CLARE COUNTY HAZARD MITIGATION PLAN

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ema

ACRONYMS

ACE	Army Corps of Engineers
ARPA	American Rescue Plan Act
BEAD	Broadband Equity Access and Deployment
CCHAC	Clare County Hazard Advisory Committee
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
EMMDG TG	Emergency Management Direct Group Talk Group
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
ITC	International Transmission Company
IWIN	Interactive Weather Information Network
KPH	Kilometers Per Hour
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
MPSCS	Michigan Public Safety Communications System
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 State Department of Transportation
USDOT/OHMS	United States Department of Transportation, Office of Hazardous Materials Safety
USGS	United States Geological Survey
WEA	Wireless Emergency Alerts
WMD	Weapons of Mass Destruction

CHAPTER 1: INTRODUCTION

Clare County is in the mid-section of the lower peninsula of Michigan situated as a gateway to the North. The County is bordered on the north by Missaukee and Roscommon Counties, on the west by Osceola County, on the south by Isabella County and on the east by Gladwin County. According to the US Census, the County covers an approximate area of 361,152 acres or about 564 square miles. Using the 2020 US Census estimated population figure of 30,856, the population density of the county is approximately 55 people per square mile. The County consists of sixteen townships, two cities, and one village. The county seat in located in the City of Harrison.

The County is predominantly regarded as a recreational tourist area. In addition, there are several automobile related manufacturers, local health services, and retail trade that contribute to the local economy.

Approximately fifteen (15) percent of the county is held in public ownership (State of Michigan Lands and Au Sable State Forest lands). The Muskegon River runs across the northwest portion of the county, while the tributaries of the Tobacco River are in the southeast. Forests, inland waters, and wetlands comprise over 68% of the County's surface area. Agricultural use accounts for approximately 14.5% of the area. Several inland lakes in the county have significant resort developments. These cottages are becoming retirement homes for many former seasonal vacationers.

North-south access is provided by US-127 in the central portion and by M-18 on the northeast border. East-West access is provided by M-115 from the south heading diagonally to the west central portion of the county. US-10 spurs off of US-127 three miles north of the City of Clare to provide east-west access. M-61 provides east-west access in the center of the county through the City of Harrison. US-127 business routes are designated in the City of Clare and the City of Harrison.

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 things in a safer 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 sounder, less vulnerable conditions are produced. Through a combination of regulatory, administrative, and engineering approaches, losses 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, Clare 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 Clare 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 local hazard mitigation plans in order to be eligible for pre- and post-disaster funding from the federal government. The Plan was prepared in accordance with the Federal Emergency Management Agency (FEMA) documents: Local Mitigation Handbook and the Local Mitigation Plan Review Guide, and the Michigan State Police Emergency Management Homeland Security Division (MSP/EMHSD) publication 207: Local Hazard Mitigation Workbook.

The Clare 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.

Clare County Emergency Management Director and the Clare County Hazard Mitigation Advisory Committee (CCHMAC) 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 familiar with Clare 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 major categories of hazards that affect Clare County (and provides some additional information about lesser hazards). The analysis of hazards makes use of community profile information that includes a description of community organization and potential resources. The major hazards have been identified as severe weather, geological threats, fires, floods/drought, hazardous materials, infrastructure problems, public health emergencies, transportation incidents, seasonal population shifts, and civil unrest and war. For each of the major hazards, the following is provided:

- Description of the hazard;

- Explanation of how it affects the County;
- Requirements/Rules affecting the County;
- Hazard mitigation Goal(s) that have been identified; and
- Description and explanation of the Action Item proposed.

This new Plan updates the previous Clare County Hazard Mitigation Plan that was approved in 2016. This process began in 2021, as recertification of the Hazard Mitigation Plan shall take place at least once every five (5) years. It has been modified so that it is easier to find and use information contained within it. This should be helpful for stakeholders to more easily find and review the information that is most relevant for their jurisdictions and areas of expertise/interest.

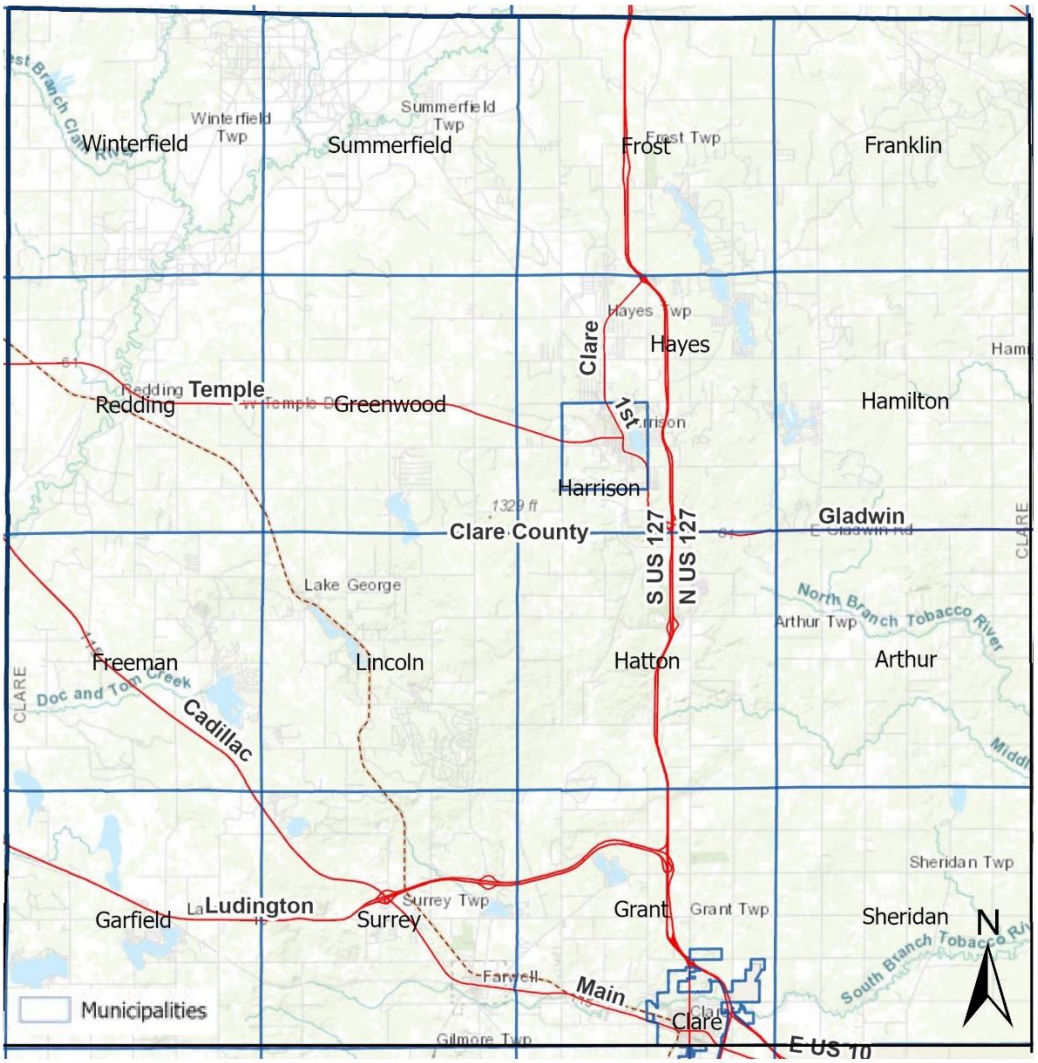
Certain information that is considered confidential or too sensitive for widespread public distribution has been kept out of this document and will only be distributed at the discretion of the Clare County Office of Emergency Management.

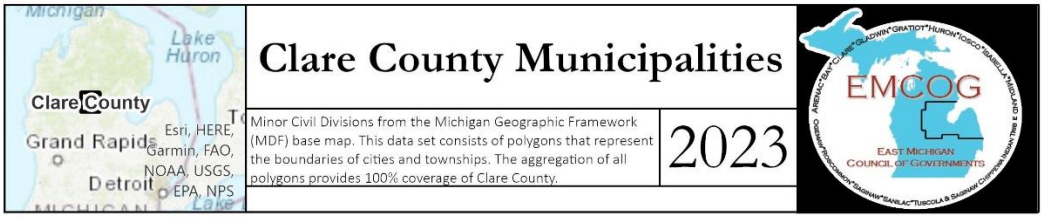
This plan is the culmination of our interdisciplinary and interagency planning effort that required the assistance and expertise of numerous agencies, organizations, and individuals. Without their technical assistance and contributions of time and ideas this plan could not have been completed.

A map of Clare County identifying the local units of government follows.

Clare County Municipal Government Map

MAP 1.1





Executive Summary

The Clare County Hazard Mitigation Plan was updated to protect the health, safety, and economic interests of the Clare 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 Clare 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 Clare County. Emphasis is placed on hazards that 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 performed by Clare County, it involved the participation of the communities within the County. Clare County's communities consist of two cities, one village, and 16 Townships. The communities are listed below:

Cities

Clare, Harrison

Village

Farwell

Townships

Arthur, Franklin, Freeman, Frost, Garfield, Grant, Greenwood, Hamilton, Hatton, Hayes, Lincoln, Redding, Sheridan, Summerfield, Surrey, and Winterfield.

In addition to the cities, village, and townships, there exists a large Amish Community within Clare County. Numbering about 400 in population, the Amish inhabit areas mainly in the Southeastern and Northwest portions of Clare County.

Clare County Community Information

TABLE 1.1

Community Name	2010 pop.	2020 pop. (est.)	Change	Participated in 2016 plan	Currently a participant in 2023 plan	NFIP Digitalized Map Available	NFIP participant	NFIP Map Date
Clare County	30,926	30,856	-0.2%	YES	YES			
City of Clare	3,071	3,181	3.6%	YES	YES	YES	YES	12/3/10
City of Harrison	2,114	2,147	1.6%	YES	YES	YES	YES	12/3/10
Village of Farwell	871	886	1.7%	YES		YES	YES	12/3/10
Arthur Twp	647	676	4.5%		YES	NO	NF	
Franklin Twp	825	728	-11.8%	YES	YES	NO	YES	NSFHA
Freeman Twp	1,157	1,123	-2.9%			YES	YES	12/3/10
Frost Twp	1,047	1,042	-0.5%	YES	YES	YES	NF	12/3/10
Garfield Twp	1,882	1,811	-3.8%	YES		YES	YES	12/3/10
Grant Twp	3,259	3,357	3.0%			YES	NO	12/3/10
Greenwood Twp	1,041	1,103	6.0%	YES	YES	YES	YES	12/3/10
Hamilton Twp	1,829	1,784	-2.5%	YES	YES	NO	NF	
Hatton Twp	933	896	-4.0%	YES		NO	NP	
Hayes Twp	4,675	4,639	-0.8%	YES	YES	YES	YES	12/3/10
Lincoln Twp	1,824	1,807	-0.9%	YES		YES	NO	12/3/10
Redding Twp	526	458	-12.9%	YES		YES	YES	12/3/10
Sheridan Twp	1,575	1,552	-1.5%	YES	YES	YES	NF	12/3/10
Summerfield Twp	456	462	1.3%	YES	YES	YES	YES	12/3/10
Surrey Twp	2,735	2,750	0.5%	YES		YES	YES	12/3/10
Winterfield Twp	459	454	-1.1%	YES	YES	YES	NO	12/3/10

Source: 2010 U.S. Census
2020 U.S. Census Estimates

NFIP Participants

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

NO-Non-participant-agency has chosen not to participate in the NFIP-residents within the municipality cannot purchase flood insurance at a lower rate.

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

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

CHAPTER 2: THE PLANNING PROCESS

In 2021, the Clare County Emergency Management staff began the update process by hosting a virtual meeting on February 9, 2021. With the COVID-19 Pandemic raging throughout the US, and vaccinations only recently being available, the meetings for the update were virtual meetings, through the ZOOM software program. The purpose of the meeting was to advise the public and Clare County representatives of the need to update the 2016 Clare County Hazard Mitigation Plan (Plan) and the process that would be utilized. Also in attendance was a representative from the East Michigan Council of Governments (EMCOG), who secured the grant for the update and who acted as the facilitator throughout the update process.

EMCOG staff worked with the Clare County Emergency Management Director (EMD), Jerry Becker and the Clare County Hazard Mitigation Advisory Committee (CCHMAC) who was designated as the steering committee for the Plan update. EMCOG was represented by Bill Ernat, Program Manager, Special Projects.

The CCHMAC was formed with members of the Clare County Local Planning Team (LPT) along with other local municipal and county representatives. It was composed of volunteers and professionals from county municipalities and various agencies located throughout the county/region, including the Michigan State Police, American Red Cross, Michigan Department of Health and Human Services, and the Department of Natural Resources.

The CCHMAC met virtually throughout the update process with Clare County Emergency Management hosting the meetings. A total of 20 meetings were held throughout the update process. Through a series of meetings open to the public, the EMD and EMCOG staff directed the CCHMAC through an assessment of the Plan in order to determine what changes, if any, would be necessary for the update. Meeting notices were posted on the Emergency Management website as well as on the Clare County website. The CCHMAC 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 Clare County website and on a bulletin board on the Clare County Courthouse. The following table (Table 2.1) identifies the meeting dates, locations, and subject matter for the CCHMAC. 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 sign-in sheets for all the public meetings for this update.

To further promote the update and residential participation, a questionnaire was sent to the municipal governments for their input on the update process and a residential survey was made available to the general public of Clare County. The residential survey was available online, as most municipal offices were closed at the time of the survey.

Clare County Hazard Mitigation Advisory Committee Meeting Schedule/Discussion Topic

TABLE 2.1

Meeting Date	Meeting Location	Discussion Topic(s)
2-9-2021	Virtual Meeting via Zoom	This was a public meeting, with notices sent out via email and posted on the Clare County Emergency Management and Clare County Websites. The meeting provided an overview of the update process, including the identification of hazards and their impact on the County. The update process also included the status of the 2016 projects and the identification of projects for the updated plan.
3-9-2021	Virtual Meeting via Zoom	This was the CCHMAC first meeting. The update process was again identified for the benefit of new attendees. It was mentioned that all Clare County municipalities should be participants in the update process for several reasons. First, the more information gathered throughout the update process, the better the Plan. Second, only those municipalities participating would be eligible to apply for FEMA funding without having to go through a multiple stepped process. The hazards were then identified, using the 2016 Clare County hazard list and the 2019 State of Michigan hazard list for their base. The CCHMAC then identified risk factors and their values. These factors and their values, would then be used to identify the overall risk each of the hazards posed to Clare County residents.
4-13-2021	Virtual Meeting via Zoom	The CCHMAC completed a risk analysis of all the hazards using the following criteria and percentages: likelihood to occur (50%), capacity to cause casualties (25%), capacity to cause physical damages (15%), public awareness (5%), and speed of onset (5%). An objective point value for each of the criteria were established and utilized for the exercise. Upon identifying the factors for all the hazards, the CCHMAC members were satisfied with the preliminary results and the meeting was adjourned.
5-11-2021	Virtual Meeting via Zoom	The risk analysis results were provided, with the public awareness and speed of onset figures inverted to properly reflect their impact. No questions were raised and the CCHMAC completed the vulnerability assessment as well. The invasive species list was provided and the species impacting Clare County were identified.

6-8-2021	Virtual Meeting via Zoom	The CCHMAC discussed the results of the vulnerability assessment (hazard prioritization) completed in May and had no changes or questions. There was a lengthy discussion on the treatment for the Spongy Moth, with a general discussion on all invasive species following that discussion. It was agreed that a community survey should be utilized to get municipal information needed for the Plan update. The CCHMAC was provided a draft of a similar survey and was asked for comments. It was suggested that Jerry Becker, Emergency Management Director (EMD) work with EMCOG staff on refining the survey.
7-13-2021	Virtual Meeting via Zoom	The hazard prioritization table was the first item discussed. There were no changes from the June meeting. The CCHMAC then reviewed the table compared to the results from the 2016 Plan. It was noted that several hazard changes were based on recent events. Goals and objectives were then discussed. Using the goals and objectives from the 2016 Clare County Plan as a starting point, goals and objectives were reviewed and then identified. No changes were recommended. The CCHMAC was then asked if any significant hazardous events had occurred in recent years that should be identified in the Plan. Several events were identified, the 2020 flood, a lightning strike in Clare, and some straight line wind events. The last item was a discussion on selection of alternative mitigation strategies. The CCHMAC was asked to review the strategies from the 2019 State of Michigan Hazard Mitigation Plan as well as the strategies from the 2016 Clare County Plan. Selection of the strategies will begin at the next meeting.
8-10-2021	Virtual Meeting via Zoom	The CCHMAC opened the meeting with the selection of alternative mitigation strategies. These were taken from the 2019 Michigan Plan and 2016 Clare County Plan. After the strategies were identified, it was suggested that blight be added as a hazard. Bill Ernat, EMCOG staff representative, said he would check into that with the Michigan Hazard Mitigation Planner for his opinion. (It was determined that blight is not included as a hazard, as it is considered to be a social issue.)

9-14-2021	Virtual Meeting via Zoom	Jerry Becker, EMD, opened the meeting with some corrections to the alternative strategies. He and Bill Ernat went through the list and eliminated several strategies that were either redundant to a previous strategy, or were

		considered to be a maintenance issue not related to hazard mitigation activities. There were no questions regarding the changes. The 2016 Action Plan (list of projects) was then discussed and updates on the progress of the projects was provided. It should be noted that the priority of several projects was questioned and that they should be changed. Bill Ernat, EMCOG staff, said that the priority was established when the Plan was adopted, and that the priority should remain as was originally determined. The CCHMAC then discussed the option to have a residential survey. The idea to have a survey was approved. It was suggested that it be online.
10-12-2021	Virtual Meeting via Zoom	The CCHMAC provided updates to the 2016 Action Plan projects' status. The next topic of discussion was hazard prioritization. It was stated that the prioritization process for the hazards will be reevaluated based on community and residential responses. These will be added to the previously identified priorities for the County.
12-14-2021	Virtual Meeting via Zoom	The mitigation strategies were finalized. The prioritization of the hazards was reevaluated by the CCHMAC and averaged out between the County, municipal, and residential responses. As a result of weighing the community and residential input in along with the Clare County impact, several hazards were reprioritized.
1-11-2022	Virtual Meeting via Zoom	The meeting opened with a review of the hazard prioritizations and there were no recommended changes. A discussion then began on potential projects for the Plan update. A review of the 2016 projects resulted in the continuation of many of these into the update. The CCHMAC then identified multiple strategies appropriate to include in the Plan update.
2-8-2022	Virtual Meeting via Zoom	The preliminary project list was reviewed and approved. The CCHMAC identified what hazard each project addressed and to make sure that all the hazards were addressed by at least one project. They also reviewed the goals and objectives to make sure that all goals and objectives were also addressed by the projects.

4-5-2022	Virtual Meeting via Zoom	A review of the goals and objectives showed that they were all met with the projects in the action list. The CCHMAC then went through the project list and began to identify the missing information regarding the projects. Representatives from Hayes Twp, City of Clare, and City of Harrison indicated that more information was needed for their projects. It was determined that a follow-up meeting after the initial meeting would have to be held. It was determined that the priority of the projects would be determined by the impact, as well as the cost-benefit ratio of the project. The follow-up meeting with Hayes Twp., City of Clare, City of Harrison, the EMD, and EMCOG staff was held, and the municipal representatives provided additional information on projects identified for their respective communities.
5-24-2022	Virtual Meeting via Zoom	The project information was again the center of discussion. Project costs and potential funding sources were identified for the projects. Several projects were reevaluated and put into phases with an assessment being the first phase and the action being the second phase. Several projects were combined as well.
6-14-2022	Virtual Meeting via Zoom	The first item on the agenda was to prioritize the projects, based “biggest bang for the buck” or cost/benefit ratio. Each project was given a high, medium, or low priority based on the benefit. A project was eliminated as the work had already been initiated. Volunteers were sought to proof the different sections of the plan prior to presenting the plan to the entire CCHMAC.
7-12-2022	Virtual Meeting via Zoom	Project priorities were evaluated with projects having similar priorities. No changes were made, and all high priority projects were kept. During the review of the medium priority projects it was determined that the tree trimming would go from medium priority to high priority. In the review of the low priority projects, the removal of diseased trees within the parkways was moved from low to medium priority. The identification of the project schedule was next on the agenda, and it was determined that the scheduled date would be the start date for each project.

8-9-2022	Virtual Meeting via Zoom	Prior to the meeting, the EMCOG staff person contacted the MSP staff to discuss several bullet points. It was suggested that project costs be identified as an estimate unless the actual costs are known. It was also suggested that schedule be renamed time frame, with a more elaborate explanation of the project work be given. The CCHMAC went over the two bullet points and provided the necessary information for each of the projects. The information for several projects was not completed as the agencies doing the projects were not in attendance. The

		CCHMAC was then advised that each municipality had to identify projects to participate in should they be funded, with a minimum of one mitigation project.
9-13-2022	Virtual Meeting via Zoom	The CCHMAC completed the all the information for the missing costs and time frames. Municipal representatives then identified projects that they would consider participating in should funding become available and the timing was right. Several municipalities were not present, the Clare County EMD will reach out to them for their input. The CCHMAC members were then advised that several chapters were completed, and proofing will begin. The volunteers again agreed to proof these chapters.
12-20-2022	Virtual Meeting via Zoom	The CCHMAC was provided a copy of the rough draft for their approval and final review. They were asked to review the municipal tables to confirm that the information was correct. Several changes were made. They were then asked to complete a review (proof) of the entire draft and let the EMD and EMCOG staff of any changes and time spent on the review. Lastly, they were given the final timetable for the approval of the Plan and provided an overview of the approval process. Several corrections were identified, with several more questions on the review process. They were thanked for their time and asked again to review the document as quickly as possible in order to get the changes before the Board of Commissioners for their review.

This update process included the review of the 2016 Clare County Hazard Mitigation 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 September 2022, completed sections of the draft were sent out to CCHMAC members who had previously volunteered to proof draft sections. Their comments were received in October and the appropriate changes were incorporated into those sections. A second group of completed sections were sent out in early November to the volunteers. Their comments were returned later in November. Again, all appropriate changes were incorporated into the chapters/appendices.

In December, the Advisory Committee met accepted the Plan in concept and agreed to have approval process begin. On January 18, 2023, the County Board of Commissioners accepted the Plan as presented and directed staff to continue with the approval process. Emergency Management Director, Jerry Becker, posted the draft of the plan on the Emergency Management Website, sent out a notice to all the advisory committee members, and to the Emergency Management staff in the neighboring counties.

During the 30-day comment period, several members of the Advisory Committee contacted EMCOG staff and offered suggestions on grammar, spelling, and address changes. In addition, an individual also offered several suggestions, many of which were utilized. It was also suggested that climate change be eliminated from the Plan. This was not done, as it is a FEMA suggested section, and will be required in the new regulations, that will take effect beginning in April 2023. Lastly, several maps were updated and inserted into the Plan.

Clare County Hazard Mitigation Advisory Committee Attendance Table

TABLE 2.2

Participating Agency or Jurisdiction	Returned Survey	Meetings Attended																		
		2-9-21	3-9	4-13	5-11	6-8	7-13	8-10	9-14	10-12	12-14	1-11-22	2-8	4-5	5-24	6-14	7-12	8-9	9-13	10-20	12-20
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
Clare 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 Clare	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
City of Harrison	X						X	X	X	X	X	X		X	X	X	X	X	X	X	X
Arthur Township			X	X	X	X	X	X	X	X		X	X		X	X	X	X	X		
Franklin Township	X	X	X	X	X	X	X		X	X	X		X		X		X		X		
Frost Township	X																				
Greenwood Township	X								X	X	X	X	X	X		X			X		
Hamilton Township	X	X	X	X	X	X	X		X	X	X		X		X		X		X		
Hayes Township	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Sheridan Township	X																				

Participating Agency or Jurisdiction	Returned Survey	Meetings Attended																		
		2-9-21	3-9	4-13	5-11	6-8	7-13	8-10	9-14	10-12	12-14	1-11-22	2-8	4-5	5-24	6-14	7-12	8-9	9-13	10-20	12-20
Summerfield Township	X				X	X															
Winterfield Township	X								X												
Clare County Board of Commissioners		X	X	X	X	X	X		X	X	X		X		X		X		X		
Clare County Administrator				X	X	X	X			X		X	X	X	X			X			
Clare Gladwin RESD		X	X		X		X		X	X			X				X				
Mid-Michigan District Health Department			X		X	X		X	X				X							X	X
Michigan State Police EMHSD			X			X	X		X							X					
Clare County 911		X	X			X														X	X
Clare County Drain Commission														X	X	X	X	X			
Clare County Road Commission								X		X		X	X	X	X			X		X	X
Clare County Sheriff's Dept.		X							X								X	X		X	X

Participating Agency or Jurisdiction	Returned Survey	Meetings Attended																		
		2-9-21	3-9	4-13	5-11	6-8	7-13	8-10	9-14	10-12	12-14	1-11-22	2-8	4-5	5-24	6-14	7-12	8-9	9-13	10-20	12-20
Clare County Transportation Commission				X		X															
Clare County Senior Services					X																
Clare County Soil Erosion					X	X		X	X	X	X	X			X	X					
Mid-Michigan Medical Center								X												X	
Clare County Clerk										X											
Clare County Recorder of Deeds																					
MSU-Extension																		X			

Clare County Hazard Mitigation Advisory Committee Attendance Table

TABLE 2.3

Person	Agency	Number of Meetings Attended
Bronwyn Asplund	Commissioner, Clare County Board of Commissioners	6
Courtney Atkins	Central Michigan District Health Dept	2
Mary Jo Beal	EM Coordinator, MidMichigan Health (2021-2022)	2
Jerry Becker	EM Director, Clare County	20
Dave Bondie	Superintendent, Clare County Road Commission	9
Sandra Bristol	Commissioner, Clare County Board of Commissioners; Hamilton Township Designee	13
Tracy Byard	Administrator, Clare County (2021-2022)	9
Justin Cavanaugh	Manager, City of Harrison (2022-)	3
Jim Chapman	Fire Chief, City of Clare	10
Ken Chinavare	IT Director, Clare/Gladwin RESD	8
Tracy Connelly	Manager, City of Harrison (2021-2022)	8
Chris Damvelt	Fire Chief, City of Harrison	9
Melissa DeRoche	Central Michigan District Health Dept	6
Bill Ernat	Program Manager, EMCOG	20
Gail Garrity	Trustee, Greenwood Township	8
Brian Gregory	Police Chief, City of Clare	1
Mark Hammer	Supervisor, Winterfield Township	1
Misty Hayes	District Administrator, Clare County Soil Conservation District	2
Jeremy Howard	Manager, City of Clare	17
Deb Hoyt	Clerk, Hayes Township	2
Ken Hoyt	Zoning Administrator, Hayes Township	6
Rick Jones	Supervisor, Hayes Township	16
Janice LaRose	Clerk, Arthur Township	14

Person	Agency	Number of Meetings Attended
Josh Lator	Lt., Michigan State Police	1
Rachel Mackson	Clerk, Greenwood Township	2
Lori Martin	Clare County Recorder of Deeds	1
Arick McCoy	EM Coordinator, MidMichigan Health (2022-)	2
Dwayne Miedzianowski	Undersheriff, Clare County Sheriff's Department	4
Joe Nash	District Forester, Clare Conservation District	1
Lori Phelps	Director, Clare County Senior Service (2021-2022) Administrator, Clare County (2022-)	3
Tom Pirnstill	Director, Clare County Transit Corporation	2
Luke Potter	DPW Director, City of Clare	15
Colleen Ritchie	Deputy Drain Commissioner, Clare County Drain Commission	5
Maye Rood	Treasurer, Hayes Township	3
David Saad	Police Chief, City of Clare	4
Shannon Sirpilla	Treasurer, City of Clare	1
Mike Sobocinski	Hazard Mitigation Planner, Michigan State Police	2
Marlana Terrian	Director, Clare County 911	5
Orville Theaker	EMHSD Lt., Michigan State Police	2
Melissa Townsend	Manager, Clare County Conservation District (2021-2022)	7
Don VanBonn	Lt., Clare County Sheriff's Department	2
Dan Wilhelm	Supervisor, Summerfield Township	2

CHAPTER 3: COMMUNITY PROFILE

NATURAL FEATURES OF CLARE COUNTY

Clare County is located in the middle of the Lower Peninsula of the State of Michigan. The counties surrounding Clare County are: Isabella to the South, Osceola to the west, Roscommon and Missaukee to the north and Gladwin to the east.

Considered the "Gateway to the North", Clare County is within an hour to an hour and a half drive from several of Michigan's largest cities, such as Grand Rapids and Lansing. Lake Michigan is 80 miles to the west, the Michigan/Indiana border is 150 miles to the south, the Straits of Mackinac and the Mackinac Bridge are 125 miles to the north and Lake Huron (Saginaw Bay) is fifty (50) miles to the east.

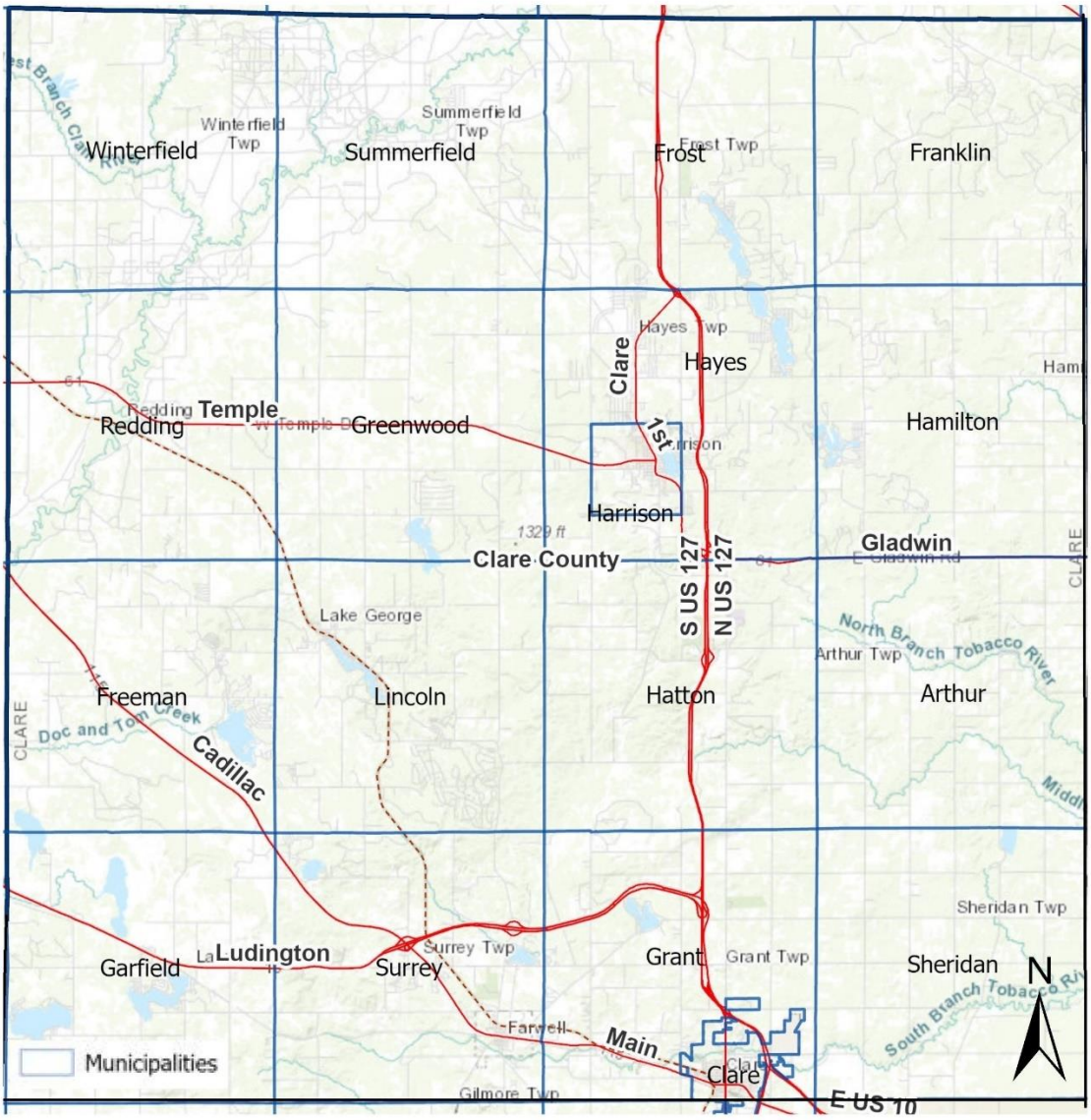
Clare County is approximately 368,140.8 acres or 575.22 square miles of land. The primary land use in Clare County is forestry with much of that being pine, aspen, and birch. Approximately sixty-three (63%) percent of the land is forested. Ninety-eight (98%) of this forested land is classified as commercial forest land. The remaining two (2%) is classified as non-commercial. Approximately twenty-four (24%) of the land in Clare County is used for cash crops, dairy, livestock production, and other farm enterprises. The remaining 13% is roads, other rural land, urban land, and water areas.

Clare County contains nineteen (19) local units of government, including 16 townships, two (2) cities, and one (1) village. The City of Harrison is the County seat. These communities were represented by a seven (7)-member Clare County Board of Commissioners through 2022, which covered as many districts. In 2022 this was changed to a nine-member Board if Commissioners. Table 3.1 on page 19 lists all 19 of the local units of government with their population data and trends from the last two United States decennial censuses. The 2020 census estimate of the County was 30,856.

Clare County is covered by District 6 of the Emergency Management & Homeland Security Division of the Michigan State Police.

Clare County Municipal Government Map

MAP 3.1





Clare County Municipalities

Minor Civil Divisions from the Michigan Geographic Framework (MDF) base map. This data set consists of polygons that represent the boundaries of cities and townships. The aggregation of all polygons provides 100% coverage of Clare County.

2023

EMCOG
EAST MICHIGAN COUNCIL OF GOVERNMENTS

Clare County Population by Municipality

TABLE 3.1

Municipalities	2020 Population[1]	2010 population	Change in population (%)
City of Clare	3,181	3,071	3.6%
City of Harrison	2,147	2,114	1.6%
Village of Farwell	886	871	1.7%
Arthur Township	676	647	4.5%
Franklin Township	728	825	-11.8%
Freeman Township	1,123	1,157	-2.9%
Frost Township	1,042	1,047	-0.5%
Garfield Township	1,811	1,882	-3.8%
Grant Township	3,357	3,259	3.0%
Greenwood Township	1,103	1,041	6.0%
Hamilton Township	1,784	1,829	-2.5%
Hatton Township	896	933	-4.0%
Hayes Township	4,639	4,675	-0.8%
Lincoln Township	1,807	1,824	-0.9%
Redding Township	458	526	-12.9%
Sheridan Township	1,552	1,575	-1.5%
Summerfield Township	462	456	1.3%
Surrey Township	2,750	2,735	0.5%
Winterfield Township	454	459	-1.1%
CLARE COUNTY TOTAL	30,856	30,926	-0.1%

Clare County had a projected decrease in population from 2010 to 2020, from 30,926 to 30,856, a projected decrease of 70 persons or 0.23 percent. The two municipalities that had a significant increase in their populations during the period were Clare and Grant Township with 110 and 98 people respectively. The two municipalities that had the largest decreases, percentage-wise were Franklin and Redding Townships, both having decreases in population of over ten percent, but having only 97 and 68 people.

[1] U.S. 2020 Census Population Estimates

LAND USE

Included is the latest Land Use Map, as completed in 2003 and approved in the 2009 Clare County Master Plan, the last master plan approved by the County. Being a County dominated by forest and rural lands, there have not been any substantial changes within the County since the Plan was adopted in 2009.

Land Use Categories

Ag-Farm-Forestry-Rural Residential-Basic wooded rural residential dominated by single-family homes, hunting cabins and recreational lands. This category is so named because of differing township zoning/ land use plans using these names interchangeably for the same type of properties.

State/Federal/County/Twp-Government owned lands covering a wide variety of uses including municipal offices, federal, state, county, and township office facilities, schools, libraries, parks, cemeteries, recreational lands, and other areas funded by the general public. A map of the state-owned land is included as map 3.3.

Resort Residential-Usually lands located around lakes consisting of primarily single-family homes year-round and seasonal.

Ag as taxed-Land actually used for agriculture including a variety of uses including crops, orchards, Christmas trees, livestock and other uses related to agriculture. Barns and other outbuildings are also included in this category, as are homes associated with the agricultural uses.

Commercial-This category includes retail and wholesale businesses, business and professional services, personal services, and other business that provide good or services to the general public.

Recreation-Lands owned by groups engaged in providing recreation, primarily for youth.

Industrial-This category includes sites where any type of manufacturing process occurs. Industries can include those that produce various emissions in the process (smoke, odor, noise, light, vibrations, etc.) or those that do not produce emissions detectable to surrounding areas – such as the assembly of parts shipped from other facilities.

Mobile Home Park-Provides rental spaces for mobile homes.

