patio items indoors or where winds cannot blow them about.
19. Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
20. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds, or broken power or phone lines that had frozen or been weighted down by fallen branches and trees.)

Drought

21. Measures or ordinances to prioritize or control water use (especially when needed to fight fires).
22. Encouragement of water-saving measures by consumers (especially during irrigation and farming).

23. Designs and plans for water delivery systems that include a consideration of drought events.

Winter Weather Hazards

24. Increased coverage and use of NOAA Weather Radio.
25. Producing and distributing family emergency preparedness information relating to severe winter weather hazards.
26. Including safety strategies for severe weather events in driver education classes and materials.
27. Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
28. Buried/protected power and utility lines.
29. Establishing heating centers/shelters for vulnerable populations.
30. Organizing outreach to isolated, vulnerable, or special-needs populations.
31. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
32. Pre-planning for debris management staging and storage areas. (Debris is usually the snow and ice itself, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. Some storage areas will definitely be needed for snow removal during blizzards.)
33. Home and public building maintenance to prevent roof and wall damage from "ice dams."
34. Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow.)
35. Proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc.
36. Farmer preparedness to address livestock needs/problems.
37. Pre-arranging for shelters for stranded motorists/travelers, and others.
38. Maintaining adequate road and debris clearing capabilities.
39. Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.
40. Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow. Some storage areas will definitely be needed for snow removal during blizzards.)

Extreme Temperatures

41. Organizing outreach to vulnerable populations during periods of extreme temperatures, including establishing and building awareness of accessible heating and/or cooling centers in the community, and other public information campaigns about this hazard.
42. Increased coverage and use of NOAA Weather Radio.

43. Housing/landlord codes enforcing heating requirements.
44. Special arrangements for payment of heating bills.

Wildfires

45. Proper maintenance of property in or near wildland areas (including short grass; thinned trees and removal of low hanging branches; selection of fire-resistant vegetation; use of fire resistant roofing and building materials; use of functional shutters on windows; keeping flammables such as curtains securely away from windows or using heavy fire-resistant drapes; creating and maintaining a buffer zone (defensible space) between structures and adjacent wild lands; use of the fire department's home safety inspections; sweeping/ cleaning dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards; keeping woodpiles and other combustibles away from structures; use of boxed or enclosed eaves on house; thorough cleaning-up of spilled flammable fluids; and keeping garage areas protected from blowing embers).
46. Safe disposal of yard and house waste rather than through open burning.
47. Use of fire spotters, towers, planes.
48. Keep handy household items that can be used as fire tools; a rake, axe, hand/chainsaw, bucket and shovel. Install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each floor of buildings and homes. Test monthly and change the batteries two times each year. Teach family members how to use the fire extinguisher.
49. Post fire emergency telephone numbers.
50. Organizing neighborhood wildfire safety coalitions (to plan how the neighborhood could work together to prevent a wildfire).
51. Residents should plan several escape routes away from their homes - by car and by foot.
52. Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.
53. Arson prevention activities, including reduction of blight (cleaning up areas of abandoned or collapsed structures, accumulated junk or debris, and with any history of flammable substances stored, spilled, or dumped on them).
54. Public education on smoking hazards and recreational fires.
55. Proper maintenance and separation of power lines. Ask the power company to clear branches from power lines.
56. Efficient response to fallen power lines.
57. Training and exercises for response personnel.
58. GIS mapping of vegetative coverage, for use in planning decisions and analyses through comparison with topography, zoning, developments, infrastructure, etc.
59. Media broadcasts of fire weather and fire warnings.
60. Create and enforce local ordinances that require burn permits and restrict campfires and outdoor burning.
61. Mutual aid pacts with neighboring communities.
62. Prescribed burns and fuel management (thinning of flammable vegetation, possibly including selective logging to thin out some areas. Fuels cleared can be given away as firewood or chipped into wood chips for distribution.)
63. The creation of fuel breaks (areas where the spread of wildfires will be slowed or stopped due to removal of fuels, or the use of fire-retardant materials/vegetation) in high-risk forest or other areas.

64. Keeping roads and driveways accessible to vehicles and fire equipment—driveways should be relatively straight and flat, with at least some open spaces to turn, bridges that can support emergency vehicles, and clearance wide and high enough for two-way traffic and emergency vehicle access (spare keys to gates around property should be provided to the local fire department, and an address should be visible from the road so homes can be located quickly).
65. Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.
66. Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.
67. Proper storage and use of flammables, including the use of flammable substances (such as when fueling machinery). Store gasoline, oily rags and other flammable materials in approved safety cans. Stack firewood at least 100 feet away and uphill from homes.
68. Have adequate water supplies for emergency firefighting (in accordance with NFPA standards). For residents, identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool or hydrant; have a garden hose that is long enough to reach any area of the home and other structures on the property; install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least 50 feet from the home; consider obtaining a portable gasoline powered pump in case electrical power is cut off.
69. Obtaining insurance.
70. Including wildfire safety information in materials provided by insurance companies to area residents.
71. Residents should be instructed on proper evacuation procedures, such as wearing protective clothing (sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards.
72. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Dam Failures

73. Ensuring consistency of dam Emergency Action Plan (EAP) with the local Emergency Operations Plan (EOP).
74. Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).
75. Public awareness and warning systems.
76. Obtaining insurance.
77. Greater local support for/assistance with dam inspections and enforcement of the Dam Safety Program (Part 315 of the Natural Resources and Environmental Protection Act) requirements and goals.
78. Increased coverage and use of NOAA Weather Radio
79. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
80. Constructing emergency access roads to dams.
81. Pump and flood gate installation/automation.

82. Real estate disclosure laws that identify a home's location within a dam's hydraulic shadow.
83. Trained, equipped, and prepared search and rescue teams.
84. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Riverine and Urban Flooding/Shoreline Flooding and Erosion

85. Accurate identification and mapping of flood-prone areas.
86. Floodplain/coastal zone management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
87. Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
88. Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
89. Wet floodproofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
90. Elevation of flood-prone structures above the 100-year flood level.
91. Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
92. Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
93. Public awareness of the need for permits (MDEQ Part 31) for building in floodplain areas.
94. Inclusion of safety strategies for flooded areas in driver education classes and materials.
95. Employing techniques of erosion control within the watershed area (proper bank stabilization, techniques such as planting of vegetation on slopes, creation of terraces on hillsides, use of riprap boulders and geotextile fabric, etc.).
96. Dredging and clearance of sediment and debris from drainage channels.
97. Protection (or restoration) of wetlands and natural water retention areas.
98. Enforcement of basic building code requirements related to flood mitigation.
99. Formation of a watershed council.
100. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
101. Obtaining insurance.
102. Joining the National Flood Insurance Program. **VERY IMPORTANT!**
103. Participating in the Community Rating System (CRS).
104. Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).

105. Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
106. Installing (or re-routing or increasing the capacity of) storm drainage systems, including the separation of storm and sanitary sewage systems.
107. Farmland and open space preservation.
108. Elevating mechanical and utility devices above expected flood levels.
109. Improved/updated floodplain mapping.
110. Real estate disclosure laws.
111. Public education and flood warning systems.
112. Monitoring of water levels with stream gauges and trained monitors.
113. Increased coverage and use of NOAA Weather Radio.
114. Training for local officials on flood fighting, floodplain management, floodproofing, etc.
115. Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.
116. Road closures and traffic control in flooded areas.
117. Trained, equipped, and prepared search and rescue teams.
118. Control and securing of debris, yard items, or stored objects (including oil, gasoline, and propane tanks, and paint and chemical barrels) in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.
119. Back-up generators for pumping and lift stations in sanitary sewer systems, and other measures (alarms, meters, remote controls, switchgear upgrades) to ensure that drainage infrastructure is not impeded.
120. Detection and prevention/discouragement of illegal discharges into storm-water sewer systems, from home footing drains, downspouts and sump pumps.
121. Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
122. Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.
123. Purchase or transfer of development rights – to discourage development in floodplain areas.
124. Stormwater management ordinances or amendments.
125. Wetlands protection regulations and policies.
126. Regional/watershed cooperation.
127. Use of check valves, sump pumps and backflow preventers in homes and buildings.
128. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Fixed Site Hazardous Material Incidents (including explosions and industrial accidents)

129. Maintaining an active and viable Local Emergency Planning Committee (LEPC).
130. Developing and exercising site emergency plans and community response plans as required under SARA Title III.
131. Development of Risk Management Plans for sites that manufacture, store, or handle hazardous materials, to comply with EPA regulations. (For guidance, see the EPA's CEPPO web site at http://www.epa.gov/swercepp/acc-pre.html .)

132. Training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials.
133. Policies stressing the importance of safety above other considerations.
134. Trained, equipped, and prepared site and local hazardous material emergency response teams.
135. Compliance with/enforcement of Resource Conservation and Recovery Act (RCRA) standards.
136. Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
137. Hazardous material public awareness and worker education programs.
138. Facility and community training and exercise programs.
139. Brownfield cleanup activities.
140. Identification of radioactive soils and high-radon areas
141. Proper separation and buffering between industrial areas and other land uses.
142. Location of industrial areas away from schools, nursing homes, etc.
143. Evacuation plans and community awareness of them.
144. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
145. Public warning systems and networks for hazardous material releases.
146. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
147. Road closures and traffic control in accident areas.
148. Trained, equipped, and prepared search and rescue teams.
149. Compliance with all industrial, fire, and safety regulations.
150. Insurance coverage.
151. Enhanced security and anti-terrorist/sabotage/civil disturbance measures.
152. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Hazardous Material Transportation Incidents

153. Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.
154. Improved design, routing, and traffic control at problem roadway areas.
155. Long-term planning that provides more connector roads for reduced congestion of arterial roads.
156. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
157. Proper planning, design, maintenance of, and enhancements to designated truck routes.
158. Enforcement of weight and travel restrictions for truck traffic.
159. Training, planning, and preparedness for hazardous material incidents along roadways and railways (in addition to fixed site emergencies).
160. Public warning systems and networks.
161. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
162. Use of ITS (intelligent transportation systems) technology.
163. Compliance with and enforcement of USDOT and MDOT regulations regarding hazardous materials transport.

