Hazard Mitigation Plan

2016

Charlevoix, Cheboygan & Emmet County, Michigan

Produced by:
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I. ACKNOWLEDGEMENTS

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

Following is a list of the key contributors to the Plan who participated in the Tri-County Hazards Mitigation Planning Committee:

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II. LETTER OF TRANSMITTAL

Mike Sobocinski
Michigan State Police Emergency Management Division
4000 Collins Road
PO Box 30636
Lansing MI 49809-8136

Dear Mr. Sobocinski:

Enclosed, please find the Charlevoix, Cheboygan and Emmet County Hazard Mitigation Plan. This Plan has been developed in conjunction with the County Planners, Michigan Township Associations for each county, the public, and the State of Michigan. The Plan lays out the process of evaluating the potential hazards, land use, and mitigation strategies to protect lives and property in the Tri-County Region.

This transmittal letter serves notice that all future development decisions in Charlevoix, Cheboygan and Emmet Counties will consider hazard vulnerability reduction as a standard practice. The intent of the Hazard Mitigation Plan is not to limit development, but to ensure that all development occurs in a manner that minimizes the possibility of damage from potential natural hazards to the greatest extent possible.

Thank you for your time and consideration. If you have any questions, please feel free to contact the Tri-County Emergency Management Coordinator, Megan Anderson at 855-515-1624

Sincerely,

Megan Anderson, Director
Tri-County Office of Emergency Management

III. PREFACE

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, technological, and human-related hazards. This procedure is an essential element of emergency management, which includes four basic “phases”: Mitigation, Preparedness, Response, and Recovery. The evaluation improves the preparedness posture of the Tri-County region for the next incident, and when successful, mitigation is intended to lessen the impacts of hazards to such a degree that succeeding incidents will remain incidents and not become disasters.

Communities may mitigate to reduce the impact of hazards on people and property through the coordination of resources, programs, and authorities. Through a combination of regulatory, administrative, and engineering approaches, losses can be limited by reducing susceptibility to damage. Mitigation allows repairs and reconstruction to be completed after an incident occurs in such a way that does not just restore the damaged property, but also reduces or minimizes the potential for future disasters. This process is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction take place after damages are analyzed, and that less vulnerable conditions result from such repair.

Recognizing the importance of reducing community vulnerability to natural hazards, Charlevoix, Cheboygan and Emmet Counties are actively addressing the issue through the development and implementation of this plan. The many benefits to be realized from this effort are:

1. Protection of the public health and safety
2. Preservation of essential services
3. Prevention of property damage
4. Preservation of the local economic base

This process will help ensure that Charlevoix, Cheboygan and Emmet Counties remain a vibrant, safe, enjoyable place in which to live, raise a family, maintain a tourist base, and continue to conduct business.

IV. EXECUTIVE SUMMARY

In 2000, the Disaster Mitigation Act shifted the Federal Emergency Management Agency's (FEMA) scope of work to promoting and supporting prevention, or what is called hazard mitigation planning. FEMA now requires government entities to have natural hazards mitigation plans in place as a condition for receiving grant money, such as hazard mitigation grant program funds, in the future.

To meet this requirement, the Michigan State Police provided funding to regional planning agencies throughout the State of Michigan to work with individual counties in developing their Hazard Mitigation Plans. The Tri-County Office of Emergency Management worked with all three Counties, local units of government and neighboring communities to develop plans for the Tri-County area. These plans included a general community profile, a comprehensive inventory of existing hazards, a hazard analysis, goals and objectives, and feasible mitigation strategies to address the prioritized hazards.

The Tri-County Hazard Mitigation Plan focuses on hazards such as drought, earthquakes, wildfires, structure fires, flooding, shoreline erosion, subsidence, thunderstorms and high winds, and severe winter weather. It was created to protect the health, safety, and economic interests of the residents and businesses by reducing the impacts of natural hazards through planning, awareness, and implementation.

Through this Plan, a broad perspective was taken in examining multiple hazard mitigation activities and opportunities in the region. Each hazard was analyzed from a historical perspective, evaluated for potential risk, and considered for possible mitigation actions.

The plan serves as the foundation for hazard mitigation activities and actions within the Tri-County area, and will be a resource for building coordination and cooperation within the community for local control of future mitigation and community preparedness around the following:

Hazard Mitigation Planning Goals for Charlevoix, Cheboygan & Emmet Counties:

Goal 1: Increase local participation in hazards mitigation
Goal 2: Integrate hazard mitigation considerations into the County's comprehensive planning process
Goal 3: Utilize available resources and apply for other resources for hazard mitigation projects
Goal 4: Develop and complete hazard mitigation projects in a timely manner

The Charlevoix, Cheboygan and Emmet County Committee participants designated the following top Hazard Mitigation Priority Areas with recommended strategies listed in the text:

1. Fire Hazards: Structural and Wildfires
2. Severe Winter Weather throughout the Counties
3. Severe Thunderstorms, High Winds, and Tornadoes throughout the Counties
4. Flooding and Dams: Along the shorelines of Lake Michigan, Lake Huron, inland streams, rivers and lakes
5. Shoreline and Steep Slope Erosion: Along the shorelines of Lake Michigan and Huron.

V. PURPOSE OF THE PLAN

The Disaster Mitigation Act of 2000 shifted the Federal Emergency Management Agency's (FEMA) scope of work to promoting and supporting prevention, or what is called Hazard Mitigation Planning. FEMA has now required government entities to create mitigation plans as a condition of receiving grant money, such as hazard mitigation grant program funds. To meet this requirement, the Michigan State Police funded regional planning agencies to work with individual counties to develop Hazard Mitigation Plans. The Tri-County Office of Emergency Management was the agency to develop this plan.

The **purpose of the Tri-County Hazard Mitigation Plan** is to find solutions to existing problems; anticipate future problems; prevent wasteful public and private expenditures; protect property values; and allocate land resources. The implementation of the plan is to prevent loss of life, injury, property damage, breakdown in vital services like transportation and infrastructure, economic slumps, diminished tourist activity, liability issues, and damage to a community's reputation. For Charlevoix Cheboygan and Emmet Counties, the planning process utilized the following steps in the development of the plan. Emphasis was placed on hazards that have had significant impact on the community in the past.

The following steps were taken in the preparation of this plan:

1. Identification of hazards and risks
2. Preparation of draft plan
3. Identification of hazard mitigation goals and objectives for the emergency management program
4. Update and review of each section of the plan
5. Combining the three plans into a single document
6. Selection of evaluation criteria
7. Selection of mitigation strategies using locally chosen criteria
8. Public Comment
9. Completion of the final plan

The plan also lays out the implementation of the plan, and the monitoring and periodic revision of the plan.

What is a Hazard?
A hazard is an event or physical condition that has potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss. This plan focuses on hazards such as drought, extreme temperatures, structural fires, wildfires, urban and riverine flooding, waters that cause shoreline flooding and erosion, ground

subsidence/landslides, thunderstorms, high winds, tornadoes, and winter weather hazards. This plan is intended to be a resource for building coordination and cooperation within a community for local control of future mitigation and community preparedness.

According to the 2012 Michigan Hazard Analysis the hazards found in northern Lower Michigan are placed into two categories as follows:
Natural Hazards: Thunderstorms, Severe Winter Weather, Severe Winds, Tornadoes, Extreme Temperatures, Flooding, Shoreline Hazards, Dam Failures, Drought, Wildfires, Invasive Species.
Technological Hazards: Structural fires, Scrap Tire Fires, Oil and Gas Well Accidents, Infrastructure Failures. Human-Related Hazards: Nuclear Attack, Public Health Emergencies, Terrorism.

What is Mitigation?
Mitigation is the sustained action taken to lessen the impact from natural, technological, and human-related hazards and to work to reduce the long-term risk to human life and property, and their effects. This long-term planning distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery. This Plan can be used to lessen the impact; to support and be compatible with community goals; to lay out considerations in choosing and evaluating methods; and to look at the feasibility of mitigation strategies.

Referenced Documents
2012 Michigan Hazard analysis, 2010 US Census, 2012 US Economic Census, FEMA flood mapping data, Cheboygan and Emmet County GIS maps including flood plain maps, population maps.

VI. Flood Mapping and Insurance Information

Figure 1

As illustrated in figure 1, Cheboygan County has been mapped almost in its entirety. There are two townships that do not appear on the list of participating communities. They are Ellis and Walker Townships. While they do not appear on the list of participating communities they are not on the list of non-participating communities either. In Charlevoix County the following Townships are not on either list: Boyne Valley, Chandler, Hudson, Melrose, Peaine, St. James, and Wilson Townships. Finally, in Emmet County: Bear Creek, Bliss, Carp Lake, Center, Friendship, Littlefield, McKinley, Maple River, Pleasant View, Resort and Wawatam Townships are not on either list. This can happen when a community has not been mapped for flood issues by FEMA. These findings mean that these Townships are not currently participating in the National Flood Insurance Program (NFIP) and that flood plain mapping has not been completed for the Townships listed above. This is indicated in (**Table 1**) below.

According to FEMA records, there are no repetitive loss properties with regards to flooding in the Tri-County region.

Table 1

Community Name	Participation in NFIP (Yes, No, Not Listed)
Charlevoix County	
Boyne City	Yes
City of Charlevoix	Yes
City of East Jordan	Yes
Village of Boyne Falls	Not Listed
Bay Township	Yes
Boyne Valley Township	Not Listed
Chandler Township	Not Listed
Charlevoix Township	Yes
Evangeline Township	Yes
Eveline Township	Yes
Hayes Township	Yes
Hudson Township	Not Listed
Marion Township	Yes
Melrose Township	Not Listed
Norwood Township	Yes
Peaine Township	Not Listed
South Arm Township	Yes
St. James Township	Not Listed
Wilson Township	Not Listed
Cheboygan County	
City of Cheboygan	Yes
Village of Mackinaw City	Yes
Village of Wolverine	Yes
Aloha Township	Yes
Beaugrand Township	Yes
Benton Township	Yes
Burt Township	Yes
Ellis Township	Not Listed
Forest Township	Yes
Grant Township	Yes
Hebron Township	Yes
Inverness Township	Yes
Koehler Township	Yes
Mackinaw Township	Yes
Mentor Township	Yes
Mullett Township	Yes
Munro Township	Yes
Nunda Township	Yes
Tuscarora Township	Yes

Community Name	Participation in NFIP (Yes, No, Not Listed)
Walker Township	Not Listed
Waverly Township	Yes
Wilmot Township	Yes
Emmet County	
City of Harbor Springs	Yes
City of Petoskey	Yes
Village of Alanson	Not Listed
Village of Mackinaw City	Yes
Village of Pellston	Not Listed
Bear Creek Township	Not Listed
Bliss Township	Not Listed
Carp Lake Township	Not Listed
Center Township	Not Listed
Cross Village Township	Yes
Friendship Township	Not Listed
Little Traverse Township	Yes
Littlefield Township	Not Listed
Maple River Township	Not Listed
McKinley Township	Not Listed
Pleasant View Township	Not Listed
Readmond Township	Yes
Resort Township	Not Listed
Springvale Township	Yes
Wawatam Township	Not Listed
West Traverse Township	Yes

VII. DAMS

The Tri-County region is an area with many waterways that connect with each other. It is also a region that supports these connections with dams and locks. Most of these dams are for recreational purposes. According to MDEQ there are 13 Dams in Charlevoix County, 25 Dams in Cheboygan County and 18 Dams in Emmet County. Dams are and have been regulated by the Michigan Department of Environmental Quality. While the inspection of these dams falls under the jurisdiction of the State of Michigan Department of Environmental Quality, the Tri-County Office of Emergency Management monitors these dams closely. The only dam in the Tri-County region that requires a EAP is the dam on the Cheboygan River at the locks. This plan is maintained and implemented by the Tri-County Office of Emergency Management should an incident occur. Below is an inventory of the Dams in the Tri-County area.

Table 1

DAM_ID	DAM_NAME	CNTY_NAME	AUTHORITY
515	Boyne River Dam	Charlevoix	FERC
700	Charlevoix KMart Retention Basin Dam	Charlevoix	Inventory
1156	Belvedere Golf Club Dam	Charlevoix	Inventory
1158	Marion Hills Dam	Charlevoix	Inventory
1159	Stoner Creek Dam	Charlevoix	Inventory
1160	Walloon Lake Dam	Charlevoix	Inventory
1576	Horton Creek Dam	Charlevoix	Inventory
2194	Massey Dam	Charlevoix	Inventory
2565	Walloon Lake CC Dam #3	Charlevoix	Inventory
2566	Walloon Lake CC Dam #14	Charlevoix	Inventory
1503	Lawton Walleye Pond Dam	Charlevoix	MOU
1940	Deer Lake Level Control Structure	Charlevoix	Part 307
514	Boyne Falls Dam	Charlevoix	Part 315
519	East Jordan Dam	Charlevoix	Part 315
545	Tower Dam	Cheboygan	FERC
546	Kleber Dam	Cheboygan	FERC
520	Cheboygan Dam	Cheboygan	FERC/MOU
521	Alverno Dam	Cheboygan	FERC/Part 307
1161	Berry Creek Ranch Dam	Cheboygan	Inventory
1162	Jury Dam	Cheboygan	Inventory
1163	Little Sturgeon Club Dam	Cheboygan	Inventory
1164	Maxson Dam	Cheboygan	Inventory
1167	Twin Lakes Dam	Cheboygan	Inventory
2196	Towner Dam	Cheboygan	Inventory
2477	Ginop Dam	Cheboygan	Inventory
464	Echo Lake Dam	Cheboygan	MOU

492	Dog Lake Dam	Cheboygan	MOU
1447	Crooked Lake Walleye Pond	Cheboygan	MOU
1513	Mill Creek Dam	Cheboygan	MOU
47	Little Black River Structure C	Cheboygan	Part 315
40	Little Black River Structure A	Cheboygan	Part 315
42	Little Black River Structure B	Cheboygan	Part 315
66	Little Black River Structure D	Cheboygan	Part 315
249	Wildwood Lake Dam	Cheboygan	Part 315
2622	Northland Properties Dam #1	Cheboygan	Part 315
2623	Northland Properties Dam #2	Cheboygan	Part 315
19	Dingman Marsh Flooding Dam	Cheboygan	Part 315/ MOU
246	Cornwall Creek Dam	Cheboygan	Part 315/ MOU
405	Stony Creek Dam	Cheboygan	Part 315/ MOU
1165	Roberts Lake Dam	Cheboygan	Part 315/ MOU
2633	Spring Lake Dam	Emmet	
37	Starks Mill Dam	Emmet	Inventory
768	Lake Street Dam And Flume	Emmet	Inventory
1213	Five Mile Creek Dam	Emmet	Inventory
1258	Birchwood Farms #2 Dam	Emmet	Inventory
1591	Paradise Lake Dam	Emmet	Inventory
1592	Crooked Lake Dam	Emmet	Inventory
2475	Ottawa Trout Pond #1 Dam	Emmet	Inventory
2478	Ottawa Trout Pond # 3 Dam	Emmet	Inventory
2564	Windward Dam	Emmet	Inventory
2656	Carp Lake River Lamprey Barrier	Emmet	Inventory
1249	Goose Pond Dam	Emmet	MOU
1267	Wycamp Lake Dam	Emmet	Part 307
424	Maple River Dam	Emmet	Part 315
1222	Birchwood Farms Dam	Emmet	Part 315
33	O'Neal Lake Dam	Emmet	Part 315/ MOU
494	French Farm Lake Dam	Emmet	Part 315/ MOU
1146	Mitchell Dam	Emmet	Removed

The State of Michigan also has a “Dam Management Grant Program. This is a program that encoiurages the removal of dams that have no economic purpose and also provides funding for the repair of dams with a clear ecomomic purpose.

The information below (Article 1) was taken from the Michigan Department of Natural Resources web site and explains the program in more detail.

Article 1

Dam Management Grant Program Overview

Program Purpose

There are approximately 2,500 Michigan dams listed in the State of Michigan Dam Inventory and many more that are not included in this database. Most of these dams were built decades ago for a variety of uses including power generation, water supply, flood storage and recreation. However, many dams no longer serve their original purpose, have no economic purpose, are threatening public safety and are literally falling apart. For example, several hydropower dams have been decommissioned and sold to local municipal or township governments to manage as waterfront recreation sites, but the structures have met or exceeded their expected life. These dams require continuous, often expensive maintenance that many owners are either unable or reluctant to provide. Representatives of several communities have approached the Department seeking financial and technical assistance to remove dams rather than repair and maintain these facilities. It is also likely the State will be required to take ownership of some of these decaying assets through tax reversion. The program will help to enable the removal of dams without any economic purpose.

In addition to the dams with no economic purpose, there are a number of dams with a clear economic benefit but need substantial investment to reduce public safety issues. For example, the Department of Natural Resources owns approximately 250 dams of which six are rated as high hazard and 16 others are considered to be a significant risk to public safety. The highest priority dams that require immediate attention are: 1) the Kalamazoo River Dams (Otsego, Plainwell #1 and Trowbridge Dams in Allegan County) which require perpetual maintenance as we await EPA's safe removal of PCBs from impoundments; and 2) Wraco Wildlife Flooding (Roscommon County) which required emergency repairs to prevent collapse this summer and urgently requires additional repairs to stabilize the dam. More than 80 of the lower hazard dams also require significant repairs. These dams exist to support fish rearing operations, recreational fishing and camping, and wildlife habitat and hunting opportunities. There are many other economically viable dams with various owners with similar public safety issues this program can help address.

To Remove or Repair: A Case for Dam Removal

Dam removal has many economic and environmental advantages. Dams obstruct recreational users of rivers and block movement of fish, other aquatic organisms and natural nutrient flows. Natural flow patterns are disrupted, causing numerous changes in stream configuration and aquatic species composition. Impoundments behind dams often have poorer water quality and abnormally high or low water temperatures in comparison to the streams they impound, making them less conducive to many desirable fish species that are traditionally found in streams. The impounded water also represents a direct loss of stream habitat that becomes buried under accumulated sediment. In many cases, sediments have accumulated to the extent that impoundments are too shallow for boating. Removal of a dam can cost three to five times less than what it costs to repair or rebuild and maintain a dam over the life of the dam. Periodic inspections and maintenance are continual, on-going expenses, and costs are frequently paid by the public. Removal of dams in poor condition also eliminates the risk to public safety, downstream property, and aquatic habitat posed by dam failure.

It is frequently far less expensive in the long term to the citizens of the state to have a dam removed than to deal with perpetual maintenance of a structure that no longer serves a societal function. It is often the case that the cost to repair a dam properly is nearly the same as removal and removal is a permanent solution to the problems with a particular structure. Thus, the return on the investment over the expected life of a dam is much greater with dam removal when the perpetual cost of maintenance is taken into account.

Program Objectives

This program is designed to address the Governor's direction on community infrastructure needs as stated in his 2011 address on this issue. The key objectives and priorities addressed by this program are:

- Removal of impairments to watershed processes that include: connectivity; fish and wildlife passage; hydrology; sediment and woody debris transport; water quality; fish community composition and size structure.
- Resolution of public safety concerns.
- Increased public involvement in watershed issues.
- Increased access to aquatic resources.
- Improving quality of life in urban areas.
- High rate of return on dam management investments.

Eligible Projects

Projects that would be eligible under this program are:

- Removal of dams that have no economic purpose resulting in the enhancement of aquatic environments and the reduction of long term infrastructure costs.
- Repair/major maintenance of dams which have an economic purpose that are an imminent public safety issue and are deemed of unsatisfactory condition by the DEQ Dam Safety Program or are under DEQ order.

Ineligible Projects

Projects with scope of work outside the grant focus area are not eligible for Dam Management Grant support. Within the focus area, the following types of projects are also not eligible:

- Feasibility or ecological studies.
- Experimental and unproven methods to rehabilitate river channels after dam removals or used in rehabilitating a dam.
- Routine maintenance activities and operational costs.
- Any project where the estimated repair/major maintenance is less than 50% of the estimated cost of replacing the structure.

VIII. CHARLEVOIX COUNTY

Charlevoix County is located in northwestern Lower Peninsula of Michigan. It borders Lake Michigan on the western portion of the County and includes Beaver Island which is located off shore from Charlevoix in Lake Michigan. Beaver Island presents a special challenge for public safety agencies in that there are year around residents and during the late fall, winter and early spring months the island is not accessible by boats. Therefore, in the event of emergencies the only way to access the island is by air transportation. This creates long response times from the mainland.

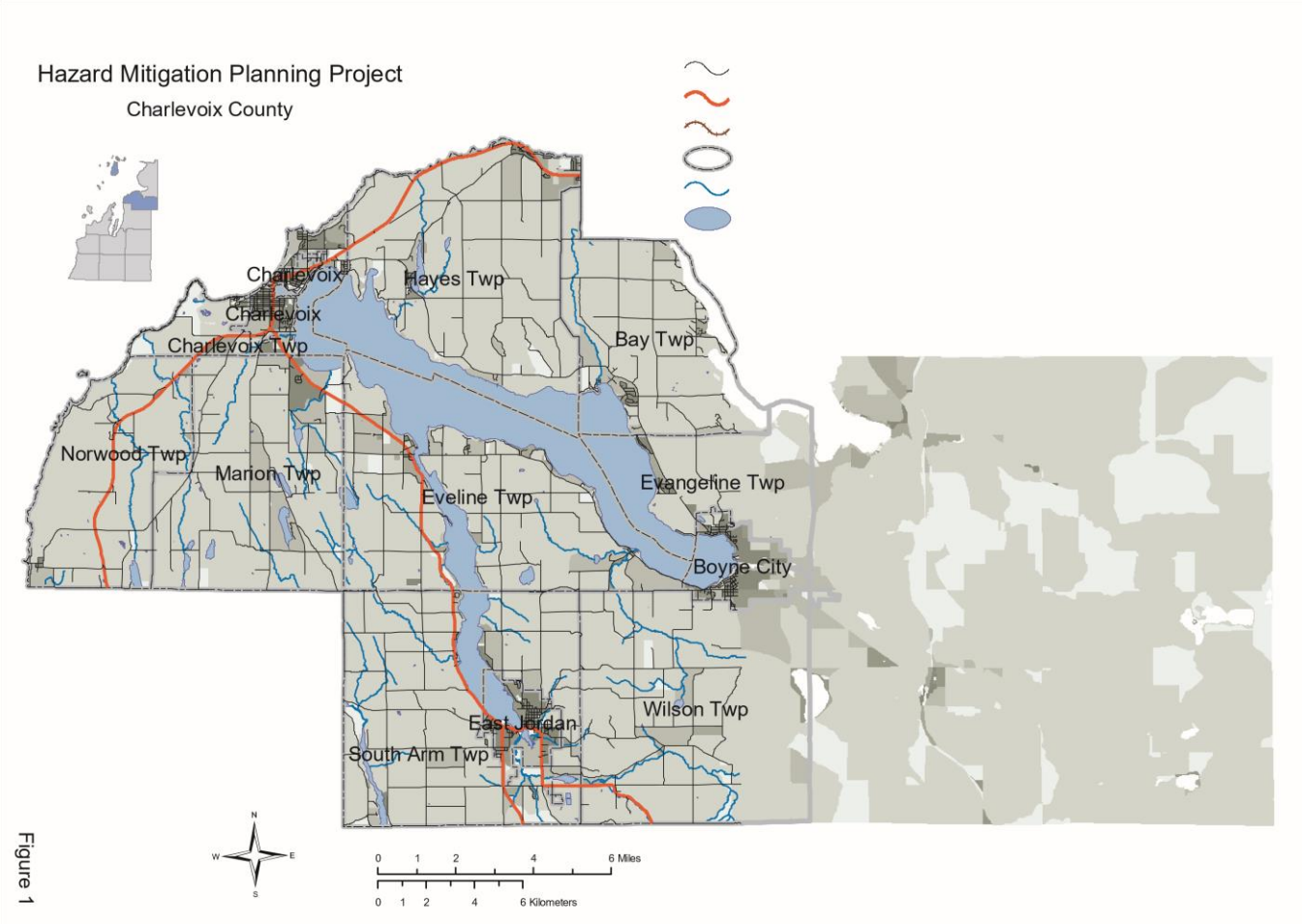


Figure 1

Charlevoix County offers its residents and visitors access to magnificent natural features including Lake Michigan shoreline and inland lakes such as Lake Charlevoix and Walloon Lake.

The following community data is provided to describe Charlevoix County for planning and implementing the mitigation strategies. (Table 1)

Table 1

Area in Water	23,552 acres
Miles of Great Lakes shoreline	102 miles
Forest Lands	172,200 acres 64.5% of total land area
Wetlands	67,349 acres 25.2% of total land area

The total Charlevoix County population in the 2010 census was **25,949**. The population in 2000 was 26090. With that, Charlevoix County experienced a plateau and slight decrease in population from 2000 to 2010. Charlevoix County also has a seasonal (summer) population that can triple the population of the area. The County is also a popular destination for winter sports and experiences transient population during the winter months as well. Although this added population is mostly seasonal in nature it still requires County resources and services. It should also be noted that while population numbers appear to be steady, the Tri-County area has seen a sharp decrease in working families and a sharp increase in the senior population. This shift has placed a burden on the County as the senior population has greater needs. This shift has also created a shortage of workers and is effecting the local economy. This is evident as some local businesses have shut down portions of their business during the busiest time of the year due to a lack of workers.

The transient population also effects the balance of population wilth in the county. The cities and townships that lay within the tourist destinations are much wealthier than the outlying townships and towns. While areas such as the City of Charlevoix, Boyne City and other areas that attract tourists do quite well and are able to provide adequate services. Most of the outlying townships struggle to provide basics such as fire protection and EMS services to the residents. These areas rely heavily on the County Sheriff and State Police for police protection, but struggle to afford equipment and training for their volunteer fire departments.

The population numbers from the 2010 Census for the **15 Townships, 3 Cities and 1 Village** covered by this plan are:

Table 2

Townships/Cities/Village	Population
Bay Township	1,122
Boyne Valley Township	1,195
Chandler Township	248

Charlevoix Township	1,645
Evangeline Township	712
Eveline Township	1,484
Hayes Township	1,919
Hudson Township	691
Marion Township	1,714
Melrose Township	1,403
Norwood Township	723
Peaine Township	292
St. James Township	365
South Arm Township	1,873
Wilson Township	1,964
Boyne City	3,735
City of Charlevoix	2,513
City of East Jordan	2,351
Village of Boyne Falls	294

As stated above, on peak days, the seasonal population can be three (3) times the normal population, especially with festivals and special events that include, but are not limited to:

Beaver Island – Homecoming
Boyne City – Mushroom Festival; 4th of July Fireworks
Boyne Falls – Boyne USA events, Polish Festival
Charlevoix – Venetian Festival, Art Fair
East Jordan – Freedom Festival
Melrose – Northern Michigan Antique Flywheelers

According to the 2012 Economic Census (Table 3) below Charlevoix County has a large number of individuals living in poverty at 13.4%, even though 91.3% of residents have at least a high school education.

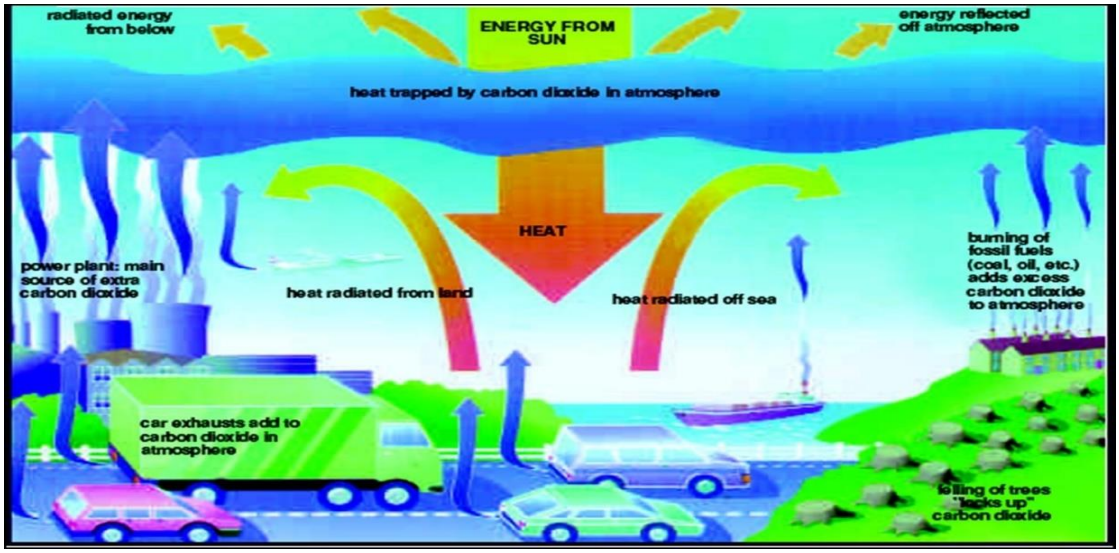
2012 Economic Census (Table 3)

Population	26,238
Median Household Income	$46,709
Individuals Below Poverty Level	13.4%
Education Attainment, High School or Greater	91.3%
Health Insurance Coverage, Population Uninsured	10.8%
Median Housing Value	$149,700.00
Total Housing Units	17,299 .
Number of Companies	3623

*Information provided above was retrieved from the 2012 United States Census Bureau website.

Natural Hazards and Climate Change

Scientists are now convinced that human activity, primarily the burning of fossil fuels to produce electricity and drive cars, is changing the climate. These activities emit gases, primarily carbon dioxide that blanket the planet and trap heat. Some of the signs of climate change we are seeing throughout the Great Lakes region include; increasing average annual temperatures; more frequent severe rainstorms; shorter winters; and duration of lake ice cover. In general, Michigan's climate will grow considerably warmer and probably drier during this century, especially in the summer.



Potential Impacts from Climate Change

Northwest, Lower Michigan depends heavily on groundwater, freshwater from Lake Michigan, and rainfall for agriculture, drinking, and industrial uses. As the population in this region continues to grow, the demand for water for all the needs increases. The projected changes in rainfall, evaporation, and groundwater recharge rates from climate change events may affect ecosystems and freshwater users.

- Lower summer water levels are likely to diminish the recharge of groundwater, cause small streams to dry up, and reduce the area of wetlands, resulting in poorer water quality and less habitat for wildlife.
- Lake levels are expected to decline in both inland lakes and the Great Lakes, as more moisture evaporates due to warmer temperatures and less ice cover.
- Pressure to increase water extraction from the Great Lakes will grow, exacerbating an already contentious debate in the region.
- Development and climate change will degrade the flood-absorbing capacities of wetlands and floodplains, resulting in increased erosion, flooding, and runoff polluted with nutrients, pesticides, and other toxins.

Floods Data

Flood hazard information can usually be derived from the Flood Rate Insurance Maps (FIRM) available for jurisdictions. So, in order to delineate potential flood plain areas (seasonal floodplains) for each county, Networks Northwest overlaid wetland, soils, and elevation data to determine the most likely flood prone areas. Once overlaid, isolated polygons (areas) were removed in order to show a more accurate representation of potential flood prone areas along lakes, rivers, and streams. Sources: Temporary/seasonally flooded areas data are from the National Wetland Inventory of the US Fish and Wildlife Service; Hydric soils data are from the county digital soil

surveys (where available); and Digital Elevation Model data are from the Center for Geographic Information, Michigan Department of Information Technology.

Fire Data
Modern forest fire data were obtained from the USDA forest service and the Departments of Natural Resources in Minnesota, Wisconsin, and Michigan. Fire regimes data (fire prone areas) were provided by the USDA Forest Service, North Central Research Station located in Wisconsin. Land type associations, and historical and modern fire rotations were used to identify the fire prone areas.

Tornadoes - National Weather Service, Michigan Hazard Analysis

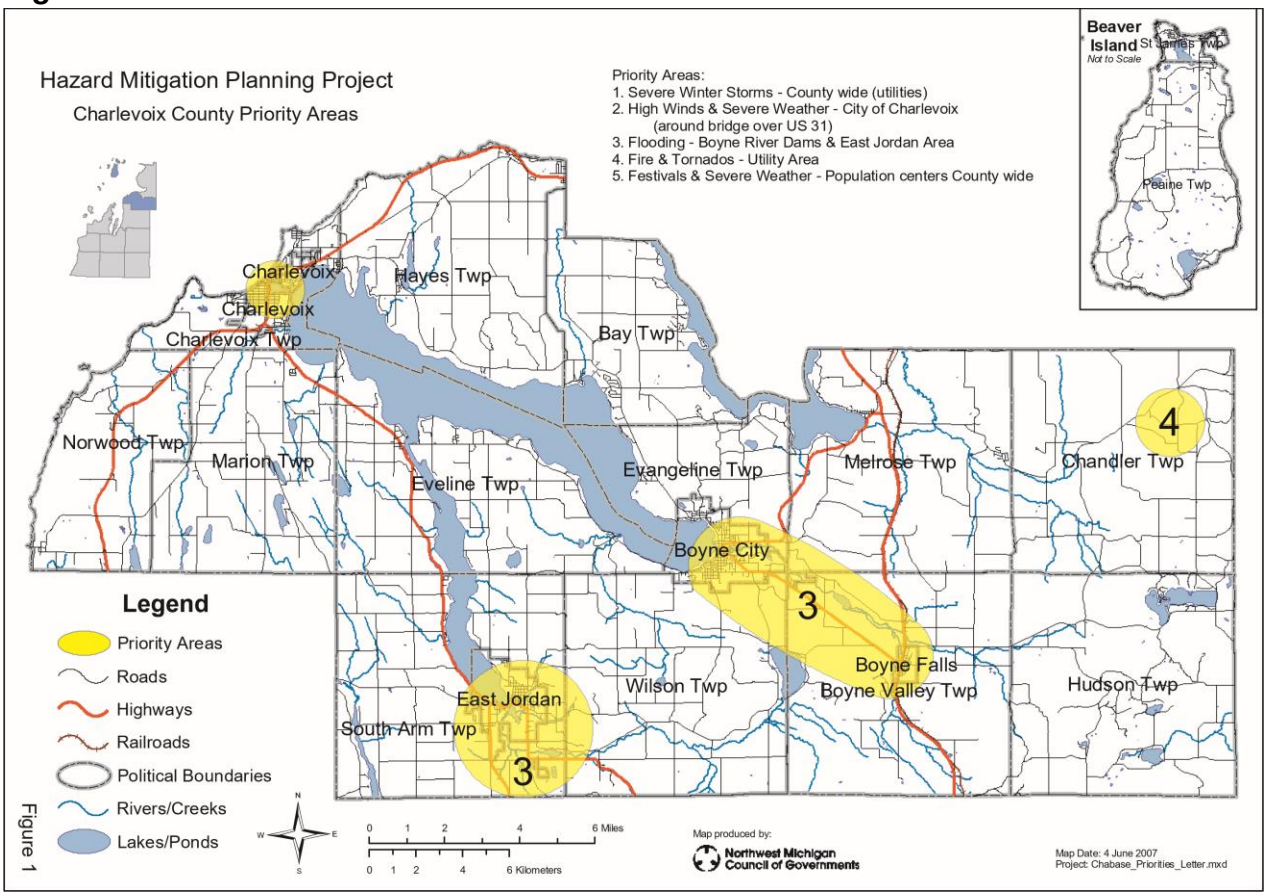
Damaging Winds - National Weather Service, Michigan Hazard Analysis

Large Hail - National Weather Service

Winter Weather* - National Weather Service *Landslide/Erosion
Shoreline erosion and landslide incident zones delineated by the US Geological Service. Digital Elevation Model data from the Center for Geographic Information, Michigan Department of Information Technology. High Lake Michigan water levels causing erosion along the coast and Lake Charlevoix.

Other hazards may exist, but are not considered to be substantial risks.

