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IOSCO COUNTY HAZARD MITIGATION PLAN

July 2016

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CHAPTER 1: INTRODUCTION

Iosco County is in the northeast quarter of the lower peninsula of Michigan in the heart of Lake Huron's "Sunrise Side." The County is bordered on the north by Alcona County, on the west by Ogemaw County, on the south by Arenac County and on the east by Lake Huron. According to the U.S. Census, the County covers an approximate area of 351,424 acres or about 549 square miles. Using the 2010 US Census population figures, the population density of the county is roughly 47 people per square mile. The County consists of eleven townships and three cities. The county seat in located in Tawas City.

Predominately regarded as a recreational and tourist area, there are several auto related manufacturers, an aircraft maintenance & refurbishment center, local health services, various mining operations, and retail trade that contributes to the economy.

Approximately 60% of the county is held in public ownership (Huron National Forest and the AuSable State Forest lands). The AuSable River, which has been designated as a Wild and Scenic River by the State, runs across the northern portion of the county. Forests, inland waters, and wetlands comprise over 86% of the County's surface area. Agricultural uses account for approximately 10.7% of the area. Several inland lakes in the county have significant resort developments. These cottages are becoming retirement homes for many former seasonal vacationers.

North-south access is provided by US-23 to the east near the shoreline and by M-65 to the west side of the county. M-55 connects with these roads to provide east-west access.

What is Hazard Mitigation?

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

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

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

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

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

Under the Disaster Mitigation Act of 2000, state and local governments are required to develop local hazard mitigation plans in order to be eligible for pre- and post-disaster funding from the federal government. The Plan was prepared in accordance with the Federal Emergency Management Act (FEMA) documents: Local Mitigation Handbook and the Local Mitigation Plan Review Guide, and the Michigan State Police Emergency Management Division (MSP/EMD) publication 207: Local Hazard Mitigation Workbook.

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

Iosco County Emergency Management Director and the Local Emergency Planning Commission (LEPC) worked with the East Michigan Council of Governments (EMCOG) and the MSP/EMD to develop this Plan. The intent of the Plan is to work with those familiar with Iosco County to describe the County, and to create an action plan to protect the health, safety, and economic interests of residents through hazard mitigation, planning, awareness, and implementation.

In the Plan, the hazard analysis section describes the major categories of hazards that affect Iosco County and provides some additional information about lesser hazards. The analysis of hazards makes use of community profile information that includes a description of community organizations and potential resources. The major hazards have been identified as severe weather, geological threats, fires, floods/drought, hazardous materials, infrastructure problems, public health emergencies, transportation incidents, seasonal population shifts, and civil unrest and war. For each of the major hazards, the following is provided:

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

This new Plan updates the previous Iosco County Hazard Mitigation Plan that was approved in 2007. This process began in 2012, as recertification of the Hazard Mitigation Plan shall take place at least once every five (5) years. It has been modified so that it is easier to find and use information contained within it. This

should be helpful for stakeholders to more easily find and review the information that is most relevant for their jurisdictions and areas of expertise/interest.

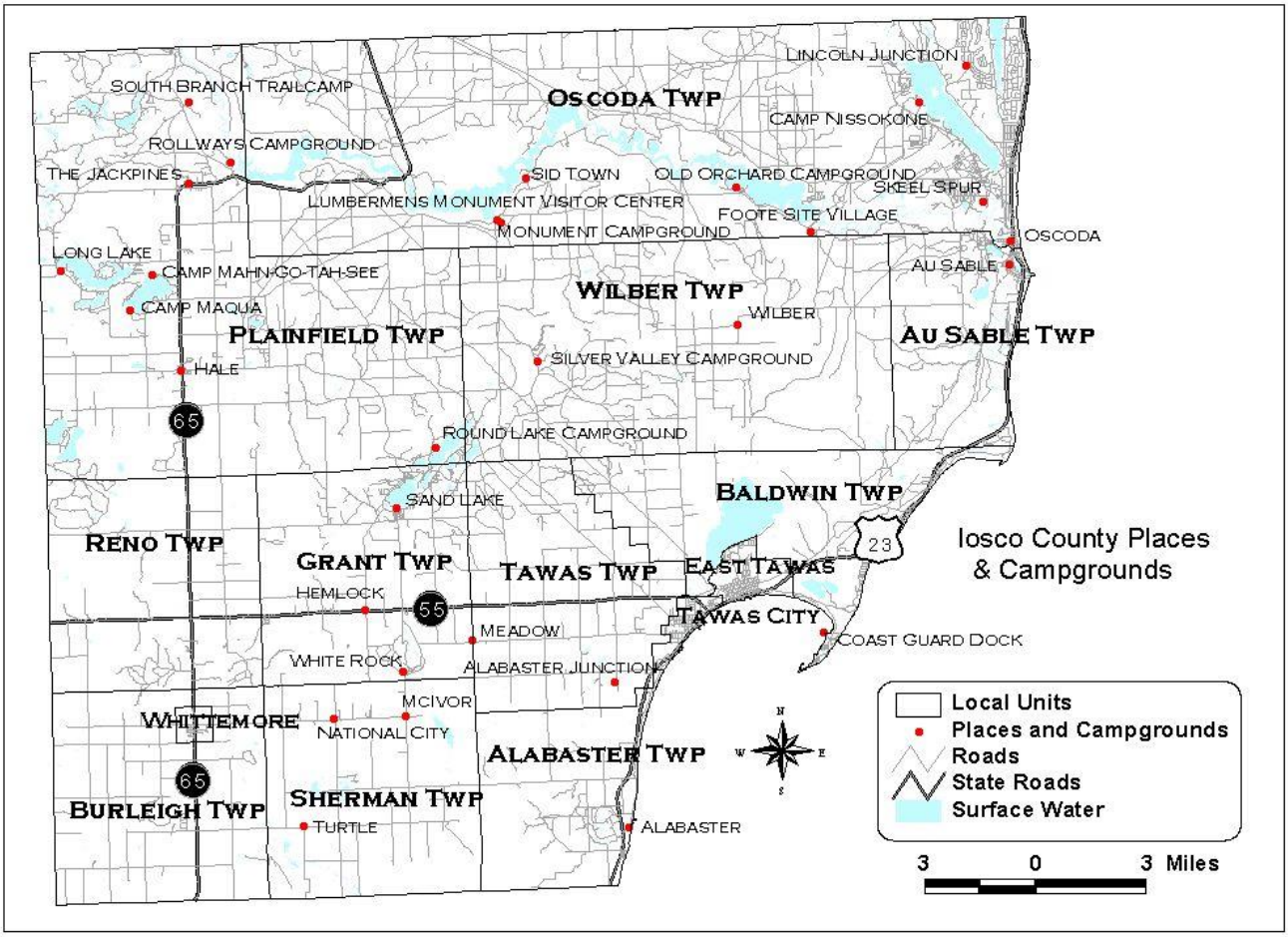
Certain information that is considered confidential or too sensitive for widespread public distribution has been kept out of this document, and will only be distributed at the discretion of the Iosco County Office of Emergency Management.

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

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

Iosco County Municipal Map

MAP 1.1



Executive Summary

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

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

Local Units of Government

While the Hazard Mitigation Plan was completed by Iosco County, it involved the participation of the communities within the County. Iosco County's communities consist of three cities and 11 Townships. They are listed below:

Cities
East Tawas, Tawas City, Whittemore

Townships
Alabaster, AuSable, Baldwin, Burleigh, Grant, Oscoda, Plainfield, Reno, Sherman, Tawas, Wilber

In addition to the cities and townships, there are many unincorporated places within Iosco County. These places are covered by township government, but often have a separate sense of community.

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Iosco County Municipal Information and Participation Status

TABLE 1.1

	2000 pop.	2010 pop.	Change	Participated in 2007 plan	Currently a participant in 2016 plan	NFIP participant	NFIP map date
Iosco County	27,339	25,887	-5.3%	YES	YES		
Alabaster Twp	503	487	-3.2%		YES	Yes	1/6/12
AuSable Twp	2,230	2,047	-8.2%	YES	YES	Yes	1/6/12
Baldwin Twp	1,726	1,694	-1.9%	YES	YES	Yes	1/6/12
Burleigh Twp	775	787	1.5%	YES			
Grant Twp	1,560	1,546	-0.9%				
Oscoda Twp	7,248	6,997	-3.5%	YES	YES	Yes	1/6/12
Plainfield Twp	4,292	3,799	-11.5%		YES	Yes	NSFHA
Reno Twp	656	590	-10.1%	YES	YES		
Sherman Twp	493	448	-9.1%		YES		
Tawas Twp	1,684	1,744	3.6%	YES	YES		
Wilber Twp	740	729	-1.5%	YES	YES		
City of East Tawas	2,951	2,808	-4.8%	YES	YES	Yes	1/6/12
City of Tawas City	2,005	1,827	-8.9%	YES	YES	Yes	1/6/12
City of Whittemore	476	384	-19.3%		YES		

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CHAPTER 2: THE PLANNING PROCESS

In 2013, the Iosco County Emergency Management staff began the update process by hosting a meeting at the East Tawas City Hall with the East Michigan Council of Governments (EMCOG) staff and the Michigan State Police Emergency Management and Homeland Security Division (EMHSD) Staff. The purpose of the meeting was to advise the public and Iosco County representatives of the need to update the 2007 Iosco County Hazard Mitigation Plan (Plan) and the process that would be utilized.