164. Locating schools, nursing homes, and other special facilities away from major hazardous material transportation routes.
165. Road closures and traffic control in accident areas.
166. Trained, equipped and prepared local hazardous materials emergency response teams.
167. Trained, equipped, and prepared search and rescue teams.
168. Evacuation plans and community awareness of them.
169. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Infrastructure Failures

170. Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).
171. Burying electrical and phone lines, where possible, to resist damage from severe winds, lightning, ice, and other hazards.
172. Redundancies in utility and communications systems, especially "lifeline" systems.
173. Mutual aid assistance for failures in utility and communications systems (including 9-1-1).
174. Alternative 9-1-1 access through radio operators whose homes are identified through special markings.
175. Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.
176. Separation and/or expansion of sewer system to handle anticipated stormwater volumes.
177. Use of generators for backup power at critical facilities.
178. Regular maintenance and equipment checks.
179. "Rolling blackouts" in electrical systems that will otherwise fail completely due to overloading.
180. Replacement or renovation of aging structures and equipment (to be made as hazard-resistant as economically possible).
181. Protecting electrical and communications systems from lightning strikes.
182. Tree-trimming programs to protect utility wires from falling branches. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
183. Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (1-800-482-7171).
184. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Oil and Natural Gas Well Accidents

185. Community and operator compliance with industry safety regulations and standards.
186. Awareness of hydrogen sulfide gas dangers and personal protection actions for these dangers.
187. Using buffer strips to segregate wells, storage tanks, and other production facilities from transportation routes and adjacent land uses, in accordance with state regulations, and consistent with the level of risk.
188. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
189. Contingency plans for worker and public protection, including the inclusion of rescue and evacuation procedures for well hazard areas in the local emergency operations plan.

190. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Public Health Emergencies

191. Encouraging residents to receive immunizations against communicable diseases.
192. Increasing public awareness of radon dangers and the prevention efforts that can be taken to reduce concentrations of radon in homes and buildings.
193. Maintaining community water and sewer infrastructure at acceptable operating standards.
194. Providing back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.
195. Demolition and clearance of vacant condemned structures to prevent rodent infestations.
196. Maintaining a community public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks.
197. Increasing public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.
198. Community support of free or reduced-expense clinics and school health services.
199. Preventing public contact with contaminated sites or waters (including floodwaters).
200. Brownfield and urban blight clean-up activities.
201. Pollution control, enforcement, and cleanup; proper disposal of chemicals and scrap materials.
202. Proper location, installation, cleaning, monitoring, and maintenance of septic tanks.
203. Separation of storm and sanitary sewer systems.

Sabotage/Terrorism/Weapons of Mass Destruction (WMD)

204. Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a sabotage/terrorism/WMD attack.
205. Alertness, awareness, and monitoring of organizations and activities that may threaten the community.
206. Implementing school safety and violence prevention programs.
207. Providing legitimate channels of political and public expression.
208. Heightening security at public gatherings, special events, and critical community facilities and industries.
209. Greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings.
210. Training, planning, and preparedness by local law enforcement and other responders for terrorist/sabotage/WMD attacks.
211. The development and testing of internal emergency plans and procedures by businesses and organizations.
212. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
213. Establishing avenues of reporting (and rewards) for information preventing terrorist incidents and sabotage.
214. Consistent use of computer data back-up systems and anti-virus software.
215. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

216. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, etc. that would get in the way or be left over following an attack or incident. The area may simultaneously need to be treated as a crime scene, site of urban search and rescue, area of hazardous materials, and/or a public health threat.

Population Increase (Seasonal/Event)

217. Provide personnel on a temporary basis to handle greater loads on public services.
218. Provide for emergency equipment to deal with higher call rates.
219. Develop plans for excessive traffic patterns.
220. Ensure water and food supplies can be maintained.
221. Provide training for Law, Fire, and EMS and other emergency services to meet the increased demand.
222. Acquire portable/changeable message signs to direct crowds and provide information.
223. Ensure capacities for water/sewer systems.
224. Maintain infrastructure such as schools, hospitals, prisons, roads, and systems for the disposal of water.
225. Include environmental degradation, air and traffic congestion, and pollution of all kinds, water shortages, increased crowding, and social stress.
226. Provide list of motel/cottages where people can stay. Provide list of alternate housing in surrounding communities.

Civil Disturbances (prison or institutional rebellions, disruptive political gatherings, violent labor disputes, urban protests or riots, or large-scale uncontrolled festivities)

227. Law enforcement training, staffing, and resource provision.
228. Incident anticipation and planning, and video documentation of events for later study and use.
229. Local law enforcement mutual aid, and support from the Michigan State Police and National Guard.
230. It is possible that design, management, integration, and lowered density of poor or blighted areas may reduce vandalism, crime, and some types of riot events. Crime Prevention Through Environmental Design (CPTED) is a field of planning that deals with this.
231. Insure structures and property in risky areas.
232. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
233. Design requirements for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, etc. that take into consideration emergency and security needs.

Earthquakes (biggest Michigan threats would be to pipelines, buildings that are poorly designed and constructed, and shelving, furniture, mirrors, gas cylinders, etc. within structures that could fall and cause injury or personal property damage)

234. Adopt and enforce appropriate building codes.
235. Use of safe interior designs and furniture arrangements.
236. Obtain insurance.
237. "Harden" critical infrastructure systems to meet seismic design standards for "lifelines."
238. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Scrap Tire Fires

239. Policies for regulated disposal and management of scrap tires, and enforcement of regulations related to them (separation of stored scrap tires from other materials; limits on the size of each pile; minimum distances between piles and property lines; covering, chemically treating, or shredding tires to limit mosquito breeding; providing for fire vehicle access to scrap tire piles; training employees in emergency response operations; installation of earthen berms around storage areas; prevention of pools of standing water in the area; control of nearby vegetation; an emergency plan posted on the property; storing only the permitted volume of tires authorized for that site).
240. Proper siting of tire storage and processing facilities (land use planning that recognizes scrap tire sites as a real hazard and environmental threat).
241. Local awareness of scrap tire risk, training and preparedness of responders.
242. Law enforcement to prevent illegal dumping of tires at the site.
243. Pest-control measures for mosquitoes and other nuisances around scrap tire yards.

Structural Fires

244. Code existence and enforcement.
245. Designs that include the use of firewalls and sprinkler systems (especially in tall buildings, dormitories, attached structures, and special facilities).
246. Public education and school programs (especially about the use of stoves, heaters, fireworks, matches/ lighters, etc.)
247. Landlords and families can install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each level of homes (to be tested monthly, with the batteries changed twice each year).
248. Family members and residents should know how to use a fire extinguisher.
249. Proper installation and maintenance of heating systems (especially those requiring regular cleaning, those using hand-loaded fuels such as wood, or using concentrated fuels such as liquid propane).
250. Safe and responsible use of electric and "space" heaters (placed at least 3 feet from objects, with space near hot elements free of combustibles).
251. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
252. Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.
253. Post fire emergency telephone numbers. (**Complete)**
254. Education and practice of safe cigarette handling and disposal (also candles, fireworks, campfires, holiday lights)
255. Measures to reduce urban blight and associated arson (including CPTED?).
256. Proper workplace procedures, training and exercising, and handling of explosive and flammable materials and substances.
257. Pre-planned escape routes and fire alert responses.
258. Improved and continuing training for emergency responders, and provision of equipment for them.
259. Defensible space around structures in fire-prone wildland areas.
260. Proper maintenance of power lines, and efficient response to fallen power lines.

261. Transportation planning that provides roads, overpasses, etc. to maximize access and improve emergency response times, and evacuation potential, for all inhabited or developed areas of a community (not just designing for the minimum amount of road capacity to handle normal traffic volumes in the community.) This includes transportation access within developed sites (shopping malls, stadiums, office & commercial parking lots, etc.)
262. Control of civil disturbances and criminal activities that could lead to arson.
263. Enforced fireworks regulations.
264. Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
265. Condominium-type associations for maintaining safety in attached housing/building units or multiunit structures.
266. Obtain insurance.
267. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Attack

268. Community awareness of designated fallout shelters and attack warning systems.
269. Developing and promoting workable population protection plans (evacuation and in-place sheltering plans, as appropriate).
270. Construction of concrete safe rooms (or shelters) in houses, trailer parks, community facilities, and business districts.
271. Using laminated glass and other hazard-resistant, durable construction techniques in public buildings and critical facilities.
272. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
273. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including enemy attack).
274. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Power Plant Accidents

275. Proper awareness of, training on, and implementation of radiological emergency procedures (to include both primary and secondary Emergency Planning Zones, as appropriate).
276. Community awareness of designated shelters and accident warning systems.
277. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including enemy attack).
278. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
279. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Pipeline Accidents (Petroleum and Natural Gas)

280. Locating pipelines away from dense development, critical facilities, special needs populations, and environmentally vulnerable areas whenever possible.
281. Increasing public awareness of pipeline locations and appropriate emergency procedures.

282. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
283. Increasing public awareness and widespread use of the “MISS DIG” utility damage prevention service (800 482-7171).
284. Proper pipeline design, construction, maintenance and inspection.
285. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Subsidence

286. Identification, mapping, and preventing or limiting development in old mining areas or geologically unstable terrain.
287. Filling or buttressing subterranean open spaces (such as abandoned mines) to discourage their collapse.
288. Hydrological monitoring of groundwater levels in subsidence-prone areas.
289. Obtain insurance for subsidence hazards.
290. Real estate disclosure laws.
291. Community awareness of subsidence risks and effects.
292. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Transportation Accidents

293. Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.
294. Improved design, routing, and traffic control at problem roadway areas.
295. Long-term planning that provides more connector roads for reduced congestion of arterial roads.
296. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
297. Enforcement of weight and travel restrictions for truck traffic.
298. Use of ITS (intelligent transportation systems) technology.
299. Use of designated truck routes.
300. Marine safety and general boater awareness programs.
301. Commercial operator training and skill enhancement programs.
302. Training, planning, and preparedness for mass-casualty incidents involving all modes of public transportation.
303. Trained, equipped, and prepared search and rescue teams.

APPENDIX G-
LENAWEE COUNTY PROPOSED PROJECT LIST

HIGH PRIORITY PROJECTS

Item 1

Continue tree trimming program to protect utility wires

Action: Continue tree trimming program to protect utility wires.