Figure 1



Natural Hazards Recorded Events

Data for weather events was compiled from the National Oceanic and Atmospheric Administration's (NOAA) website utilizing the following sections:

- Weather/Climate Events, Information, Assessments
- Climatology and Extreme Events
- U.S. Storm Events Data Base: 1950 to present, local storm reports, damage reports, etc. from various sources – events checked for Charlevoix County included drought, flooding, funnel clouds, hail, lightning, snow and ice, thunderstorms and high winds, tornadoes, wild/forest fires

The most severe events recorded for Charlevoix County are listed below, including the number of events, dates, and descriptions of the most severe.

1. Flood – 3 events
   1993: (regional)

2. Extreme Cold and wind chill events
   - February 15, 2015: Extreme cold weather hit the area. Freezing well heads and causing numerous cases of frost bite
   - February 19, 2015: temperatures again dipped into -10 to -20 degree range causing freezing of wells and frost bite.

3. Hail – 14 events
   - July 1996: 0.75 inches (East Jordan) - 2-inch accumulation
   - September 1996: 1.0 inch (Boyne City) - 6-inch accumulation
   - July 2003: .88 inches (East Jordan) - nickel sized
   - August 2004: .75 inches (Boyne Falls)

4. Snow and Ice – 66 events (12 inches or more of snow)
   - March 1993: (statewide) $500,000 property damage; heavy snow
   - April 1993: (region) $50,000 property damage; heavy snow
   - January 1994: (region) $5.0 million property damage; heavy snow/freezing rain.
   - November 1996: (county) 9 to 17 inches of snow
   - December 2001: (county) 99 inches of snow 25th-28th; records were broken, and a State of Emergency was declared by Governor John Engler. The county requested $15,906.85 in disaster assistance.
   - November 2003: (region) $40,000 property damage; winter storm
   - Winter 2013 brought record snowfall to the region.
   - In February 2015 record cold temperatures caused frozen wells and many other issues to the region.

5. Thunderstorm and High Wind – 32 events
   - October 1993: (county); high winds with many trees, power poles and power lines blown down; power outages; 59 mph gusts
   - September 1998: (St. James, Beaver Island; East Jordan; Boyne Falls); thunderstorm/wind with numerous trees uprooted on the southern portion of the Island; numerous trees snapped off.
   - November 1998: (county); high winds with trees and homes damaged
   - August 2, 2015: Straight line winds knocked down powerlines and caused major damage in the area. Mainly in Leelanau and Grand Traverse Counties.

a Probability of Natural Hazards:

The probability that a natural hazard such as hail, thunderstorms and high winds, tornadoes, and snow and ice will affect this area of Michigan is an annual possibility. The magnitude and severity depends on the season, which determines temperature, moisture in the air, ice cover on the lakes, etc. Also, the severity of an event is connected with tourist activity during the year, the pace of developing second homes, and an increasing base population in northwest, Lower Michigan leads to more development. The events recorded by NOAA show that natural hazard events may be happening more frequently, but the geographic impact of the natural hazards' impact has remained the same in Charlevoix County. The areas where natural hazards overlap in Charlevoix County can include heavy snow that causes trees and power lines down, and then melting, rain and flooding. **(Table 4)**

Table 4

Thunderstorm and High Wind	32 events	57% chance	**S Charlevoix Twp. Round Lake Boyne City & Boyne Falls Evangeline Twp. South of Advance Hayes Township Beaver Island East Jordan Boyne Falls Boyne City Charlevoix**	26,090		$235,000 property damage
Tornadoes	4 events	7% chance	**Boyne City East Jordan Chandler Twp.**	3,503 + seasonal	**4**	
			Boyne Valley NE			
Wildfires	99 events	100% chance	**County**	26,090	**4**	

b Charlevoix County Natural Hazards Task Force and Public Input

To create the original Charlevoix County Natural Hazards Task Force, invitations for the meetings were sent to the following entities requesting their participation:

County Administrator/Coordinators
County Board of Commissioners
County Sheriff/Emergency Services (911 Services Coordinators, Public Safety)
County Emergency Manager/Coordinators
County Public Works Directors
County Health Department Director
County Planning or Community Development Directors
County Drain Commissioner/Soil Erosion Officers
County Road Commission Directors
County Conservation District Director/Soil Erosion Officers
Township elected and appointed officials
Township Supervisors
Township Clerks
Michigan State Police
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
Michigan Department of Transportation
U.S. Coast Guard
Hospitals
City/Village Maintenance/Utilities
Tribal Governments
Environmental/Conservation Groups/Organizations
American Red Cross
Groundwater Protection Organizations
Housing Associations
Chambers of Commerce
National Weather Service (Gaylord)
Michigan Family Independence Agencies

Two meetings were planned and the actual participants in the development of the plan are listed below. First the Task Force identified the natural hazard priority areas and second the Task Force developed the mitigation strategies for the priority issues.

Charlevoix Area Hospital
Charlevoix County Board of Commissioners
Charlevoix County Building and Safety Department
Charlevoix County GIS Department
Charlevoix County Planning Department (2)
Charlevoix County Road Commission

Charlevoix County Sheriff Department
Charlevoix Housing Commission
City of East Jordan
East Jordan Family Health
Emergency Management Coordinator
Grand Traverse Band of Ottawa and Chippewa Indians
Marion Township/Charlevoix County Farm Bureau
Northwest Michigan Community Health Agency

A different approach was used in updating the plan. Since the purpose was to update the original plan and not to create a new plan the process was simplified. A questionnaire was developed and posted on the Tri-County Emergency Management web site for public comment. Public Hearings were scheduled in all three communities. The following notice was posted in the local paper:

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan for the Tri-County area. A public hearing will be held at the Charlevoix County Sheriff's Department, 1000 Grant St., Charlevoix, MI 49720, Wednesday October 6th, 7:00 PM in the lower level meeting room to accommodate any member of the public that would like to offer suggestion or input into the local Hazard Mitigation plan. A survey is also available for citizens to share some insight about local concerns at www.cceoem.net.

At about the same time, representatives from Tri-County Emergency Management attended meetings of the Michigan Township Association in each County and made local officials aware of the questionnaire and how to find the document on our website. The Michigan Township Association for each county involves at least one representative from each Township. With that, each township was provided the information about the plan and the type of input we were looking to get from them. The meeting for Charlevoix County took place on September 28, 2015 at 7:00 PM. This information was also on the agenda's and discussed at meetings of the LEPC on October 20, 2015, January 19, 2016, April 19, 2016 and July 19, 2016. Tri-County Emergency Management also attended Fire Chief Association Meetings in each of the three counties to make them aware of the HMP and ask for their input. In March we had only heard from a few of the many communities, so an email was sent to all members of the MTA's again, explaining the project, the types of projects that are fundable through FEMA and asking for their input on projects. The process then continued until the plan was reviewed, information in each section was updated as needed and drafts were presented to local communities and the public. Public hearings were held in each county for a second time. The draft was then sent to MSP/EMHSD and ultimately FEMA for their approval and/or comment. Specific mitigation projects were provided for the plan from the following Charlevoix County jurisdictions: Hayes Township and Charlevoix County Road Commission regarding the Beaver Island Road Garage.

The original group analyzed the map areas for the top natural hazard priority areas by documenting the most threatening. They did a qualitative assessment of points and concerns where they saw potential conflicts with and the relationship to critical facilities and population centers. The general list created included:

- Wildfire, high winds/tornadoes in Chandler Township where a natural gas transmission facility is located
- Highway U.S. 31 as a main traffic corridor
- The dam and water system at Village of Walloon Lake
- Boyne River dams – flooding and sewage and water treatment plants in Boyne City
- Big Rock decommissioned nuclear power plant on the shores of Lake Michigan
- 4th of July festival (tornado summer of 2001) in Boyne City
- Morel Mushroom festival in the spring in Boyne City
- Wilson Township and East Jordan area: East Jordan Iron Works; flooding; East Jordan plastics plant; telephone and communications centers in East Jordan; East Jordan possible flooding area
- Hudson Township: Hoffman Lake area is growing in population, and has an EMS/Access center
- Wildfire areas near Thumb Lake (Lake Louise Christian Community) with pines
- Major gas pumping station on Thumb Lake Road
- Winter festival at Boyne Mountain
- Dam at Boyne Falls to the dam at the Kircher property to Boyne City (culverts)
- Charlevoix: US Highway 31 Bridge
- Wildfire areas on Beaver Island
- Transportation to and from Beaver Island with severe weather issues
- Large festivals – Beaver Island Homecoming event, Mushroom Festival Boyne City, Boyne USA events and Polish Festival in Boyne Falls, Venetian Festival and Art Fair in Charlevoix, Freedom Festival in East Jordan
- The seasonal population fluctuation in the summer can be up to three times the offseason population
- Road closure problem area on US 131 north of the Village of Walloon/Shorts Hill

The participants then took the complete list above and developed their Top Five Natural Hazards Priority Areas. Due to the rural nature of the county, there has not been a lot of property damage, injuries, or deaths due to natural hazard.

Top Five Natural Hazards Priority Areas

a. **Severe winter storms: Potential throughout the County and concerns about Utilities**

Charlevoix County is in a Snow Belt area. Snowstorms can be very dangerous for a community for short periods of time. Heavy snows can shut down towns and businesses for a period of a few days if the snow is falling faster that it can be cleared in a timely fashion. Blowing and drifting with blizzard conditions cause driving hazards.

b. City of Charlevoix: Potential of severe thunderstorms and high winds and severe winter storms around the U.S. 31 Bridge

There is a historical record of high wind events around the Lake Michigan shoreline area and a few tornadoes in the county. Severe winds, or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage due to downed power lines caused by falling trees and limbs.

There is a history of severe thunderstorm events in the county with some concerns regarding the influx of tourists. Thunderstorms are hazards that bring a variety of problems during the spring, summer, and fall seasons. They can cause lightning, flash flooding, hail, strong winds, and even tornadoes.

Given its proximity to Lake Michigan, Charlevoix County is subject to lake-induced precipitation and is recognized by the National Weather Service as a Snow Belt area. Snowstorms can be very dangerous for a community for short periods of time. Heavy snows can shut down towns and businesses for a period of a few days if the snow is falling faster that it can be cleared in a timely fashion. Blowing and drifting with blizzard conditions cause driving hazards.

c Boyne River and East Jordan Area: Potential flooding

The risk of the dams failing could cause a chain reaction of failure down river. Damages will be greater from a cascading failure of events than they will from gradual floodplain inundation (rainfall or snowmelt event).

In addition to “regular” flooding in a riverine floodplain, other flooding may involve low-lying areas that collect runoff waters; flaws or shortcomings in existing sewer infrastructure; undersized or poorly designed storm water control practices; collective effects of land use and development trends; illegal diversion of water, or actions that interfere with system function.

d Eastern Portion of the County: Potential wildfire and the possibility of tornadoes in a utility area

Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been 4 reported tornado touchdowns in Charlevoix county according to the Michigan Hazard Analysis. Servicebut there is concern of the potential threat affecting utility facilities.

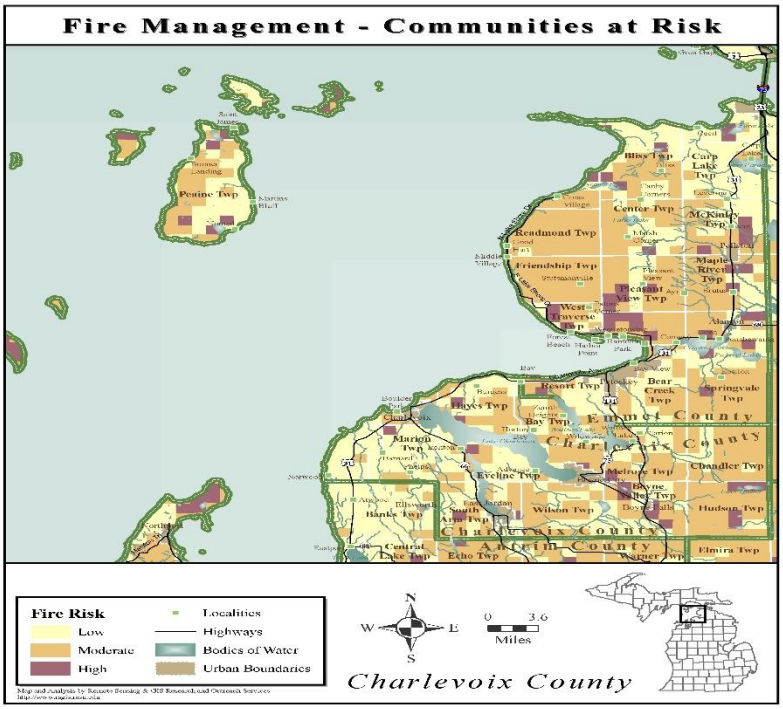
e **Wildfires in the rural areas of Charlevoix County**

The forest types (jack pine, red pine, white pine) that are most fire prone are not located in this area, but the rural, forested topography of this portion of the county make it susceptible to wildfire. Additional factors that increase fire risk include lightning and human factors, such as the number of persons residing in, camping in, or traveling through an area.

Charlevoix County's summer season brings numerous tourists to the area that often enjoy camping on private, county, and state lands. The summer camping season brings with it numerous campfires and the number one cause of wildfires in Michigan is the result of human action, which makes the county highly susceptible during those months.

In addition, Charlevoix County has also become a favored building site for vacation homes. Many of these homes are located in remote areas of the county on unimproved roads or long and narrow private driveways. These remote locations and narrow roads pose numerous difficulties for emergency responders including: discovery and reporting of fires; travel distances; access for fire trucks; lack of turnarounds for water trucks and other equipment; and limited means of warning these remote locations.

With nearly 65% of the total lands in Charlevoix County being forested and a major source of economic benefit relying on the aesthetic appeal of the County's wildlands, wildfires are a moderate to significant risk. This risk is present throughout the County with the exception of the urban areas. However, the risk is much greater in the rural townships east of M131 and along the M131 corridor including the area near Waloon Lake Village. With that, Charlevoix County has a tight association of Fire Chiefs that meet on a regular bases and are connected through mutual aid agreements with each other. However, since most of the Fire Departments are volunteer it may take a response from several departments to get enough manpower to safely work a wild fire incident depending on the time of day and resources available. The region also has the advantage of a MDNR office in Indian River that can quickly bring the resources of the State of Michigan to the scene of major wild fire events.



As seen in the study from Michigan State University on the left, wild fire risks are moderate for most of the County except for the urban hubs in the County.

c. Festival events at seasonal population centers throughout the County: Potential of severe thunderstorms, high winds, and tornadoes

There is a historical record of severe thunderstorms and high wind events in these sections of the county with concerns regarding the influx of tourists. Thunderstorms are hazards that bring a variety of problems during the spring, summer, and fall seasons. They can bring potential lightning, flash flooding, hail, strong winds, and even tornadoes.

Severe winds, or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage due to downed power lines from falling trees and limbs.

Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. According to the Michigan Hazard Analysis 2012 there have been four tornados in Charlevoix County.

_____ Not Completed _____ In Progress _____Completed

Action Agenda Layout:

Priority and Action Strategies	Responsible Parties	Timeframe
Priority Area 1 ***Severe Winter Storms Mitigation Strategies:***		
a. A National Oceanic and Atmospheric Administration weather station for the area	Emergency Management Coordinator Planning Department Townships Incorporated Cities and Villages Elected Officials	1-5 years after adoption of the plan
b. Public education, awareness, and preparedness; also for decision makers	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Townships, Cities, Villages	1-3 years after adoption of the plan
c. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator Planning Department County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships, Cities, Villages	1-5 years after adoption of the plan
d. Emergency Operations Center planning to include winter storms in future exercises	Emergency Management Coordinator Local Emergency Planning Committee Planning Department Sheriff's Department	1-2 years after adoption of the plan
e. Identify and maintain critical fueling facilities	Emergency Management Coordinator Facilities Department, Road Commission	Ongoing
f. Work with utility companies – implement sound tree planting strategies around power lines; relocate electrical lines underground; bury lines for new construction	Emergency Management Coordinator Utility Companies Planning Department Townships, Cities, Villages	1-5 years after adoption of the plan
g. Inventory of public four-wheel drive and special use vehicles	Emergency Management Coordinator Planning Department Sheriff's Department Facilities Department Road Commission	1-2 years after adoption of the plan
Wind Mitigation Strategies:		
a. Work with utility companies – implement sound tree planting strategies around power lines; maintenance of trees education; burying lines for new construction	Emergency Management Coordinator Utility Companies Planning Department Townships, Cities, Villages	1-5 years after adoption of the plan

b. Business and homeowner education	County Building Inspector Planning Department Insurance Agencies Chambers of Commerce MSU Extension Personnel Emergency Management Coordinator	1-3 years after adoption of the plan
c. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator Planning Department County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships, Cities, Villages	1-5 years after adoption of the plan
Priority Area 2 ***Severe Thunderstorms and High Winds, Mitigation Strategies:***		
a. A National Oceanic and Atmospheric Administration weather station for the area	Emergency Management Coordinator Planning Department Townships, Cities, Villages Elected Officials	1-5 years after adoption of the plan
b. Coordinate the use of sirens that are in place and public education	Emergency Management Coordinator Planning Department Law Enforcement Agencies Townships, Cities, Villages	1-3 years after adoption of the plan
c. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator Planning Department County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships, Cities, Villages	1-5 years after adoption of the plan
d. Pre-plan and label alternate transportation routes	Emergency Management Coordinator Road Commission MI Department of Transportation Planning Department GIS Department	1-3 years after adoption of the plan
e. Develop inventory of homes located on seasonal roads	Planning Department GIS Department Road Commission	1-2 years after adoption of the plan
f. Work with utility companies – implement sound tree planting strategies around power lines; maintenance of trees education; burying lines for new construction.	Emergency Management Coordinator Utility Companies Planning Department Townships, Cities, Villages	1-5 years after adoption of the plan

g. Continue support of the Road Commission in their clearance of blocked roads	Emergency Management Coordinator Planning Department Elected and Appointed Officials	Ongoing
Severe Winter Storms Mitigation Strategies:		

a. A National Oceanic and Atmospheric Administration weather station for the area	Emergency Management Coordinator Planning Department Townships Incorporated Cities and Villages Elected Officials	1-5 years after adoption of the plan
b. Public education, awareness, and preparedness; also for decision makers	Emergency Management Coordinator Planning Department County Building Inspector Business Owners Non-Profit Organizations Townships, Cities, Villages	1-3 years after adoption of the plan
c. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator Planning Department County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships, Cities, Villages	1-5 years after adoption of the plan
d. Emergency Operations Center planning to include winter storms in future exercises	Emergency Management Coordinator Local Emergency Planning Committee Planning Department Sheriff's Department	1-2 years after adoption of the plan
e. Identify and maintain critical fueling facilities	Emergency Management Coordinator Facilities Department Road Commission	Ongoing
f. Work with utility companies – implement sound tree planting strategies around power lines; relocate electrical lines underground; bury lines for new construction	Emergency Management Coordinator Utility Companies Planning Department Townships, Cities, Villages	1-5 years after adoption of the plan
g. Inventory of public four-wheel drive and special use vehicles	Emergency Management Coordinator Planning Department Sheriff's Department Facilities Department Road Commission	1-2 years after adoption of the plan
Priority Area 3 ***Flood Mitigation Strategies:***		
a. Assessment of flood threat and results of dam inspections	Researchers, Engineers, and Architects Planning Department Townships, Cities, Villages County Conservation District Drain Commissioner Insurance Agencies Emergency Management Coordinator Non-profit organizations	1-5 years after adoption of the plan
b. Create a better flood warning system	Emergency Management Coordinator County Planning Townships, Cities, Villages Elected and Appointed Officials County Conservation District Drain Commissioner	1-3 years after adoption of the plan

c. Re-engineer culverts for flood mitigation	Researchers, Engineers, and Architects Planning Department Townships, Cities, Villages, Road Commission	1-5 years after adoption of the plan
d. Public education	Emergency Management Coordinator Planning Department County Building Official Business Owners Non-Profit Organizations Townships, Cities, and Villages	1-3 years after adoption of the plan.
Priority Area 4 ***Wildfire Mitigation Strategies:***		
a. Inventory dry hydrants and water sources and ensure sources are accessible	Emergency Management Coordinator, Local Fire Departments, GIS Departments	1-2 years after adoption
b. Put water source location maps in all emergency vehicles	County GIS Department, Fire and Law enforcement agencies	1-2 years after adoption
c. Study roads in the area for emergency vehicle accessibility and enforce minimum standards for private roads to ensure emergency vehicle access	Planning Departments, Emergency Management Coordinator, Cities, Towns, Villages, Planning Commissions, Zoning Administrators, GIS Departments, and Road Commissions.	1-3 years after the plans adoption
d. Revise ordinances to include standards that ensure access, stipulate maximum grade, minimum driveway width, and turnaround areas	Planning Departments, Emergency Management Coordinator, Cities, Townships, Villages, Planning/Zoning Administrators, and Road Commissions.	1-5 years after the plans adoption
e. Public awareness and education	Emergency Management Coordinator County Planning Townships, Cities, Villages	1-3 years after adoption
Tornado Mitigation Strategies:		
a. Consistent weather event warnings.	Emergency Management Coordinator, NOAA Office, County Planning, Townships, Cities, Villages	1-3 years after adoption of the plan
b. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator, Planning Department, County Building Official, Business Owners, Non-Profit Organizations, Public	1-5 years after adoption of the plan
c. Work with utility companies – implement sound tree planting strategies around power lines; relocate electrical lines underground; bury lines for new construction	Emergency Management Coordinator Utility Companies, Planning Department, Townships, Cities, and Villages	1-5 years after adoption

d. Public Awareness and Education	County Building Official, Planning Department, First Responders, Insurance Agencies, Townships, Cities, Villages, MI Department of Natural Resources, Non-profit organizations, MSU Extension Personnel, Emergency Management Coordinator.	1-3 years after adoption of the plan
Priority Area 5 **Festival events - Severe thunderstorms, High Wind, and Tornadoes Mitigation Strategies:**		
a. Charlevoix County Board of Commissioners to recommend that all groups sponsoring festivals to plan mitigation strategies for their respective festivals	Emergency Management Coordinator, Planning Department, Planning Commission, Board of Commissioners, Townships, Villages, Cities	1-2 years after adoption of the plan
b. Require mass gathering events to have a permit review process to include natural hazards mitigation	Townships, Cities, Villages, Planning Department, Emergency Management Coordinator	1-2 years after adoption of the plan
c. Identify, improve, and/or construct shelter capacity.	Emergency Management Coordinator, Planning Department, County Building Official, Business Owners, Non-Profit Organizations, Public Citizens, Townships, Cities, and Villages.	1-5 years after adoption of the plan
d. Work with utility companies – implement sound tree planting strategies around power lines; relocate electrical lines underground; bury lines for new construction	Emergency Management Coordinator, Utility Companies, Planning Department, Townships, Cities and Villages	1-5 years after adoption of the plan
e. Public awareness and education	Emergency Management Coordinator County Planning Townships, Cities, Villages	1-3 years after adoption of the plan
f. Develop and implement mutual support and aid practices with surrounding communities	Emergency Management Coordinator County Planning Townships, Cities, Villages Non-profit	1-3 years after adoption of the plan

While it appears there are still many unfinished projects, most are ongoing and of a nature that will never be completed such as “Public Education”. This is an ongoing effort for all emergency managers.

VIII: CHEBOYGAN COUNTY

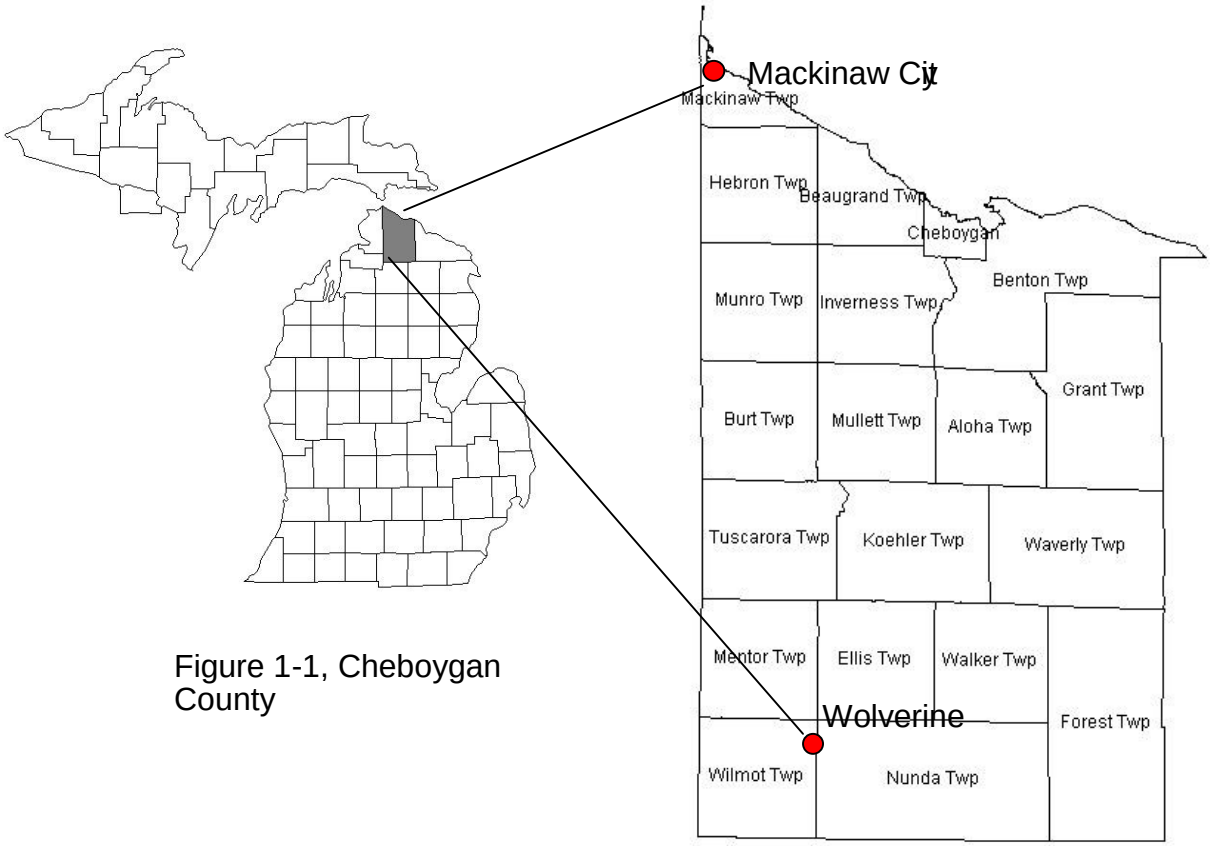


Figure 1-1, Cheboygan County

Cheboygan County is located at the northern tip of the Lower Peninsula. The county is composed of 19 townships: Aloha, Beaugrand, Benton, Burt, Ellis, Forest, Grant, Hebron, Inverness, Koehler, Mackinaw, Mentor, Mullett, Munro, Nunda, Tuscarora, Walker, Waverly, and Wilmot. Also located in Cheboygan County are the City of Cheboygan, the villages of Mackinaw City, Wolverine, and Indian River (Census Designated Place). The City of Cheboygan is the county seat and is located on Lake Huron. The name Cheboygan stands for "Water of the Chippewa's." The first settler was Jacob Sammons, a cooper from Mackinaw City who built a log cabin there in 1844, and then founded a town. The area grew productive during the lumber days, and was incorporated as a village in 1871, while it later becoming a city in 1889.

Cheboygan County's northern border runs for 32.5 miles along the Straits of Mackinac and Lake Huron. It is bordered on the east by Presque Isle County, on the south by Otsego County and on the west by Emmet and Charlevoix Counties. Cheboygan County covers 715.6 square miles, or 457,984 acres. Fifty-seven

percent of the County is in public ownership and 63 percent of the county is forested.

Population Overview

Over the past decade Cheboygan County's population leveled off from its rapid growth experienced in the decade from 1990 to 2000. The growth rate for Cheboygan County in the period from 1990 to 2000 was among the highest in the region and continued a 60-year trend **(Table 3)** in population growth. However, Cheboygan County actually experienced a slight decrease in population in the period between 2000 and 2010. In 2000 the population of Cheboygan County was 26448, in 2010 the population dropped to 26152. It should also be noted that while population numbers appear to be steady the Tri-County area has seen a sharp decrease in working families and a sharp increase in the senior population. This shift has placed a burden on the County as the senior population has greater needs and less income as a rule. This shift also means a smaller workforce to support the region and the economy. This is evident as some local businesses have shut down portions of their business during the busiest time of the year due to a lack of workers.

In 2010, the population density for Cheboygan County was 36 persons per square mile. The highest concentrations of people are located close to the City of Cheboygan and around the villages of Mackinaw City and Indian River. Smaller concentrations are found in the villages of Topinabee, Wolverine, Tower, Alverno and Afton. The many miles of waterfront in Cheboygan County are also areas with higher population concentrations. Many residences are located along the shores of the Cheboygan and Black Rivers, around the inland lakes of Mullet, Burt, Douglas and Black and along the Straits of Mackinac.

Table 3

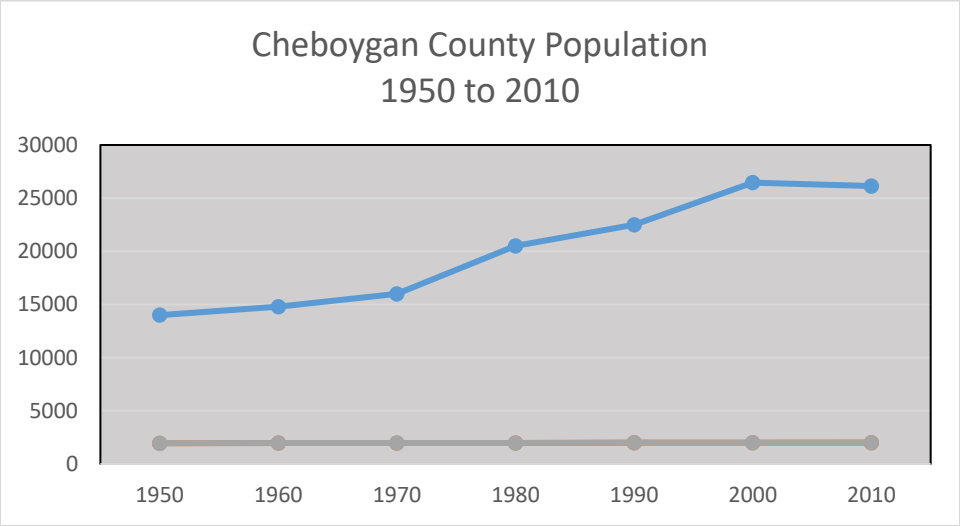


Table 4
Cheboygan County Population by Municipality 1990-2010

Unit of Gov.	1990	2000	% Change	2010	% Change
Cheboygan Co.	21,398	26,448	23.6%	26,152	-1.1%
Aloha Twp.	707	1041	47.2%	949	-8.8%
Beaugrand Twp.	1,004	1,157	15.2%	1,168	1.0%
Benton Twp.	2,388	3,080	29.0%	3,206	4.1%
Burt Twp.	533	654	22.7%	680	4.0%
Cheboygan City	4,999	5,295	5.9%	4867	
Ellis Twp.	345	519	50.4	596	14.8%
Forest Twp.	929	1,080	16.3%	1,045	-3.2%
Grant Twp.	686	947	38.0%	846	-10.7%
Hebron Twp.	202	303	50.0%	269	-11.2%
Indian River	*	*	*	1959	
Inverness Twp.	1952	2278	16.7%	2261	-0.7%
Koehler Twp.	722	1168	61.8%	1,283	9.8%
Mackinaw Twp.	604	576	-4.6%	539	-6.4%
Mackinaw City	875	859	-1.8%	806	
Mentor Twp.	518	781	50.8%	818	4.7%
Mullettt Twp.	1,056	1,284	21.6%	1,312	2.2%
Munro Twp.	512	679	32.6%	571	-15.9%
Nunda Twp.	725	925	27.6%	1042	12.6%
Tuscarora Twp.	2,297	3,091	34.6%	3,038	-1.7%
Walker Twp.	256	292	14.1%	327	12.0%
Waverly Twp.	371	472	27.2%	457	-3.2%
Wilmot Twp.	592	826	39.5%	878	6.3%
Wolverine Village	283	359	26.9%	244	

As with Charlevoix county the economic balance in Cheboygan County is effected by the influx of seasonal population. While some area of the county experience a large increase in seasonal population that boosts the economy and provides for better police and fire protection other areas of the county do not benefit from the seasonal influx and depend on the County Sheriff and State Police for law enforcement, but struggle to afford equipment and training for fire protection.

According to the 2012 Economic Census (Table 1, below), even though 88.4% of the population have at least a high school education, 17.8% of the people of Cheboygan County live in poverty.

2012 Economic Census (Table 1)

Population	25427
Median Household Income	$39,486
Individuals Below Poverty Level	17.8%
Education Attainment, High School or Greater	88.4%
Health Insurance Coverage, Population Uninsured	14.5%
Median Housing Value	$110,800.00
Total Housing Units	18,288 .
Number of Companies	2810

In Cheboygan County the original hazard mitigation plan was developed with input from the Cheboygan County Local Emergency Planning Committee (LEPC). The committee is comprised of representatives from local units of governments; local, state and federal agencies; law enforcement, fire departments and community organizations. Committee members provided feedback throughout plan development, including identification of hazards and high hazard areas, definition of goals and objectives, identification of hazard mitigation strategies and selection of an action plan.

The intent of a hazard mitigation plan is to inventory possible hazards, assess the vulnerability of community to the hazards it faces, and to provide possible mitigation activities for those hazards. The focus of the hazard mitigation plan is the development of projects and policies that can be implemented to reduce or prevent losses from future disasters. The Cheboygan County portion of the Tri-County Hazard Mitigation Plan includes text, tables, charts and maps necessary to describe and discuss the following:

- A hazard analysis based on a current community profile, hazard identification, risk assessment, and vulnerability assessment.
- A listing of the communities' goals and objectives;
- A discussion of the alternatives for solving problems.
- Evaluation and prioritization of alternatives.
- Selection of feasible mitigation strategies.
- Recommended mitigation strategies. The plan contains a hazard mitigation element that can be easily integrated into county or township comprehensive plans.

The process of Hazard Mitigation Planning consists of the following steps:

- Develop community profile and identify community hazards and risks
- Identification and definition of goals and objectives
- Identification of alternatives for solving problems
- Selection of evaluation criteria
- Selection of Alternatives
- Preparation of final plan
- Implementation of plan
- Monitoring and periodic revision of the plan

In the original plan NEMCOG staff worked closely with the Tri-County Office of Emergency Management and the Cheboygan County Local Emergency Planning Committee to prepare the Hazard Mitigation Plan. In addition, considerable effort was made to gain input from stakeholders in the county. This included meetings with townships; township association; county board of commissioners; local, state and federal agencies; local officials; community leaders and general public.

NEMCOG looked at relevant plans, maps, studies and reports. Federal, state, regional and local government sources. These documents were reviewed to develop a current community profile. Information sources included: U.S. Census, zoning ordinances, master plans, recreation plans, capital improvement plans, parcel maps, aerial photography, MIRIS land use/land cover, USGS topographic maps, National Weather Service, NRCS soils maps, Michigan Department of Transportation, Michigan Hazard Analysis, local hazard analysis, Flood Insurance Rate Maps, emergency management plans, and Section 302 Sites from the LEPC.