This update was made possible after Iosco County and four other counties were awarded a grant from the Federal Emergency Management Agency (FEMA) through the Michigan State Police to update their hazard mitigation plans. EMCOG staff worked with the Iosco County Emergency Management Coordinator (EMC) Ed Rohn, and the Iosco County Hazard Mitigation Planning Committee (ICHMPC) who was designated as the steering committee for the Plan update.

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

To further promote the update and municipal participation, two written questionnaires were sent to the municipal governments for their input on the update process. The first questionnaire sought information on the hazards and how they impacted the County. The follow-up questionnaire sought information on the mitigation measures to address the hazards and what measures would be most beneficial for each municipality. Copies of the questionnaires are included in Appendix B, which also includes a summary of the municipalities' responses. In addition, the EMC and EMCOG staff on two occasions met with Iosco County Township officials at their quarterly meetings to provide copies of the questionnaires and encourage their participation in the monthly update meetings as well as respond to the questionnaires. The responses from the municipal governments that submitted timely responses were incorporated into the final mitigation actions found in Chapter 5. Those responses that were submitted late were not added to the update.

Through a series of open meetings to the public, the EMD and EMCOG staff directed the ICHMPC through an assessment of the Plan in order to determine what changes, if any, would be necessary for the update. The ICHMPC and municipal officials were provided meeting agendas and any accompanying memos regarding the Plan update the week before each meeting, at which time the agendas were also posted on the public bulletin board at the Iosco County Building. The following table (Table 2.1) identifies the meeting dates, locations, and subject matter for the ICHMPC and township association meetings. At the end of this chapter are two tables identifying the agencies represented at the meetings (Table 2.2) and the individuals at each meeting (Table 2.3). Appendix A includes the sign-in sheets for all the public meetings for this update.

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Iosco County Hazard Mitigation Planning Committee
Meeting Schedule/Discussion Topic
Table 2.1

Meeting Date	Meeting Location	Discussion Topic(s)
5-09-13	East Tawas Community Center 760 Newman St., East Tawas	Kick-off meeting with to discuss Plan update process.
9-18-14	East Tawas Fire Department 122 Main St., East Tawas	Initial meeting of ICHMPC, they were provided an overview of the process, and a discussion on what hazards occur in Iosco County.
10-16-14	Plainfield Township Hall 415 Main St., Hale	Community Profile distributed for proofing purposes. Discussion on the hazards to determine which hazards impact Iosco County. Discussion on hazard assessment and prioritizing the hazards based on their impact.
12-04-14	Alabaster Township Hall 1716 S. U.S. Hwy 23, Tawas City	Discussion on the hazards and finalized the hazard assessment ranking. Discussed the vulnerability assessment and started designing the questionnaire. Questionnaire format to be approved in January.
1-15-15	Iosco County Public Safety Building 1808 E. US-23, East Tawas	Completed the discussion on hazard assessment and vulnerability chart. Completed the municipal questionnaire and cover memo. Reviewed/amended the 2007 goals and objectives.
1-15-15	Quarterly Township Association Meeting East Tawas Community Center	Attended the quarterly meeting of the Iosco County Township Association. Advised them of the Hazard Mitigation Plan update and the importance of their participation. Distributed the questionnaire to local officials.
2-17-15	Iosco County Public Safety Building	Subcommittee met to review the Community Profile.
2-26-15	Iosco County Public Safety Building	Distributed the revised Community Profile for comments. Discussed the need to include reference of the Hazard Mitigation Plan in other local documents. Began discussion on the status 2007 Plan's Strategy Table.
3-12-15	Iosco County Public Safety Building	Discussed the status of the 2007 Plan's Strategy Table.
4-30-15	Iosco County Public Safety Building	Completed the status of the projects identified in Plan's Strategy Table. Initiated a discussion on the county's high and significant risk dams.
5-14-15	Iosco County Public Safety Building	Identified events by hazards. Initiated the discussion on mitigation strategies.

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6-11-15	Iosco County Public Safety Building	Continued discussion on mitigation strategies in an effort to reduce them to a workable number.
7-16-15	Iosco County Public Safety Building	Completed the discussion on mitigation strategies reducing the number to 44. Initiated discussion on updated implementation strategies (2016 Action List).
8-27-15	Iosco County Public Safety Building	Finalized the priority chart, initiated discussion on Action List with a revised focus on the number of projects (12-20).
9-24-15	Iosco County Public Safety Building	Continued with the Action List Items discussion and began developing a list of items to include in the plan update.
10-15-15	Iosco County Public Safety Building	Action list items proposed and information on the items discussed. Prioritization of the items also initiated.
10-15-15	Quarterly Township Association Meeting St. Paul's Lutheran Church, Hale	Met with township (and other local) officials to again promote their participation in the Hazard Mitigation Plan update by attending the monthly meetings and returning the questionnaires on their specific hazards/ concerns.
11-11-15	Iosco County Public Safety Building	Prioritization of high and medium action list items completed, discussed the action list item information.
12-17-15	Iosco County Public Safety Building	Modified the action list items, modified the action list information.
1-14-16	Iosco County Public Safety Building	Discussed the chapter on follow-up procedures during the next five years, finalized the action list items.
3-17-16	Iosco County Public Safety Building	Revised action list items per recommendations of MSP and FEMA staffs. Discussed the approval/public hearing process.

At the above meetings, the chapters of the Plan were evaluated and modified accordingly. Below are the results of the chapter reviews for each chapter in the Plan.

- Reviewed and updated Chapter 1: Introduction. Reviewed and updated information on Iosco County, as well as on the process. Information is included in Chapters 1: Introduction and Chapter 2: Planning Process of the update.
- Reviewed and updated Chapter 2: Environment. Reviewed and updated information on the physical characteristics of Iosco County. Information is included in Chapter 3: Community Profile of the update.
- Reviewed and updated Chapter 3: Social Features. Reviewed, updated, and modified the social and demographic data of Iosco County. Information is included in Chapter 3: Community Profile of the update.

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- Reviewed and updated Chapter 4: Land Use Characteristics. Reviewed land use characteristics of Iosco County. Information is included in Chapter 4: Hazard Analysis of the update.
- Reviewed and updated Chapter 5: Public Facilities and Services. Updated and reviewed the public services being available in Iosco County. Information is included in Chapter 3: Community Profile of the update.
- Reviewed and updated Chapter 6: Advanced Analysis. Reviewed and updated the analyses for the hazards identified in Iosco County. Information is included in Chapter 4: Hazard Analysis of the update.
- Reviewed and updated Chapter 7: Risk and Vulnerability Assessment. Reviewed and updated the risk and vulnerability assessments for Iosco County. Information is included in Chapter 2: Planning Process of the update.
- Reviewed and updated Chapter 8: Goals and Objectives. Reviewed and updated the goals and objectives for Iosco County. Updated goals and objectives are found in Chapter 6: Action Items.
- Reviewed and updated Chapter 9: Mitigation Strategies and Priorities. Reviewed the mitigation strategies and priorities for Iosco County. Status of the mitigation strategies is found in Chapter 5: Evaluation of Alternatives. Updated priorities are found in Appendix C.
- Reviewed and updated Chapter 10: Approval and Implementation. Reviewed and updated the approval and implementation schedule for Iosco County. The revised implementation process is included in Chapter 7: Follow-up.

This update process included the review of the Iosco County Master Plan, the 2014 Michigan Hazard Mitigation Plan, county maps and studies, municipal master plans, as well as ongoing planning activities. This included the review of informational sources such as: U.S. Census, National Weather Services, emergency management plans, Michigan Department of Transportation, Michigan Department of Natural Resources, and local health departments.

In January 2016, the action list was sent to the EMHSD staff for their review and comment. This list was then sent to FEMA staff for their comments. In February, the EMD and EMCOG staff were notified that FEMA staff suggested that a larger proportion of action items involve mitigation activities rather than education and preparedness activities.

In March 2016 the EMC and the EMCOG regional planner discussed the proofing of the draft document and the scheduling for the approval of the Plan. Also in March the ICHMPC met reviewed the changes in the Chapter 5: Action List Items and Appendix E, and discussed the public hearing and approval process. This scheduling included the timing for the public hearing, the approval of the plan by EMHSD staff, FEMA staff, and the adoption of the Plan by the County Board and other municipal agencies. The Public Hearing date was scheduled for April 20, 2016, and arrangements were made for final review of the plan by the committee, notifications of the meeting, and distribution of the draft document.

To be completed after the public hearing on April 20, 2016.