- Location: County-wide
- Lead Agency: Consumers Energy, DTE, and Midwest Energy
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All weather hazards, infrastructure failures, and energy emergencies
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $100,000 annually (Estimate)
- Potential Funding Source(s): Consumers Energy, DTE, and Midwest Energy
- Time Frame: This is an ongoing and continuous process by the utility companies, as they annually budget tree trimming to help reduce power outages due to fallen tree limbs.
- Priority: High
- Benefit(s): Reduction in number of events and duration of power loss due to severe weather conditions.

Item 2

Purchase and distribute smoke detectors

Action: Promote the purchase of maintenance-free smoke detectors.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 annually (Estimated cost of smoke detectors)
- Potential Funding Source(s): Lenawee County Fire Chiefs Association
- Time Frame: This is an ongoing and annual program.
- Priority: High
- Benefit(s): Mitigate the loss of property/lives due to structural fires.

Item 3

Floodplain Structure Analysis

Phase I: Identify and evaluate structures within floodplains

Action: Identify and evaluate structures within floodplains**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding

- Goal/Objective Addressed: goal 4, objective b
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): OEM budget
- Time Frame: Anticipated to occur in 2024.
- Priority: High
- Benefit(s): Target the removal/retrofit existing structures in floodplains subject to flood damage.

Phase II: Demolish/relocate/retrofit structures within floodplains per Phase I

Action: Secure funding to demolish/relocate/retrofit structures located in floodplains based on the assessment completed in Phase I**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 4, objective b
- Project Costs: $2,000,000 (Estimate)
- Potential Funding Source(s): Federal Emergency Management Agency (FEMA) grants, United States Department of Agriculture (USDA) grants
- Time Frame: 2025 (Estimated)
- Priority: High
- Benefit(s): The demolition/removal/retrofit existing structures in floodplains will mitigate damages resulting from floods.

Item 4 (NEW)

Promote emergency evacuation plans/disaster awareness/emergency planning in County

Action: Continue promotion of emergency evacuation planning/disaster awareness and emergency planning in Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Mitigate losses from hazards through public education.

Item 5 (NEW)

Continue program for educating public on responding to hazards

Action: Continue to educate the public on hazard response, including the development of Family Disaster Plans and Family Disaster Kits.

- Location: County-wide
- Lead Agency: OEM

- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Better educated public on hazard response, thereby mitigating injuries and possibly deaths due to hazardous events.

Item 6 (NEW)

Promote annual Evacuation Day

Action: Encourage citizens, businesses, and organizations to participate in an Annual Evacuation Day event.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Anticipated to occur in the Annual Severe Weather Week beginning in 2023 or 2024.
- Priority: High
- Benefit(s): Better educated public on evacuation processes during emergency/hazardous events.

Item 7 (NEW)

Waterway Assessment/Improvements

Phase I: Assess all waterways for potential shoreline erosion and algal bloom concerns

Action: Identify and prioritize all shoreline concerns/algal blossoms on rivers, streams, creeks, ditches, ponds, lakes, and wetlands within the County.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $200,000 (Estimate)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2025 or 2026.
- Priority: High
- Benefit(s): Drinking water is protected, and bodies of water are properly maintained.

Phase II: Complete necessary improvements to waterways in Lenawee County as identified in Phase I on the flooding matters

Action: Work on bodies of water as identified in Phase I to limit erosion.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $100,000 (Estimated, subject to change per the assessment)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2028.
- Priority: High
- Benefit(s): Preservation of waterways and preserving public recreation areas. Improvements will also mitigate damages resulting from flooding.

Phase III: Complete necessary improvements to waterways in Lenawee County as identified in Phase I to eradicate algal blooms

Action: Work on bodies of water as identified in Phase I to eradicate algal blooms within Lenawee County.

- Location: Countywide
- Lead Agency: EGLE
- Participating Agencies: River Raisin Watershed Council, Lenawee Conservation District, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergency
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $100,000 (Estimate, subject to change per the assessment)
- Potential Funding Source(s): EGLE, FEMA
- Time Frame: Anticipated to be completed in 2028.
- Priority: High
- Benefit(s): The eradication of algal blooms will improve the potable water throughout Lenawee County, as well as the safety of pets.

Item 8 (NEW)

Recruitment of first responders

Action: Recruitment of first responders.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs' Association, Lenawee County Police Chiefs' Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $3,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Fire Chiefs' Association, Lenawee County Police Chiefs' Association
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Increased response personnel for all hazards within Lenawee County, which should provide improved coverage.

Item 9

Provide equipment/training for first responders and specialty teams

Action: Provide required equipment/training for first responders and specialty teams.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $150,000 annually (Estimate)
- Potential Funding Source(s): Homeland Security Grant Program, fire grants, fireworks tax, local budgets
- Time Frame: Ongoing and continuous
- Priority: High
- Benefit(s): Improved response capability for all hazard events.

MEDIUM PRIORITY PROJECTS

Item 10

Encourage municipalities to join the National Flood Insurance Program (NFIP) and to adopt/enforce local regulations for floodplain development

Action: Work with non-participating municipalities in Lenawee County to join the NFIP, which includes the adoption/enforcement of regulations limiting development within floodplains.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal, 4, objective b
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Reduction in number of claims for losses due to floods.

Item 11 (NEW)

Installation of Dry Hydrants

Phase I: Assess locations adjacent to natural water bodies to install dry hydrants for use during firefighting emergencies

Action: An assessment shall be made to identify potential locations for the installation of dry hydrants.

- Location: County-wide
- Lead Agency: Fire Chief's Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires

- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $1,000-estimated
- Potential Funding Source(s): Fire Chief's Association, local budgets
- Time Frame: Anticipated to begin in 2023 and completed in 2023/2024.
- Priority: Medium
- Benefit(s): The identification of sites to install dry hydrants would be beneficial for firefighting purposes.

Phase II: Install dry hydrants for use during firefighting emergencies

Action: Municipalities to install dry hydrants as identified In Phase I

- Location: County-wide
- Lead Agency: Fire Chief's Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural Fires
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $7,500 per hydrant-estimated
- Potential Funding Source(s): Fire Chief's Association, local budgets
- Time Frame: Anticipated to begin upon the completion of the assessment and securement of funding. The number of dry hydrants will determine the length of time to complete the project.
- Priority: Medium
- Benefit(s): The installation of dry hydrants would be beneficial during rural fires, when using standing water as sources for firefighting the structural fires.

Item 12

Live Snow Trees

Phase I: Assess roads subject to drifting snow.

Action: Working with Michigan Department of Transportation (MDOT), complete an assessment of roads in Lenawee County that are subject to drifting snow.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission (LCRC)
- Participating Agencies: MDOT, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Transportation accidents, snowstorms
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): MDOT
- Time Frame: Anticipated to be in 2024.
- Priority: Medium
- Benefit(s): With the identification of problems areas for drifting snow, an emphasis to reduce or eliminate the drifting can be concentrated on these areas.

Phase II: Plant living snow fences as identified in Phase I

Action: Working with MDOT, plant living snow fences on roads in Lenawee County that are subject to drifting snow.

- Location: County-wide
- Lead Agency: LCRC

- Participating Agencies: MDOT, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Transportation accidents, snowstorms
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $100,000 (Estimate)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Anticipated to be completed in 2025.
- Priority: Medium
- Benefit(s): Drifting snow on roads should be reduced as the live snow fences grow, thereby mitigating the number of accidents that result from the drifting snow.

Item 13

Promote the retrofit of older buildings with sprinkler systems

Action: Promote the installation of sprinkler systems in all older buildings.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural fires
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Fire Chiefs Association budget
- Time Frame: Ongoing and continuous in Adrian. The rest of the County anticipated to begin in 2023.
- Priority: Medium
- Benefit(s): Public awareness of need for sprinkler systems and potential to mitigate losses resulting from fires.

Item 14 (NEW)

Warning Siren Assessment Program

Phase I: Assess all-purpose warning sirens throughout the County

Action: Complete an assessment of all warning sirens throughout Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000
- Potential Funding Source(s): OEM
- Time Frame: Completed in 2022.
- Priority: Medium
- Benefit(s): Effectiveness of warning sirens is identified.

Phase II: Repair/replace/upgrade sirens to the 800 MHz system as identified in Phase I

Action: Based on the assessment in Phase I, repair/replace/upgrade all non-conforming sirens to meet the 800 MHz requirement.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $1,500,000 (Estimated-dependent upon the assessment)
- Potential Funding Source(s): USDA, Homeland Security Grant Program (HSGP), local municipalities
- Time Frame: Anticipated to occur in 2025, but dependent upon funding.
- Priority: Medium
- Benefit(s): Improved warning system for the residents of Lenawee County.

Item 15 (NEW)

Purchase portable electronic message boards

Action: Purchase portable electronic message boards to be used strategically throughout Lenawee County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Road Commission, Sheriff's Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $100,000 (Estimate)
- Potential Funding Source(s): LCRC, MDOT, USDA
- Time Frame: Anticipated to occur in 2024, but dependent upon funding.
- Priority: Medium
- Benefit(s): Improve public notification of hazardous situations/locations.

Item 16 (NEW)

Intelligent Transportation System (ITS) Analysis/Installation

Phase I: Assess the use of Intelligent Transportation System (ITS) for potential use in Lenawee County

Action: Assess the feasibility of using ITS for installing permanent electronic message board(s) in Lenawee County.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Anticipated to begin in 2025
- Priority: Medium
- Benefit(s): Determine the location for permanent electronic message boards in Lenawee County.

Phase II: Install permanent electronic message boards in Lenawee County as identified in Phase I

Action: Based on the assessment in Phase I, install electronic message boards in Lenawee County to better inform transportation network users.

- Location: County-wide
- Lead Agency: Lenawee County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $500,000/sign (estimate)
- Potential Funding Source(s):
- Time Frame: Anticipated to occur in 2026 but is dependent upon funding.
- Priority: Medium
- Benefit(s): Use of ITS will keep make better, safer use of the County's transportation systems.

Item 17

Purchase and install generators/battery packs for critical municipal infrastructure and facilities

Action: Coordinate the funding for the purchase and installation of generators and battery packs.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $1,000,000 (Estimate)
- Potential Funding Source(s): United States Department of Agriculture (USDA) grants
- Time Frame: Anticipated to occur by 2027, but is dependent upon funding
- Priority: Medium
- Benefit(s): Facilities can remain operational during power outages, thereby allowing critical services to remain available.