NEMCOG's Geographic Information System (GIS) was used as a decision support tool and public education tool throughout the process. Existing data sets were incorporated and new data sets created in order to analyze existing conditions and study potential future scenarios. Specialized maps showing community hazards, land cover/use, infrastructure, topography, soils, national wetlands inventory, forest cover,

gas and oil wells, zoning, future land use and community facilities were prepared as part of the plan development. Maps helped identify community characteristics, vulnerable populations, and hazard areas. GIS data and maps will be retained by the community for future use to help implement and monitor hazard mitigation activities.

Information was disseminated to the communities and public through the use of public meetings, presentations, news releases, and contacts. A secondary benefit of the planning process was the education of community leaders and citizens of the community in regards to hazard awareness. This education supported the decision making process and will assist communities in making better, more informed decisions in the future. In addition, the process strengthened partnerships between local units of government, planning commissions, emergency services, public agencies and private interests to pool resources and helped facilitate communication and understanding between various entities. By fostering lines of communication and increasing awareness of the cross jurisdictional impacts of land use and policy decisions, better and more informed decisions will be made in the future.

The planning process provided several opportunities for public, community and agency input and comments. Public meetings involved the County Board of Commissioners during plan development and the draft plan was presented for commissioners' approval. Staff met regularly with the Local Emergency Planning Committee during plan development. This group has representatives from local communities, state and federal agencies and citizens. The group, together with the Tri-County Emergency Management Director, was instrumental in guiding plan development. Public meetings were advertised and held in Cheboygan County. Notices of the public meetings were sent to LEPC members and local communities officials. Meeting notices were also published in the local newspaper.

A different approach was used in updating the plan. Since the purpose was to update the original plan and not to create a new plan the process was simplified. A questionnaire was developed and posted on the Tri-County Emergency Management web site for public comment. Public Hearings were scheduled in all three communities. The following notice was posted in the local paper:

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan for the Tri-County area. A public hearing will be held at the Cheboygan County Building, 870 S Main St., Cheboygan, MI 49721, Wednesday September 30th, 7:00 PM in the Commissioner's meeting room to accommodate any member of the public that would like to offer suggestion or input into the local Hazard Mitigation plan. A survey is also available for citizens to share some insight about local concerns at www.cceoem.net.

At about the same time, representatives from Tri-County Emergency Management attended meetings of the Michigan Township Association in each County and made local officials aware of the questionnaire and how to find the document on our website. The Michigan Township Association for each county involves at least one representative from each Township. With that, each township was provided the

information about the plan and the type of input we were looking to get from them. The meeting for Cheboygan County took place on September 24, 2015 at 7:00 PM in the Inverness Township Hall. This information was also on the agenda's and discussed at meetings of the LEPC on November 9, 2015, January 11, 2016, April 11, 2016 and August 8, 2016. Tri-County Emergency Management also attended Fire Chief Association Meetings in each of the three counties to make them aware of the HMP and ask for their input. In March we had only heard from a few of the many communities, so an email was sent to all members of the MTA's again, explaining the project, the types of projects that are fundable through FEMA and asking for their input on projects. The process then continued until the plan was reviewed, information in each section was updated as needed and drafts were presented to local communities and the public. Public hearings were held in each county for a second time. The draft was then sent to MSP/EMHSD and ultimately FEMA for their approval and/or comment. Specific mitigation projects were provided for the plan from the following Cheboygan County jurisdictions: Beauregard Township, Cheboygan County Road Commission and Forest Township.

Climate

Cheboygan County's climate is directly affected by the Great Lakes and inland lakes of Michigan. The effect of Lake Huron on Cheboygan's climate is particularly strong during periods of easterly to northeasterly winds. Under these conditions, the long trajectory of the air over Lake Huron gives Cheboygan cooler summer temperatures while increased snow shower activity may accompany the milder fall and early winter temperatures. As a result of the prevailing westerly winds, Cheboygan does experience some additional lake effect; however, this is minimal and essentially limited to increased cloudiness during the late fall and early winter. With light southwesterly winds, a localized lake breeze may be nearly as effective in giving Cheboygan cooler summer temperatures. Differences in temperature and precipitation exist between the northern and southern portions of the county. This is generally attributed to the moderating influence of the lakes in the northern portion of the county. The local weather conditions in the southern portion are similar to those in the Vanderbilt and Gaylord areas.

The average temperature in the summer months as recorded by the Cheboygan weather station is 65 degrees Fahrenheit, while the winter average is 19 degrees (**Table 2**). From 1981 to 2010, the temperature for the region varied from highs in the mid to upper 70's in the summer to single digits in the winter months, Historical temperature data illustrates the following county temperature extremes:

- Highest recorded temperature: 104 degrees (8/6/47)
- Lowest recorded temperature: 38 degrees below zero (2/6/95)

In the late winter as ice builds up on the lakes, Cheboygan is subjected to temperature variations which are more closely associated with interior locations. Diminished wind speeds or winds that do not traverse large unfrozen lakes often produce clearing skies

and the colder temperatures expected at continental locations. Because movement of pressure systems controls day-to-day weather across the nation, this area seldom experiences prolonged periods of hot, humid weather in the summer or extreme cold during the winter.

Table 2: Temperature Extremes

Element	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Max °F	26.3	28.3	36.6	48.7	62.1	71.5	77.4	75.5	67.6	55.8	42.5	31.5	52.0
Min °F	8.2	7.6	16.7	29.5	40.4	50.7	57.1	55.6	48.0	37.1	27.9	17.0	33.0
Mean °F	17.3	18.0	26.7	39.1	51.3	61.1	67.3	65.6	57.8	46.5	35.2	24.3	42.5
HDD base 65	1482	1317	1188	778	431	149	46	74	221	576	894	1263	8419
CDD base 65	0	0	0	0	5	33	114	92	5	0	0	0	249

Severe Weather

According to the Michigan Hazard Analysis the Tri-County Region experiences approximately 28 to 30 thunderstorm days per year. These are storms that can produce heavy rain, high winds, hail and tornadoes. Although relatively rare, tornados have occurred in Cheboygan County. Michigan is located on the northeast fringe of the Midwest tornado belt. The Michigan hazard analysis of 2012 states that in a period from 1950 to 2009 Cheboygan County has experienced 6 tornadoes. The lower frequency of tornadoes occurring in Michigan may be, in part, the result of the colder water of Lake Michigan during the spring and early summer months, a prime period of tornado activity. The majority of tornados have occurred in the month August, although tornados can occur in the spring and fall. In 1970, a tornado struck Cheboygan County on October 2nd.

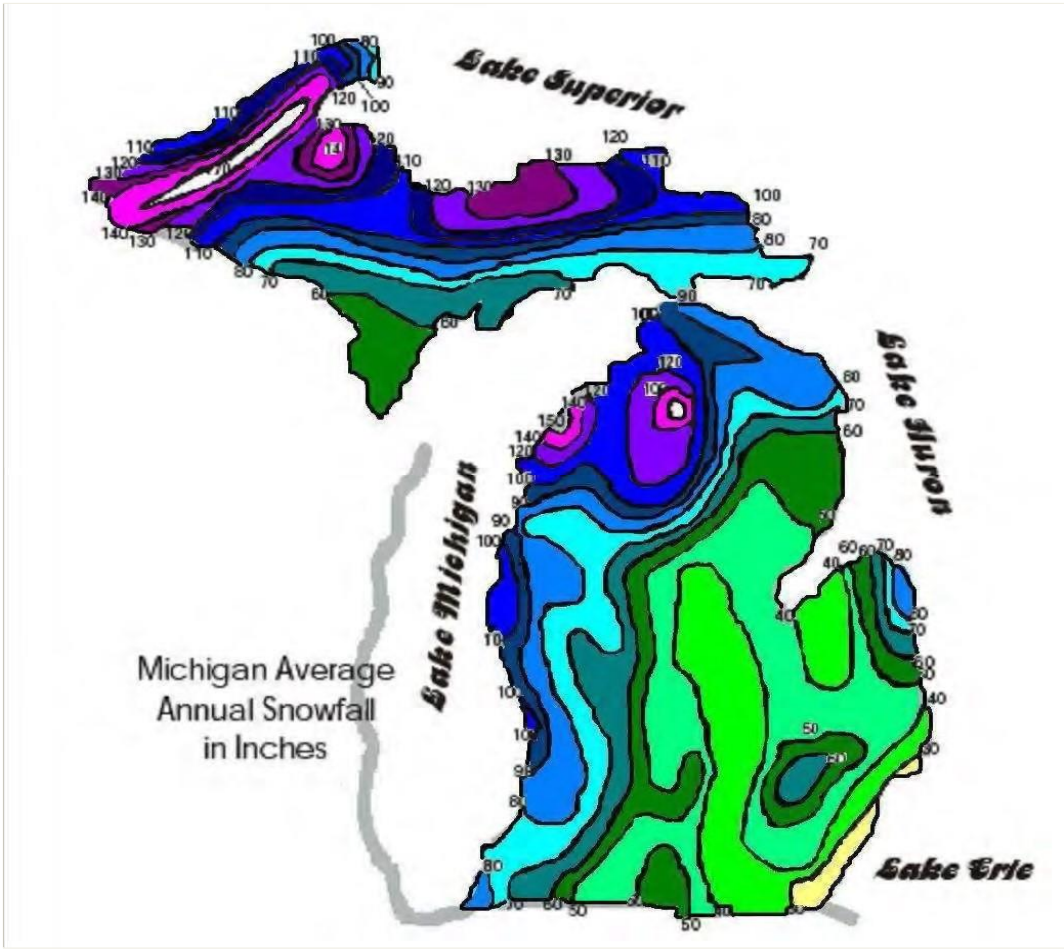
The geographical location of the Tri-County region makes this area vulnerable to strong wind events. Surrounded by lakes Michigan and Huron this region is in an area where high winds are likely. Strong winds and thunderstorm winds are the most prevalent severe weather that affects Cheboygan County. Annually, thunderstorms will occur on an average of 28 to 30 days and on average one or two thunderstorms per year will have severe winds. Since 1967 there have been 39 severe wind events recorded in Cheboygan County causing over $50,000 in damage. Strong winds are most likely in the summer months of June, July, and August, but can occur any time of year. One of the most powerful windstorms ever recorded in the Great Lakes region occurred on November 10, 1998. Wind speeds from this powerful storm reached 82 knots. A similar event occurred

on December 24, 2015 when winds gusted up to 80 mph and knocked out the 911 communication system for part of the Tri-County region. This storm also caused wide spread damage to homes and businesses in the area and uprooted trees blocking some roads.

Winter storms consisting of heavy snow, freezing rain and blizzards are common seasonal hazards can be expected to occur several times every year. Since 1997, 41 heavy snowstorms and 4 blizzards have been recorded in Cheboygan County. (**Figure 1**) Over the past 10 years the county averaged 2-3 heavy snowstorms and/or blizzards each year, although the number and intensity of snowstorms can fluctuate dramatically from year to year. Improved weather forecasting methods and better understanding of global phenomenon such as el-ninó and la-nina have increased the reliability of forecasting future long-term trends. While general trends, such as mild or severe winters can be, and are, predicted, they are not always completely accurate.

Figure 1

Source: Michigan Committee for Severe Weather Awareness



Water Resources

Surface Water

Cheboygan County contains numerous rivers and inland lakes (**Figure 2**). Thirty-eight miles of Lake Huron shoreline establish the northern boundary of the county. Inland lakes cover 10% (51,358 acres) of the county's total surface area, the largest percentage of any county in the state. There are several large bodies of water in the county. The largest inland lake in the county and the fourth largest in the State is Burt Lake (17,335 acres). The second largest is Mullett Lake (16,744 acres), followed by Douglas Lake (3,745 acres) and Black Lake, of which 7,887 acres are in the county. Of the 182 miles of inland lakeshore, 46 miles are publicly owned.

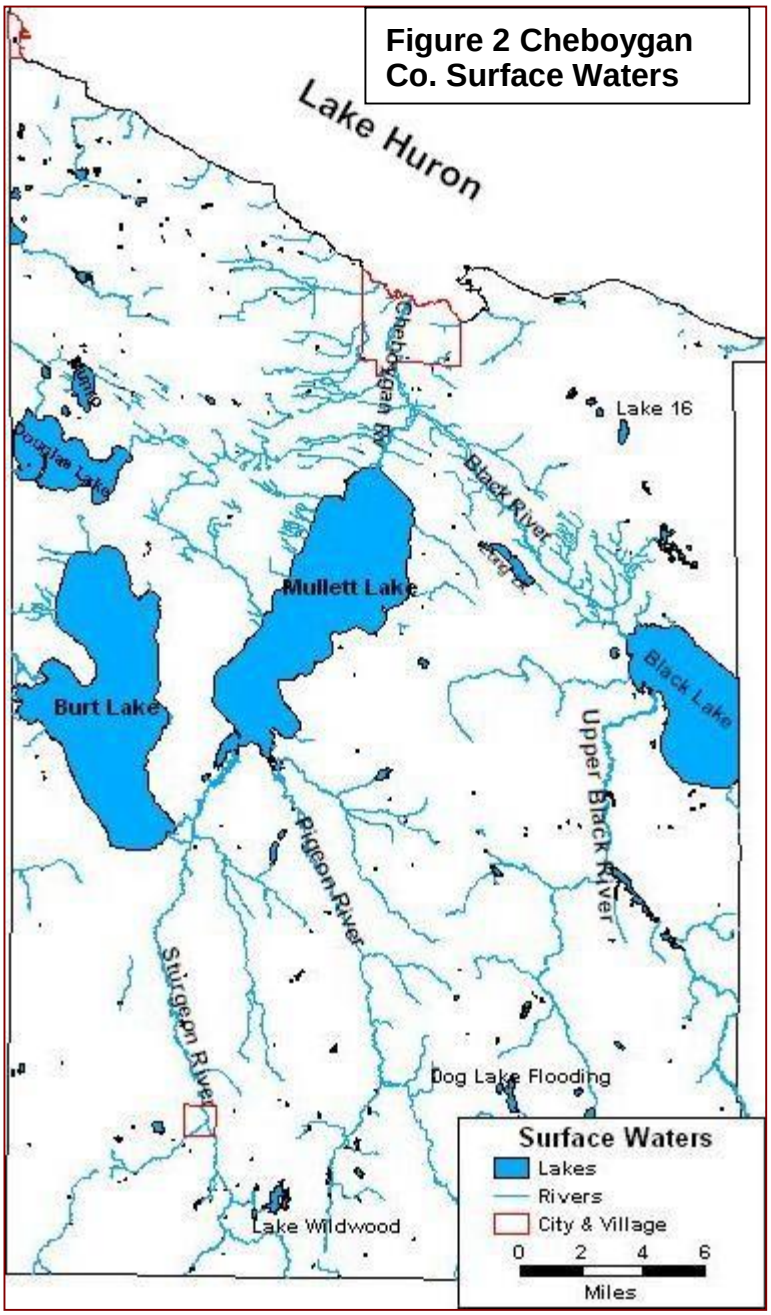


Figure 2 Cheboygan Co. Surface Waters

Cheboygan County, along with portions of the Counties of Presque Isle, Emmet, Otsego, Montmorency and Charlevoix, is within the Cheboygan River Watershed. Also within the Cheboygan River Watershed and the boundary of Cheboygan County are the watersheds of the Sturgeon, Pigeon and Black Rivers. Drainage from the Cheboygan River Watershed flows into the Cheboygan River through the City of Cheboygan and into Lake Huron. Portions of the county northwest and east of the City of Cheboygan are part of the coastal watershed, which drains directly into Lake Huron.

Within each of these watersheds are numerous lakes and rivers. The Sturgeon River Watershed, in the western portion of the county, includes the Sturgeon River. Directly adjacent is the renowned Pigeon River Watershed. The Pigeon River flows into Mullett Lake that empties into the
Cheboygan River and directly into Lake Huron. The western portion of the county includes the Black River Watershed. The Upper Black River and its tributaries within the

county drain directly into Black Lake. The Black River carries lake water directly into the Cheboygan River.

Groundwater

Groundwater is the source of drinking water for over 90 % of Northeast Michigan's population. In the more rural areas, virtually everyone uses a well to provide clean drinking water. Large supplies of groundwater can be found under the surface throughout much of northern Michigan.

Cheboygan County has been blessed with abundant groundwater supplies of very high quality. The generally thick glacial deposits in Cheboygan County result in ample groundwater aquifers and a large number of springs and streams with cold, steady, high quality flows of groundwater. The bedrock geology and the large amount of limestone in the glacial deposits influence the chemical quality of groundwater and most surface waters, resulting in moderately high hardness and alkalinity.

The groundwater of Cheboygan County is an extremely valuable resource. Groundwater discharge is important to the recreational values of the county. Groundwater is the principal source of water in streams and rivers during dryer, rainless periods, providing Cheboygan County with rivers and streams that flow year-round. Groundwater has a large influence on water temperatures. Because groundwater leaves the ground at a constant temperature year round, it has the effect of moderating water temperature. Streams that receive large amounts of groundwater are generally cooler in summer and warmer in winter than those where groundwater inputs are small. These temperature moderations and year-round flows provide ideal conditions for many fish, including trout, as well as other wildlife.

A number of factors, such as soil permeability, the amount, timing and intensity of precipitation, vegetative cover and land use govern the amount of groundwater recharge on any area of land. Precipitation and permeability usually exert the greatest influence on groundwater recharge. In Cheboygan County, rainfall intensity is seldom greater than soil permeability, resulting in large quantities of infiltration and groundwater recharge.

Wetlands

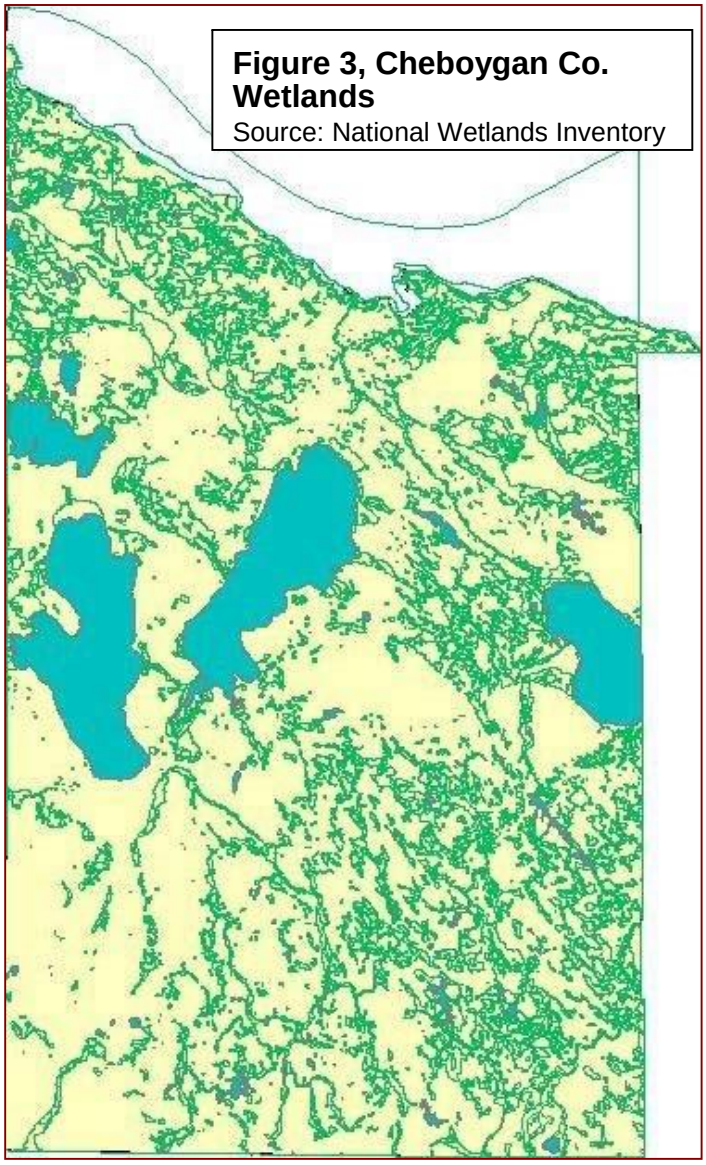


Figure 3, Cheboygan Co. Wetlands
Source: National Wetlands Inventory

Cheboygan County's wetlands **(Figure 3)** are unique ecosystems that serve as the transitional zone between upland and aquatic habitats. The purity and clarity of lakes and streams is maintained and enhanced, in large part, by wetlands. Wetlands filter out nutrients and sediments, some of the most harmful pollutants associated with lakes and streams. Without wetlands these pollutants can cloud once clear waters and accelerate the growth of choking aquatic weeds. Since many of the existing undeveloped waterfront properties contain environmental limitations such as wetlands, floodplains, or soils poor for septic development, there will be more and more pressure to alter these landscapes. To preserve the water quality of area lakes and streams and their associated property values, attempts must be made to preserve wetlands and other environmentally sensitive landscapes. This will insure that the quality of life and natural resources of the county remain its chief economic assets. The ecological functions that wetlands provide benefit numerous property owners.
Conversely, land use alterations that disturb or alter wetland functions can create nuisances or cause damage to surrounding land owners (e.g., downstream flooding as a result of upstream wetland filling) as well as effecting broader public health issues (e.g., wetland loss can lead to water quality impairment of lakes and streams)**.**

Woodlands

According to 2001 statistics from the U.S. Forest Service, forestland accounts for approximately 63% of the county's total land area. The major forest species found in the county are Maple/Beech/Birch (30%) and Aspen (27%). Northern White Cedar and Elm/Ash/Cottonwood total approximately 10% and 8% respectively. Smaller amounts of forestland are comprised of Red Pine (5%), Balsam Fir (5%), and Oak/Hickory (4%). Smaller acreages of Jack Pine, Exotic Softwoods, Eastern White Pine, Black Spruce,

Tamarack, Black Ash/American Elm/Red Maple, Sugar Maple/Beech/Yellow Birch, Paper Birch, and Balsam Poplar are also present.

Forestland in Cheboygan County is fairly evenly split between State and private ownership. 53% is privately owned and 47% is State-owned in the form of Pigeon River State Forest, Black Lake State Forest, and Hardwood State Forest. In addition to using the forest resources for timber and fiber, woodlands are also used for all types of outdoor recreation.

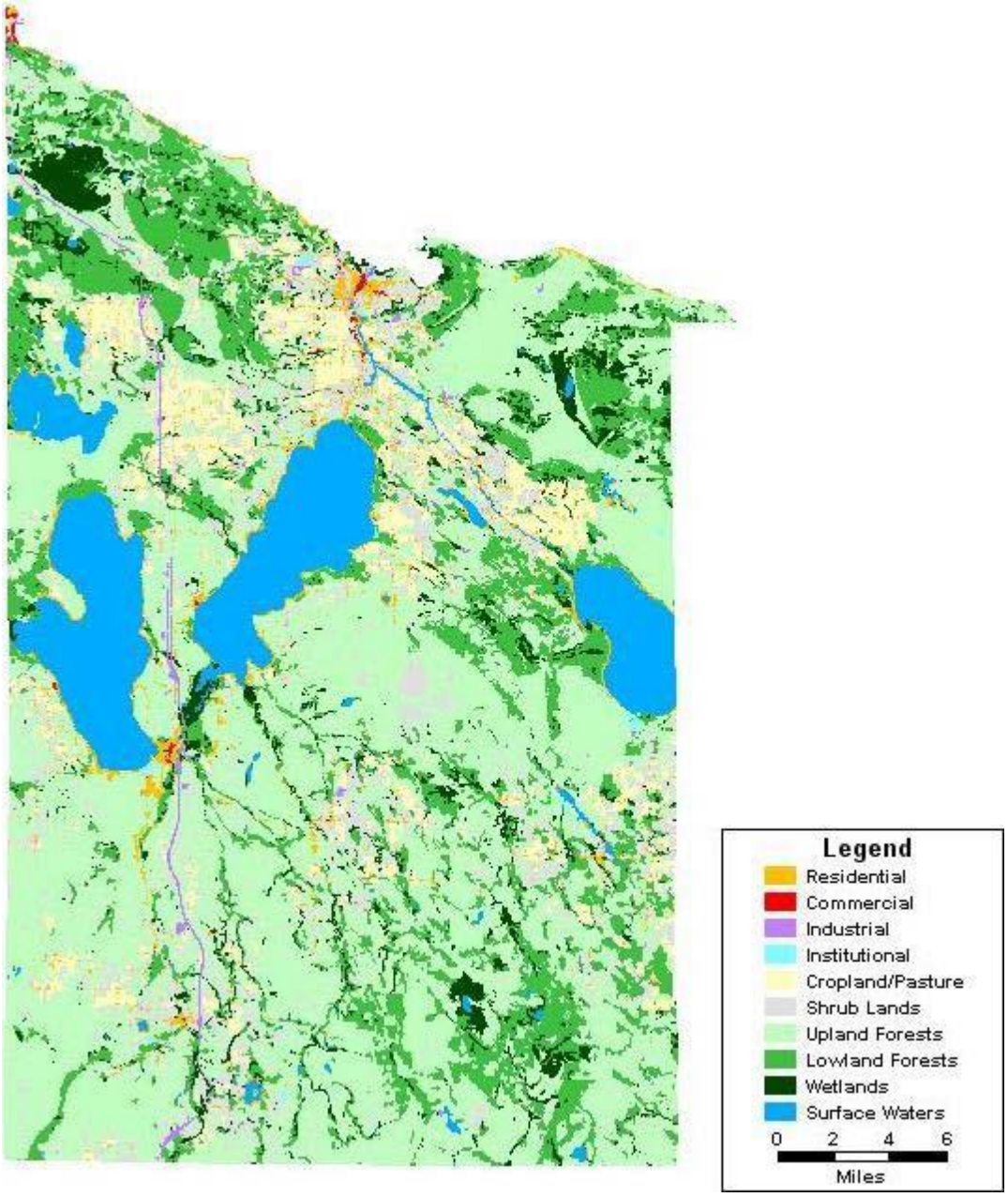
Land Use

The purpose of this section is to present the existing land uses, the status of planning and zoning and potential hazardous land uses in the county. Vulnerable populations can be identified using the existing land use map, zoning maps, and future land use maps combined with hazardous areas and land uses.

To recognize and mitigate potential hazards, the community must have an accurate assessment of existing land uses. The process identifies urban built-up land uses such as residential and commercial along with natural land cover types like farmlands, forests, and wetlands. The map presented below (Figure 4) is a hybrid that combines land cover and land use.

Planning and Zoning are the principal tools that local communities have to manage growth, preserve community character, protect property values and enhance the economic viability of the area. Planning helps establish and focus the desired future of the community and zoning ordinances are used as one of the primary ways to implement the community master plan and achieve community goals. It is not the intention to compare strengths and weaknesses of zoning regulations among various zoning ordinances but to give a comprehensive perspective on county planning and zoning. Until recently, the potential to use these tools for hazard mitigation has been largely ignored.

Figure 4



Residential

According to the MIRIS Land Cover/Use update, 2.9 percent or 14,582 acres of the County's total land area was used for residential purposes. For the most part, residential development found in the county consists of single-family dwellings; however, single-family duplexes, multi-family residential, condominiums, mobile homes and mobile home parks are also included in this category (Figure 4). Residential uses are concentrated in the community centers of Cheboygan, Mackinaw City, Indian River and Wolverine. Many

of the larger lakes such as Burt, Mullett, Black and Douglas Lakes and the major rivers have high concentrations of residential development both along the lakeshores and in subdivisions adjacent to the lakes. Many of these once seasonal, weekend residential developments have undergone a transition to year around residences, in addition to new dwellings being built on waterfront property. Residential development is also occurring along county roads as larger parcels are split into ten-acre and smaller parcels.

Commercial

Commercial land uses include primary/central business districts, shopping center/malls, and secondary/neighborhood business districts including commercial strip development. The 1998 land use inventory identified 1,031 acres (0.2%) in commercial use. Commercial facilities are found primarily in the City of Cheboygan and south out of the city limits along M-27 (Figure 4). Other urbanized communities, such as Mackinaw City, Indian River and Wolverine have smaller commercial service centers with limited services found in other outlying sections of the county.

Industrial

In addition to industrial and extractive development, this land use category includes transportation, oil and gas, communication and utility facilities. Development falling under this category made up only 0.8 percent of the total County land area. These land uses cover approximately 3,868 acres of the County. Much of the industrial development is located near the main community centers.

Institutional/Recreational

Land devoted specifically for institutional and recreational purposes amounted to approximately 0.4 percent or about 2,088 acres of Cheboygan County. Land uses included in this category are public parks and campgrounds, golf courses, schools, churches and public buildings.

Agricultural Lands

With some 32,152 acres classified as farmland, agriculture is the county's fourth largest land use category. The bulk of the county's agricultural land is found in the northern portion of the county in Beaugrand, Munro, Inverness, Benton, Aloha and Grant Townships with smaller sections of farm land found in all other townships. It is interesting, but not surprising, to note that much of the agricultural property is found along or very near the county's major rivers and lakes. Predominate agricultural land uses are pastures, hay land and growing crops such as beans, oats, and barley. A small amount of land is used for livestock such as cattle, milk cows, and hogs.

Non-Forest Lands

Non-forest land is defined as areas supporting early stage of plant succession consisting of plant communities characterized by grasses or shrubs. Non-forest land makes up nearly 11 percent of the County's land area. One type of opening are those created by turn of the century logging operations and subsequent wildfires. Other non-forest areas consist of abandoned or idle farmland. A majority of these areas are located within the

active agriculture band mentioned above with the largest portions of this land type found around the City of Cheboygan, Inverness and Benton Townships. Typical grass species are quack grass, Kentucky bluegrass, upland and lowland sedges, reed canary grass and clovers. Typical shrub species include blackberry and raspberry briars, dogwood, willow, sumac and tag alder.

Upland Forests

Upland forests make up 237,074 acres or 46.5 percent of the county's surface area. The following species predominate areas classified as upland forests: sugar and red maple, elm, beech, yellow birch, cherry, basswood, white ash, all aspen types, white, red, jack and scotch pines and any managed Christmas tree plantations. Other upland conifers include white or black spruce, balsam fir, and douglas fir along with areas covered by larch and hemlock.

Lowland Forests

The county's land use inventory shows that 87,999 acres or 17.3 percent of the county's surface area consists of lowland forests. Lowland forests are defined as those containing ash, elm and soft maple along with cottonwood and balm-of-Gilead. Lowland conifers such as cedar, tamarack, black and white spruce, and balsam fir stands are also included.

The upland and lowland forests combine to encompass 325,073 acres or 63.8 percent of the county's total surface area. Forests, therefore, constitute Cheboygan County's largest single land use category. Of the total forests, 72.9 percent are upland forests, while 27.1 percent are lowland forests.

Wetlands

As can be noted from **Table 5**, 26,312 acres or 5.2 percent of the County's land area was identified as non-forested wetlands. Wetlands are those areas between terrestrial and aquatic systems where the water table is at, near, or above the land surface for a significant part of most years. The hydrologic regime is such that it permits the formation of hydric soils or it supports the growth of hydrophilic vegetation. Examples of wetlands include marshes, mudflats, wooded swamps and floating vegetation situated on the shallow margins of bays, lakes, rivers, ponds, and streams. These wetland categories include shrub wetlands, fresh-water marshes, wet meadows, open bogs, emergent wetlands and aquatic bed wetlands.

Table 5
Cheboygan County - 1998 Land Use

Land Use Type	Number of Acres	Number of Square Miles	Percent of Total Area
Residential	14,582	22.8	2.9%
Commercial	1,031	1.6	0.2%
Industrial	3,868	6.0	0.8%
Institution/Recreation	2,088	3.3	0.4%
Agricultural	32,152	50.2	6.3%
Non-Forest	54,468	85.1	10.7%
Upland Forest	237,074	370.4	46.5%
Lowland Forest	87,999	137.5	17.3%
Wetlands	26,312	41.1	5.2%
Beaches	77	0.1	0.02%
Surface Water	49,937	78.0	9.8%
Total	509,588	796.2	100%

Source:1998 update of 1978 MIRIS Land Cover/Use Inventory by Wade-Trim

It is important to note that existing land use statistics used in this report are based on Michigan Resource Information System (MIRIS) data. Forested and wetland information contained in the MIRIS data was not verified by field inspection when the data was compiled. Thus, areas shown as wetlands on the MIRIS system may not actually meet State and Federal criteria for legally regulated wetlands. However, the information is still valuable for general land use planning decisions.

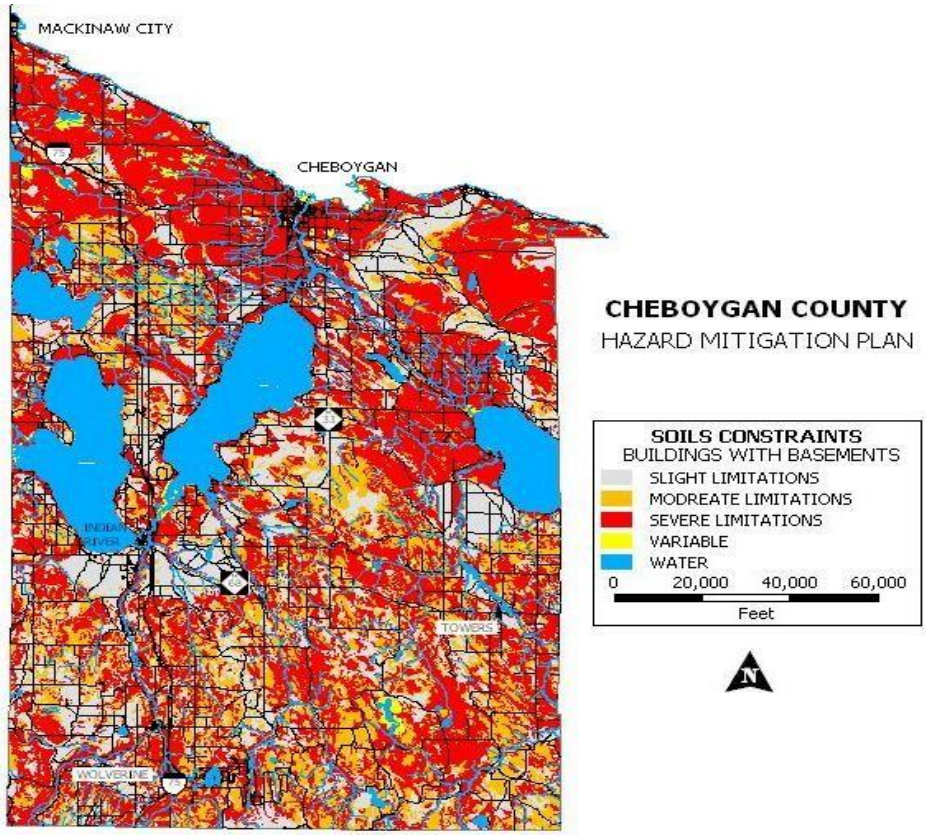
Beaches

Only 77 acres or 0.02 percent of the county's surface area is classified as beaches. Beaches include all sloping accumulations of exposed sand and gravel along shorelines and sand dunes.

Surface Water

Cheboygan County is home to four major inland lakes - Burt, Mullett, Black and Douglas Lakes. These are linked together and to two Great Lakes by a series of major rivers. In fact, surface water makes up nearly 10 percent of the county's land use types (49,937 acres) and is the county's third largest land use category. **(Figure 5)** The combination of wetlands types (including lowland forests) and surface water makes up nearly one third of the county's surface area. Therefore, protecting the county's water and wetland resources should be a major priority in land use planning.

Figure 5



Hazard Analysis Evaluation Measures

This model uses a common set of 8 evaluation measures to evaluate each hazard facing the community. Those measures are: 1) likelihood of occurrence; 2) potential for damage; 3) potential for casualties; 4) ability to mitigate; 5) public awareness; 6) current response capabilities; 7) inter agency cooperation; and 8) economic impact.