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Iosco County Hazard Mitigation Planning Committee
Attendance Table
TABLE 2.2

Participating Agency or **Jurisdiction**	Returned Questionnaire (1) and (2)	MEETING DATES																	
		5-13	9-14	10-14	12-14	1-15	2-15	3-15	4-15	5-15	6-15	7-15	8-15	9-15	10-15	11-15	12-15	1-16	3-17
East Michigan Council of Governments	NA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Iosco County	NA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
East Tawas	1, 2	X	X		X	X		X		X			X		X		X	X	X
Tawas City	1																		
Whittemore	1	X					X	X	X										X
Alabaster Township		X	X		X														
AuSable Township	1						X	X	X	X	X	X	X					X	
Baldwin Township	1						X												
Burleigh Township	1																		X
Grant Township																			
Oscoda Township	1, 2							X	X	X	X	X		X	X	X		X	X
Plainfield Township	1, 2	X		X	X	X			X			X	X				X	X	X
Reno Township	1							X											
Sherman Township	1, 2											X		X			X	X	
Tawas Township	1, 2							X	X	X	X	X	X	X	X	X	X	X	X
Wilber Township	1, 2						X	X			X	X	X	X	X	X	X	X	

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American Red Cross			X	X															
Amateur Radio Emergency Services (ARES)																X			X
District Health Department No. 2		X	X		X	X	X		X	X	X	X					X	X	X
Huron Shore Water Treatment Facility	NA						X	X				X			X	X		X	X
Iosco County 911	NA	X	X	X		X		X	X	X	X	X	X	X		X	X		X
Iosco County EMS	NA	X	X		X	X			X	X	X				X	X	X	X	X
Iosco County Sheriff's Dept,				X	X	X	X	X				X							
Kelly Karpp's Organization	NA															X			
Michigan State Police	NA				X	X	X	X											
Mobile Medical Response	NA																		
St. Joseph's Hospital	NA				X														
Tawas Hospital	NA											X							
US Forest Service	NA			X	X	X													

Jurisdictions in bold font have contributed to the Plan update.

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Iosco County Hazard Mitigation Plannin Committee
Attendance Table
TABLE 2.3

Person	Agency	Hazard Mitigation Advisory Committee Member	Number of Meetings Attended
Joe Alyea	U.S. Forest Service	X	2
Blinda Baker	East Tawas	X	5
Nick Bernelis	Mobile Medical Response	X	
Ralph Boudreau	Iosco County Sheriff Department	X	4
Tom Clement	Reno Township	X	1
Christina Curtis	American Red Cross	X	2
Bill Deckett	East Tawas Fire Dept.	X	4
Ron Dorcey	City of Whittemore	X	4
Bill Ernat	EMCOG	X	17
Lorna Ganci	Oscoda Township	X	10
Catherine Garnham	Huron Shore Water Plant	X	
Brian Golden	Iosco County EMS	X	11
Tara Harris	**Iosco County EMS**		**1**
Mary Hart	Oscoda Township	X	
Tim Haskin	Tawas Township	X	12
Annge Horning	Tawas City	X	
Vicki Jones	**Iosco County EMS**		**1**
Matt Jurczyk	Huron Shore Water Plant	X	6
Kelly Karpp	Iosco County Amateur Radio Emergency Services (ARES)	X	2
Sally Krueger	Wilber Township	X	10
Ron Leslie	East Tawas	X	7
Fred Lewis	Plainfield Township	X	9
Allan MacGregor	Iosco County Sheriff Dept.	X	4
Mel Mathews		X	
Pat McDougall	**St. Joseph's Hospital**		**1**
Rick Mikulski	Sherman Township	X	4
John Moehring	Iosco County Board of Commissioners	X	10
Pete Myers	Tawas Hospital	X	1
Peter Neuman	**Tawas Area Schools**		**1**
Bob Rae	Iosco 911	X	15
BJ Roach	Michigan State Police	X	4
Ed Rohn	Iosco County	X	18
Robert Stalker	Oscoda Township	X	
Kathie St. Clair	Mobile Medical Response	X	
Leisa Sutton	AuSable Township	X	8
Jim Svoboda	Baldwin Township	X	1
Todd Torrey		X	

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Cori Upper	Department of Health District 2	X	14
Janel Walmsley	City of Tawas City	X	
Jeff Webster	City of Whittemore Fire Dept./ Burleigh Township	X	3
Stephanie Wentworth	Alabaster Township	X	3
Bob White	Wilber Township	X	
Persephone Wilson	U.S. Forest Service	X	1

Bold print denotes a person not on the ICHMPC

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CHAPTER 3: COMMUNITY PROFILE

NATURAL FEATURES OF IOSCO COUNTY

Iosco County is located in northeastern Lower Michigan. The County is bordered by Alcona County to the North, Ogemaw County to the West, Arenac County to the South and on the east by Lake Huron.

Iosco County covers an area of approximately 565 square miles. It is a sparsely populated county characterized by a variety of scenic water bodies, large tracts of public and private forest lands and clustered areas of agricultural land. The majority of the local population resides along the Lake Huron shoreline near US-23, East Tawas, Tawas City and Oscoda. The remaining population concentrations and employment opportunities are found in the west where M-65 connects Hale and Whittemore.

Iosco County is a popular destination for tourism and recreation due to an abundance of scenic natural features. It is easily accessible from I-75 via US-23, M-65 and M-55.

Iosco County is home to many seasonal residents who are drawn to the county's attractive natural environment. According to the 2010 U.S. Census, there were 10,878 occupied housing units in the county and another 9,457 housing units described as "rental, vacant, seasonal, recreational, or occasional use."

Iosco County contains fourteen (14) local units of government, including eleven (11) townships, and three cities. Tawas City is the County seat. These communities are represented by a five (5) member Iosco County Board of Commissioners which cover as many districts. The 2010 census of the County was 25,887.

Iosco County is covered by District 3 of the Emergency Management & Homeland Security Division of the Michigan State Police.

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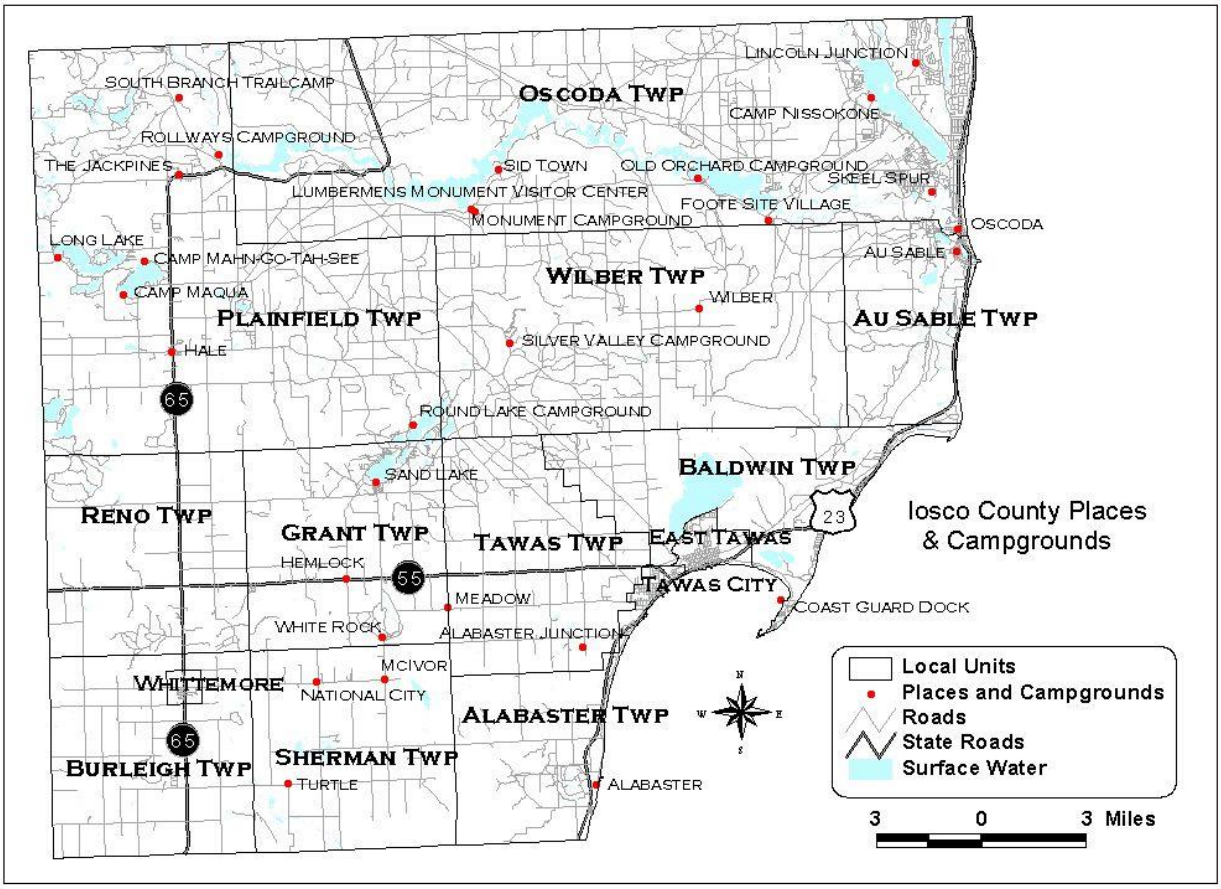
Iosco County Geographic and Municipal Map