Item 18 (NEW)

Dam Repair Program

Phase I: Assess all dams within the County

Action: Coordinate with qualified engineering firms, the inspection of all dams and develop work program to upgrade/repair dams within Lenawee County.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Dam failures, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Medium

- Benefit(s): Dams properly assessed in order to be maintained/repaired, which would reduce dam failures.

Phase II: Work with dam owners to upgrade/repair dams within the County as identified in Phase I

Action: After completing Phase I, work with dam owners and begin work program to upgrade/repair dams within Lenawee County in a timely manner.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Dam failures, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $500,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): Dam owners, special assessments
- Time Frame: Ongoing and continuous.
- Priority: Medium
- Benefit(s): The number of dam failures and subsequent flooding will be mitigated as a result of the upgrades/repairs to the dams.

Item 19 (NEW)

Promote livestock emergency planning

Action: Promote livestock community planning

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: MSU-Extension, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): MSU-Extension
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Farmers advised on emergency planning methods addressing livestock.

Item 20 (NEW)

Promote Internet Security Programs

Action: Advise public of property internet security protocols and fraud/scam activities.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County IT Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: cyberterrorism
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM/IT budgets
- Time Frame: New program anticipated to begin in 2023/4.
- Priority: Medium

- Benefit(s): Public better informed on property internet protocols, thereby reducing the number of individuals/businesses negatively impacted by cyberterrorism.

Item 21

Encourage municipalities to update/enforce zoning and land use regulations, and floodplain management

Action: Encourage municipalities to update/enforce zoning and land use regulations, and floodplain management.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Planning Commission, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: flooding, weather events
- Goal/Objective Addressed: goal, 4, objective a
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Reduced loss of life/property due to weather events/flooding.

Item 22 (NEW)

Develop program to educate public on underground water supply and wellhead protection programs

Action: Develop program to educate public on underground water supply and wellhead protection programs.

- Location: County-wide
- Lead Agency: Lenawee County Health Department
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Public Health Department
- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Public provided information on maintaining potable water.

Item 23 (NEW)

Maintain inventory of first response municipal equipment and personnel

Action: Maintain inventory of first response municipal equipment and personnel**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective b
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM

- Time Frame: Ongoing and continuous
- Priority: Medium
- Benefit(s): Decreased response times from assisting agencies through a more efficient mutual aid process.

Item 24 (NEW)

Encourage the inclusion of hazard mitigation into other planning documents

Action: Encourage the inclusion of hazard mitigation in other planning documents**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: Goal 4, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Upon adoption/approval of the Lenawee County Hazard Mitigation Plan, this is anticipated to begin in 2023.
- Priority: Medium
- Benefit(s): Land use planning and hazard mitigation goals would be consistent, thereby reducing loss of live/property due to hazardous events

Item 25 (NEW)

Sewer Analysis Program

Phase I: Assess the status of combined storm and sanitary sewers

Action: Complete an assessment to identify all combined storm and sanitary sewer systems.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, Lenawee County Health Department
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): EGLE, Lenawee County Health Department
- Time Frame: Anticipated to begin in 2024.
- Priority: Medium
- Benefit(s): Combined storm/sanitary sewers can result in contaminated drinking water as well as flooding due to overloads in the system.

Phase II: Separate combined storm and sanitary sewers as identified in Phase I

Action: Separate combined storm and sanitary sewer systems.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, Lenawee County Health Department, the list of participating municipalities can be found in Table 6.1 on page 139.
- Hazards Addressed: public health emergencies, flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $2,500,000 (Estimate-dependent upon assessment)

- Potential Funding Source(s): EGLE
- Time Frame: Upon completion of the study and availability of funds, this is anticipated to begin in 2026.
- Priority: Medium
- Benefit(s): Separating the two sewer systems can reduce flooding resulting from overloaded sewer systems. Separation can also eliminate potential contaminated water due to overloaded water treatment facilities.

Item 26 (NEW)

Sewer Capacity Program

Phase I: Assess existing water/sewer capacity

Action: Assess existing water and sewer capacity levels.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): EGLE, special assessment areas
- Time Frame: Anticipated to begin in 2025.
- Priority: Medium
- Benefit(s): Identify potential areas of concerns with water and sewer/septic systems.

Phase II

Expand water/sewer capacity per recommendation of Phase I

Action: Update existing water/sewer systems to improve capacities.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: EGLE, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: public health emergencies
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): EGLE, special assessment areas
- Time Frame: Dependent upon study but anticipated to begin in 2027. Number of improvements will determine the length of the program.
- Priority: Medium
- Benefit(s): Update of the existing water and sewer systems can eliminate sewer/septic failure potentially impacting the drinking water.

Item 27 (NEW)

Use GIS to develop map layers for the storage of hazardous materials

Action: Use GIS to develop map layers for the storage of hazardous materials.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: GIS Department

- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Anticipated to begin in 2023, be on to manage updates.
- Priority: Medium
- Benefit(s): Hazardous materials identified county-wide on one map.

Item 28 (NEW)

Use GIS to develop map layers for the location of critical infrastructure

Action: Use GIS to develop map layers for the location of critical infrastructure**.**

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: GIS Department
- Hazards Addressed: All Hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Anticipated to begin in 2023, will be ongoing for updates.
- Priority: Medium
- Benefit(s): Critical infrastructure identified on layered infrastructure map, allowing quicker responses to infrastructure failures.

Item 29 (NEW)

Infested Tree Program

Phase I: Identify and assess dead/diseased trees along county roads due to invasive species

Action: Identify and assess dead/diseased trees along roads due to invasive species to determine which trees should be eliminated along with the order in which they should be cut down.

- Location: County-wide
- Lead Agency: Michigan Department of Transportation (MDOT), Lenawee County Road Commission (LCRC)
- Participating Agencies: Michigan Department of Natural Resources, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Invasive species, weather related events
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Anticipated to begin in 2025.
- Priority: Medium
- Benefit(s): Identifying and assessing the dead/diseased trees would prioritize their removal as well as mitigate the number of infested trees.

Phase II: Cut down dead/diseased trees as identified in Phase I

Action: Cut down dead/diseased trees along roads due to invasive species based on the results of the assessment completed in Phase I**.**

- Location: County-wide

- Lead Agency: Michigan Department of Transportation (MDOT), Lenawee County Road Commission (LCRC)
- Participating Agencies: Michigan Department of Natural Resources, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Invasive species, weather related events
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $2,500,000 (Estimate, dependent upon assessment)
- Potential Funding Source(s): MDOT, LCRC
- Time Frame: Results of the study will determine when the program begins. Anticipated to begin in 2027.
- Priority: Medium
- Benefit(s): Dead/diseased trees can be removed before they cause property damage from falling naturally or impacting other trees.

LOW PRIORITY PROJECTS

Item 30

Vulnerable Population Outreach

Phase I: Develop outreach program to identify vulnerable populations

Action: Development of an outreach program intended specifically to connect with vulnerable populations and identify their locations for possible assistance.

- Location: County-wide
- Lead Agency: Office of Emergency Management (OEM)
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing and continuous
- Priority: Low
- Benefit(s): Identification of vulnerable populations and provide them with the necessary services.

Phase II: Utilize GIS to create layered maps identifying vulnerable populations

Action: Create maps of vulnerable populations and their needs for specific hazards that can be used during hazardous events.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County GIS Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Original map anticipated to be completed in 2024, after which it will need to be updated annually and/or as needed.

- Priority: Low
- Benefit(s): Vulnerable population will be identified on maps that can be used during hazards, which would allow for quicker response times to those households.

Item 31

Develop program to promote prevention of roof/wall damages resulting from ice dams

Action: Develop program to promote prevention of roof/wall damages resulting from ice dams.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Snowstorms, ice/sleet storms
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM Budget
- Time Frame: Program anticipated to begin in 2025, if not sooner.
- Priority: Low
- Benefit(s): Reduced property damages resulting from ice dams on the roofs.

Item 32

Promote the use of design and construction methods to reduce damages resulting from severe weather

Action: Promote the use of window shutters, laminated glass, and other measures to protect structures from damages due to severe weather conditions.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Severe weather events
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget
- Time Frame: Program anticipated to begin in 2025, if not sooner.
- Priority: Low
- Benefit(s): Damage to personal property and personal injuries is mitigated.

Item 33

Promote the construction of concrete safe rooms

Action: Promote the construction of concrete safe rooms.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OMB budget
- Time Frame: Program anticipated to begin in 2025, if not sooner.

- Priority: Low
- Benefit(s): Creating awareness for the need of shelters for at-risk locations.

Item 34

Map flood prone areas

Action: Identify all flood-prone areas of the County (not restricted to floodplains)

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Drain Commission, GIS Department, Lenawee County Sheriff's Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: flooding
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): GIS Department
- Time Frame: Anticipated to be completed in late 2023/early 2024 and updated annually.
- Priority: Low
- Benefit(s): Flood areas more clearly identified providing direction to reduce/eliminate construction in these areas.

Item 35

Promote the Location of future development away from gas pipelines

Action: Future development to be located away from gas pipelines.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: Lenawee County Health Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Pipeline incidents
- Goal/Objective Addressed: Goal 4, objective a
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM, local municipal budgets
- Time Frame: Ongoing and continuous.
- Priority: Low
- Benefit(s): Mitigate damages resulting from pipeline incidents.

Item 36 (NEW)

Install water height gauges, identification markers, and dam notification markers for county waterways

Action: Install water height gauges, identification markers, and dam notification markers for county waterways**.**

- Location: County-wide
- Lead Agency: Lenawee County Drain Commission
- Participating Agencies: OEM, Michigan Department of Natural Resources (MDNR), the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: flooding
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: $50,000 (Estimate)
- Potential Funding Source(s): Lenawee County Drain Commission
- Time Frame: Anticipated to begin in 2025.

- Priority: Low
- Benefit(s): Public provided information on water system in Lenawee County.

Item 37 (NEW)

Work with Amish on hazard notification process

Action: Work with Amish representatives on hazard notification procedures/processes.