Clare County Land Use by Acre and Percentage

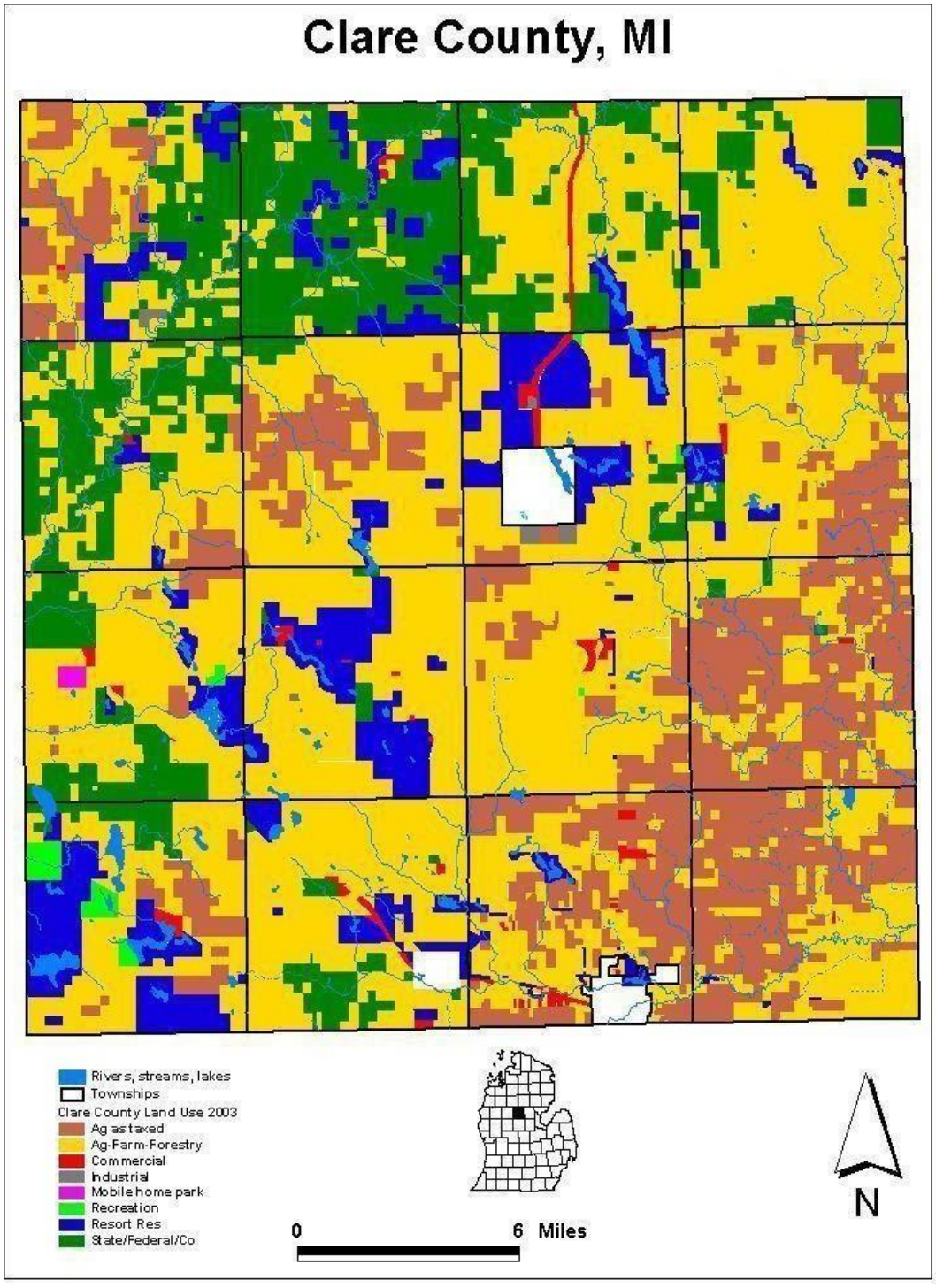
TABLE 3.2

Land Use	Acres	Percentage
Agriculture, Farm, Forest, Rural Residential	201,223	55.8%
Agriculture as Taxed	65,048	18.0%
Government (Federal, State, County, and Township)	55,495	15.4%
Resort Residential	33,190	9.2%
Commercial	3,250	.9%
Recreation	1,494	.4%
Industrial	633	.2%
Mobile Home Park	259	.1%
Total	360,592	100%

Source: 2009 Clare County Land Use Plan

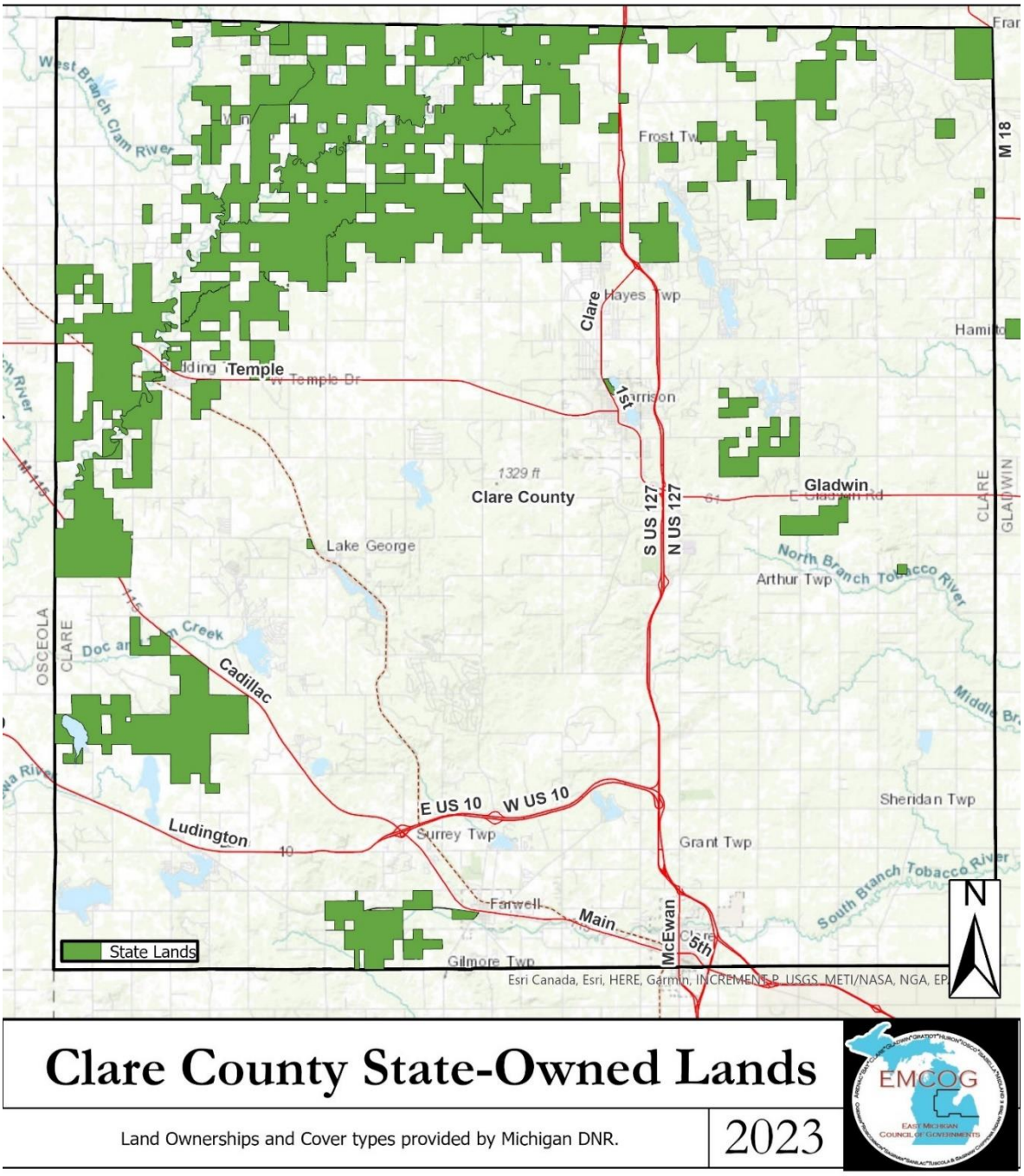
Clare County Current Land Use Map

MAP 3.2



Clare County State-owned Land Map

MAP 3.3



Source: Michigan Department of Natural Resources

FUTURE LAND USE

Methodology

The Clare County Board of Commissioners does not want to tread on Township authority in advocating any particular land uses; however, they do want to encourage responsible planning for future land use. No future land use map has been created as a result.

The most immediate threat for future land uses in Clare County is the fragmentation of large parcels that diminish the recreational uses of the properties. (This is especially true where a new house will render approximately 15 acres of land off limits to hunting.) Cluster zoning, if done properly, can reduce the impact of fragmentation on new housing and hunting.

Loss of farmland is another threat for future land uses in Clare County. Farmland is expected to be threatened by urban sprawl and fragmentation. The County's agricultural land is currently grouped in specific areas of the County, which allows Farmland Preservation to occur more easily. Government entities have been strongly urged to address the preservation of open space and agricultural land.

Residential housing pressure is expected to continually build. Projections expect areas already devoted to denser housing to spread to form clusters in and around the lakes and subdivisions that are already in place.

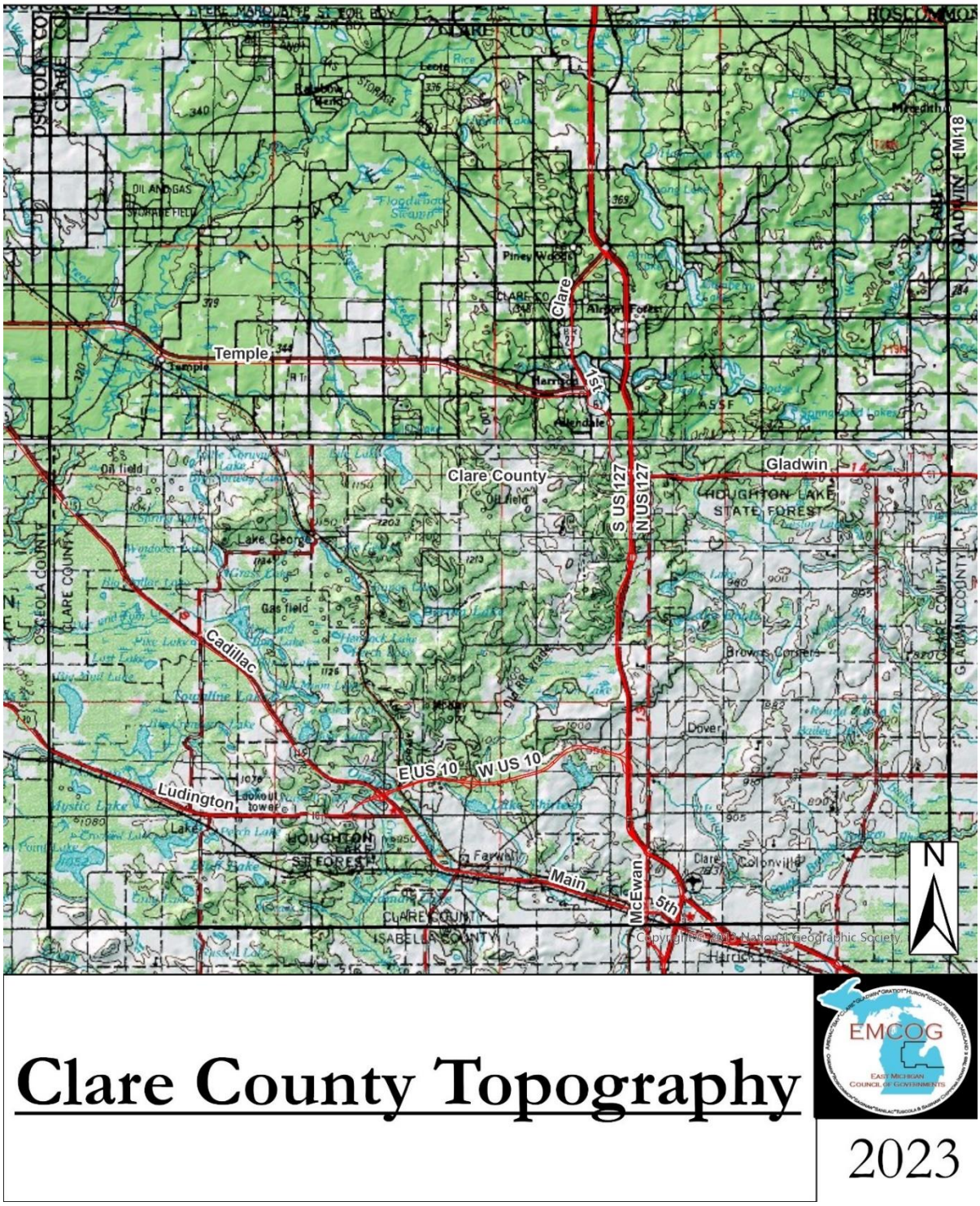
The same should be true for commercial and industrial uses. Most of the expected commercial/industrial areas are already in place and it is expected that they expand from this base.

TOPOGRAPHY

The land surface of Clare County was shaped by glaciation. The County is split nearly in half by two types of glacier related landforms. The southern portion of the county is the northern edge of a post glacial lake that has the characteristics of being flat land (elevations between 700' to 1,000' above sea level) with soils made up in clay and silt materials. The northern portion of the County is the southern edge of the glacial moraine area that makes up most of northern Michigan. This area is made up of gently rolling to steeply sloping terrain (elevations between 1,000' to 1,400') and consists of soils of sand and gravel material. The highest elevation is located in Greenwood Township at 1,377' above sea level and the lowest elevation is located in Sheridan Township at 754' above sea level.

Clare County Topographical Map

MAP 3.4



SOILS

The Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service, and an agency within the U.S. Department of Agriculture (USDA) has identified 18 soil types in Clare County. The three most common soil types Montcalm-Kalkaska-Graycalm, Montcalm-Leelanau-Blue Lake, and Nester-Kawkawlin take up more than 50 percent of the soil found in the County. Descriptions of the 18 soil types are found below.

1. Grayling: Very deep, excessively drained soils formed in sandy glaciofluvial deposits on outwash plains, deltas, kames, kame moraines, stream terraces, disintegration moraines and lake plains. Slope ranges from 0 to 45 percent. **9% of the county.**

2. Houghton-Carlisle-Adrian: Very deep, very poorly drained soils formed in herbaceous organic materials more than 130 cm (51 inches) thick in depressions and drainageways on lake plains, outwash plains, ground moraines, end moraines, till plains, and floodplains. Slope ranges from 0 to 2 percent. **1% of the county.**

3. Iosco-Brevort-Kawkawlin: Very deep, somewhat poorly drained soils formed in sandy lacustrine deposits or outwash and the underlying loamy lacustrine deposits or till on ground moraines, outwash plains, and lake plains. Slope ranges from 0 to 6 percent. **0.4% of the county.**

4. Menominee-Markey: Very deep, well drained soils on ground moraines, end moraines, outwash plains, and lake plains. The soils formed in sandy glaciofluvial deposits over loamy till or lacustrine deposits. Slope ranges from 6 to 70 percent.**11% of the county.**

5. Montcalm-Kalkaska-Graycalm: Very deep, well drained soils that formed in sandy and loamy drift on moraines, outwash plains, and glacial drainage channels. Slope ranges from 0 to 45 percent. **27% of the county.**

6. Montcalm-Leelanau-Blue Lake: Very deep, well drained soils that formed in sandy and loamy deposits on moraines. Slope ranges from 0 to 50 percent. **13% of the county.**

7. Nester-Kawkawlin: Very deep, moderately well drained soils formed in till on ground moraines and end moraines. Slope ranges from 0 to 12 percent. **14% of the county.**

8. Perrinton-Ithaca-Coloma: Very deep, moderately well drained soils formed in loamy and/or clayey till on ground moraines, end moraines, and till plains. Slope ranges from 0 to 12 percent. **2% of the county.**

9. Pipestone-Grattan: Very deep, somewhat poorly drained soils formed in sandy outwash on outwash plains, lake plains, beach ridges, and water-worked till plains. Slope ranges from 0 to 8 percent. **1% of the county.**

10. Pipestone-Kingsville-Covert: Very deep, very poorly drained soils formed in glaciolacustrine sediments on Wisconsinan age lake plains. Permeability is rapid. Slope ranges from 0 to 2 percent. **1% of the county.**

11. Roscommon-Croswell-Au Gres: Very deep, poorly drained and very poorly drained soils formed in sandy deposits on lake plains, outwash plains, lake basins and glacial drainageways. The saturated hydraulic conductivity is rapid. Slopes range from 0 to 2 percent. **0.2% of the county.**

12. Rubicon-Croswell-Au Gres: Very deep, excessively drained soils formed in sandy deposits on disintegration moraines, ground moraines, end moraines, kame moraines, lake plains, outwash plains, stream terraces, beach ridges, and sand dunes. Slope ranges from 0 to 70 percent. **8% of the county.**

13. Rubicon-Grayling: Very deep, excessively drained soils formed in sandy glaciofluvial deposits on outwash plains, deltas, kames, kame moraines, stream terraces, disintegration moraines, ground moraines, end moraines, and lake plains. Slope ranges from 0 to 45 percent. **0.3% of the county.**

14. Spinks-Coloma: Very deep, well drained soils formed in sandy eolian or outwash material. They are on dunes, moraines, till plains, outwash plains, beach ridges, and lake plains. Slope ranges from 0 to 70 percent. **4% of the county.**
15. Spinks-Perrinton-Miami-Metea: Very deep, moderately well drained soils that are moderately deep to dense till. Miami soils formed in as much as 46 cm (18 inches) of loess or silty material and in the underlying loamy till. They are on till plains. Slope ranges from 0 to 60 percent. **3% of the county.**

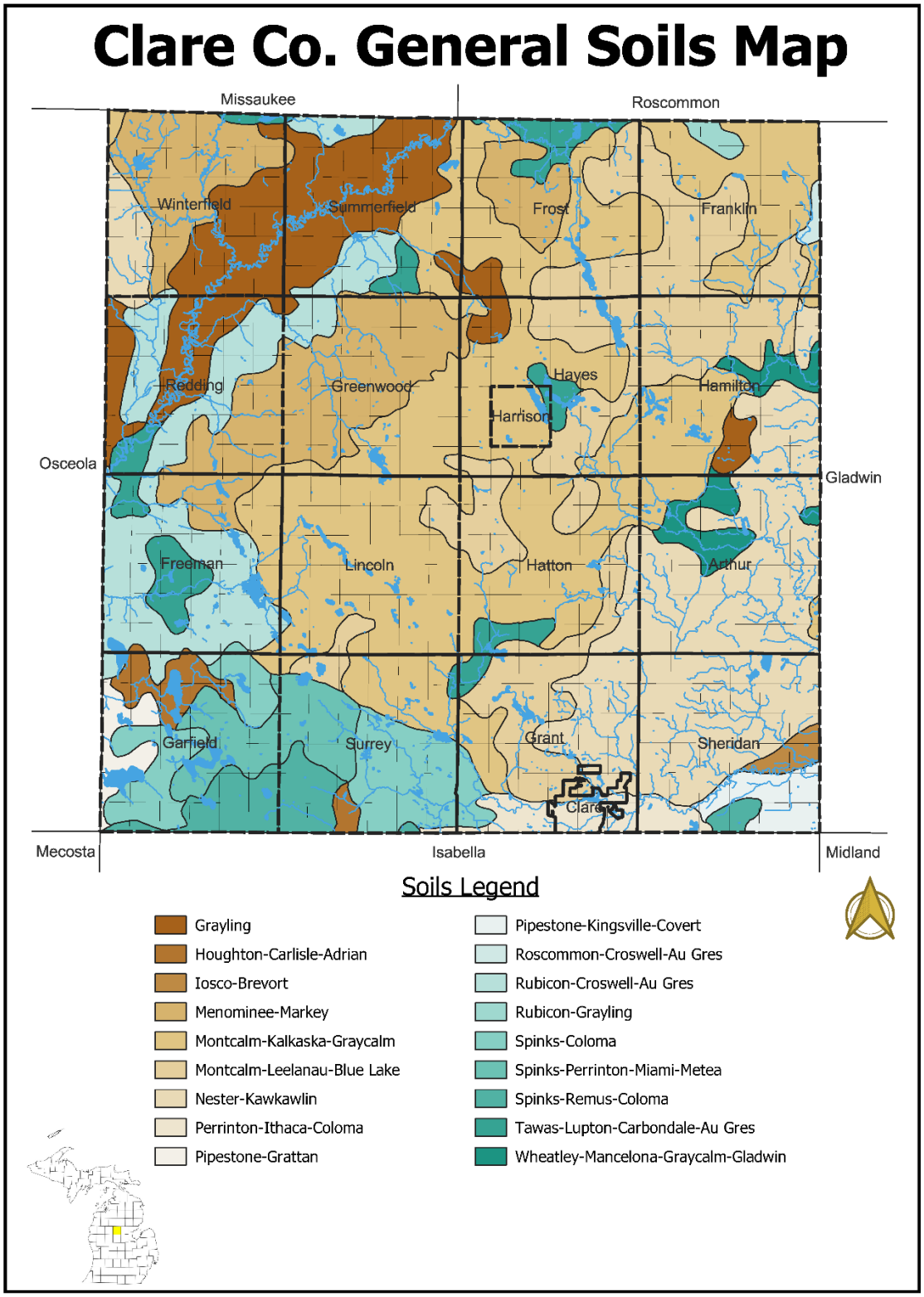
16. Spinks-Remus-Coloma: Very deep, well drained soils formed in loamy till on ground moraines and end moraines. Slope ranges from 0 to 60 percent. **2% of the county.**

17. Tawas-Lupton-Carbondale-Au Gres: Very deep, very poorly drained organic soils that are moderately deep to sandy material. They formed in sapric material 41 to 130 centimeters thick overlying sandy drift. They are in depressions within outwash plains, lake plains, till floored lake plains and moraines. Saturated hydraulic conductivity of these soils is moderately high to high in the organic material and high or very high in the sandy material. Slopes typically range from 0 to 2 percent, but may range to 15 percent. **3% of the county.**

18. Wheatley-Mancelona-Graycalm-Gladwin: Very deep, poorly drained or very poorly drained soils formed in sandy and gravelly glaciofluvial deposits on lake terraces, outwash plains, lake plains, and valley trains. Slope ranges from 0 to 3 percent. **1% of the county.**

Clare County Soils Map

MAP 3.5



Source: Natural Resource Conservation Service

CLIMATE

Climate has a strong influence on the way of life and the activities of the people of Clare County. It is considered a continental type of climate which is characterized by larger temperature ranges than in areas at the same latitude near the Great Lakes which have moderated temperatures. As a result of the prevailing westerly winds, this region experiences some lake effect snow. Like the rest of the State, the County has four distinct seasons that allow for a wide variety of outdoor activities. In table below is a breakdown of the average mean temperatures for each month (daily average), along with the monthly average precipitation and snowfalls. The first column in each category is from 1929-2000 and the second column is for the period from 2001-2015.

Clare County Climate

TABLE: 3.3

MONTH	AVERAGE TEMPERATURES		AVERAGE PRECIPITATION		AVERAGE SNOWFALL	
	1929 to 2000	2001 to 2015	1929 to 2000	2001 to 2015	1929 to 2000	2001 to 2015
January	20.0	21.2	1.86	1.78	13.0	12.6
February	21.2	20.8	1.40	1.64	10.3	13.2
March	30.8	31.1	2.17	1.82	7.6	7.0
April	43.8	44.3	3.00	3.70	2.0	1.6
May	55.4	55.6	3.10	4.11	0	0
June	65.1	65.5	3.30	3.46	0	0
July	69.3	69.7	3.10	3.12	0	0
August	67.4	67.9	3.42	3.06	0	0
September	59.5	60.8	3.30	2.80	0	0
October	48.4	48.8	2.79	3.18	0.3	0
November	36.4	38.3	2.70	2.46	3.7	2.7
December	25.3	26.4	2.17	2.36	11.0	12.5
Year	45.1	45.9	32.30	33.50	47.9	49.5

Source: National Weather Service

WATER FEATURES AND WETLANDS

Clare County has a variety of water features such as rivers, streams, lakes, and wetlands. The County has more than 6,000 acres of lake surface and 20,000 acres of wetlands; combined, they account for approximately seven (7%) of the County's total acreage.

There are thirty-two lakes that occupy at least 50 acres within the County and provide ample opportunity for water related activities such as fishing and boating. The most significant lakes include: Arnold, Budd, Cranberry, Crooked, Eight Point, Five Lakes, Lake George, Lily, Long, and Sutherland.

Two major watersheds, Muskegon and Saginaw Bay, divide the County in half. The Muskegon River, which drains the western portion of the County, is the largest river in the County and provides a number of recreational opportunities from canoeing to camping. The Tobacco and Cedar Rivers drain the eastern portion of the County and are a part of the Saginaw Bay watershed. Each of these rivers has their beginnings in Clare County.

Wetlands are defined by the existence of water, either on or near the surface for a portion of the year and by the type of vegetation present. Wetlands may have many names and are often referred to as bogs, marshes, and swamps. Wetlands are an important resource to the people of Clare County. They improve the water quality of lakes and streams by filtering polluting nutrients and chemicals. More importantly, wetlands recharge aquifers, support wildlife and vegetation, and protect shorelines from erosion. See following table for detail.

Clare County Water and Wetland Area by Acres

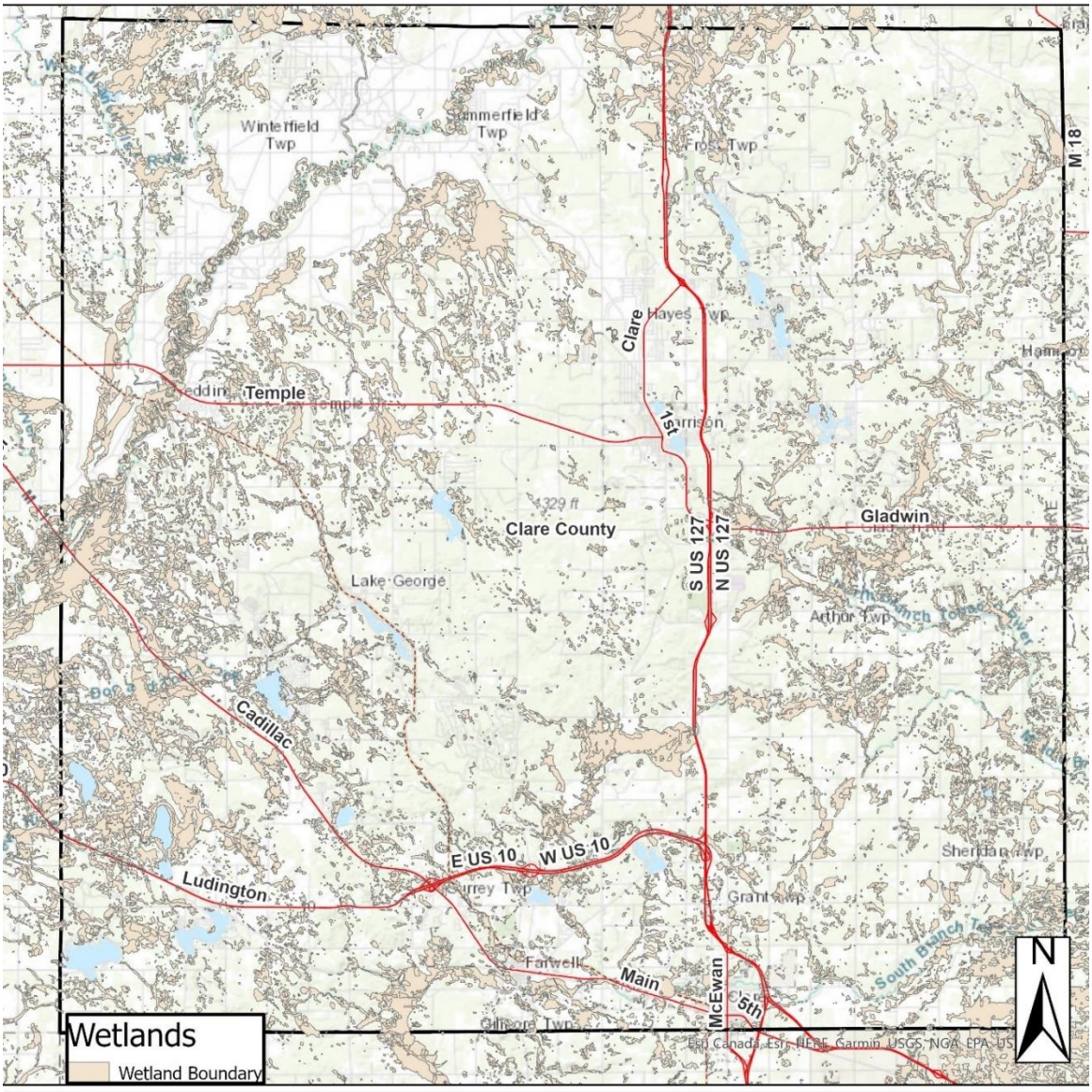
TABLE 3.4

	Acreage			% of Area
	Water	**Wetlands**	**Total**	
Arthur Township	122.69	593.02	715.71	3.1%
Franklin Township	96.46	175.42	271.88	1.2%
Freeman Township	852.04	7,417.80	8,269.84	36.3%
Frost Township	404.60	1,763.23	2,167.83	9.6%
Garfield Township	1,647.69	3,482.66	5,130.35	22.5%
Grant Township (including City of Clare)	484.02	0.0	484.02	2.1%
Greenwood Township	228.0	905.15	1,133.15	5.0%
Hamilton Township	308.03	918.52	1,226.55	5.3%
Hatton Township	191.08	702.04	893.12	3.9%
Hayes Township (including Harrison)	1,038.63	54.0	1,092.63	4.7%
Lincoln Township	686.53	0.0	686.53	3.0%
Redding Township	323.84	5,133.7	5,457.55	24.2%
Sheridan Township	210.55	1,412.12	1,622.67	6.9%
Summerfield Township	432.93	2,603.68	3,036.61	13.2%
Surrey Township	499.80	431.90	931.70	4.1%
Winterfield Township	584.04	2,633.60	3,217.64	13.7%
Total	8,110.93	28,226.85	36,337.78	9.9%

Source: Michigan Department of Environment, Great Lakes, and Energy

Clare County Wetlands

MAP 3.6



Clare County Wetlands

The NWI 2005 was an update to the original 1978 NWI Layer produced by US Fish and Wildlife Service and utilized 1998 and 2005 imagery to map wetland loss/change over time. Classification of wetlands is based on the Cowardin Wetland Classification system with a minimum mapping unit of 1/10 acre. Wetland data produced by interpreting aerial imagery and digitizing boundaries in a heads-up GIS environment. The most current up to date statewide wetland inventory for Michigan available as of 2020. NWI 2015 update is currently in progress in a partnership between EGLE and Ducks Unlimited, with expected statewide completion in 2025.

2023

EMCOG
East Michigan Council of Governments

VEGETATION

Originally, Clare County was covered with a dense mixture of coniferous (eastern white pine) and deciduous (oak and maple) forests. In the late 1800's the County's forests were cleared leaving an open landscape littered with stumps. Wildfires burned through Mid-Michigan, including Clare County, following the cutover in the late 1800's. In the late 1800's and early 1900's, much of the land was converted to farmland or ranch land.

Current Vegetation

Today, Clare County has a mixture of open farmland and forested areas. The southern portion of the County is predominantly farmland with smaller forest areas found along rivers, streams, and wetlands. The northern portion of the County is predominantly forest land with some open farmland. The Pere Marquette State Forest encompasses a large area in northwest Clare County and is the current location of the Kirtland Warbler habitat area. The area was either burned or clear cut and regenerated naturally or replanted by humans with jack pine, which the Kirtland Warble requires for nesting and breeding.

Forest Cover

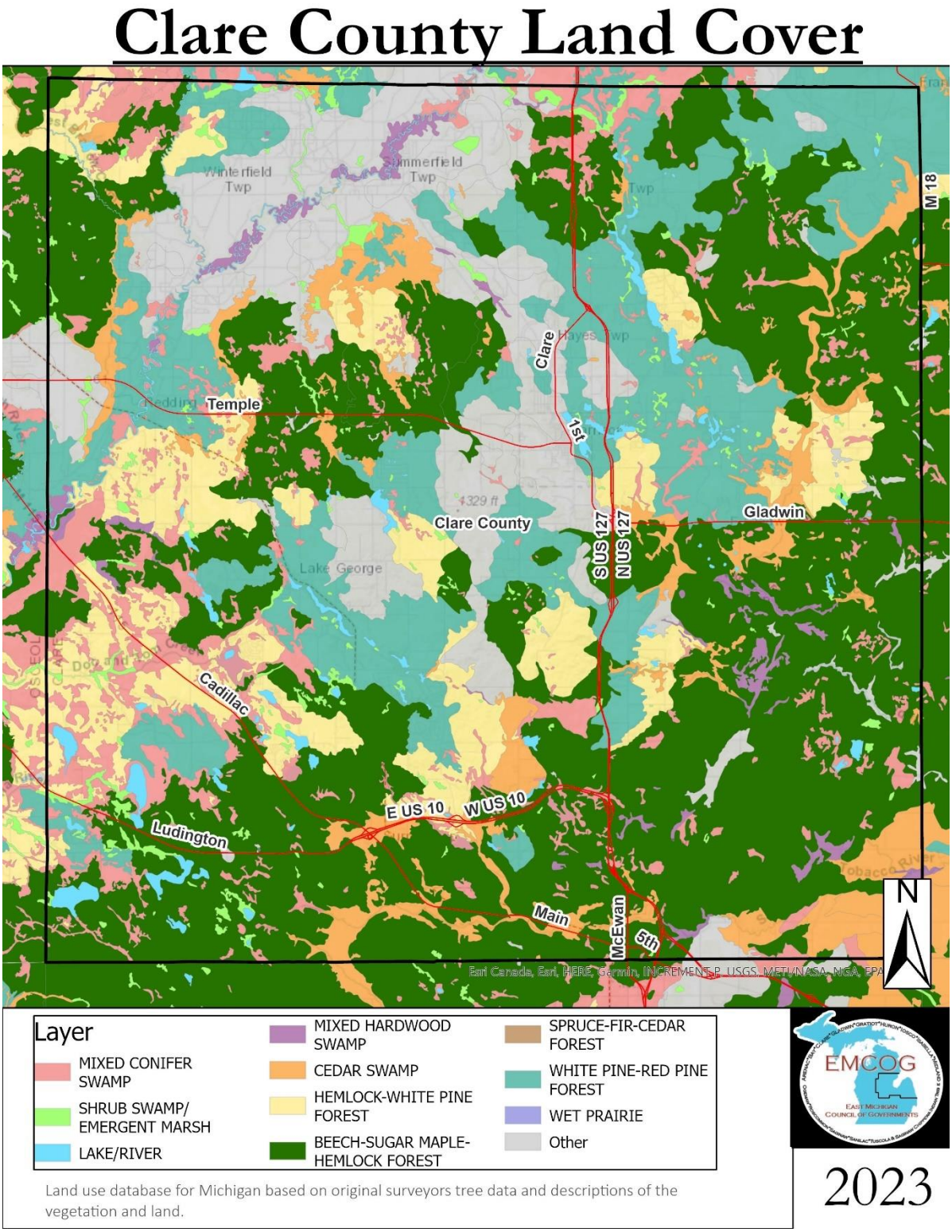
About 62 percent of the County is forested and, an analysis of forest types will assist in defining vulnerable areas and populations. The Michigan Resource Information System's (MIRIS) 1978 land use inventory compiled land cover maps that depict forest types in the county (Map 3.7). Tree species vary depending upon the soils, moisture and past activities such as logging, fires and land clearing. Aspen-Birch, central hardwoods, and pine are the most common forest types. Under dry spring conditions forest fires can occur in any forests type; however, some forest types have higher risks. Jack and red pine forests have a high risk for wildfires. Oak and white pine forests have a moderate risk for wildfires. According to the MIRIS Land Cover/Use Inventory, jack pine and red pine forest types cover approximately 12 percent of the forestland. Draughty, low fertility sandy soils, found in outwash plains and channels, supported pre-settlement pine forests that for thousands of years were perpetuated by wildfires. Today, residential development has occurred within the same wildfire prone areas. There is a concentration of pine forest types in Redding, Winterfield, Summerfield, Hayes, Frost, and Franklin Townships.

Red jack and white pine forest types are included in the pine forest category. Bigtooth aspen, quaking aspen, white birch, red maple, and northern red oak are the primary tree species found in the aspen birch type. Red oak, white oak, black oak, and northern pine oak are the primary species growing in the oak forests. Northern hardwoods include species such as sugar maple, red maple, American beech, basswood and yellow birch.

Poorly drained, lowland areas support northern white cedar, tamarack, balsam fir, black spruce, eastern hemlock, white pine, balsam poplar, trembling aspen, paper birch, black ash, speckled alder and shrub willows. Northern white cedar dominates the wetland areas where there is good lateral water movement and the soils are high in organic content. Lowland forests are typically located adjacent to water features and function as riparian forests and water quality buffers. The network of lowland forests, associated with rivers and creeks, also function as wildlife corridors and are the backbone of large regional ecological corridors. Lowland forests adjacent to the Great Lakes are prone to flooding during periods of high lake levels. Lowland forests adjacent to rivers and streams are prone to flooding during the spring snow melt, particularly when combined with heavy spring rains. Extensive areas of lowland forests can be found along the Muskegon River, Winterfield, Summerfield, Redding, Freeman, Hamilton, Garfield, and Surrey Townships.

Clare County Land Cover

MAP 3.7



Source: Michigan Department of Natural Resources

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.

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.

Clare County Office of Emergency Management Adjacent to (CLARE County Sheriff's Office)

255 West Main Street
Harrison, MI 48625
989-539-6161
FAX: 989-539-6389

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 purpose of Emergency Management is to plan and prepare for high impact, low probability events. The Clare County Emergency management office assesses local capabilities to respond to emergency and disaster situations, and advocate 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 Environment, Great Lakes and Energy (EGLE), the Region 6 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.

Local Emergency Planning Committee (LEPC) – Local Planning Team (LPT)

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 exercising activities are implemented. Michigan has 89 designated LEPCs – one for each of the 83 counties and six 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.

Local Emergency Planning Committee - SARA Title III requires the establishment of LEPCs. There are 89 LEPCs in Michigan-one for each of the 83 counties, as well as LEPCs for the cities of Ann Arbor, Detroit, Grand Rapids, Livonia, Romulus, and Wayne. The LEPCs' primary responsibility is to develop emergency response plans and review them at least annually thereafter. In developing these plans, the LEPC evaluates available resources for preparing for and responding to a potential chemical accident. The facilities for which these plans must be written are those that have extremely hazardous substances on site in amounts above certain thresholds.

An LEPC can be a vital tool for a community in developing other plans. Local EMCs should consult with the LEPC for assistance in other planning activities. **Local Planning Teams** may be used in the development process of local emergency plans because of their representation of multiple disciplines in the jurisdiction.

Note: Many of the programs and initiatives designed to mitigate, prepare for, respond to, and recover from fixed- site hazardous material incidents have the dual purpose of also protecting against hazardous material transportation incidents.

Government Offices and Facilities (Main Office Locations) County

Clare County
225 W. Main St.
Harrison, MI 48625
Phone: (989) 539-2510
Website: www.clareco.net

Cities

City of Clare
202 West Fifth Street
Clare, MI 48617-1490
Phone: (989) 386-7541
Website: www.cityofclare.org

City of Harrison
2105 Sullivan Drive
Harrison, MI 48625
Phone: (989) 539-7145
Website: cityofHarrison-mi.gov

Village

Village of Farwell
109-1/2 Hall
P.O. Box 374
Farwell, MI 48622
Phone: (989) 588-9926
Website: www.villageoffarwell.net

Townships

Arthur Township
3031 S. Athey Ave.
Clare, MI 48617
Phone: (989) 386-5305
Website: www.arthurtownshipmi.com

Franklin Township
9809 N. M18
Gladwin, MI 48624
Phone: (989) 246-0692
Website: www.franklin-twp.com

Freeman Township
7280 Mannsiding Rd.
Lake, MI 48632
Phone: (989) 588-2752
Website: www.freemantwp.com

Frost Township
7255 N. Clare Ave.
Harrison, MI 48625
Phone: (989) 539-3804
Website: www.frosttownship.com

Garfield Township
9348 Terry St.
P. O. Box 390
Lake, MI 48632
Phone: (989) 544-2445
Website: www.garfieldtownship.net
Email: info@garfieldtownship.net

Grant Township
3022 Surrey Rd.
Clare, MI 48617
Phone: (989) 386-4209
Website: www.grant-township.org

Greenwood Township
3447 W. Temple Drive
Harrison, MI 48625
Phone: (989) 539-6991
Website: www.greenwood.township.org

Hamilton Township
3042 N. Rodgers Road
Harrison, MI 48625
Phone: (989) 539-7943
Website: www.hamiltontwp.us

Hatton Township
3988 E Ashard Road
Harrison, MI 48625
Phone: (989) 386-8123
Website: www.hattontownship.com

Hayes Township
2055 E. Townline Lake Road
P.O. Box 310
Harrison, MI 48625
Phone: (989) 539-7128
Website: www.hayestownship.com

Lincoln Township
175 Lake George Avenue
Lake George, MI 48633
Phone: (989) 588-9841
Website: www.lincolntwp.com

Redding Township
101 S Main Street
Temple, MI 48625
Phone: (231) 743-6170
Website: www.reddingtownship.net

Sheridan Township
8987 E. Surrey Road
Clare, MI 48617
Phone: (989) 386-7648
Website: www.sheridantwpclareco.com

Summerfield Township
9971 N. Finley Lake
Harrison, MI 48632
Phone: (989) 539-2501
Website: www.summerfieldtwo.org

Surrey Township
101 E. Michigan
Farwell, MI 48622
Phone: (989) 588-6691
Website: www.surreytownship.com

Winterfield Township
8987 Cook Ave.
Marion, MI 48665
Phone: (231) 743-6888
Website: www.winterfieldtownship.org

Participating Municipal Resources

Below 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 (*).