MAP 3.1



Iosco County Population
TABLE 3.1

Minor Civil Division	2000 Population	2010 Population	Change in Population
Alabaster Twp	503	487	-3.2%
AuSable Twp	2,230	2,047	-8.2%
Baldwin Twp	1,726	1,694	-1.9%
Burleigh Twp	775	787	1.5%
Grant Twp	1,560	1,546	-0.9%
Oscoda Twp	7,248	6,997	-3.5%
Plainfield Twp	4,292	3,799	-11.5%
Reno Twp	656	590	-10.1%
Sherman Twp	493	448	-9.1%
Tawas Twp	1,684	1,744	3.6%
Wilber Twp	740	729	-1.5%
City of East Tawas	2,951	2,808	-4.8%
City of Tawas City	2,005	1,827	-8.9%
City of Whittemore	476	384	-19.3%
Iosco County Total	27,339	25,887	-5.3%

Iosco County Top Employers
TABLE 3.2

Company Name	Location	# of Employees
Kalitta Air	Oscoda	788
St. Joseph Hospital	Tawas City	550
Cooper Automotive Fluid System	Oscoda	400
Wal-Mart Supercenter	Tawas City	250
CruseCom	Oscoda	249
Plastic Trim Intl.	East Tawas	230
Oscoda Area Schools	Oscoda	150
Iosco Medical Care Facility	Tawas City	140
Tendercare Tawas City	Tawas City	140
Cooper Standard	East Tawas	105
Family Faire	Oscoda	100
Lakewood Shores Resort	Oscoda	100
Phoenix Composite Solutions	Oscoda	103

Source: Region 7B Michigan Works - Top Firms

Land Use:

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Iosco County is a large county with 11 townships and three cities. The following map identifies land use in Iosco County.

The majority of development in Iosco County is located along Lake Huron in the communities of Tawas City, East Tawas, Oscoda and AuSable. Urbanized areas take up approximately 1% of the County's land area. This development is centered along and around the most destructible portions of the County, its lake shores. The majority of development in urbanized areas involves tourist and resort attractions.

Approximately 64.3% of the County is forested. The majority of this land is held in trust by the state and federal governments, known as the AuSable State Forest and Huron National Forest, respectively. These holdings represent significant recreational resources for the County. Forests, inland waters, and wetlands comprise over 8.6% of the County's surface area. Agricultural uses account for approximately 10.7% of the area. All of the townships and cities in Iosco County have prepared individual Land and/or Zoning Ordinances.

Iosco County Land Use by Acre and Percentage

TABLE 3.3

Category	Acres	Percent of Total
Residential	11,400	3.15%
Commercial/Institutional	1,947	0.54%
Industrial/Extractive/Transportation	5,759	1.6%
Recreational	1,161	0.32%
Agricultural	50,532	13.94%
Non-forested Uplands	18,467	5.1%
Upland Forest	187,759	51.8%
Lowland Forests & Wetlands	73,516	20.3%
Surface Water	11,774	3.25%
Total	362,315	100%
Source: Michigan Department of Natural Resources - MIRIS		

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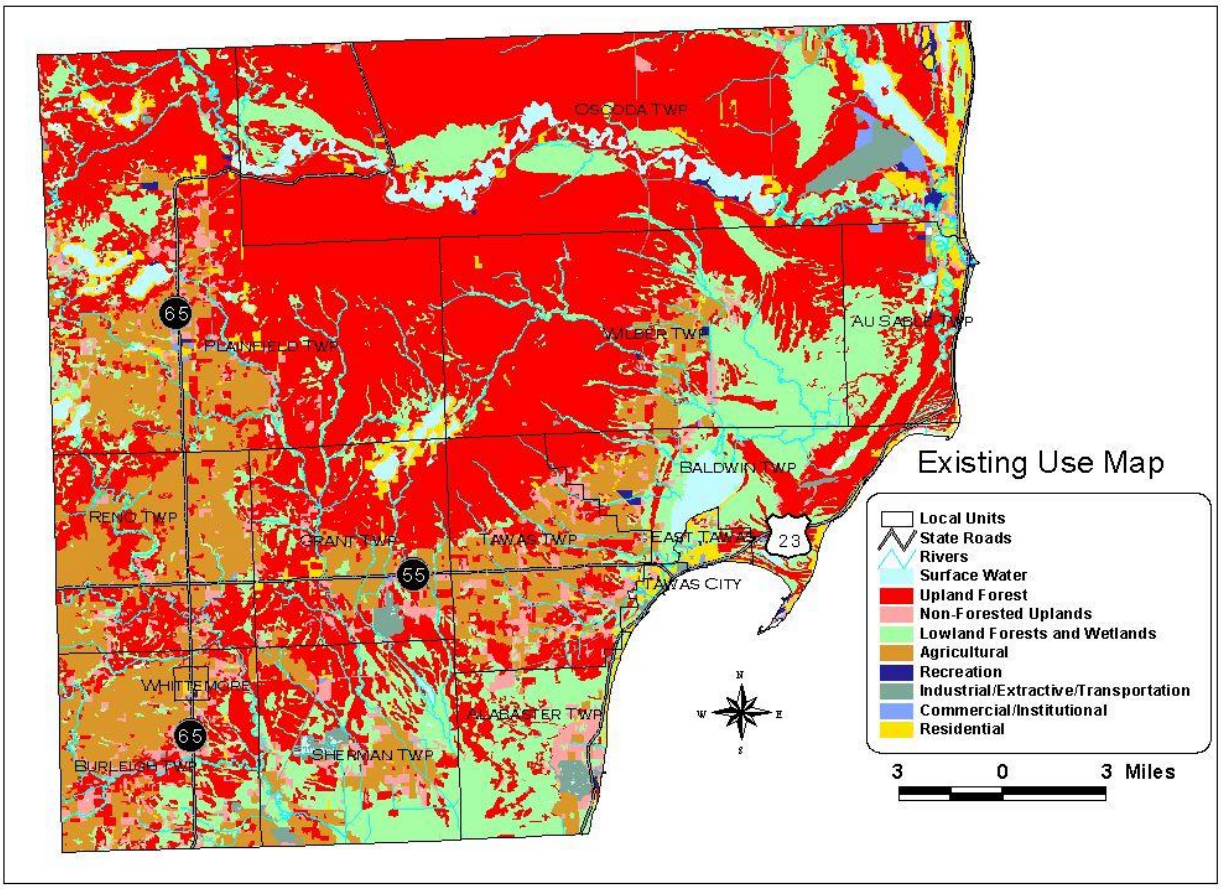
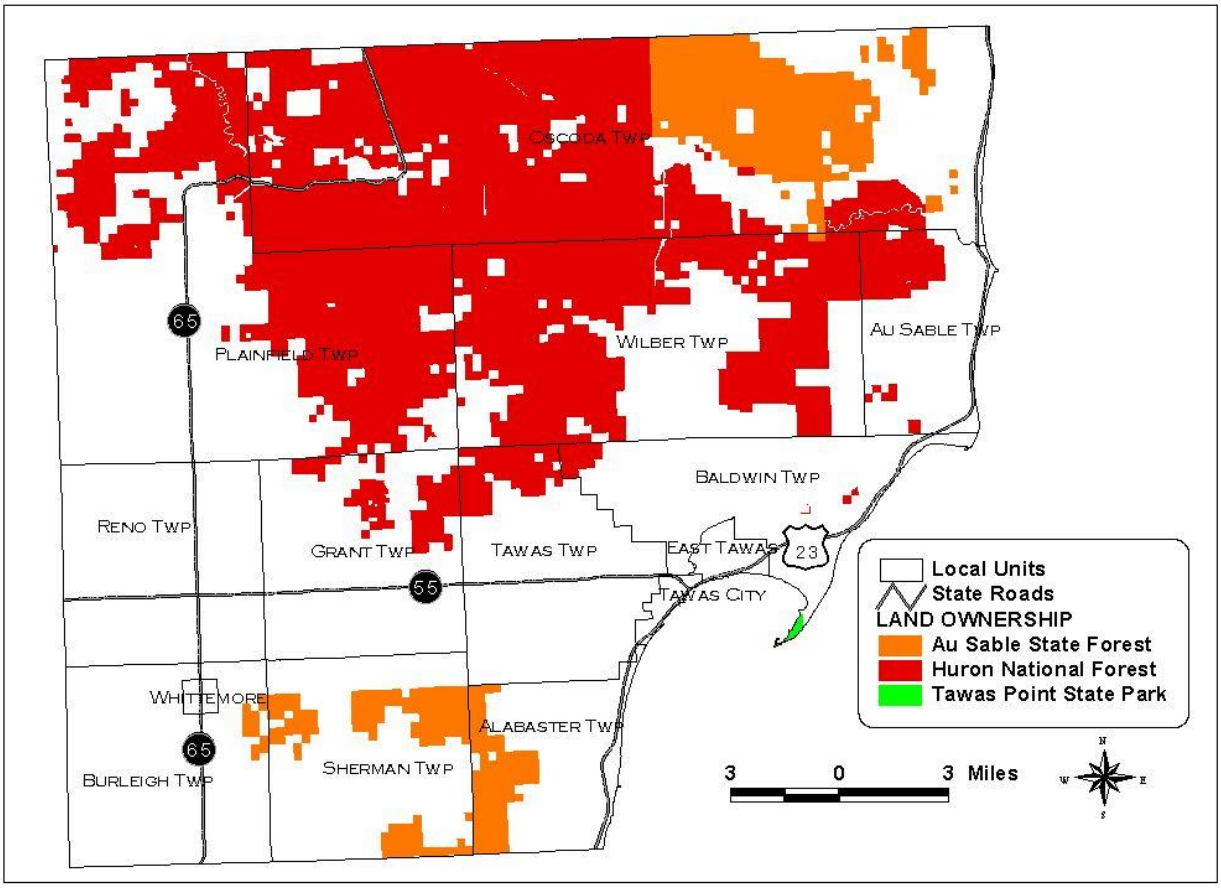
Iosco County Existing Land Use Map