- Location: Southwest Lenawee County
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $2,000 annually (Estimate)
- Potential Funding Source(s): OEM budget
- Time Frame: Anticipated to begin anew in 2025. The Amish in Lenawee County have not been receptive to local government in recent past.
- Priority: Low
- Benefit(s): Amish provided early warnings on hazard, thereby mitigating property damages/ personal injuries due to hazardous events.

Item 38 (NEW)

Water Treatment Facilities Program

Phase I: Assess all water treatment warning and monitoring systems

Action: Encourage treatment facility owners to assess effectiveness of water treatment warning and monitoring systems.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000 (Estimate)
- Potential Funding Source(s): EGLE
- Time Frame: 2026 (Estimate)
- Priority: Low
- Benefit(s): Water treatment facilities assessed for any necessary upgrades.

Phase II: Complete improvements to water treatment warning and monitoring systems identified in Phase I

Action: As identified in Phase I, water treatment facility owners make necessary upgrades/improvements to water treatment warning and monitoring systems.

- Location: County-wide
- Lead Agency: EGLE
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a

- Project Costs: $250,000 (Estimate)
- Potential Funding Source(s): EGLE Loans and Grants
- Time Frame: 2028 (Estimate)
- Priority: Low
- Benefit(s): Water treatment facility monitoring systems will be upgraded, improving the overall safety of the facilities, which would reduce the likelihood of terrorism/sabotage to the facilities.

Item 39 (NEW)

Lenawee County Security Program

Phase I: Assess security measures for all county buildings

Action: Encourage county administration to assess security measures for all county buildings and facilities.

- Location: City of Adrian, Madison Township
- Lead Agency: Lenawee County Administration
- Participating Agencies: Sheriff's Department, OEM
- Hazards Addressed: Civil disturbances, terrorism/sabotage
- Goal/Objective Addressed: Goal 2, objective c
- Project Costs: $1,000 (Estimate)
- Potential Funding Source(s): Lenawee County Administration Budget
- Time Frame: Study anticipated to be complete by 2024.
- Priority: Low
- Benefit(s): Ensure county facilities have up-to-date security measures in place.

Phase II

Complete security measures of county buildings as identified in Phase I

Action: Encourage county administration to assess security measures for all county buildings and facilities.

- Location: City of Adrian, Madison Township
- Lead Agency: Lenawee County Administration
- Participating Agencies: OEM, Sheriff's Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Civil disturbances, terrorism/sabotage
- Goal/Objective Addressed: Goal 2, objective c
- Project Costs: $500,000 (Estimate-dependent upon assessment)
- Potential Funding Source(s): ~~OEM budget,~~ Lenawee County Administration budget
- Time Frame: Anticipated to be completed by 2026, dependent on funding and number of projects.
- Priority: Low
- Benefit(s): Ensure county facilities have up-to-date security measures in place.

Item 40 (NEW)

Encourage municipalities to adopt/enforce State Building Code/International Property Maintenance Code

Action: Encourage municipalities to adopt/enforce State Building Code/International Property Maintenance Code.

- Location: County-wide
- Lead Agency: OEM

- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: all hazards
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget
- Time Frame: Ongoing and continuous
- Priority: Low
- Benefit(s): With the enforcement of Codes, there may be a reduction in loss of property/lives.

Item 41 (NEW)

Encourage municipalities to adopt/enforce International Fire Code

Action: Encourage municipalities to adopt/enforce International Fire Code.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chief's Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural fires
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Fire Chief's Association
- Time Frame: Ongoing and continuous.
- Priority: Low
- Benefit(s): Reduced loss of life/property due to structural fires.

Item 42 (NEW)

Educate public on chimney use/maintenance

Action: Educate public on chimney use/maintenance.

- Location: County-wide
- Lead Agency: Lenawee County Fire Chiefs' Association
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: Structural fires
- Goal/Objective Addressed: goal 3, objective e
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): Lenawee County Fire Chiefs' Association
- Time Frame: Ongoing and continuous
- Priority: Low
- Benefit(s): Chimneys inspected and properly maintained, thereby reducing the number of structural fires due to improper chimney use.

Item 43 (NEW)

Use GIS to create map layers identifying previous hazard event locations

Action: Use GIS to create map layers identifying previous hazard event locations.

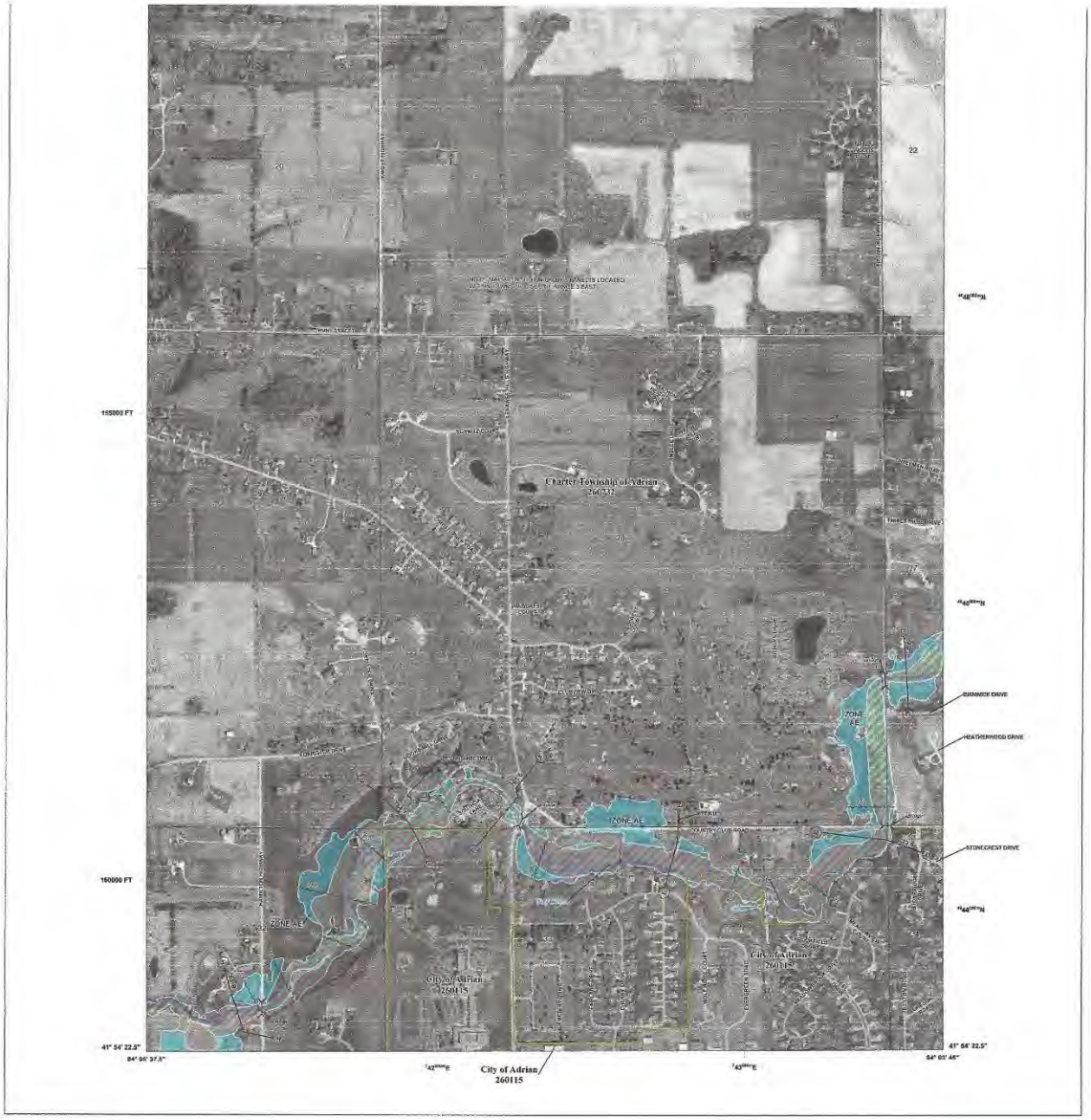
- Location: County-wide
- Lead Agency: OEM

- Participating Agencies: GIS Department, the list of participating municipalities can be found in Table 6.1 on page 140.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $1,000 annually (Estimate)
- Potential Funding Source(s): OEM budget, GIS budget
- Time Frame: Anticipated to being in 2024 and completed in 2025 and annually updated thereafter.
- Priority: Low
- Benefit(s): Mitigation efforts can be prioritized based on actual events.

APPENDIX H-
FLOODPLAIN MAPS

City of Adrian/Adrian Township Flood Map

MAP H1



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) (Zones A, and V)
- With BFE or Depth (Zones AE, AO, AH, VE, AR)
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile (Zone X)
- Future Conditions 1% Annual Chance Flood Hazard (Zone X)
- Area with Reduced Flood Risk due to Levee See Notes. (Zone X)

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain (Zone X)
- Area of Undetermined Flood Hazard (Zone D)

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Lenawee County, MI GIS Division. This information was derived from digital orthophotography at 1-meter resolution from photography dated 2017.