Clare County Participating Municipality's Resources

TABLE 3.5

Municipality	Resources Available												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Clare County			Y	Y		Y	Y				*	Y	Y
City of Clare	Y	Y	*	Y	Y	Y	Y	Y		y	*	Y	*
City of Harrison		y	*	y	y		y	*		y			*
Arthur Township	Y		*	Y	Y		Y						*
Franklin Township			*	Y	Y	Y	Y	*		*	*		*
Frost Township	Y		*	Y	Y	Y	Y		Y		*	Y	*
Greenwood Township			*			*				*	*		*
Hamilton Township	Y		*	Y	Y	Y	Y						*
Hayes Township			*	y	y	*	y			*	*		*
Sheridan Township	Y		*	Y		Y	Y			*	*		*
Summerfield Township			*		Y					y	*		*
Winterfield Township			*	Y	Y	Y	Y	*		y	*	Y	*

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

Police

Clare County has one police department within the County outside the Sheriff's Department. The Clare County Sheriff Department is located in the City of Harrison and the City of Clare has a fulltime police department. In addition, the County is served by the Michigan State Police Post from Mt. Pleasant, and the Great Lakes Central Railroad Police Department.

Clare County Sheriff's Department
255 W Main St
Harrison, MI 48625
Phone: (989) 539-7166

City of Clare Police Department
206 W Fifth St
Clare, MI 48617
Phone: (989) 386-2121

Michigan State Police-Mt. Pleasant Post 63
Police Department 3580 S Isabella Rd
Mt. Pleasant, MI 48858
Phone: (989) 773-5951
Email: mtlivermore@glcrailroad.com

Great Lakes Central Railroad
600 Oakwood Ave.
Owosso, MI 48867
Phone (989) 725-6644 Ext. 6180

Fire

There are five (5) fire departments located in Clare County, with Marion Fire Department from Osceola County serving Winterfield Township as well. The five departments are located in the City of Harrison, serving nine (9) townships, the City of Clare, serving two townships, Lincoln Township serving two townships, Surrey Township serving townships in Clare and Isabella Counties, and Garfield Township. There is a County-wide Mutual Aid Agreement between all of the fire departments.

Clare Fire Department
207 W Fifth St
Clare, MI 48617
Phone: (989) 386-2151

Harrison Community Fire Department
2115 Sullivan Drive
Harrison, MI 48625
Phone: (989) 539-3617

Garfield Township Fire Rescue
9460 Terry St
Lake, MI 48632
Phone: (989) 544-2711

Lincoln Township Fire Department
310 Bringold
Lake George, MI 48633
Phone: (989) 588-9402

Surrey Township Fire Rescue
185 N Superior
Farwell, MI 48622
Phone: (989) 588-9571

Marion Fire Rescue
116 East Main St
Marion, MI 49665
Phone: (231) 743-6801

Public Works

There are three (3) city/village departments of public works. 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.

Clare County Public Works Departments

City of Clare Department of Public Works
Works 202 W. Fifth Street
Clare, MI 48617
Phone: (989) 386-7541

City of Harrison Department of Public
2105 Sullivan Drive
Harrison, MI 48625
Phone: (989) 539-7145

Village of Farwell Department of Public Works
109 S. Hall Street
Farwell, MI 48622
Phone: (989) 588-9926

Clare County Sheriff's Office 255 West Main Street Harrison, MI 48625
Phone: (989) 539-7166
The Sheriff's Office provides law enforcement and services to protect the lives and property of Clare 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.

Clare County Drain Commissioner
P.O. Box 564,
Harrison, MI 48625
Phone: (989) 539-7320
The mission of this office is to provide for the health, safety and welfare of Clare County citizens, the protection of surface waters and the environment, and to promote the long-term environmental sustainability of Clare County by providing storm water management, flood control, soil erosion control and education. The office is particularly relevant for hydrological hazards.

Clare County Road Commission 3900 East Mannsiding Road Harrison, MI 48625
Phone: (989) 539-2151
The Clare County Road Commission uses their expertise, energy, and funds to provide the safest and most convenient road system possible, and contributes to economic development and the high quality of life throughout the County. Their goal is to maintain a county road system that is safe and convenient for public travel and to manage the roadside environment, with a view toward preservation. (Currently under contract with MDOT to plow US-127, M-61, M-115, and US-10).

Central Michigan District Health
815 North Clare Ave, Harrison, MI 48625
Phone: (989) 539-6731
Website: www.cmdhd.org
The mission of the Central Michigan District Health Department (CMDHD) 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 – CLARE Office
225 West Main, P.O. Box 439
Harrison, MI 48625
Phone: (989) 539-7805
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.

Department of Community Development
212 Broad Street
P.O. Box 438
Harrison, MI 48625
Phone: (989) 539-2761
The Clare County Department of Community Development is responsible for the administration of the housing program benefiting low- and moderate-income families, for administering the State of Michigan Construction codes via inspections and permits, and for information on who needs Flood insurance along with the criteria for requiring flood plain building inspections.

Ambulance
Mobile Medical Response (MMR) is based out of Saginaw, Michigan. They currently have stations located in Clare and Harrison with ambulances. Using a "System Status", units are shifted to where they are needed on a continual basis. These units are Advanced Life Support/Paramedic staffed. They do have other units available if needed, including disaster services.

MMR/Mobile Medical Response
8746 S. Clare Ave.
Clare, MI 48617
Phone: (989) 386-0911 or 1-800-232-5216

Health Care
Clare County has one hospital, MyMichigan Medical Center Clare, which provides a range of services that include hospital care, outpatient care, urgent care, home care, nursing home care, and wellness. There is also an urgent care center, a county health department in Harrison, and a community mental health department, also located in Harrison.

MyMichigan Medical Center-Clare Department
703 N. McEwan Street
Clare, MI 48617
Phone: (989) 802-5000
Website: www.midmichigan.org.

Central Michigan District Health 104 W
815 North Clark Ave, Suite A
Harrison, MI 48625
Phone: (989) 802-5000

MyMichigan Urgent Care
602 Beech Street
Clare, MI 48617
Phone: (989) 386-9911

Community Mental Health Department
789 N. Clare Ave.
Harrison, MI 48625
Phone: (989) 539-2141

Local Emergency Capability

Procedures in the Emergency Operations Plans address the of problems associated with hazards, including specific functions such as rescue and evacuation. Communities work closely with company officials 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

Clare County has a system of fourteen (14) active Emergency Alert Sirens controlled by the counties dispatch system. These sirens are located in the following communities: City of Clare, City of Harrison (2), Lake George, Freeman Township, Garfield Township, Grant Township, Greenwood Township, Hamilton Township, Lincoln Township, Redding Township, Summerfield Township (2), and Surrey Township.

Schools

There are three (3) primary public school districts in Clare County. In addition, the County is also served by five school districts from outside the County. Clare County has one community college, Mid-Michigan College. The College offers two year associate degree programs on a wide variety of academic courses, technical programs. In addition to the public schools, there are several private elementary schools and the Amish community operates four one-room schools for grades first through eighth.

Clare Public Schools
201 E. State Street
Clare, MI 48617
Phone: (989) 386-9945
Website: www.clare.k12.mi.us

Farwell Area Schools
399 E. Michigan St
Farwell, MI 48622
Phone: (989) 588-9917
Website: www.farwellschools.net

Harrison Community Schools
County)
224 W Main St
PO Box 529
Harrison, MI 48625
Phone: (989) 539-7871
www.beavertonruralschools.com

Beaverton Rural Schools (Gladwin

468 S Ross St
Beaverton, MI 48612
Phone: (989) 246-3000
Website:
Website: www.harridonschools.com

Evart Public Schools (Osceola County)
County) 321 N. Hemlock
Evart, MI 49631
Phone: (231) 734-5594
Website: www.evartps.org

Gladwin Community Schools (Gladwin
401 N. Bowery
Gladwin, MI 48624
Phone: (989) 426-9255
Website: www.gladwinschools.net

Marion Public Schools (Osceola County)
(Missaukee 510 W. Main St.
Marion, MI 49665
Phone: (231) 734-2836

McBain Rural Agricultural Schools
County)
107 E. Maple St.
McBain, MI 49657

Website: www.marion.k12.mi.us

Website: www.mcbain.org

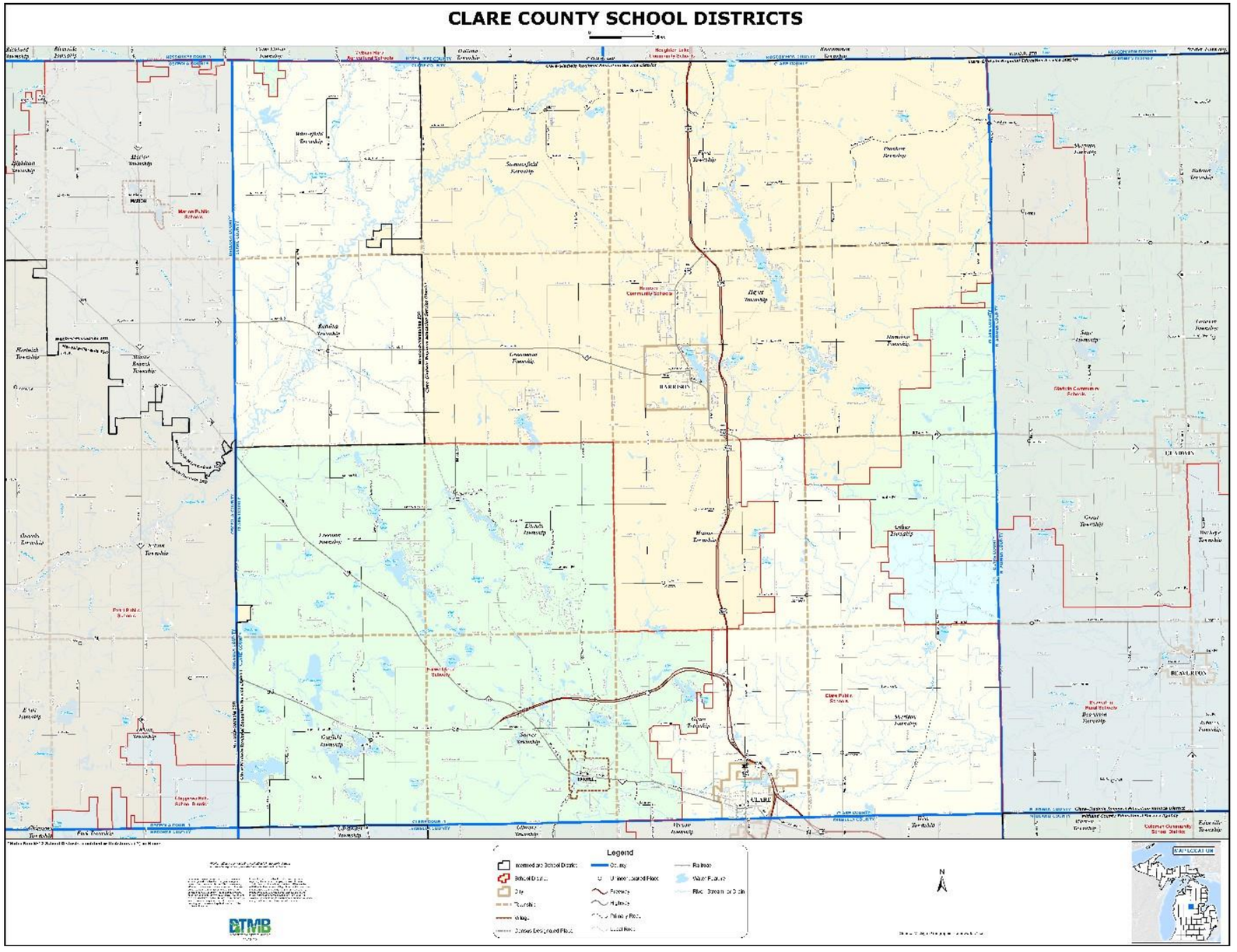
Clare County School Districts

TABLE 3.6

School District (address)	Number of Students (2021-2022)	School District (address)	Number of Students (2021-2022)
Clare Public Schools 201 E. State Street Clare, MI 48617 Phone: (989) 386-9945 Website: www.clarek.12.mi.us	1566	Farwell Area Schools 399 E. Michigan St Farwell, MI 48622 Phone: (989) 588-9917 Website: www.farwellschools.net	990
Harrison Community Schools 224 W Main St PO Box 529 Harrison, MI 48625 Phone: (989) 539-7871 Website: www.harrisonschools.com	1233	Beaverton Rural Schools (Gladwin County) 468 S Ross St Beaverton, MI 48612 Phone: (989) 246-3000 Website: www.beavertonschools.com	932
Gladwin Community Schools (Gladwin County) 401 N. Bowery Gladwin, MI 48624 Phone: (989) 426-9255	1,616	Marion Public Schools (Osceola County) 510 W Main St Marion, MI 49665 Phone: (231) 776-2836	422
Evart Public Schools (Osceola County) 321 N. Hemlock Evart, MI 49631 Phone: (231) 734-5594 Website: www.evartps.org	881	McBain Rural Agricultural Schools/ (Missaukee County) 107 E. Maple St. McBain, MI 49657 Website: www.mcbain.org	1,029

Clare County School District Map

MAP 3.8



Utilities

Information on the utilities provided to communities within the County is 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.).

Water

There are three Public Works agencies in Clare County. They are located in the City of Harrison, the City of Clare, and the Village of Farwell. The water supply for the City of Harrison consists of three wells via a water tower. The City of Clare also has three wells and the Village of Farwell has two.

Telephone Service

Landline/SBC Ameritech Corporation

Electricity

Consumers Power Company/Tri-County (Southwest Corner of Clare County)/Wolverine Electric Co-op (northwest corner of Clare County/Winterfield Township).

Natural Gas

Michigan Consolidated Gas/ DTE Energy

Transportation Roads

Clare County is served by an extensive highway system. The US-127 expressway provides North and South access through the County and the US-10 expressway provides East and West access in the southern portion of the County. Both are major linkages for goods and services from Southern Michigan to Northern Michigan.

Two state highways serve the county. M-115 provides Northwest/Southeast access through the County and is a major route for tourist to Northwest Michigan and Traverse City. M-61 provides East and West access and divides the County nearly in half.

The Clare County Road Commission office is located in Hatton Township. The County has 390 total miles of roads that are Federal Aid eligible. Clare County Transit Corporation (CCTC) provides county-wide busing.

Clare County Road Commission
3900 E. Mannsiding Road
Harrison, MI 48625
Phone: (989) 539-2151

Michigan Department of Transportation
Bay City Transportation Service Center
2590 E. Wilder Rd.
Bay City, MI 48706

Railroads

Clare County has one active rail line running through it. It is the Great Lakes Central Railroad (GLC), which runs from Ann Arbor to Traverse City and Petoskey. The portion from Owosso north is state-owned and operated under contract by Great Lakes Central Railroad.

Shipping Ports
The nearest shipping port is located in Bay City on Lake Huron, with Ludington being the closest port on Lake Michigan.

Airports
Clare County has two public airports. Clare Municipal Airport, which is located in the City of Clare, and the Clare County Airport, which is located in Hayes Township. The closest commercial airport for residents of Clare County would be the MBS (Tri-City) International Airport located in Freeland, Michigan.

Clare Municipal Airport
Gary Todd, Manager
10725 South Eberhart
Clare, MI 48617
Phone: (989) 386-0445/ (989) 429-1874

Clare County Airport
Gale Bensigner, Manager
4527 North Clare Ave.
Harrison, MI 48625
Phone: (989) 205-4142

Public Transportation
Greyhound – There is a greyhound bus route that has a local stop in the City of Clare.

American Tour Club – The American Tour Club offers private tours throughout the state. It is located in Arthur Township. They have three (3) buses.

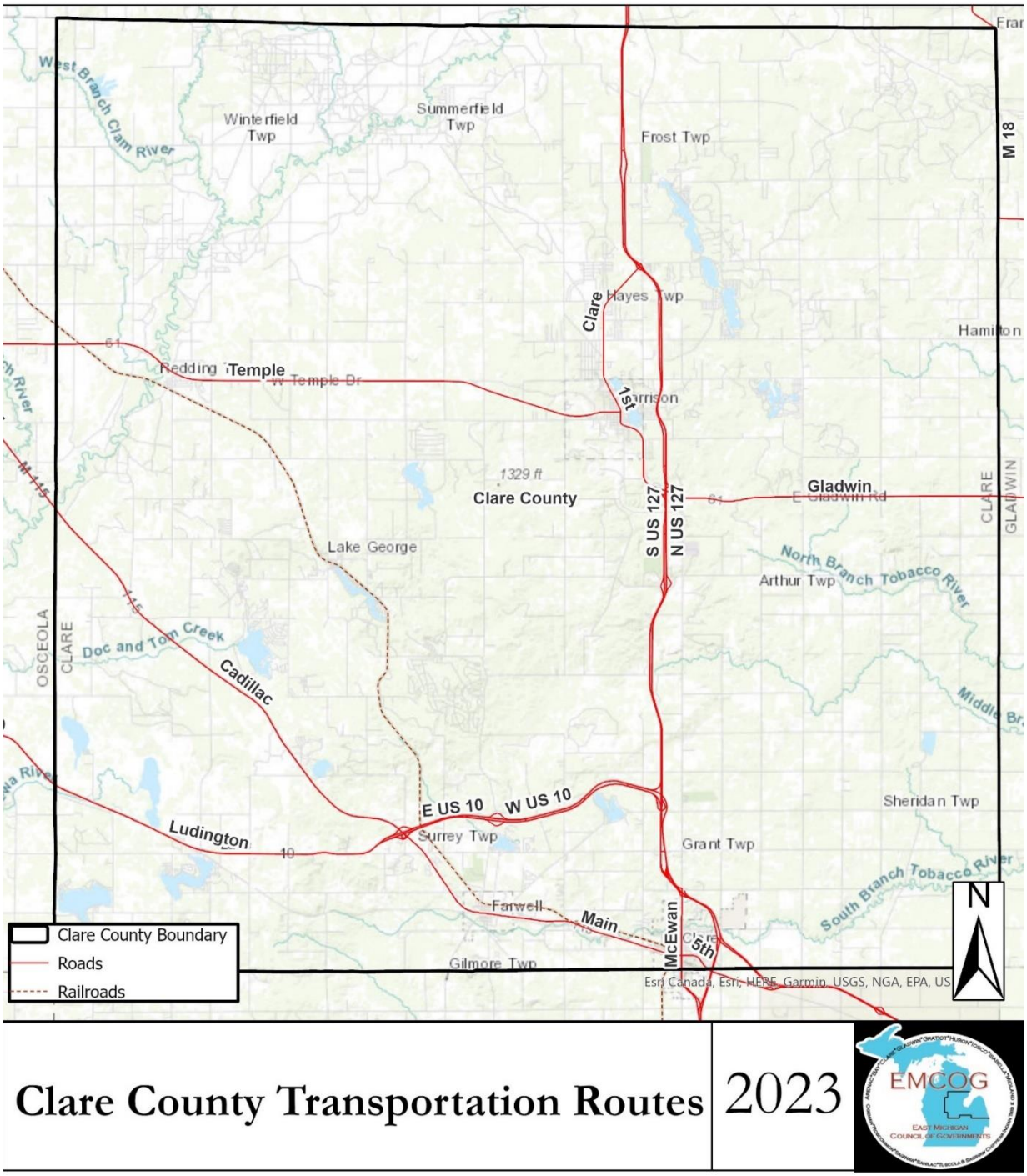
Clare County Transit - Clare County Transit is a government subsidized service. Clare County Transit operates with thirty-three (33) vehicles on a demand-response basis. Of the 33 vehicles, thirteen are handicap accessible. In 2022 two (2) Electric EV Busses were purchased. This service travels on all Clare County roads. The Isabella Transportation Authority covers just into the City of Clare within the Isabella County section. Clare County Transit has a Memorandum of Understanding (MOU) with Clare County Emergency Management as the primary emergency transportation system.

School Buses – The Clare School District and the Farwell School District own and operate their own Transportation (Bus) System for student transport. The Harrison School System contracts with (First Student Corporation) and the Clare Gladwin RESD Contracts with (Dean Transportation Corporation).

Clare County Transit Corporation (CCTC) 1473 Transportation Drive,
Harrison, MI 48625
Phone: (989) 539-1473 or (989) 539-1474
Website: www.clarecountytransit.org
The purpose of the Clare County Transit Corporation (CCTC) is to plan, promote, finance, acquire, improve, enlarge, extend, own, construct, operate, maintain, replace, and contract for public transportation service by means of one or more public transportation systems and public transportation facilities within the jurisdictional boundaries of the County of Clare. They may have resources useful for the transportation or evacuation of residents during emergency situations. Clare County Transit has an MOU with Clare County Emergency Management as the primary emergency transportation system.

Clare County Transportation Map

MAP 3.9



AUTHORITIES, CENTERS, PROGRAMS, ETC. 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.

Metropolitan Medical Response System

One of the key features of the federal response element is the formation of highly skilled and mobile Metropolitan Medical Response Systems (MMRS) to provide medical care in incidents involving nuclear, chemical or biological terrorism. The nearest MMRS facility is in Grand Rapids. In case of an incident that may involve nuclear, chemical or biological weapons, this MMRS would be mobilized to provide initial, on-site response, in addition to providing for patient transportation to hospital emergency rooms. The MMRS are self-contained and capable of providing both medical and mental health care to victims. Should local health care resources be overrun, they will assist in preparing to move victims to other regions. The U.S. Department of Health and Human Services (HHS) coordinates the MMRS program. The West Michigan Metropolitan Medical Response System in Grand Rapids has a goal of coordinating the efforts of local law enforcement, fire, HAZMAT, EMS, hospital, public health, and other personnel to improve response capabilities in case of a terrorist attack.

Region 6 Healthcare Coalition

The Region 6 Healthcare Coalition was established in 2001 through the MDHHS Bureau of EMS, Trauma and Preparedness. The HP program is designed to work with local partners within the region to prepare hospitals, emergency medical services, and supporting healthcare organizations to deliver coordinated and effective care to victims of terrorism and other public health/ healthcare emergencies. **www.miregion6.org**

51st Weapons of Mass Destruction (WMD)/Civil Support Team

The Michigan National Guard, 51st Weapons of Mass Destruction (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 WMD or suspected WMD 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 is 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 6 Homeland Security Governing/Planning 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 seven Homeland Security Regions. The West Michigan Shoreline Regional Development Commission is the designated fiduciary and is responsible for management and administration of the Region 6 Homeland Security Program. The Region 6 Homeland Security Planning Board consists of voting representation from the thirteen West-Central counties of Clare, Ionia, Isabella, Kent, Lake, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Oceana, Osceola, and Ottawa as well as the City of Grand Rapids (large city), Saginaw Chippewa Tribe, and Public Health and Bio-Terrorism. Non-voting representation includes membership from Citizen Corps, the State of Michigan MSP District 6, and the Region 6 Fiduciary West Michigan Regional Medical Consortium (WMRMC).

The Region 6 Board works to achieve the following goals through its four committees with funds from the Department of Homeland Security through the State Homeland Security Program and the Law Enforcement Terrorism Prevention Program.

Overarching Goals

- Maximize effectiveness and achieve collaboration in planning, training, equipment purchase, and exercises.
- Effectively manage and administer State and Federal funds, guidelines, and resources.
- Promote communications and information sharing in the Region.
- Achieve collaboration in professional and volunteer response and recovery.

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 allows 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 and 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 program 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 February 2014

The bill amended the Fire Prevention Code to modify school drill requirements. The bill 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 was 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. By September 15, the chief administrator of a K-12 school will have to give a list of scheduled drill days to the county emergency management coordinator, who will 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 will 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 will have to adopt and implement a cardiac emergency response plan for the school. The plan will 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. Clare County is covered by Grand Rapids NOAA

Weather Office and Doppler Radar located adjacent to the Gerald R. Ford International Airport in Grand Rapids, MI.

National Weather Service Watches/Warnings

The National Weather Service 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. The 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), and 800 MHZ Michigan Public Safety Communications System (MPSCS) Direct Radio to NOAA Office Grant Rapids and the Emergency Management Direct Group Talk Group (EMMDG TG). Public warning is provided through the Emergency Alert System (EAS), (IPAWS) Integrated Public Alert Warning System. The National Weather Service stations in Michigan transmit information directly to radio and television stations, which in turn pass the warning on to the public. The National Weather Service also provides detailed warning information on the Internet through the Interactive Weather Information Network (IWIN).

National Weather Service Education

The National Weather Service 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 National Weather Service 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 National Weather Service 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 National Weather Service 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.

The 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, Wireless Emergency Alerts (WEA), and Commercial Mobile Alert System (CMAS) using wireless towers. The National Weather Service stations in Michigan transmit information directly to radio and television stations, which in turn pass the warning on to the public. The National Weather Service also provides detailed warning information on the Internet, through the Interactive Weather Information Network (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 as hazardous chemical transportation emergencies. 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, WEA, and RAVE alerts directly to mobile phones and wireless devices to supplement or supplant outdoor warning siren systems. Some rural areas of Clare County are still in poor NOAA radio reception areas and limited cellular network coverage, these areas are encouraged to supplant with monitoring of local TV and Radio Broadcasts.

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. Clare County can reduce its vulnerability to wildfires by: 1) participating in multi-state and interagency mitigation efforts. Clare County has a (Designated Zone 4) Wildfire potential area designated by the MDNR and both State and Local Agencies have specific plans in place addressing this zone which is located in the North West section of Clare County.

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 following communities within Clare County are recognized by FEMA as participants in the National Flood Insurance Program: the cities of Clare and Harrison, the Village of Farwell, the townships of Franklin, Freeman, Garfield, Greenwood, Hayes, Redding, Summerfield, and Surrey are currently signed into the NFIP program within Clare County. These communities have all had their floodplain areas officially mapped and are in compliance with the NFIP. There are five (5) townships that do not have a floodplain. Lastly, there are three (3) townships in the County, that are not signed into NFIP. They are Grant, Lincoln, and Winterfield Townships. Both Winterfield and Grant Townships have stated that they have chosen not to participate due to ongoing reporting costs and limited development located within floodplains.

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 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 the 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. 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 EGLE for any dredging, filling, draining or alteration of a wetland. This permitting process helps preserve, manages, 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 the 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. The Department of Environmental Quality regularly provides floodplain information to public and private interests as part of its Floodplain Service Program under the Land and Water Management 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, the EGLE will provide information on land and water “interface” permit requirements and on building requirements relating to construction in flood hazard areas.

Dam Failures

Both EGLE and the Federal Energy Regulatory Commission (FERC) classify and regulate dams in Michigan. Under state and federal legislation, certain dam owners are required to develop a survey of the downriver area, develop flood-prone area maps and develop emergency action plans (EAPs). Furthermore, the FERC requires the owners of such dams to exercise these plans; EGLE has initiated an effort to encourage owners of state-regulated dams to voluntarily perform exercises of their EAPs. In Michigan, well over 100 dams are covered by Emergency Action Plans. Dams in Michigan are regulated by Part 315 of The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Part 315, Dam Safety provides for the inspection of dams. This statute requires the EGLE to rate each dam as either "high," "significant," or "low" hazard potential, according to the potential downstream impact if the dam were to fail (not according to the physical condition of the dam). EGLE has identified and rated over 2,400 dams. Dams over 6 feet in height that create an impoundment with a surface area of 5 acres or more are regulated by this statute. Dam owners are required to maintain an EAP for "high" and "significant" hazard potential dams. Owners are also required to coordinate with local emergency management officials to assure consistency with local emergency operations plans. Dams regulated by FERC, such as hydroelectric power dams, are generally exempt from this statute. The FERC licenses waterpower projects (including dams) that are developed by non-federal entities, including individuals, private firms, states, and municipalities. Under provisions of the Federal Power Act and federal regulations, the licensee of the project must prepare an EAP. This plan must include a description of actions to be taken by the licensee in case of an emergency. Inundation maps showing approximate expected inundation areas must also be prepared. Licensees must conduct a functional exercise at certain projects, in cooperation with local emergency

management officials. Clare County Emergency Management currently has three (3) Identified High Hazard Dams within the county and maintains copies of specific site plans for these sites in conjunction and cooperation with the dam owners and the State of Michigan. The three dams are: Lake 13 in Surrey Township, Shamrock Dam in the City of Clare, and Surrey Lake Dam in Surrey Township.

Shoreline Flooding and Erosion
Not Applicable to CLARE - No Great Lakes Boundaries.

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

Hazardous Materials
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 the Michigan Department of Environment, Great Lakes, and Energy (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 the Department of Environmental Quality. 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 Wells 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 Systems (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 53 in 1974 – 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 53) 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) EGLE, Geological Survey Division (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 3.7

Pipeline Type	Jurisdiction	Applicable Code	Inspected by
Inter-state natural gas	USDOT/OPS	49 CFR Part 192	MPSC Gas Safety Intrastate
Inter-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

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 – the latter three issues are addressed in other sections of this mitigation action item section of the mitigation plan.

Infrastructure Systems

Water/Electrical Infrastructure

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 Waste 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. A collaboration between Clare County EMD and International Transmission Company (ITC) Power Transmission Corporation continues and materials are updated annually and share with responders.

Electrical system

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, ITC Transmission Company among 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.

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 intercounty 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 (MDA) or an MDA Deputy Director.

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, including Clare 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, that 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 Community Health/Central Michigan Department of Public Health

The Director of the Department of Community Health, 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 plans 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 flu cases were indeed of the correct type.

Michigan Pandemic Influenza Plan

In October 2009, and again in 2020 following the COVID-19 Pandemic, 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.

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 Clare County Hazard Mitigation Advisory Committee (CCHMAC) ranked the hazards based on the frequency, potential to cause casualties, capacity to cause damage, and potential to cause a negative financial impact. These factors were used as the hazards impact communities in one of three ways, causing injury, causing damage, causing financial distress, with all factors impacted by frequency. This ranking resulted in the overall prioritization of the hazards impacting Clare County. Below is the table that was utilized in developing this prioritization.

The four criteria for prioritization were frequency (likelihood to occur), potential to cause casualties, capacity to cause damage, and potential to cause a negative financial impact. All factors were given a high, medium, or low rating. Frequency highs were occurrence happening every 4-5 years or more often, mediums were every 6-25 years, and low consisted of events occurring once every 25 years or longer. Potential to cause casualties rankings were high ratings were deaths, medium ratings were death/injuries, and low ratings were limited to injuries. Capacity to cause damages ratings were as follows: high ratings were extensive damage, medium ratings were moderated damage, and low rating were either no or low damages. Potential to cause negative financial impacts were as follows: high ratings would impact more than 66 percent of the county's population, a medium rating impacted 33-66 percent of the population, and a low rating impacted less than 33 percent of the population.

Hazard Prioritization

TABLE 4.1

Event	Frequency (Likelihood to Occur)	Potential to Cause Casualties	Capacity to Cause Damage	Potential to Cause a Negative Financial Impact	Overall Priority
Invasive Species	High	Low	Medium	High	High
Public Health Emergencies	High	High	Low	Medium	High
Tornadoes/Severe Winds	High	Medium	High	High	High
Severe Weather[1]	High	Medium	High	High	High
Drought	High	Low	high	High	Medium
Extreme Temperatures[2]	High	Medium	Medium	Medium	Medium
Hazardous Material Incidents[3]	High	Low	Medium	Low	Medium
Dam Failures	Low	Medium	High	High	Medium
Energy Emergencies	High	Low	Medium	Medium	Medium
Cyberterrorism	High	Low	Low	Medium	Medium
Civil Disturbances	Low	Medium	Medium	Medium	Medium
Infrastructure Failures	High	Low	Medium	Medium	Medium
Pipeline/Well Incidents[4]	High	Medium	High	Medium	Medium
Population Changes-Seasonal/Event[5]	High	Low	Low	Low	Medium
Riverine/Urban Flooding	High	Low	Medium	Medium	Medium
Structural Fires	High	High	High	Medium	Medium
Terrorism/Sabotage	Low	High	Medium	Medium	Medium
Wildfires	Medium	Medium	Medium	Medium	Medium
Fog	High	Low	Low	Low	Low
Transportation Accidents	High	Medium	Low	Low	Low
Celestial Impact Incidents	Low	Low	Low	Low	No Impact
Earthquakes	Low	Low	Low	Low	No Impact
Subsidence	Low	Low	Low	Low	No Impact

(1) Severe weather includes: Thunderstorms Hail, Lightning, Ice/Sleet Storms, and Snowstorms
(2) Extreme Temperatures include: Extreme Heat and Extreme Cold
(3) Hazard Materials Incidents include: Hazard Mitigation Fixed Site and Hazard Mitigation Transportation
(4) Pipeline/Well Incidents include petroleum and gas pipelines incidents, and natural gas well incidents
(5) Population Changes include: seasonal population changes and special events

HIGH PRIORITY HAZARDS

INVASIVE SPECIES

Invasive Species: a species that has been introduced by human action to a location where it did not previously occur naturally, becomes capable of establishing a breeding population in the new location without further intervention by humans, and becomes a pest by threatening local biodiversity and causing human health impacts, significant economic costs, and/or harmful ecological effects.

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 Clare County

The Clare County Conservation District Manager provided the following list of invasive species that have an adverse impact on the County: Beech Bark Disease, Emerald Ash Borer, Spongy Moth (formerly Gypsy Moth), Quagga Mussel, Zebra Mussel, Eurasian Watermilfoil, Phragmites, Japanese Stiltgrass, Garlic Mustard, Giant Hogweed, Autumn Olive, Common Buckthorn, Glossy Buckhorn, Japanese Knotweed, Black Swallow-wort, Oriental Bittersweet, and Pale Swallow-wort. The Clare County Hazard Mitigation Advisory Committee (CCHMAC) reviewed and approved the list.

Invasive Species Overview

The County continues to address several invasive species such as phragmites, emerald ash borer, and the Spongy Moth on a limited basis and will be seeking to rejuvenate the Spongy Moth program to help reduce their impact on the County. Due to the exorbitant costs to eliminate any single one 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.

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/pandemics; 2) large-scale incidents of food or water contamination; 3) extended periods without adequate water and 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 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.

An emerging public health threat would be the intentional release of a radiological, chemical, or biological agent 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.

Public Health Emergencies

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.

Occurrences of influenza and disease are common to residents, students, and visitors to the Clare County 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 within the 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.

In the 1980s, the state health department confirmed that 95 percent of Michigan's population had PBB in their bodies from eating beef, drinking milk, or consuming other products from contaminated farms. A cancer epidemic was feared. Although one has not occurred, so far anyway, studies do show the most exposed families have increased breast and digestive cancer, and lymphoma. Among the effects observed in the exposed populations the daughters of the most highly exposed women began menstruation, on average, before they reached their twelfth birthdays, which is slightly earlier on the average than most girls. “In the United States, the average age of menarche, the onset of menstruation is 12.8 years; most girls begin menstruating between the ages of 11 and 14, but the normal range extends from 9 to about 17 years.”

In 2001, Michigan health officials were introduced to the emerging health threats posed by foot-and-mouth disease and the West Nile encephalitis virus. Although foot-and-mouth disease is a highly contagious disease that only affects animals, a widespread outbreak such as that which occurred in parts

of the United Kingdom in the spring of 2001 could have significant public health implications for humans as well, due to the potentially large numbers of dead animal carcasses that would have to be disposed of to prevent disease outbreaks. The Michigan Department of Agriculture and Rural Development, in conjunction with numerous other federal, state, and local agencies and the agriculture industry, continues to monitor the foot-and-mouth disease situation and take the necessary steps to prevent the introduction and spread of the disease in the United States.

Public Health Emergency Events

In 2009/10 the H1N1 virus (swine flu) threatened the health of the residents throughout the US. While there were cases reported in Clare County, there were no deaths reported as a result of the virus.

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.

Public Health Emergency Overview

Michigan has had several large-scale public health emergencies in recent history, with only the COVID-19 pandemic causing widespread severe injury or death in the Clare County.

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 Enhanced 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 following page for scale.)

The Enhanced Fujita Scale of Tornado Intensity

TABLE 4.2

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

There have been four (4) reported tornado events reported in Clare County between 1997 and 2022. Of these events, three (3) events resulted in damages totaling $10,000 or more. The total reported damages were $310,000. There were no injuries or deaths reported during this time period. All of these tornadoes had either an F0 or EF0 rating. Table 4.3 on page 70 identifies the four tornadoes that were identified in

Clare County since 1997. Map 4.1 on page 71 also identifies the four tornadoes. There is also a brief statement on the two tornadoes that caused more than $50,000 in damages following the table.

Significant Tornado Events in Clare County

TABLE 4.3

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Clare	10/06/1998	F0	0	0	$200,000	$0
Brown's Corner	05/21/2001	F0	0	0	$10,000	$10,000
Dover	07/30/2008	EF-0	0	0	$0	$0
Dover	06/26/2021	EF-0	0	0	$100,000	$0

Source: National Centers for Environmental Information

On 10/06/1998 a tornado touched down near the City of Clare along with heavy rains resulting in flooding. Damages were estimated at $200,000.