MAP 3.2



Iosco County State/Federally Owned Lands

MAP 3.3

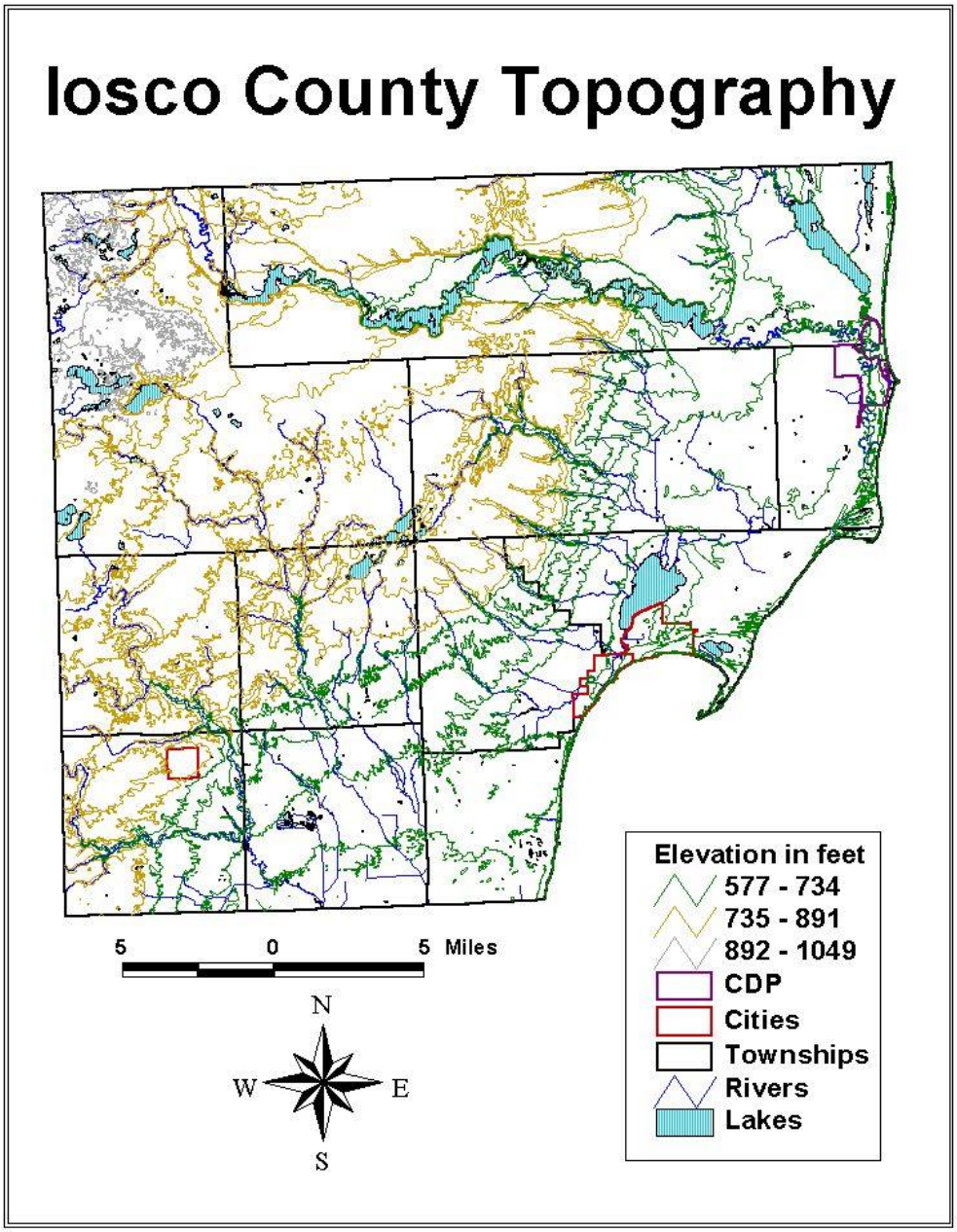


TOPOGRAPHY

Iosco County's topography will indicate a total relief of about 470 feet, with the high point being the 1,049 foot contour which crosses the extreme northwest corner of the county. From there, the terrain slopes towards Lake Huron which is approximately 580 feet above sea level. Significant deviations from the gently rolling terrain can be seen in the "high banks" along the AuSable River and the moraine located roughly in the center of the County near the Silver Valley Winter Sports area.

Iosco County Topography Map

MAP 3.4

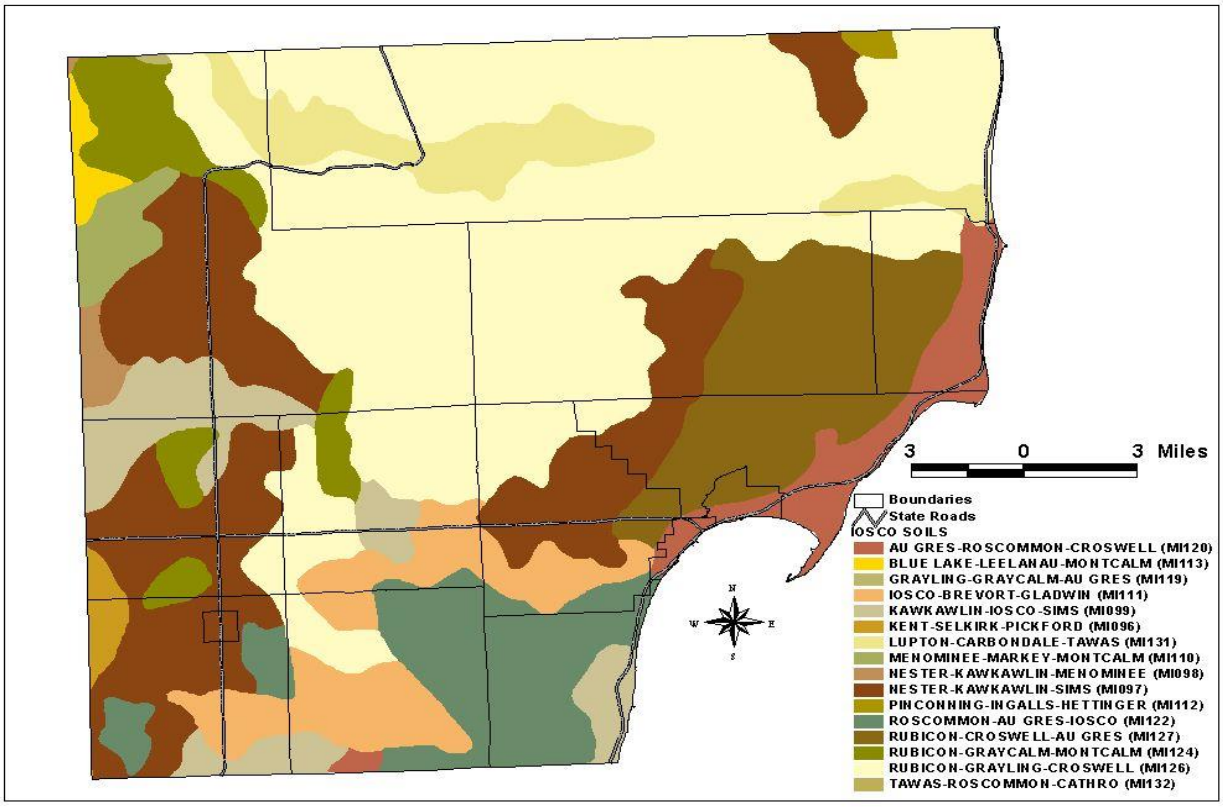


SOILS

Iosco County is one of three counties in the state of Michigan that does not have a soil survey manual. The following is a STATSGO soil classification map that shows Iosco County with sixteen different types of soil classes. The largest area of one soil class would be the Rubicon-Grayling-Croswell class in the northern central area of the county. This soil association is undulating, and in this case, it is an outwash plain where sand deposits are greater than 66 inches deep. Another prominent soil class would be the Nester-Kawkawlin-Sims class. This soil class serves well for farming uses, which coincides with the agricultural uses in the land cover map – see below.

Iosco County Soils Map

MAP 3.5



CLIMATE

Typical of northern Michigan, the distinct four seasons offer an ever changing landscape. Long snowy, cold winters; and moderately warm summers are separated by a cool, green spring and a cool colorful fall. Located in the northeastern part of the northern Lower Peninsula, the eastern boundary of the County is formed by Lake Huron. Given this geographic location, the weather is influenced by the moderating effect of Lake Huron. The climate along the immediate Lake Huron shore is semi-marine in nature and lacks many of the temperature extremes found only a few miles inland.