SCALE

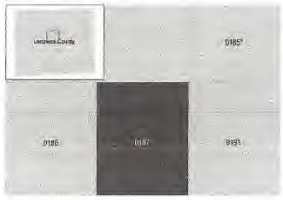
Map Projection: Auto 1983 StatePlane Michigan South FIPS 2113 Feet; Transverse Mercator; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

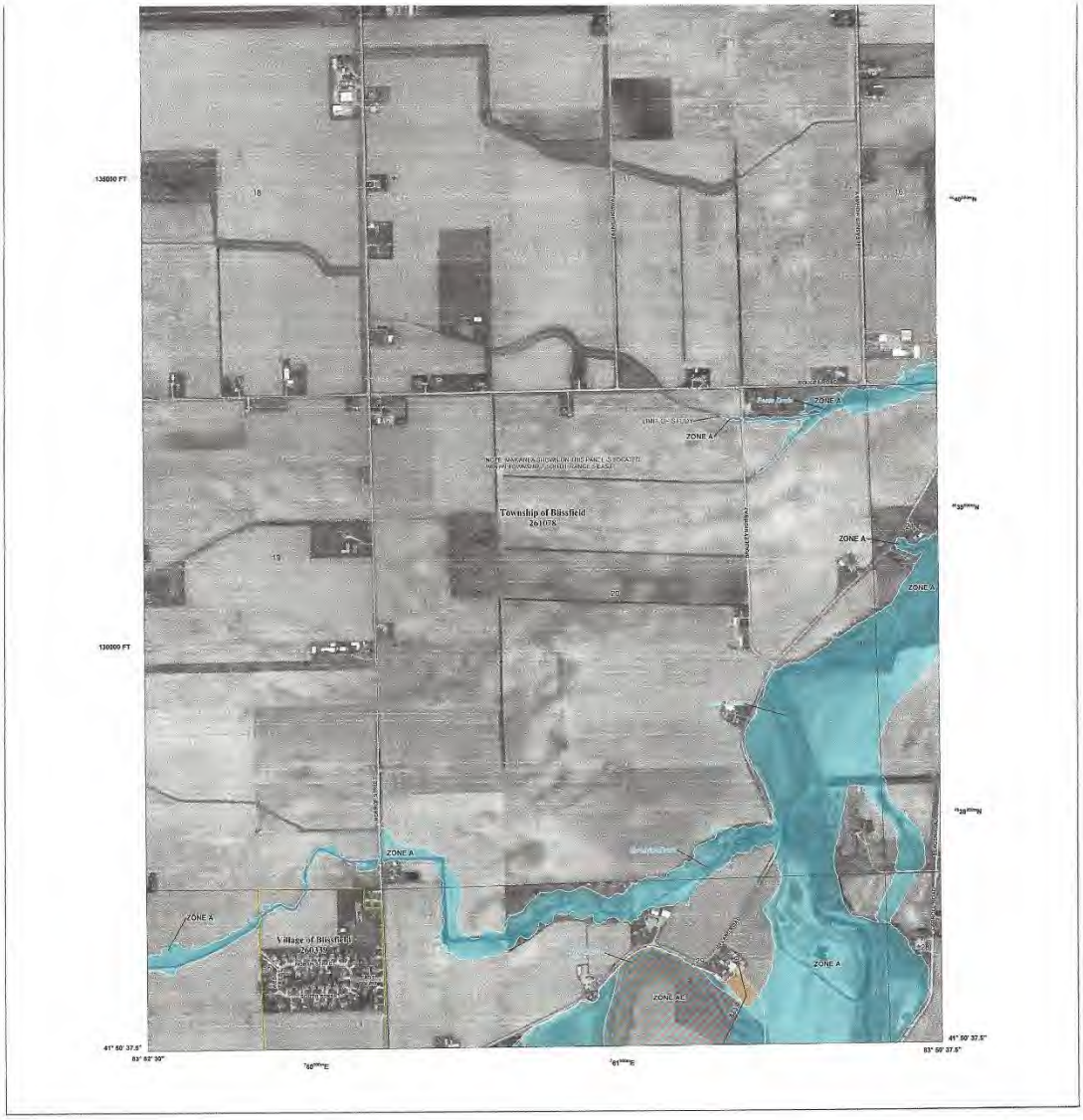
LENAWEE COUNTY, MICHIGAN
(All Jurisdictions)

PANEL 187 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
ADRIAN, CHARTER TOWNSHIP OF	260152	0187	D
ADRIAN, CITY OF	260115	0187	D

Village of Blissfield/Blissfield Township Flood Map

MAP H2



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON FHS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, AO, With BFE or Depth Zone AE, AH, AR, VE, A1
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone A
- Future Conditions 1% Annual Chance Flood Hazard Zone X

OTHER AREAS OF FLOOD HAZARD
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

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For community map revision history prior to countywide mapping, refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE

Map Projection: NAD 1983 State Plane Michigan South FIPS 2113 Feet; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

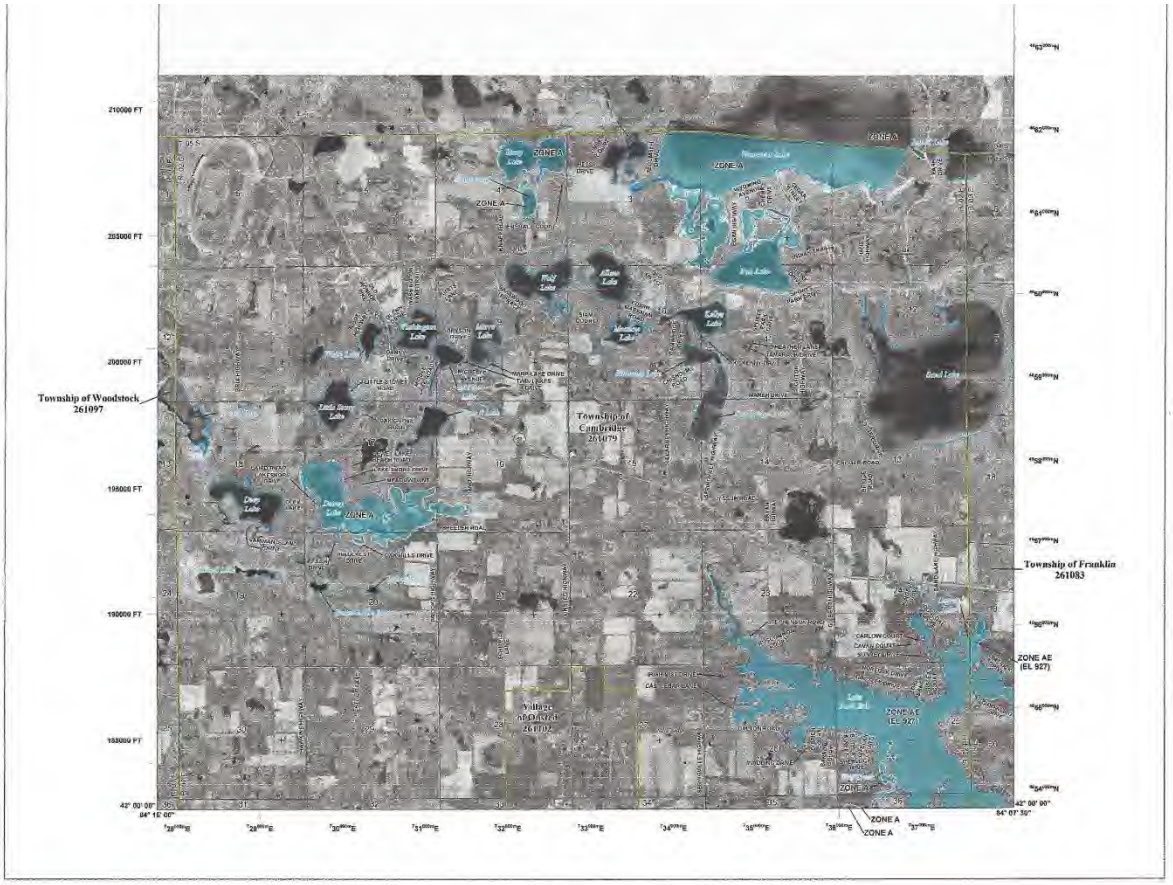
LENAWEE COUNTY, MICHIGAN

PANEL 351 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
BLISSFIELD, TOWNSHIP OF	261018	0051	D
BLISSFIELD, VILLAGE OF	260339	0051	D

Cambridge/Franklin/Woodstock Townships Flood Maps

MAP H3



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE)
- With BFE or Depth
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile

OTHER AREAS OF FLOOD HAZARD
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Flood Risk due to Levee See Notes.

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain
- Area of Undetermined Flood Hazard

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

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For community map revision history prior to the Flood Insurance Study report for this jurisdiction, contact the community map repository.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE

Map Projection: NAD 1983 StatePlane Michigan South FIPS 2113 Feet; Western Hemisphere; Vertical Datum: NAVD 88

N

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

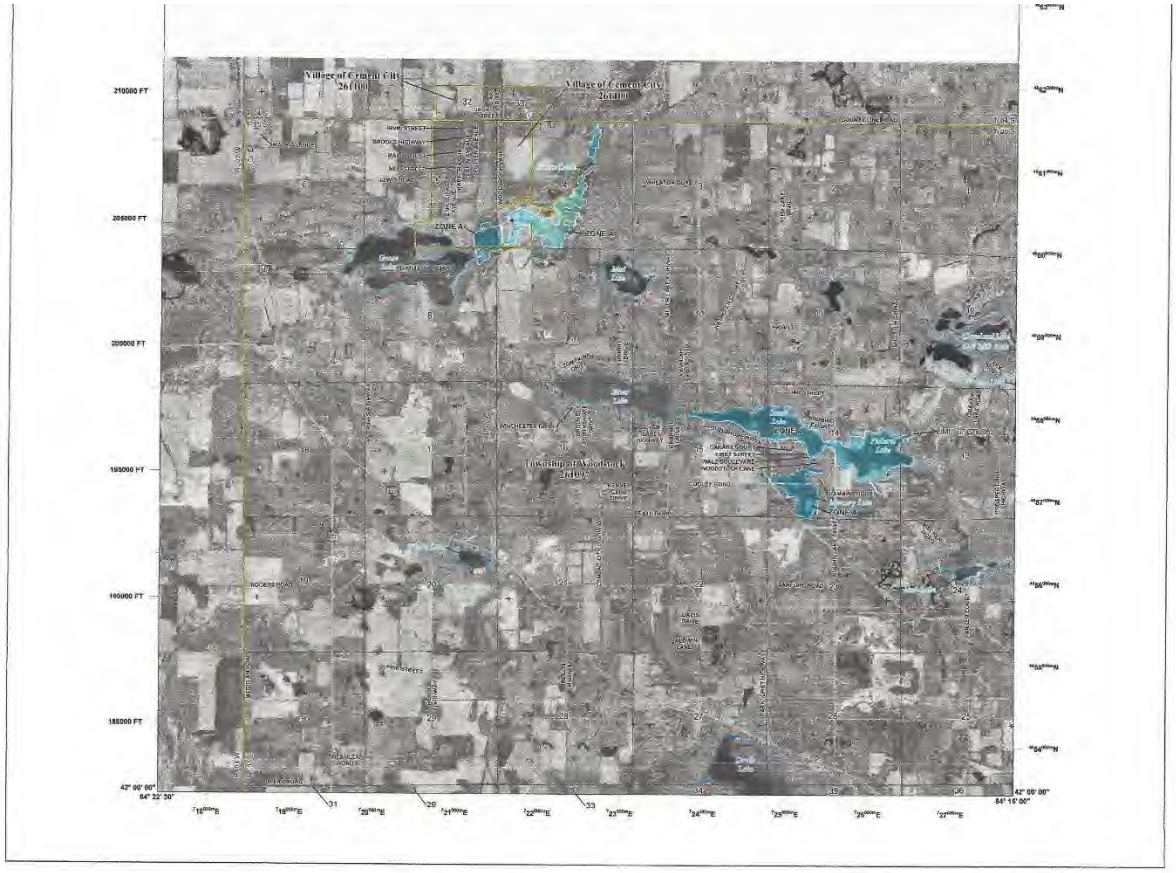
LENAWEE COUNTY, MICHIGAN AND INCORPORATED AREAS

PANEL 50 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
CAMBRIDGE, TOWNSHIP OF	261079	0050	G
FRANKLIN, TOWNSHIP OF	261083	0050	G
ONSTED, VILLAGE OF	261082	0050	G
WOODSTOCK, TOWNSHIP OF	261097	0050	G

Village of Cement City/Woodstock Township Flood Map

MAP H4



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE)
- With BFE or Depth
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile

OTHER AREAS OF FLOOD HAZARD
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Flood Risk due to Levee See Notes.