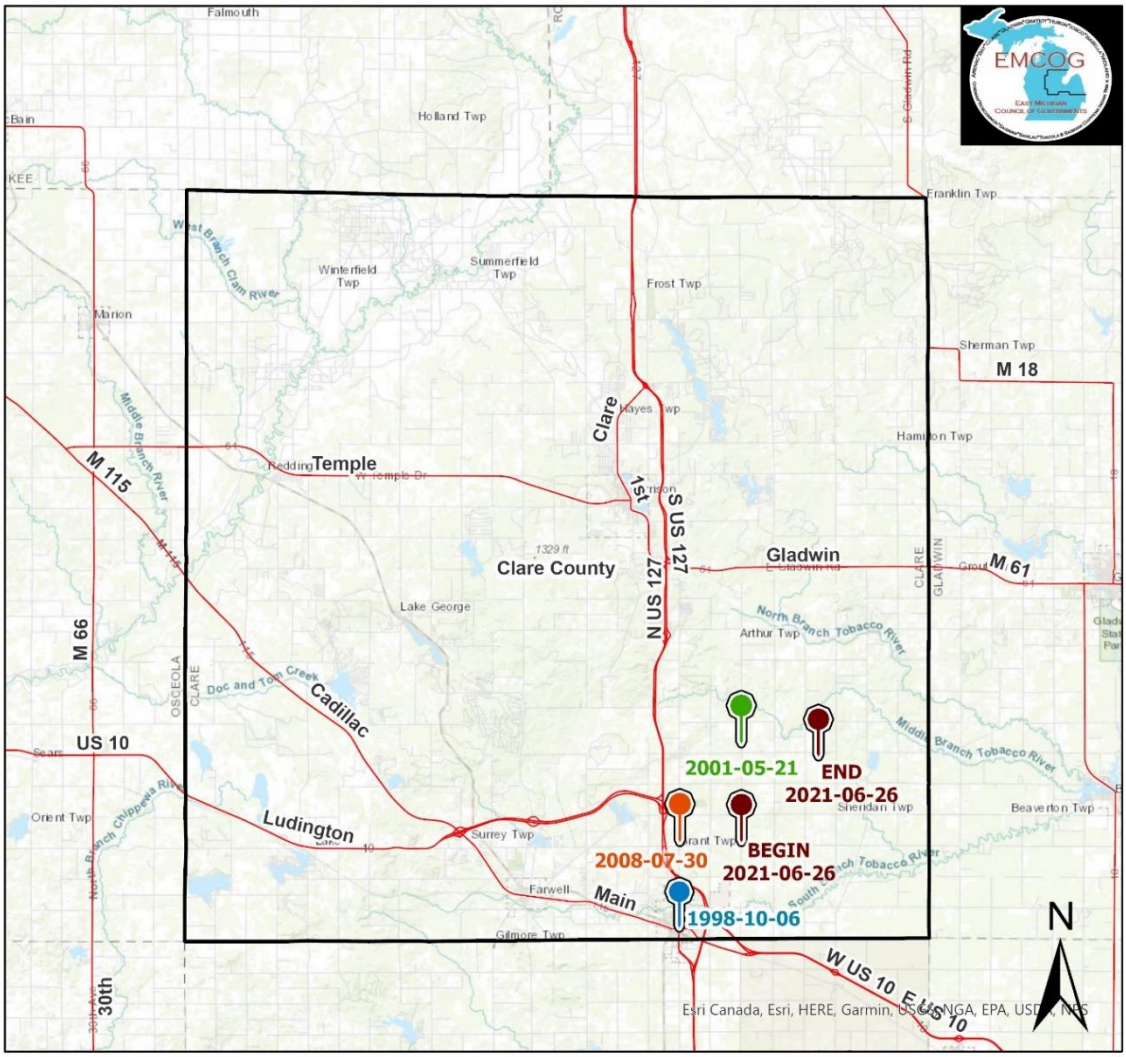
On 06/26/2021 an EF0 tornado touched down with a path length of approximately 100 yards. (This was one of several tornadoes that occurred that day, with two EF-1 tornadoes and several EF-0 tornadoes all being reported.) Damages on one property included one barn wall caving in, a garage-like structure being destroyed, and numerous tree limbs being snapped off. In addition, numerous trees were snapped or sheared, and a section of metal roof of a barn was torn off.

Tornadoes Overview

There was a total of four (4) reported tornadoes impacting Clare County from 1997 to 2022 or about one every 6+ years. The probability of a tornado event occurring would be approximately 16% 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, Clare County utilizes multiple warning systems to alert the residents, employees, and visitors in the County. All four tornado events were located in the southeast portion of Clare County, making the City of Clare, Village of Farwell, and Arthur, Grant, Hatton, and Sheridan Townships the most vulnerable to tornadoes.

Significant Tornado Events in Clare County 1997-2022

MAP 4.1



Clare County Tornado Events	2023
Length: 100 Miles Width: 50 Yards Begin Date: 1998-10-06 16:55 EST End Date: 1998-10-06 16:58 EST Property Damage: $200K EF-0 Tornado confirmed in Clare County and moved NE.	Length: 0.38 Miles Width: 50 Yards Begin Date: 2008-07-30 02:17 EST End Date: 2008-07-30 02:18 EST A weak and short-lived EF-0 tornado; Winds estimated 80mph. Tree damage and some roofs collapsed.
Length: 0.1 Miles Width: 30 Yards Begin Date: 2001-05-21 16:30 EST End Date: 2001-05-21 16:31 EST Property Damage: $10K F0 tornado briefly touched down/damage to a few trees.	Length: 3.72 Miles Width: 100 Yards Begin Date: 2021-06-26 16:09 EST End Date: 2021-06-26 16:16 EST Property Damage: $100K EF-0 Tornado due to a low pressure system and warm front produced several weak tornadoes. Tree damage/Roof damage.

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

According to the National Centers for Environmental Information (NCEI), there have been 52 non-tornado wind events on 40 days that have occurred on or impacting Clare County residents from 1997 to 2022. Of these 52 events, there was one event that an injury and one event that resulted in two deaths. Reported property and crop damages are estimated to be $5,958,600 per NCEI. Below are the significant events that have resulted in deaths, injuries, and/or property damages of $50,000 or more.

Significant Severe Wind Events in Clare County

TABLE 4.4

Location	Date	Windspeed Gusts	Deaths	Injuries	Property Damage	Crop Damage
Temple	05/31/1998	60 mph	0	0	$50,000	$0
Harrison	05/17/1998	70 mph	0	0	$50,000	$0
Leota	08/01/2002	70 mph	0	0	$50,000	$10,000
Countywide	10/30/2004	60 mph	0	0	$50,000	$0
Harrison	11/17/2013	60 mph	0	1	$75,000	$0
Countywide	03/08/2017	60 mph	2	0	$5,000,000	$0
Leota	08/28/2018	75 mph	0	0	$200,000	$0
Lake George	09/07/2021	70 mph	0	0	$50,000	$0

Source: National Centers for Environmental Information
mph-miles per hour

On 11/17/2013 there was widespread wind damage throughout the lower peninsula with storms and even several small scale, weak EF-0 tornadoes. Trees were downed causing power outages, with one person

being injured by a fallen tree. Part of US-10 was blocked by a fallen tree and a house was damaged by a fallen tree. Reported damages were estimated at $75,000.

On 03/08/2017 widespread winds were estimated to be between 40 and 70 mph throughout the region. Trees were downed, roofs lost shingles, and power was lost throughout the region.

On 08/28/2018 numerous trees were downed resulting in damages to buildings and vehicles. Leota was hit the hardest in the area. Damages were estimated to be $200,000 in Clare County and over $1,000,000 in Michigan.

Severe Winds Overview

There was a total of 52 non-tornado wind events from 1997 through 2022, which is slightly more than two (2) per year. The probability of an event occurring in future years is approximately 100 percent. Even though the average is slightly more than 2 events per year, there were several years when no events occurred and multiple years when three or more events occurred. Estimated damages have been moderate, with one exception being the event on 03/08/2017, when the estimated damages were $5,000,000. These events cover large areas of land and are not identified to a specific point. However, the more developed areas are more vulnerable to damages resulting from these events.

Damages from these events often result in down trees and/or power lines leading to loss of electricity in large areas. Two deaths and one injury were reported during this time period as a direct result of downed trees. Because of the damages resulting from the events and their frequency, severe winds was given a high priority to address.

SEVERE WEATHER

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.

Hail Events

According to the National Centers for Environmental Information (NCEI), 25 hail events occurred over 23 in Clare County from 1997 to 2022. Of these 25 events, only 11 events reported damages from the hail, with only three (3) events having property/crop damages in excess of $50,000. Damages totaled $715,000 in property damages, and $110,000 in crop damages. No injuries or deaths were reported from these events. Table 4.5 below identifies those events with damages in excess of $50,000. In addition to the table, Map 4.2 on page 75 also identifies the locations of the three events.

Significant Hail Events in Clare County

TABLE 4.5

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Leota	09/26/1998	1.75 to 3.00 in.	0	0	$300,000	$0
Leota	07/13/2003	1.75 in.	0	0	$40,000	$40,000
Lake	04/07/2020	1.75 in.	0	0	$250,000	$0

Source: National Centers for Environmental Information

On 09/26/1998 Hail measuring from 1.75 to 3.00 inch in diameter was reported near Leota in Summerfield Township. The hail resulted in damaged skylights in automobiles, with other structural and roof damage also reported. Damages were estimated to be approximately $300,000.

On 07/13/03 Hail measuring 1.75 inch in diameter was reported in Leota. Damages included structural damages and crop damages. Damages were estimated to be approximately $40,000 in property damages and $40,000 in crop damages.

On 04/07/2020 Hail measuring 1.75 inch in diameter hail was reported near Lake in Surrey Township. Damages were estimated to be approximately $250,000.

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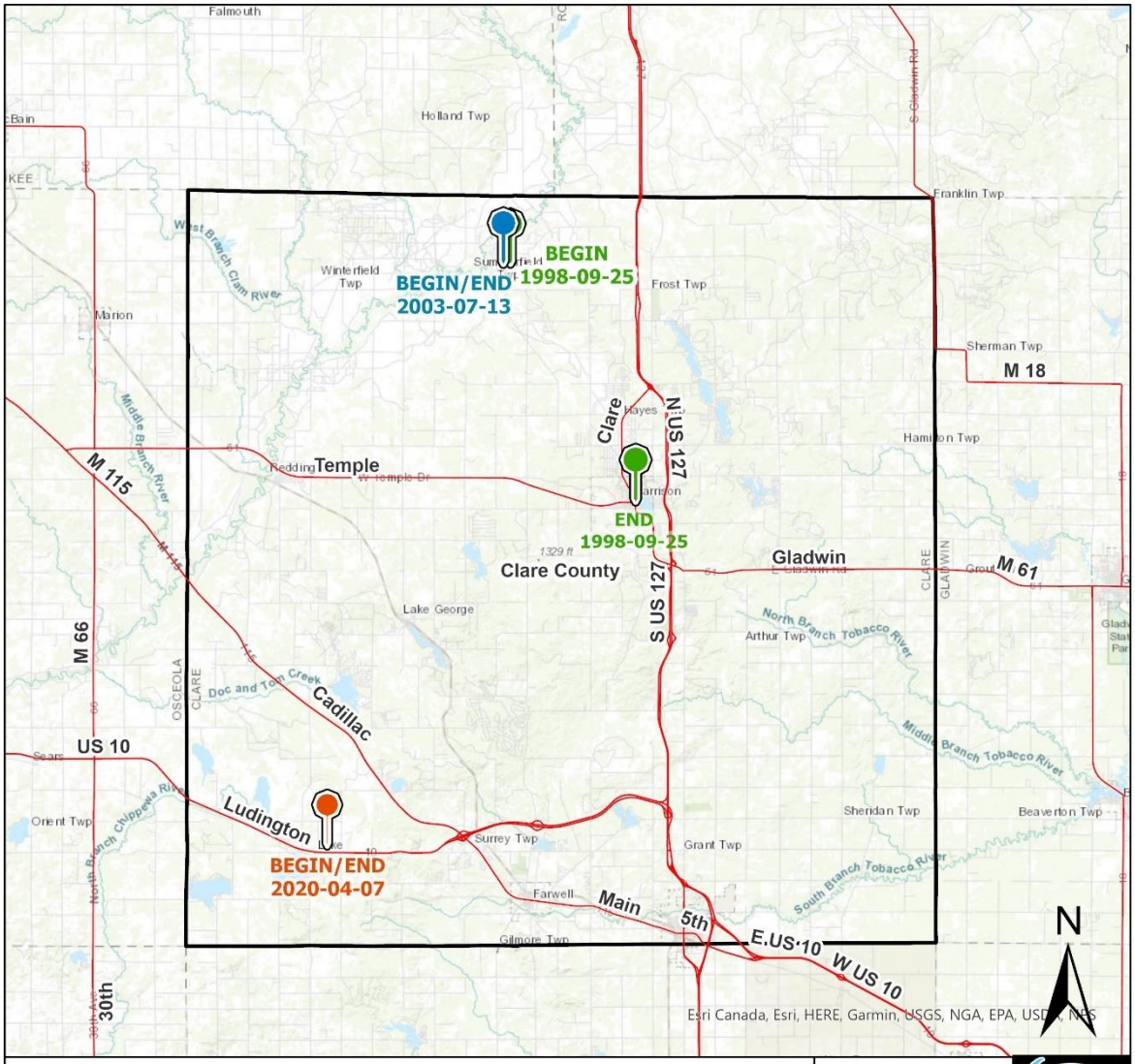
Hail Overview

From 1997 to 2022, there were 25 hail-producing events or about 1 event per year impacting the residents of Clare County and their property. Based on the above information, there is a 100% probability that a hail event could occur annually. (While on average there was at one event a year, some years had multiple events and some years did not have an event.) While the events were spaced throughout the County, Surrey and Summerfield Townships, along with the cities of Clare and Harrison appear to be the most vulnerable as they reported the most damages resulting from the hail events.

NCEI received limited information on the damages totaling $715,000, in property damages and $110,000 in crop damages. Clare County is identified as a moderate risk county by the State of Michigan for hail events. However, hail is associated with thunderstorms and severe weather which were given a high priority to address. The County is still vulnerable to the impacts of hail but does utilize warning sirens and other storm alerts programs to provide warning for the residents of the County.

Significant Hail Events in Clare County 1997-2022

MAP 4.2



Clare County Hail Events | 2023

Begin Date: 1998-09-25 05:30 EST
End Date: 1998-09-25 05:50 EST
The supercell of the morning of September 26th produced hail and wind damage across the norther tier of the GRR CWA, Emergency Manager of Clare County estimates 200 to 500K dollars in damage with hail up to softball size. Skylights were wiped out with automobile and other structural, roof and antenna damage noted. 1.75 to 3 inch hail damaged buildings and vehicles.

Begin Date: 2003-07-13 14:57 EST
End Date: 2003-07-13 15:02 EST
1.75 inch diameter hail was reported in Meredith and Leota; Property/Crop Damage $40K

Begin Date: 2020-04-07 18:28 EST
End Date: 2020-04-07 18:33 EST
A warm and relatively humid early spring day with sharply colder air aloft provided the instability needed for thunderstorms to develop late in the day, touched off by a wave of low pressure approaching from the west. Wind shear between the lower and upper layers of the atmosphere helped organize the storms into long lived cells and lines. Many of the storms produced severe hail greater than 1 inch in diameter. Several locations in central to southwest Lower Michigan reported hail the size of golf balls. The Plainwell and Morley areas saw hail about the size of hen eggs (2 inches in diameter).

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

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 heavily reported property damages and multiple deaths and injuries in recent years (according to NCEI, 309 events were reported in Michigan from 1996 through 2020, resulting in 18 deaths and 113 injuries, and over $18 million in personal property damages).

Lightning Overview

According to the NCEI, there were no reported lightning events recorded in Clare County during the past 25 years (from 1997 to 2022). The statistical probability of a major event being reported annually is about 0%, but events do occur that do not get recorded as they do not result in damages. Clare County is located in moderate risk region, with the region averaging about 1.5 events per county during the 25 year period. To reduce the vulnerability of the residents, all-purpose warning sirens have been installed at various points in the County. As there were no reported lightning events during the reporting period, all communities within Clare County would appear to be equally vulnerable to the lightning events.

Additionally, lightning protection devices have been installed at various municipal facilities to further minimize the impact of lightning strikes. However, even with those measures Clare county is still vulnerable to damages resulting from lightning strikes, as individual homes/barns are still susceptible to lightning. Even though the County has not experienced any recent lightning strike events, it is possible that future events could still occur. Lightning strikes are considered to be a severe weather activity, which was given a high priority to address.

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 Events

Five (5) ice/sleet events were reported by NCEI that impacted the Clare County from 1997 to 2022. Of these storms three (3) had reported damages and two (2) did not. Four of the storms were ice storms and one storm was a sleet storm. There were no reported injuries or deaths resulting from these storms. All of the ice/sleet storms are identified in the following table, which is followed by a short paragraph on the three events with reported damages.

Significant Ice/Sleet Storm Events in Clare County

TABLE 4.6

Location	Date	Time	Deaths	Injuries	Property Damage	Crop Damage
Countywide	12/17/2002	8:00 PM	0	0	$100,000	$0
Countywide	04/03/2003	10:00 AM	0	0	$200,000	$0
Countywide	02/13/2005	8:00 PM	0	0	$50,000	$5,000
Countywide	02/13/2006	12:00 AM	0	0	$0	$0

Countywide	12/29/2015	2:00 PM	0	0	$0	$0

Source: National Centers for Environmental Information

On 12/17/2002 an ice storm hit mid-Michigan. It was reported that approximately ¼ inch of ice fell on Clare County. No specific information was provided regarding the damages.

On 04/03/2003 a major ice storm hit mid-Michigan that resulted in ½ inch of ice in Clare County. Many tree limbs fell due to the ice resulting in loss of power in many regions of Michigan. No specific information was provided regarding the damages.

On 02/15/2005 snow changed from freezing rain during the night of February 13th, creating a minor ice storm, which resulting in three to four tenths of an inch of ice. The ice brought down trees and power lines.

Ice and Sleet Storms Overview

Five ice/sleet storms were reported by the NCEI from 1997 to 2022 or about one every five years. There is a probability of 20% that an ice/sleet storm could occur in any year in Clare County. A major concern resulting from ice and sleet storms is the downing of power lines, which often results in the loss of power. The weight of the ice builds up on branches that fall on the power lines causing them to snap and break disrupting service. In these circumstances, power can take days to be restored. 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 potential problem caused by ice and sleet storms would be debris cleanup. The weight of the ice often causes tree limbs to snap and break. When there are a large number of downed limbs, finding an appropriately sized area to store the debris.

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. Clare County remains vulnerable to ice storms and their impact on damages trees, leading to power outages. Ice/sleet storms often cover large areas and are not restricted to a specific point. Therefore, all of Clare County would be equally vulnerable to these events. 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 Clare County. Ice/sleet storms are considered to be severe weather events, which were 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.

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.

Snowstorm Events

There was a total of 55 storms that were identified in the NCEI database, impacting Clare County 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 events had reported damages, and no events had human-related injuries/deaths; however, the data from these events may be incomplete because not all damages that may have occurred were reported. Below is a table that identifies the four storms that had reported damages.

Significant Snowstorms Events in Clare County

TABLE 4.7

Location	Date	Death	Injuries	Property Damage	Crop Damage
Countywide	03/01/2007	0	0	$50,000	$0
Countywide	12/11/2010	0	0	$250,000	$0
Countywide	04/14/2018	0	0	$100,000	$0
Countywide	12/12/2020	0	0	$100,000	$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 Clare County.

Blizzard-On 02/24/2019 blizzard conditions developed throughout Clare County with moderate to heavy snow and wind gusts of 45 to 50 mph resulting in near zero visibility at times. No injuries, deaths or damages were reported as a result of this event.

Heavy snow-On 01/20/2006 a band of heavy snow fell across central and central lower Michigan. The heaviest snow fell just north of I-96 from Muskegon to Clare. Snowfall ranged from 8-11 inches along this belt. No injuries, deaths or damages were reported as a result of this event.

Winter storm-On 12/11/2010 nine to ten inches of wet snow was reported across most of Clare County. The wet snow and strong winds brought down power lines resulting in power outages causing reported damages in the amount of $250,000. No specific information was available regarding the damages.

Winter weather-On 01/04/1999 widely scattered snow showers fell throughout the day, along with blowing and driving of snow. This snow, along with snow showers from the 2nd and 3rd, ended up being one of the strongest events in lower Michigan. Snowfalls from the 2nd to the 5th totaled as much as 36

inches for some of the lake front counties to 12 inches in Clare County. No injuries, deaths or damages were reported as a result of this event.

Snowstorms Overview

There has been a total of 55 events in the snowstorm category (blizzards, winter storms, winter weather, and heavy snows) from 1/1/1997 to 11/30/2022. This is approximately two winter weather events a year. Based on the number of storms, there is a 100% probability that a winter storm event could occur in any given year. Severe snowstorms affect every community in Clare County. These events cover large land areas and are not site specific. All communities are vulnerable to these events.

While the number of events has not resulted in any reported deaths/injuries, due to the nature of these events snowstorms are considered to be severe weather events, which were given a high priority to address. 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, Clare County is still vulnerable to the impacts of these events (power outages, road closures, school/business closings).

MEDIUM PRIORITY HAZARDS

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 Clare 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 dueto 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 all that good for monitoring climatic impacts on vegetation, especially crops.

Droughts/Drought Related Events

The State of Michigan has been divided into ten (10) climate divisions for drought monitoring an analyses. Clare County is located in Division 6, which includes the counties in the heart of the Lower Peninsula. According to the State of Michigan Hazard Analysis Appendix of the 2019 State of Michigan Hazard Mitigation Plan, since 1895 Division 6 experienced seven (7) lengthy droughts ranging from nine (9) to 18 months in duration.[3] The NCEI identified no droughts occurring from 1997 to 2022.

In 1930-31 the most extreme drought occurred when the Palmer Index reached a record low of -6.22 for Division 6. The drought was 17 months in duration. While drought occurs periodically, the Palmer Drought Index indicated drought conditions reached extreme severity only 2.4% of the time. No crop damages or other property damages, or injuries/deaths resulted from the drought events.

Drought Overview

There were no droughts reported in Clare County between 1/1/1997 and 11/30/2022 by the NCEI. The statistical probability that a drought could occur is 0%. However, as previously cited, the 2019 Michigan Hazard Mitigation Plan identified six and seven droughts since 1895 in the two regions. Because there is land devoted to agricultural use, there is a threat of loss of crops/livestock should an extended drought occur. Droughts are wide reaching in nature making the entire County vulnerable to droughts. Even though there have been no documented droughts in recent years, because of their potential limited impact to the residents of Clare County, droughts were given a medium priority to address.

EXTREME TEMPERATURES

COLD TEMPERATURES

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 Clare County residents. 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

There were no extreme cold events reported by the NCEI for Clare County from 1997 to 2022. Furthermore, the Michigan State Hazard Mitigation Plan of 2019 also reported that there were no excessive cold events in Clare County from 1996 to 2017.

Extreme Cold Overview

There were no extreme cold events recorded by the NCEI for Clare County between 1/1/1997 and 11/30/2022. The statistical probability of a cold event occurring in a given year, based on the past 25 years, is 0 percent. While there was no excessive cold event recorded, excessive cold events occur annually in Clare County, which could become a risk to the residents and visitors. Excessive cold events extend over a large area and are not site specific. Because of their wide-reaching nature, all communities are equally vulnerable to these events.

Additionally, with the climate changes occurring, and the extreme weather events beginning to occur more often, there is a likelihood that an excessive cold period could occur. There have been minimal conditions with excessive cold, cold events occur annually in central Michigan and pose 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. Excessive cold is considered to be a medium priority to address.

HOT TEMPERATURES

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. 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 Clare County residents. Extreme summer 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 can become 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 temperature 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

There were no extreme heat events recorded by the NCEI for Clare county from 1997 to 2022. Additionally, the Michigan State Hazard Mitigation Plan of 2019 also reported that there were no excessive heat events in Clare County from 1996 to 2017

Extreme Heat Overview

There were no extreme heat events reported by the NCEI Clare County between 1997 and 2022. The statistical probability of a heat event occurring in a given year, based on the past 25 years, is 0 percent. However, with the climate changes occurring, and the extreme weather events occurring often, there is a likelihood that an excessive cold period could occur. Additionally, with the climate changes occurring, and the extreme weather events beginning to occur more often, there is a likelihood that an excessive cold period could occur. Excessive heat events extend over a large area and are not site specific. Because of their wide-reaching nature, all communities are equally vulnerable to these events.

While there was no excessive heat event recorded, high heat events occur annually in Clare County, which could become a risk to the residents and visitors. 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, and homeless individuals, and the critically ill) do not have access to air-conditioned environments. Excessive heat is considered to be a medium priority to address.

HAZARDOUS MATERIAL 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.

Amendments and Reauthorization Act (SARA), Title II

There are currently 5 Sites in Clare 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 Clare County have an emergency plan on file with the Local Emergency Planning Committee and their individual Fire Departments.

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.

Hazardous Material Incidents/Industrial Accident Events

On 02/18/2021 two gentlemen were noticed to be dumping fuel behind a filling station in Clare. Approximately 26 gallons of fuel was pumped into a vehicle. After the fuel was pumped into the truck, the gentlemen realized they pumped the wrong fuel into the truck. They then siphoned the fuel out of the truck and dumped the fuel behind the fueling station. They were confronted about the event and admitted their mistake. They then were ordered to clean up the "dump" which they did. There were no long term impacts to the environment.

Hazardous Material Incidents/Industrial Accidents Overview

Like all heavily industrialized states, Michigan will always be concerned with the risk of accidental hazardous material releases. However, the threat of accidental hazardous material releases that can affect life, health, property or the environment can be greatly reduced by: 1) developing and maintaining adequate community hazardous material response plans and procedures; 2) adequately training hazardous material workers and off-site emergency responders; 3) educating the public about hazardous materials safety; 4) enforcing basic hazardous material safety regulations; and 5) mitigating, wherever possible, the threat of accidental hazardous material releases. Fortunately, many Michigan communities

are making great strides in these important areas. As there has not been a reported event in recent years this hazard was given a medium priority.

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-Transportation Events

IN 05/2020 a fuel transport tank carrying, 12,500 gallons of assorted vehicle fuels suffered a tire blowout on US -10 in Surrey Township, which caused a spill of 1,250 gallons of diesel fuel. The cleanup lasted two days with monitoring equipment used to make sure the cleanup was complete. No lasting impact resulted from the event.

On 3/25/2021 an oil s p ill was reported near the intersection of Forest Road and Garfield Avenue in Winterfield Township. A truck driver overfilled his tanks and released approximately 630 gallons of fuel. The driver realized his mistake and immediately began cleanup and remediation procedures.

On 04/30/2022 a semi-truck tractor/tanker rolled onto the roadway near the intersection of Harding Avenue and M-115, in Surrey Township. The rollover resulting in a spill of approximately 3,500 to 4,000 gallons liquid pig manure. The site was cleaned up within a matter of hours with no environmental impact detected.

Hazardous Material Incidents: Transportation Overview

Although there have not been any significant hazardous materials transportation incidents, there have been several minor hazardous materials spills throughout the years. Most major roads within the County are primarily two lanes, however, there are several state and federal roads that are four lane roads. The primary routes can be heavily congested in the summer months due to summer travelers, and they can be icy or impassible 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. Although there have not been any reported events, because of the dangers that could arise from these accidents, they were given a medium priority.

DAM FAILURES

Dam failure: 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.

Dam Failure Events

On 03/25/2022 the Rogers Road Bridge Culvert failed resulting in a dam failure. The structure was repaired with no damages resulting from the dam failure.

Dam Failure Flooding Overview

With one event occurring in the past 25 years, there is a 4 percent chance of a dam failure in any given year. According to EGLE there is a total of 33 dams in Clare County. Of these dams, only three (3) are considered to be high risk dams, with the rest of the dams being low risk dams. The three high risk dams are Lake 13 Dam, Shamrock Dam, and Surrey Lake Dam. High risk dams are those dams that, should they fail, a loss of life and significant property loss would be expected.

Currently all three dams are considered to be in proper working order. Thus, this hazard has been given a medium priority.

ENERGY EMERGENCIES

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 energy resources to power the public and private utility infrastructure which provide essential life services such as electric power, heating and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation.

Temporary loss of any one source of energy can have devastating consequences. For example, when

electric 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 there is a gasoline shortage (automobile fuel) people can be left stranded and unable to leave their dwellings for shopping trips, doctor trips, or other necessary trips to maintain their household.

Energy Emergency Events

On 08/18/2003 a blackout occurred that covered seven states, including southeastern Michigan. Some homes did not have power restored for two weeks. Due to the blackout many residents of southeastern Michigan left their homes and traveled to the north and went to areas unaffected by the blackout. This resulted in food supplies shortages in numerous areas in northern Michigan.

In 11/2014 a windstorm hit Clare County and the surrounding area causing the loss of power. Over 25 percent of the County residents were initially without power. Toral restoration took one week. There was over $2,000,000 from residential and utility damages. A local declaration was issued.

In 08/2018 straight winds and tornadoes sped across Clare County causing power outage for several days. Damages were over several thousand dollars

Energy Emergencies Overview

Most of the energy emergencies are the result of major weather events such as floods, windstorms, snow/ice storms. The main infrastructure failures are power outages, which are normally restored in a matter of hours. Due to the potential impact that could result from the energy emergencies, they were given a medium priority to address.

CYBERTERRORISM

Cyberterrorism: a malicious and deliberate attempt by an individual or organization to breach the information system of another individual or organization. Usually, the attacker seeks some type of benefit from disrupting the victim's network.[4]

Hazard Description

Cyberterrorism threaten businesses daily and have incrementally increased in recent years. According to Cisco, the total number of cyber-attacks have increased nearly fourfold over a 20-month period from January 2016 to October 2017.[5] These attacks can range from the installation of malware (malicious software) to intentionally cause damage to computers or computer networks to calls to the public and defraud them from the money in their bank accounts.

Programs are being offered through the Emergency Management Office and through law enforcement offices throughout the region to educate the public on the threat of cyberterrorism.

Cyberterrorism Events

In December 2021 the Clare County computer network was hacked impacting their outgoing emails and their network history. The network was not fully restored until late 2022.

Cyberterrorism Overview

While some forms of cyberattack occur every day, the main focus of cyberterrorism mitigation is two-fold. The first concern is at the regional level and is a large-scale event or events that can be inflicted on local governments and businesses causing widespread hardship to the residents of Clare County. The second concern are telephone calls that use misrepresentation and prey upon the general public, specifically the elderly or lower income 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 has been identified as a known concern. Because of the access of computers and the increase of occurrences, the residents are vulnerable to this hazard. Due to the ever increasing

[4] Cisco Technology

[5] Cicso Technology

occurrences, this hazard was given a medium priority to address.

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 certain types of 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 that would normally be considered unacceptable by most ordinary people. 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 itself known through unlawful or extreme acts of deviance, and it is 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 also be noted that many persons who are normally law-abiding may temporarily behave in unusually aggressive ways during these events, often prompted by an understandably defensive anxiety about the disorder and behavior exhibited by the deviant minority, but also 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 diffuse 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, however, elements of hooliganism may emerge and even 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 mores, 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 Events

In 5/2020 Clare County was identified as a potential rally site for Black Lives Matter. The Sheriff and Undersheriff met with the leaders of the rally and were able to dissuade from the event.

Civil Disturbance Overview

Civil disturbances have been infrequent and none in recent years. However, with a greater polarization of the country, activists may appear to be more ready to protest locally. Therefore, this hazard was given a medium 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 Failure Events

In 11/2014 a windstorm hit Clare County and the surrounding area causing the loss of power. Over 25 percent of the County residents were initially without power. Toral restoration took one week. There was over $2,000,000 from residential and utility damages. A local declaration was issued.

In 08/2018 straight winds and tornadoes sped across Clare County causing power outage for several days. Damages were over several thousand dollars

On 02/23/2001 there was a gas line rupture on the American Natural Resources (ANR) Pipeline in Lincoln Township. The accident caused three county roads to be closed down, two of which were reopened later in the day, but the third road remained closed until repairs were completed.

Infrastructure Failures Overview

Many of the Clare County infrastructure failures were secondary hazards caused by other major events such as floods, windstorms, snow and ice storms. The infrastructure failures that have resulted in recent years include power outages, pipeline incidents, road closures, which are normally restored in a matter of hours. Because most of these events usually are resolved in a brief period of time and because they are not within the control of Clare County or local government's control , they were given a medium priority to address.

WELL/PIPELINE INCIDENTS

OIL/GAS WELL INCIDENTS

Oil/Gas Well incident: 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 Hydrogen Sulfide Gas (H_2S)

TABLE 4.8

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

In 05/2020 an oil well ruptured underground causing a spill of crude oil into Whiskey Creek. The clean up took several days to complete. The well is located in Winterfield Township in Northwest Clare County.

Oil and Gas Well Accidents Overview

There are over 400 oil and natural gas wells in Clare County with many of them being located in the western half of the County. 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. 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 number of wells, these events were given a medium priority to address.

PIPELINE (PETROLEUM AND NATURAL GAS) INCIDENTS

Petroleum and natural gas pipeline accident: 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 (H_2S) 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 Events

On 02/23/2001 there was a gas line rupture on the American Natural Resources (ANR) Pipeline in Lincoln Township. The accident caused three county roads to be closed down, two of which were reopened later in the day, but the third road remained closed until repairs were completed.

On 02/17/2010 1700 gallons of fuel were spilling in a rural, unpopulated area of Winterfield Township. The spill was contained to a 250 square yard area. Cleanup was completed by 02/19/2010.

Petroleum and Natural Gas Pipeline Accidents Overview

There are several petroleum and natural gas pipelines running throughout the County. Clare 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. This hazard was given a medium priority to address.

POPULATION CHANGES

SEASONAL POPULATION CHANGES

Seasonal population increase: a population, in the subject area, beyond the normal level of people to which resources are allocated.

Hazard Description

Clare County is impacted by seasonal population as it has nearly half of the houses in the County utilized as vacation homes. This has changed recently with the onset of COVID-19, as many secondary homes are now used as the primary residences. With the increased of permanent homes being used throughout the year, traffic has increased resulting in county roads deteriorating at faster rate. This has been a minor issue with the Clare County Road Commission.

For local governments, seasonal population changes can put additional stress on the local services provided by the fire departments, police departments, medical facilities, road commissions, and ambulance services to maintain the status quo of service.

Seasonal Population Increases

On 08/14/2003 the power outage that impacted southeastern Michigan, resulted in numerous families temporarily relocating to their secondary homes, which included Clare County. As a result of this unintended population surge, many food supplies were depleted or very low. This also caused additional strain on local governments, including emergency services.

Seasonal Population Increase Overview

The annual population of Clare County fluctuates greatly and varies annually with secondary (seasonal) houses being used as summer homes, and numerous residents leaving for warmer climates during the winter months. These populations are not only anticipated, but the changes in population, without knowing the specific houses that are vacant during different seasons of the year do put a strain on first responders. For the above reasons, this hazard was given a medium priority to address.

SPECIAL EVENTS

Special events: an event or series of events resulting in an additional population to a city or region for a period of time.

Hazard Description

There are numerous special events held throughout the County, most notably in the City of Clare, the City of Harrison, and the Village of Farwell. These events bring in thousands of people for a brief time period and results in the increase of security at the location of the event. Additionally, due to the increased traffic in the immediate area, there is a concern for the possibility of the threat of multiple traffic accidents and the safety of the visitors to the area.

Several of the larger events are:

- Farwell-Lumberjack Festival
- Clare-Irish Festival, on St. Patrick's Day, usually draws 6,000 to 7,000 people throughout the week.
- Harrison-Clare County Fair, draws up to 4,000 people during the 7-day event

Special Events Occurrences

The annual events occurring in the City of Clare, City of Harrison, and the Village of Farwell are spread out over the course of each year. In recent history there has not been any significant occurrences that have resulted in a disaster or emergency

Special Events Overview

Special events are often revenue generating events to bring in additional visitors to the event site. The cities/villages as well as the Clare County Emergency Management Office will have historical information to predict the approximate number of visitors, and the number of additional staff needed to address any potential concerns of the additional visitors. As a result of hosting many such events without any occurrences, this hazard was given a medium priority.

FLOODING

RIVERINE (FLUVIAL)/SURFACE (PLUVIAL) FLOODING

Riverine (fluvial) flooding is the overflowing of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, ice, or high winds. **Surface (pluvial)** flooding is 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.

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, and rooftops, and through man-made channels and pipes.

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 experienced in Clare County can produce thick river ice and the potential for ice jams. An ice jam develops when pieces of snow and ice buildup 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 rise and result 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 in Clare County

TABLE 4.9

Month	1929-2000	2001-2015
January	1.86	1.88
February	1.33	1.64
March	2.21	1.82
April	2.76	3.82
May	3.00	3.98

June	3.38	3.58
July	2.95	3.12
August	3.38	3.06
September	3.53	2.80
October	2.88	3.18
November	2.67	2.46
December	1.97	2.21
Annual Average	31.92	33.55

Source: National Weather Service

Riverine and Surface Flooding in Clare County

According to the NCEI, from 1997 to 2022 Clare County reported 7 floods, four pluvial floods and three riverine floods. According to the 2019 Michigan State Hazard Mitigation Plan, from Jan 1996 to April 2017 Clare County experienced 10 flood events. Table 4.3 lists all seven floods as identified by the NCEI. The reported damages for the seven events total $4,450,000 with $4,175,000 being property damage and $275,000 being crop damage. No injuries or deaths were reported due to the flooding. Following the table are the most significant events in recent years, including the flood from 1986, which predates the reporting period, but was the worst flood for the region in over 50 years.

Significant Flood Events in Clare County

TABLE 4.10

Location	Date	Type	Death	Injuries	Property Damage	Crop Damage
Countywide	02/21/1997	Flash Flood	0	0	$0	$0
Southwest Clare County	07/14/1998	Flash Flood	0	0	$0	$0
Countywide	02/09/2001	Flood	0	0	$50,000	$0
Countywide	05/15/2001	Flash Flood	0	0	$100,000	$50,000
Countywide	05/16/2001	Flash Flood	0	0	$25,000	$25,000
Countywide	05/23/2004	Flood	0	0	$1,000,000	$200,000
Leota	04/17/2013	Flood	0	0	$3,000,000	$0

From 9/09/1986 to 9/12/1986 a slow moving, low pressure system moved into the Lower Peninsula. During this time, an intense storm produced rainfall ranging from 8 inches to 20+ inches. In Central Michigan, there was an estimated $500 million in damages, with 6 deaths and 89 injuries resulting from the storm. A presidential declaration was issued due to the heavy flooding.

On 05/15/2001 flash flooding occurred throughout Clare County due to the heavy rains that fell upon central and southwest Michigan. No specific information was available regarding the damages

From 05/20/2004 to 06/03/2004 steady rains fell over the region, resulting in the worst flooding in 20 years. Property damages were estimated to be over $1 million and crop damages were estimated to be at $200,000. No specific information was available regarding the damages

On 04/17/2013 steady rain fell throughout the day on the already wet ground due to previous rainfalls earlier in the month. Significant flooding occurred on the rivers and streams across Clare County. No specific information was available regarding the damages.

Riverine and Surface Flooding Overview

According to the NCEI there were seven flood events from 1997 to 2022, occurring in Clare County. This is about one event every 3.5 years, which is about a 28% chance of a flood occurring in any given year. With the changing weather patterns, more floods may be anticipated due to the heavier more potent rains. While steps have been taken to reduce riverine flooding in the City of Clare, all of the County is still vulnerable to riverine and flash flooding. Additionally, with the recent trend of heavy rains over a short period of time, the County is also vulnerable to flash flooding.

There are currently 11 of the 19 municipalities participating in the National Flood Insurance Program (NFIP). In order to maintain their participation in the NFIP, ordinances have been adopted that prohibit new construction within floodplains. Modifications to existing buildings within floodplains have to be approved by a certified floodplain manager within the County. To further reduce their vulnerability, municipalities must maintain culverts and drainage ditches throughout the county as well as keep them clear of all debris. While this will not eliminate flooding, it will reduce the flooding from the less powerful storms. In 2021, FEMA was contacted to identify properties officially designated as “repetitive loss properties”. FEMA responded and stated that there were no properties designated as "repetitive loss properties”.

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, can have a major impact on many communities in Michigan and across the country. According to the National Fire Protection Association (NFPA) from 2014-2018 the United States averaged, approximately 494,000 structural fires, approximately 2,850 deaths, approximately 12,800 civilian injuries, and approximately $10.5 billion dollars in losses.[6]

In 2018, residential fires represent 75% of all fire deaths, cause 77% of all fire injuries, and 43% of fire losses. The top three causes for residential fires are cooking, at approximately 51%, heating, at approximately 9%, and unintentional/carelessness at approximately 8%.[7]

Structural Fire Events

In the first week of 2018 a home and garage were destroyed when a turkey fryer tipped over on the back porch and started a fire, which quickly spread from the porch to the garage. The house and garage were completely destroyed but no injuries or deaths were reported as a result of the fire.