Each corresponding benchmark factor was assigned a specific point value (10, 7, 4 or 1 point), based on each individual factor's relative severity and negative impacts. In

recognition of the fact that some factors need to be given more consideration than others, each of the criteria was weighted. A percentage value has been assigned to each measure based on the relative significance of the measure in ranking the hazards. The sum of all measures must equal 100 percent. The following is a synopsis of each hazard evaluation measure, weight and benchmark factor used in this analysis:

Likelihood of Occurrence

Likelihood of occurrence measures the frequency with which a particular hazard occurs. The more frequently a hazard event occurs, the more potential there is for damage and negative impact on a community.

Size of Affected Area

Each hazard affects a geographic area. For example, a blizzard might affect an entire state or even several states, while a flood might only affect a portion of a county or municipality. Although size of the affected area is not always indicative of the destructive potential of the hazard (a tornado is a good example), generally the larger the affected area, the more problematic the hazard event is to a community.

Capacity to Cause Physical Damages

The capacity to cause physical damages refers to the destructive capacity of the hazard. While the destructive capacity of some hazard events, such as floods and tornadoes, is often immediate and readily apparent, some hazards may have significant destructive capacity that is less obvious as it may occur over an extended period of time such as extreme temperatures or drought.

Speed of Onset

Speed of onset refers to the amount of time it typically takes for a hazard event to occur. Speed of onset is an important evaluation measure because the faster an event occurs; the less time local governmental agencies typically have to warn the potentially impacted population of appropriate protective actions.

Potential for Causing Casualties

Potential for causing casualties refers to the number of casualties (deaths and injuries) that can be expected if a particular hazard event occurs.

Percent of Population Affected

Percent of Population affected refers to the percent of the county population that may be affected directly or indirectly by the hazard event.

Economic Effects

Economic effects are the monetary damages incurred from a hazard event and include both public and private damage. Direct physical damage costs, as well as indirect impact costs such as lost business and tax revenue, are included as part of the total monetary damages.

Duration

Duration refers to the time period the hazard event is actively present and causing damage (often referred to as the “time on the ground”.) Duration is not always indicative of the damaging potential of a hazard event (a tornado is a good example). However, in most cases, the longer an event is “active” and thus causing damage, the greater the total damages will be.

Seasonal Pattern

Seasonal pattern refers to the time of year in which a particular hazard event can reasonably be expected to occur. Some hazard events can occur at any time of the year, while others occur primarily during one particular season (i.e., blizzards in winter). Oftentimes, hazard patterns coincide with peak tourism seasons and other times of temporary population increases, greatly increasing the vulnerability of the population to the negative impacts of certain hazard events.

Predictability

Predictability refers to the ease with which a particular hazard event can be predicted - in terms of time of occurrence, location, and magnitude. Predictability is important because the more predictable a hazard event is, the more likely it is a community will be able to warn the potentially impacted population and take other preventive measures to minimize loss of life and property.

Collateral Damage

Collateral damage refers to the possibility of a particular hazard event causing secondary damage and impacts. For example, blizzards and ice storms can cause power outages, which can cause loss of heat, which can lead to hypothermia and possible death or serious injury. Generally, the more collateral damage a hazard event causes, the more serious a threat the hazard is to a community.

Environmental Impact

Environmental Impact refers to the environmental damage that may be caused by a particular hazard event. The effects of a hazard event must be thought through to identify possible environmental impact. For example, a flood event may overwhelm a sewage treatment plant which then discharges raw sewage thereby contaminating water supplies.

Availability of Warnings

Availability of warnings indicates the ease with which the public can be warned of a hazard. This measure does not address the availability of warning systems in a community, per se. Rather, it looks at the overall availability of warning in general for a particular hazard event. For example, a community might receive warning that a flood will occur within 24 hours, but receive no warning when a large structural fire occurs. Generally, hazards that have little or no availability of warning tend to be more problematic for a community from a population protection and response standpoint.

Mitigative Potential

Mitigative potential refers to the relative ease with which a particular hazard event can be mitigated against, through application of structural or non-structural (or both) mitigation measures. Generally, the easier a hazard event is to mitigate against, the less future threat it may pose to a community in terms of loss of life and property.

Public Awareness

The amount of public awareness indicates the ease with which the public can be informed about particular hazards. This measure does not address the current level of public awareness that exists in the community. Rather, it looks at the overall value of public awareness in general for a particular hazard event.

Hazard Analysis Evaluation Benchmark Factors

Likelihood of Occurrence	
Excessive Occurrence	**10 pts**
High Occurrence	**7 pts**
Medium Occurrence	**4 pts**
Low Occurrence	**1 pt**

Speed of Onset	
Minimal/No Warning	**10 pts**
Less than 12 Hours	**7 pts**
12-24 Hours	**4 pts**
Greater than 24 Hours	**1 pt**

Economic Effects	
Significant Effects	**10 pts**
Medium Effects	**7 pts**
Low Effects	**4 pts**
Minimal Effects	**1 pt**

Seasonal Pattern	
Year-round Occurrences	**10 pts**
Three Season Occurrences	**7 pts**
Two Season Occurrences	**4 pts**
One Season Occurrence	**1 pt**

Collateral Damage	
High Possibility	**10 pts**
Good Possibility	**7 pts**
Some Possibility	**4 pts**

Affected Area	
Large Area	**10 pts**
Small Area	**7 pts**
Multiple Sites	**4 pts**
Single Site	**1 pt**

Population Impact	
High Impact	**10 pts**
Medium Impact	**7 pts**
Low Impact	**4 pts**
No Impact (none)	**1 pt**

Duration	
Long Duration	**10 pts**
Medium Duration	**7 pts**
Short Duration	**4 pts**
Minimal Duration	**1 pt**

Predictability	
Unpredictable	**10 pts**
Somewhat Predictable	**7 pts**
Predictable	**4 pts**
Highly Predictable	**1 pt**

Availability of Warnings	
Warnings Unavailable	**10 pts**
Generally Not Avail.	**7 pts**
Sometimes Available	**4 pts**

No Possibility	**1 pt**

Mitigative Potential

Easy to Mitigate	**10 pts**
Possible to Mitigate	**7 pts**
Difficult to Mitigate	**4 pts**
Impossible to Mitigate	**1 pt**

Environmental Damage

High Possibility	**10 pts**
Good Possibility	**7 pts**
Some Possibility	**4 pts**
No Possibility	**1 pt**

Public Awareness

Significant Value	**10 pts**
Some Value	**7 pts**
Limited Value	**4 pts**
No Value	**1 pts**

Warnings Available	**1 pt**

Percent of Population Affected

60% to 100%	**10 pts**
30% to 60%	**7 pts**
15% to 30%	**4 pts**
15% or less	**1 pts**

Damage Capacity

High Capacity	**10 pts**
Medium Capacity	**7 pts**
Low Capacity	**4 pts**
No Capacity	**1 pt**

Table 6
Cheboygan County Hazard Rating

Criteria	Likelihood to Occur	Size of Area Affected	Warning system available	% Pop. Affected	Ability to Mitigate	Collateral Damage	Total Weight Must = 100%	
WEIGHT =========>	30%	20%	5%	15%	25%	5%	100%	
Hazards								
Winter Weather Hazard	10	10	1	10	5	7	8.15	1
Fixed Site Hazmat	7	7	4	4	7	7	6.40	2
Transportation Hazmat	10	4	10	4	4	7	6.25	3
Extreme Temperature	3	10	3	10	5	2	5.90	4
Transportation Accident	10	2	10	4	4	7	5.85	5
Public Health	4	7	6	7	7	2	5.80	6
Infrastructure Failure	4	5	7	5	7	4	5.25	7
Structural Fire	10	3	7	1	4	2	5.20	8
Terrorism/Sabotage/WMD	4	5	10	5	4	5	4.70	9
Dam Failure	4	4	4	1	7	7	4.45	10
Civil Disturbance	4	5	4	4	5	3	4.40	11
Wildfire	7	3	6	1	4	4	4.35	12
Shoreline Flooding	5	5	1	4	4	4	4.35	12
Severe Winds	4	4	3	4	5	7	4.35	14
Lightning	10	2	5	1	1	3	4.20	15
Nuclear Attack	1	10	2	7	1	7	4.05	16
Pipeline Accident	5	2	10	1	5	4	4.00	17
Earthquake	1	10	7	5	1	4	3.85	18
Hail	4	4	5	3	2	3	3.35	19
Tornados	4	1	5	5	2	7	3.25	20
Scrap Tire Fire	1	1	7	1	8	4	3.20	21
Riverine Flooding	1	3	5	4	4	7	3.10	22
Drought	1	4	2	5	2	7	2.80	23
Oil/Gas Well Incident	1	1	10	1	4	2	2.25	24
Subsidence	1	1	10	1	1	2	1.50	25

d 2.1 Hazard Identification and Risk Assessment

Composite Hazard Rankings High to Moderate County Significance

Winter Weather Hazards – 8.15
Fixed Site Hazmat – 6.40
Transportation Hazmat – 6.25
Riverine/urban Flooding – 5.95
Extreme Temperatures – 5.9
Transportation Accidents –5.85
Public Health – 5.8

Moderate to Low County Significance

Infrastructure Failure – 5.25
Terrorism/Sabotage/WMD – 4.7
Dam Failure – 4.45
Civil Disturbance – 4.4

Low County Significance

Shoreline Flooding – 4.35
Wildfire – 4.35
Severe Winds – 4.35
Lightning – 4.2
Nuclear Attack – 4.05
Pipeline Accident – 4.0

e Risk Assessment and Vulnerability Assessment Summary

Risk Assessment

The goals of risk assessment are to determine where hazards exist, and develop an understanding of how often they will arise and how much harm they cause. Based on the weighted hazard ranking process recommended in the Michigan Hazard Analysis workbook, a composite of hazards and their relative risk are presented below. This list will be used as the foundation for developing hazard mitigation goals and strategies in subsequent chapters.

- **High Risk:** -- very likely to occur during hazard mitigation planning horizon of 20 years, and/or affect all or most of the county.
- **Medium Risk:** -- somewhat likely to occur during hazard mitigation planning horizon of 20 years, and/or affect a significant area of the County.
- **Low Risk:** -- means it is not likely to occur, or cover only a limited area within county.

Vulnerability Assessment

This step looks at such points as population concentrations, age-specific populations, development

Table 7
Cheboygan County -- Risk and Vulnerability Assessment Summary

Ranked Hazards in Cheboygan County	Risk Assessment	Vulnerability Assessment
Winter Weather Hazards	**High**	**High**
Fixed Site Hazmat	**High**	**Medium**
Transportation Hazmat	**High**	**Medium**
Riverine Flooding	**High**	**Low**
Extreme Temperatures	**High**	**High**
Transportation Accidents	**High**	**Medium**
Public Health	**Medium**	**Medium**
Infrastructure Failure	**Medium**	**High**
Terrorism/Sabotage/WMD	**Medium**	**Low**
Dam Failure	**Medium**	**Low**
Civil Disturbance	**Medium**	**Low**
Shoreline Flooding	**Medium**	**Low**
Wildfire	**Medium**	**Low**
Severe Winds	**High**	**Medium**
Nuclear Attack	**Low**	**Medium**
Oil/Gas Pipeline Accident	**Low**	**Medium**
Shoreline Erosion	**Low**	**Low**
Oil/Gas Well Incident	**Low**	**Low**
Drought	**Low**	**Medium**
Lightning	**Low**	**Low**
Hail	**Low**	**Low**
Scrap Tire Fire	**Low**	**Low**
Subsidence	**Low**	**Low**
Earthquake	**Low**	**Low**

pressures, types of housing (older homes, mobile homes), presence of agriculture, sprawl (spreading resources too thin), and other issues that may make Cheboygan County more vulnerable to specific hazards. Basic criteria are listed below.

- **High Vulnerability: --** If an event occurred it would have severe impacts over large geographic areas or more densely populated areas and have a serious financial impact on County residents and businesses.
- **Medium Vulnerability: --** If an event occurred it would have confined impacts on the safety of residents but would have a financial impact on County residents and businesses.
- **Low Vulnerability: --** If an event occurred it would have very minimal impact on the safety of County residents and minimal financial impact on County residents and businesses.

Specific Vulnerabilities in Cheboygan County

Winter Weather Hazards.

Located at the northern tip of Michigan's Lower Peninsula with an extensive shoreline along Lake Huron Cheboygan County is very susceptible to all forms of severe winter weather. The description and extent of these weather conditions are defined in Chapter 6. Although local residents are generally prepared to cope with these conditions, and State and local highway and police agencies are equipped to provide adequate response to these often extreme conditions the immediate and rapid onset of these conditions, especially to travelers, can often be extremely hazardous. I-75 and the Mackinaw Bridge to the Upper Peninsula serve as the principal land-transport north-south artery in the state, and carry significant traffic all times of the year.

In many cases it is not the extent or overall amount of snowfall, but the rapid change in encountered conditions. With the right combination of wind-speed and direction, white-out conditions can occur in otherwise clear conditions. Knowledge of these conditions through signs posted at critical positions along I-75 and other vulnerable state highways could provide warning of rapid deterioration of driving conditions to unsuspecting drivers.

The National Oceanic and Atmospheric Administration (NOAA) office in Gaylord, Michigan has prepared a series of maps relating wind direction and the risk and distribution of Lake-Effect snow across the Northern Lower and Eastern Upper Peninsulas of Michigan. From this series of maps, it becomes apparent that when winds are from the West **(Figure 6)** and West-Southwest **(Figure 7)** Cheboygan County, especially along the I-75 corridor and Straits area are vulnerable to significant Lake-Effect snow, and often accompanying white-out conditions.

Actions involving public education and communication are important approaches toward mitigating this winter hazard. A program to distribute situational information to drivers at the Mackinaw Bridge and northbound rest areas would be beneficial. NOAA is also urging road-signs, both portable and fixed to provide travelers with direct and immediate warnings of changing road conditions.

Figure 6, Lake Effect Snow Vulnerability, from West Flow Source: NOAA, Gaylord, MI

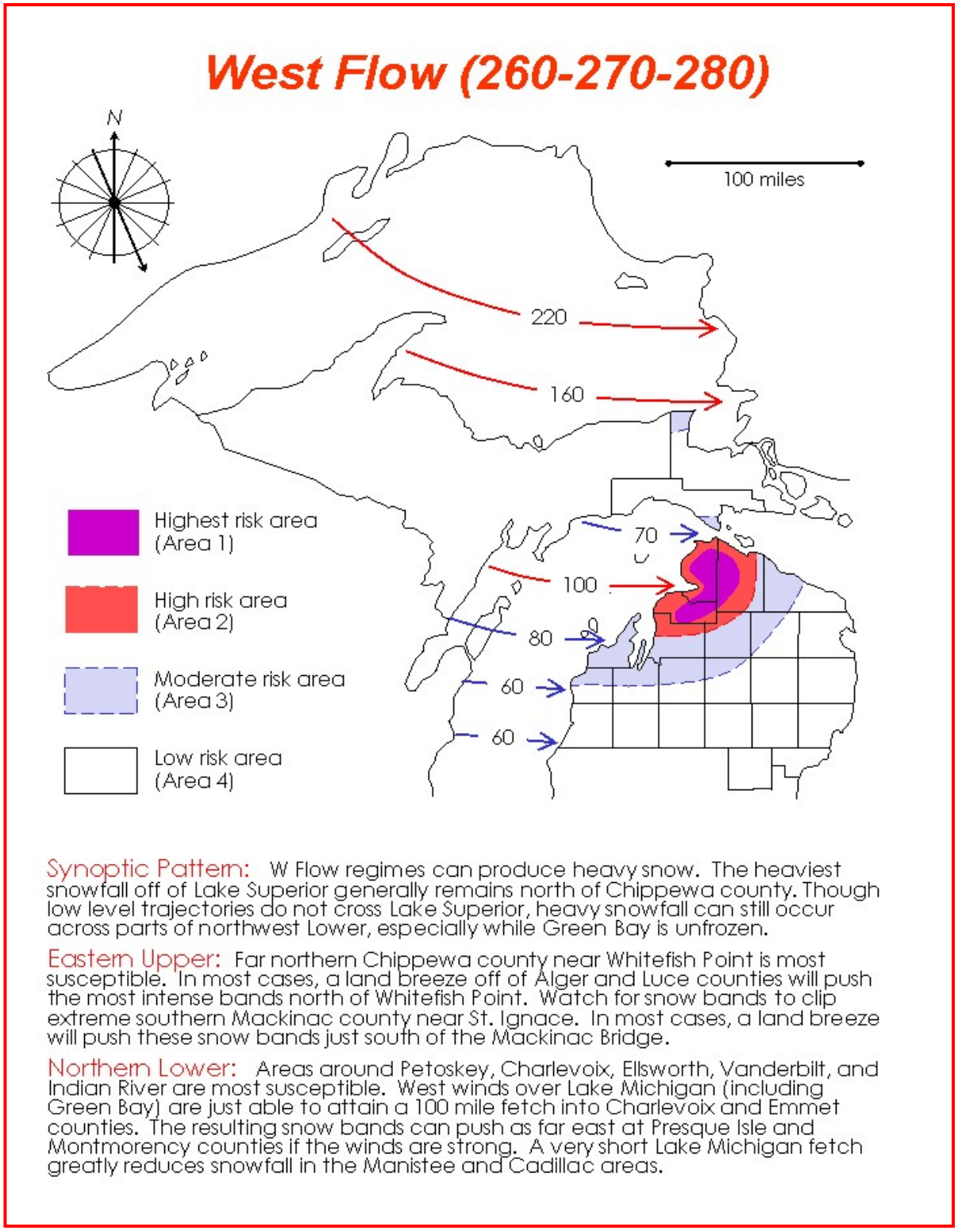
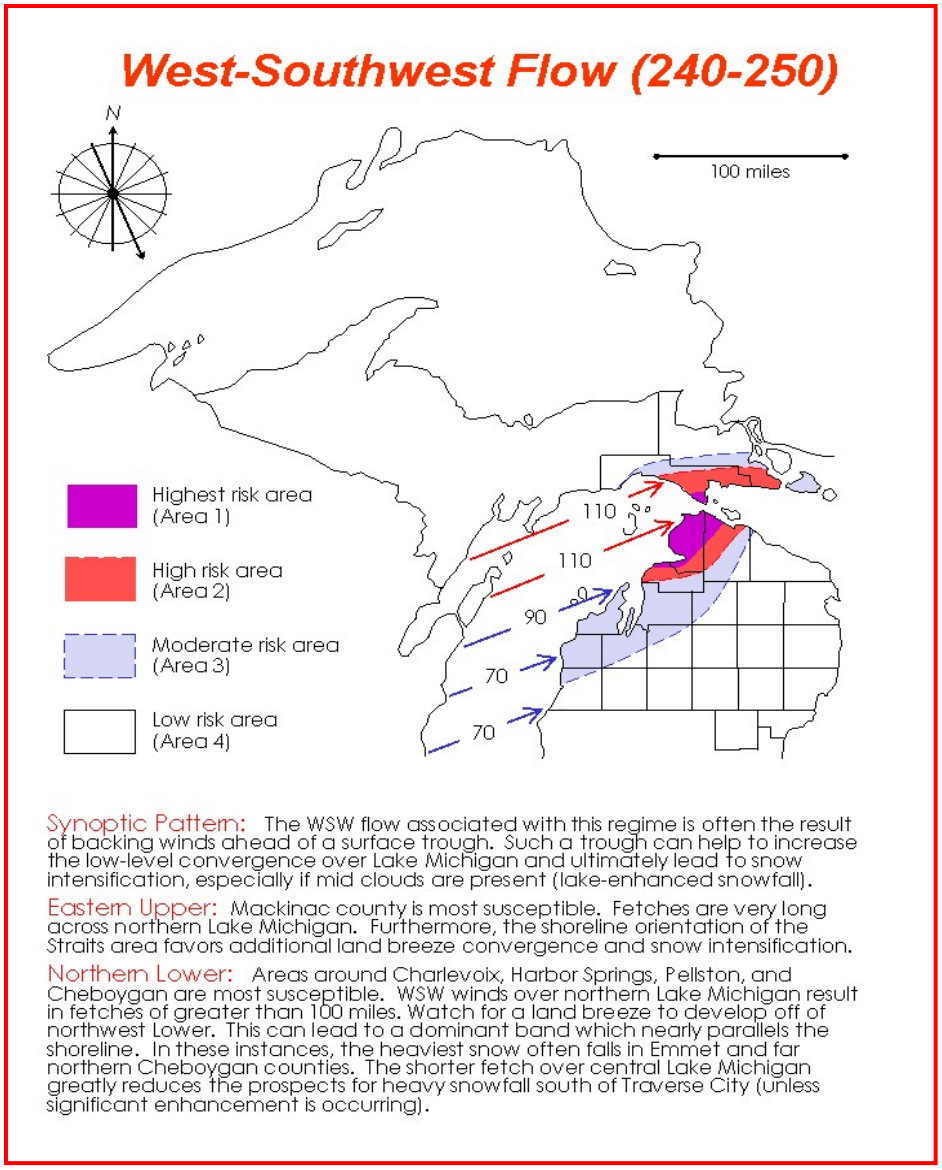


Figure 7, Lake Effect Snow Vulnerability, from West-Southwest Flow
Source: NOAA, Gaylord, MI



N
N

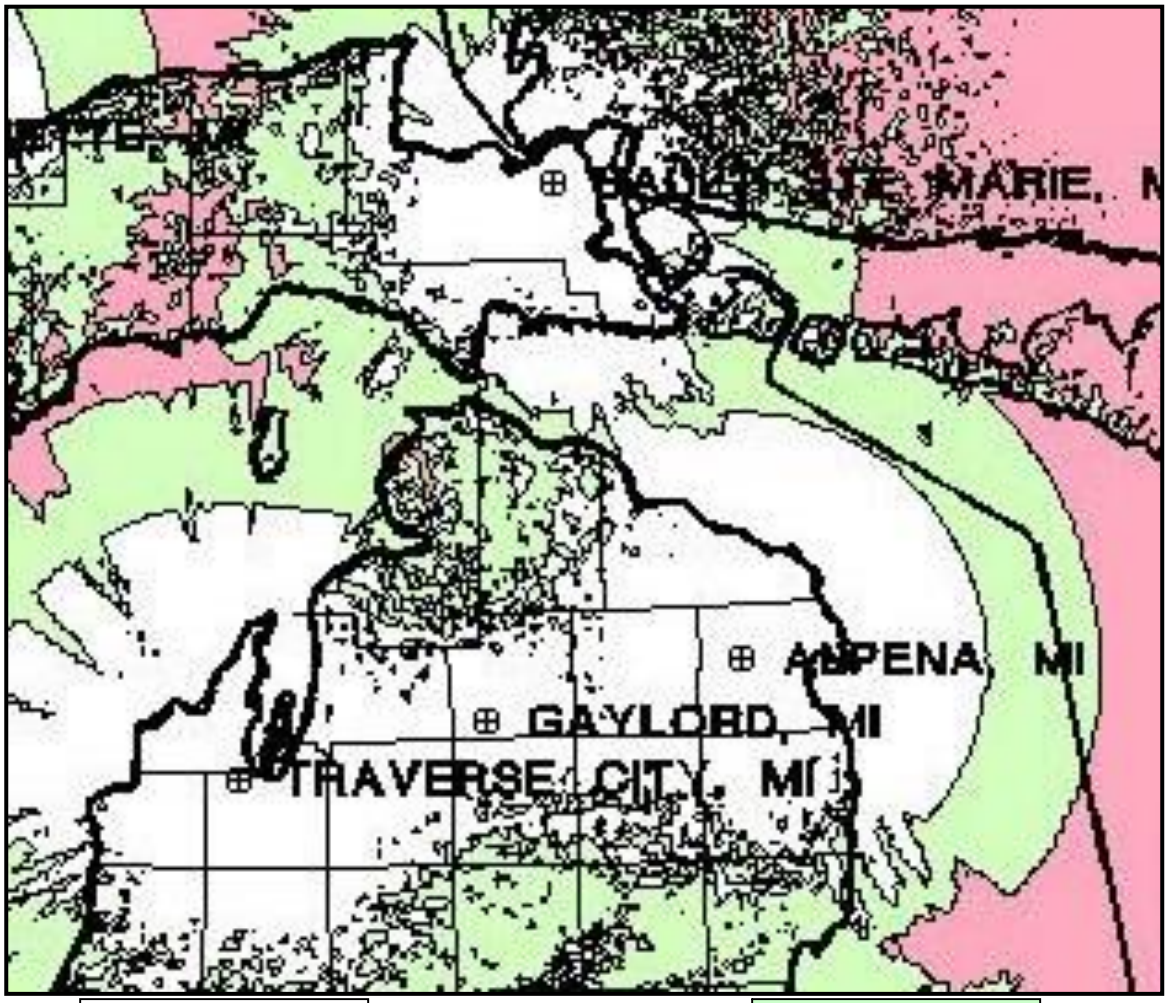
NOAA Weather Radio broadcasts warnings and post-event information for all types of hazards - weather (such as tornadoes, hurricanes, and floods), natural (such as earthquakes, forest fires, and volcanic activity), technological (such as chemical releases, oil spills, nuclear power plant emergencies, etc.), and national emergencies. Working with other Federal agencies and the Federal Communications Commission (FCC) Emergency Alert System (EAS), NOAA Weather Radio is an all-hazards radio network, making it the single source for the most comprehensive weather and emergency information available to the public.

Another source of weather related vulnerability for Cheboygan County, and the northern tip of the Lower Peninsula was distribution of NOAA Weather Radio signal. At the time of the original plan there was no NOAA Weather Radio coverage for the

areas shown below. **(Figure 8).** With the addition of a single station the coverage has improved greatly. **(Figure 9)**

Figure 8–NOAA Radio Coverage before Emmet station

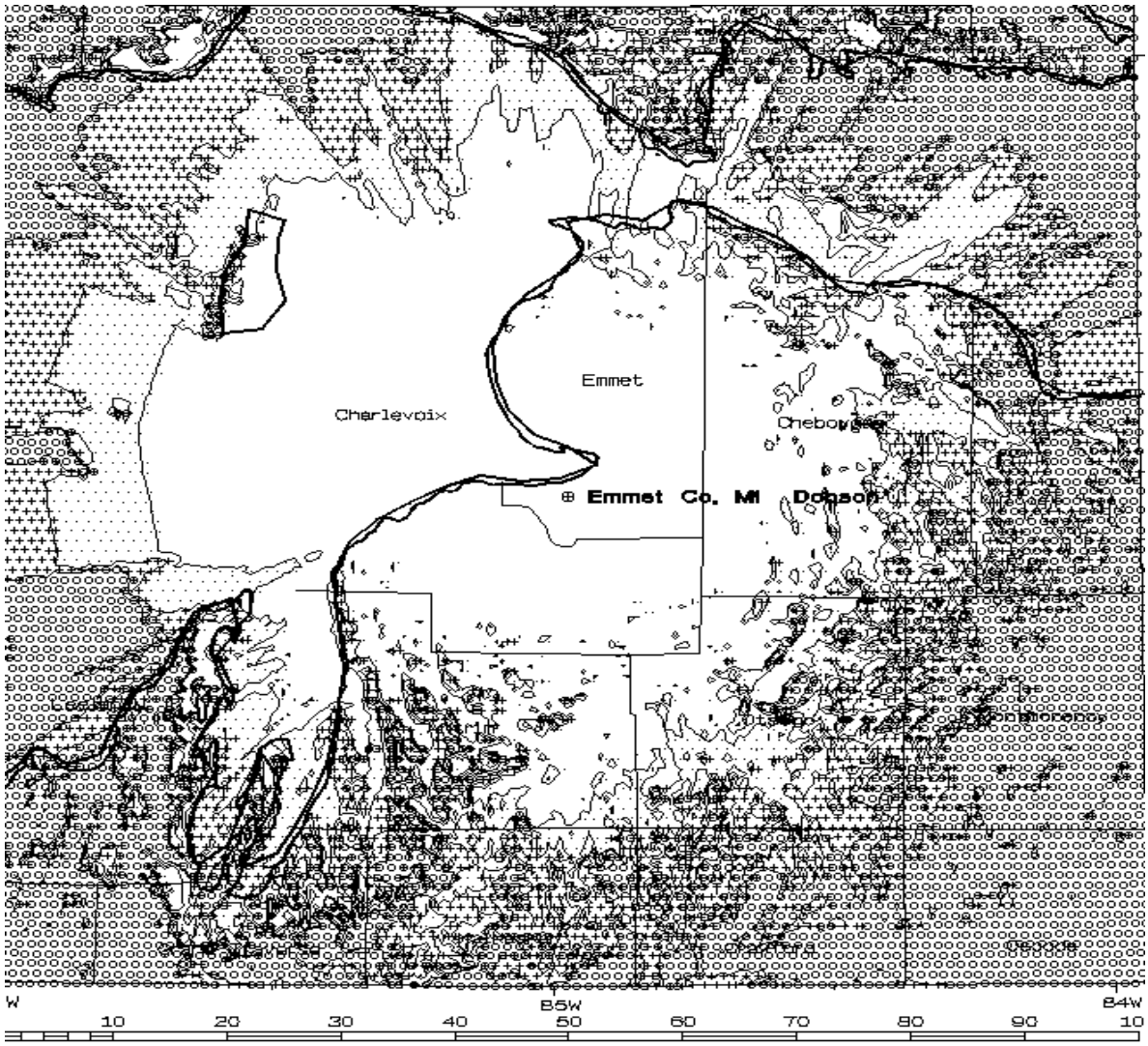
Source: NOAA, Gaylord, MI



Coverage

No Coverage

Figure 9 –NOAA Radio
Coverage after installation of the new Emmet County Station



Source: NOAA, Gaylord, MI

Greater than 20.00

5.00 to 12.00

A site for a NOAA Weather Radio transmitter was identified in Emmet County. Development of this transmitter has provide coverage for almost all of Cheboygan County. **(Figure 9)** This has opened the entire region to the hazard mitigation advantages inherent in the NOAA Weather Radio system.

Riverine and Urban Flooding

Major flooding was recorded in Cheboygan on the Little Black River in 1923, 1925, 1929, 1935, 1938, 1943, 1948 and 1954. The largest of these floods was the 1923 flood, followed by the 1938 flood. Average annual floodwater damages were primarily to urban property in the City of Cheboygan estimated from Work Plans to be $35,612.07 at current dollar value. The installation of flood prevention structural measures has had a very significant effect in reducing floodwater damages in the flood plain area of the Little Black Watershed.

In September of 1997, the U.S. Department of Agriculture, Natural Resource Conservation Service published a Flood Plain Management Study for the Little Black River. The approximate areas of inundation for the 100-year and 500-year floods were shown and indicated minimal vulnerability to the areas. The Plan suggested several Non-structural Measures to help mitigate flooding in the Little Black Watershed"

- Develop and implement, or update a flood plain protection and zoning ordinance based on the 100-year frequency high water profile and the flood plain delineation.
- Flood-proof existing buildings and residences in the flood plain to reduce flood damages.
- Develop alternate routes for automobile, truck and emergency vehicle traffic around those roads that will be inundated during flooding.
- Debris, fallen trees and brush should be removed from the floodway at least yearly. Snow and ice from road clearing operations should not be piled in floodway.
- Owners and occupants of all types of buildings and mobile homes should obtain flood insurance coverage for the structure and content, especially if located within or adjacent to delineated flood hazard areas.

Additionally, the following structural measures were suggested in the Little Black River Flood Management Study:

Flood stages can be reduced by improving flow conditions within the channel by increasing stream and storm sewers' carrying capacity. The existing series of dams and open channels generally provide protection from a 100-year flood.

In January of 2004 the Sturgeon River in the Village of Woverine experienced an episode of “Anchor Ice Flooding” along a swift flowing section of the river. Local citizens indicate that the weather conditions that cause this problem recurs about once every five years. After meetings with local officials and representatives from the Michigan Department of Environmental Quality, it is apparent that some of the same measures suggested in the Little Black Flood Management Plan, above, apply to the Wolverine situation, specifically:

- Develop and implement a flood plain protection and local zoning ordinance based on a 100-year flood plain delineation
- Flood-proof existing buildings and residences in the flood plain
- Steps be implemented to promote owners and occupants of all buildings to obtain flood insurance.

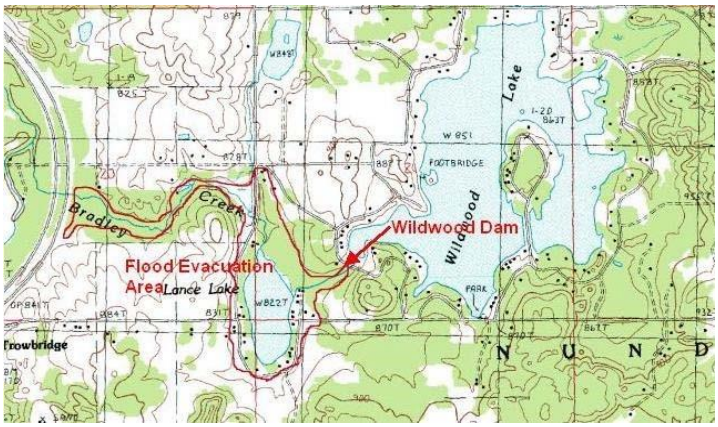
Dam Failure

The Wildwood Lake Dam is located in Nunda Township on the Bradley Creek Tributary to the Sturgeon River. The reservoir size of Wildwood Lake covers 222 acres. The dam is an earth fill dam approximately 305 feet long and 200 feet wide. The dam was constructed in 1961.

In 2002, flooding estimates from dam failure defined a flood inundation map for Wildwood Lake dam, and a Flood Evacuation area identified**. (Figure 10)** Twenty-three residences were located in the Flood Evacuation Area for Wildwood Dam, primarily fronting Lance Lake. The total assessed value of these residences was $1,191,000

Wildwood Evacuation Area

(Figure 10)



The Wildwood Lake Property Owners Association requested another inspection of the Wildwood Lake Dam by the Spicer Group. The objective of this study was to identify specific problems and estimated the magnitude of materials and construction required to rehabilitate the dam. To implement dam rehabilitation, the following procedures are necessary:

- Develop conceptual design alternatives
- Develop preliminary design to meet MDEQ permit requirements
- Develop final design
- Obtain Financing
- Construction

Total estimated construction costs to rehabilitate the dam and reconstruct the inlet, including contingencies, were $503,000. The report to the Wildwood Lake Property Owners Association from the Spicer group made the following recommendations.

At this time, we would recommend that steps be taken to secure funds to perform the necessary repairs to the earthen embankment, drop structure, and outlet structure. At a minimum, we recommend that the inlet structure with gates and outlet pipe be considered for repair, that the trees be removed from the downstream face of the dam and that road improvements direct all drainage towards the lake.

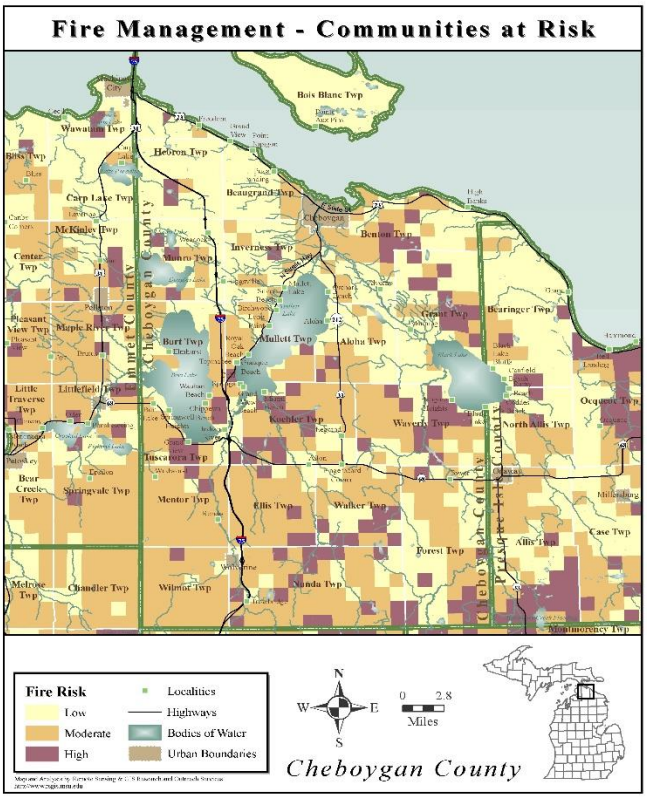
Although other Cheboygan dams reflect a range of conditions, none have comparable vulnerability conditions similar to the situation at Wildwood Lake Dam.