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain
- Area of Undetermined Flood Hazard

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

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For community and panel-specific map revision history refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE

Map Projection: NAD 1983 StatePlane Michigan South FIPS 2113 Feet; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LENAWEE COUNTY, MICHIGAN

(All Jurisdictions)

PANEL 25 of 500

COMMUNITY	NUMBER	PANEL	SUFFIX
CEMENT CITY, VILLAGE OF	261160	0025	D
WOODSTOCK, TOWNSHIP OF	260387	0025	D

Clinton/Macon Townships Flood Map

MAP H5

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X

OTHER AREAS OF FLOOD HAZARD
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- 16.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

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For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Lenawee County, MI GIS Division. This information was derived from digital orthophotography at 1-meter resolution from photography dated 2017.

SCALE

Map Projection: NAD 1983 StatePlane Michigan South FIPS 2113 Feet: Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 250 500 1,000 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LENAWEE COUNTY, MICHIGAN

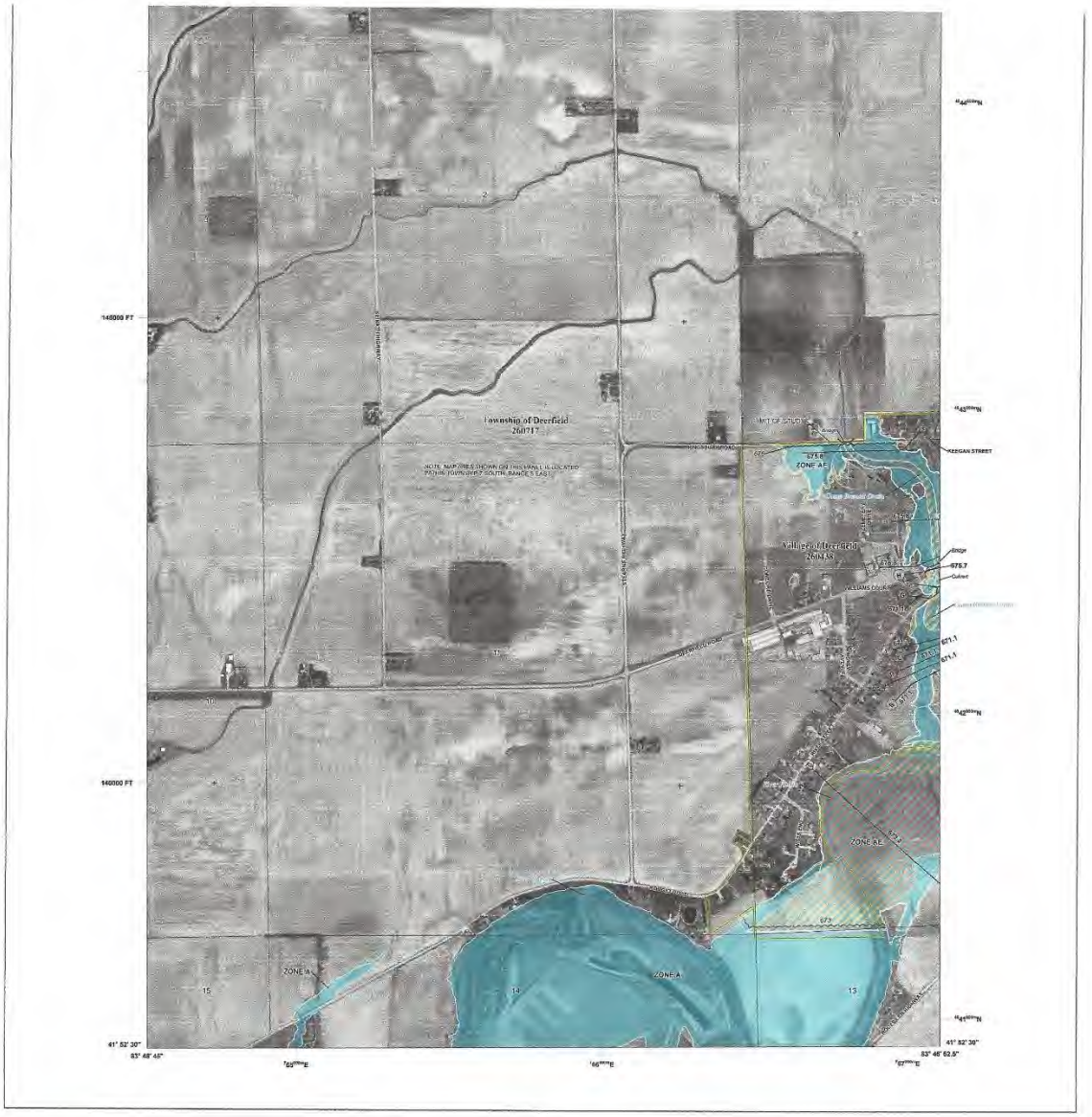
(All Jurisdictions)

PANEL 85 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
CLINTON, TOWNSHIP OF	261080	0085	D
MACON, TOWNSHIP OF	261085	0085	D

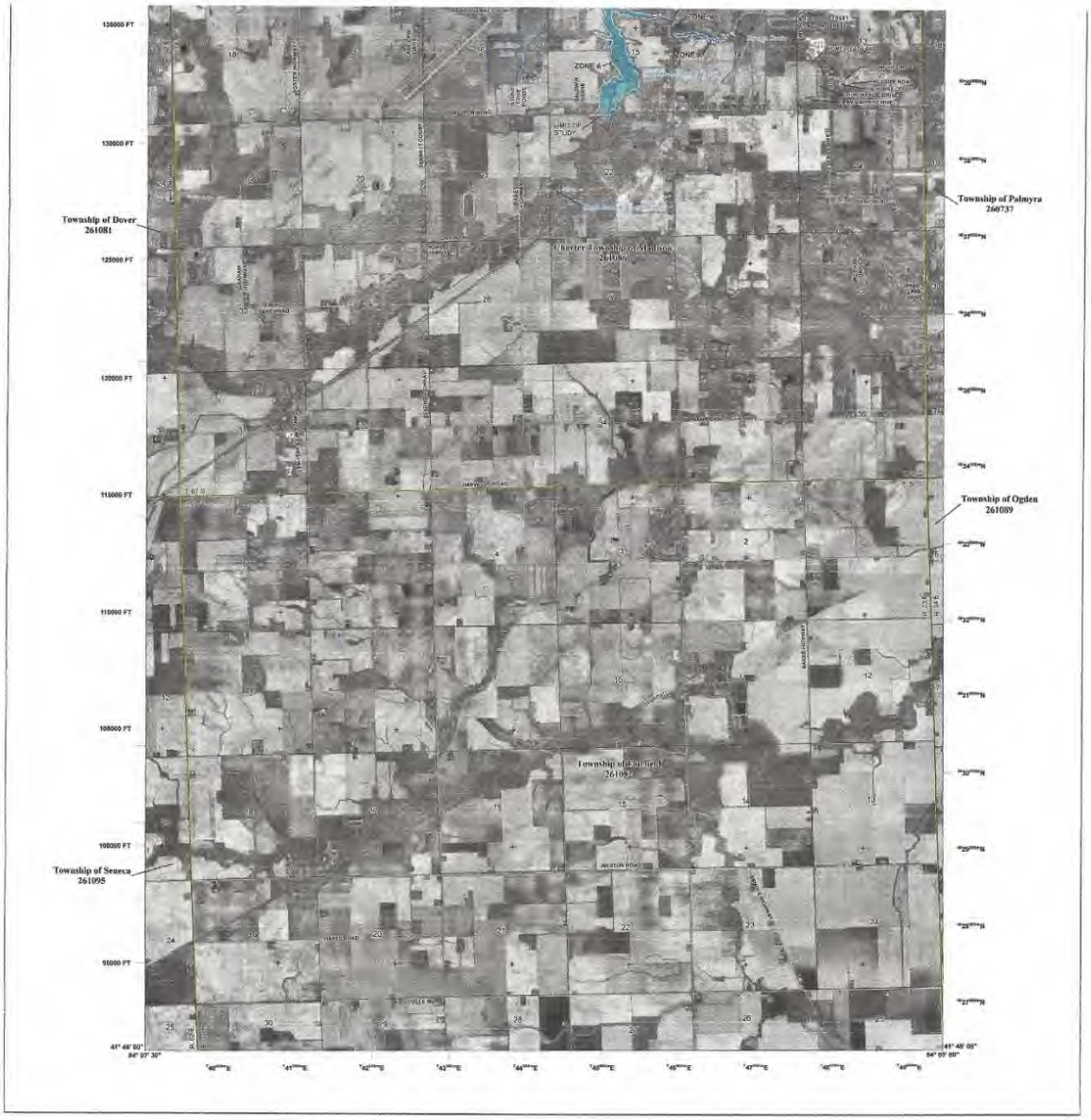
Village of Deerfield/Deerfield Township Flood Map