On 07/05/2020 the Harrison Eagles Club caught fire. Due to the size of the fire mutual aid was called in, which resulted in five other departments assisting the City of Harrison’s Fire Department to put out the fire. Much of the building was destroyed, but no injuries or deaths were identified as a result of the fire.

On 09/06/2020 at 11 pm an explosion and fire occurred at the Consumers Energy Gas Compressor Plant, located in Marion. Two additional fire departments assisted the Marion Fire Department in the suppression of the fire. The fire resulted in minimal damage and no deaths or injuries. All water spillage was contained.

On 7/18/2022 an abandoned home was destroyed by fire. Both the City of Clare Fire Department and the Surrey Township Fire Department responded to the call. It was deemed a suspicious fire as the house was vacant and scheduled to be torn down. There were no injuries or deaths reported due to the fire.

[6] National Fire Protection Association, 2021
[7] U.S. Fire Administration, 2021

Structural Fires Overview

Structural fires occur every year, beyond the ordinary single-home fires that happen in every community. Since historic areas are less well-fireproofed and tend to have greater densities, the risk of major fire impacts appears to be higher. Because of the impact and potential danger to the community, structural fires were viewed as the hazard that poses a threat to the residents of Clare County and 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; 4) 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 Sanilac 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) Events

There have been several bomb threats at the Harrison Community Schools and at the Clare County Courthouse, which is also located in Harrison. All of the threats were hoaxed

Sabotage (Terrorism) Overview

Even though there have been several recently recorded bomb the Emergency Management staff has regularly scheduled training events and school drills to address these circumstances. With the ever-growing threat of local acts, the Emergency Management Director is working to prepare the different local agencies should another event occur. Because there have not been any real threats, this hazard was given a medium priority to address.

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. Wildfire

Events

There have been no significant wildfires in Clare County in recent years. The DNR maintains a status report for the County and does not have any significant fires that have been reported in recent years. All fires have been addressed by local fire personnel.

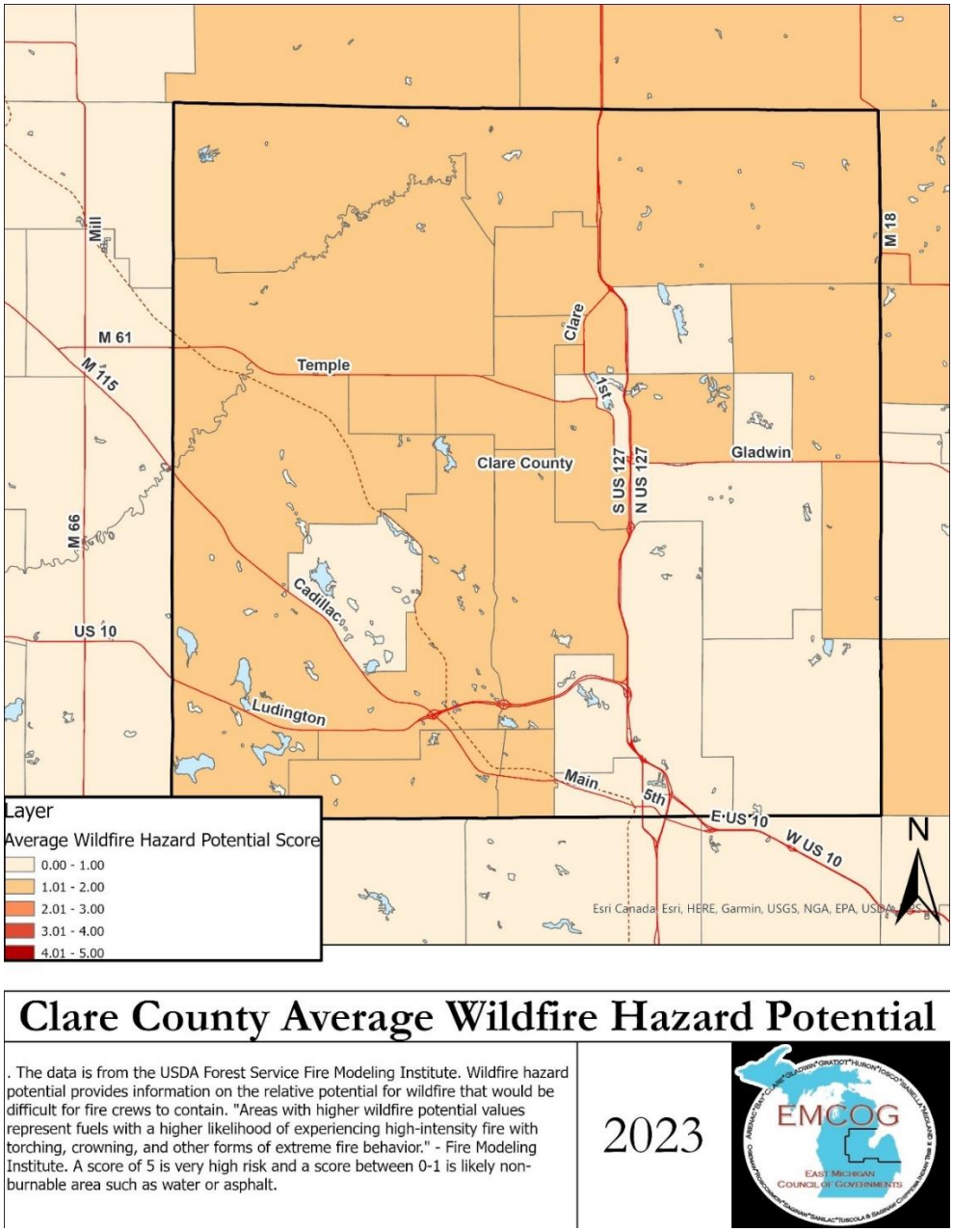
Wildfire Overview

While there have been a number of small brush/grass fires in the recent past, no significant fires have been reported by the DNR. Map 4.3 on page 100 identifies the wildfire potential for Clare County. There

are five categories for potential ranging from very low to very high. These categories were determined by the USDA Forest Service Fire Modeling Institute. Clare County has two potential rankings throughout the County. The light color on the map is identified as a very low potential for wildfires, while the darker color has been identified with a low potential for wildfires. There have not been any injuries or deaths resulting from these fires. However, even though the potential of wildfires is low-very low, due to the destructive nature of these events, wildfires were given a medium priority to address.

Clare County Wildfire Potential Map

MAP 4.3



Clare County Average Wildfire Hazard Potential

. The data is from the USDA Forest Service Fire Modeling Institute. Wildfire hazard potential provides information on the relative potential for wildfire that would be difficult for fire crews to contain. "Areas with higher wildfire potential values represent fuels with a higher likelihood of experiencing high-intensity fire with torching, crowning, and other forms of extreme fire behavior." - Fire Modeling Institute. A score of 5 is very high risk and a score between 0-1 is likely non-burnable area such as water or asphalt.

2023

EMCOG
East Michigan Council of Governments

Source: USDA Forest Service Fire Modeling Institute

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

There has been no dense or freezing fog events in Clare County from 1997 to 2022, as reported by the NCEI. There have been numerous fogs; however, these events would be considered to be minor in nature as there were no injuries, deaths, or accidents reported as a result of the fogs.

Fog Overview

With no significant event being reported by the NCEI or in the 2019 State of Michigan Hazard Mitigation Plan in Clare County in the 25-year reporting period, the statistical probability of a future significant would 0%; however, there have been fogs occurring during that time period that do not result in damages or injuries/deaths. According to the Michigan State Hazard Mitigation Plan, one major fog event is estimated to occur in Michigan approximately every two years. All communities are vulnerable to these events.

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 Clare County residents in recent years, it is not unforeseeable that fogs could become more prevalent in the future. While 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 according, which is why the hazard was given a low priority.

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. (See the NTSB section below).

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, the 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 beforethe 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- 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.

Transportation Events

In 2002 a tour bus carrying foreign exchange students was involved in an accident on US-127. Due to the number of injuries, EMS personnel from Clare County and other counties were called in.

On 11/05/2021 a single engine aircraft crashed occurred in Harrison, near the Clare County Airport. It was observed that the plane was overhead, then banked upward, finally doing a nosedive, all without any engine noise. The crash resulted in one death, the pilot. There were no injuries reported from the crash.

Transportation Overview

In addition to the single death resulting from an aircraft crash, there was a total of 135 fatalities in automobile accidents from 1997 to 2022 or approximately 5.4 fatalities per year. Any fatality is too many; however, with over 2,009 miles of gravel and paved road in the County, and average annual daily traffic well over 40,000 vehicles on these roads (according to MDOT, over 26,000 vehicles use US-127 and US-10 daily), the fatalities have been minimal. Based on the miles of roads, number of vehicles on the roads, transportation accidents were given a low 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 a 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 being over 90 percent of the 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 of such an event continuously increases.

Celestial Impact Overview

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

The greatest impact on Clare County would probably come from damage to the infrastructure system, natural gas and petroleum pipelines, railroad lines, and/or roads and bridges. If the earthquake occurs in the winter, areas of the state could be severely impacted by fuel shortages - which could translate into temporary shortages in for the residents of Clare County.

Damage would probably be negligible in well-designed and constructed buildings. However, poorly designed, and constructed buildings could suffer damage under the right circumstances.

In January 1990, Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, was signed into law. This EO requires that appropriate seismic design and construction standards and practices be adopted for any new construction or replacement of a federal building or federally building during or after an earthquake. Earthquakes were identified as a no impact hazard and were not addressed in the Plan.

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 in the single salt mine that is still operating in Michigan, 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. 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 Bay 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. The map on the previous page indicates the areas in the state that are potentially vulnerable to mine subsidence. 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

Clare 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 still occur within the County. Because of the recent history of no events, this hazard was been identified as a no impact hazard.

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 emergency management will be taken over by the Department of Homeland Security.)

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 in-active commercial nuclear power plants, in addition to 4 small nuclear testing/research facilities located at 3 state universities and within the City of Midland.

Clare County does not have a nuclear power plant located within 50 miles and is not 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 within Michigan is over 100 miles, at the Fermi 2 Nuclear Plant in Monroe County. Should an event occur, that would impact the County, the Emergency Management Director would defer to the governing agency.

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 of the last forty years present environmental and safety hazards that will last into the foreseeable future. By 2001, the State of Michigan had identified a total in excess of 24 million scrap tires in disposal sites scattered around the state. By 2010, these were all reported as removed from the county.

The Scrap Tire Regulatory Program is implemented by the Waste Management Division of the EGLE, under the authority of Part 169 of the Natural Resources and Environmental Protection Act (451 P.A. 1994), 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 Clare County
Clare County has not had a significant tire fire in recent memory.

Scrap Tire Overview
With the elimination of scrap tire sites, this hazard has been greatly reduced and was given a very low priority. Very low priority hazards have not been addressed in this plan, as high, medium, and low rated priority hazards all were viewed as greater risks to the residents and businesses of Clare County.

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 4.11 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 4.12, 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 Clare County Municipalities

TABLE 4.11

Community	High Impact Hazards	Medium Impact Hazards	Low Impact Hazards	No Impact Hazards	Community	High Impact Hazards	Medium Impact Hazards	Low Impact Hazards	No Impact Hazards
Clare County	b,c,d,n	a,	e,f,g,h,i,j, k,l,m,o,p, q,r	d,t	Greenwood Township	b,c,r	e,h,i,l,m,n,p	a,d,f,g,j,k,o,q, s,t	
City of Clare	f,g	c,d,e,h,j,k,p	a,i,l,n,o,s,t	b,m,q,r	Hamilton Township	n	a,b,m	h,j,k,o,r,t	c,d,e,f,g,j,l, p,q,s
City of Harrison	c,d,f,p	b,e,g,h,j,k m,q,s	a,i,l,n,o,r,t		Hayes Township	c,h,i,m,n	a,b,d,f,k,t	e,j,l,p,q,r,s	g,o
Arthur Township	b	a,p,s	c,d,h,i,n,o, t	e,f,g,j,k,l,m, q,r	Sheridan Township	a,c,d,n	o	b,h,i,k,p,r,t	e,f,g,j,l,m,q, s
Franklin Township	b,d,f,h,i, k,l,n,r	c,j,m,q	a,e,o,p,s,t	g	Summerfield Township	b,c,d	a,g,h,i,k,l,m n,o	e,f,j,p,q,r,s	t
Frost Township	b,h,k	c,i,m,n,p	a,d,e,f,j,l,r, t	g,o,q,s	Winterfield Township	b,l	a,h,i,j,n,q,r	c,d,f,k,m,o,p,t	e,g,s

HAZARDS: A-Drought; B-Invasive Species; C-Severe Weather (hail, ice/sleet storms. Lightning, thunderstorms, snowstorms); D-Tornadoes/Severe Winds; E-Civil Disturbances; F-Cyberterrorism; G-Dam Failures; H-Energy Emergencies; I-Extreme Temperatures (Hot and Cold); J-Hazard Material Incidents (Fixed Site and Transportation); K-Infrastructure Failures; L-Pipeline/Well Incidents (petroleum/gas pipelines and oil/gas well); M- Seasonal Population Changes/Special Events; N-Public Health Emergencies; O-Riverine Flooding; P-Structural Fires; Q-Terrorism/Sabotage; R-Wildfires; S-Fog; T-Transportation Accidents

Asset Vulnerability For Clare County Municipalities

TABLE 4.12

Community	Hail	Lightning	Severe Winds	Tornados	Extreme Heat	Ice/Sleet Storms	Snowstorms	Extreme Cold	Flooding	Drought	Fog
Clare 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,b,f,g	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.f
City of Clare	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,b,f,g	a,b,c,d,e,f,g	a,f	a,f	a,b,c,d,e,f,g	a	a.f
City of Harrison	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,b,f,g	a,b,c,d,e,f,g	a,f	a,f	a	a	a.f
Arthur Township	a,b	a,b	a,b	a,b	a	a,b	a	a	a	a	a
Franklin Township	a,b	a,b	a,b	a,b	a	a,b	a	a	a	a	a
Frost Township	a,b	a,b	a,b	a,b	a	a,b	a	a	a	a	a
Greenwood Township	a,b,e,f	a,b,e,f	a,b,e,f	a,b,e,f	a,f	a,b,e,f	a,f	a,f	a	a	a
Hamilton Township	a,b	a,b,e	a,b,e	a,b,e	a	a,b,e	a	a	a	a	a
Hayes Township	a,b,d,e,g	a,b,d,e,g	a,b,d,e,g	a,b,d,e,g	a,g	a,b,d,e,g	a	a	a	a	a
Sheridan Township	a,b,f	a,b,f	a,b,f	a,b,f	a,f	a,b,f	a,f	a,f	a	a	a
Summerfield Township	a,b.e	a,b.e	a,b.e	a,b.e	a	a,b.e	a	a	a	a	a
Winterfield Township	a,b	a,b	a,b	a,b	a	a	a	a	a	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

Prior to the development of the mitigation strategies, the Clare County Hazard Mitigation Advisory Committee (CCHMAC) developed goals and objectives. Upon the development of the goals and objectives, mitigation actions were determined, based on the six categories of mitigation actions. Below are the goals and objectives, and the mitigation action categories as determined for the 2016 Hazard Mitigation Plan. Revised goals and objectives for the 2023 Plan, as determined by the CCHMAC members will appear in Chapter 6: Action Plan.

Goals are general guidelines that explain what a community wants to accomplish. Goals are often long term and represent broad visions. **Objectives** define strategies or implementation steps to attain the identified goals. They are specific, measurable and may have completion dates.

The action plan items from the 2016 Plan were then evaluated and those items that were deemed complete or no longer applicable were eliminated from this plan. The CCHMAC then reviewed the mitigation strategies as identified in the 2016 Plan.

In addition to the strategies found on pages 119-121, several communities in Clare County also addressed activities in their Master Plans/Comprehensive Plans to reduce the impacts of flooding. Some of these communities are listed below.

- The City of Clare in their 2022 Master Plan identified open space preservation, development standards, and identified environmentally sensitive areas.
- The City of Harrison in their 2017 Master Plan identified open space, developed regulations to address flooding matters, stressed the inclusion of utilizing pervious surfaces in lieu of impervious surfaces.
- The Village of Farwell in their 2017 Master Plan addressed stormwater issues and maintaining natural features.

GOAL 1: Protect Public Health and Safety

OBJECTIVES

- Provide community wide hazard warning systems (natural, health and terrorism)
- Provide information and resources to increase hazard awareness and education
- Maintain existing resources and provide necessary training
- Identify and obtain necessary resources and equipment to prevent or minimize hazard effects

GOAL 2: Minimize damage to public and private property

OBJECTIVES

- Adopt policies to make property less vulnerable
- Apply proactive mitigation measures to prevent hazard damage
- Obtain necessary equipment, resources, and training to protect property if hazard occurs
- Conduct training sessions and exercises to prepare for possible hazards

GOAL 3: Maintain essential services

OBJECTIVES

- Identify, inspect, and maintain all critical infrastructure and facilities
- Repair or replace critical infrastructure and facilities that are damaged or degraded
- Protect critical infrastructure and facilities from hazard damage
- Obtain necessary resources and equipment to insure essential services are maintained in the event of a hazard

GOAL 4: Manage growth/development

OBJECTIVES

- Develop hazard resistant growth policies
- Discourage development in high hazard areas
- Integrate hazard mitigation planning into land use planning
- Encourage sustainable development
- Protect and conserve natural resources

CLARE COUNTY IMPLEMENTATION STRATEGY TABLE: 2016-2023					
Item Number	**Mitigation Activity**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
High Priority Mitigation Actions					
1	Deepening, widening, clearing of Tobacco Creek/Drain through downtown Clare	High	In Process	Clare County Drain Commission	Total cost of the project is $11 million. Clare received $2,200,000 in grants from EPA, EDA, and FEMA to complete the improvements. Bridges, renovated, roads updated, storm drains installed, buildings from floodplain removed, utilities relocated.
2	Remove existing structures from flood hazard areas	High	In Process	Clare County Drain Commission	22 homes targeted to be removed. 10 have been purchased and removed. The cost of the properties was $775,000.
3	Conduct regular maintenance of drainage system/flood control structures	High	In process	Clare County Drain Commission	Drain maintenance has been initiated on approximately ten (10) drains, which includes clearing brush and/or trees, beaver control, and replacing culverts.
4	Public education on underground water supply and wellhead protection programs	High	Ongoing	City of Harrison	School programs teach children the importance of having potable drinking water from wells. Information also provided at Harrison Street Fair and by the Health Department.
5	Tower site improvements for public safety communications	High	Ongoing	Clare County Office of Emergency Management (OEM)/911	Towers all in secured locations. Lightning protection completed along with the purchase of several generators.
6	Maintenance and sustainability of warning sirens	High	Ongoing	OEM	Batteries have been replaced throughout the County, and the sirens have been relocated in Hamilton Twp. Reviewed the possibility of future replacements/ enhancements.
7	Purchase of generators to be utilized at critical facilities throughout the County	High	In Process	OEM	Generators for several facilities have been purchased. More generators are still needed.

CLARE COUNTY IMPLEMENTATION STRATEGY TABLE: 2016-2023					
Item Number	**Mitigation Activity**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
8	Obtain Geographical Information Systems (GIS) service to create maps that can be used by the Emergency Management staff for hazard mitigation purposes	High	Completed	Clare County/911	GIS purchased and is available on the County network. Amalgam has been hired to do the mapping.
9	Purchase and distribute smoke detectors and carbon monoxide detectors	High	Ongoing	Clare County Fire Chiefs' Association	Both detectors are being distributed by the fire departments through a grant from the State Fire Marshall. Funds from Red Cross have been used for smoke detectors.
10	Seek grant funds to complete Community Wildfire Protection Plan	High	Not Started	OEM	Grants are needed to complete the Plan. Grant funds have not been available for these projects.
11	Public education on chimney fires	High	Ongoing	Clare County Fire Chiefs' Association	Local fire departments do the education and inspecting.
12	Senior internet security program	High	Ongoing	OEM	The program was started in 2017 but has been dormant since the start of the pandemic. The information hotline-211 also has information for seniors.
13	Purchase of mobile generators for special needs population facilities	High	In Process	OEM	Generators for several facilities have been purchased.
14	Prepare special needs population facilities for generator use	High	In Process	OEM	Facilities with generators have been upgraded to allow for the installation of the generators.
15	Purchase and distribute National Oceanic Atmospheric Administration (NOAA) weather radios	High	In Process	OEM	Emergency Management Director is working on several grants to purchase additional radios.
16	Educate public of shelters and warning sirens	High	Ongoing	OEM	County website has information that has been posted, shelters are identified. Clare and Harrison send out siren information with their water bills.
Medium Priority Mitigation Actions					
17	Replace older damaged culverts throughout the County as needed	Medium	Ongoing	Clare County Road Commission	In the past five (5) years, the Road Commission has installed multiple culverts and replaced the metal culverts with PVC culverts.

CLARE COUNTY IMPLEMENTATION STRATEGY TABLE: 2016-2023					
Item Number	**Mitigation Activity**	**Priority**	**Status**	**Lead Agency**	**Outcomes**
18	Monitor/repair/replace Shamrock Dam	Medium	In Process	City of Clare	Work on dam is an ongoing project. City of Clare has a log sheet that identifies the maintenance activities. Grant funds have been received to replace the dam and add an emergency spillway.
19	Continue to develop emergency plans for businesses, schools, governmental facilities, and special events	Medium	Ongoing	OEM	Emergency Management Director meets with different entities throughout the year.
20	Continue to develop evacuation plans for businesses, schools, governmental facilities, and special events	Medium	Ongoing	OEM	Emergency Management Director meets with different entities throughout the year.
21	Plant live snow fences along US 127/ Old US 127 corridors	Medium	In Process	OEM	Trees have been planted. (Unfortunately, farmer has mowed down the trees eliminating the wind break.)
22	Trimming of tree branches around power lines	Medium	Ongoing	Consumers Energy	Each of the counties three power distributors have trimmed trees to protect their power lines.
23	Protect critical facilities/structures from lightning damage and other hazards	Medium	Completed	OEM	Lightning protection devices have been installed throughout the County.
Moderate Priority Mitigation Actions					
24	Enhance security system for Clare County Courthouse	Moderate	In Process	OEM	The security station has been moved to the main entrance, accessibility to the building has been made available at one entrance, door locks installed. Training for employees has been initiated.
25	Purchase of portable electronic message boards	Moderate	Not Started	Clare County Road Commission	Road Commission currently borrows them, as they are needed.

CHAPTER 6: ACTION PLAN

Through a systematic process, that included the review of all action items identified in the Clare County 2016 Hazard Mitigation Plan (2016 Plan) and the possible mitigation strategies as identified in the 2007 Local Hazard Mitigation Planning Workbook (Workbook), the Clare County Hazard Mitigation Advisory Committee (CCHMAC) was able to identify the following actions to be the most effective strategies for hazard mitigation for 2023 Hazard Mitigation Plan for Clare County. The actions include mitigation actions identified in the 2016 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 CCHMAC.

The CCHMAC initiated the selection process with a review of the goals and objectives as identified in the 2016 Plan and modified them to fit the needs of Clare County in 2023 and beyond. These goals and objectives are identified below.

The action plan items from the 2016 Plan were then evaluated and those items that were deemed complete or no longer applicable were eliminated from this plan (see review of all 2016 items in Chapter 5). The CCHMAC then began review of the possible mitigation strategies as identified in the Workbook. After reviewing and identifying over 250 possible mitigation strategies the CCHMAC were able to eliminate strategies to reduce the number of possible strategies to 108. The revised list was reviewed and approved by the CCHMAC. The final list of 108 strategies is found in Appendix E. The list of original strategies is found in Appendix F.

The CCHMAC was then asked to identify hazard mitigation projects/processes that address the items on the list. The projects/processes that provided the best benefit to cost ratio have been given a high priority. These projects are included in this chapter and comprise the Action List for this Hazard Mitigation Plan update.

Projects/processes items that provide a lesser cost to benefit ratio have been identified as a medium priority. Projects/processes that provide the least benefit to cost ratio were identified as low priorities. While these projects provide a lesser cost to benefit ratio than the high priority projects, they still are viewed as important projects and are to be included in the Plan. These projects can be found in Appendix G.

Should events/circumstances change within the next five (5) years, a new assessment of any project or projects can be completed which may alter their priority. This can be done during the annual assessment, or at any point, during the life of this Plan.

The projects identified in the Action List found on the pages 124-131 and in appendix G were based on the reevaluation of hazards and the impacts of recent hazards as identified by the Advisory Committee. Based on this reevaluation and the nearly complete changeover in the Committee from the 2016 Plan to the 2023 Plan, many of the projects that have been retained from the 2016 Plan have had modified priorities.

GOALS AND OBJECTIVES

GOAL 1: Protect Public Health and Safety

OBJECTIVES

- Provide community wide hazard warning systems (natural, health and terrorism)
- Provide information and resources to increase hazard awareness and education
- Maintain existing resources and provide necessary training
- Identify and obtain necessary resources and equipment to prevent or minimize hazard effects

GOAL 2: Minimize damage to public and private property

OBJECTIVES

- Adopt policies to make property less vulnerable
- Apply proactive mitigation measures to prevent hazard damage
- Obtain necessary equipment, resources, and training to protect property if hazard occurs
- Conduct training sessions and exercises to prepare for possible hazards

GOAL 3: Maintain essential services

OBJECTIVES

- Identify, inspect, and maintain all critical infrastructure and facilities
- Repair or replace critical infrastructure and facilities that are damaged or degraded
- Protect critical infrastructure and facilities from hazard damage
- Obtain necessary resources and equipment to insure essential services are maintained in the event of a hazard

GOAL 4: Manage growth/development

OBJECTIVES

- Develop hazard resistant growth policies
- Discourage development in high hazard areas
- Integrate hazard mitigation planning into land use planning
- Encourage sustainable development
- Protect and conserve natural resources

HIGH PRIORITY HAZARD MITIGATION ACTIONS

Item 1

Deepening, widening, clearing of Tobacco Creek/Drain through Downtown Clare.

Action: Project will include the replacement of bridges, retaining walls, and dredging of Tobacco Creek in downtown Clare.

- Location: City of Clare
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $17,500,000
- Potential Funding Source(s): FEMA grants, local funding (special assessment)
- Time Frame: Project began in 2020 and is anticipated to be completed in 2022.
- Priority: High
- Benefit(s): Project has been designed to reduce flooding along Tobacco Creek and specifically in downtown Clare.

Item 2

Remove existing structures from flood hazard areas

Action: Purchase and remove structures throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: flooding and erosion
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $10,000,000 (Estimated)
- Potential Funding Source(s): FEMA grants
- Time Frame: Project began in 2020 in the City of Clare. Project has expanded to include all of Clare County.
- Priority: High
- Benefit(s): Project has been designed to reduce flooding along Tobacco Creek and specifically in downtown Clare and the vicinity. With the expanded scope, more properties can be removed from flood hazard areas.

Item 3

Public education on underground water supply and wellhead protection programs.

Action: Public education campaign to inform the public of the threat of water contamination. Campaign will include public access cable, handouts/flyers at public events within the County, and social media.

- Location: City of Clare, City of Harrison
- Lead Agency: City of Harrison
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Public Health Emergency
- Goal/Objective Addressed: goal 1, objective b

- Project Costs: $2,000 (Estimated)
- Potential Funding Source(s): municipal budgets
- Time Frame: Ongoing
- Priority: High
- Benefit(s): Maintain public health by providing potable drinking water.

Item 4

Purchase generators to be utilized at municipal facilities throughout Clare County

Action: Purchase of propane, natural gas, and diesel-powered generators for backup power at all municipal facilities in Clare County that do not have them.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Infrastructure failures, energy emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,000,000 (Estimated)
- Potential Funding Source(s): American Rescue Plan Act (ARPA) funds
- Time Frame: Ongoing, generators are purchased individually, as funds become available. Generators are anticipated to be purchased by 2027.
- Priority: High
- Benefit(s): Municipal office throughout County can remain open during power outages. Additionally, several municipal building are also utilized as shelters.

Item 5

Educate public on shelters and warning systems

Action: Educate the general public on the location of public shelters and the use of warning systems through the use of flyers, Public Service Announcements (PSAs), and presentations.

- 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 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: Goal 1, objective b
- Project Costs: $5,000 (Estimated)
- Potential Funding Source(s): OEM budget
- Time Frame: Ongoing
- Priority: High
- Benefit(s): Public advised of location of shelters and warning system usage.

Item 6 (NEW)

Replace lead pipes and connections to all water service lines

Action: Replace all lead pipes and connections to all water service lines.

- Location: City of Clare and City of Harrison
- Lead Agency: City of Clare, City of Harrison, Village of Farwell
- Participating Agencies: Clare County Building Department, and the list of participating municipalities can be found in Table 6.1 on page 133.

- Hazards Addressed: Public Health Emergencies
- Goal/Objective Addressed: goal 2, objective b
- Project Costs: $6,600,000 (Estimated)
- Potential Funding Source(s): USDA grants, local municipal budgets, State of Michigan Funding
- Time Frame: Project was started in 2021, state mandate in 2019 to complete project in 20 years 2039.
- Priority: High
- Benefit(s): Replacement of lead pipes and connections will improve the quality of potable water in these municipalities and potentially remove a health/safety issue with the removal of lead in the water from the service line.

Item 7 (NEW)

Complete advance training for first responders and specialty teams

Action: Continue educating/training of first responders and specialty on up-to-date techniques and strategies

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective d
- Project Costs: $100,000 (Estimated)
- Potential Funding Source(s): Local budgets, Homeland Security Grant Program (HSGP), State Fire Training Council
- Time Frame: Ongoing
- Priority: High
- Benefit(s): First responders and specialty team members better prepared to address hazards/ emergency situations.

Item 8 (NEW)

Dam Evaluation/Repair Program

Phase I: Complete a structural assessment of existing dams in the County

Action: Complete a structural assessment of all dams within Clare County.

- Location: County-wide
- Lead Agency: Office of Dam Safety
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $50,000 (Estimated)
- Potential Funding Source(s): EGLE, dam owners, special assessment districts
- Time Frame: In progress, started in 2022 and anticipated to be completed in 2023.
- Priority: High
- Benefit(s): The assessment done to identify potential structural problems with the dams in Clare County.

Phase II: Devise a program to repair/replace dams using public/private partnership

Action: Develop a program using public/private dollars to repair/replace dams within Clare County based on the assessment completed in Phase I.

- Location: County-wide
- Lead Agency: Office of Dam Safety
- Participating Agencies: Clare County Drain Commission, dam owners, and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000,000 (Estimated)
- Potential Funding Source(s): USDA grants, EGLE grants, State of Michigan, municipal budgets
- Time Frame: Depending on fund availability, the work is anticipated to be complete by 2030.
- Priority: High
- Benefit(s): After dams have been repaired/replaced, potential flooding due to dam failure will be lessened.

Item 9 (NEW)

Develop gas and natural gas list to maintain supply chain to businesses and governmental agencies to distribute in emergency situations

Action: Maintain the list of suppliers able to distribute fuel/natural gas/propane through normal supply chain.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Energy emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,000 (Estimated)
- Potential Funding Source(s): OEM budget
- Time Frame: This is an ongoing process.
- Priority: High
- Benefit(s): Maintain supply chain for energy distribution in times of emergencies and/or disasters.

Item 10 (NEW)

Enhance warning and monitoring systems of water treatment facilities

Action Enhance warning and monitoring systems of water treatment facilities.

- Location: City of Clare, City of Harrison, and Village of Farwell
- Lead Agency: City of Clare, City of Harrison, and Village of Farwell
- Participating Agencies: EGLE and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $5,000,000 (Estimated)
- Potential Funding Source(s): USDA grants
- Time Frame: Project was started in 2022 and is anticipated to be completed in 2023.
- Priority: High

- Benefit(s): Water treatment facilities better protected to prevent compromises to water treatment system.

Item 11 (NEW)

Educate public on benefits of RAVE alerts

Action: Notify public of RAVE notification system and encourage public to opt into the system.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $4,000 (Estimated)
- Potential Funding Source(s): 9-1-1 budget
- Time Frame: This is an ongoing process.
- Priority: High
- Benefit(s): Public education of use of mobile devises for prompting/alerts on local emergency situations. Also will provide access to Integrated Public Alert Warning System (IPAWS) and Wireless Emergency Alerts (WEA).

Item 12 (NEW)

Shamrock Dam replacement/lake dredging and spillway improvements

Action: This project will replace the existing with an upgraded dam, install an emergency spillway, upgrade the dam infrastructure, and dredge the lake to its previous (1962) depth.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE, Michigan Department of Treasury, and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Dam failures
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $8,200,000 (estimate)
- Potential Funding Source(s): USDA grants, special assessment
- Time Frame: Project started in 2021 and is anticipated to be completed by 2026.
- Priority: High
- Benefit(s): Replacing Shamrock Dam and infrastructure along with including a will mitigate the changes of a dam failure as well as damages to the properties within the shadow of the dam.

Item 13 (NEW)

City of Harrison Sewer Improvements

Action: Upgrade sewer system with new sewer lining, manhole improvements, and aeration system improvements.

- Location: City of Harrison
- Lead Agency: City of Harrison
- Participating Agencies: EGLE and USDA
- Hazards Addressed: Infrastructure failures
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,400,000

- Potential Funding Source(s): USDA grants, FEMA grants
- Time Frame: Project started in 2022 and is anticipated to be completed in 2023.
- Priority: High
- Benefit(s): Improvements to the sewer system will improve system and potentially reduce flooding.

Item 14 (NEW)

City of Harrison water system improvements

Action: Upgrade the water system with upgrades to the well pumps, water meters, replacement of the watermain, and improvements to the water tower.

- Location: City of Harrison
- Lead Agency: City of Harrison
- Participating Agencies: EGLE, USDA
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $6,000,000
- Potential Funding Source(s): USDA grants, USDA loans
- Time Frame: Project started in 2022 and is anticipated to be completed in 2023.
- Priority: High
- Benefit(s): The improvements to the water system, will improve the quality of the potable water, as well as upgrade the infrastructure, mitigating infrastructure failures.

Item 15 (NEW)

Expand the wastewater treatment system within Hayes Township

Action: Expand the wastewater collection and disposal services in the Township from Townline Lake Road north to US-127 along North Clare Avenue.

- Location: Hayes Township
- Lead Agency: Hayes Township
- Participating Agencies: ELGE and USDA
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $10,000,000
- Potential Funding Source(s): USDA Grants
- Time Frame: In progress The feasibility study is in process of be redone. After study is complete, the work timeline can be established.
- Priority: High
- Benefit(s): Limit the environmental impacts by reducing the burden on the existing septic fields.

Item 16 (NEW)

City of Clare Water System Improvements

Phase I: City of Clare Water Plant upgrades-treatment improvements

Action: Upgrade the City of Clare water plant equipment, installation of a SCADA system for monitoring, add city well, purchase GIS, and upgrade the pumps and treatment system.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC

- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $2,800,000
- Potential Funding Source(s): MEDC, CDBG grants and municipal funds
- Time Frame: The planning phase has been initiated. Work is anticipated to begin in 2023 and completed in 2024.
- Priority: High
- Benefit(s): Replacing/upgrading the existing water plant/treatment facilities will mitigate the infrastructure failures as they relate to the water plant and wells.

Phase II: City of Clare Water Plant upgrades-building improvements

Action: Upgrade the City of Clare water plant building with the replacement of piping, valves, and aeration tower.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $2,000,000 (Estimate)
- Potential Funding Source(s): USDA grants and loans
- Time Frame: This phase of the project will be initiated after the first phase is complete and should take several years to complete.
- Priority: High
- Benefit(s): Replacing/upgrading the existing water plant building with the replacement of pipes and aeration tower will mitigate the infrastructure failures.

Phase III: City of Clare Water Plant upgrades-watermain replacement, additional well

Action: This phase of the project will add a well to the current system and will replace nearly 9000 linear feet of 8 inch watermain.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $3,500,000
- Potential Funding Source(s): USDA grants and loans
- Time Frame: The third and final phase of this project is anticipated to be completed in 2032.
- Priority: High
- Benefit(s): Increasing the capacity of water for the city as well as replacing a lengthy portion of the watermain will provide allow better service to the residents of Clare.

Item 17

Trim tree branches around power lines

Action: Consumers Energy, Tri County Electric, and Wolverine Power have ongoing tree trimming initiatives along the power lines rights-of-way.

- Location: County-wide
- Lead Agencies: Consumers Energy, Tri County Electric, and Wolverine Power

- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Infrastructure failures, energy emergencies
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000,000 (Estimated)
- Potential Funding Source(s): Consumers Energy, Tri County Electric, and Wolverine Power
- Time Frame: Ongoing, this is a budgeted item with the utility companies.
- Priority: High
- Benefit(s): The trimming of trees would lessen the duration of power failures as well as the number of power failures due to downed power lines.

Clare County Hazard Mitigation Municipal Participation Chart

Table 6.1

Community	Action Item (s)[1]
Clare County	1,2,4,5,7,8,9,11,18,20,21,22
City of Clare	1,2,3,4,5,6,7,8,9,10,11,12,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30, 31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50
City of Harrison	2,3,4,5,6,7,9,10,11,13,14,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31, 32,33,34,35,36,37,38,39,41,13,44,45,46,47,48,49,50
Arthur Township	2,4,5,9,11,17,20,21,23,24,30,33,35,36,37,38,41,47,50
Franklin Township	2,4,5,9,11,17,20,21,23,27,30,33,35,36,37,38,41,47,50
Frost Township*	4,5,11,17,20,21,24,27,30,31,35,36,37,38,43,47,
Greenwood Township	5,11,17,18,20,21,27,35,36,37,38,41,44,47,50
Hamilton Township	2,4,5,9,11,17,18,20,21,23,24,27,33,35,36,37,38,41,47,50
Hayes Township	2,4,5,8,9,11,15,17,18,20,21,23,24,27,30,31,33,35,36,37,38,41,43,47,50
Sheridan Township	2,4,5,9,11,17,20,21,23,24,30,33,35,36,37,38,41,47,50
Summerfield Township *	2,4,5,11,17,18,20,21,24,27,30,31,33,35,36,37,38,43,44,47
Winterfield Township	4,5,17,19,20,21,24,30,31,35,36,47

1-The complete list of projects can be found in Appendix G beginning on page 214.
*-The projects for these communities are estimates, based on input throughout the planning process.

CHAPTER 7: FOLLOW-UP

The follow-up for Clare 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 Clare County Hazard Mitigation Advisory Committee (CCHMAC) 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 Clare County, when future updates of their comprehensive plans are taking place.

The CCHMAC will continue to monitor the status and track the progress of the plan elements on an annual basis. The CCHMAC 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 Clare 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 need 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 CCHMAC 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 in the quarterly Michigan Township Association (MTA) meetings.