Iosco County's weather, like all of Michigan's, influences the types of hazards that communities must plan for throughout the year. According to the U.S. Department of Agriculture, the climate of Iosco County experiences a variety of extremes – from hot and dry summers to snowstorms in the winter. Generally, January is the coldest month and has the highest snowfall. July is generally the warmest month in the County. August has the highest average precipitation and February generally has the lowest. Wind direction and speed significantly influence the extent to which Lake Huron modifies the weather in Iosco County. Prevailing winds in the area are from the northwest during all but the months of May and June, when southeasterly winds predominate. Lake breezes are also common during daylight hours in July and August as air, heated over sun-warmed land, rises and is replaced by cooler air masses from Lake Huron. Mean annual wind speed is 7.3 mph with the greatest average velocities occurring in April (8.6 mph) and the least in August (6.1 mph).

WETLANDS AND WATER FEATURES

Wetlands

Poorly drained, lowland areas support northern white cedar, tamarack, balsam fir, black spruce, eastern hemlock, white pine, balsam poplar, trembling aspen, paper birch, black ash, speckled alder and shrub willows. Northern white cedar dominates the wetland areas where there is good lateral water movement and the soils are high in organic content. These lowland forests are typically located adjacent to water features and function as riparian forests and water quality buffers. The network of lowland forests, associated with rivers and creeks, also function as wildlife corridors and are the backbone of large regional ecological corridors. Non-forested wetland types include lowland brush, marshes and bogs. Forested and non-forested wetlands are a finite resource in the county. Land use planning activities should focus on protecting and preserving these limited and critical resources. The following color thematic maps were prepared from the MIRIS Inventory. Green areas depict emergent, scrub-shrub and forested wetlands areas.

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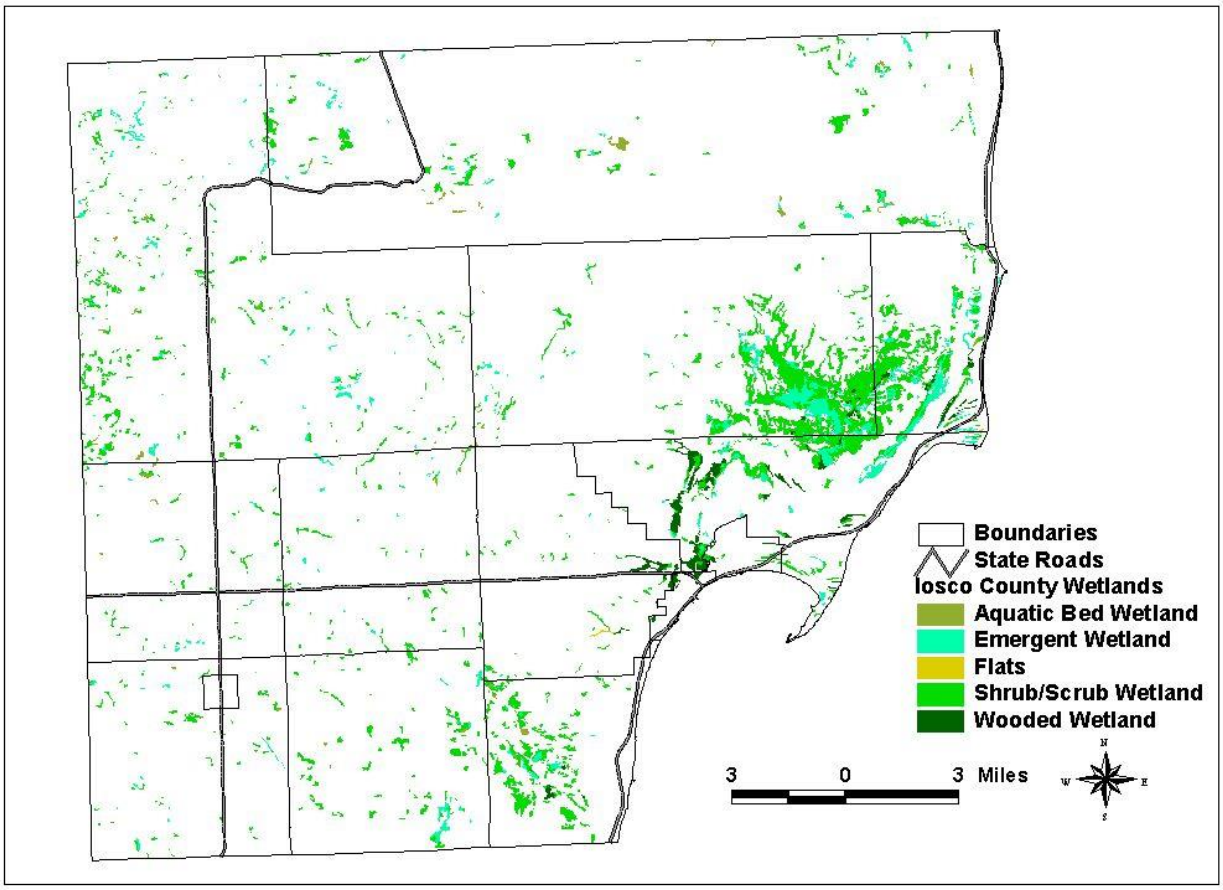
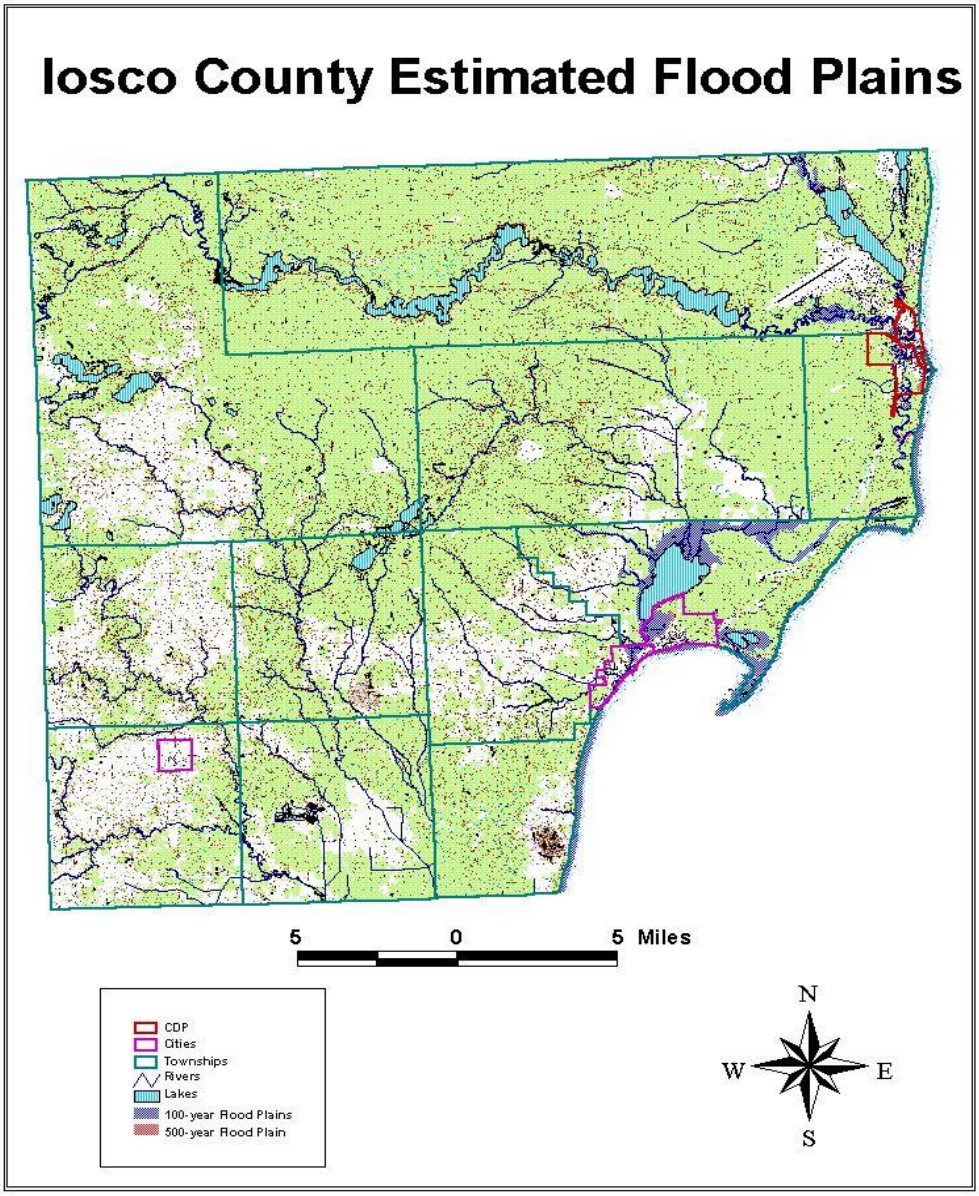
Iosco County Wetlands
MAP 3.6



Water Features and Estimated Floodplains

Iosco County has many water resources. The AuSable River provides many fishing and boating opportunities and passes through the northern third of the County from west to east. The County has about 12,000 acres of scattered lakes and ponds. These water areas range from less than 5 acres to more than 1900 acres. Some lakes are located in marshes and exhibit all stages of filling by vegetation. Most of the lakes are in the northern half of the County. Among the larger ones are Cooke Pond, 1,942 acres; Foote Pond, 1,824 acres; Tawas Lake, 1,670 acres; Van Etten Lake, 1,320 acres; Long Lake, 493 acres; Loon Lake, 417 acres; and Sand Lake, 240 acres. Iosco County has three major drainage systems - The AuSable River, the AuGres River and the East Branch of the AuGres River. All waterbodies have a floodplain associated with them. The following map shows the County's estimated floodplains.