Structural and Wildfires

Cheboygan County's summer season brings numerous tourists to the area that often enjoy camping on private, county, and state lands. The summer camping season brings with it numerous campfires and the number one cause of wildfires in Michigan is the result of human action, which makes the county highly susceptible during those months.

In addition, Cheboygan County has also become a favored building site for vacation homes. Many of these homes are located in remote areas of the county on unimproved roads or long and narrow private driveways. These remote locations and narrow roads pose numerous difficulties for emergency responders including: discovery and reporting of fires; travel distances; access for fire trucks; lack of turnarounds for water trucks and other equipment; and limited means of warning these remote locations.

With nearly 64% of the total lands in Cheboygan County being forested and a major source of economic benefit relying on the aesthetic appeal of the County's wildlands, wildfires are a moderate to significant risk. As illustrated in the map below that was produced by Michigan State University as part of a study on wildfires that they conducted, the greatest wild fire danger is in the rural areas outside of the population hubs of the County. With that, Cheboygan County has a tight association of Fire Chiefs that meet on a regular bases and are connected through mutual aid agreements with each other. The region also has the advantage of a MDNR office in Indian River that can quickly bring the resources



of the State of Michigan to the scene of major wild fire events. However, it should be said that as with Charlevoix and Emmet Counties most of the fire departments are volunteer departments. With that the time of day and who is available will greatly effect the number of presonel that respond to the scene of a fire. This means that the fire may be well seated before enough personel can respond to safely begin firefighting operations.

Risk and Vulnerability Assessment

Hazard Ranking Methodology

After a thorough review of the community profile, a county hazard ranking was completed using a three step process. The first step was selecting evaluation criteria, the second step assigned relative weights to each of the rating criteria, and the third step assigned point values in each of the selected criteria for each of the hazards.

Evaluation Criteria

Selection of evaluation criteria was accomplished by determining what aspects of the hazards were of most concern to the community. This process was completed by assigning a level of importance ranging from “Always Important” to “Not Worth Considering” to each hazard aspect. **Table 8** shows a complete list of all aspects considered and level of importance assigned by the committee.

Each evaluation criteria was then assigned a “weight” to express the level of importance each criteria will have in ranking hazards. The sum of weights of all of evaluation criteria must equal 100%. Each individual criteria was then assigned a percentage value based on the relative importance that specific criteria would have in ranking the various hazards. Point values of 1-10 were assigned using the scoring parameters as outlined

in the Evaluation Measure Benchmark Factors shown below. Using a spread sheet, values were input and calculated to provide a hazard ranking.

Table 8
Cheboygan County Hazard Evaluation Criteria

Hazard Aspect	Always Important	Usually Important	Sometimes Important	Rarely of Importance	Not worth Considering
Likelihood of Occurrence	X				
Capacity to Cause Damage		X			
Size of Affected Area	X				
Speed of Onset			X		
Percent of Population Affected	X				
Potential for Casualties		X			
Negative Economic effects		X			
Duration of Threat				X	
Seasonal Risk Pattern				X	
Environmental Impact		X			
Predictability of Hazard			X		
Ability to Mitigate	X				
Availability of Warning System	X				
Public Awareness		X			
Collateral Damage	X				

Mitigation Strategies and Priorities

The next step in the hazard mitigation planning process is to identify mitigation actions suitable to the community, evaluate the effect the action will have on the specified mitigation objective and prioritize actions to decide what sequence or order these actions should be pursued.
Mitigation actions can be grouped into six broad categories:
1. Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
2. Property Protection: Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter resistant glass.

3. Public Education and Awareness: Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
4. Natural Resource Protection: Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
6. Structural Projects: Actions that involve construction of structures to reduce the hazard impact. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

Identification of Mitigation Actions

The public was invited to a meeting held in Cheboygan County on May 10, 2004 to discuss and identify hazards and possible mitigation actions. Communities, agencies, LEPC and general public were invited to attend the workshop that was held in conjunction with the Cheboygan County Local Emergency Planning Committee.

_____Done _____In Progress _____Not Done

Mitigation Actions

A. Multi-Hazard Actions. #1
Priority Responsible
Agency Funding Sources Application Time
Frame
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)
1 A,B,C,E,P,D,J Federal- F76, F77, F79,
F104, F10 Homeland
Security
Local- General Fund
State- MDIT
County wide Ongoing

Provide trained, equipped, and prepared search and rescue
teams. 1 B,C,D,F,S,W
Local- LEPC
State- Health Department
Federal- F38, F104
County wide Short
Term

Review and develop site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, etc .to cover all potential hazards.
2 A,B,C,D,E,K,M,N
,R Federal- F87, F104 County wide Short Term

Promote and implement solutions for keeping roads and driveways accessible to emergency vehicles and fire equipment. 3 A,B,C,D,E,F,J,U State- MDOT
Federal- F102 County wide Ongoing

Study and evaluate methods to improve NOAA Weather radio reception in county. 3 A,B,C,O Federal- F104 County wide Mid-term

Increase usage of NOAA Weather Radio by subsidizing purchase and distribution of radios to county residents, organizations and businesses. Use NOAA radios as a community emergency alert system to information on hazard events.
4 A,B,C,D,K,O.U,X Federal- F104 County wide Short Term

Encourage residents to develop a Family Disaster Plan that includes the preparation of a Disaster Supplies Kit. 5 A,C,D,G,H,I,P,U Federal- F104
Local- General Fund
State- Health Department
American Red Cross,
Civic Groups
County wide Mid-term

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross| |J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov.| U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities

A. Multi-Hazard Actions. #2
Priority Responsible
Agency Funding Sources Application Time
Frame
Organize outreach program to vulnerable populations during and after hazard events, including wildfires, extreme winter and summer weather events, periods of extreme temperatures, public health emergencies, and other hazards that can impact the community.
4 A,C,D,E,I,N,P,
S

Local- General Fund
Federal- F9, F70, F97,
F98, F100, F104
American Red Cross
County wide Mid-term

Pre-planning for debris management staging and storage areas … 4 A,B,C,D,E,Q Federal- F104 County wide Mid-term
Encourage continuation of house numbering program 5 A,B,C,D,E,S, Federal- F104 County wide Ongoing

Produce and distribute family emergency preparedness information relating to all natural hazards affecting the County.
5 A,D,E,G,H,I,J,L
,N,O,Q,U,V
Local- General Fund
State- Health Department
Federal- F54, F104
County wide

To address multiple hazards in the county recommend tree trimming and maintenance efforts to prevent limb breakage and safeguard nearby utility lines. Where cost effective bury and protect power lines. The end goal is to create and maintain a disaster-resistant landscape in public rights of-way.
A,E,P County wide Long-term

Acquire portable/changeable message signs to direct crowds and provide information. A,B,C,E,H,Q,X County wide Mid-term

Individual communities should prepare future land use plans and capital improvement programs to plan for their future hazard mitigation needs.
A,B,C,D,F County wide Long-term

Encourage key gasoline stations have the capacity to pump gasoline during power outages. A,M,W County wide Long-term

Develop plans to identify and inform persons of "Safe Areas" during festivals/events. (include signs and directions to shelters)
A,B,C,D,E,N,Q County wide Long-term

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross| |J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov. |U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities

Winter Weather Hazards 3
Priority Responsible
Agency Funding Sources Application Time
Frame

Study and support pre-arranged shelters for stranded motorists/travelers, and others. 1 A,I,N,R
Local- General Fund
State- Health
Department
Federal- F14, F92,
F102, F104, F108
County wide Mid-term

Inventory existing and acquire equipment and portable signs for road closures and traffic control in accident areas, and to inform motorists of high wind area, lake effect snow area and road glazing area on major highways.
2 A,B,C,E,Q,W,X State- S38
Federal- F104 County wide Shortterm

Study and improve location and design and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze)
C,H, County wide Ongoing

Produce and distribute family emergency preparedness information relating to severe winter weather hazards A,G,I,N County wide Mid-term

Study and employ available NOAA data to predict location and warn motorists of potential white-out road hazards. A,E,O,W County wide Shortterm

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross| |J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov.| U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities

Fixed Site Hazmat, #1 Priority Responsible
Agency Funding Sources
Application
Time
Frame

Provide annual training to County Fire Departments related to on site products, and how they are handled. 1 A,B,C,D,W Federal- F68, F79, F81, F104 County wide Shortterm

Develop and exercise site emergency plans and community response plans as required under SARA Title III.
1 A,B,D,H Federal- F68, F77, F104 County wide Ongoing

Provide training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials, including public education to help identify and eliminate clandestine neighborhood drug labs in the County
A,B,C,D,M,U County wide
Ongoing/Short term

Educate public and implement steps to encourage "shelter in place" response to Hazmat incidents. A,B,C,D,U County wide Mid-term

Continue brownfield cleanup activities. B,C County wide Ongoing

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross| |J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov. |U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities 7

D. Transportation & Trans Hazmat #2 Priority Responsible Agency Funding Sources Application Time Frame

Provide more training for firemen, police and first responders to school bus and commercial bus accidents.
1 A,B,D,E,R,W Federal- F104 County wide Ongoing/ Short-Term

Provide more training for aircraft emergencies involving all county fire departments 2 A,B,C,D,W Federal- F54, F104, F105 County wide Short-term

Encourage and enforce use of designated truck routes, and strict enforcement of weight and travel restrictions for truck traffic.
3 A,B,C,E,Q Federal- F62, F63, F66, F104 County wide Ongoing

Study and employ available NOAA data to predict location and warn motorists of potential white-out road hazards.
E,O,Q County wide Mid-term

Review and enhance airport maintenance, security, and safety programs. A,B,C County wide Long-term

Explore placement of computerized weather kiosks at major Lake Huron marinas in conjunction with U.S. Power Squadron.
K,N,O U.S. Power Squadron
Mackinaw ,
Beaugrand,
Benton Twps,
City of
Cheboygan
Long-term

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross|| J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov .|U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities

Riverine Flooding, Priority Responsible
Agency Funding Sources Application Time Frame

Review and enforce basic building code requirements related to flood mitigation. 1 A,B,C Local- General Fund
Federal- F96, F102, F104 County wide Ongoing

Promote accurate identification and mapping of floodprone areas. 2 A,B,C,F,J,S Federal- F20, F23, F31, F39,
F104 County wide Short-term

Increase public awareness of need for permits (MDEQ Part 31) for building in floodplain areas. 2 A,B,C,G,Q State- MDEQ
Federal- F23, F39, F104 County wide Short-term

Study and implement appropriate solutions to property damage caused by “anchor ice” flooding in the Village of Wolverine

4 A,B,C,D,E,O,Q
Federal- F1, F9, F38, F39,
F41, F43, F44, F70, F87, F96,
F102, F104, F108
Village of
Wolverine,
Wilmot Twp,
Cheboygan
County
Short-term

Promote and employ soil erosion techniques within watershed. 4 A,B,G,N,S
State- S1
Federal- F3, F22, F23, F41,
F104
County wide Ongoing

Consider government acquisition, relocation or condemnation of structures within floodplain. A,C,B,J,K County wide
Long-term

Review and identify possible sites for drainage easements. B,E,G County wide Long-term

Review and provide for detection and prevention/discouragement of illegal discharges into storm-water sewer system.
A,C County wide Mid-term

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross|| J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov.| U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities **9**

F. Extreme Temperatures Priority Responsible Agency Funding Sources Application Time Frame

Identify location and organize outreach to vulnerable populations during periods of extreme temperatures…
1 A,B,C,N,I Federal- F104 County wide Mid-term

G. Infrastructure Failure
Priority Responsible
Agency Funding Sources Application Time
Frame

Review and develop strategies to insure redundancies in
utility and communications systems, and mutual aid
assistance for failures in utility and communication systems.
1 A,B,C,D,H,N,O,W Local- Private
Federal- F35, F104 County wide Long-term
A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross|| J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov.| U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority.
Cheboygan Hazard Mitigation Plan
Mitigation Strategies and Priorities **10**

H. Dam Failures Priority Responsible Agency Funding
Sources Application Time Frame

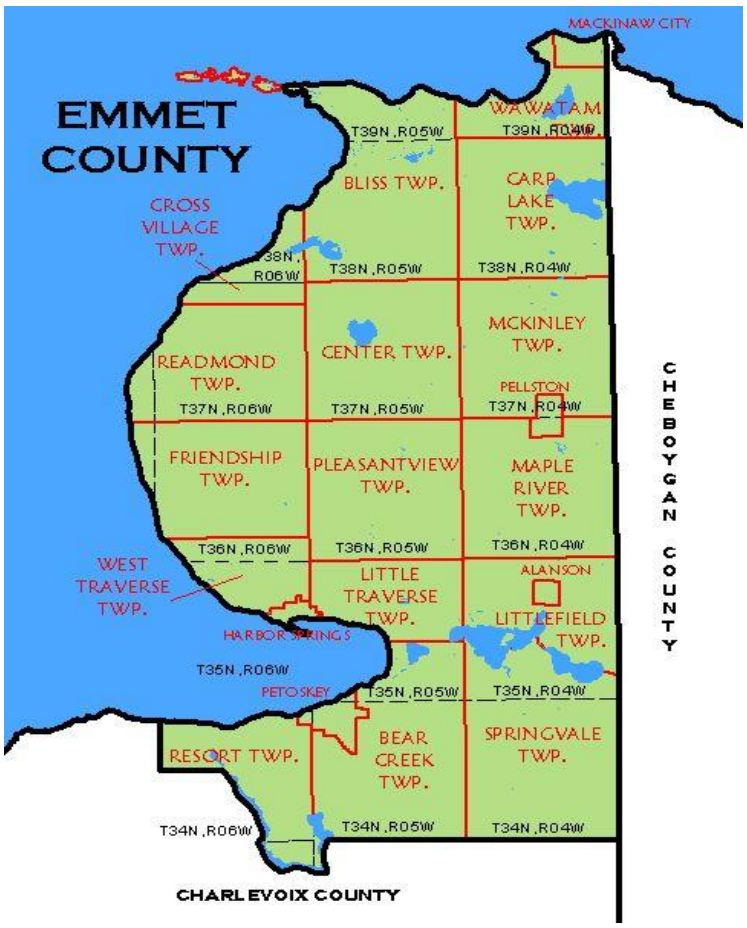
Encourage MDEQ to enforce annual review requirements
of dam Emergency Action Plan (EAP) with the local
Emergency Operations Plan (EOP).
1 A,J,P State- MDEQ, Federal- F103, F104
County wide Ongong

Regulate development in the dam's hydraulic shadow
(where flooding would occur if there was a severe dam
failure).
A,B,C Mid-term

A. County Emergency Management Office| B. County| C. Local Units of Gov.| D. Local Fire Dept.| E. County Road Commission| F.
NEMCOG| G. MSU Extension| H. District Health Dept.| I. American Red Cross|| J. USFS & MDNR| K. Insurance Companies| L. Real
Estate Companies| M. Local Businesses| N. Civic Groups and Churches| O. National Weather Service|, P. Utility Co.| Q. State Gov.|, R.
Schools|, Hospitals & Health facilities|, S. Fed. Gov .|U. Landowners,; V. Salvation Army; W. Police, X. Bridge Authority

While it appears there are still many unfinished projects, most are ongoing and of the nature that will never be completed such as “Public Education”. This is an ongoing effort for all emergency managers.

IX: EMMET COUNTY



Emmet County is located in the northern Lower Peninsula and is traversed by US Highways 31 and 131 with Lake Michigan to the west and north. The county also encompasses the Waugoshance Island group in Wilderness State Park. The county seat, in the City of Petoskey, and the City of Harbor Springs, are at the heart of a large natural harbor in Little Traverse Bay. The county is experiencing some of the most rapid growth in the state, with major resort developments on Little Traverse Bay.

The community data located below (Table 1), is provided to describe Emmet County for planning and implementing the mitigation strategies.

Major Geographic Features of Emmet County

Table 1

Area in Water	10,560 acres
Miles of Great Lakes shoreline	60 miles
Forest Lands	208,100 acres 69.5% of total land area
Wetlands	58,589 acres 19.6% of total land area

The total County population in the 2010 census was 32,694. This represents an increase in population of 1257 residence. While this represents a small increase in population it falls far below the projected population estimated with the 2000 census. It should also be noted, that as with Charlevoix and Cheboygan Counties the population increases dramatically with the summer season. While this population are transient in nature, they still require and tax the resources of the County. While Emmet County saw a small increase in population demographics show that the region has seen a large reduction in population of the 20– 45 year-old, age group. Many in this age group left the area in search of work during the 2008 recession.

Township/Cities/Villages Population

Table 2

Bear Creek Township	6201
Bliss Township	620
Carp Lake Township	759
Center Township	568
Cross Village Township	281
Friendship Township	889
Littlefield Township	2978
Little Traverse Township	2380
McKinley Township	1297
Maple River Township	1348
Pleasant View Township	823
Readmond Township	581
Resort Township	2697
Springvale Township	2141
Wawatam Township	661
West Traverse	1606

City of Harbor Springs	1194
Mackinaw City (part)	609
City of Petoskey	5670
Village of Alanson	738
Village of Pellston	822

According to the 2012 Economic Census (Table 3) below Emmet County has a large number of individuals living in poverty at 11.0%, even though 94.2% of the population have at least a high school education. These figures also support the issues that were discussed above about the lack of working families to support the economy.

2012 Economic Census (Table 3)

Population	33,161
Median Household Income	$53,113
Individuals Below Poverty Level	11.0%
Education Attainment, High School or Greater	94.2%
Health Insurance Coverage, Population Uninsured	12.3%
Median Housing Value	$165,500.00
Total Housing Units	21,223 .
Number of Companies	4688

THE DEVELOPMENT OF THE PLAN

A. Data Methodology and Map Development

Emmet County's staff identified the critical facilities and infrastructure on the base map and then the Northwest Michigan Council of Governments digitized the facilities as point files. Hazards points, polygons, and population centers data was then added to the base maps utilizing the following data (Table 4):

Critical Infrastructure (**Table 4)**

	Airports • Emmet County/Pellston Regional Airport • Harbor Springs • Boyne Highlands
1	Communications Facility
1	Dam
1	Emergency Management Services Facilities
11	Fire Stations
1	Fish Hatchery
23	Government Buildings
3	Hazardous Materials Sites or Facilities
4	Historic Sites
2	Hospital Facilities
3	Industrial Facilities
5	Medical Facilities • Primary physicians per 100,000 population 1998 is 123.5
6	Police Stations
14	Resort/Recreational Facilities
18	Schools
1	Senior Apartment Complex
4	Utility Facilities
3	Water and Sewage Treatment Facilities • Water: 38.8% public system or private company; 61.2% individual wells; • Sewer: 40.3% public sewer; 58.0% individual septic/cesspool; 1.7% other
2	Water Well/Towers

Flood Data

Flood hazard information can usually be derived from the Flood Insurance Rate Maps (FIRM) which are available for some overlaid wetland, soils, and elevation data to determine the most likely flood prone areas. Once overlaid, isolated polygons (areas) were deleted in order to show a more accurate representation of potential flood prone areas along lakes, rivers, and streams. Sources: Temporary/Seasonally Flooded Areas data are from the National Wetland Inventory of the US Fish and Wildlife Service; Hydric soils data are from the county digital soil surveys (where available); and Digital Elevation Model data are from the Center for Geographic Information, Michigan Department of Information Technology.

Fire Data
Modern forest fire data was obtained from the USDA forest service and the Departments of Natural Resources in Minnesota, Wisconsin, and Michigan. Fire regimes data (fire prone areas) were provided by the USDA Forest Service, North Central Research Station in Wisconsin. Land type associations, and historical and modern fire rotations were used to identify the fire prone areas.

Tornadoes - National Weather Service and the 2012 Michigan Hazard Analysis.

Damaging Winds - National Weather Service and the 2012 Michigan Hazard Analysis.

Large Hail - National Weather Service

Winter Weather - National Weather Service and the 2012 Michigan Hazard Analysis.

Landslide/Erosion
Shoreline erosion and landslide incident zones delineated by the US Geological Service. Digital Elevation Model data from the Center for Geographic Information, Michigan Department of Information Technology.

Other hazards may exist in northwest Michigan communities, but are not considered to be substantial risks.

Hazards Information

Data for events was compiled from the National Oceanic and Atmospheric Administration's web site utilizing the following sections:

- Weather/Climate Events, Information, Assessments
- Climatology and Extreme Events
- U.S. Storm Events Data Base: 1950 to present, local storm reports, damage reports, etc. from various sources – events observed for Charlevoix, Cheboygan and Emmet Counties included hail, snow and ice, fog, flooding, jthunderstorms and high winds, excessive heat, extreme cold, tornadoes, waterspouts, lightning, and wild/forest fires.

The most severe events recorded for Emmet County, and regional events which included Emmet County, are listed below.

Hail – 12 events

- June 1998: (county) $100,000 property damage; large hail up to 2.5 inches in diameter caused damage to cars on two lots west of Petoskey
- June 2005: (Petoskey and Conway) .75 inches to .88 inches
- October 2005: (Cross Village) 1.0 inch
- July 2006: (Alanson) .75 inch
- June 2008 (Brutus) .75 inch
- June 2010 (Bay View) .75 inch
- June 2011 (Bay View) .75 inch
- September 2012 (Pellston Airport) .88 inch

Fire – 6 events

- 1989: 44 acres, Littlefield Township
- 1989: 10 acres, Pleasant View Township
- 1991: 12 acres, Readmond Township
- 1992: 20 acres, Pleasant View Township
- 1994: 32 acres, Bliss Township
- 2000: 35 acres, Bliss Township

Snow, Ice and Extreme Cold – 64 events (10 inches or more of snow)

- December 1996: (Cross Village) 12-18 inches of heavy snow; (county) 8-12 inches of snow
- January 1997: (county) ice storm; up to 3 inches of ice; widespread power outages and numerous driving accidents
- February 1997: (county); 10-14 inches of heavy snow
- March 1997: (county); 8-12 inches of heavy snow
- November 2000: (county); 16-20 inches of heavy snow

- December 2001: (county); 71 inches of heavy snow 25th-28th; records were broken and a State of Emergency was declared by Governor John Engler. The county requested $59,538.34 in disaster assistance.
- March 2002: (region); 10-16 inches of heavy snow/winter storm; also freezing rain and sleet; trees and power lines down
- February 2003: (region); winter storm with some ice
- April 2003: (region); winter storm with rain, sleet, and snow; tree limbs and power lines down
- November 2003: (region) $40,000 property damage; winter storm
- January 2004: (region); winter storm; no travel recommended; (Cross Village and Bliss); 12 inches of heavy snow; (Petoskey); 4-12 inches of heavy snow
- February 2004: (region) Six to twelve inches of snow fell
- December 2004: (county) Up to 8 inches of snow fell in parts of central and northern Emmet County; Up to 12 inches of snow, the snow was heaviest in eastern Upper and northwest Lower Michigan, closer to Lake Michigan; 6 to 10 inches of snow fell, with the highest amounts near Petoskey
- January 2005: (county) 6 to 10 inches of snow fell along the Lake Michigan shoreline of eastern Upper and northwest Lower Michigan
- October 2006: Heavy Snow
- November 27 & December 1, 2007 Winter storm hits the region dumping snow and high winds.
- January 10 & 29, 2008, Winter Storm hits the region dumping snow and high winds.
- February 2008: Ice Storm
- November 2008: Heavy Snow
- February 2009: Heavy Snow
- December 2009, Winter Storm hit the region
- December 2010, Winter Storm hits region
- January 2012: Winter Storm hits region
- December 2012 Winter Storm hits the region
- March 2012: Heavy Snow
- Winter 2013-2014 record snowfall hits the region
- February 2015 record low temperatures hit the area, freezing wells and causing other damage.

Fog – 1 event

- January 1995 (region) Dense fog blanketed much of Lower Michigan during the evening on the 11th through the morning on the 13th. The fog caused numerous traffic accidents, which resulted in four fatalities

Flood – 3 events

- January 1993: (region) $ 5,000 property damage; Rainfalls of 1.5 to 2.5 inches fell in about 26 hours

- March 1993: (region) Rainfalls of 0.50 to 1.00 inches fell from about a 12-hour period
- April 1993: (region) $5.0 million; From 2.00 to 3.25 inches of rain fell in a 12-hour period from the evening hours of the 19th to the morning hours of 20th

Thunderstorm and High Wind – 50 events

- October 1993: (county); high winds with many trees, power poles and power lines blown down; power outages; 59 mph gusts
- June 1994: (12 miles west of Cheboygan); thunderstorm/winds; two-foot diameter maples trees were downed and several 6-12-inch diameter trees, a corn bin, numerous tree branches were blown down;
- July 1994: (Harbor Springs); thunderstorm/winds; utility poles toppled; 52 knots
- November 1994: (region – mostly southern Michigan) 1 injury, $100,000 property damage; high winds of 50 knots
- July 1995: (county) thunderstorm/wind; 30-50 mph gusts
- October 1997: (Bliss/Carp Lake); thunderstorm/winds; numerous trees of various sizes were downed in Wilderness State Park; U.S. Coast Guard received reports of several waterspouts in northern Lake Michigan; a report of a wind gust of around 90 knots was received from a ship on northern Lake Michigan;
- August 1998: (Conway); thunderstorm/wind; trees toppled; 52 knots
- July 1999: (Harbor Springs); thunderstorm/winds; large benches ripped from the ground and thrown; (Pellston Airport); trees and power lines down; 65 knots
- June 2001: (Petoskey) $15,000 property damage; thunderstorm/winds; numerous large tree limbs blown down; one large limb fell on a house; 50 knots
- August 2001: (Alanson) 1 injury – tree fell on a car, injuring occupant; thunderstorm/winds; numerous trees were down; 50 knots
- September 2001: (Petoskey); thunderstorm/winds; trees down; 50 knots
- October 2001: (region); high wind; trees down; 50 knots
- August 2002: (Harbor Springs) thunderstorm/winds; trees and power lines down; 50 knots
- October 2002: (Petoskey); thunderstorm/winds; two trees down; 50 knots
- August 2003: (Petoskey/Alanson) $51,000 property damage; thunderstorm/winds; number trees and power lines down damaging several homes and cottages near Crooked and Pickerel Lakes, a small aluminum boat was tossed into a tree, trailers at a dealership in Petoskey were rolled off the parking lot and into a ditch; 55 knots
- November 2003: (region) $155,000 property damage; high wind; trees and power lines down, power outages; 56 mph at Harbor Springs and 62 mph at Pellston Airport; 68 knots

- April 2004: (county) $20,000 property damage; At the Pellston Regional Airport a parked turboprop commercial aircraft was spun into nearby boarding docks, damaging the wings and tail section of the aircraft and a Cessna 150 was flipped by the strong winds, causing substantial damage.
- July 2004: (region) $5,000 property damage; trees and power lines were downed.
- June 2005: (Petoskey) $25,000 property damage; 55 knots; numerous trees downed; restaurant damaged by falling tree
- September 2005: (County) $15,000 property damage; 55 knots; numerous trees and power lines downed
- July 2006: (Alanson) $2,000 property damage; large tree limbs downed into a backyard
- July 2007: (Petoskey) Severe Thunderstorm with winds gusting to 52 to 58 knots. Power lines and some trees down.
- June 2010: (Bay View Area) Severe Thunderstorms with winds gusting to 52 knots
- June 2012: (Crab Lake Area) Severe Thunderstorms with wind gusts at 52 knots
- July 2012: (Pellston Airport) Severe Thunderstorm with wind gusts to 54 knots
- August 2, 2015 Straight line winds and severe thunderstorms swept across Northern Michigan causing downed trees and powerlines and severe damage to the region. Most damage being in Leelanau and Grand Traverse Counties.

Excessive Heat – 1 event

- August 2001: (region) Temperatures stayed at mid to upper 90s for 5 days across all of northern Michigan.

Tornadoes – 5 events

- September 1953: (county) F1 classification
- June 1955: (county) $3,000 property damage; F1 classification; 1 mile long, 33 yards wide
- July 1957: (county) $25,000 property damage; F1 classification; 6 miles long, 33 yards wide
- August 1987: (county) $25,000 property damage; F0 classification; 0 miles long, 30 yards wide
- August 1996: (Pellston Airport); F0 classification; 0 miles long; 5 yards wide

Waterspout – 1 event

- August 1999: (county) unseasonably cold air over the warmer waters of Lake Michigan triggered numerous cold air funnel clouds over Little Traverse Bay; three of which developed into waterspouts.

Shoreline Erosion
Shoreline erosion is caused mostly by wind, waves, waterlevels and human activities along the shoreline of the Great Lakes. It constantly affects communities along the shoreline and if severe enough can cause great damage to costal areas in Emmet County. This can include, but is not limited to washing out roadways and infrastructure to washing out foundations of buildings built too close to the water's edge. While there are no recently recorded incidents of damage by shoreline erosion, it is and will continue to be a possible source of damage to buildings and infrastructure. According to MDEQ records the Townships most at risk of damage from shoreline erosion in Emmet County are Bear Creek, Bliss, Cross Village, Readmond, Resort and West Traverse.

Earthquakes
There has been no occurrence of earthquakes in the county in recent history and the closest ones have been in Ohio and Indiana which are about seven hours from Emmet County.

Subsidence
The Michigan Hazards Analysis of 2012 and local information indicate that there have been no significant events in the county. Given the geological structure below the county, no significant subsidence issues are expected in the future.

Probability of Hazards:

It is probable that hazards such as hail, thunderstorms and high winds, tornadoes, and snow and ice will affect this area of Michigan annually. The magnitude and severity depends on the season, which determines temperature, moisture in the air, ice cover on the lakes, etc. Also, the level of disaster of an event is connected with tourist activity during the year, the pace of developing second homes, and an increasing base population in northwest, Lower Michigan. The events recorded by NOAA show that natural hazard events may be happening more frequently, but the geographic impact of the natural hazards' impact has remained the same in Emmet County.

The areas where natural hazards overlap in Emmet County can include heavy snow and ice storms, which can down trees and power lines, and then a combination of rain and melting snow and ice can contribute to flooding.

Emmet County Hazards Task Force and Public Input

To create the Emmet County Hazards Task Force, **invitations for the meetings** were sent to the following entities requesting their participation:

County Administrator/Coordinator
County Board of Commissioners
County Sheriff/Emergency Services (911 Services Coordinators, Public Safety)
County Emergency Manager/Coordinator
County Public Works Director
County Health Department Director
County Planning or Community Development Director
County Drain Commissioner/Soil Erosion Officers
County Road Commission Director
County Conservation District Director/Soil Erosion Officers
Township elected and appointed officials
Township Supervisors
Township Clerks
Michigan State Police
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
Michigan Department of Transportation
U.S. Coast Guard
Hospitals

In the development of the original plan, the first Task Force meeting was held to identify the hazard priority areas and the second Task Force meeting was held to develop the mitigation strategies for the priority issues. The following organizations/individuals participated in these meetings:

Emmet County Emergency Management Coordinator
Emmet County Sheriff Department
Emmet County Planning Department
Charlevoix/Emmet Conservation District
Little Traverse Bay Bands of Odawa (2)
American Red Cross (2)

At the first Task Force meeting, the Networks Northwest staff presented the background of the required project; the principal natural hazards in Michigan; described what mitigation planning is about; the purpose of the plan; suggested goals; and the political process. A full county hazards map was available for review with four separate quadrant maps. These sectional maps were for the participants to review the areas of

the county they were most familiar with. The Emergency Management Coordinator and Planners reviewed all the maps to give input on the entire county.

The original group analyzed the map areas for the top hazard priority areas by documenting the most threatening. They did a qualitative assessment of points and concerns where they saw potential conflicts with, and their relationship to, critical facilities and population centers. The general list created included:

- Lake Michigan shoreline and bluff erosion from Harbor Springs to Cross Village, endangering roads and homes in the corridor
- Mackinaw Bridge
- Need power substations (Wolverine Power); tap Consumers Energy
- Harbor Springs – flood (1923) affected structures and people. Today, there are schools, major roads, and an EMS building in the flood route
- Bear River dam in Petoskey
- Carp River dam in Carp Lake
- US 31 West of Petoskey – Bluffs paralleling US-31 have the potential for erosion along Little Traverse Bay
- Boyer Creek/Tannery Creek flooding area – yearly near US 31 and M-119
- Pipeline pumping station
- Communications area southeast of town (winter weather)
- Forest fire potential (Of notable concern was the airport in Pellston)
- Structural fires throughout the county (need for more fire stations to decrease response times)
- Hazardous Materials – Mitchell Road: populated and flood zone, farms
- Industrial areas – Circuit Controls M-119; Northern Michigan Diecast Industrial park;
- Little Traverse Park; Moeller Drive; Mitigation strategy – revert back certain industrial areas to non-industrial, planning of industrial parks and hazards; transportation of hazardous materials and avoiding cities
- Minimum driveway size for emergencies
- Need a NOAA weather station
- Transportation Issues on U.S. 31 through Bay View
- Pipeline pumping station at Pellston
- Walloon Lake Dam and Bear River flooding; Bridge Street area with houses and senior apartments; Sheridan Road area
- Severe winter weather
- Severe thunderstorms and high winds in the Petoskey area
- Little Traverse Bay erosion during high water; Boulder Avenue area, water rushing down the slope and erosion
- Alanson Lock area
- Maple River dam
- Storm water runoff down steep roads with erosion

- Increase in development in dune areas
- Ice damage on Little Traverse Bay and Walloon Lake
- Mitchell Road washout – small creek to near the High School, to Winter Park, to Lockwood MacDonald Building, then under US 31 to the Bay

The participants then took the complete list above and developed their Top Five Hazard Priority Areas. Due to the rural nature of the county, there has not been a lot of property damage, injuries, or deaths due to hazards.