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 CCHMAC and its jurisdictions. The CCHMAC'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 Clare County Emergency Management Director 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 CCHMAC:

- Updates to the plan.
- The Clare County plan has been posted on the Clare County Emergency Management webpage 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

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	12/20/2022	Director	V Harrison
	Chris Damvelt	Harrison Community Fire Dept.	12/20/2022	Fire Chief	V Harrison
	Bill Ernat	EMCOG	12/20/2022	Planner	V Saline, Mi.
	Luke Potter	Clare DPW Supervisor	12/20/2022	Clerk	V Clare
	Aric McCoy	My-Mid Michigan Health EHS Coordinator	12/20/2022	EHS Coordinator	V Harrison
	Dwayne Miedzianowski	Clare County Undersheriff	12/20/2022	Clare County Undersheriff	V Harrison
	Marlana Terrian	Clare Co. 911 Director	12/20/2022	Clare Co. 911 Director	V Harrison
	Dave Bondie	CCRC - Road Comm.	12/20/2022	Supervisor	V Harrison
	Jeremy Howard	City of Clare	12/20/2022	City Manager	V Clare
	Rickie Jones	Hayes Twp. Supervisor	12/20/2022	Hayes Twp. Supervisor	V Harrison
	Courtney Atkins	MDHHS	12/20/2022	MDHHS Clare & Isabella Director	V. Mt. Pleasant

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 09/13/2022 10:00AM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	09/13/2022	Director	In-Person CCEMHSD
	Deb Hoyt	Hayes Township	09/13/2022	Clerk	V Harrison
	Bill Ernat	EMCOG	09/13/2022	Planner	V Saline, Mi.
	Janice LaRose	Arthur Twp.	09/13/2022	Clerk	V. Harrison
	Sandra Bristol	County Commissioner Dist#5	09/13/2022	Commissioner	In-Person CCEMHSD
	Gail Garrity	Greenwood Township	09/13/2022	Clerk	V Harrison
	Shannon Sirpilla	City of Clare	09/13/2022	Accountant	V Clare
			09/13/2022		
	Jeremy Howard	City of Clare	09/13/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	09/13/2022	Superintendent	V Clare
			09/13/2022		
			09/13/2022		
			09/13/2022		
	Chris Damvelt	Harrison Fire Department	09/13/2022	Fire Chief	V Harrison
			09/13/2022		

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 08/09/2022 10:00AM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	08/09/2022	Director	V Harrison
	Joe Nash	MSU Extension - Forester	08/09/2022	Forester	V Harrison
	Bill Ernat	EMCOG	08/09/2022	Planner	V Saline, Mi.
	Janice LaRose	Arthur Twp.	08/09/2022	Clerk	V. Harrison
	Rick Jones Maye Rood	Hayes Twp. Hayes Twp.	08/09/2022	Supervisor Twp. Clerk	V Harrison
	Lori Phelps	Clare County	08/09/2022	Administrator	V Harrison
	Dave Bondie	Clare County Road Commission	08/09/2022	Supervisor	V Harrison
	Jim Chapman	Clare Fire Chief	08/09/2022	Fire Chief	V Harrison
	Jeremy Howard	City of Clare	08/09/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	08/09/2022	Superintendent	V Clare
	Lt. Don VanBonn	Clare County Sheriff	08/09/2022	Lt. Road Patrol	V Harrison
	Colleen Ritchie	Clare County Drain Commission	08/09/2022	Admin Secretary	In-Person CCEMHSD
	David Saad	Clare Police Dept. Chief	08/09/2022	Police Chief	V CPD
	Chris Damvelt	Harrison Fire Department	08/09/2022	Fire Chief	V Harrison

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 07/12/2022 10:00AM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	07/12/2022	Director	V Harrison
	Sandy Bristol	Clare County BOC/Hamilton/Franklin/Sheridan	07/12/2022	Commissioner Dist#5	In-Person CCEMHSD
	Bill Ernat	EMCOG	07/12/2022	Planner	V Saline, Mi.
	Janice LaRose	Arthur Twp.	07/12/2022	Clerk	V. Harrison
	Rick Jones Maye Rood	Hayes Twp. Hayes Twp.	07/12/2022	Supervisor Twp. Clerk	V Harrison
	Justin Cavanaugh	City of Harrison	07/12/2022	City Manager	V Harrison
	Ken Chinavare	CGRESD IT	07/12/2022	IT Director	V Clare
	Jim Chapman	Clare Fire Chief	07/12/2022	Fire Chief	V Harrison
	Jeremy Howard	City of Clare	07/12/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	07/12/2022	Superintendent	V Clare
	Lt. Don VanBonn	Clare County Sheriff	07/12/2022	Lt. Road Patrol	V Harrison
	Colleen Ritchie	Clare County Drain Commission	07/12/2022	Admin Secretary	In-Person CCEMHSD
	David Saad	Clare Police Dept. Chief	07/12/2022	Police Chief	V CPD

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 1:30PM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	06/14/2022	Director	V Harrison
	Gail Garrity	Greenwood Twp. Govt.	06/14/2022	Trustee	V Harrison
	Bill Ernat	EMCOG	05/24/2022	Planner	V Saline, Mi.
	Janice LaRose	Arthur Twp.	06/14/2022	Clerk	V. Harrison
	Rick Jones Maye Rood	Hayes Twp. Hayes Twp.	06/14/2022 06/14/2022	Supervisor Twp. Clerk	V Harrison
	Justin Cavanaugh	City of Harrison	06/14/2022	City Manager	V Harrison
	Tracey Connelly	City of Harrison	06/14/2022	City Manager	V Harrison
	Jim Chapman	Clare Fire Chief	06/14/2022	Fire Chief	V Harrison
	Jeremy Howard	City of Clare	06/14/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	06/14/2022	Superintendent	V Clare
	Josh Lator	Michigan State Police	06/14/2022	Post# 63 Lt.	V. Mt. Pleasant
	Colleen Ritchie	Clare County Drain Commission	06/14/2022	Admin Secretary	V Harrison In-Person CCEMHSD
	David Saad	Clare Police Dept. Chief	06/14/2022	Police Chief	V CPD
	Misty Hayes	Clare Conservation District	06/14/2022	Administrator	V Harrison
	Ken Hoyt	Hayes Twp. Government	06/14/2022	Zoning Administrator	V Harrison

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 1:30PM Pg. 1 of 2

Name	Agency/Dept.	Date	Title	Location
Jerry Becker	CCEMHSD	05/24/2022	Director	V Harrison
Tracy Byard	Clare County	05/24/2022	Administrator	V Harrison
Bill Ernat	EMCOG	05/24/2022	Planner	V Saline, Mi.
Janice LaRose	Arthur Twp.	05/24/2022	Clerk	V. Harrison
Rick Jones	Hayes Twp.	05/24/2022	Supervisor	V Harrison In-Person CCEMHSD
Sandy Bristol	Commissioner Dist#5	05/24/2022	Commissioner	V In-Person CCEMHSD
Tracey Connelly	City of Harrison	05/24/2022	City Manager	V Harrison
Dave Bondie	CCRC - Road Comm.	05/24/2022	Supervisor	V Harrison
Jeremy Howard	City of Clare	05/24/2022	City Manager	V Clare
Luke Potter	City of Clare DPW	05/24/2022	Superintendent	V Clare
Chris Damvelt	Harrison Community Fire dept.	05/24/2022	Chief	V Harrison
Colleen Ritchie	Clare County Drain Commission	05/24/2022	Admin Secretary	V Harrison In-Person CCEMHSD
David Saad	Clare Police Dept. Chief	05/24/2022	Police Chief	V CPD
Misty Hayes	Clare Conservation District	05/24/2022	Administrator	V Harrison
Ken Hoyt	Hayes Twp. Government	05/24/2022	Zoning Administrator	V Harrison

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 1:30PM Pg. 2 of 2

	Name	Agency/Dept.	Date	Title	Location
	Justin Cavanaugh	City of Harrison	05/24/2022	City Manager	V Harrison
	Lori Phelps	Clare County	05/24/2022	County Administrator	V Harrison
			05/24/2022		
			05/24/2022		
			05/24/2022		
			05/24/2022		
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			05/24/2022		
			05/24/2022		
			05/24/2022		

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 1:00PM/ Meeting#2

Water Sewer Infrastructure sub committee meeting

Name	Agency/Dept.	Date	Title	Location
Jerry Becker	CCEMHSD	04/05/2022	Director	V Harrison
Deb Hoyt	Hayes Twp.	04/05/2022	Clerk	V Harrison
Bill Ernat	EMCOG	04/05/2022	Planner	V Saline, Mi.
Rick Jones	Hayes Twp.	04/05/2022	Supervisor	V Harrison
Tracey Connelly	City of Harrison	04/05/2022	City Manager	V Harrison
Jeremy Howard	City of Clare	04/05/2022	City Manager	V Clare
Luke Potter	City of Clare DPW	04/05/2022	Superintendent	V Clare

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 10:00AM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	04/05/2022	Director	V Harrison
	Tracy Byard	Clare County	04/05/2022	Administrator	V Harrison
	Bill Ernat	EMCOG	04/05/2022	Planner	V Saline, Mi.
	Jim Chapman	Clare Fire Dept.	04/05/2022	Chief	V Clare
	Rick Jones	Hayes Twp.	04/05/2022	Supervisor	V Harrison
	Gail Garrity	Greenwood Twp.	04/05/2022	Trustee	V Harrison
	Tracey Connelly	City of Harrison	04/05/2022	City Manager	V Harrison
	Dave Bondie	CCRC - Road Comm.	04/05/2022	Supervisor	V Harrison
	Jeremy Howard	City of Clare	04/05/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	04/05/2022	Superintendent	V Clare
	Chris Damvelt	Harrison Community Fire dept.	04/05/2022	Chief	V Harrison
	Colleen Ritchie	Clare County Drain Commission	04/05/2022	Admin Secretary	V Harrison

V = Virtual Meeting Format

2-8-22

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD		Director	V Harrison
	Tracy Byard	Clare County		Administrator	V Harrison
	Bill Ernat	EMCOG		Planner	V Saline, Mi.
	Janice LaRose	Arthur twp.		Clerk	V Harrison
	Sandy Bristol	Clare County Commissioner		Commissioner Dist.#5	V Harrison
	Gail Garrity	Greenwood Twp.		Trustee	V Harrison
	Ken Chinavare	CGRESD		IT Supervisor	V Harrison/Clare
	Dave Bondie	CCRC - Road Comm.		Supervisor	V Harrison
	Jeremy Howard	City of Clare		City Manager	V Clare
	Melissa DeRoche	CMDHD		Emergency Preparedness Coordinator CMDHD	V Mt. Pleasant

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	01/11/2022	Director	V Harrison
	Tracy Byard	Clare County	01/11/2022	Administrator	V Harrison
	Bill Ernat	EMCOG	01/11/2022	Planner	V Saline, Mi.
	Janice LaRose	Arthur twp.	01/11/2022	Clerk	V Harrison
	Rick Jones	Hayes Twp.	01/11/2022	Supervisor	V Harrison
	Gail Garrity	Greenwood Twp.	01/11/2022	Trustee	V Harrison
	Tracey Connelly	City of Harrison	01/11/2022	City Manager	V Harrison
	Dave Bondie	CCRC - Road Comm.	01/11/2022	Supervisor	V Harrison
	Jeremy Howard	City of Clare	01/11/2022	City Manager	V Clare
	Luke Potter	City of Clare DPW	01/11/2022	Superintendent	V Clare
	Melissa Townsend	Clare County Gypsy Moth/Soil Erosion	01/11/2022	Director	V Harrison

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet V - Virtual

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	December 14, 2021	Director	Harrison
	Mary Jo Beal	MMMCC	December 14, 2021	EHS Operations	Mt. Pleasant
	Bill Ernat	EMOCOG	December 14, 2021	Planner	Saline, Mi.
	Gail Garrity	Greenwood twp.	December 14, 2021	Trustee Greenwood Twp.	Harrison
	Rick Jones	Hayes Twp.	December 14, 2021	Supervisor	Harrison
	Luke Potter	City of Clare DPW Supervisor	December 14, 2021	Supervisor	Clare
	Jeremy Howard	City of Clare	December 14, 2021	City Manager	Clare
	Melissa Townsend	Clare County Soil Erosion/Gypsy Moth	December 14, 2021	Coordinator	Harrison
	Sandy Bristol	CCBOC Dist#5	December 14, 2021	Dist#5 Rep.	Harrison
	Jim Chapman	Clare Fire Department	December 14, 2021	Fire Chief	Clare
					Harrison
	Tracey Connelly	City of Harrison	December 14, 2021	City Manager/Clerk	Harrison

V = Virtual Meeting Format 10:00A.M.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet V - Virtual

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	October 12th, 2021 10:00AM	Director	Harrison
	Bronwyn Asplund	CCBOC Dist#6	October 12th, 2021 10:00AM	Dist#6 Rep.	Harrison
	Bill Ernat	EMOCOG	October 12th, 2021 10:00AM	Planner	Saline, Mi.
	Gail Garrity	Greenwood twp.	October 12th, 2021 10:00AM	Trustee Greenwood Twp.	Harrison
	Rick Jones	Hayes Twp.	October 12th, 2021 10:00AM	Supervisor	Harrison
	Janice LaRose	Arthur Twp. Clerk's Office	October 12th, 2021 10:00AM	Arthur Twp. Clerk	Harrison/Clare
	Ken Chinavare	CGRESD IT Dept.	October 12th, 2021 10:00AM	IT Director	Harrison/Clare
	Melissa Townsend	Clare County Soil Erosion/Gypsy Moth	October 12th, 2021 10:00AM	Coordinator	Harrison
	Sandy Bristol	CCBOC Dist#5	October 12th, 2021 10:00AM	Dist#5 Rep.	Harrison
	Lori Martin	Clare County Clerk Register of Deeds	October 12th, 2021 10:00AM	Clare County Clerk	Harrison
	Tracy Byard	Clare County Administration	October 12th, 2021 10:00AM	Clare County Admin	Harrison
			October 12th, 2021 10:00AM		
	Dave Bondie	CCRC - Clare County Road Commission	October 12th, 2021 10:00AM	Supervisor	Harrison

	Tracey Connelly	City of Harrison	October 12th, 2021 10:00AM	City Manager/Clerk	Harrison

V = Virtual Meeting Format 10:00A.M.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 09/14/2021 Pg.1 of 2

	Name	Agency/Dept.	Date	Title	Location
V	Jerry Becker	Clare County EMHSD	09/14/2021	Director	Harrison, Mi.
V	Bill Ernat	EMCOG	09/14/2021	Planner	Saline, Mi.
V	Dwayne Miedzianowski	Clare County Sheriff's Dept.	09/14/2021	Undersheriff	Grant Twp. Clare
V	Jim Chapman	Clare Fire Dept.	09/14/2021	Fire Chief	Clare, Mi.
V	Ken Chinavare	Clare Gladwin RESD	09/14/2021	IT Technology Dir.	Hatton twp. Clare
V	Rick Jones	Hayes Twp. Government	09/14/2021	Supervisor	Hayes twp. Harrison, mi.
	Sandra Bristol	Clare County BOC	09/14/2021	Commissioner Dist. 6	Harrison, Mi.
V	Melissa DeRoche	CMDHD	09/14/2021	Hazardous Preparedness Coordinator	Okemos, Mi.
V	Ken Hoyt	Hayes Twp. Government	09/14/2021	Zoning Administrator	Harrison, Mi.
V	Melissa Townsend	Clare County Gypsy Moth/Soil Erosion Coordinator	09/14/2021	Coordinator	Harrison, Mi.
V	Gail Garrity	Greenwood Township	09/14/2021	Trustee	Livonia, Mi.,
V	Janice LaRose	Arthur Twp.	09/14/2021	Clerk	Mt. Pleasant, Mi.
V	Tracey Connelly	City Of Harrison	09/14/2021	City Manager/Clerk	Harrison, Mi.
V	Mark Hammar	Winterfield Twp.	09/14/2021	Supervisor	Harrison/Marion , Mi.
V	Chris Damvelt	Harrison Community Fire Dept.	09/14/2021	Chief	Harrison, Mi.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet 09/14/2021 Pg.2 of 2

	Name	Agency/Dept.	Date	Title	Location
V	Bronwyn Asplundh	Clare County Commissioner	09/14/2021	Dist.># 6	Harrison, Mi.
	Lt. Orville Theaker	MSP District #6	09/14/2021	Dist.# 6 Lt.	Harrison, Mi.

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet V - Virtual

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	August 10th, 2021	Director	Harrison
	Chris Damvelt	Harrison Community Fire Dept.	August 10th, 2021	Chief	Harrison
	Bill Ernat	EMOCOG	August 10th, 2021	Planner	Saline, Mi.
	Jim Chapman	Clare Fire Department	August 10th, 2021	Chief	Clare
	Rick Jones	Hayes Twp.	August 10th, 2021	Supervisor	Harrison
	Orville Theaker	MSP District 6 Lt.	August 10th, 2021	Lt. MSP	Reed City
	Rachel Mackson	Arthur Township	August 10th, 2021	Clerk	Harrison
	Melissa Townsend	Clare County Soil Erosion/Gypsy Moth	August 10th, 2021	Coordinator	Harrison
	Melissa DeRoche	CMDHD	August 10th, 2021	Hazard Preparedness Coordinator	Mt. Pleasant
	Luke Potter	City of Clare DPW	August 10th, 2021	DPW Superintendent	Clare
	Jeremy Howard	City of Clare	August 10th, 2021	City Manager	Clare
	Mary Jo Beal	CMCH - Hospital	August 10th, 2021	Emergency Preparedness Coordinator	Clare
	Dave Bondie	CCRC - Clare County Road Commission	August 10th, 2021	Supervisor	Harrison
	Tracey Connelly	City of Harrison	August 10th, 2021	City Manager/Clerk	Harrison

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet V - Virtual

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	July 13th, 2021	Director	Harrison
	Chris Damvelt	Harrison Community Fire Dept.	July 13th, 2021	Chief	Harrison
	Bill Ernat	EMOCOG	July 13th, 2021	Planner	Saline, Mi.
	Tracy Byard	Clare County	July 13th, 2021	Administrator	Harrison
	Rick Jones	Hayes Twp.	July 13th, 2021	Supervisor	Harrison
	Ken Chinavare	CGRESD Technology Dept.	July 13th, 2021	Director	Clare
	Rachel Mackson	Arthur Township	July 13th, 2021	Clerk	Harrison
	Bronwyn Asplund	Clare County Commissioner Dist. 6	July 13th, 2021	Comm.Dist# 6	Harrison
	Luke Potter	City of Clare DPW	July 13th, 2021	DPW Superintendent	Clare
	Jeremy Howard	City of Clare	July 13th, 2021	City Manager	Clare
	Janice LaRose	Arthur Twp.	July 13th, 2021	Clerk	Harrison
	Sandy Bristol	Clare County Commissioner Dist. 5	July 13th, 2021	Comm. Dist.# 5	Harrison/Mobile

V = Virtual Meeting Format 10:00A.M.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet V - Virtual

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	June 8th, 2021		Harrison
	Melissa Townsend	CC Gypsy Moth - Soil Erosion	June 8th, 2021		Harrison
	Bill Ernat	EMOCOG	June 8th, 2021		Saline, Mi.
	Tracy Byard	CC Administrator	June 8th, 2021		Harrison
	Rick Jones	Hayes Twp. Supervisor	June 8th, 2021		Harrison
	Tom Pirnstill	CCTC	June 8th, 2021		Harrison
	Dan Wilhelm	Summerfield Twp. Supervisor	June 8th, 2021		Harrison
	Bronwyn Asplund	Clare County Commissioner Dist. 6	June 8th, 2021		Harrison
	Marlana Terrian	Clare County Central Dispatch	June 8th, 2021		Harrison
	Luke Potter	City of Clare DPW	June 8th, 2021		Clare
	Jeremy Howard	City of Clare	June 8th, 2021		Clare
	Melissa Deroche	CMDHD	June 8th, 2021		Clare
	Janice LaRose	Arthur Twp. Clerk	June 8th, 2021		Harrison
	Sandi Bristol	Clare County Commissioner Dist. 5	June 8th, 2021		Harrison
	Mike Sobocinski	MSP EMHSD	June 8th, 2021		East Lansing, Mi.

V = Virtual Meeting Format

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet/ Virtual 05/11/2021 10:00AM

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	May 11th, 2021		Harrison, Mi.
	Rick Jones	Hayes Twp. Supervisor	May 11th, 2021		Harrison, Mi.
	Bronwyn Asplund	Clare County BOC	May 11th, 2021		Traverse City/Mobile
	Tracy Byard	Clare County Admin	May 11th, 2021		Harrison, Mi.
	Lori Phelps	Clare County Senior Svcs	May 11th, 2021		Harrison, Mi.
	Melissa Townsend	Clare County Soil Erosion/Gypsy Moth	May 11th, 2021		Harrison, Mi.
	Sandy Bristol	Clare County BOC	May 11th, 2021		Harrison, Mi./Mobile
	Ken Chinavare	CGRESD IT	May 11th, 2021		Harrison, Mi.
	Dan Wilhelm	Supervisor Summerfield twp.	May 11th, 2021		Harrison, Mi.
	Melissa Deroche	CMDHD	May 11th, 2021		Mt. Pleasant, Mi.
	Luke Potter	Clare DPW	May 11th, 2021		Clare, Mi.
	Jeremy Howard	City Manager City of Clare	May 11th, 2021		Clare, Mi.
	Janice LaRose	Clerk Arthur Twp.	May 11th, 2021		Harrison, Mi.
	Bill Ernat	EMCOG	May 11th, 2021		Saline, Mi.
	Jim Chapman	Fire Chief - Clare	May 11th, 2021		Clare, Mi.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet/Virtual 04/13/2021

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	04/13/2021	Director	Harrison, Mi.
	Tom Pirnstill	CCTC	04/13/2021	Director	Harrison, Mi.
	Bronwyn Asplund	CC BOC	04/13/2021	Commissioner Dist. 6	Harrison, Mi.
	Brian Gregory	CPD	04/13/2021	Chief	Clare, Mi.
	Luke Potter	CDPW	04/13/2021	DPW Supt.	Clare, Mi.
	Rick Jones	Hayes Twp.	04/13/2021	Supervisor	Harrison, Mi.
	Ken Hoyt	Hayes Twp.	04/13/2021	Zoning Administrator	Harrison, Mi.
	Bill Ernat	EMCOG	04/13/2021	Planner/Consultant	Saline, Mi.
	Tracy Byard	CC Administration	04/13/2021	County Administrator	Harrison, Mi.
	Janice LaRose	Arthur Twp.	04/13/2021	Twp. Clerk	Arthur Twp. Harrison, Mi.
	Jeremy Howard	City of Clare	04/13/2021	City Manager	Clare, Mi.
	Sandy Bristol	CC BOC	04/13/2021	County Commissioner Dist. 5	Franklin Twp. Harrison, Mi.

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet Virtual – Zoom

03/09/2021 10:00A.M.

	Name	Agency/Dept.	Date	Title	Location
	Jerry Becker	CCEMHSD	03/09/2021		Virtual-Harrison
	Bill Ernat	EMCOG	03/09/2021		Virtual - Saline
	Mike Sobocinski	MSP EMHSD	03/09/2021		Virtual - MSP Lansing
	Bronwyn Asplund	Clare County BOC	03/09/2021		Virtual - Mt. Pleasant
	Melissa Deroche	CMDHD	03/09/2021		Virtual - Mt. Pleasant
	Ken Chinavare	CGRESD	03/09/2021		Virtual - Hatton Twp. Clare
	Ken Hoyt	Hayes Township Government	03/09/2021		Virtual - Hayes Twp.
	Luke Potter	Clare DPW	03/09/2021		Virtual - Clare
	Marlana Terrian	Clare County 911 CD	03/09/2021		Virtual - Harrison
	Lt. Orville Theaker	MSP EMHSD	03/09/2021		Virtual - Rockford
	Jeremy Howard	City Manager - Clare	03/09/2021		Virtual - 'Clare
	Janice Larose	Arthur Township Government	03/09/2021		Virtual - Arthur Twp.
	Sandra Bristol	Clare County BOC	03/09/2021		Virtual - Hamilton Twp.
	V = Virtual Meeting Format				

Clare County Hazard Mitigation Planning Meeting Sign – In Sheet

	Name	Agency/Dept.	Date	Title	Location
V	Jerry Becker	Clare County EMHSD	02/09/2021	Director	Harrison, Mi.
V	Bill Ernat	EMCOG	02/09/2021	Planner	Saline, Mi.
V	Dwayne Miedzianowski	Clare County Sheriff's Dept.	02/09/2021	Undersheriff	Grant Twp. Clare
V	Jim Chapman	Clare Fire Dept.	02/09/2021	Fire Chief	Clare, Mi.
V	Ken Chinavare	Clare Gladwin RESD	02/09/2021	IT Technology Dir.	Hatton twp. Clare
V	Rick Jones	Hayes Twp. Government	02/09/2021	Supervisor	Hayes twp. Harrison, mi.
V	Sandra Bristol	Clare County BOC	02/09/2021	Commissioner Dist. 6	Franklin Twp. Harrison, Mi.
V	Marlana Terrian	Clare County 911	02/09/2021	Director	Harrison, mi.
V	Ken Hoyt	Hayes Twp. Government	02/09/2021	Zoning Administrator	Harrison, Mi.

V = Virtual Meeting Format

APPENDIX B
VOLUNTEER RATE 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
CLARE COUNTY 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 Clare County Hazard Mitigation Advisory Committee (CCHMAC), which was used in advisory capacity for the Clare County data. The CCHMAC 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 cover letter and 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.

Clare County:

- Bronwyn Asplund, Clare County Board of Commissioners Trustee
- Jerry Becker, Clare County Emergency Management Director
- Dave Bondie, Superintendent, Clare County Road Commission
- Sandra Bristol, Clare County Board of Commissioners Trustee
- Tracy Byard, Clare County Administrator (2021-2022)
- Jeff Haskell, Clare County Board of Commissioners Trustee
- Lori Martin, County Clerk
- Dwayne Miedzianowski, Clare County Undersheriff
- Lori Phelps, County Administrator (2022-)
- Tom Pirnstill, Executive Director Clare County Transportation
- Colleen Ritchie Deputy Director, Drain Commission
- Marlana Terrain, 9-1-1 Director
- Melissa Townsend, Manager Clare County Soil Erosion
- Don VanBonn, Clare County Sheriff Lieutenant

City of Clare:

- Jim Chapman, Fire Chief
- Sam Eberhart, Assistant Fire Chief
- Brian Gregory, Police Chief (2021-2022)
- Jeremy Howard, City Manager
- Steve Kingsbury, City Treasurer (2021-2022)
- Diane Lyon, City Clerk
- Luke Potter, DPW Director

- Davis Saad, Police Chief (2022-)
- Shannon Sirpilla City Treasurer (2022-)

City of Harrison:

- Justin Cavanaugh, City Manager (2022-)
- Tracy Connelly, City Manage/Clerk (2021-2022)
- Chris Damvelt, Fire Chief

Arthur Township: Janice LaRose, Township Clerk

Franklin Township:

Frost Township:

Greenwood Township:

- Gail Garrity, Township Trustee
- Rachel Mackson, Township Clerk

Hamilton Township: Sandra Bristol, Designated Attendee

Hayes Township:

- Debra Hoyt, Township Clerk
- Ken Hoyt, Township Zoning Administrator
- Rick Jones, Township Supervisor
- Maye Rood, Township Treasurer

Sheridan Township:

Summerfield Township: Dan Wilhelm, Township Supervisor

Winterfield Township: Mark Hammer, Township Supervisor

[Insert Date]

Dear Local Official,

Clare County staff is working with the East Michigan Council of Governments staff in updating the Clare County 2016 Hazard Mitigation Plan. In order to have a better understanding of the hazards that impact each community within Clare County, we ask that you complete the attached survey and return it to beckerj@clareco.net no later than [Insert Date].

The first page of the survey identifies each of the hazards that were identified as potential threats to the citizens/businesspersons/visitors of Clare 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.

After completing the information on the first page, we ask that the remaining 11 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 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 Hazard Mitigation Plan is dependent upon getting the best, most recent information to include in the Plan. Your response is greatly appreciated. Without your input, we will not have that information in the Plan.

If you have any questions on the survey or the status of the Hazard Mitigation Plan update process, please contact Jerry Becker at beckerj@clareco.net or Bill Ernat at bernat@emcog.org.

Sincerely,

Jerry Becker
Emergency Management Director
Clare County

_____

Local Municipality

Hazard Mitigation Community Survey

Hazard	High Impact	Medium Impact	Moderate Impact	No Impact
Drought				
Invasive Species				
Severe Weather[1]				
Tornadoes/Severe Winds				
Civil Disturbances				
Cyberterrorism				
Dam Failures				
Energy Emergencies				
Extreme Temperatures[2]				
Hazardous Material Incidents[3]				
Infrastructure Failures				
Pipeline/Well Incidents[4]				
Population Changes-Seasonal/Event[5]				
Public Health Emergencies				
Riverine Flooding				
Structural Fires				
Terrorism/Sabotage				
Wildfires				
Fog				
Transportation Accidents				

1- severe weather-ice/sleet storms, snowstorms, hail, lightning, severe winds, and thunderstorms

2- extreme temperatures-extreme cold and extreme heat

3- hazard material incidents-hazardous material fixed site and transportation

4-well/pipeline incidents-oil/gas well incidents and petroleum/gas pipelines

5-population changes- seasonal population changes and major special live events

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	_____	County Emergency Management Staff	_____
Taxing Authority	_____	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. 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. (Hazards can be found on the previous page.)

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(s), location, dates, and approximate attendance. What extra measures are required by your 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 (lessen the impact)? Why?

9. What hazard from the first page do you feel your community is least prepared to mitigate (lessen the impact)? Why?

10. What types of initiatives, improvements or efforts do you think could be implemented that would help reduce your community's vulnerability to specific hazards?

11. Are you aware of any properties that have experienced flood damage to their homes on multiple occasions as a result of flood waters?

_____ _____

Local Municipality Date

_____

Person Completing Survey

HAZARDOUS EVENT DEFINITIONS

BLIZZARDS-includes strong winds (0ver 35 mph), drifting snow, low temperatures, and blowing snow that reduces visibility.

CELSETIAL 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, social, or financial 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.

SHORELINE 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.

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.

Hazard Mitigation Community Survey

Hazard	High Impact	Medium Impact	Moderate Impact	No Impact
Drought	9	3,7,8,10,11	1,2,4,5,6	
Invasive Species	3,4,5,6,10,11	2,7,8	9	1
Severe Weather	2,6,8,9,10	1,4,5,	3,11	7
Tornadoes/Severe Winds	2,4,9,10	1,8	3,5,6,11	7
Civil Disturbances		1,2,6	4,5,8,10	3,7,9,11
Cyberterrorism	1,2,4	8	5,6,10,11	3,7,9
Dam Failures	1	2,10	6	3,4,5,7,8,9,11
Energy Emergencies	4,5,8	1,2,6,10,11	3,7,9	
Extreme Temperatures	4,8	5,6,10,11	1,2,3,9	7
Hazardous Material Incidents		1,2,4,11	5,6,7,8,10	3,9
Infrastructure Failures	4,5	1,2,8,10	6,7,9,11	3
Pipeline/Well Incidents	4,11	6,10	1,2,5,8	3,7,9
Population changes-Seasonal/Event	8	1,2,4,5,6,7,10	11	3,9
Public Health Emergencies	4,7,8,9	5,6,10,11	1,2,3	
Riverine Flooding		9,10	1,2,3,4,6,11	5,7,8
Structural Fires	2	1,3,5,6	4,7,8,9,10,11	
Terrorism/Sabotage		2,4,11	6,7,8,10	1,3,5,9
Wildfires	4,6	11	2,5,7,8,9,10	1,3,
Fog		2,3	1,4,6,7,8,10	5,9,11
Transportation Accidents		7,8	1,2,3,4,5,6,9,11	10

1- City of Clare
2- City of Harrison
3- Arthur Township
4- Franklin Township
5- Frost Township
6- Greenwood Township
7- Hamilton Township
8- Hayes Township
9- Sheridan Township
10- Summerfield Township
11-Winterfield Township

1. FEMA is well aware that municipal resources vary with each municipality. Please identify those resources below that are available to your community.

   These responses can be found in Table 3.5 on page 40.

2. 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. (Hazards can be found on the previous page.)

Municipality	Events
City of Clare	NA
City of Harrison	NA
Arthur Township	NA
Franklin Township	Severe Winds and Tornadoes- property damages
Frost Township	NA
Greenwood Township	NA
Hamilton Township	Heavy Rains-took out culvert on Cranberry Lake Road
Hayes Township	NA
Sheridan Township	Tornadoes/Flooding
Summerfield Township	NA
Winterfield Township	Gas Pipeline-failure; Oil Well-leaks in 2021

3. Does your community have large seasonal shifts in population?
   Yes-City of Harrison, Frost Township, Franklin Township, Greenwood Township, Hamilton Township, Hayes Township, Summerfield Township, Winterfield Township
   No-City of Clare, Arthur Township, Sheridan Township

   Are there a significant number of seasonal homes in the community?
   Yes-City of Harrison, Frost Township, Franklin Township, Greenwood Township, Hamilton Township, Hayes Township, Summerfield Township, Winterfield Township
   No-City of Clare, Arthur Township, Sheridan Township

   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?

Municipality	Response
City of Clare	NA
City of Harrison	Summer brings in tourists, and in the winter, the snowbirds leave for the south.
Arthur Township	NA
Franklin Township	Summer recreational use, no impact.
Frost Township	Summer recreational homes and snowbirds leaving in the winter. No impact.
Greenwood Township	Summer visitors brings in additional traffic.
Hamilton Township	Summer recreation. No hazards, only discomfort with the additional people.
Hayes Township	Recreational activities.

Sheridan Township	NA
Summerfield Township	State-owned Land has brought in many people seeking recreational activities including side x side use.
Winterfield Township	Hunting in the fall, summer recreation, and COVID are all factors. This does put a strain on local first responders.

4. Are there any annual events held in the community that attract large numbers of people? If so, describe the event(s), location, dates, and approximate attendance. What extra measures are required by your community?

Municipality	Events
City of Clare	Irish Festival brings in 10,000 or more. Additional police presences is needed as well as road closures.
City of Harrison	February-Frost Bite Festival July-Clare County Fair August-Harrison Street Fair
Arthur Township	NA
Franklin Township	NA
Frost Township	NA
Greenwood Township	NA
Hamilton Township	NA
Hayes Township	Summer holidays and hunting season.
Sheridan Township	Amish
Summerfield Township	Terror Run-700-1,000 vehicles (ATV Charity Event) Freedom Ride-500 motorcycles (Charity ride for veterans) Dates change annually.
Winterfield Township	River activities in the summer-increase of gas field and compressor plant workers.

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 Clare, City of Harrison, Arthur Township, Franklin Township, Frost Township, Hamilton Township, Hayes Township, Sheridan Township, Summerfield Township, Winterfield Township
   No-Greenwood Township (individual computers, no centralized network)

6. Has your community installed lightning protection devices on the community's infrastructure? If no, why not?

   Yes-City of Clare, City of Harrison (water towers only), Greenwood Township (township hall has a lightning rod), Hamilton Township (just on tower), Hayes Township, Sheridan Township (light at the Township Hall), Summerfield Township, Winterfield Township (only some structures)
   No- Arthur Township, Franklin Township, Frost Township (NA)

7. Does your staff utilize surge protectors on critical electronic equipment? If no, why not?

Yes-City of Clare, City of Harrison, Arthur Township, Franklin Township, Frost Township, Hamilton Township, Hayes Township, Summerfield Township, Winterfield Township
No-Greenwood Township, Sheridan Township

8. What hazard from the first page do you feel your community is best prepared to mitigate (lessen the impact)? Why?

Municipality	Hazard
City of Clare	NA
City of Harrison	Weather events with a warning system in place as well as shelters
Arthur Township	NA
Franklin Township	NA
Frost Township	Structural Fires-there is a contract with Harrison Fire Dept.
Greenwood Township	Fires-they have contracted services; Crime-they have extra patrols from the Sheriff's Department; Invasive Species-Lake Board assess and contracts to treat lake.
Hamilton Township	NA
Hayes Township	NA
Sheridan Township	NA
Summerfield Township	Energy Emergencies-they lose power so often, many residents have generators.
Winterfield Township	Wildfires-Resources include state forest staff as well as their own fire department.

9. What hazard from the first page do you feel your community is least prepared to mitigate (lessen the impact)? Why?

Municipality	Hazard
City of Clare	Civil Disturbances-lack of Law Enforcement personnel
City of Harrison	Civil Disturbances/Cyberterrorism-these activities occur infrequently
Arthur Township	Severe Winds & Wildfires
Franklin Township	Infrastructure Failures-need generators
Frost Township	Energy Emergencies and Invasive Species
Greenwood Township	Public Health Emergencies-lack of medical services lacking septic systems
Hamilton Township	Severe Weather
Hayes Township	NA
Sheridan Township	Tornadoes and Flooding
Summerfield Township	Invasive Species-there is currently a Gypsy Moth issue and they have been advised there is nothing that can be done.
Winterfield Township	Gas pipelines-control of pipes is out of their control

10. 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	Activity
City of Clare	NA
City of Harrison	Countywide mobile alert system is needed.
Arthur Township	Generators
Franklin Township	Siren for storm warnings and possibly pipeline issues.
Frost Township	Warning signs for weather events. Assistance with invasive species
Greenwood Township	NA
Hamilton Township	Weather alerts
Hayes Township	More paved road.
Sheridan Township	NA
Summerfield Township	NA
Winterfield Township	NA

11. Are you aware of any properties that have experienced flood damage to their homes on multiple occasions as a result of flood waters?

    Yes-Hamilton Township, Hayes Township, Sheridan Township, Summerfield Township

    No-City of Clare, City of Harrison, Arthur Township, Franklin Township, Frost Township, Greenwood Township, Winterfield Township

APPENDIX D
CLARE COUNTY RESIDENT SURVEY RESPONSES

CLARE COUNTY HAZARD MITIGATION RESIDENTIAL SURVEY

Welcome! Clare County is in the process of updating the 2016 Clare County Hazard Mitigation Plan as required by the Federal Emergency Management Agency (FEMA) to qualify for hazard pre-disaster funding. As part of this process, the Clare County Hazard Advisory Committee (CCHAC) would like your feedback and is seeking your assistance in identifying the concerns of Clare County residents as they relate to natural and man-made hazards. Please fill out the survey, as all the information will be useful in the update process. Thank you for taking the time to assist the Committee in this very important process.

1. Please identify the Municipality/Township in which you live. _____

2. Do you own your home? Yes _____ No _____

3. Do you have internet access at home? Yes _____ No _____

   If so, how do you access the internet? _____

4. Do you own a smart phone? Yes _____ No _____

5. How long have you lived at your current address? _____

6. Please indicate below the level of impact each of the hazards have had on you, your family, and/or your property since you have lived in Clare County. Please use the following levels:
   0-No Impact 1-Impact but no Significant Damages 2-Significant Damages
   3-Significant Damages with Injuries

Event	No Impact	Impact but no Significant Damage	Significant Damage	Significant Damages with Injuries
Drought				
Invasive Species				
Hail				
Lightning				
Ice/Sleet Storms				
Snowstorms				
Tornadoes				
Severe Winds				
Civil Disturbances				
Cyberterrorism				
Dam Failures				

Energy Emergencies				
Extreme Heat				
Extreme Cold				
Hazardous Materials-Transportation				
Hazardous Materials Fixed Site				
Infrastructure Failures				
Gas/Oil Well/Pipeline Incidents				
Seasonal Population Changes				
Special Events				
Public Health Emergencies				
Riverine Flooding				
Structural Fires				
Terrorism/Sabotage				
Wildfires				
Fog				
Transportation Accidents				

7. How are you currently notified when there is a disaster or emergency?
Is this notification system effective? Why or why not?