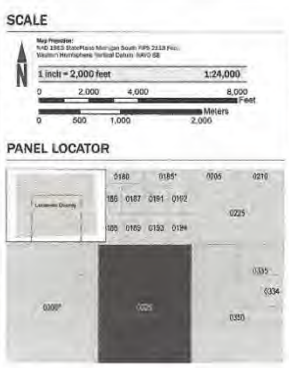
MAP H6



Dover/Fairfield/Madison/Sheridan Townships Flood Map

MAP H7



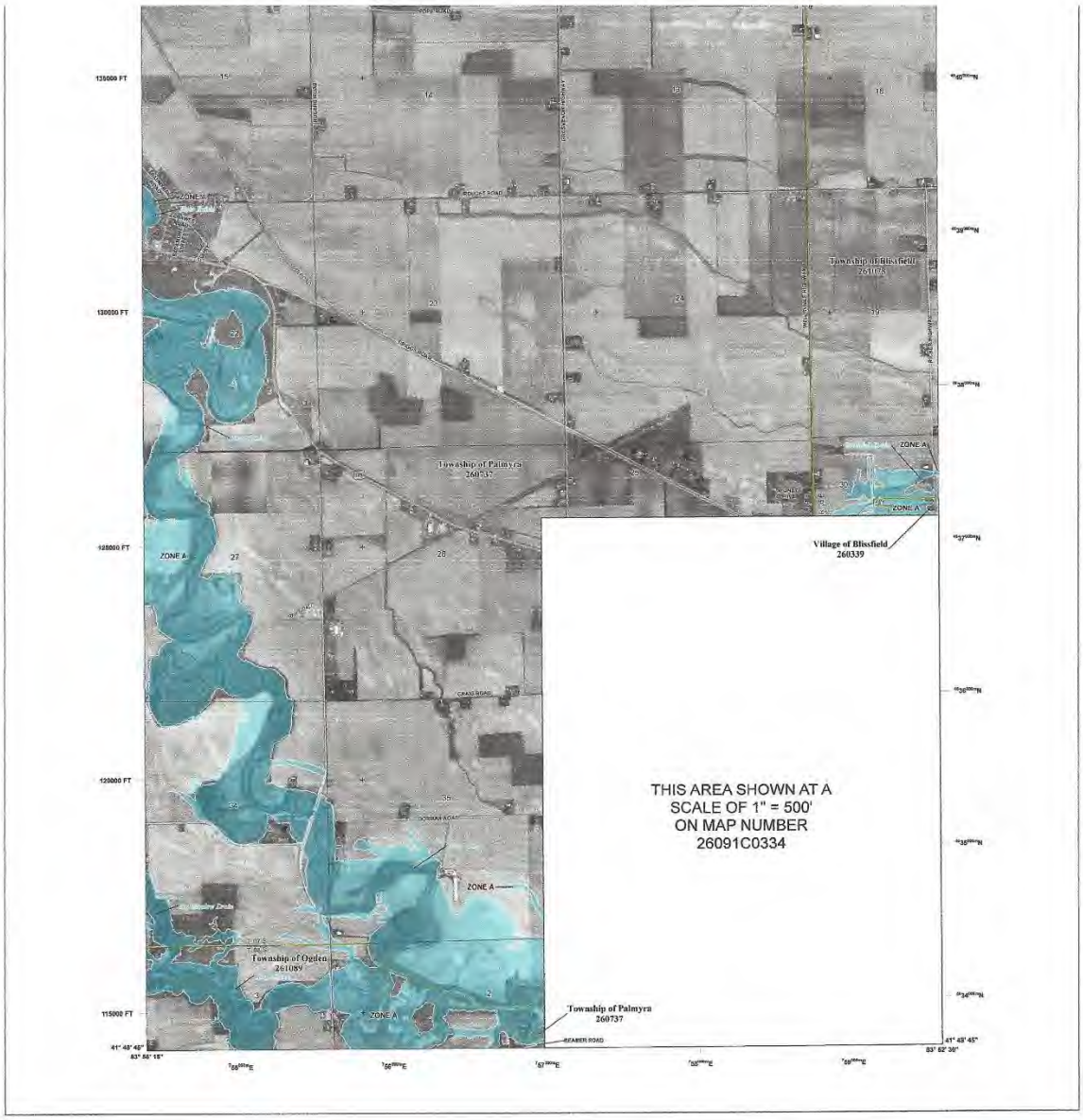


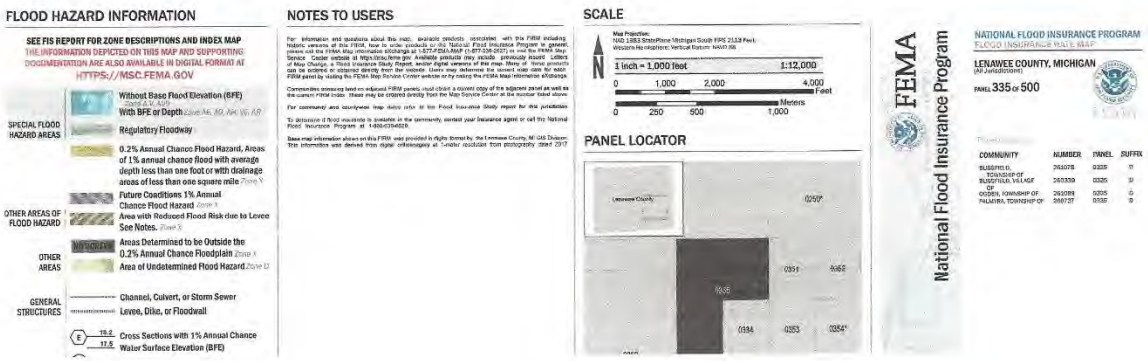
Hudson Township Flood Map

MAP H8

Ogden and Palmyra Townships/Village of Blissfield Flood Map

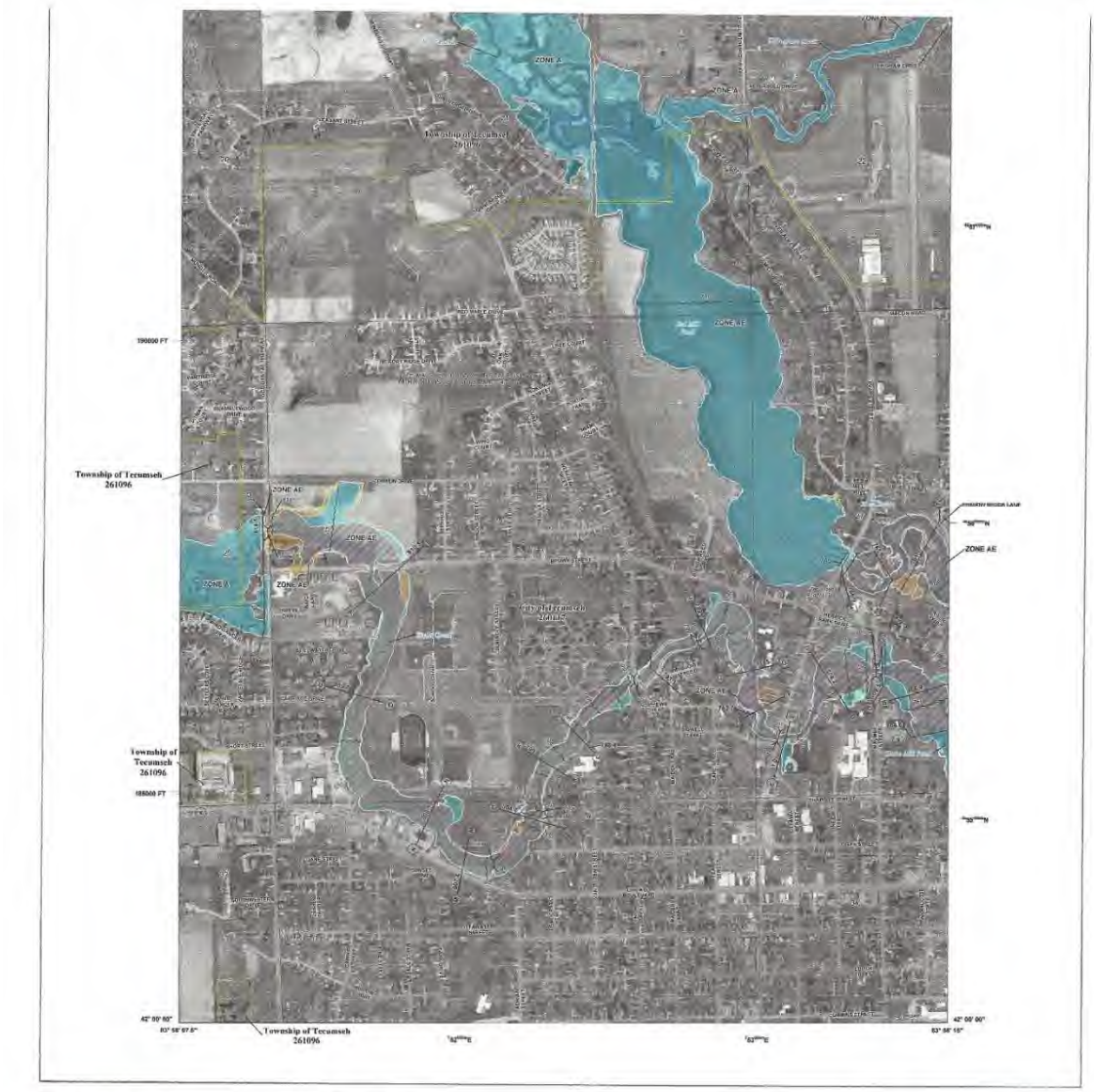
MAP H9





City of Tecumseh/Tecumseh Township Flood Map

MAP H10



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) With BFE or Depth
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
- Future Conditions 1% Annual Chance Flood Hazard

OTHER AREAS OF FLOOD HAZARD
- Area with Reduced Flood Risk due to Levee See Notes.

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain
- Area of Undetermined Flood Hazard

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

NOTES TO USERS

For information and questions about this map, available products associated with the FIRM including current revision of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from our website, which may also host the most current map data for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Lenawee County, MI GIS Division. This information was derived from digital orthophotography at 1-meter resolution from orthophotos dated 2017.

SCALE

N

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LENAWEE COUNTY, MICHIGAN

PANEL 89 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
TECUMSEH, CITY OF	260132	0089	D
TECUMSEH, TOWNSHIP OF	261096	0089	D