A different approach was used in updating the plan. Since the purpose was to update the original plan and not to create a new plan the process was simplified. A questionnaire was developed and posted on the Tri-County Emergency Management web site for public comment. Public Hearings were scheduled in all three communities. The following notice was posted in the local paper:

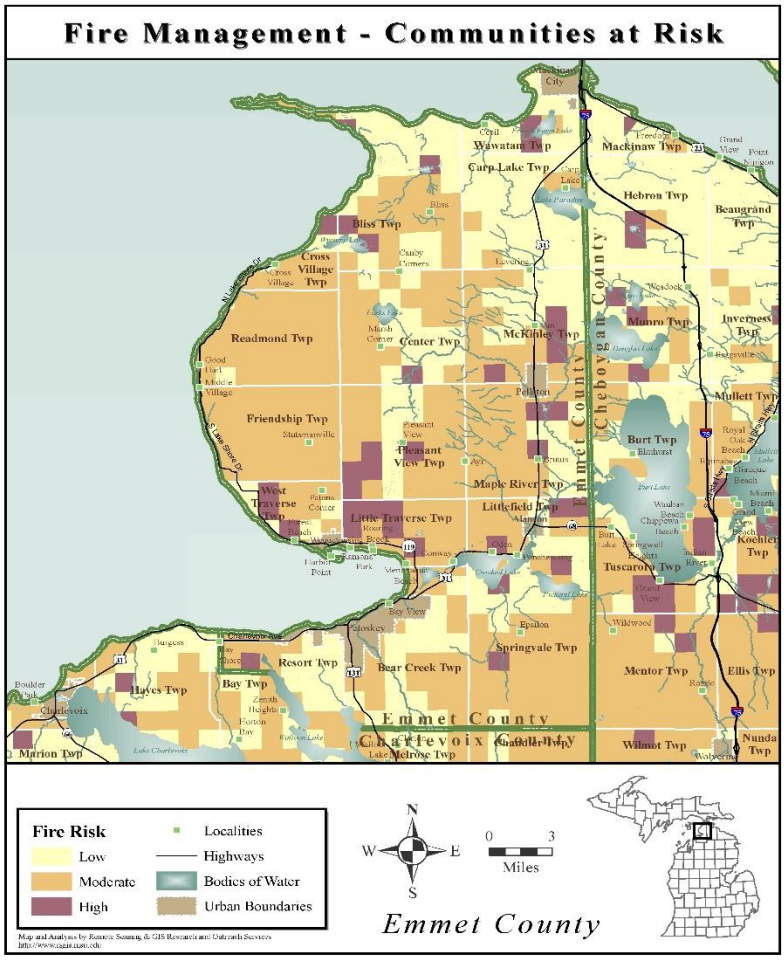
The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan for the Tri-County area. A public hearing will be held at the, Emmet County Building, 200 Division St., Petoskey, MI 49770, on Tuesday September 29, 2015, 7:00 PM, in the Commissioner's meeting room to accommodate any member of the public that would like to offer suggestion or input into the local Hazard Mitigation plan. A survey is also available for citizens to share some insight about local concerns at www.cceoem.net.

At about the same time, representatives from Tri-County Emergency Management attended meetings of the Michigan Township Association in each County and made local officials aware of the questionnaire and how to find the document on our website. The Michigan Township Association for each county involves at least one representative from each Township. With that, each township was provided the information about the plan and the type of input we were looking to get from them. The meeting for Emmet County took place on October 21, 2015 at 7:00 PM. This information was also on the agenda's and discussed at meetings of the LEPC on November 10, 2015, February 17, 2016, April 20, 2016 and August 17, 2016. Tri-County Emergency Management also attended Fire Chief Association Meetings in each of the three counties to make them aware of the HMP and ask for their input. In March we had only heard from a few of the many communities, so an email was sent to all members of the MTA's again, explaining the project, the types of projects that are fundable through FEMA and asking for their input on projects. The process then continued until the plan was reviewed, information in each section was updated as needed and drafts were presented to local communities and the public. Public hearings were held in each county for a second time. The draft was then sent to MSP/EMHSD and ultimately FEMA for their approval and/or comment. Specific mitigation projects were provided for the plan from the following Emmet County jurisdictions: Cross Village, Bear Creek Township and Emmet County Road Commission, Emmet County Engineer.

Top Five Hazard Priority Areas

1. Fire Hazards: Structural and Wildfires

Emmet County's summer season brings numerous tourists to the area that often enjoy camping on private, county, and state lands. The summer camping season brings with it numerous campfires and the number one cause of wildfires in Michigan is the result of human action, which makes the county highly susceptible during those months.



In addition, Emmet County has also become a favored building site for vacation homes. Many of these homes are located in remote areas of the county on unimproved roads or long and narrow private driveways. These remote locations and narrow roads pose numerous difficulties for emergency responders including: discovery and reporting of fires; travel distances; access for fire trucks; lack of turnarounds for water trucks and other equipment; and limited means of warning these remote locations.

As seen in this fire risk map to the left, produced from a study done by Michigan State University on the risk for wildfires, much of the County is at least a moderate risk for wildfires with the exception of the urban areas of the County.

The areas most at risk for wildfires in Emmet County are in the outlying Townships in the County. Nearly 65% of the total lands in Emmet County are forested and a major source of economic benefit. With the ever present risk of wildfires, Emmet County has a tight association of Fire Chiefs that meet on a regular bases and are connected through mutual aid agreements with each other. The region also has the advantage of a MDNR office in Indian River that can quickly bring the resources of the State of Michigan to the scene of major wild fire events. However, it should be said that as with Charlevoix and Cheboygan Counties most of the fire departments in Emmet County are volunteer departments. This means the time of day and who is available will greatly effect the number of presonel that respond to the scene of a wildfire. This also means that the fire may be well seated before enough personel can respond to safely begin firefighting operations.

2. Severe Winter Weather throughout the County

Emmet County's winter weather is influenced by lake effect snows, which can be very dangerous for a community for short periods of time. The blowing and drifting of snow during blizzard conditions does create a driving hazard. Heavy snows can shut down towns and businesses for a period of several days. Ice damages can occur when the ice is breaking up and strong winds occur pushing the ice onto shore. Winter storms can also result in freezing rain and ice storms, which contribute to hazardous driving conditions, downed power lines, and blocked roads.

3. Severe Thunderstorms, High Winds, and Tornadoes throughout the County

There is a historical record of damaging wind events in Emmet County and a few tornadoes in the county. Severe winds, or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause property damage and loss of life from flying debris. Damage from straight line winds is more widespread than tornadoes and often affects multiple counties. Fallen trees, limbs, and power lines are a typical risk to power lines and other infrastructure.

There is a historical record of severe thunderstorm events in the county and thunderstorms are hazards that bring a variety of problems during the peak tourist seasons of spring, summer, and fall. Potential thunderstorm event pose likely threats such as lightning, flash flooding, hail, strong winds, and even tornadoes.

Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been five recorded tornado touchdowns in Emmet County from 1950 to 2009. So the potential is there in the future for additional damage by tornados.

4. Flooding: Harbor Springs, Boyer Creek, Tannery Creek, Bear River, Alanson Locks, Maple River

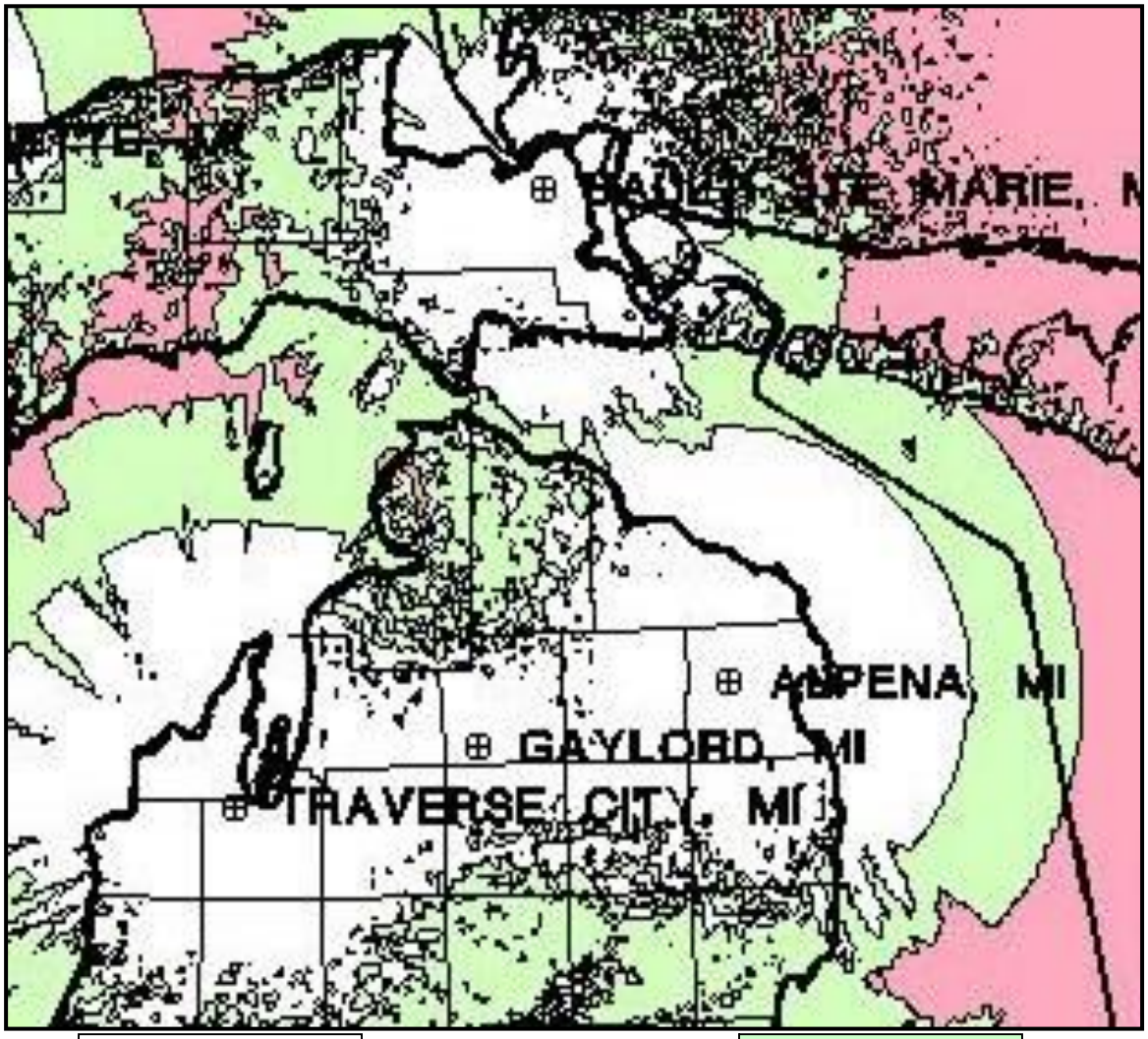
Although Emmet County has few dams, the risk of the dam failure is always present with an aging infrastructure. The Emmet County Hazard Analysis published in January of 2015 indicated three (3) structures as being a “Significant Hazard” Emmet County Staff estimates indicate that a dam failure would likely impact a maximum of 500 people. Damages could be greater from flash flood types of events than they would from gradual floodplain inundation.

In addition to “regular” flooding in a riverine floodplain, other flooding may involve low-lying areas that collect runoff waters; flaws or shortcomings in existing sewer infrastructure; undersized or poorly designed storm water control practices; collective effects of land use and development trends; illegal diversion of water, or deliberate actions that interfere with storm water systems.

6. **Shoreline and Steep Slope Erosion: Lake Michigan/Little Traverse Bay**

Shoreline erosion hazards involve the loss of property as sand or soil is removed by water action and carried away over time. This can cause structures to stand perilously close to waters or bluffs. The foundation of a structure, or underground utility pipes in the area may become fully exposed and vulnerable to extreme temperatures, water damage, or other sources of risk. Shoreline erosion may also cause adjacent roadways to crack, become unstable, washout and slough. With weather patterns generally moving from west to east this makes Emmet County vulnerable along the lake Michigan shoreline.

Source: NOAA, Gaylord, MI (Figure 1)



Coverage

No Coverage

Emergency Warning System Coverage

In the original plan, an immediate area of concern was that NOAA alert stations did not reach Emmet County (Figure1), and there is no countywide siren alert system. This leaves Emmet County residents, vacationers, and boaters within Lake Michigan waters surrounding the county vulnerable to natural hazards. An investment in a countywide siren alert system or a NOAA alert station was needed for the protection of county residents and vacationers. The solution was the addition of a NOAA weather station in Emmet County. The addition of this station has greatly improved coverage for the Tri-County region

Economic Impact Analysis

The total Damaging Events' Costs recorded since 1950 by the National Oceanic and Atmospheric Administration for Emmet County and the region are as follows:

1.	Hail	$100,000
2.	Snow and Ice	$5,149,538
3.	Thunderstorm and High Wind	$321,000
4.	Tornadoes	$53,000

Total damage in Emmet County from Structural and Wild fires for 2002-2004, according to the National Fire Incident Report System (NFIRS), was $1,694,455.

The incidents above indicate past issues in and around Emmet County. While there are no certainties when it comes to disasters. One thing that is certain is that severe weather will reoccur throughout the Tri- County area. Some incidents will be large enough to be considered disasters, others will be considered part of what is expected to happen in northern Michigan.

IMPLEMENTATION OF THE EMMET COUNTY HAZARD MITIGATION PLAN

Hazards Mitigation Plan - Managers and Technical Assistance

The leader for implementing the Hazard Mitigation Plan is the Emmet County Board of Commissioners, with the staff leaders being the Emergency Management Coordinator and the Planning Department. Working partnerships can be established with the following to provide technical assistance to accomplish the goals and objectives of the Plan.

Emmet County Government
Townships, cities, and villages
Emmet County Conservation District
Emmet County Drain Commissioner
Emmet County Road Commission
Little Traverse Bay Bands of Odawa Indians
Tip of the Mitt Watershed Council
Michigan State University Extension
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
U.S. Department of Agriculture Natural Resources Conservation Service
Insurance Companies

Real Estate Companies

All hazard mitigation planning could be pursued with a tool available to local governments, which is identified in the Michigan Public Act 226 of 2003, the Joint Municipal Planning Act. This Act provides for joint land use planning by cities, villages, and townships and allows two or more municipalities' legislative bodies to create a single joint planning commission to address planning issues. This tool helps with planning for complex multijurisdictional issues, such as hazards.

The intent of this legislation is for local governments to consider the following:

Individual units of government modifying their ordinances simultaneously to include language that would incorporate aspects of protection
Developing an overlay zoning district that would cross jurisdictional boundaries that would be incorporated into existing independent units of government's zoning ordinances
Forming a new joint multi-jurisdictional planning commission or zoning board
Sharing zoning administration
Sharing enforcement activities

Funding the Implementation of the Plan

To assist with the funding of the proposed hazard mitigation strategies, here is a list of potential financial assistance entities to help fund the implementation projects of the Plan.

Federal Emergency Management Administration – Hazard Mitigation Grant Program
U.S. Environmental Protection Agency
U.S. Department of Agriculture Natural Resources Conservation Service
U.S. Department of Agriculture Rural Development: Rural broadband opportunity – high speed telecommunication funding from the Public Telecommunications Facilities Planning and Construction grants
U.S. Department of Housing and Urban Development
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
National Oceanic and Atmospheric Administration
Community and Regional Foundations
Businesses often assist with educational initiatives that provide developers and the general public with the information they need to make homes more disaster resistant.

Action Agenda

Following is table summary for accomplishing the **recommended natural hazards mitigation actions** for Emmet County. The County and four of the Townships have zoning.

_____ Completed _____In Progress _____Not Done

Action Agenda Layout:

Priority and Action Strategies	Responsible Parties	Timeframe
Priority Area 1 ***Fire Hazards: Structural and Wildfire Mitigation Strategies:***		
a. Seek funding for a countywide siren alert system or a NOAA alert station is needed for the protection of county residents and vacationers.	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages	1-3 years after adoption of the plan
b. Introduce ordinance which encourage proper road and driveway construction for vehicle and fire equipment access	County Road Commission County Planning and Zoning Townships Incorporated Cities and Villages	1-3 years after adoption of the plan
c. Educate and establish programs which encourage the safe use and maintenance of fireplaces and chimneys.	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials MSU Extension Personnel Emergency Management Coordinator	1-5 years from adoption of the plan
d. Have adequate water supplies for emergency fire fighting	County Building Inspector Emergency Management Coordinator Township Fire Chiefs	1-5 years from adoption of the plan
e. Maintain roads and develop connector roads to reduce fire response time	County Road Commission County Planning	Ongoing
f. Develop additional fire stations where needed	County Planning	To be addressed in the County Master Plan (Expected Completion 2007)
g. Identify and/or construct prearranged shelters	County Planning County Building Inspector Emergency Management Coordinator Elected Officials	To be addressed in the County Master Plan (Expected Completion 2007)

Structural Fire Mitigation Strategies:		
a. Education and enforcement of building and zoning codes	County Building Inspector County Planning and Zoning Townships Incorporated Cities and Villages	Ongoing
b. Education for developers, realtors, business owners, architects, and engineers	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials Non-profit organizations MSU Extension Personnel Emergency Management Coordinator	1-5 years from adoption of the plan
c. Public education and school programs, which encourage the development of a Site Emergency Plan for public buildings, a Family Disaster Plan for private households, and the preparation of a Disaster Supplies Kit	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials Non-profit organizations MSU Extension Personnel Emergency Management Coordinator	1-5 years from adoption of the plan
d. Encourage first responder education of methods and training on a regular basis	First Responders Emergency Management Coordinator	1-3 years from adoption of the plan
e. Review existing publicly owned facilities and identify their potential need for retrofitting	County Building Inspector Elected Officials Emergency Management Coordinator	1-3 years from adoption of the plan
Wildfire Mitigation Strategies:		
a. Educate and encourage the proper maintenance of property in or near wildlands, to include the introduction of defensible buffer zones, short grass, thinning trees, and sweeping and cleaning dead or dry leaves and needles, from roofs, decks, eaves, porches, and yards	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials Non-Profit Organizations MSU Extension Personnel Emergency Management Coordinator Townships Incorporated Cities and Villages	1-3 years from adoption of the plan
b. Encourage safe disposal of yard and house waste rather than open burning	County Department of Public Works Townships Incorporated Cities and Villages	Ongoing

c. Construct fire towers, and use fire spotters and planes	County Planning County Building Inspector Emergency Management Coordinator Public Citizens Non-profit Organizations Townships Incorporated Cities and Villages	1-3 years from adoption of the plan
d. Encourage programs on arson prevention activities, including the reduction of blight	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials Non-profit organizations MSU Extension Personnel	1-3 years from adoption of the plan

e. Public education on smoking hazards and recreational fires	County Building Inspector County Planning First Responders Public Citizens Insurance Agencies Elected Officials Non-profit organizations MSU Extension Personnel Emergency Management Coordinator	1-3 years from adoption of the plan
f. Communication with media for broadcasting weather and fire warnings	First Responders Emergency Management Coordinator	Ongoing
Priority Area 2 ***Severe Winter Weather – Snow and Ice Mitigation Strategies:***		
a. Seek funding for a countywide siren alert system or a NOAA alert station is needed for the protection of county residents and vacationers.	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials Non-Profit Organizations	1-3 years after adoption of the plan
b. Public education and awareness	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials	1-3 years after adoption of the plan
c. A National Oceanic and Atmospheric Administration weather station for the area	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials	1-5 years after adoption of the plan

d. Identify, improve, and/or construct shelter capacity	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials	1-5 years after adoption of the plan
e. Promote community response for snow removal activities such as using community services clients to assist the elderly	Public Citizens Non-profit organizations MSU Extension Personnel Emergency Management Coordinator Elected Officials	1-3 years after adoption of the plan
f. Enforcement of building code snow load requirements which is 70 lbs. per sq. ft. especially when there is snow, rain and then freezing	County Building Inspector Public Citizens Insurance Agencies	Ongoing
Priority Area 3 ***Severe Thunderstorms, high winds, and tornadoes Mitigation Strategies:***		
a. Seek funding for a countywide siren alert system or a NOAA alert station is needed for the protection of county residents and vacationers.	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials Non-profit organizations	1-3 years after adoption of the plan
b. Address the practice of placing utilities underground for new construction	County Planning County Building Inspector Townships Incorporated Cities and Villages	Ongoing
c. A National Oceanic and Atmospheric Administration weather station for the area	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials	1-5 years after adoption of the plan
d. Education and enforcement of building codes for such activities as bracing elevated platforms, and anchoring and tie downs	County Building Inspector Public Citizens Insurance Agencies	Ongoing
e. Tree management coordination	Business Owners Public Citizens Insurance Agencies Non-Profit Organizations	Ongoing

f. Public education	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials	1-3 years after adoption of the plan
Priority Area 4 ***Flooding – Flood Mitigation Strategies:***		
a. Seek funding for a countywide siren alert system or a NOAA alert station is needed for the protection of county residents and vacationers.	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials Non-profit organizations	1-3 years after adoption of the plan
b. Assessment of flood threat and dam inspections results	Researchers, Engineers, and Architects County Planning Townships Incorporated Cities and Villages Elected Officials Non-profit organizations Insurance Agencies Emergency Management Coordinator	1-5 years after adoption of the plan
c. Drainage improvements	Researchers, Engineers, and Architects County Planning Townships Incorporated Cities and Villages	1-5 years after adoption of the plan
d. Enforcement of Storm Water Management Ordinance	Researchers, Engineers, and Architects County Planning Townships Incorporated Cities and Villages County Soil Erosion and Storm Water Management Officer	Ongoing
e. Enforcement of building and zoning codes	County Planning County Building Inspector	Ongoing
f. Open space designations: acquisition or conservation easements by land	County Planning Business Owners Non-Profit Organizations Public Citizens	To be addressed in the County Master Plan (Expected Completion 2007)

conservancies, county, townships	Townships Incorporated Cities and Villages Elected Officials	
g. Education for realtors through the creation of a handbook for distribution	Researchers, Engineers, and Architects County Planning County Building Inspector County Soil Erosion and Storm Water Management Officer	1-5 years after adoption of the plan

h. Public education	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials	1-3 years after adoption of the plan
Priority Area 5 ***Shoreline and Steep Slope – Landslide Erosion Mitigation Strategies:***		
a. Seek funding for a countywide siren alert system or a NOAA alert station is needed for the protection of county residents and vacationers.	Emergency Management Coordinator County Planning Townships Incorporated Cities and Villages Elected Officials Non-profit organizations	1-3 years after adoption of the plan
b. Enforcement of the Storm Water Management Ordinance and the Soil Erosion and Sedimentation Control Ordinance: slide areas, drainage control, grading, debris flow measures, vegetation (native species) placement	Researchers, Engineers, and Architects County Planning Townships Incorporated Cities and Villages County Soil Erosion and Storm Water Management Officer Non-Profit Organizations Insurance Agencies	Ongoing and To be addressed further in the County Master Plan (Expected Completion 2007)
c. Utilize the Critical Dunes Overlay	County Planning Townships Incorporated Cities and Villages County Soil Erosion and Storm Water Management Officer	Ongoing and To be addressed further in the County Master Plan (Expected Completion 2007)
d. Education and enforcement of building and zoning codes: setbacks, lot sizes, driveways, relocation of structures, Lake Michigan coastal zoning ordinances – U.S. Army Corps of Engineers and Michigan Department of Environmental Quality	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials County Soil Erosion and Storm Water Management Officer	1-3 years after adoption of the plan
e. Building code enforcement through permits	County Building Inspector	Ongoing

f. Open space designations: acquisition or conservation easements by land conservancies, state, county, or townships	County Planning Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages	To be addressed in the County Master Plan (Expected Completion 2007)
	Elected Officials	
g. Education for developers, realtors, and engineers	Researchers, Engineers, and Architects County Planning County Building Inspector Business Owners County Soil Erosion and Storm Water Management Officer	1-5 years after adoption of the plan
h. Public education	Emergency Management Coordinator County Planning County Building Inspector Business Owners Non-Profit Organizations Public Citizens Townships Incorporated Cities and Villages Elected Officials County Soil Erosion and Storm Water Management Officer	1-3 years after adoption of the plan

• ***Working with utility companies to protect the power grid • Working with other governmental entities, organizations, businesses, and the public to implement the plan and have input in any revisions or updates in the future***

Emmet County can also utilize watershed management plans that have been developed within the county boundaries. Proposed mitigation strategies that have been laid out in the Little Traverse Bay Watershed Management Plans include:

- Resident, commercial/industry, and government official education
- Stabilizing erosion at road/stream crossings.
- Correcting most severe streambank and lakeshore erosion sites.
- Reducing the pollutant load from storm water in the urban areas.
- Restricting livestock from streams.
- Maintaining adequate recreational access.
- Removing sediments from appropriate locations.
- Contacting landowners of sensitive lands and educating about land stewardship and protection options.
- Ensuring that state and federal wetland laws are properly administered and enforced.
- Developing local ordinances to protect wetlands.

- Educating landowners, developers, and citizens on the importance of wetland protection.

The County should consider the following key land use issues and the relationship to hazard mitigation:

- Safe, beneficial uses for hazard prone areas Concentration issues
- Proximity issues
- Location of public facilities and infrastructure Development standards for public facilities and infrastructure
- Effect of accumulated development on community systems and facilities

While it appears there are still many unfinished projects, most are ongoing and of the nature that will never be completed such as “Public Education”. This is an ongoing effort for all emergency managers.

X. LAWS, POLICIES, AND ORDINANCES

Policies, ordinance and regulation: Charlevoix, Cheboygan and Emmet Counties all have policies that support hazard mitigation. These policies are supported through zoning ordinances, building and fire codes and community planning. Each County has a zoning board that decides if projects presented to the County meet the zoning ordinance that are established by the County board of commissioners for each County respectively. Projects are then sent to the planning commission who decides if the project meets requirements of the Counties master plan and/or ordinances that apply. It is then sent back to County board of Commissioners to discuss the findings of the other boards and determine if the project will fit the community. The board of commissioners will vote on the project to either move the project forward or deny the application for the project.

Once it has been established that a building can be built the way the building is constructed is regulated by the Michigan Building Code. Each county has a Building Division. The head of that division is the Building Official. Who is required by state law PA54 to be licensed with the State Bureau of Building and Construction Codes. Plans for a project are submitted to the Building division for review and approval. Once approved, the building process is inspected for compliance with the approved plan and the Michigan Building Code. Each inspector is also required to be licensed in their respective field of expertise. This entire process is consistent with state and local laws and provides a high level of safety to buildings, taking into account where the project is to be built, reasons for/or not building the project in a particular location, wind shear and construction features that support buildings that are strong enough to with stand most natural disasters.

XI. AREA DEVELOPMENT AND PROGRESS

The entire region has seen a major shift in demographics since the 2008 recession. During that recession there was a sharp decrease in the population of 25 to 55-year-old residents. Now that the economy is recovering we are seeing some of that 25 to 55 age group return to the area. This has created a housing shortage in the region. The area is seeing many multifamily housing projects springing up throughout the Tri-County area. However, making the housing affordable is another issue. According to Megan Atwood reporter for 9&10 News; “Some in the Traverse City area can't find workers because potential workers can't afford a place to live. Northwest Michigan has seen a housing shortage for the past decade, and within the past few years particularly for small families and single people.”

Another part of this equation is the fact that the area’s economy is seasonal. During the summer months there is a sharp increase in populations which creates a booming economy between Memorial Day and Labor Day and while the area is a popular spot for the autumn color season, winter ski and snowmobile season, it is not nearly as busy as it is during the summer months. This has caused some business owners to become creative. One such owner bought an old motel and renovated the rooms to provide housing for his summer workers. I’m sure there are other similar stories throughout the region. However, the other side of this is that for most workers, their employment is seasonal. When the fall season comes around many find themselves out of work and faced with how to make ends meet with the unemployment checks that they receive.

There are also many improvements that have taken place or are being proposed. The town of Indian River installed sanitary sewers in its downtown district. This could potentially open the door for further development within that area. Indian River is also proposing an I75 business loop to bring more people into town.

Cheboygan has recently approved a plan for a new Meijer store. Emmet, Cheboygan and Charlevoix are also seeing infrastructure improvements, including refurbishment of the I75 bridges on M27, the M33 project, improvements to M75 at Waloon Lake, East Jordon Road project and a new Township office, DPW, EMS and Fire Station in Boyne City. Traverse City while out of the jurisdiction of this plan, is in the process of approving a new Costco store.

One of the major accomplishments during the past few years is the addition of a NOAA weather station in Emmet County. This was in all three previous plans and as seen in the illustrations greatly improved coverage in the area. Since the last HM cycle all three counties now have GIS capabilities. This was identified in the Cheboygan County plan and has proven to be a key in hazard mitigation planning. Another great tool has been the Tri-County enrollment in the Everbridge, Be Alert system. Tri-County EM has worked diligently to get this program running and with the help of the schools has been successful in gaining enrollment of residents. As stated elsewhere in this document, Public Education is and will continue to be an ongoing priority of the Tri-County EM program. In working with utility companies through miss dig residents and contractors are told when calling for utility locations that they can’t plant or install anything under power lines or within five feet on either side of the lines.

While land acquisition of flood prone areas is always a good solution, only about 1/3 of the Tri-County has been mapped at this point. The flood prone areas must be identified first for this action to be effective.

XII. HAZARDS MITIGATION GOALS AND OBJECTIVES

The mission of the Tri-County Hazard Mitigation Plan is to protect the health and safety of the public and preserve property in the Tri-County area that includes prevention of injury, loss of life, property damage, breakdown in vital services like transportation and infrastructure, economic slumps, maintain tourist base, and liability issues. This is done by taking action to permanently eliminate or reduce the long-term risks from hazards.

Specific goals and objectives have been established based upon the community's hazard analysis, as well as input from the LEPC in each County, Michigan Township associations in each County and the public through meetings, posting of the draft plan on line and at the clerk's office in each County with a request for comments. A notice of public hearing was placed in the local newspaper with meeting dates and times to allow the public an opportunity to comment, and the final draft of the plan will be presented to the County board of Commissioners in each of the three Counties.

Goal 1: Increase local awareness and participation in hazard mitigation strategies
Objectives:

A. Encourage cooperation and communication between planning and emergency management officials
B. Encourage additional local governmental agencies to participate in the hazard mitigation process
C. Encourage public and private organizations to participate

Goal 2: Integrate hazard mitigation considerations into each County's comprehensive planning process *Objectives:*

A. Enforce and/or incorporate hazard mitigation provisions in ordinances, and procedures, and into each county's master plan
B. Incorporate hazard mitigation into basic land use regulation mechanisms
C. Update of zoning ordinances, shoreline protection rules, etc.
D. Incorporate hazard area classifications into standard zoning classifications
E. Develop community education programs and public warning systems
F. Strengthen the role of the Local Emergency Planning Committee in the land development process
G. Integrate hazard mitigation into the capital improvement planning process so that public infrastructure does not lead to development in hazard areas
H. Encourage County agencies to assess local roads, bridges, dams, and related transportation infrastructure for hazard vulnerability

Goal 3: Utilize available resources and apply for additional funding for hazard mitigation projects *Objectives:*

A. Prepare a list of desired community mitigation projects to submit to the State for mitigation grant funding
B. Encourage the application for project funding from other entities

Goal 4: Develop and complete hazard mitigation projects in a timely manner *Objectives*

A. Encourage public and business involvement in hazard mitigation projects

XIII IDENTIFICATION AND SELECTION OF MITIGATION STRATEGIES

A. Participation in the Plan:

As stated above the Tri- County office of Emergency Management worked diligently to get participation in the plan.

B. Selection of Feasible Mitigation Strategies

The Tri-County Office of Emergency has worked diligently with local units of government as well as public safety in all three counties to identify and add new mitigation strategies to this plan. We have identified new issues in all three Counties and added them to uncompleted issues on the original lists. We then formed a single list of strategies below. Based on the guidelines that at least some of the strategies should be the type that is fundable through FEMA project grants for Hazard Mitigation. Including:

- Physical construction, demolition, engineering or property acquisition/alteration, expanded infrastructure capacity.
- Warning systems, sirens, communications infrastructure, emergency generators.
- Water retention / detention areas, creation of new open space, installation of structural bracing, wind resistant windows, storm or tornado shelters, anchorage for mobile homes.

By anticipating future problems, the three Counties can reduce potential injury, structure losses, loss of power such as electric and gas, and prevent wasteful public and private expenditures.

The strategies were then organized and the process of combining existing open strategies with new strategies that were identified through the processes described above was completed.

1. Fire Hazards: Structural and Wildfires *Structural*

Fire Mitigation Strategies:

a. Education and enforcement of building and zoning codes
b. Education for developers, realtors, business owners, architects, and engineers (All 3 Counties)
c. Public education and school programs, which encourage the development of a Site Emergency Plan for public buildings, a Family Disaster Plan for private households, and the preparation of a Disaster Supplies Kit
d. Encourage first responder education of methods and training on a regular basis. (All 3 Counties)
e. Seek funding and grants to improve services and training in the rural areas of all 3 counties, where services are not adequate to provide minimal fire protection.

f. Review existing publicly owned facilities and identify their potential need for retrofitting with generators and other services to bring then up to a minimum standard. (All 3 Counties)

Wildfire Mitigation Strategies:

a. Educate and encourage the proper maintenance of property in or near wildlands, to include the introduction of defensible buffer zones, short grass, thinning trees, and sweeping and cleaning dead or dry leaves and needles, from roofs, decks, eaves, porches, and yards.
b. Encourage safe disposal of yard and house waste (Recycle or Compost programs) rather than open burning.
c. Construct fire towers, and use fire spotters and planes
d. Encourage programs on arson prevention activities, including the reduction of blight. (Partnership between Police and Fire
e. Public education on smoking hazards and recreational fires
f. Communication with media for broadcasting weather and fire warning
g. Maintain the relationship that exists now between MDEQ Forest Resources Division and the Local Fire Chief's organizations

Both Structural and Wildfire Mitigation Strategies:

a. Introduce ordinance which encourage proper road and driveway construction for vehicle and fire equipment access. Especially areas that close down for the winter months and do not maintain Fire Department Access Routes.
b. Educate and establish programs which encourage the safe use and maintenance of fireplaces and chimneys.
c. Have adequate water supplies for emergency firefighting. Pre incident plan to identify areas that have no supply. Install water supply lines and hydrants for drafting from lakes and other sources of water.
d. Maintain roads and develop connector roads to reduce fire response time
e. Develop additional fire stations where needed
f. Identify and/or construct prearranged shelters

2. Severe Winter Weather throughout the Counties

a. Encourage the use of Be Alert and IPAWS for the protection of county residents and vacationers.
b. Public education and awareness
c. Identify, improve, and/or construct shelter capacity.
d. Promote community response for snow removal activities such as using community services clients to assist the elderly.
e. Encourage elderly residents to call if help is needed. Such as their heat is out, they need help with snow removal, out of food, etc.
f. Enforcement of building code snow and wind load requirements.

3. Severe thunderstorms, High Winds, and Tornadoes throughout the Counties

a. Encourage the use of IPAWS and the Everbridge Be Alert applications that are available through Tri-County Emergency Management.
b. Address the practice of placing utilities underground for new construction
c. Education and enforcement of building codes for such activities as bracing elevated platforms, and anchoring and tie downs
d. Tree management coordination
e. Public education

Tornado Mitigation Strategies*:*

a. Seek funding for a countywide siren alert system or a NOAA alert stations are needed for the protection of county residents and vacationers. Mostly needed in Urban areas and Cities. No system currently exists.
b. Consistent weather event warnings
c. Public awareness and education

4. Flooding: Around Lakes, Streams and Wetlands throughout the Tri-County area.

a. Assessment of flood threat and dam inspections results
b. Drainage improvements
c. Enforcement of storm water management ordinance
d. Enforcement of building and zoning codes
e. Open space designations: acquisition or conservation easements by land conservancies, county and townships
f. Public education

5. Shoreline and Steep Slope Erosion: Lake Michigan & Huron Shoreline Area

a. Enforcement of the Storm Water Management Ordinance and the Soil Erosion and Sedimentation Control Ordinance: slide areas, drainage control, grading, debris flow measures, vegetation (native species) placement
b. Utilize the Critical Dunes Overlay
c. Education and enforcement of building and zoning codes: setbacks, lot sizes, driveways, relocation of structures, Lake Michigan coastal zoning ordinances – U.S. Army Corps of Engineers and Michigan Department of Environmental Quality
d. Building code enforcement through the permit process. (Building Officials in all three Counties)
e. Open space designations: acquisition or conservation easements by land conservancies, state, county, or townships.

XIV Implementation of the Tri-County Hazard Mitigation Plan

Under the leadership of each Counties Board of Commissioners respectively, this plan will be administered by the Tri-County Office of Emergency Management with the assistance of Directors and Employees of each County with input and assistance from local governments and /or outside sources when appropriate.