_____

Radio/Television _____ Outdoor warning siren _____
Mobile Alert _____ Landline _____

Public Service Announcement _____ Emergency Weather Radio _____
Other _____ Not Notified _____

8 Do you currently have flood insurance?

Yes _____ No _____ Not Required _____

9. Have you taken measures to make your home/property more resilient to disasters?
If Yes ____, what are they? No_____ Not Sure _____

_____
_____
_____
_____
_____

10. Does your family have a Family Disaster Kit?

Yes _____ No _____

11. Do you or a member of your family have a special needs that would require assistance during a disaster? If so, what are those needs?

Yes _____ No _____

_____

_____

_____

HAZARDOUS EVENT DEFINITIONS

BLIZZARDS-includes strong winds (0ver 35 mph), drifting snow, low temperatures, and blowing snow that reduces visibility.

CELSETIAL 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, social, or financial 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.

SHORELINE 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.

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.

CLARE COUNTY HAZARD MITIGATION RESIDENTIAL SURVEY RESULTS

1. Where do you live?

Community	Responses	Community	Responses
City of Clare	5	Hatton Township	6
City of Harrison	19	Hayes Township	38
Village of Farwell	4	Lincoln Township	11
Arthur Township	3	Redding Township	2
Franklin Township	2	Sheridan Township	1
Freeman Township	3	Summerfield Township	1
Frost Township	6	Surrey Township	5
Garfield Township	6	Winterfield Township	1
Grant Township	9	Lake Station	3
Greenwood Township	12	Piney Woods	1
Hamilton Township	7		

2. Do you own your home?
   Yes 140 No 8

3. Do you have internet access in your home?
   Yes 139 No 9

   If so, how do you access it?
   In numerous responses the answer was inadequate to determine the source of the internet. No tabulation was made.

4. Do you have a smart phone?
   Yes 142 No 6

5. How long have you lived at your current address?

Length of Time	Number of Responses	Length of Time	Number of Responses
< 1 year	7	16-20 years	21
1-5 years	46	21-25 years	14
6-10 years	24	26-30 years	6
11-15 years	12	31+ years	18

6. Please indicate below the level of impact each of the hazards have had on you, your family, and/or your property since you have lived in Clare County. Please use the following levels:
   0-No Impact 1-Impact but no Significant Damages 2-Significant Damages

3-Significant Damages with Injuries

Event	No Impact	Impact but no Significant Damage	Significant Damage	Significant Damages with Injuries
Drought	97	41	10	0
Invasive Species	26	8	62	22
Hail	81	51	14	3
Lightning	76	51	14	7
Ice/Sleet Storms	Information not tabulated.			
Snowstorms	35	69	31	13
Tornadoes	108	28	10	2
Severe Winds	17	62	50	19
Civil Disturbances	123	17	6	2
Cyberterrorism	123	19	0	3
Dam Failures	137	9	0	2
Energy Emergencies	62	55	22	9
Extreme Heat	79	55	14	3
Extreme Cold	76	45	22	5
Hazardous Materials-Transportation	126	15	4	2
Hazardous Materials Fixed Site	127	13	5	3
Infrastructure Failures	112	18	16	2
Gas/Oil Well/pipeline Incidents	124	17	4	3
Seasonal Population Changes	88	38	18	4
Special Events	120	22	6	0
Public Health Emergencies	61	46	30	11
Riverine Flooding	135	8	5	0
Structural Fires	124	11	8	5
Terrorism/Sabotage	130	11	5	2
Wildfires	125	16	5	2
Fog	87	47	10	4
Transportation Accidents	101	31	13	3

7. How are you currently notified when there is a disaster or emergency? Please select all that apply.

Notification Type	Responses	Notification Type	Responses
Radio/Television	107	Landline	5
Mobile Alert	117	Outdoor Warning Siren	66
Public Service Announcement	36	Other: Scanner Facebook	 1 1

Emergency Weather Radio	19	Not Notified*	6

*-Persons responding positive notifications and not notified were not included in this category.

Is this notification effective?
Yes 122 No 26

"No" response notifications were as follows:

a-Radio/Television, Mobile Alert: Not always effective due to satellite being down or no cell phone service during storms/winds
b-Mobile Alert: Always after the fact
c-Radio/Television: usually to0 late already know what's happening
d-Radio/Television, Mobile Alert, Outdoor Warning Siren, Not Notified: NA
e-Radio/Television Mobile Alert, Public Service Announcement, Outdoor Warning Siren: Don't always get
f-Not Notified: We don't receive notices other than social media
g-Radio/Television: If you're not in front of it, you don't know in time
h-Not Notified: Never seen any notifications about anything around here. It's secret.
i-Outdoor Warning Siren: Don't know what's happening
j-Mobile Alert: Never seen or heard about this before
k-Not Notified: Because we are not notified
l-Mobile Alert, Outdoor Warning Siren: Information is insufficient/not specific
m-Not Notified: Don't get them
n-Outdoor Warning Siren, Not Notified: Don't really hear the siren, it's too far away
o-Radio/Television, Outdoor Warning Siren: sometimes the siren doesn't go off
p-Radio/Television, Mobile Alert, Public Service Announcement, Outdoor Warning Siren: The sirens sometimes do not go off in time
q-Radio/Television, Mobile Alert, Public Service Announcement: No signals in bad storm
r-Mobile Alert, Not Notified: Intermittent
s-Mobile Alert: Normally family notifies each other
t-Radio/Television: Can't hear southern warning sirens.
u-Not Notified: We are not notified
v-Radio/Television, Mobile Alert: Do not always have on. Cannot hear the sirens
w-Not Notified: No notification is not satisfactory.
x-Radio/Television, Mobile Alert: Don't watch much tv
y-Radio/Television: My area not always reported
z-Radio/Television: Sometimes notification comes too late

8. Do you currently have flood insurance?
Yes 11 No 137

9. Have you taken measures to make your home/property more resilient to disasters?
If Yes ____, what are they? No_____Not Sure _____

No information was provided for the responses to this question.

10. Does your family have a Family Disaster Kit?
    Yes 33 No 115

11. Does anyone in your family have special needs that would require assistance during a disaster?
    Yes 25 No 123

APPENDIX E
FINAL MITIGATION STRATEGIES

1. Public early warning systems and networks and NOAA Weather Radio.
2. Producing and distributing family emergency preparedness information relating to all hazards, including development of a Family Disaster Plan and preparation of a Family Disaster Supplies Kit.
3. Training and increased use of weather spotters.
4. Work with power companies to inventory condition of power line rights-of-way and identify priority sections to clear branches and trees from power lines. The end goal is to create and maintain a disaster resistant landscape in public rights-of-way.
5. Installing surge protectors and lightning protection devices on the community's communications infrastructure, electronic equipment, and other critical equipment.
6. Proper anchoring of manufactured homes and exterior structures such as carports and porches.
7. 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.)
8. Anticipation of potential drought conditions, and preparation of drought contingency plans.
9. Establishing heating centers/shelters for vulnerable populations.
10. Proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc.
11. Farmer preparedness to address livestock needs/problems.
12. Pre-arranging for shelters for stranded motorists/travelers, and others.
13. Ensure key gasoline stations have the capacity to pump gasoline during power outages.
14. Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.
15. 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.
16. Special arrangements for payment of heating bills.
17. 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 houses; thorough cleaning-up of spilled flammable fluids; and keeping garage areas protected from blowing embers).
18. Organizing neighborhood wildfire safety coalitions to plan how the neighborhood could work together to prevent a wildfire.

19. Residents should plan several escape routes away from their homes, both by car and by foot. Residents should also be familiar with 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.
20. Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.
21. 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).
22. Mutual aid pacts with neighboring communities, state agencies, and other appropriate agencies for all first responders.
23. 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).
24. 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.
25. 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).
26. Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.
27. 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.
28. Including wildfire safety information in materials provided by insurance companies to area residents.
29. Ensuring consistency of dam Emergency Action Plan (EAP) with the local Emergency Operations Plan (EOP).
30. Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).
31. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
32. Constructing emergency access roads to dams.
33. Trained, equipped, and prepared first responders.
34. Floodplain-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.
35. 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.

36. Individual communities should prepare future land use plans and capital improvement programs to plan for their future needs.
37. Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
38. Public awareness of the need for permits (EGLE Part 31) for building in floodplain areas.
39. Dredging and clearance of sediment and debris from drainage channels.
40. Joining the National Flood Insurance Program.
41. Participating in the Community Rating System (CRS).
42. Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
43. Farmland and open space preservation.
44. Build the capabilities of the county GIS program to function as a tool to address multiple hazards. This effort would require the creation/updating of datasets such as parcels/ownership, location of all structures, driveways with ingress/egress conditions, roads, forest types, ownership types, floodplains, utilities (power lines, gas lines, and water lines), wetlands, water features, bridges and culverts, (SARA III sites).
45. Monitoring of water levels with stream gauges and trained monitors.
46. Training for local officials on flood fighting, floodplain management, floodproofing, and all hazardous situations.
47. Road closures and traffic control during all hazardous situations.
48. Floodplain management to include prohibition of new construction within 100-year flood levels, floodproofing (wet and dry) existing structures within 100-year flood levels and relocating existing mechanical and utility devices from 100-year flood level areas.
49. Purchase of generator to maintain an adequate level of emergency power generators to supply emergency water needs, wastewater processing, emergency communications, emergency health care, and shelters.
50. Protecting watershed by utilization of erosion control techniques and protecting wetlands and natural water retention areas.
51. Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
52. Purchase or transfer of development rights – to discourage development in floodplain areas.
53. Stormwater management ordinances or amendments.
54. Wetlands protection regulations and policies.
55. Regional/watershed cooperation.
56. Use of check valves, sump pumps and backflow preventers in homes and buildings.
57. Maintaining an active and viable Local Emergency Planning Committee (LEPC).
58. Developing and exercising site emergency plans and community response plans as required under SARA Title III.
59. 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.)
60. Training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials.

61. Compliance with/enforcement of Resource Conservation and Recovery Act (RCRA) standards. (The RCRA is the law that creates the framework for proper management of hazardous and non-hazardous solid waste.)
62. Facility and community training and exercise programs.
63. Proper separation and buffering between industrial areas and other land uses.
64. Evacuation plans and community awareness of them.
65. Anti-terrorist/sabotage/civil disturbance measures.
66. Improved design, routing, and traffic control at problem roadway areas.
67. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
68. Proper planning, design, maintenance of, and enhancements to designated truck routes.
69. Use of ITS (intelligent transportation systems) technology, including the purchase of portable/changeable message signs.
70. Locating schools, nursing homes, and other special facilities away from major hazardous material transportation routes.
71. Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).
72. Burying electrical and phone lines, where possible, to resist damage from severe winds, lightning, ice, and other hazards.
73. Redundancies in utility and communications systems, especially "lifeline" systems.
74. Mutual aid assistance for failures in utility and communications systems (including 9-1-1).
75. Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.
76. Replacement or renovation of aging structures and equipment (to be made as hazard-resistant as economically possible).
77. Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (1-800-482-7171).
78. Awareness of hydrogen sulfide gas dangers and personal protection actions for these dangers.
79. 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.
80. Encouraging residents to receive immunizations against communicable diseases.
81. Demolition and clearance of vacant condemned structures to prevent rodent infestations.
82. Monitor vacant commercial/residential sites, as well as their demolition/cleanup for hazardous waste and rodent Infestation.
83. Maintaining a community public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks.
84. Community support of free or reduced-expense clinics and school health services.
85. Preventing public contact with contaminated sites or waters (including floodwaters).
86. Brownfield and urban blight clean-up activities.
87. Pollution control, enforcement, and cleanup; proper disposal of chemicals and scrap materials.
88. Separation of storm and sanitary sewer systems.
89. Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a for actions that may threaten the community including sabotage/ terrorism/WMD attacks.

90. Implementing school safety and violence prevention programs.
91. Heightening security at public gatherings, special events, and critical community facilities and industries.
92. Using laminated glass and other hazard-resistant, durable construction techniques in public buildings and critical facilities.
93. Greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings.
94. Establishing avenues of reporting (and rewards) for information preventing terrorist incidents and sabotage.
95. Consistent use of computer data back-up systems and anti-virus software.
96. Provide personnel on a temporary basis to handle greater loads on public services.
97. Provide for emergency equipment to deal with higher call rates.
98. Design requirements for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, etc. that take into consideration emergency and security needs.
99. 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).
100. Proper siting of tire storage and processing facilities (land use planning that recognizes scrap tire sites as a real hazard and environmental threat).
101. Code existence and enforcement.
102. 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).
103. Family members and residents should know how to use a fire extinguisher.
104. Defensible space around structures in fire-prone wildland areas.
105. 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.).
106. Locating pipelines away from dense development, critical facilities, special needs populations, and environmentally vulnerable areas whenever possible.
107. Increasing public awareness of pipeline locations and appropriate emergency procedures.
108. Community awareness of subsidence risks and effects.

APPENDIX F
CLARE COUNTY 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 windowpanes, 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 (EGLE 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
PROPOSED CLARE COUNTY PROJECTS

HIGH PRIORITY PROJECTS

Item 1

Deepening, widening, clearing of Tobacco Creek/Drain through Downtown Clare.

Action: Project will include the replacement of bridges, retaining walls, and dredging of Tobacco Creek in downtown Clare.

- Location: City of Clare
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $17,500,000
- Potential Funding Source(s): FEMA grants, local funding (special assessment)
- Time Frame: Project began in 2020 and is anticipated to be completed in 2022.
- Priority: High
- Benefit(s): Project has been designed to reduce flooding along Tobacco Creek and specifically in downtown Clare.

Item 2

Remove existing structures from flood hazard areas

Action: Purchase and remove structures throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: flooding and erosion
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $10,000,000 (Estimated)
- Potential Funding Source(s): FEMA grants
- Time Frame: Project began in 2020 in the City of Clare. Project has expanded to include all of Clare County.
- Priority: High
- Benefit(s): Project has been designed to reduce flooding along Tobacco Creek and specifically in downtown Clare and the vicinity. With the expanded scope, more properties can be removed from flood hazard areas.

Item 3

Public education on underground water supply and wellhead protection programs.

Action: Public education campaign to inform the public of the threat of water contamination. Campaign will include public access cable, handouts/flyers at public events within the County, and social media.

- Location: City of Clare, City of Harrison
- Lead Agency: City of Harrison

- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Public Health Emergency
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $2,000 (Estimated)
- Potential Funding Source(s): municipal budgets
- Time Frame: Ongoing
- Priority: High
- Benefit(s): Maintain public health by providing potable drinking water.

Item 4

Purchase generators to be utilized at municipal facilities throughout Clare County

Action: Purchase of propane, natural gas, and diesel-powered generators for backup power at all municipal facilities in Clare County that do not have them.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Infrastructure failures, energy emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,000,000 (Estimated)
- Potential Funding Source(s): American Rescue Plan Act (ARPA) funds
- Time Frame: Ongoing, generators are purchased individually, as funds become available. Generators are anticipated to be purchased by 2027.
- Priority: High
- Benefit(s): Municipal office throughout County can remain open during power outages. Additionally, several municipal building are also utilized as shelters.

Item 5

Educate public on shelters and warning systems

Action: Educate the general public on the location of public shelters and the use of warning systems through the use of flyers, Public Service Announcements (PSAs), and presentations.

- 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 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: Goal 1, objective b
- Project Costs: $5,000 (Estimated)
- Potential Funding Source(s): OEM budget
- Time Frame: Ongoing
- Priority: High
- Benefit(s): Public advised of location of shelters and warning system usage.

Item 6 (NEW)

Replace lead pipes and connections to all water service lines

Action: Replace all lead pipes and connections to all water service lines.

- Location: City of Clare and City of Harrison

- Lead Agency: City of Clare, City of Harrison, Village of Farwell
- Participating Agencies: Clare County Building Department, and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Public Health Emergencies
- Goal/Objective Addressed: goal 2, objective b
- Project Costs: $6,600,000 (Estimated)
- Potential Funding Source(s): USDA grants, local municipal budgets, State of Michigan Funding
- Time Frame: Project was started in 2021, state mandate in 2019 to complete project in 20 years 2039.
- Priority: High
- Benefit(s): Replacement of lead pipes and connections will improve the quality of potable water in these municipalities and potentially remove a health/safety issue with the removal of lead in the water from the service line.

Item 7 (NEW)

Complete advance training for first responders and specialty teams

Action: Continue educating/training of first responders and specialty on up-to-date techniques and strategies

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective d
- Project Costs: $100,000 (Estimated)
- Potential Funding Source(s): Local budgets, Homeland Security Grant Program (HSGP), State Fire Training Council
- Time Frame: Ongoing
- Priority: High
- Benefit(s): First responders and specialty team members better prepared to address hazards/ emergency situations.

Item 8 (NEW)

Dam Evaluation/Repair Program

Phase I: Complete a structural assessment of existing dams in the County

Action: Complete a structural assessment of all dams within Clare County.

- Location: County-wide
- Lead Agency: Office of Dam Safety
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $50,000 (Estimated)
- Potential Funding Source(s): EGLE, dam owners, special assessment districts
- Time Frame: In progress, started in 2022 and anticipated to be completed in 2023.
- Priority: High
- Benefit(s): The assessment done to identify potential structural problems with the dams in Clare County.

Phase II: Devise a program to repair/replace dams using public/private partnership

Action: Develop a program using public/private dollars to repair/replace dams within Clare County based on the assessment completed in item 29.

- Location: County-wide
- Lead Agency: Office of Dam Safety
- Participating Agencies: Clare County Drain Commission, dam owners, and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000,000 (Estimated)
- Potential Funding Source(s): USGA grants, EGLE grants, State of Michigan, municipal budgets
- Time Frame: Depending on fund availability, the work is anticipated to be complete by 2030.
- Priority: High
- Benefit(s): After dams have been repaired/replaced, potential flooding due to dam failure will be lessened.

Item 9 (NEW)

Develop gas and natural gas list to maintain supply chain to businesses and governmental agencies to distribute in emergency situations

Action: Maintain the list of suppliers able to distribute fuel/natural gas/propane through normal supply chain.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Energy emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,000 (Estimated)
- Potential Funding Source(s): OEM budget
- Time Frame: This is an ongoing process.
- Priority: High
- Benefit(s): Maintain supply chain for energy distribution in times of emergencies and/or disasters.

Item 10 (NEW)

Enhance warning and monitoring systems of water treatment facilities

Action Enhance warning and monitoring systems of water treatment facilities.

- Location: City of Clare, City of Harrison, and Village of Farwell
- Lead Agency: City of Clare, City of Harrison, and Village of Farwell
- Participating Agencies: EGLE and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $5,000,000 (Estimated)
- Potential Funding Source(s): USDA grants
- Time Frame: Project was started in 2022 and is anticipated to be completed in 2023.
- Priority: High

- Benefit(s): Water treatment facilities better protected to prevent compromises to water treatment system.

Item 11 (NEW)

Educate public on benefits of RAVE alerts

Action: Notify public of RAVE notification system and encourage public to opt into the system.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $4,000 (Estimated)
- Potential Funding Source(s): 9-1-1 budget
- Time Frame: This is an ongoing process.
- Priority: High
- Benefit(s): Public education of use of mobile devises for prompting/alerts on local emergency situations. Also will provide access to Integrated Public Alert Warning System (IPAWS) and Wireless Emergency Alerts (WEA).

Item 12 (NEW)

Shamrock Dam replacement/lake dredging and spillway improvements

Action: This project will replace the existing with an upgraded dam, install an emergency spillway, upgrade the dam infrastructure, and dredge the lake to its previous (1962) depth.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE, Michigan Department of Treasury, and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Dam failures
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $8,200,000 (estimate)
- Potential Funding Source(s): USDA grants, special assessment
- Time Frame: Project started in 202i and is anticipated to be completed by 2026.
- Priority: High
- Benefit(s): Replacing Shamrock Dam and infrastructure along with including a will mitigate the changes of a dam failure as well as damages to the properties within the shadow of the dam.

Item 13 (NEW)

City of Harrison Sewer Improvements

Action: Upgrade sewer system with new sewer lining, manhole improvements, and aeration system improvements.

- Location: City of Harrison
- Lead Agency: City of Harrison
- Participating Agencies: EGLE and USDA
- Hazards Addressed: Infrastructure failures
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $2,400,000
- Potential Funding Source(s): USDA grants, FEMA grants

- Time Frame: Project started in 2022 and is anticipated to be completed in 2023.
- Priority: High
- Benefit(s): Improvements to the sewer system will improve system and potentially reduce flooding.

Item 14 (NEW)

City of Harrison water system improvements

Action: Upgrade the water system with upgrades to the well pumps, water meters, replacement of the watermain, and improvements to the water tower.

- Location: City of Harrison
- Lead Agency: City of Harrison
- Participating Agencies: EGLE, USDA
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $6,000,000
- Potential Funding Source(s): USDA grants, USDA loans
- Time Frame: Project started in 2022 and is anticipated to be completed in 2023.
- Priority: High
- Benefit(s): The improvements to the water system, will improve the quality of the potable water, as well as upgrade the infrastructure, mitigating infrastructure failures.

Item 15 (NEW)

Expand the wastewater treatment system within Hayes Township

Action: Expand the wastewater collection and disposal services in the Township from Townline Lake Road north to US-127 along North Clare Avenue.

- Location: Hayes Township
- Lead Agency: Hayes Township
- Participating Agencies: ELGE and USDA
- Hazards Addressed: Public health emergencies
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $10,000,000
- Potential Funding Source(s): USDA Grants
- Time Frame: In progress The feasibility study is in process of be redone. After study is complete, the work timeline can be established.
- Priority: High
- Benefit(s): Limit the environmental impacts by reducing the burden on the existing septic fields.

Item 16 (NEW)

City of Clare Water System Improvements

Phase I: City of Clare Water Plant upgrades-treatment improvements

Action: Upgrade the City of Clare water plant equipment, installation of a SCADA system for monitoring, add city well, purchase GIS, and upgrade the pumps and treatment system.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b

- Project Costs: $2,800,000
- Potential Funding Source(s): MEDC, CDBG grants and municipal funds
- Time Frame: The planning phase has been initiated. Work is anticipated to begin in 2023 and completed in 2024.
- Priority: High
- Benefit(s): Replacing/upgrading the existing water plant/treatment facilities will mitigate the infrastructure failures as they relate to the water plant and wells.

Phase II: City of Clare Water Plant upgrades-building improvements

Action: Upgrade the City of Clare water plant building with the replacement of piping, valves, and aeration tower.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $2,000,000 (Estimate)
- Potential Funding Source(s): USDA grants and loans
- Time Frame: This phase of the project will be initiated after the first phase is complete and should take several years to complete.
- Priority: High
- Benefit(s): Replacing/upgrading the existing water plant building with the replacement of pipes and aeration tower will mitigate the infrastructure failures.

Phase III: City of Clare Water Plant upgrades-watermain replacement, additional well

Action: This phase of the project will add a well to the current system and will replace nearly 9000 linear feet of 8 inch watermain.

- Location: City of Clare
- Lead Agency: City of Clare
- Participating Agencies: EGLE and MEDC
- Hazards Addressed: Infrastructure failures, public health emergencies
- Goal/Objective Addressed: goal 3, objective b
- Project Costs: $3,500,000
- Potential Funding Source(s): USDA grants and loans
- Time Frame: The third and final phase of this project is anticipated to be completed in 2032.
- Priority: High
- Benefit(s): Increasing the capacity of water for the city as well as replacing a lengthy portion of the watermain will provide allow better service to the residents of Clare.

Item 17

Trim tree branches around power lines

Action: Consumers Energy, Tri County Electric, and Wolverine Power have ongoing tree trimming initiatives along the power lines rights-of-way.

- Location: County-wide
- Lead Agencies: Consumers Energy, Tri County Electric, and Wolverine Power
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Infrastructure failures, energy emergencies

- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $1,000,000 (Estimated)
- Potential Funding Source(s): Consumers Energy, Tri County Electric, and Wolverine Power
- Time Frame: Ongoing, this is a budgeted item with the utility companies.
- Priority: High
- Benefit(s): The trimming of trees would lessen the duration of power failures as well as the number of power failures due to downed power lines.

MEDIUM PRIORITY PROJECTS

Item 18 (NEW).

Repair/replace sirens as identified in the study completed in 2022

Action: Complete the repair/replacement of sirens 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 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $1,500,000 (Estimated)
- Potential Funding Source(s): Federal Emergency Management Agency (FEMA) grants, United States Department of Agriculture (USDA) grants
- Time Frame: 2027
- Priority: Medium
- Benefit(s): Provide residents, businesses, and visitors with advance warning of oncoming hazards.

Item 19

Purchase and distribute smoke detectors and carbon monoxide detectors

Action: Acquire/distribute smoke detectors and carbon monoxide detectors to households throughout the County.

- Location: County-wide
- Lead Agency: Clare County Fire Chiefs Association
- Participating Agencies: City of Clare, City of Harrison, Red Cross, and State Fire Marshall
- Hazards Addressed: Fire, public health emergencies
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $5,000
- Potential Funding Source(s): Red Cross
- Time Frame: This is an annual program run by Red Cross.
- Priority: Medium
- Benefit(s): Households are warned of carbon monoxide and/or smoke and fires.

Item 20 (NEW)

Broadband Expansion

Phase I: Complete an assessment of current broadband coverage

Action: Complete an assessment to identify areas with unserved or underserved broadband services.

- Location: County-wide (State-wide)

- Lead Agencies: State of Michigan Broadband Office, Connect Michigan
- Participating Agencies: OEM and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000
- Potential Funding Source(s): Clare County budget
- Time Frame: This was initiated in 2022 and is anticipated to be completed by November 2022.
- Priority: Medium
- Benefit(s): Provide better communications services to unserved and underserved areas of Clare County.

Phase II: Collaborate with broadband providers to expand coverage

Action: Install broadband to unserved and underserved residents in Clare County.

- Location: County-wide
- Lead Agency: Clare County Broadband Network Users Group (CCBNUG)
- Participating Agencies: OEM and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $54,100,000
- Potential Funding Source(s): Broadband Equity Access and Deployment (BEAD) grants
- Time Frame: If project is done in total, work is anticipated to be done by 2025.
- Priority: Medium
- Benefit(s): Provide better communications services to unserved and underserved areas of Clare County.

Item 21

NOAA Weather Radio Program

Phase I: Purchase and distribute National Oceanic Atmospheric Administration (NOAA) weather radios

Action: Purchase NOAA weather radios for households/businesses in Clare County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $50,000
- Potential Funding Source(s): Trans-Canada Pipeline Grants, FEMA Grants
- Time Frame: This is an annual request from the OEM. First phase completed in 2022.
- Priority: Medium
- Benefit(s): Households/businesses will be advised of oncoming hazardous events.

Phase II: Promote the use of NOAA weather radios

Action: Promote the use/placement of NOAA weather radios to optimize usage.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: OEM and the list of participating municipalities can be found in Table 6.1

on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective a
- Project Costs: $1,000
- Potential Funding Source(s): OEM budget
- Time Frame: Ongoing
- Priority: Medium
- Benefit(s): Households/businesses will be advised of oncoming hazardous events.

Item 22 (NEW)

Purchase cameras for local business districts

Action: Purchase cameras to be installed throughout the downtown business districts.

- Location: City of Harrison, City of Clare, Village of Farwell
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Civil Disturbances, terrorism/sabotage
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $750,000
- Potential Funding Source(s): USDA grants, FEMA grants, local municipal and Downtown Development Authority (DDA) budgets
- Time Frame: Project began in 2022 in the City of Clare and is anticipated to be completed by 2026 for all participants.
- Priority: Medium
- Benefit(s): Project will provide a safer work/business environment for employees and visitors to the downtowns.

Item 23 (NEW)

Secure GIS for local municipalities

Action: Acquire GIS software/hardware for local municipality users.

- Location: County-wide
- Lead Agency: Clare County Equalization Department
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $500,000
- Potential Funding Source(s): Municipal budgets
- Time Frame: Anticipated to begin in 2023 and completed by 2026,
- Priority: Medium
- Benefit(s): Municipalities will have access to better, more complete information on events, facilities, and critical infrastructure within Clare County.

Item 24 (NEW)

Update and enforce zoning regulations

Action: Municipalities to update and enforce local zoning regulations to restrict developments within local floodplains.

- Location: County-wide

- Lead Agency: City of Clare, City of Harrison, Arthur, Hamilton, Hayes, and Sheridan Townships
- Participating Agencies: OEM and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 4, objective b
- Project Costs: Costs will vary depending on the municipality and their update process.
- Potential Funding Source(s): Municipal budgets
- Time Frame: This is an ongoing process.
- Priority: Medium
- Benefit(s): Floodplains and areas prone to flooding will be monitored as development will be restricted per local regulations.

Item 25 (NEW)

Update and enforce State Building Code

Action: Municipalities to update and enforce building codes.

- Location: County-wide
- Lead Agency: Clare County Building Department
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed:
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: Costs will vary depending on the municipality and their update process.
- Potential Funding Source(s): Municipal budgets
- Time Frame: Ongoing, as each municipality will update accordingly.
- Priority: Medium
- Benefit(s): Enforcing building code standards will help maintain buildings and keep up property values while also mitigating damages resulting from hazards.

Item 26 (NEW)

Update and enforce International Fire Code

Action: Municipalities to update and enforces the International Fire Code.

- Location: County-wide
- Lead Agency: Local fire authorities
- Participating Agencies: City of Clare and City of Harrison
- Hazards Addressed: Structural fires
- Goal/Objective Addressed: goal 2, objective a
- Project Costs: Costs will vary depending on the municipality and their update process.
- Potential Funding Source(s): Municipal budgets
- Time Frame: Ongoing, as each municipality will update accordingly.
- Priority: Medium
- Benefit(s): Local jurisdictions will have most up-to-date regulations regarding fire safety for new development, which would mitigation damages resulting from fires.

Item 27 (NEW)

Update and enforce Property Maintenance Code

Action: Municipalities to update and enforce property maintenance codes.

- Location: County-wide
- Lead Agency: Clare County Building Department

- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed:
- Goal/Objective Addressed: goal 4, objective a
- Project Costs: Costs will vary depending on the municipality and their update process.
- Potential Funding Source(s): Municipal budgets
- Time Frame: Ongoing, as each municipality will update accordingly.
- Priority: Medium
- Benefit(s): Enforcing minimum property standards will help reduce/eliminate blight, mitigate vermin infestation, and will keep up property values.

Item 28 (NEW)

Provide equipment for first responders/specialty teams

Action: Secure necessary equipment and training for first responders and specialty teams.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: City of Clare and City of Harrison
- Hazards Addressed: All Hazards
- Goal/Objective Addressed: goal 1, objective c
- Project Costs: $2,500,000, will vary based on the community and their needs.
- Potential Funding Source(s): Municipal budgets, DNR grants, USDA grants
- Time Frame: Ongoing, as each municipality will purchase based on their needs.
- Priority: Medium
- Benefit(s): First responders and specialty team better equipped/rained to responses to hazardous events/emergency situations.

Item 29 (NEW)

Recruit first responders

Action: Actively recruit/retain and certify first responders (law enforcement, fire, EMS, and 9-1-1 staff).

- Location: County-wide
- Lead Agency: Local Municipalities
- Participating Agencies: City of Clare and City of Harrison
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective d
- Project Costs: $1,000,000 is estimated and includes recruitment, training, and potential bonuses.
- Potential Funding Source(s): Municipal budgets, FEMA grants, State of Michigan
- Time Frame: This is an ongoing and continuous process.
- Priority: Medium
- Benefit(s): Maintain minimally required staffs for rural communities.

Item 30 (NEW)

Encourage the inclusion of hazard mitigation into other planning documents.

Action: Encourage municipalities to include hazard mitigation into master plans/comprehensive land use plans and 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 133.

- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 4, objective c
- Project Costs: $5,000 (Estimated, includes Emergency Management Director staff time.)
- Potential Funding Source(s): OEM budget
- Time Frame: Will occur as the planning documents are updated.
- Priority: Medium
- Benefit(s): The identification of hazard mitigation in other local planning documents will promote community awareness of hazard mitigation, thereby improving public health and safety.

Item 31 (NEW)

Work with local agencies to identify vulnerable populations

Action: Identify and maintain list of vulnerable populations located throughout Clare County.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, Clare County Senior Services, Bay Area Council on Aging, Midland County Agency on Aging, Region 7 Agency on Aging, Michigan Works, Mid-Michigan Community Action Agency, Community Mental Health for Central Michigan
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective d
- Project Costs: $5,000 (Estimated, includes Emergency Management Director staff time.)
- Potential Funding Source(s): OEM Budget
- Time Frame: This is an ongoing and continuous process.
- Priority: Medium
- Benefit(s): Vulnerable populations that have been identified will be provided resources need during emergency situations.

Item 32 (NEW)

Combined Sewer Separation Program

Phase I: Assess storm and sanitary sewer lines to identify combined sewer lines

Action: Assess the status of storm and sanitary sewer lines to identify combined sewer lines.

- Location: City of Clare, City of Harrison
- Lead Agency: Departments of Public Works
- Participating Agencies: EGLE and USDA
- Hazards Addressed: Public health, flooding
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $50,000 (Estimated.)
- Potential Funding Source(s): USDA grants
- Time Frame: 2024
- Priority: Medium
- Benefit(s): Sewer lines will be clearly defined for particular use, thereby reducing the flooding and contamination due to combined sewer lines.

Phase II: Separate storm and sanitary sewer lines

Action: Separate combined storm and sanitary sewer lines into individual distinct sewer lines.

- Location: City of Clare, City of Harrison
- Lead Agency: Departments of Public Works

- Participating Agencies: EGLE and USDA
- Hazards Addressed: Public health, flooding
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $2,500,000 (Estimated.)
- Potential Funding Source(s): USDA grants
- Time Frame: 2026
- Priority: Medium
- Benefit(s): Sewer lines will be clearly defined for particular use, thereby reducing the flooding and contamination due to combined sewer lines.

Item 33 (NEW)

Encourage municipalities to join the National Flood Insurance Program (NFIP)

Action: Encourage non-NFIP participating municipalities to join the Program.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 132.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 4, objective a
- Project Costs: $1,000 (Estimated, includes Emergency Management Director staff time.)
- Potential Funding Source(s): OEM budget
- Time Frame: Ongoing
- Priority: Medium
- Benefit(s): Participating municipalities are required to adopt more restrictive development regulations, which can reduce flooding. Homeowners can acquire flood insurance at a lower rate.

Item 34 (NEW)

Utilize GIS to create layer for hazardous material locations

Action: Add layer of hazardous material incidents to GIS.

- Location: County-wide
- Lead Agency: Clare County Equalization Department
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: hazardous materials fixed site, and transportation
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $2,000 includes staff time to complete data entry.
- Potential Funding Source(s): Clare County Equalization Department
- Time Frame: Work is anticipated to begin in 2024 and be completed by 2025.
- Priority: Medium
- Benefit(s): Information will be invaluable to help identify potential HazMat problematic sites.

Item 35 (NEW)

Clare County Road Upgrade Program

Phase I: Assess county roads to determine if roads require upgrading to accommodate increased traffic/ flooding

Action: Complete an assessment of the Clare County roads to determine if roads are sufficiently constructed to handle increased traffic due to the revised use of “second homes” as a result of Covid-19

and recent flooding.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: Infrastructure failures
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $20,000, includes staff time for Clare County Road Commission staff to complete Paser study and road use assessment.
- Potential Funding Source(s): CCRC
- Time Frame: Paser study completed, analysis of road use to be completed by 2023.
- Priority: Medium
- Benefit(s): With the increase of second homes being converted into primary residences, traffic patterns have changed. This assessment will determine if upgrades are necessary to for any roads in Clare County.

Phase II: Upgrade county roads as identified in Phase I

Action: Upgrade Clare County roads based on assessment in phase I.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: Infrastructure failures
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000,000 (Estimated)
- Potential Funding Source(s): CCRC, MDOT
- Time Frame: Upgrades will be dependent upon the funding sources and availability of funds.
- Priority: Medium
- Benefit(s): With the increase of second homes being converted into primary residences, traffic patterns have changed. These upgrades will improve overall quality of roads in Clare County.

Item 36 (NEW)

Removal of Diseased Right-of-Way Trees Program

Phase I: Assess feasibility of cost share program to eliminate dead/diseased trees along public rights-of-way

Action: Identify diseased trees along major public rights-of-way throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: Transportation accidents, invasive species
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000 (Estimated, based on staff time of CCRC, MDOT, and MDNR)
- Potential Funding Source(s): CCRC, MDOT, MDNR
- Time Frame: A meeting between agencies to discuss the program must be arranged based on the availability of staffs from the three agencies. Meeting is anticipated to occur in 2023.
- Priority: Low
- Benefit(s): Completing an assessment of major public rights-of-way will allow for a better sense

of the tree problem and will provide an estimate of time/money to complete the removal of the trees.

Phase II: (If feasible) initiate cost share program to eliminate dead/diseased trees along public rights-of-way

Action: Upon completion of the assessment begin the removal of diseased trees throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: Transportation accidents, invasive species
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000,000, based on previously replaced trees.
- Potential Funding Source(s): CCRC, MDOT, Soil Conservation Grants
- Time Frame: Funding availability will determine the start of the work.
- Priority: Low
- Benefit(s): Removal of diseased trees will eliminate, many dead/infested trees before they fall freely on the road as well as reduce the spread of the invasive species.

LOW PRIORITY PROJECTS

Item 37

Seek grant funds to complete Community Wildfire Protection Plan

Action: Secure a grant (Michigan Department of Natural Resources) to complete the Community Wildfire Protection Plan and become a Firewise Community.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDNR
- Hazards Addressed: Wildfires
- Goal/Objective Addressed: goal 4, objectives d and e
- Project Costs: $40,000 (Estimated)
- Potential Funding Source(s): Michigan Department of Natural Resources (MDNR)
- Time Frame: Grant funding from MDNR will determine start of plan, which should take approximately 18 months to complete.
- Priority: Low
- Benefit(s): Mitigation of damages to personal property and/or human live due to wildfires.

Item 38

Internet security program

Action: The Internet Security Program offers citizens essential cyber security and education on fraud.

- Location: Countywide
- Lead Agency: OEM
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Cyberterrorism

- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $2,000 annual costs. (Estimated, based on Emergency Management Director staff time.)
- Potential Funding Source(s): OEM
- Time Frame: Ongoing, since 2016.
- Priority: Low
- Benefit(s): Senior citizen population will be better educated in cyber security matters and less likely to be susceptible to scams and frauds.

Item 39 (NEW)

Live Fence Planting Program

Phase I: Work with Michigan Department of Transportation (MDOT) to assess roads for snow drifting

Action: Work with MDOT to assess all roads in the County to identify potential location for live snow fences.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: snowstorms, ice-sleet storms, transportation accidents
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $5,000 (Estimated staff time of CCRC and MDOT staffs.)
- Potential Funding Source(s): MDOT
- Time Frame: In progress, CCRC has identified several potential locations, but will have to confirm any potential locations with MDOT.
- Priority: Low
- Benefit(s): Potential live snow fence sites to be identified, which could reduce the number of traffic accidents caused by ice and/or drifting snow.