Iosco County Estimated Floodplains
MAP 3.7



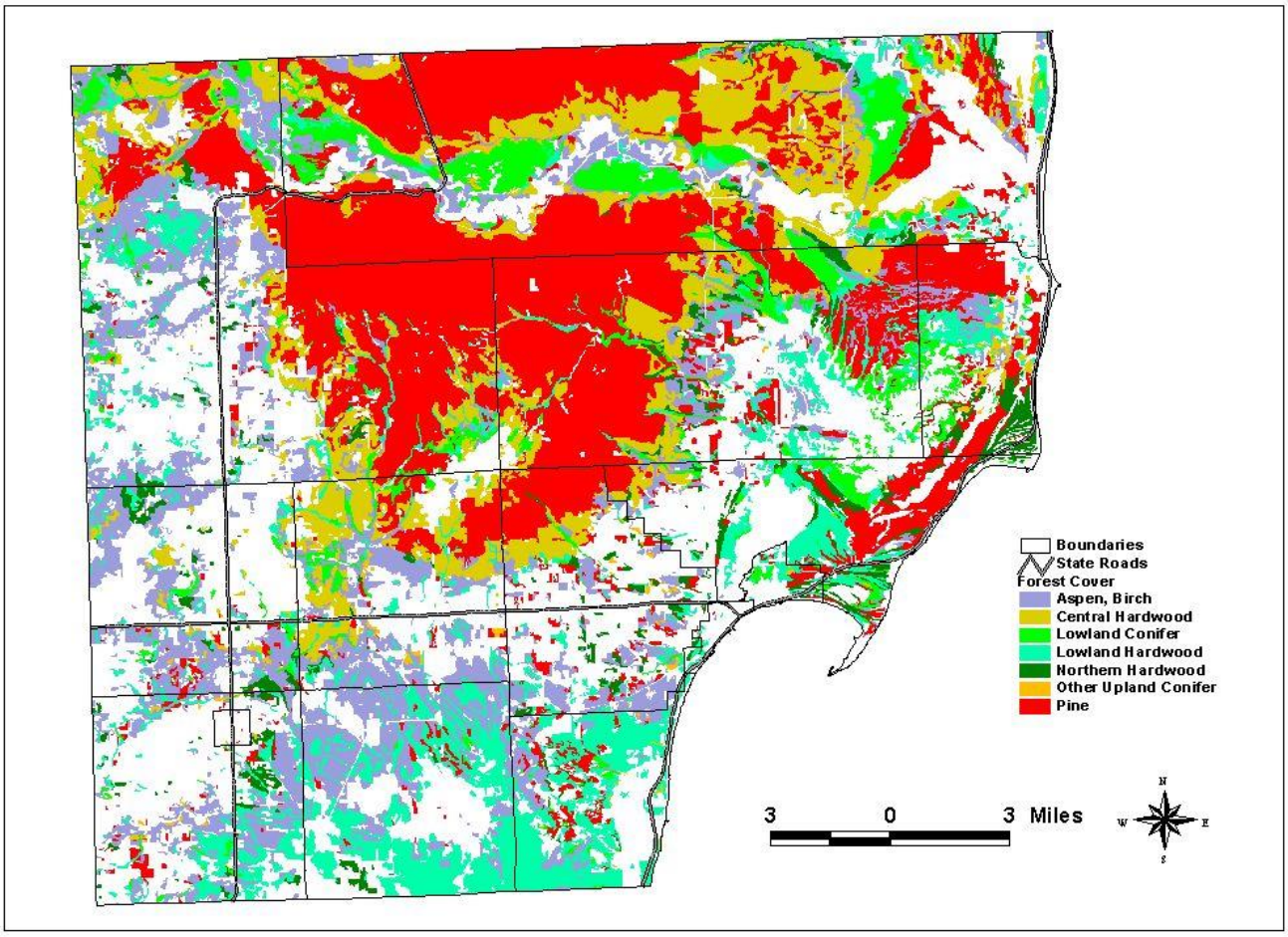
VEGETATION

The Michigan Department of Natural Resources has compiled pre-settlement vegetation maps of counties in Michigan. The maps were generated from information contained in the first government land survey notes in the 1800's along with information such as current vegetation, land forms and soils. A review of the pre-settlement vegetation map of Iosco County show extensive areas were covered with pine and oak forests, see Map 7. This clearly shows a long history of wildfires in the area. The map delineates jack pine-red pine forest, white pine-red pine forest, pine barrens and pine/oak barrens, which combined covered

40.5 percent of the County. In the late 1800's extensive logging and subsequent wildfires resulted in the conversion of hemlock-white pine and beech-sugar maple-hemlock forests to farmland or urban areas. This is most noticeable in eastern Oscoda Township and the western and southern portion of the county.

Iosco County Vegetation Cover

MAP 3.8



Forest Cover

Since about 65 percent of the County is forested and forest fires have been identified as the number one natural hazard in the Iosco County Hazard Analysis Plan, an analysis of forest types will assist in defining vulnerable areas and populations. The Michigan Resource Information Systems (MIRIS) 1978 land use inventory compiled land cover maps that depict forest types in the county. Tree species vary depending upon the soils, moisture and past activities such as logging, fires and land clearing. Jack-red-white pine, other upland conifers, and aspen-birch are the most common forest types. Under dry spring conditions forest fires can occur in any forest type. However some forest types have higher risks. Jack and red pine forests have a high risk for wildfires. Oak and white pine forests have a moderate risk for wildfires. According to the MIRIS Land Cover/Use Inventory, jack pine and red pine forest types cover approximately 37 percent of the forestland. Oak and white pine forests account for another 16 percent. Draughty, low fertility sandy soils, found in outwash plains and channels, supported pre-settlement pine forests that for thousands of years were perpetuated by wildfires. Today, residential development has occurred within

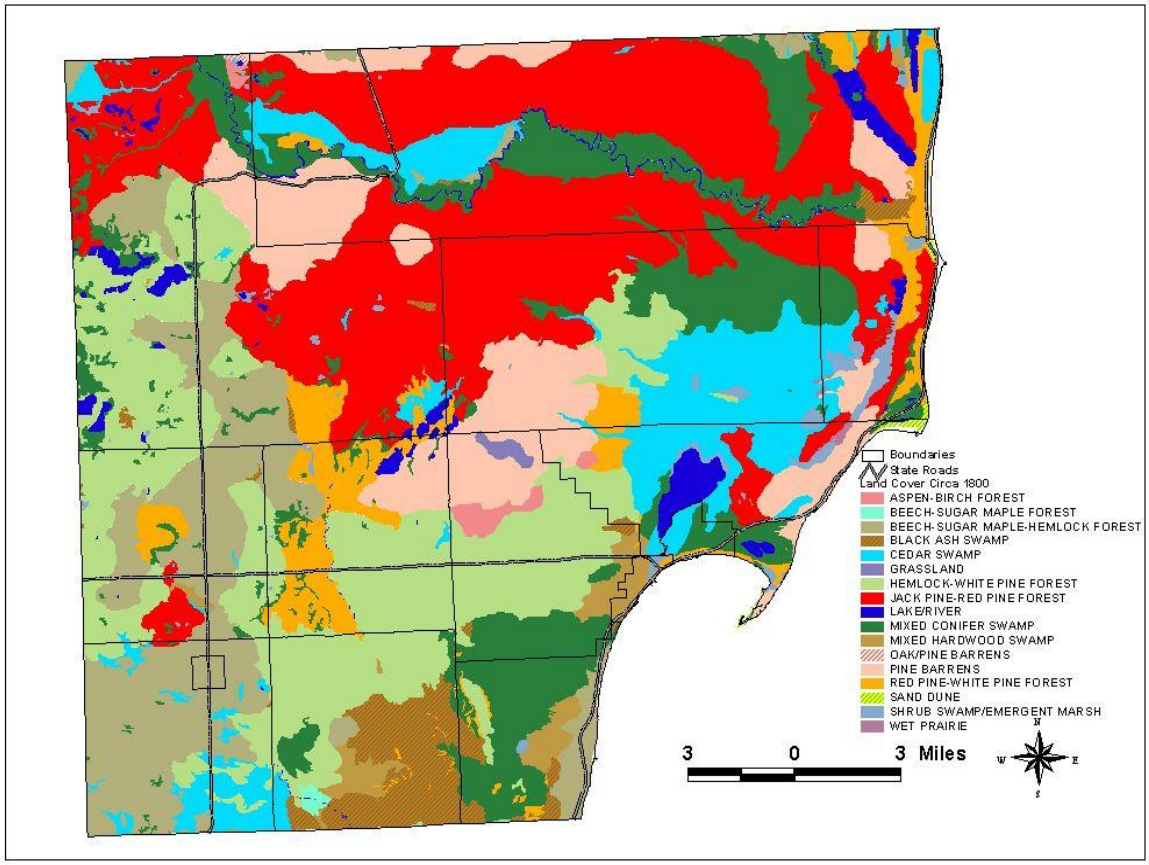
the same wildfire prone areas. There is a concentration of pine forest types in AuSable, Grant, Tawas, Wilber, Plainfield, and Oscoda Townships.