The Tri-County Office of Emergency Management will assist County employees and work with each County to seek grant funding for projects identified in this plan when available. Other funding sources could include, but are not limited to:

a. Federal Emergency Management Administration-Hazard Mitigation Grant Program.
b. U.S. Environmental Protection Agency
c. U.S. Department of Agriculture Conservation Services
d. U.S. Department of Agriculture Rural Development: Rural broadband opportunity- high speed funding from Public Telecommunication Facilities planning and construction grants.
e. U.S, Department of Housing and Urban Development
f. Michigan Department of Environmental Quality
g. Michigan Department of Natural Resources
h. National Oceanic and Atmospheric Administration
i. Community and Regional Foundations
j. Area Businesses.

The natural hazards identified in the original plans have not changed and the probability of these hazards reoccurring is absolute. They will continue to occur in all three Counties. Therefore, the mitigation strategies listed below apply to all three Counties. Unless stated otherwise. Additionally, new mitigation projects were identified and added to the original list.

a. Winter Storms are common to the region and occur several times each winter. While these storms can drop up to 24 inches of snow at a time most of these storms produce between 8 to 12 inches of snow at a time and are handled as part of living in northern Michigan. Mitigation Strategies include:
    i. Expand public awareness that in the event of a large storm with a possible power outage, it may be several days before emergency workers could get to them. This may include alternative sources of heat and supplies that will last up to 72 hours following an event. Implementation: On Going (Tri-County EM, LEPC's)

ii. Identify shelters throughout the county that could be opened during a storm event and develop a plan for opening the shelters and alerting residents to their location in the event of a storm.
Implementation 1 to 3 years (Tri-County EM, LEPC's, MTA's)

iii. Ensure that the shelters identified in ii above are equipped with back-up generators, chairs, TV, kitchens, and are Michigan barrier free compliant.
Implementation 1 to 3 years (Tri-County EM, Building Divisions, Planning Divisions, MTA's)

iv. Provide back-up generators for the township hall and fire station in Forest Twp. These buildings are also used as shelters in severe weather and have no back-up power. 1-3 years (Tri-County EM, Building Division, Forest Twp. Elected Officials)

v. Promote community programs that provide snow removal for the elderly and/or handicapped residents of the county.
Implementation: Immediate and ongoing. (Fire Departments, community volunteers)

vi. Apply for grant funding to raise and rebuild the garage for road equipment on Beaver Island. The trucks will not fit in the garage with the snow plows attached. This means that the plows outside must be lined up and attached to the trucks each time it snows. ASAP (Building Division, Island leadership)

b. High winds and gales

i. Pass and enforce local ordinances that prohibit plantings under and around power lines.
Implementation: 1-3 years (Building and Planning Divisions)

ii. Pass and enforce local ordinances that require new developments and subdivisions to install utilities underground.
Implementation: 1-3 years (Building and Planning Divisions)

iii. Enforce provisions in the Michigan Building Code that address wind bracing, etc. (Building Official)

c. Thunderstorms, Tornadoes and Hail

i. Seek funding for warning sirens in the most populated areas and tourist destinations of the Tri-County region. These systems can be expanded as population and tourism demands.
Implementation: 1-5 years (Tri-County EM, Planning Divisions, Elected Officials)

ii. Identify shelters throughout the county that could be opened during a storm event and develop a plan for opening the shelters and alerting residents to their location in the event of a storm.
Implementation: 1 to 3 years (Tri-County EM, Planning Divisions, Elected Officials)

iii. Require new mobile and pre-manufactured home parks to provide a storm shelter for residents of the park.
Implementation: 1-3 years (Building and Planning Divisions)

iv. Pass and enforce local ordinances that prohibit plantings under and around power lines.
Implementation: 1-3 years (Planning Division)

v. Pass and enforce special event ordinances that require a plan for patrons to seek shelter in the event of severe weather.
Implementation: 1-3 years (Planning Divisions, Elected Officials)

d. Flooding

i. Pass and enforce local zoning ordinances regarding building and development of property that falls within a flood plain.
Implementation: 1-3 years (Planning Division, Zoning Boards, Building Division and County Board of Commissioners)

ii. Examine and improve existing storm systems to ensure storm water drains properly. U.S. 31 near M119 and in the Bayview area Storm Sewers are inadequate causing repetitive flooding.
Implementation: 2-5 years (Emmet County Engineer)

iii. Install storm sewers in Cross Village at the commercial district and at the Catholic church, repetitive flooding during heavy rain events in Emmet County: 2-5 years (Emmet County Engineer)

iv. Inspect and repair existing dams and locks to ensure their integrity.
Implementation: 3-5 years (MDEQ, Tri-County EM)

v. Repair foundations on cabins in the girl's camp that were damaged by years of flooding. In Hayes Township, Charlevoix County.
Implementation: 1-3 years (Building Division and Hayes Township Elected Officials)

vi. Repair flooding that occurs on Campbell Rd. in Beauregard Township.

e. Wild Fires and Structure Fires

i. Partner with DNR and MDEQ and exercise response capabilities to wildfires.
Implementation: 1-3 years (Charlevoix, Cheboygan & Emmet County Fire Chief Associations, MDEQ)

ii. Remove trees that have died from insect manifestation. The dead trees cause increased fuel load to the area as well as a hazard to motorists:
Implementation: 1-3 years (Road Commissions, Tri-County EM)

iii. Install heat in the fire apparatus garage in Hayes Township. Fire pumps freeze during cold weather: 1-2 years (Tri-County EM Hayes Twp. Fire Chief, Hayes Twp. Elected Officials)

iv. Seek grant funding for training and equipment for a regional task force for wildfires.

Implementation: 3-5 years (Tri-County EM, 3 Fire Chief Associations, MDEQ)

v. Identify water supplies available for both structure fires and wildfires. Improve and/or install systems where possible.
Implementation 1-3 years (Fire Chief Associations, Tri-County EM)

vi. Identify and preplan seasonal roads and transportation routes for access to rural areas.
Implementation 1-3 years (Fire Chief Associations, Tri-County EM, County Elected Officials)

vii. Encourage and implement mutual and automatic aid agreements, to ensure adequate manpower is available for firefighting.
Implementation: Ongoing (Tri-County EM, Fire Chief Associations, Elected Officials)

f. Ground water purity and protection from contamination.

i. Pass and enforce local ordinances regarding chemical storage, spill protection for areas where storage and use of hazardous materials is taking place, including but not limited to the storage of old motor vehicles.
Implementation: 1-5 years (Planning Divisions)

ii. Educate the public about the storage and disposal of hazardous chemicals.
Implementation: 1-3 years (Garbage Companies, Planning Divisions, Elected Officials)

iii. Consider partnering with local disposal companies for hazardous waste drop off days.
Implementation: 1-3 years (Garbage Companies, Planning Divisions, Elected Officials)

iv. Encourage and educate residents who have buried underground storage tanks to have them removed and/or pumped out and filled.
Implementation: 1-5 years (MDEQ, Planning Divisions

Monitoring and Evaluation

The Charlevoix, Cheboygan and Emmet County Hazard Mitigation Plan will be monitored on a regular basis by the Emergency Management Coordinator and the Planning Departments in each County respectively. Because Tri-County region is a dynamic, changing community, it is expected that the plan should be reviewed on a five-year basis and subsequent laws and ordinances in each community changed to meet the needs and dynamics of each County.

To assess the effectiveness of the Plan, some questions to ask in the review include:

1. How many and which mitigation strategies were developed? Implemented?
2. Did any new hazard events take place the past year to report?

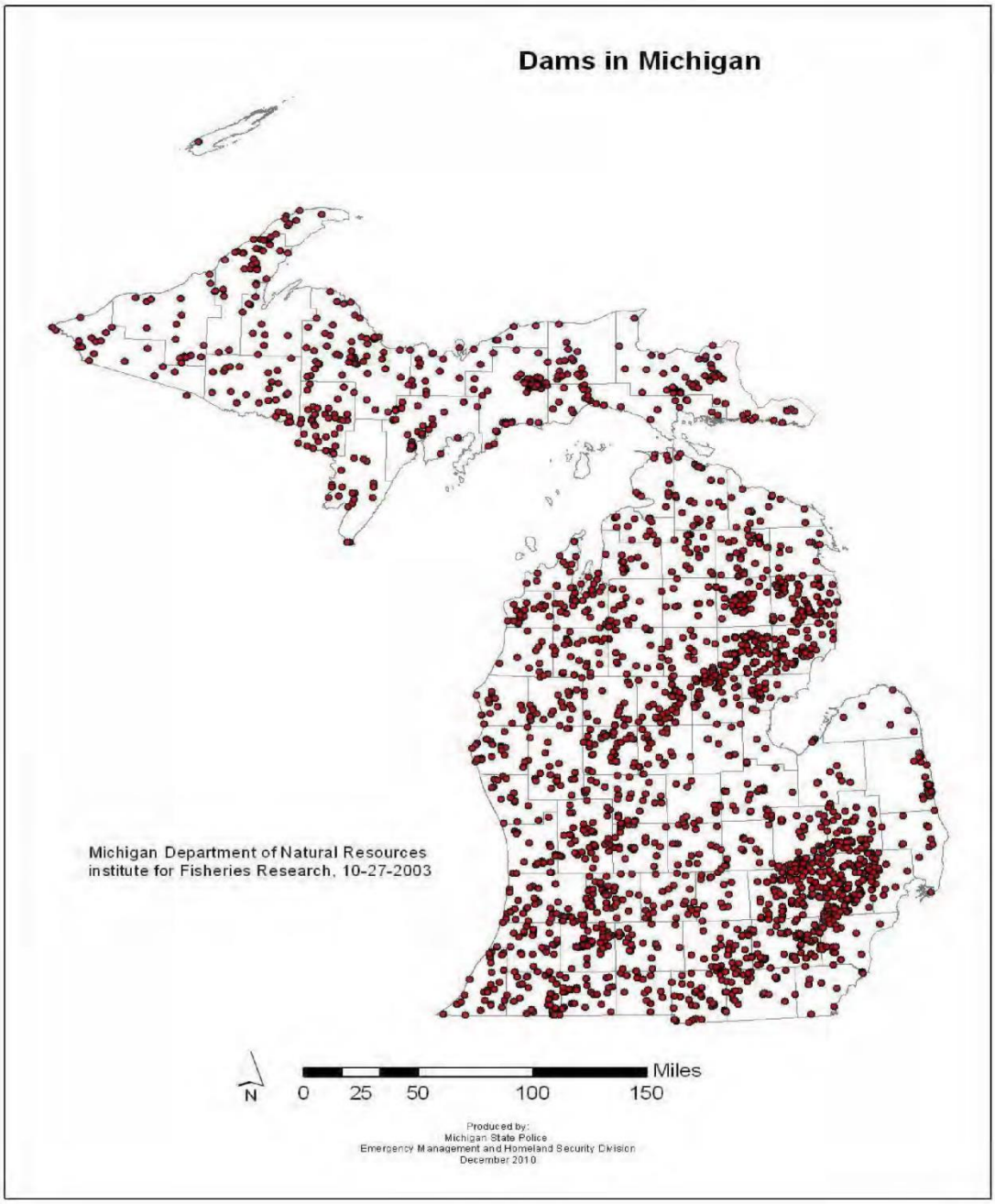
Tri-County Office of Emergency Management

This review will be administered by the Emergency Management Coordinator with the LEPC in each County, each Counties Planning Commissions, and the public. If changes are needed, the plan will be revised by the Tri-County Office of Emergency Management.

Although review of the plan will occur every five years, a formal revision may not be needed. New editions of the plan will be based on annual reviews, monitoring, evaluation, and an accumulation of official feedback and public input. Tri-County Emergency Management has an area on their web site that encourages public comment and input on not only these mitigation strategies, but any observations and/or additions to the contents herein. When it is appropriate to publish a revised version of the plan, the Tri County Office of Emergency Management will be the agency to take the lead in the revision process. Each new edition of the plan will again be officially adopted by the County Board of Commissioners in each of the three Counties respectively. Approval will also be required from the MSP-EMHSD and FEMA.

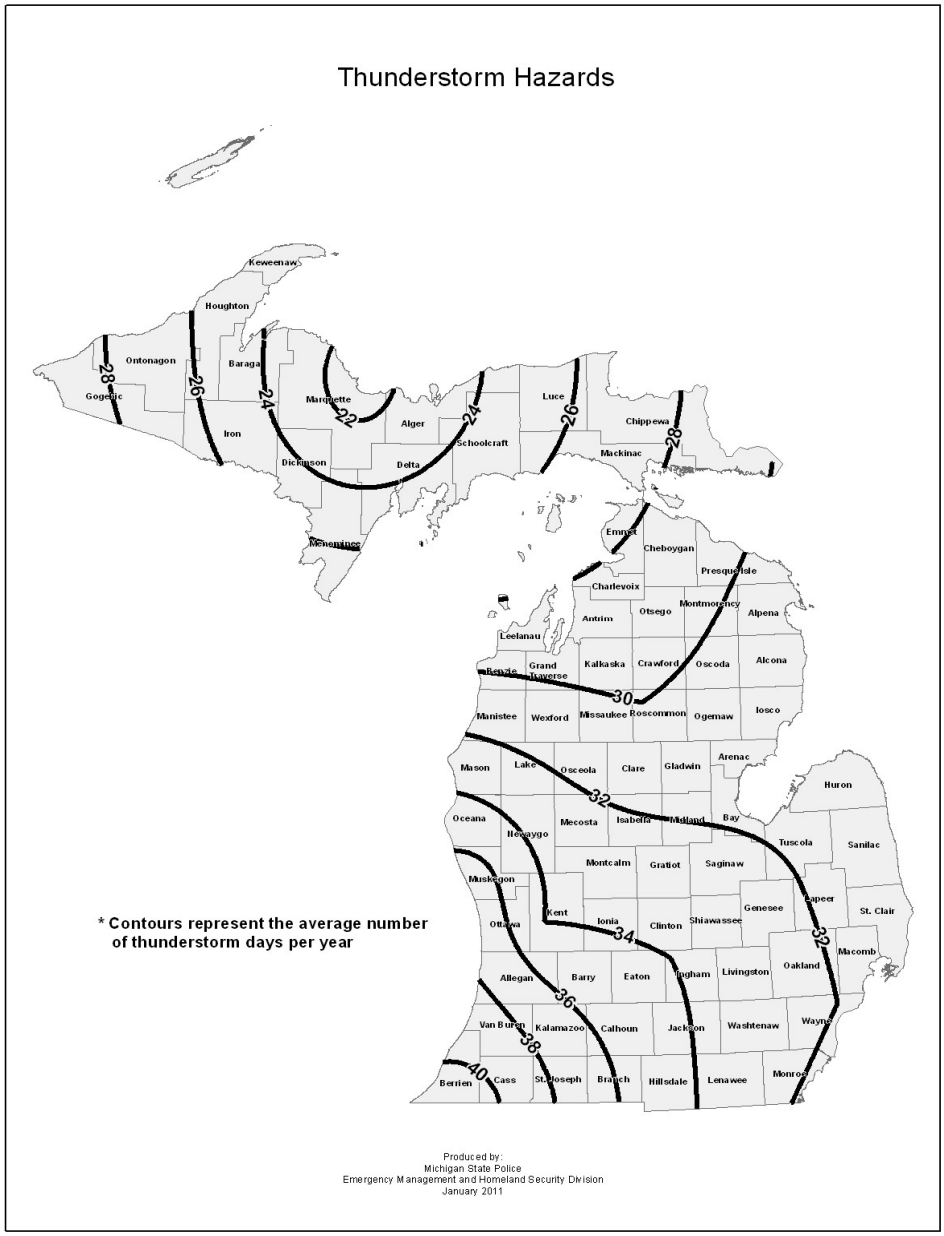
This Plan received input on projects for mitigation from the following jurisdictions in the Tri-County region: Charlevoix County, Cheboygan County, Emmet County, Hayes Township, Beauregard Township, Forest Township Cross Village and Bear Creek Township. As these Townships have provided information about hazard mitigation projects within their jurisdiction they are listed as poarticipating communities. With that said, the Tri-County Office of Emergency Management will continue to work with jurisdictions that did not participate in the mitigation process. In order to be considered a “participating community” under FEMA guidelines they would need to identify their most significant hazards and identify their mitigation priorities. The plan can then be amended by the Tri-County Office of Emergency Management. That community could then be counted as a participating community.

Appendix A



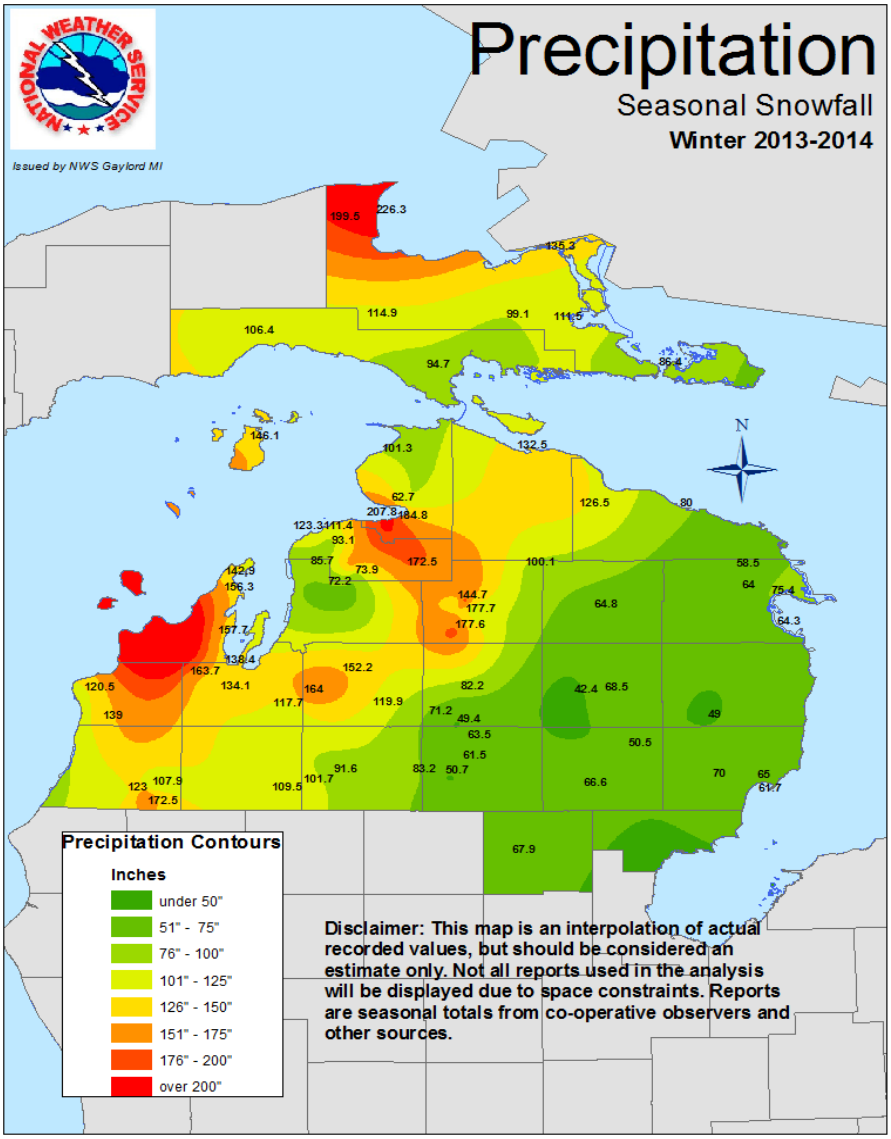
As seen in the attached figure from the 2012 Michigan Hazard Analysis there are a significant number of dams in the Tri-County region. While some of these dams are small and pose no major flood risk others are larger and could bring catastrophic results should they fail. While MDEQ is responsible for the required inspections of existing dams the Tri-County Office of Emergency Management will request reports on existing dams that pose a risk to the area.

Appendix B



Appendix B represents the average number of thunderstorms that effect the area each year according to the 2012 Michigan Hazard Analysis.

Appendix C



Appendix C represents the average annual snowfall that effects the region. This information was gathered from the National Weather Service. While these numbers are only an average. It can be noted that like most of northern Michigan winter storms are a common occurrence and create a hazard for Tri-County residents.

Appendix D

Number of Tornadoes in Michigan, by County: 1950- 2009
2012 Michigan Analysis

County Tornadoes: County Tornadoes: (A-K) 1950-2009 (L-Z) 1950-2009			
Alcona	11	Lake	2
Alger	6	Lapeer	20
Allegan	26	Leelanau	3
Alpena	14	Lenawee	31
Antrim	9	Livingston	24
Arenac	7	Luce	2
Baraga	2	Mackinac	5
Barry	18	Macomb	18
Bay	12	Manistee	2
Benzie	4	Marquette	6
Berrien	28	Mason	5
Branch	15	Mecosta	9
Calhoun	15	Menominee	7
Cass	14	Midland	8
Charlevoix	4	Missaukee	8
Cheboygan	6	Monroe	28
Chippewa	6	Montcalm	11
Clare	8	Montmorency	6
Clinton	17	Muskegon	7
Crawford	10	Newaygo	12
Delta	11	Oakland	31
Dickinson	7	Oceana	5
Eaton	25	Ogemaw	14
Emmet	5	Ontonagon	2
Genesee	41	Osceola	16
Gladwin	9	Oscoda	5
Gogebic	3	Otsego	3
Gd. Traverse	4	Ottawa	18
Gratiot	12	Presque Isle	6
Hillsdale	23	Roscommon	8
Houghton	1	Saginaw	21
Huron	12	Sanilac	14
Ingham	27	Schoolcraft	3

Ionia	17	**Shiawassee**	A25
Iosco	11	**St. Clair**	20
Iron	5	**St. Joseph**	9
Isabella	13	**Tuscola**	17
Jackson	17	**Van Buren**	18
Kalamazoo	25	**Washtenaw**	24
Kalkaska	7	**Wayne**	28
Kent	31	**Wexford**	7
Keweenaw	2	**STATEWIDE:**	**923**

IMPORTANT NOTE: Tornadoes that crossed county lines are counted more than once in this table.

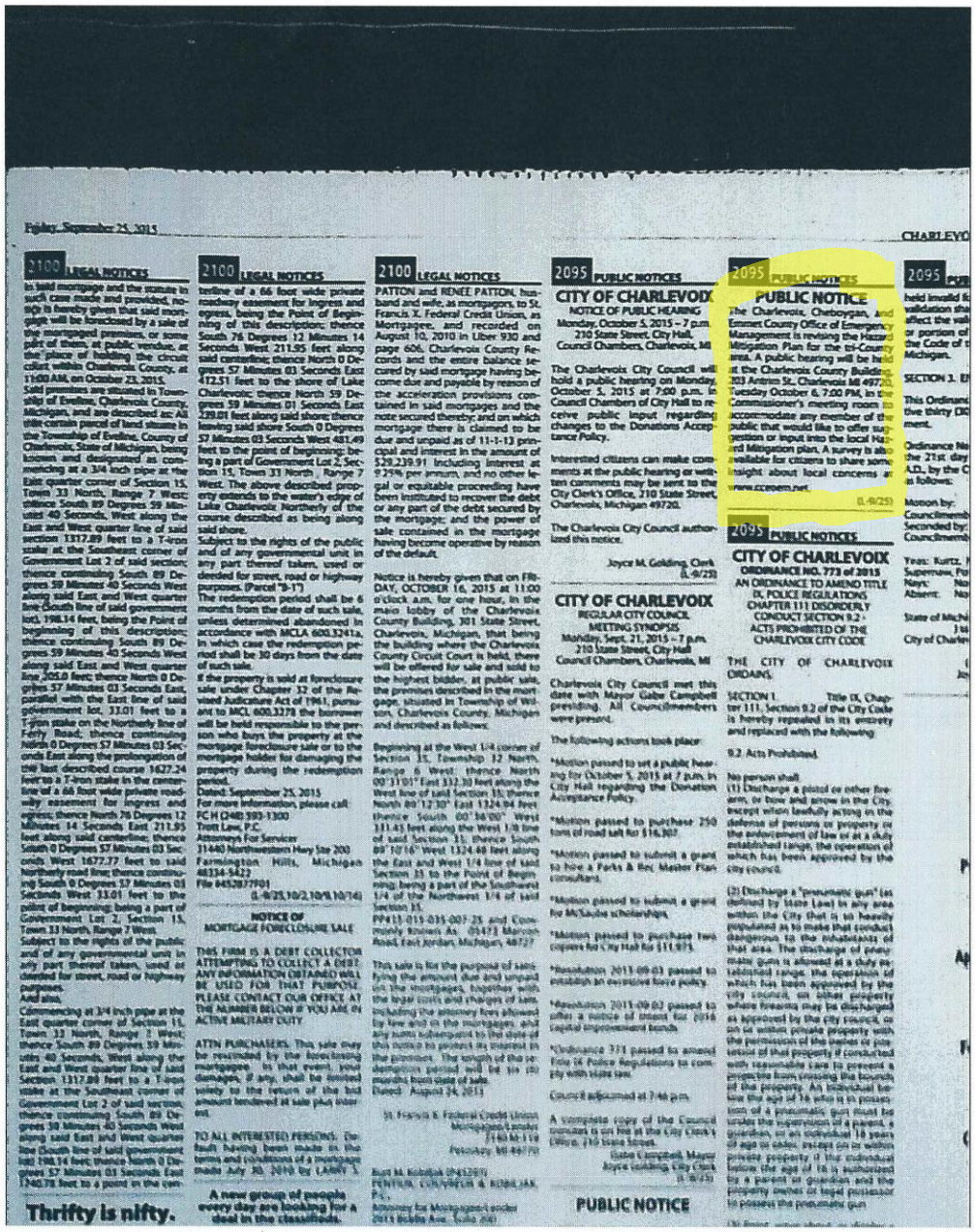
Therefore, the statewide total is less than the sum of the individual county totals.
Source: National Weather Service

Appendix D represents the number of tornados that have been confirmed in the State of Michigan by County from 1950 to 2009. The Tri-County area is highlighted in red. It should be noted that there has been at least one more confirmed tornado in the Tri-Counties since 2009.

Appendix E

Documents

1. Charlevoix



Friday, September 25, 2015

2100 LEGAL NOTICES

2100 LEGAL NOTICES

2100 LEGAL NOTICES

2095 PUBLIC NOTICES

CITY OF CHARLEVOIX
NOTICE OF PUBLIC HEARING
Monday, October 5, 2015 – 7 p.m.
210 State Street, City Hall,
Council Chambers, Charlevoix, MI

The Charlevoix City Council will hold a public hearing on Monday, October 5, 2015 at 7:00 p.m. in Council Chambers of City Hall to receive public input regarding changes to the Donations Acceptance Policy.

Interested citizens can make comments at the public hearing or written comments may be sent to the City Clerk's Office, 210 State Street, Charlevoix, Michigan 49720.

The Charlevoix City Council authorized this notice.

Joyce M. Golding, Clerk
(L-9/25)

CITY OF CHARLEVOIX
REGULAR CITY COUNCIL
MEETING SYNOPSIS
Monday, Sept. 21, 2015 – 7 p.m.
210 State Street, City Hall
Council Chambers, Charlevoix, MI

Charlevoix City Council met this date with Mayor Gabe Campbell presiding. All Councilmembers were present.

The following actions took place:

*Motion passed to set a public hearing for October 5, 2015 at 7 p.m. in City Hall regarding the Donation Acceptance Policy.

*Motion passed to purchase 250 tons of road salt for $16,307.

*Motion passed to submit a grant to have a Parks & Rec Master Plan consultant.

*Motion passed to submit a grant for McSauba scholarships.

*Motion passed to purchase two copiers for City Hall for $11,875.

*Resolution 2015-09-03 passed to establish an excessive force policy.

*Resolution 2015-09-02 passed to offer a notice of intent for 2016 capital improvement bonds.

*Ordinance 331 passed to amend Title IX Police Regulations to comply with state law.

Council adjourned at 7:46 p.m.

A complete copy of the Council minutes is on file at the City Clerk's Office, 210 State Street.

Gabe Campbell, Mayor
Joyce Golding, City Clerk
(L-9/25)

PUBLIC NOTICE

2095 PUBLIC NOTICES

PUBLIC NOTICE

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan for the tri-County area. A public hearing will be held at the Charlevoix County Building, 203 Antrim St., Charlevoix MI 49720, Tuesday October 6, 7:00 PM, in the Commissioner's meeting room to accommodate any member of the public that would like to offer suggestion or input into the local Hazard Mitigation plan. A survey is also available for citizens to share some insight about local concerns at www.eceoem.net.

(L-9/25)

2095 PUBLIC NOTICES

CITY OF CHARLEVOIX
ORDINANCE NO. 773 of 2015
AN ORDINANCE TO AMEND TITLE IX, POLICE REGULATIONS, CHAPTER 111 DISORDERLY CONDUCT SECTION 9.2 - ACTS PROHIBITED OF THE CHARLEVOIX CITY CODE

THE CITY OF CHARLEVOIX ORDAINS:

SECTION 1. Title IX, Chapter 111, Section 9.2 of the City Code is hereby repealed in its entirety and replaced with the following:

9.2 Acts Prohibited.

No person shall:

(1) Discharge a pistol or other firearm, or bow and arrow in the City, except when lawfully acting in the defense of persons or property or the enforcement of law or at a duly established range, the operation of which has been approved by the city council.

(2) Discharge a "pneumatic gun" (as defined by State Law) in any area within the City that is so heavily populated as to make that conduct dangerous to the inhabitants of that area. The discharge of pneumatic guns is allowed at a duly established range, the operation of which has been approved by the city council, on other property where firearms may be discharged as approved by the city council, or on or within private property with the permission of the owner or possessor of that property if conducted with reasonable care to prevent a projectile from crossing the bounds of the property. An individual below the age of 18 who is in possession of a pneumatic gun must be under the supervision of a parent, a guardian, or an individual 18 years of age or older, except on or within private property if the individual below the age of 18 is authorized by a parent or guardian and the property owner or legal possessor to possess the pneumatic gun.

Trucks

003 Chevrolet Silverado Z 1, 4X4, 5.3 ,Automatic, extend- d cab, tow package, tires are year old. 222,694 miles. Linex ed liner. $4,000 989-619-3038

NEW TODAY

2004 Dodge Dakota, 4x4, ess than 130,000 miles. Origi- nal owner. Runs great. $6,000 231-330-4984

Vans

2002 Ford E250 V8 Triton blue cargo van with full racks. Runs great. Needs two minor repairs. $800 Call 989-786-7490

Watercraft

16' deep V fishing boat, 20 hp Merc 4-stroke, less than 20 hours use, includes trolling motor, battery Eagle depth finder, anchor, cushioned swivel seats. Trailmaster trailer. Cherry condition. Boat and trailer price $6,000. (616)402-1886, Lake Charlevoix.

16' Old Town camper canoe, excellent condition, red Kevlar hull; weight 56 lbs.Two cedar

Legals

Executors Admin Notice

State of Michigan
Probate Court
County of Charlevoix

Notice to Creditors
Decedent's Estate

File No. 16-012344-DE

Estate of Frederick John Siegwart, Deceased
Date of birth: 01/16/1953
TO ALL CREDITORS:
NOTICE TO CREDITORS: The decedent, Frederick John Siegwart, died 06/25/2016.
Creditors of the decedent are notified that all claims against the estate will be forever barred unless presented to Mary E.A. Siegwart, personal representative, or to both the probate court at 301 State Street, Charlevoix, Michigan 49720 and the personal representative within 4 months after the date of publi-

Foreclosure

and recorded October 17, 2002 in Liber 492 Page 671 Charlevoix County Records, Michigan. Said mortgage was assigned to: Deutsche Bank National Trust Company, as Trustee of Residential Asset Securitization Trust Series2004-IndyPort 1, Mortgage Pass- Through Certificates, Series 2004-1 under the Pooling and Servicing agreement dated February 1, 2004, by assignment dated November 9, 2009 and recorded November 23, 2009 in Liber 906, Page 188, on which mortgage there is claimed to be due at the date hereof the sum of Three Hundred Seventy-Nine Thousand Three Hundred Thirty-Three Dollars and Seventy-Two Cents ($379,333.72) including interest 3.25% per annum. Under the power of sale contained in said mortgage and the statute in such case made and provided, notice is hereby given that said mortgage will be foreclosed by a sale of the mortgaged premises, or some part of them, at public vendue, Circuit Court of Charlevoix County at 11:00AM on September 16, 2016 Said premises are situated in City of Boyne City, Charlevoix County, Michigan, and are described as: Beginning at an iron stake at the Southwest corner of Section 34 Township 33 North, Range 6 West; thence North 88 degrees

Foreclosure

Notice Of
Mortgage Foreclosure Sale
THIS FIRM IS A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION WE OBTAIN WILL BE USED FOR THAT PURPOSE. PLEASE CONTACT OUR OFFICE AT THE NUMBER BELOW IF YOU ARE IN ACTIVE MILITARY DUTY.
ATTN PURCHASERS: This sale may be rescinded by the foreclosing mortgagee. In that event, your damages, if any, shall be limited solely to the return of the bid amount tendered at sale, plus interest.
MORTGAGE SALE - Default has been made in the conditions of a mortgage made by Ila M. Sineway, original mortgagor(s), to Greenpoint Credit Corp., Mortgagee, dated March 26, 1999, and recorded on March 30, 1999 in Liber 360 on Page 513, and assigned by said Mortgagee to Ditech Financial LLC as assignee as documented by an assignment, in Charlevoix county records, Michigan, on which mortgage there is claimed to be due at the date hereof the sum of Twenty-Six Thousand Six Hundred Ninety-Nine and 90/100 Dollars ($26,699.90).
Under the power of sale contained in said mortgage and the statute in such case made and provided, notice is hereby

Foreclosure

Notice Of
Mortgage Foreclosure Sale
THIS FIRM IS A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION WE OBTAIN WILL BE USED FOR THAT PURPOSE. PLEASE CONTACT OUR OFFICE AT THE NUMBER BELOW IF YOU ARE IN ACTIVE MILITARY DUTY.
ATTN PURCHASERS: This sale may be rescinded by the foreclosing mortgagee. In that event, your damages, if any, shall be limited solely to the return of the bid amount tendered at sale, plus interest.
MORTGAGE SALE - Default has been made in the conditions of a mortgage made by Eric S Baxter, A Single Man, original mortgagor(s), to Mortgage Electronic Registration Systems, Inc. as nominee for Decision One Mortgage Company, L.L.C., its successors and assigns, Mortgagee, dated October 26, 2005, and recorded on November 2, 2005 in Liber 713 on Page 853, and assigned by said Mortgagee to The Bank of New York Mellon f/k/a The Bank of New York, as Trustee for the Benefit of the Certificateholders of the CWABS, Inc. Asset-Backed Certificates Series 2006-BC3 as assignee as documented by an assignment, in Charlevoix county records, Michigan, on which mortgage there is claimed to be

Notices

Notice

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management has revised the Hazard Mitigation Plan for the Tri-County area. A public hearing will be held at the Charlevoix County Sheriff's Department, 1000 Grant St., Charlevoix, MI 49720, Tuesday August 23, 2016, 7:00 PM, in the lower level meeting room to accommodate any member of the public that would like to offer comment on the local Hazard Mitigation plan. The revised plan is posted at www.cceoem.net for review before comment.
(L-8/19)

Public Notices

CITY OF CHARLEVOIX
REGULAR CITY COUNCIL
MEETING SYNOPSIS

Tuesday, August 15, 2016 –
7 p.m.
210 State Street, City Hall
Council Chambers,
Charlevoix, MI

Charlevoix City Council met this date with Mayor Gabe Campbell presiding. All Councilmembers were present.