Phase II: Plant live snow fences per Phase I

Action: Utilizing the assessment completed in action item 14, plant trees to reduce snow drifts along county roads.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: Transportation accidents, snowstorms, ice/sleet storms
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $100,000 (Estimated)
- Potential Funding Source(s): MDOT, Clare County Road Commission (CCRC)
- Time Frame: Project will begin with the availability of funding from MDOT and CCRC and is anticipated to be completed by 2023.
- Priority: Low
- Benefit(s): Critical infrastructure (roads and bridges) can remain open, and would reduce transportation accidents, thereby keeping the supply chain open as well as allowing passage for emergency vehicles.

Item 40

Enhance security system for Clare County Courthouse

Action: Replace entrance/exit doors with security doors, add exit alarms system, install security camera system, and replace existing x-ray security system with upgraded systems.

- Location: County Courthouse, City of Harrison
- Lead Agency: Clare County
- Participating Agencies: Clare County Sheriff's Department and Michigan Supreme Court
- Hazards Addressed: Civil Disturbances, terrorism/sabotage
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $100,000 (Estimated)
- Potential Funding Source(s): ARPA grant funds, Clare County budget
- Time Frame: Work has been initiated in 2022 and is anticipated to be completed in 2023.
- Priority: Low
- Benefit(s): Project will provide a safer work environment for County employees and visitors utilizing the Courthouse.

Item 41

Purchase portable electronic message boards

Action: Purchase four (4) portable electronic message boards that can be utilized by multiple agencies throughout the County.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective d
- Project Costs: $100,000
- Potential Funding Source(s): CCRC, MDOT, USDA grants
- Time Frame: The initial message board was purchased in 2022, with additional message boards to be purchased as funds become available. Completion date is anticipated to be 2025, depending on funding.
- Priority: Low
- Benefit(s): Enhance public safety with advance notice of hazardous conditions and/or traffic accidents.

Item 42 (NEW)

Permanent Electronic Message Board Program

Phase I: Complete an assessment for the possible purchase/installation of permanent electronic message boards

Action: Work with the Michigan Department of Transportation (MDOT) to assess the need to install permanent message boards in Clare County.

- Location: County-wide
- Lead Agency: Clare County Road Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective d
- Project Costs: $5,000 (Estimated, based on CCRC and MDOT staff time.)
- Potential Funding Source(s): MDOT
- Time Frame: Anticipated to be in 2023 but will be dependent upon availability of MDOT funding.

- Priority: Low
- Benefit(s): Enhance public safety with advance notice of hazardous conditions and/or traffic accidents.

Phase II: Purchase and install permanent electronic message boards

Action: Install permanent electronic message boards at locations identified in Item 20.

- Location: County-wide
- Lead Agency: CCRC
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133, and MDOT
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective d
- Project Costs: $500,000 per message board
- Potential Funding Source(s): MDOT, CCRC
- Time Frame: This is dependent upon the identification of potential sites and availability of funding.
- Priority: Low
- Benefit(s): Enhance public safety with advance notice of hazardous conditions and/or traffic accidents.

Item 43 (NEW)

Anchor mobile homes

Action: Anchor mobile homes to meet state statutes.

- Location: County-wide
- Lead Agency: Clare County Building Department
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Severe winds/tornadoes
- Goal/Objective Addressed: goal 2, objective b
- Project Costs: $10,000,000 (Estimated)
- Potential Funding Source(s): homeowners, USDA grants
- Time Frame: Mobile home anchoring is required by the state. Anchoring will be available based on the funding.
- Priority: Low
- Benefit(s): Mobile homes will be better protected against hazardous events.

Item 44 (NEW)

Work with Amish representatives on hazard notification program

Action: Develop a line of communication between the Amish representatives and local governments.

- Location: County-wide
- Lead Agency: Clare County Sheriff
- Participating Agencies: OEM and the list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $2,000 (Estimated annual staff time.)
- Potential Funding Source(s): Clare County Sheriff
- Time Frame: This is an ongoing process that was initiated in 2021
- Priority: Low

- Benefit(s): Amish population better informed through trusted sources of emergency situations.

Item 45 (NEW)

Enhance reporting system to local public safety to include potential domestic/foreign terrorism

Action: Purchase additional software (DATAMINR) to allow the monitor/gathering of information for distribution to public safety personnel.

- Location: County-wide
- Lead Agency: OEM/FLO (Fusion Liaison Officer)/Law Enforcement
- Participating Agencies: City of Clare, City of Harrison, Clare County Sheriff's Office, Michigan State Police, Michigan Intelligence Operation Center, National Counterterrorism Center, FEBI, Social Services, and Department of Homeland Security (DHS)
- Hazards Addressed: terrorism/sabotage, civil disturbances
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $35,000 (Estimated)
- Potential Funding Source(s): Homeland Security Grant Program (HSGP), State Homeland Security Program (SHSP)
- Time Frame: Anticipated to begin in 2023 and completed by 2025.
- Priority: Low
- Benefit(s): Better informed public safety personnel to address potential domestic/foreign terrorism.

Item 46 (NEW)

Maintain an inventory of municipal equipment and personnel

Action: Maintain an inventory of municipal equipment and personnel.

- Location: County-wide
- Lead Agency: OEM
- Participating Agencies: City of Clare and City of Harrison
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 2, objective c
- Project Costs: $1,000, which is Emergency Management Director staff time.
- Potential Funding Source(s): OEM budget
- Time Frame: This is an ongoing and continuous process.
- Priority: Low
- Benefit(s): Municipalities are provided with current and accurate list of personnel capabilities and equipment available for use during emergency situations, saving time and possibly lives.

Item 47 (NEW)

Clare County Drainage Assessment Program

Phase I: Assess current drainage system to determine the need to expand county drain system

Action: Complete an assessment of the Clare County drainage system to determine the location of the inadequate facilities.

- Location: County-wide
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective a
- Project Costs: $500,000 (Estimated)

- Potential Funding Source(s): Clare County Drain Commission (CCDC)
- Time Frame: This assessment was initiated in 2022 and is anticipated to be completed by 2024
- Priority: Low
- Benefit(s): An assessment of the current drainage system should identify the deficiencies and what is needed to eliminate those deficiencies.

Phase II: Expand county drain system as identified in Phase I

Action: Initiate/complete the necessary drainage system deficiencies as identified in phase I.

- Location: County-wide
- Lead Agency: Clare County Drain Commission
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective c
- Project Costs: $5,000,000 (Estimated)
- Potential Funding Source(s): CCDC, USDA grants
- Time Frame: This is anticipated to begin in 2024, and completed by 2027, but is dependent upon funding.
- Priority: Low
- Benefit(s): With the deficiencies mitigated/eliminated, flooding throughout Clare County should be reduced.

Item 48 (NEW)

Utilize GIS to create layer to identify critical infrastructure

Action: Add information layer to GIS that contains critical infrastructure throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Equalization Department
- Participating Agencies: City of Clare, City of Harrison, and State of Michigan
- Hazards Addressed: Infrastructure failures
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $2,000 (Estimated staff time.)
- Potential Funding Source(s): Clare County Equalization Department
- Time Frame: This is anticipated to begin in 2023.
- Priority: Low
- Benefit(s): With infrastructure identified throughout Clare County, it will be easier to identify problematic structures.

Item 49 (NEW)

Utilize GIS to create layer for the location of previous hazardous events

Action: Add information layer to GIS that contains locations of previous hazardous events infrastructure throughout Clare County.

- Location: County-wide
- Lead Agency: Clare County Equalization Department
- Participating Agencies: City of Clare, City of Harrison, EGLE, EPA, and FEMA
- Hazards Addressed: All hazards
- Goal/Objective Addressed: goal 1, objective b
- Project Costs: $2,000 (Estimated staff time.)
- Potential Funding Source(s): Clare County Equalization Department

- Time Frame: This is anticipated to begin in 2024.
- Priority: Low
- Benefit(s): This layer will provide history of previous events and possibly used to identify future events.

Item 50 (NEW)

Purchase vacuum truck to be used to remove water from flooded areas

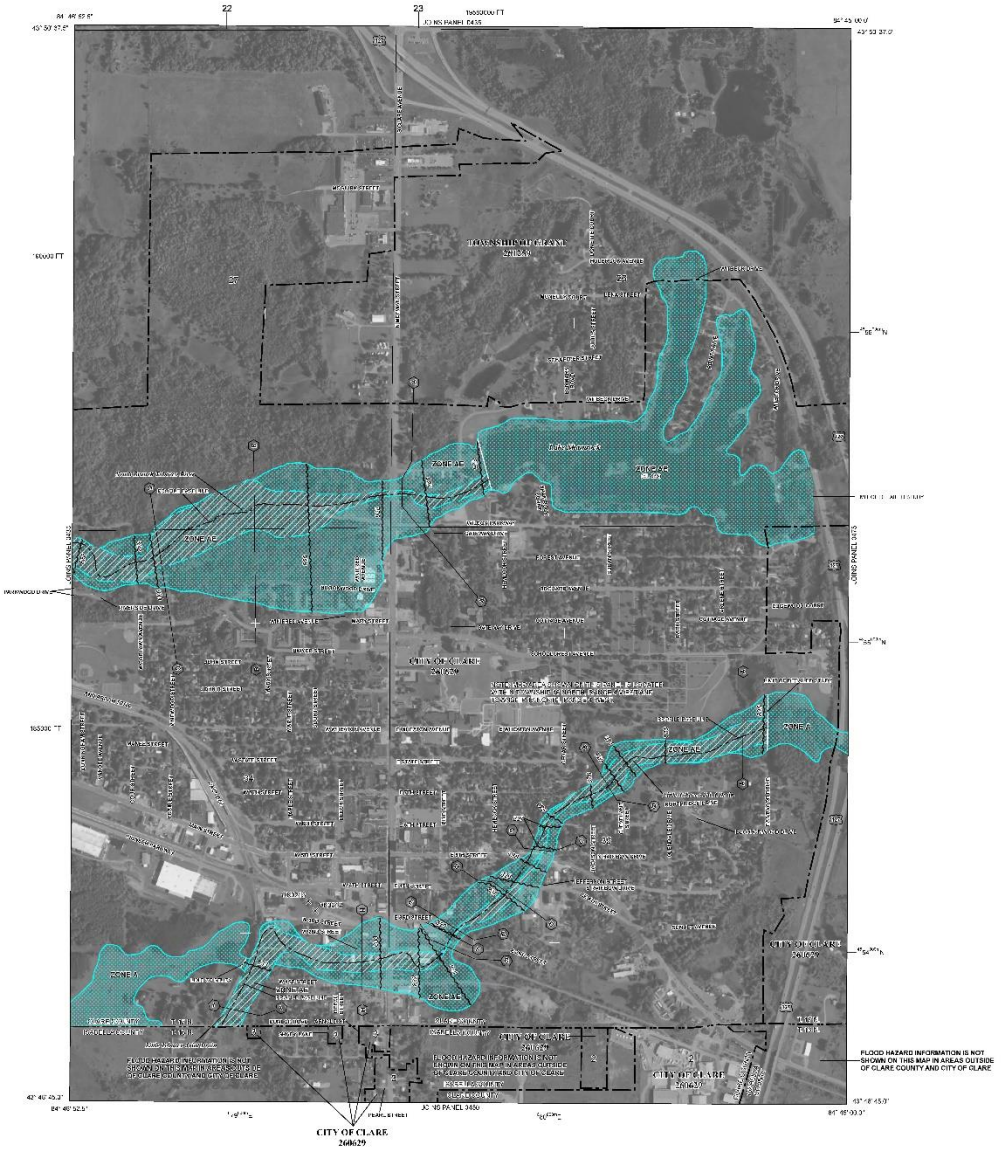
Action: Purchase vacuum truck to be used to siphon water during floods.

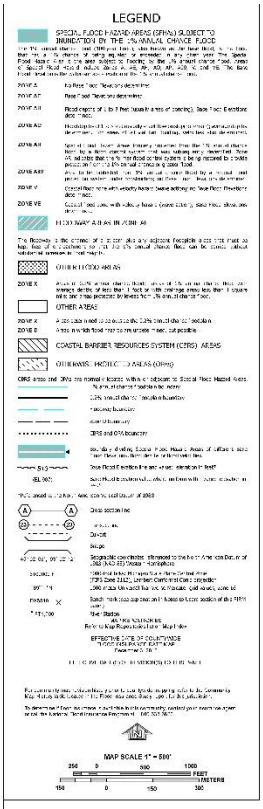
- Location: County-wide
- Lead Agency: CCRC
- Participating Agencies: The list of participating municipalities can be found in Table 6.1 on page 133.
- Hazards Addressed: Flooding
- Goal/Objective Addressed: goal 3, objective d
- Project Costs: $600,000
- Potential Funding Source(s): USDA grants and CCRC
- Time Frame: This is anticipated to occur in 2023, should funding become available.
- Priority: Low
- Benefit(s): In recent years, flooding has increased due to flash floods, The purchase of a vacuum truck would assist in the removal of flood waters from buildings, thereby mitigating damages resulting from flood waters.

APPENDIX H
CLARE COUNTY FLOOD MAPS

City of Clare/Grant Township Flood Map

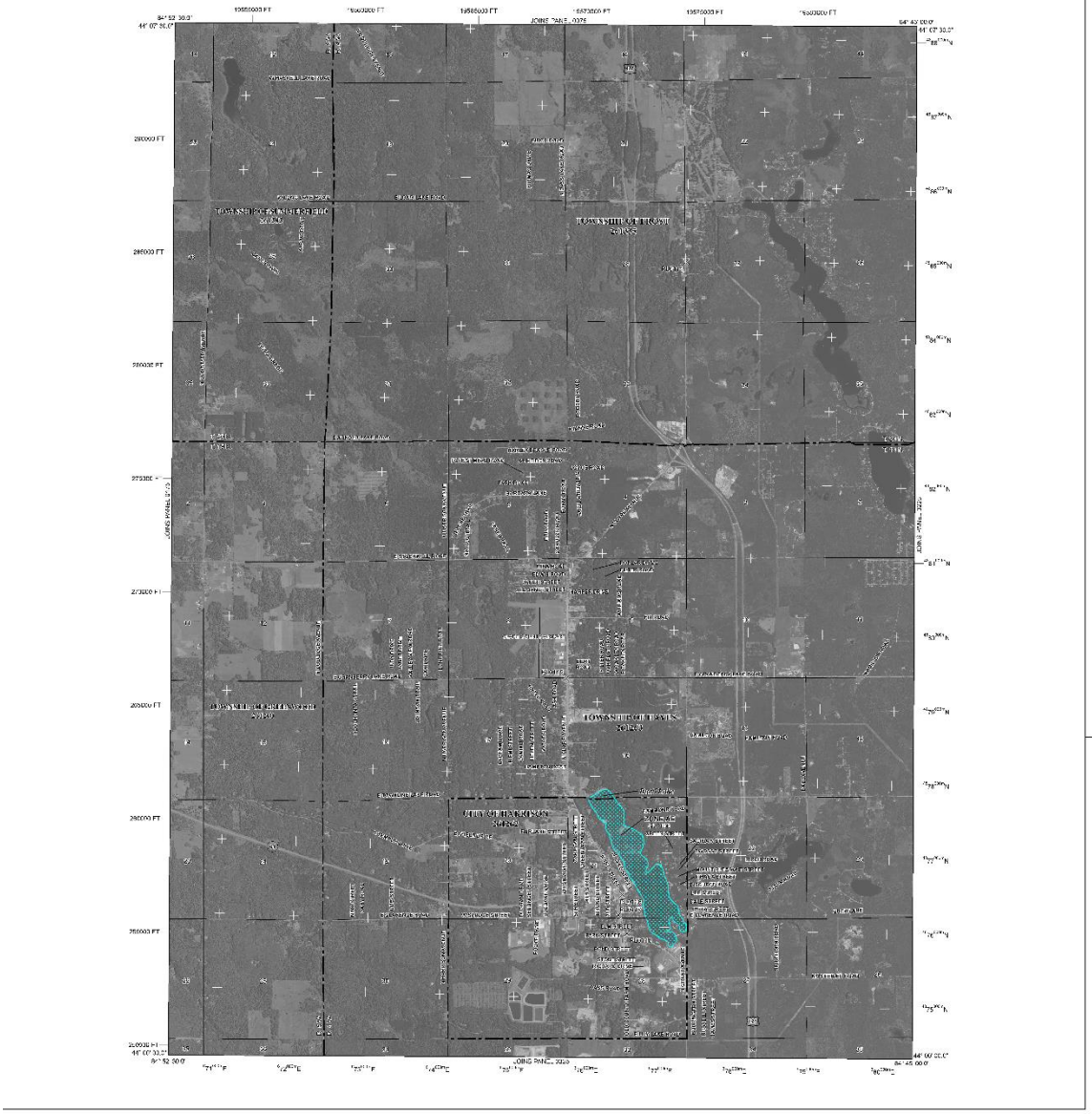
MAP H1

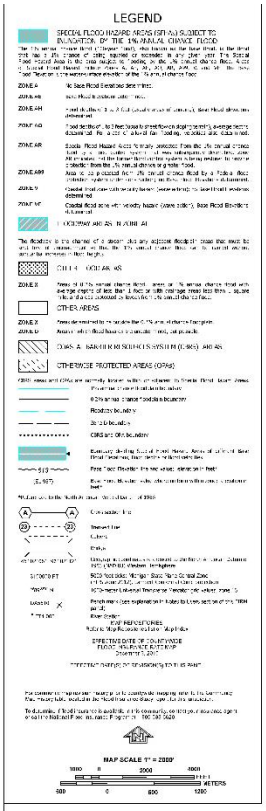


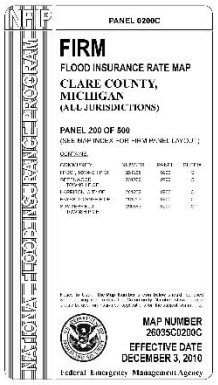


City of Harrison/Frost/Greenwood Summerfield Flood Map

MAP H2

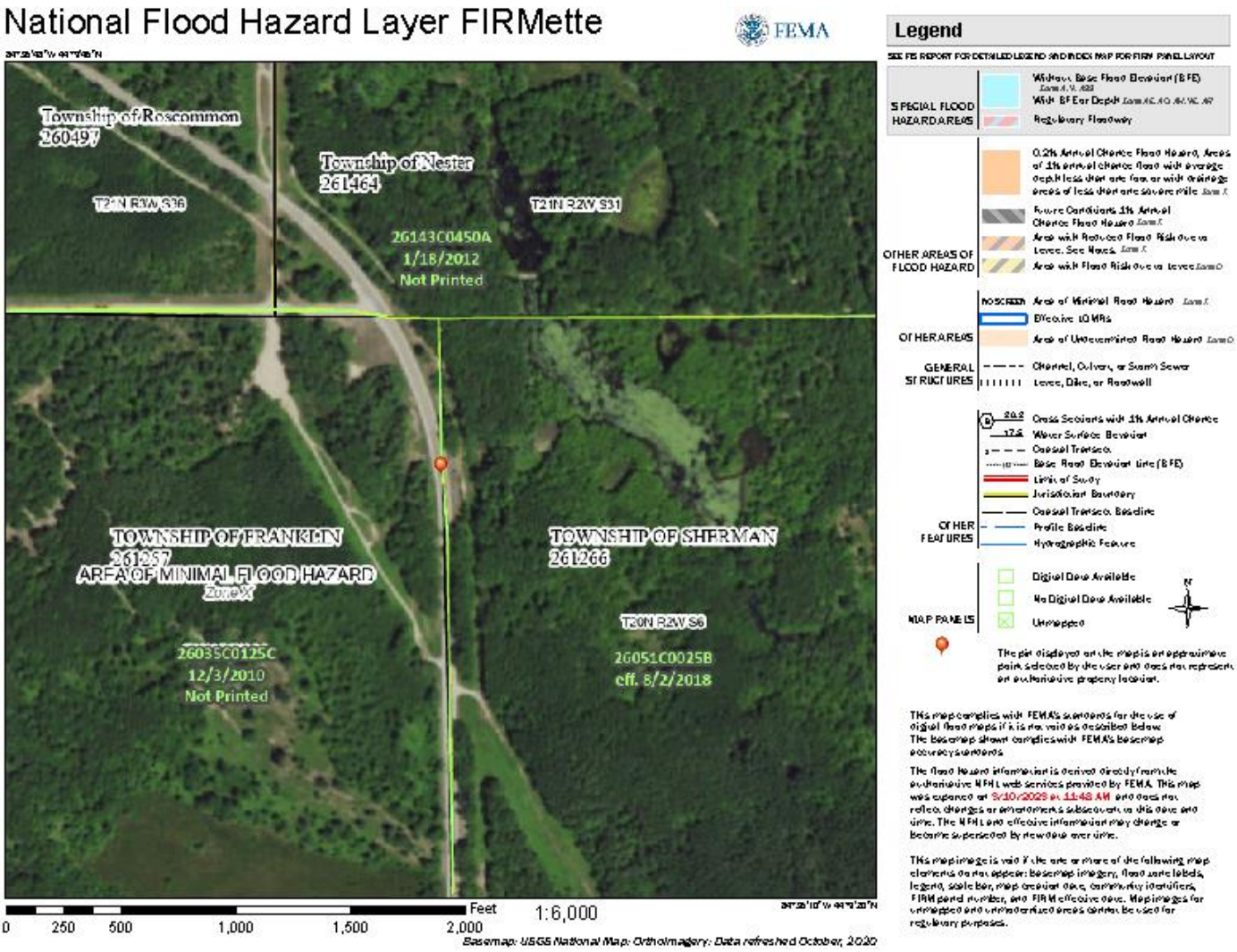






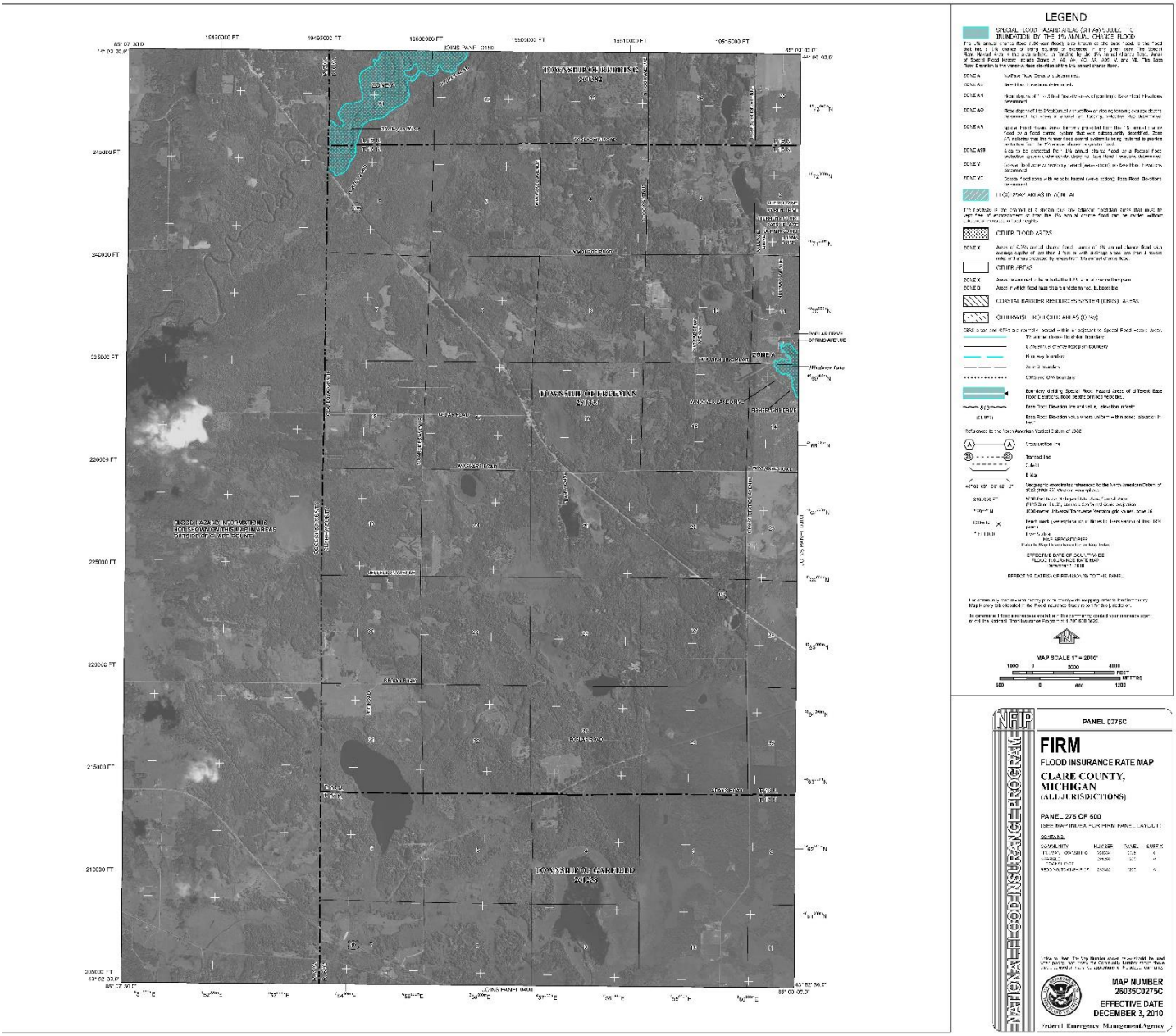
Franklin Township Flood Map

MAP H3



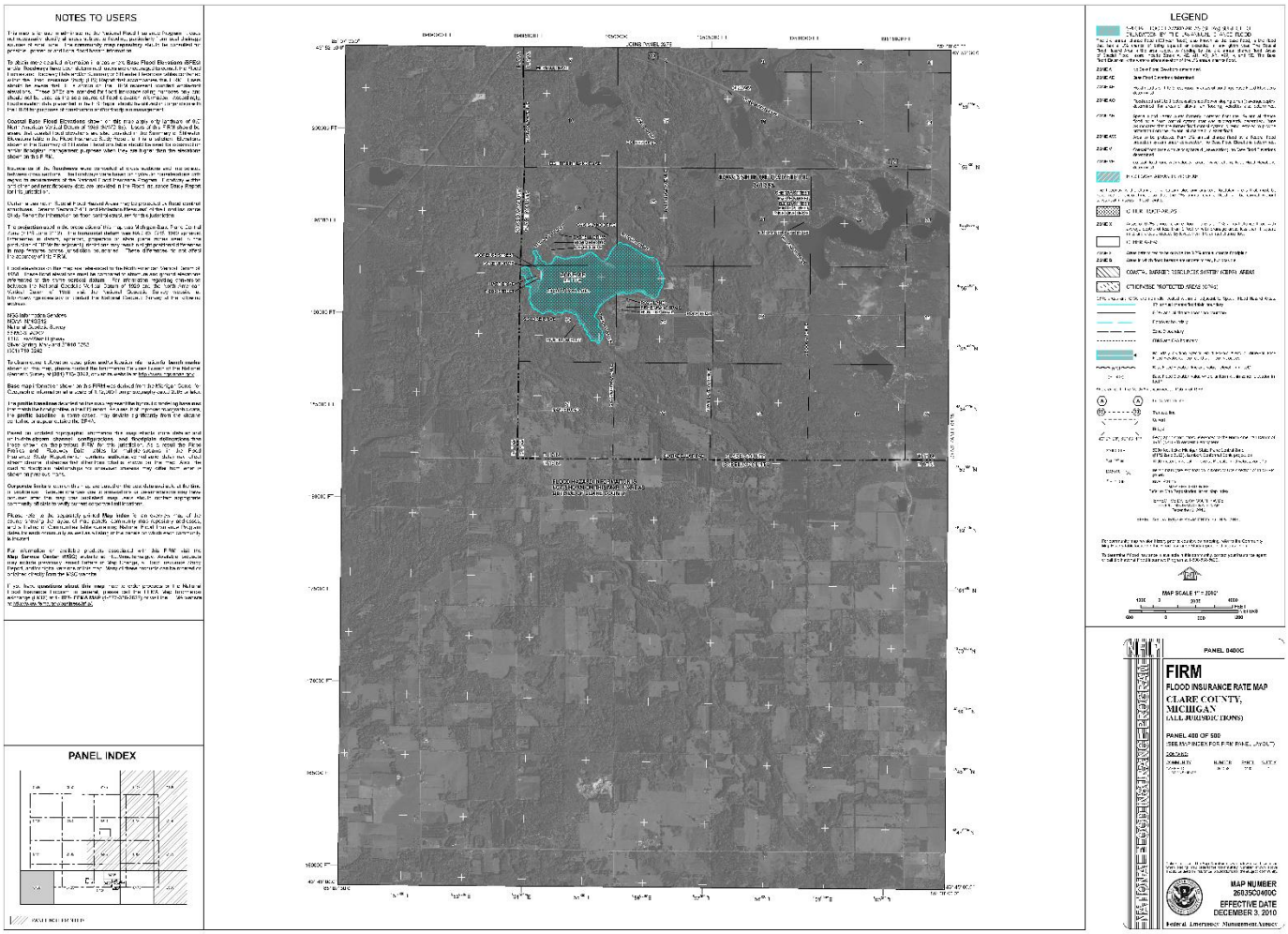
Freeman/Garfield/Redding Townships Flood Map

MAP H4



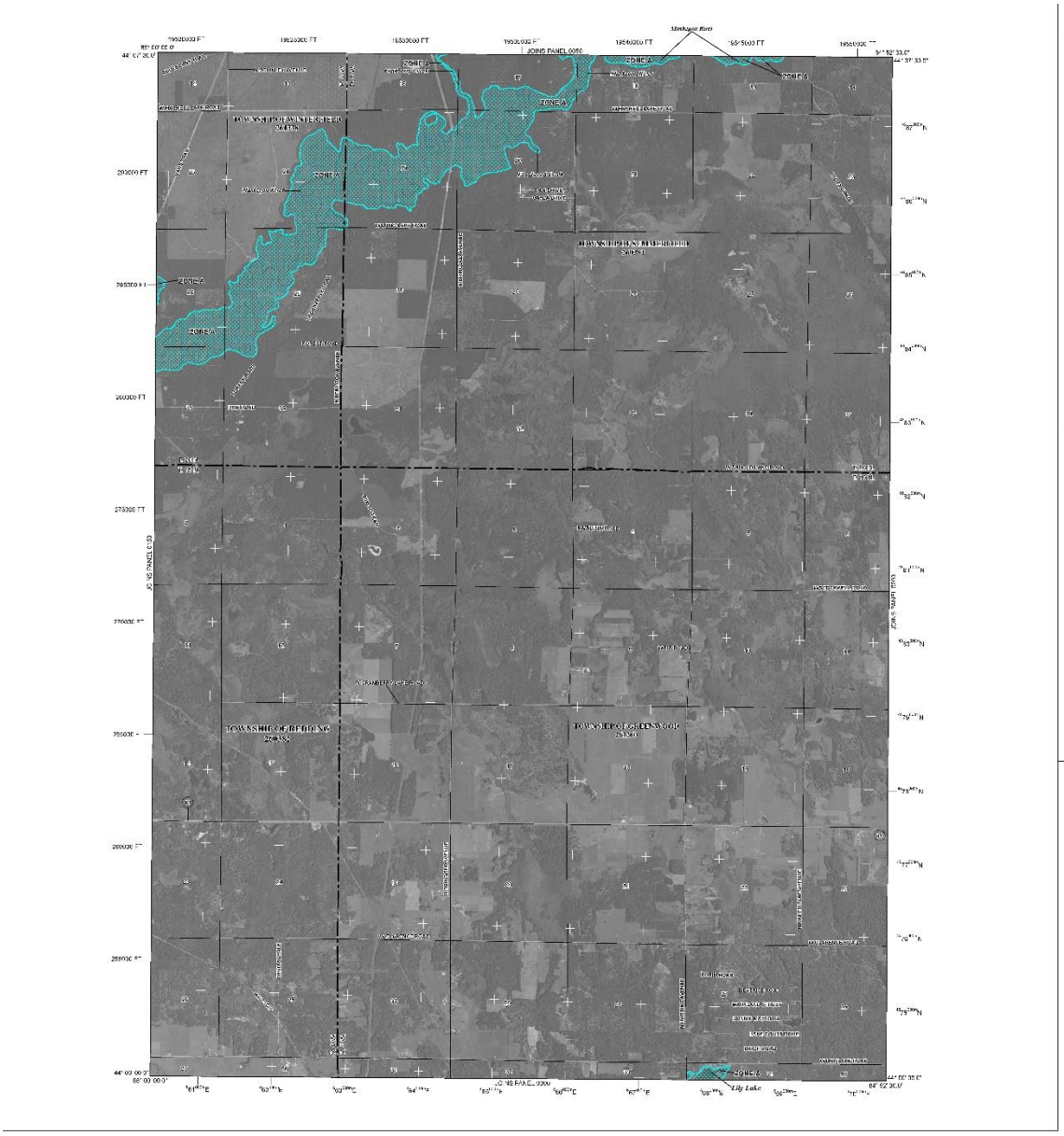
Garfield Township Flood Map

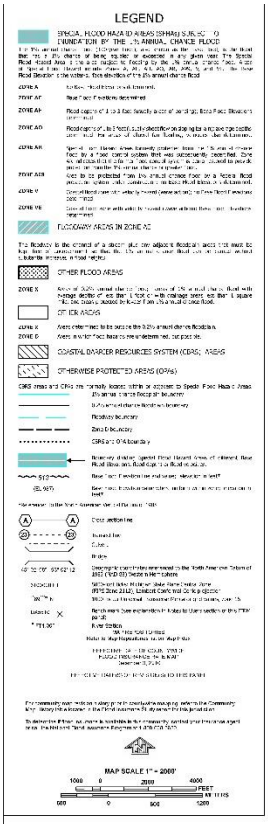
MAP H5

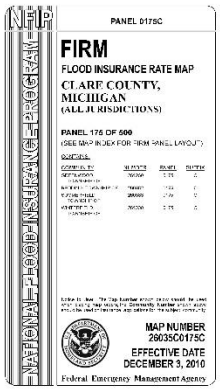


Greenwood/Redding/Summerfield/Winterfield Townships Flood Map

MAP H6

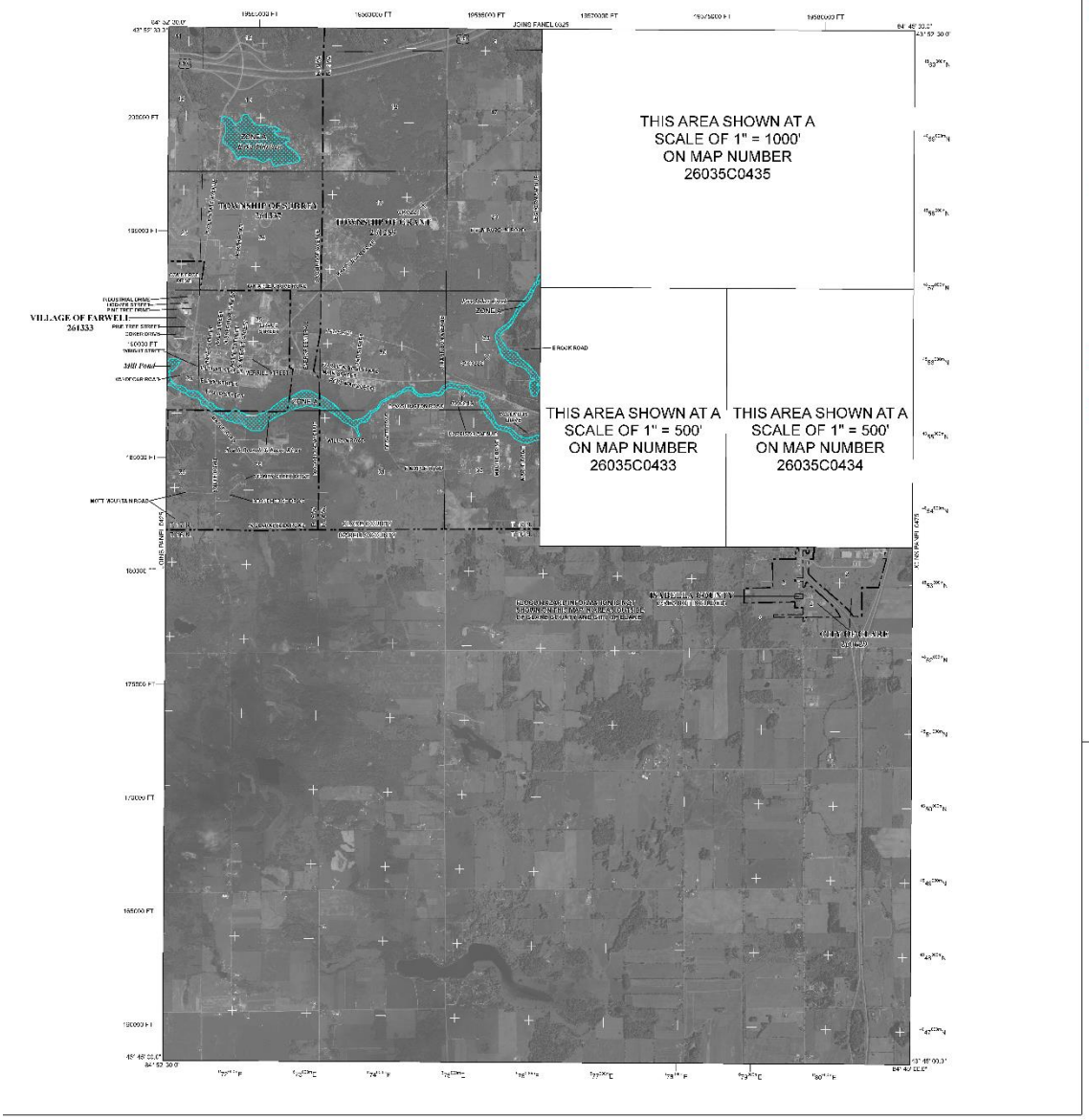


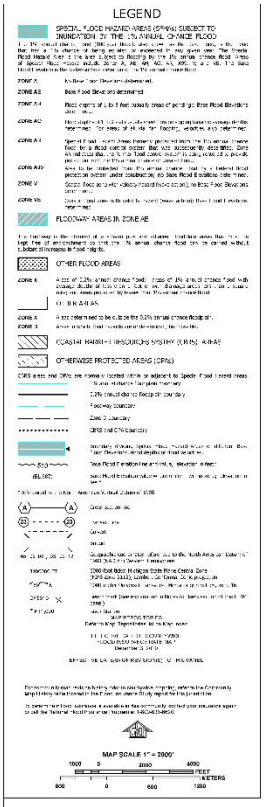


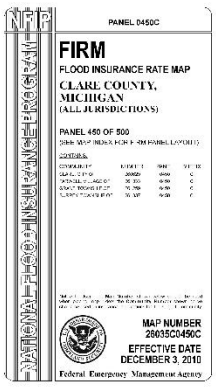


Village of Farwell/Surrey Township Flood Map

MAP H7







Greenwood/Hatton/Hayes/Lincoln Township Flood Map

MAP H8