The following actions took place:

Tri-County Office of Emergency Management

MTA

MICHIGAN TOWNSHIPS ASSOCIATION

Charlevoix County Chapter

MEMORANDUM

DATE: September 28, 2015

FROM: Marilyn Beebe, Secretary

SUBJECT: Charlevoix County Chapter – MTA Meeting Minutes

The September 28, 2015 MTA – Charlevoix County Chapter met at Whiting Park. In attendance were representatives from the townships of Bay, Boyne Valley, Eveline, Melrose, and Wilson. Also present Russell Magee, Charlevoix County Road Commission, and Shirley Roloff, Charlevoix County Commissioner.

Meeting speakers were State Representative Tristin Cole and Megan Anderson, Charlevoix, Cheboygan, Emmet County Office of Emergency Management.

Representative Cole gave an update of state and local issues.

- Road funding
- DNR opening roads to ORVs (4 wheelers) on state land
- Energy
- Medial Marijuana
- Process of supporting bills and how committees function
- Importance of direct communication with him
- Answered direct questions

Megan Anderson, Deputy Director of Charlevoix, Cheboygan, Emmet County Office of Emergency Management updated the group on the OEM's work on the Hazard Mitigation Plan.

- Public hearing on October 7th to hear public concerns regarding planning for hazards in their community and to learn about the planning process
- Survey for public to gauge the public's awareness at: http://www.cceoem.net/hazard/
- Survey for local officials to help OEM understand the types of problems in local municipalities that the OEM can address I the plan: http://www.ceoem.net/local
- "Be Alert" Emergency Notification Network

Tri-County Office of Emergency Management

The meeting adjourned at 8:30 PM. The next chapter meeting is scheduled for October 26, 2015 at the Evangeline Township hall.

Respectfully submitted

Marilyn L. Beebe, Clerk
Wilson Township

Tri-County Office of Emergency Management

MTA

MICHIGAN TOWNSHIPS ASSOCIATION

Charlevoix County Chapter

MEMORANDUM

DATE: February 28, 2016

FROM: Marilyn Beebe, Secretary

SUBJECT: Charlevoix County Chapter – MTA Meeting Minutes

The February 28, 2016 MTA – Charlevoix County Chapter met at the Boyne City city hall. In attendance were representatives from the townships of Bay, Eveline, Melrose, Norwood, South Arm, and Wilson. Also present were Ron Reinhardt, Charlevoix County Commissioner, Michael Cain, Boyne City city manager, Larry Levengood, Charlevoix County Planning Commission; with speakers Megan Anderson, CCEOEM and Tim Maylone, Cherry Capital Connection.

Megan Anderson, Deputy Director of Charlevoix, Cheboygan, Emmet County Office of Emergency Management gave a quick review of the "BeAlert" notification system.

- Receive severe weather information / urgent community alerts
- Several school systems use the alerts to notify parents of emergency issues
- Alerts about specific neighborhoods
- Compatible with landlines, cell phones
- Alerts by text, email, or voice message

Megan recommended putting the "BeAlert" link in local newsletters to help get the word out to the community. She also touched on a rewrite of the Hazard Mitigation Plan and a survey that local officials are being asked to complete.

Mr. Tim Maylone, General Manager of Cherry Capital Connection and director of Wireless Internet Service Providers Association (WISPA). Mr. Maylone started by highlighting changes in telecommunications in recent times. Legislative:

- Satellite, cable and WISP were re-defined as Title II "Telecommunication Providers" from Title I "Information Service Providers", which was a significant change classifying WISPs as utilities.
- Creation of the Metro Act, Broadband Act, and Telecommunications Act that define use of public resources

Obstacles to the industry, including Cherry Capital Connection:

- Services to offer: TV, phone, internet
- Cost for construction
- Legislation to invest and do business in Michigan

Tri-County Office of Emergency Management

- Zoning regulations (much of the tower related zoning was introduced in the 1990's) Cherry Capital Connection's business model:
- Network neighborhood, which are cost effective and financially sustainable
- Can construct a tower in 1 to 2 days, creating a network neighborhood (the towers are significantly different from Cell towers)
- Establishes revenue as the infrastructure is built) Recommendations:
- Zoning language requires review
- Remove barriers

The meeting adjourned at 8:250 PM. The next chapter meeting is scheduled for March 28, 2016 at the Boyne Valley Township hall.

Respectfully
submitted, Marilyn L.
Beebe
Clerk, Wilson Township

Tri-County Office of Emergency Management

Charlevoix County
Local Emergency Planning Committee

October 20, 2015 1:00 p.m.

City of Charlevoix Fire Department

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business

   a. Hazard Mitigation Plan Update

VI. New Business

   a. Reappointment to Membership
   b. 2016 Calendar

VII. Public Comments

VIII. Member Comments

IX. Adjourn

Charlevoix County LEPC
January 19, 2015
Minutes

PERSONS PRESENT:
M. Anderson, L. Potter, L. Levengood, J. Evans, C. Vondra, M. McCully, D. Schneider, S. Hankins

I. CALL TO ORDER:
The meeting was called to order at 1:09.

II. ELECTIONS
Motion to approve S. Shephard as Chair made by L. Levengood, seconded by D. Schneider. Motion carries. Motion to approve C. Potter-Browe as Vice-Chair made by L. Levengood, seconded by D. Schneider. Motion carries. Motion to approve M. McCully as Secretary made by M. Anderson seconded by D. Schneider. Motion carries.

III. APPROVAL OF THE AGENDA
Motion to approve the agenda made by D. Schneider, seconded by L. Potter. Motion carries.

IV. APPROVAL OF MINUTES
Motion to approve minutes, as amended, by M. Anderson, supported by J. Evans. Motion carries.

V. INTRODUCTIONS:

VI. OLD BUSINESS:
a. Mike McCully- OEM Hazard Mitigation
OEM has been making the rounds at the MTA meetings to try to work with the municipalities to uncover projects that can be incorporated in the plan. The work as of late is continuing to blend the three separate plans into one according to the state and federal requirements.

VII. NEW BUSINESS:
a. Tabletop
A tabletop exercise is being planned for the next meeting and topics were discussed. Because of a recent radio outage, a lengthy discussion about the outage itself led to the topic of a radio outage being chosen as the desired topic.

VIII. PUBLIC COMMENTS: None

IX. LEPC MEMBER COMMENTS: None

X. ADJOURN:
Motion to adjourn at 2:07 by D. Schneider, seconded by M. McCully. Motion carries.

Charlevoix County
Local Emergency Planning Committee

April 19, 2016

East Jordan Ambulance

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business

a.Hazard Mitigation Plan Update

VI. New Business

VII. Public Comments

VIII. Member Comments

IX. Adjourn

Charlevoix County
Local Emergency Planning Committee

Char-Em ISD, Boyne City

July 19, 2016 1:00 P.M.

Agenda

I. Call Meeting to Order

II. Approve Agenda

III. Approve Minutes

IV. Introductions

V. Old Business
   a. Hazard Mitigation Plan

VI. New Business
   a. Tier 2 Reports
   b. 302 Site Plans

VII. Public Comment

VIII. Member Comments

IX. Adjorn

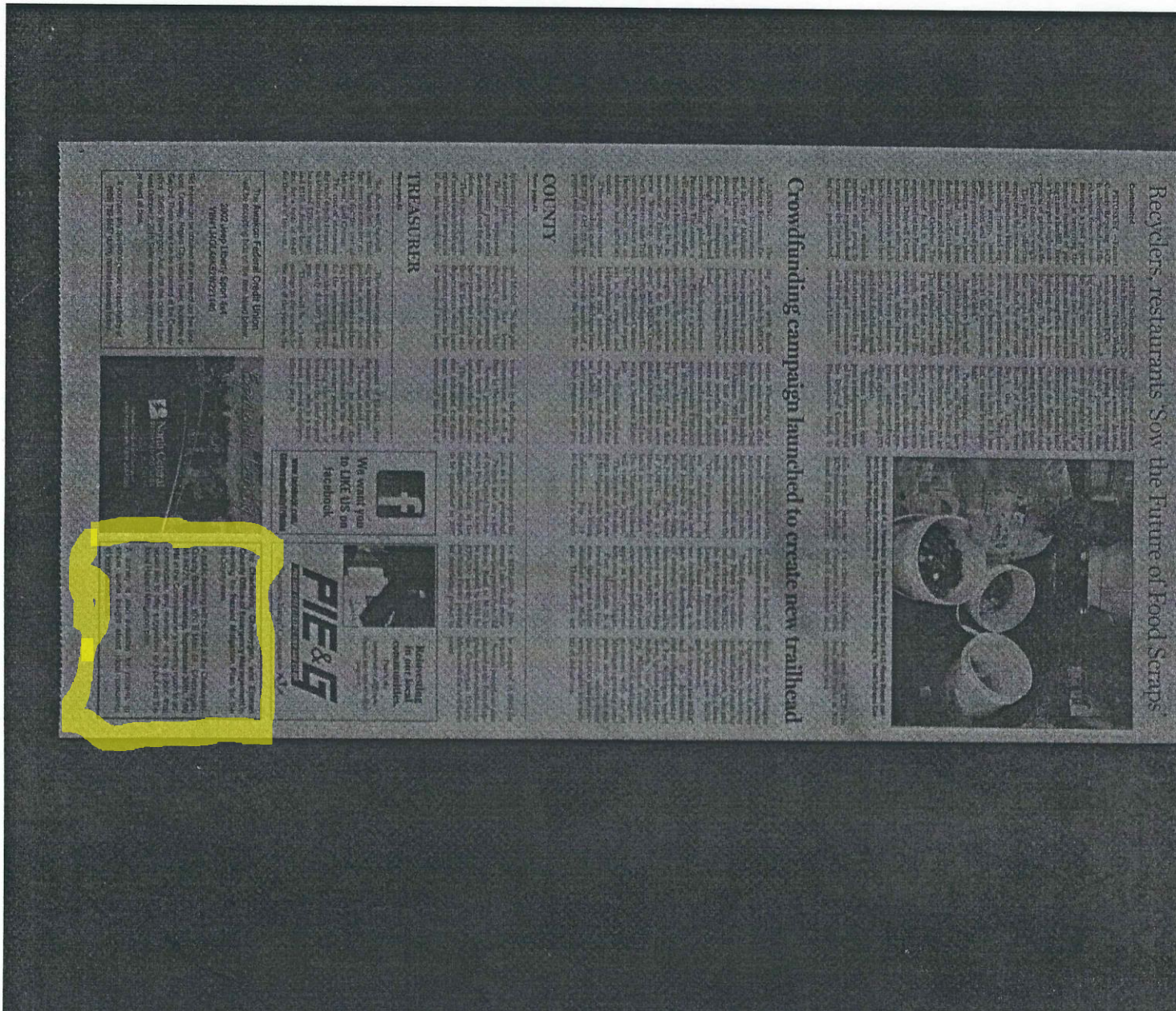
Tri-County Office of Emergency Management

2. Cheboygan

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan tor the tri"County area,

A public hearing will be held at the Cheboygan County Building, 870 S Main St., Cheboygan, Ml 497211 Wednesdayt September 30th, 7:00 PM in the Commissioner's meeting room to accommodate any member ot the public that would like to offer suggestion input into the local Hazard Mitigation plan.

A survey is also available for citizens to share some insight about local concerns at www.cceoem.net.



Recyclers, restaurants Sow the Future of Food Scraps

Crowdfunding campaign launched to create new trailhead

COUNTY

TREASURER

PIE&G

We want you to LIKE US on Facebook

Cheboygan County Chapter, MTA
September 24, 2015
Inverness Township

The meeting was called to order by Sec/Treas Barb Hall at 7:00pm. The Pledge of Allegiance was recited by all. Roll call was taken and there was a total of 35 members present representing: Aloha, Beaugrand, Benton, Burt, Forest, Grant, Hebron, Inverness, Koehler, Mackinaw, Mullett, Munro, Nunda, Tuscarora and Wilmot Townships. Absent Townships: Ellis, Mentor, Walker and Waverly. Motion by Harold Koviak and supported by Linda Ginop. Motion carried.

Treasurer's Report: No checks were written. The balance in the checking account is $83.40 and in the savings is $2015.68 which includes $ .17 interest. The total is $2099.08. A motion was made by Steve Crusoe and supported by Ted Knight to approve the Treasurer's report as presented. Motion carried.

Speakers:
Harold Koviak, District Five rep, has AMAR information if needed, gave legislative update – nothing on a road package, presidential election in March will not have any ballot proposals, talked retreats at Boyne Highlands, Convention coming in January(Need to register for Conference get a code to get housing).

Emergency Management, Mike McCulley and Megan Anderson – handed out Be Alert cards – talked Hazard Mitigation Plan-Survey on line. Public Hearing Sept 30th 7PM at Cheboygan County Building. CCEOEM.net/local. Mike's # 248-891-7312 Megan's email manderson@cceeom.net

MDOT Alex Nikoloff – Transportation, TAP money-paved shoulders/bike paths, fix old train depot into visitor centers. 80-20 match. Website – on line-open no deadlines, conditional commitments.

Road – Brett-Road Funding close, Bob Chadwick introduced self.

Tuscarora Supervisor Mike Ridley thanked Alex from MDOT for coming.

Old Business: Hold discussion of using some of treasury for a project until next month.

New Business: Benton Clerk Jayne Passeno mentioned that the State MTA group looking at giving general township supervisor same powers as Charter Township Supervisors. Need more info on this.

The next MTA meeting will be held October 29th at Mentor Township.

Thank you to Inverness Township for hosting this months' MTA meeting and for goodies.

Motion to adjourn by Steve Crusoe and seconded by Jayne Passeno.
Adjourned at 7:32PM.

Barb Hall

Cheboygan County
Local Emergency Planning Committee

November 9, 2015

10:00 a.m.
Cheboygan County Building
Board of Commissioner's Room
870 South Main Street
Cheboygan, Michigan

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions
a. Mike McCully- OEM and Hazard Mitigation Staff

V. Old Business
a. Hazard Mitigation Plan Update

VI. New Business
a. 2016 Calendar

VII. Public Comments

VIII. Member Comments

IX. Adjourn

Cheboygan County
Local Emergency Planning Committee

January 11, 2016

10:00 a.m.
Cheboygan County Building
Board of Commissioner's Room
870 South Main Street
Cheboygan, Michigan

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business
a. Hazard Mitigation Plan Update

VI. New Business

VII. Public Comments

VIII. Member Comments

IX. Adjourn

Cheboygan County
Local Emergency Planning Committee

April 11, 2016

10:00 a.m.
Cheboygan County Building
Board of Commissioner's Room
870 South Main Street
Cheboygan, Michigan

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business
a. Hazard Mitigation Plan Update

VI. New Business

VII. Public Comments

VIII. Member Comments

IX. Adjourn for Exercise

Cheboygan County
Local Emergency Planning Committee

August 8, 2016

10:00 a.m.
Cheboygan County Building
Board of Commissioner's Room
870 South Main Street
Cheboygan, Michigan

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business
a. Hazard Mitigation Plan Update

VI. New Business
a. 302 Site Plans
b. Tier II Reports

VII. Public Comments

VIII. Member Comments

IX. Adjourn

3. Emmett

OATS & MARINE QUIPMENT

WHALER 1979, 13'4" nson, trailer, cover, life nd trolling motor in- reat condition. $6,200. 1056 or (310)804-1579.

CENTER Console 18.5', ltwater series, Shore- ler, Garmin fishfinder, . Very good condition. all Tim (616)437-3509.

good condition. Excel- er boat. Trailer included. 8-1578

UTDOOR RECRE-- ION

pop-up camper, Eagle l 10UD. Sleeps 6, excel- n. Must see to appreci- $1,900. Serious inquiries -1089

NEBAGO Adventurer, , 38,000 miles. 2 full lent condition. Includes dolly. (231)242-4400 or 06.

Montego Bay 34' fifth des. Very good condi- s/smoking, clean. Must ealth reasons. $20,000 09 or (231)313-0896.

WEATHERBY Orion 20 and under, 26" barrel, condition. $850. Call 01.

OS WANTED

CEPTING BIDS

Area Ambulance is bids from licensed r a 30 x 16 addition at dustrial Park Dr. in

ds are due by tober 27, 2015
ould be mailed to:
P.O. Box 454
ay, MI 49765-0454

be obtained for a fee (989) 350-0365.

mbulance retains the cept any or reject any

2100 LEGAL NOTICES

NOTICE OF
Mortgage Foreclosure Sale
THIS FIRM IS A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION WE OBTAIN WILL BE USED FOR THAT PURPOSE. PLEASE CONTACT OUR OFFICE AT THE NUMBER BELOW IF YOU ARE IN ACTIVE MILITARY DUTY.
ATTN PURCHASERS: This sale may be rescinded by the foreclosing mortgagee. In that event, your damages, if any, shall be limited solely to the return of the bid amount tendered at sale, plus interest.
MORTGAGE SALE - Default has been made in the conditions of a mortgage made by Kelly Trieweiler aka Kelly A Frieweiler, a single woman, original mortgagor(s), to Mortgage Electronic Registration Systems, Inc., Mortgagee, dated May 27, 2004, and recorded on June 10, 2004 in Liber 1052 on Page 69, and assigned by said Mortgagee to Wells Fargo Bank, NA as assignee as documented by an assignment, in Emmet county records, Michigan, on which mortgage there is claimed to be due at the date hereof the sum of Eighty-Nine Thousand Four Hundred Sixty-Eight and 67/100 Dollars ($89,468.67).
Under the power of sale contained in said mortgage and the statute in such case made and provided, notice is hereby given that said mortgage will be foreclosed by a sale of the mortgaged premises, or some part of them, at public vendue, at the place of holding the circuit court within Emmet County, at 11:00 AM, on October 1, 2015.
Said premises are situated in Township of West Traverse, Emmet County, Michigan, and are described as: Unit 16, Windward, a Condominium, according to the Consolidating Master Deed recorded in Liber 484, Pages 357 through 429, inclusive, Emmet County Records and designated as Emmet County Condominium Subdivision Plan No. 38, together with rights in general common elements and limited common elements as set forth in the above Master Deed, and amendments thereto, and as described in Act 59 of the Public Acts of 1978, as amended
The redemption period shall be 6 months from the date of such sale, unless determined abandoned in accordance with MCLA 600.3241a, in which case the redemption period shall be 30 days from the date of such sale.
If the property is sold at foreclosure sale under Chapter 32 of the Revised Judicature Act of 1961, pursuant to MCL 600.3278 the borrower will be held responsible to the person who buys the property at the mortgage foreclosure sale or to the mortgage holder for damaging the property during the redemption period.
Dated: August 28, 2015

2100 LEGAL NOTICES

NOTICE OF
Mortgage Foreclosure Sale
THIS FIRM IS A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION WE OBTAIN WILL BE USED FOR THAT PURPOSE. PLEASE CONTACT OUR OFFICE AT THE NUMBER BELOW IF YOU ARE IN ACTIVE MILITARY DUTY.
ATTN PURCHASERS: This sale may be rescinded by the foreclosing mortgagee. In that event, your damages, if any, shall be limited solely to the return of the bid amount tendered at sale, plus interest.
MORTGAGE SALE - Default has been made in the conditions of a mortgage made by Deborah Archer and Terry Joe Archer, wife and husband, original mortgagor(s), to JPMorgan Chase Bank, National Association successor by merger to Bank One, NA, Mortgagee, dated April 29, 2004, and recorded on May 20, 2004 in Liber 1051 on Page 279, in Emmet county records, Michigan, on which mortgage there is claimed to be due at the date hereof the sum of Forty Thousand Five Hundred Twenty-Six and 06/100 Dollars ($40,526.06).
Under the power of sale contained in said mortgage and the statute in such case made and provided, notice is hereby given that said mortgage will be foreclosed by a sale of the mortgaged premises, or some part of them, at public vendue, at the place of holding the circuit court within Emmet County, at 11:00 AM, on October 22, 2015.
Said premises are situated in Township of Carp Lake, Emmet County, Michigan, and are described as: The North 1/2 of the Southwest 1/4 of the Southwest 1/4 of Section 5, Township 38 North, Range 4 West.
The redemption period shall be 6 months from the date of such sale, unless determined abandoned in accordance with MCLA 600.3241a, in which case the redemption period shall be 30 days from the date of such sale.
If the property is sold at foreclosure sale under Chapter 32 of the Revised Judicature Act of 1961, pursuant to MCL 600.3278 the borrower will be held responsible to the person who buys the property at the mortgage foreclosure sale or to the mortgage holder for damaging the property during the redemption period.
Dated: September 18, 2015
For more information, please call:
FC S (248) 593-1304
Trott Law, P.C.
Attorneys For Servicer
31440 Northwestern Hwy Ste 200
Farmington Hills, Michigan 48334-5422
File #455858F01
(L-9/18,9/25,10/2,10/9)

2100 LEGAL NOTICES

court within Emmet County, at 11:00 AM, on October 22, 2015.
Said premises are situated in Township of Carp Lake, Emmet County, Michigan, and are described as: The North 1/2 of the Southwest 1/4 of the Southwest 1/4 of Section 5, Township 38 North, Range 4 West.
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Farmington Hills, Michigan 48334-5422
File #455858F01
(L-9/18,9/25,10/2,10/9)

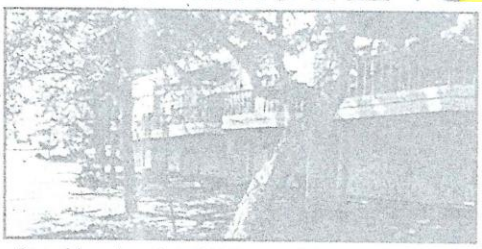
A photo is worth a thousand words.
Add a picture to your classified liner ad for just $5 a week.

2095 PUBLIC NOTICES

CHARLEVOIX COUNTY
NOTICE
There are openings for the following Committees for terms beginning January 1, 2016:
Brownfield Redevelopment Authority, Charlevoix County Commission on Aging, Department of Human Services Board, Fair Board, Housing Oversight Committee, Land Bank, Northern Lakes Economic Alliance, Parks Committee, Charlevoix County Planning Commission and Veterans Affairs.
If you are interested in either being appointed or reappointed ,please respond in writing NO LATER THAN November 1, 2015 to the Charlevoix County Clerk, 203 Antrim Street, Charlevoix, MI 49720 or by email at clerk@charlevoixcounty.org
(L-9/18)

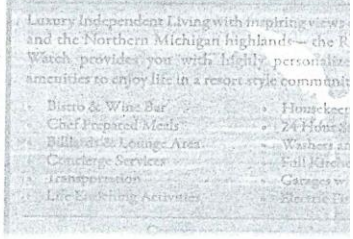
PUBLIC NOTICE
The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management is revising the Hazard Mitigation Plan for the tri-County area. A public hearing will be held at the Emmet County Building, 200 Division St., Petoskey MI 49770, Tuesday September 29th, 7:00 PM, in the Commissioner's meeting room to accommodate any member of the public that would like to offer suggestion or input into the local Hazard Mitigation plan. A survey is also available for citizens to share some insight about local concerns at www.cceoem.net.
(L-9/18)

NEW LISTING



Beautiful condo, right in the heart of town! Walk everywhere. Overlooking the Bear River, close to Bayfront Park, Petoskey Marina, downtown shops and many great, unique restaurants. Great area for biking. Near the Wheelway to Charlevoix & Harbor Springs. Three bedrooms, two full bathrooms, 13 foot high ceilings, custom granite kitchen with custom maple cabinetry, professionally appointed furnished interior, and cozy custom stone gas fireplace. Use as three bedroom or two bedrooms and an office or den.
MLS # 446138 $248,000
Deborah Graham 231-330-5567

THE FINEST IN INDEPENDENT SENIOR LIVI



Luxury Independent Living with inspiring views and the Northern Michigan highlands — the R Watch provides you with highly personalized amenities to enjoy life in a resort style communit
Bistro & Wine Bar
Chef Prepared Meals
Billiards & Lounge Area
Concierge Services
Transportation
Life Enriching Activities
Housekeep
24 Hour S
Washers an
Full Kitche
Garages w
Electric Fir

Foreclosure

the redemption period shall be 30 days from the date of such sale.

If the property is sold at foreclosure sale under Chapter 32 of the Revised Judicature Act of 1961, pursuant to MCL 600.3278 the borrower will be held responsible to the person who buys the property at the mortgage foreclosure sale or to the mortgage holder for damaging the property during the redemption period.

Dated: July 22, 2016

For more information, please call:

FC J (248) 593-1311
Trott Law, P.C.
Attorneys For Servicer
31440 Northwestern Hwy Ste. 200
Farmington Hills, Michigan 48334-5422
File #463785F01

(L-7/22,7/29,8/5,8/12)

Notices

NEW TODAY

Public Notice

The Charlevoix, Cheboygan, and Emmet County Office of Emergency Management has revised the Hazard Mitigation Plan for the Tri-County area. A public hearing will be held at the Emmet County Building, 200 Division St., Petoskey, MI 49770 Wednesday August 17, 2016, at 7:00 PM, in the Commissioner's meeting room to accommodate any member of the public that would like to offer comment on the local Hazard Mitigation plan. The revised plan is posted at www.cceoem.net for review before comment.

(L-8/12)

Public Notices

NEW TODAY

CHARLEVOIX COUNTY COMMISSIONERS

SYNOPSIS
August 10, 2016

The Charlevoix County Board of Commissioners met in the Charlevoix County Commissioners Room on August 10,

Public Notices

Motion approved Resolution #16-067, Approve County Expenditures.

Motion approved Resolution #16-068, 2015/2016 Child Care Budget Amendment.

Motion approved Resolution #16-069, County Building Entrance.

Motion approved Resolution #16-070, Treasurer Doors.

Motion approved Resolution #16-071, Cameras.

A Committee of the Whole meeting will take place September 8, 2016 at 9:30 a.m. to review the General Fund budget.

Motion adjourned the meeting at 10:30 a.m.

Complete copies of Board minutes can be found on the County website, www.charlevoixcounty.org.

Cheryl Potter Browe,
County Clerk
(L-8/12)

NEW TODAY

Eveline Township

Zoning Ordinance
Amendment- Adopted

The Eveline Township Board of Trustees adopted Ordinance No. 0809 of 2016, an Ordinance to Amend the Zoning Map in Eveline Township Zoning Ordinance on Aug. 9, 2016 the provisions of this amendment will become effective on August 19, 2016. Additional information can be obtained by contacting Sandi Whiteford, Clerk at 231-675-4426 or evelinetwpclerk@gmail.com.

The regulatory effect of this amendment is to:

Rezone the following two properties from Single Family Residential (R) zoning district to Farm Forest (FF), parcel numbers: 15-006-106-007-35 and 15-006-106-007-40 located at 05240 Waverly Lane, Charlevoix, MI 49720, owned by Coseo Family Trust.

(L-8/12)

Public Notices

NEW TODAY

Public Notice

Schools of Choice-
Open Enrollment for
Inland Lakes Schools

Inland Lakes Schools located in Indian River will be accepting open enrollment applications for non-resident students through Policy #5121.01- Schools of Choice for the 2016-17 school year. Applications will be accepted from Monday, August 15, 2016 until noon on Monday, August 22, 2016. Applications are available on-line at www.inlandlakes.org (Click on "Parents" then "Forms" and "Schools of Choice"). You may also request the form by calling the phone number listed below. Parents of out of district students who are currently attending Inland Lakes Schools should also complete the open enrollment application. Anyone having questions may call (231) 238-6868 ext. 4. Enrollment numbers per grades are as follows:

Grade	Total
K	8
1	7
2	2
3	10
4	15
5	5
6	20
7	20
8	20
9	20
10	20
11	20
12	20

Total numbers include non-resident students
already attending ILS

(L-8/12)

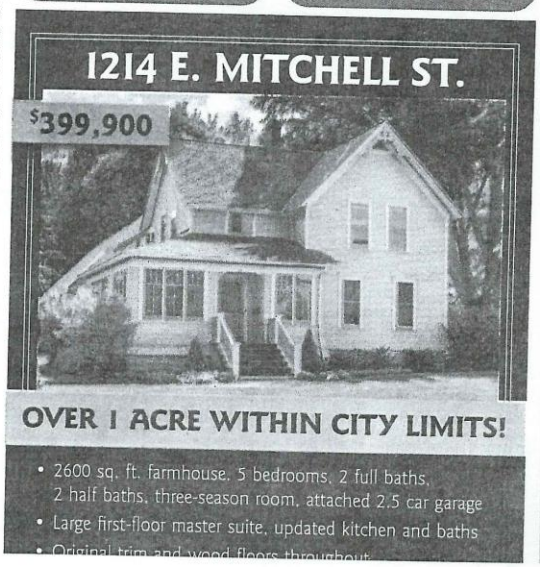
Public Notices

Misc. Equipment

1950 Oliver 60, great starter for antique Fly Wheel Club. $2,500 or best offer. Call for other information: (231) 330-9629

CLASSIFIED TIP #23
Ads with a price almost always generate more qualified calls.

Houses for Sale

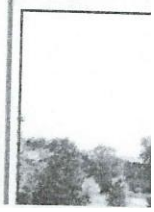


Houses for Sale

Houses f

Built on the highest

OPEN H



EMMET COUNTY TOWNSHIPS ASSOCIATION
A Chapter of The
MCHIGAN TOWNSHIPS ASSOCIATION
EMMET COUNTY, MICHIGAN

MINUTES – October 21, 2015

The Regular meeting of the Emmet County Townships Association was conducted at the Crash Rescue Building of the Pellston Regional Airport on October 21, 2015. The meeting was called to order by the President, Roger Moore at 7:00PM. The Pledge of Allegiance was recited by all.

ROLL CALL OF TOWNSHIPS:

Present (22): Bear Creek (1) – Hoffman
Bliss (1) – Cease
Little Traverse (4) – Dohm, Garver, Chattaway, Arman
Littlefield (3) – Henning, Morford, Derrohn
Maple River (4) – Eby, Blumke, Gregory, Wekwert
McKinley (2) – Bohn, Ball
Pleasantview (2) – Wiechmann, Rogier (new Supervisor) Readmond (2) – Kruski, Krupa
Wawatam (1) – Moore
West Traverse (2) – Baiardi, Baker

Absent: Carp Lake
Center Cross Village
Friendship
Resort
Springvale

Guests: Harold Koviak – MTA, Megan Anderson – Emergency Management, Jim Tamlyn, EC Commissioner, Kelley Atkins, Airport Manager.

No additional items for the agenda.

MINUTES: It was moved by Wiechmann, seconded by Dohm and passed unanimously by voice vote to approve the minutes of the meeting on July 15, 2015, as presented.

TREASURER'S REPORT: In the absence of Mays, Baiardi presented the written Treasurer's Report that had been supplied by Mays. The checking balance after the July expenses was $488.19. The County supplied the refreshments for the October 21st meeting so no new bills

were presented. Baiardi made a motion to accept the report as presented. Seconded by Ball and passed unanimously by voice vote.

MTA UPDATE: Harold Koviak reported that the Supervisor, Clerk and Treasurer clinics had been well attended. The big concern now in the legislature is the “road fix” and what will be put forward to be considered. The hope is that something can be done yet this year but time is running out as we are all aware that nothing typically can get done in the election year. Harold also informed the group of some changes to the reservation system for the upcoming MTA annual conference. There will be a bus from the UP that will stop in either Gaylord or Mackinaw to pick up anyone that may want a ride to Detroit for the event.

Dohm commented on the status of some changes that are being implemented for the assessing certification. He felt that Judy Allen had been instrumental, along with MTA and the local chapters, in getting some of these changes in place. This should help with more being able to enter the assessing field and achieving certification at higher levels in a shorter amount of time.

An additional item was added to the agenda with the attendance of Megan Anderson from the Office of Emergency Management. She updated us on Hazard Mitigation Management and grants that are available to governmental entities through CCEOEM and encouraged anyone that might have an interest to contact her for help in applying for these grants. All in attendance were encouraged to also complete a survey on their website cceoem.net/local. This is the link for municipalities.

BUSINESS:

The next meeting will be held January 20, 2016 at the Littlefield Township Fire Hall and the program will be the report from the Road Commission. Some program ideas for upcoming meetings included at visit to the 911 Center and perhaps a visit to a Fire Station and being informed of the changes that Departments are mandated to comply with now.

There was a motion to adjourn offered by Weichmann and supported by Ball. It passed by unanimous voice vote. The meeting was adjourned at 7:20PM.

PROGRAM: Moore introduced the program for the meeting. Jim Tamlyn had invited the group to tour the Crash Rescue Building and learn a bit about the facility and how it had come about. It is an impressive $7 million+ building that was funded 95% by the Federal government, 2.5% by the State and 2.5% by Local dollars. Kelley Atkins then gave the group the grand tour of the facility. THANK YOU to Kelley and Jim for allowing us to visit.

Respectfully submitted,
Cindy J. Baiardi, Secretary

Emmet County
Local Emergency Planning Committee

November 10, 2015

10:00 a.m.
Emmet County EOC 1694 S. US 131 Hwy
Petoskey, MI

AGENDA

I. Call Meeting to Order

II. Approve agenda

III. Approve minutes

IV. Introductions

V. Old Business a. Hazard Mitigation Plan Update

VI. New Business a. Health Department - Regionalization b. LEPC Tabletop

VII. Public Comments

VIII. Member Comments

Adjourn

Emmet County
Local Emergency Planning Committee

February 17, 2016

10:00 a.m.
Emmet County EOC
1694 S. US 131 Hwy
Petoskey, MI

AGENDA

I. Call Meeting to Order

III. Approve agenda

IV. Approve minutes

V. Introductions

VI. Old Business
   a. Hazard Mitigation Plan Update

VII. New Business

VIII. Public Comments

IX. Member Comments

X. Adjourn

Emmet County
Local Emergency Planning Committee

April 13, 2016

11:00 a.m.

Emmet County EOC 1694 S. US 131 Hwy

Petoskey, MI

AGENDA

I. Call Meeting to Order

II. Elections

III. Approve agenda

IV. Approve minutes

V. Introductions- James Cousino

VI. Old Business a. Hazard Mitigation Plan Update

VII. New Business

VIII. Public Comments

IX. Member Comments

Adjourn

Emmet County
Local Emergency Planning Committee

August 16, 2016

10:00 a.m.
Emmet County EOC
1694 S. US 131 Hwy
Petoskey, MI

AGENDA

I. Call Meeting to Order

III. Approve agenda

IV. Approve minutes

V. Introductions

VI. Old Business
   a. Hazard Mitigation Plan Update

VII. New Business
   a. 302 Site Plans
   b. Tier II Reports

VIII. Public Comments

IX. Member Comments

X. Adjourn

4. Questionaire

Edit this form

Hazard Mitigation

We are in the process of forming a partnership of municipalities, agencies and stakeholders address natural hazards that may occur in Charlevoix, Cheboygan and Emmet Counties. In effort to identify and plan for incidents involving natural hazards, we need assistance from residents of the three Counties. The questions below are designed to gauge the level of that our residents have about natural disaster that could occur and areas that are vulnerable to type of disaster within the community. The information that you provide will help activities to reduce the risk of injury and/or property damage in the

General Household

The following information concerning demographics will help the steering committee determining the hazard mitigation needs of the communities. For example, indicating whether own a house or are a tenant will help determine the needs of both renters and homeowners. answers provided in this questionnaire will be treated as con dential and will be for the purpose of preparing this plan. They will not be provided to any other

Please indicate your age

- 1 to3
- 3 to4
- 4 to5
- 5 to6
- 6 or

Gende

- Mal
- Femal

Please indicate in which County you

- Charlevoi
- Cheboyga
- Emme

How long have you resided in the

- Less than 1
- 1 to 5
- 6 to 9
- 1 to 19
- 2 years or

Do you own or

Own

Rent

What is your zip code?

What is your home address? (optional)

Continue »

25% completed

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