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

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

Iosco County Forested Areas

MAP 3.9



COMMUNITY ORGANIZATION AND RESOURCES FOR HAZARD MITIGATION including County and Local Community Agencies, Departments and organizations potentially relevant for Hazard Mitigation.

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

Iosco County Office of Emergency Management
Iosco County Public Safety Building
1808 E. US-23
East Tawas, MI 48730
989-362-1423
Ed Rohn, Emergency Management Coordinator
emc@iosco911.com
Mobile: 989-820-6300

This office was established under the provisions of the Michigan Emergency Management Act, PA 390 of 1976, as amended, to ensure a coordinated public response in the event of a natural or man-made disaster. The purpose of Emergency Management is to plan and prepare for high impact, low probability events. The Iosco County Emergency management office assesses local capabilities to respond to emergency and disaster situations, and advocates emergency preparedness in both the public and private sectors and works to assure a comprehensive approach is used involving a range of public and private agencies including local police, fire and EMS agencies, the Michigan State Police Emergency Management and Homeland Security Division, the Michigan Department of Environmental Quality, the Homeland Security Board and the National Weather Service. Other agencies coordinating with emergency management include the American Red Cross, local and state health departments, educators and amateur radio operators. This office tends to be central for all major threats and incidents within the county. This office also handles NOAA Weather alerts, and Homeland Security matters.

Warning Sirens or System
Iosco County has no weather sirens in the county. NOAA radios, local TV and radio, and smartphone technology are utilized for early warning of weather events.

Police
The Michigan State Police Post, located in the city of East Tawas was reduced to “detachment” status in March of 2011 as part of an MSP reorganization plan which concentrates on regional policing models. With twenty nine—posts remaining operational, the West Branch post would be the central servicing entity for Iosco County.

The County Sheriff s Office is located in Tawas City, Michigan. The facility has served the community for more than 50 years. The jail has a rated capacity of 63 beds. Staffing includes a Jail Administrator along with two Corporals and ten Correction Officers.

The Tawas Policy Authority was formed in 1991 to provide police protection to both East Tawas and Tawas City.

The Oscoda Township Police Department provides 24 hour, 7 day per week patrol coverage for Oscoda and AuSable Townships. The patrol coverage area for the police department is approximately 163 square miles. The department currently consists of 2 Sergeants, 8 patrol officers and the Chief of Police. The Oscoda Township Police Department patrol vehicles are equipped with in car video cameras to reduce liability and for officer / citizen protection.

Michigan State Police/West Branch Post
496 East Houghton
West Branch, MI 48661
989-345-0955
www.michigan.gov/msp

Iosco County Sheriff Department
428 West Lake Street
Tawas City, MI 48763
989-362-6164
FAX: 989-984-1103
Sheriff Allan L. MacGregor
amacgregor@ioscocounty.org

Tawas Police Authority
810 West Westover Street
East Tawas, MI 48730
989-362-7718
989-362-5140 – Fax
After hours: Central Dispatch – 989-362-1430
Mark Ferguson, Chief of Police
mferguson@tawaspd.us

Oscoda Township Police Department
110 State Street
Oscoda, MI 48750
989-739-9113
Mark David, Chief of Police
otpd@OscodaTownshipMI.gov

Fire
The population and government units of Iosco County depend upon separate volunteer fire departments, interconnected by mutual aid agreements that includes membership from neighboring Alcona, Arenac, and Ogemaw Counties as well. There are six (6) fire departments located in Iosco County. They are: Grant Township Volunteer Fire Department, Plainfield Township Fire Department, East Tawas Fire Department, Tawas City Fire Department, Oscoda Fire Department, and Whittemore Volunteer Fire Department.

East Tawas Fire Department
122 Main Street
East Tawas, MI 48730
989-362-3685
Bill Deckett, Fire Chief
www.easttawas.com

Tawas City Fire Department
416 Matthews, P. O. Box 568
Tawas City, MI 48764
989-362-8688
Steven Masich, Fire Chief

Grant Township Fire Department
4049 West Indian Lake Road
National City, MI 48748
989-362-6468
Fred Jennett, Fire Chief

Plainfield Township Fire Department
300 North Washington
Hale, MI 48739
989-728-2811
Ken Emery, Fire Chief
Klemery505@gmail.com
www.plainfieldtwpmi.com

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Oscoda Area Fire Department
110 S. State
Oscoda, MI 48750
989-739-9113
otfd@OscodaTownshipMI.gov

Whittemore Fire Department
503 South Bullock
Whittemore, MI 48770
Rick Farrand, Fire Chief
989-469-8241

Central Dispatch
An enhanced 911 (E911) Authority was established and became operational in April of 1996. The Authority is made up of representatives from the State Police, Sheriff's Department, City of East Tawas, Tawas Police Authority, Oscoda Township Police Department, City of Tawas City, Iosco County Board of Commissioners, East Tawas Fire Department and Oscoda Township Fire Department. The 911 facility is located in the Iosco County Public Safety Building northeast of East Tawas on US-23 in Baldwin Center, Baldwin Township. Dispatching services utilize state-of-the-art computer systems to receive emergency calls and to direct fire, police and ambulance units to the emergency scene. The facility was renovated in 1999 and now contains state-of-the-art classrooms that double as the County Emergency Operations Center. The County Emergency Management Office is co-located in the building along with Emergency Medical Services.

Iosco County Central Dispatch
1795 Pine Trail
East Tawas, MI 48730
Robert Rae, Director
director@iosco911.com

Ambulance
Ambulance service is available throughout the county. The emergency medical services (EMS) has 24 full-time and 4 part-time employees. The County also has a poison control toll-free number.
Iosco County Emergency Medical Services
1808 E. US-23
East Tawas, MI 48730
989-362-5534
Nick Bernelis, Operations Manager
nbernelis@mobilemedical.org

Health Care
County Health Department District 2 offices are located in Tawas City. Overall, the department serves Iosco, Alcona, Ogemaw and Oscoda Counties. The County Health Department offers an array of services including but not limited to home care services (physical therapy, home health aides, etc.), immunization, nutrition, education, and family planning. The Health Department's Environmental Section processes permits, food establishment inspections, and inspections for individual on-site water wells and septic/drain field systems.

Tawas St. Joseph Hospital provides 69 beds and employs 28 doctors (including several specialists) on staff. The hospital's service area includes all of Iosco County and portions of Alcona, Arenac, Ogemaw and Oscoda Counties. Tawas St. Joseph Hospital has been instrumental in developing clinics at Hale, Whittemore, the Tawases, Oscoda and AuGres; an area Hospice program; home health care programs; and the Northern Michigan Health Care Consortium. The hospital provides many health care needs in-house, including intensive care, cardiac control, x-ray, blood bank, abdominal surgery, etc. Patients

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needing specialized services such as neuro-surgery, thoracic-surgery, radiation therapy or severe trauma care can be flown by helicopter directly to larger institutions in Saginaw, Flint, Midland or Detroit.

Several nursing home medical recovery facilities are available in the county. The Iosco Medical Facility provides 64 beds plus a 28 bed Alzheimer's Unit, Tendercare provides 120 beds, Lakeview Manor Health Care provides 60 beds, Tawas Village provides 47 beds, and Hale Creek Manor provides 37 beds. There are approximately 25 independent doctors, 10 dentists, 11 optometrists, and 7 chiropractors practicing within Iosco County.

There is a comprehensive community mental health services program available in Iosco County. The program is a tri-county cooperative effort for Iosco, Ogemaw and Oscoda counties known as AuSable Valley Community Mental Health Services.

The Iosco County Interagency Council is a formal group of county service agencies. The Council serves several functions in the County: 1) It is a vehicle for communication among human service agencies so they can share resources and prevent duplication of efforts, 2) it identifies county human needs and initiates action to meet those needs and involves localities whenever appropriate, and 3) it encourages all agencies to be represented on the Council and foster cooperation among these agencies.

District Health Department #2
420 W. Lake, P.O. Box 98
Tawas City, MI 48764
Cori Upper, Emergency Preparedness Coordinator
cupper@dhd2.org
989-724-6757 ext. 1603

St. Joseph Medical Clinic
200 Hemlock
P. O. Box 659
Tawas City, MI 48764-0659
(800) 362-9404

St. Joseph Health Systems
700 German Street
Tawas City, MI 48730
989-362-4170

St. Joseph Hospital/St. Joseph Health Systems
200 E. M-55
Tawas City, MI 48763
989-362-3411
www.sjhsys.org

Hale St. Joseph Medical Clinic
116 S. Church Street
Hale, MI 48739
989-728-4211
989-728-4334

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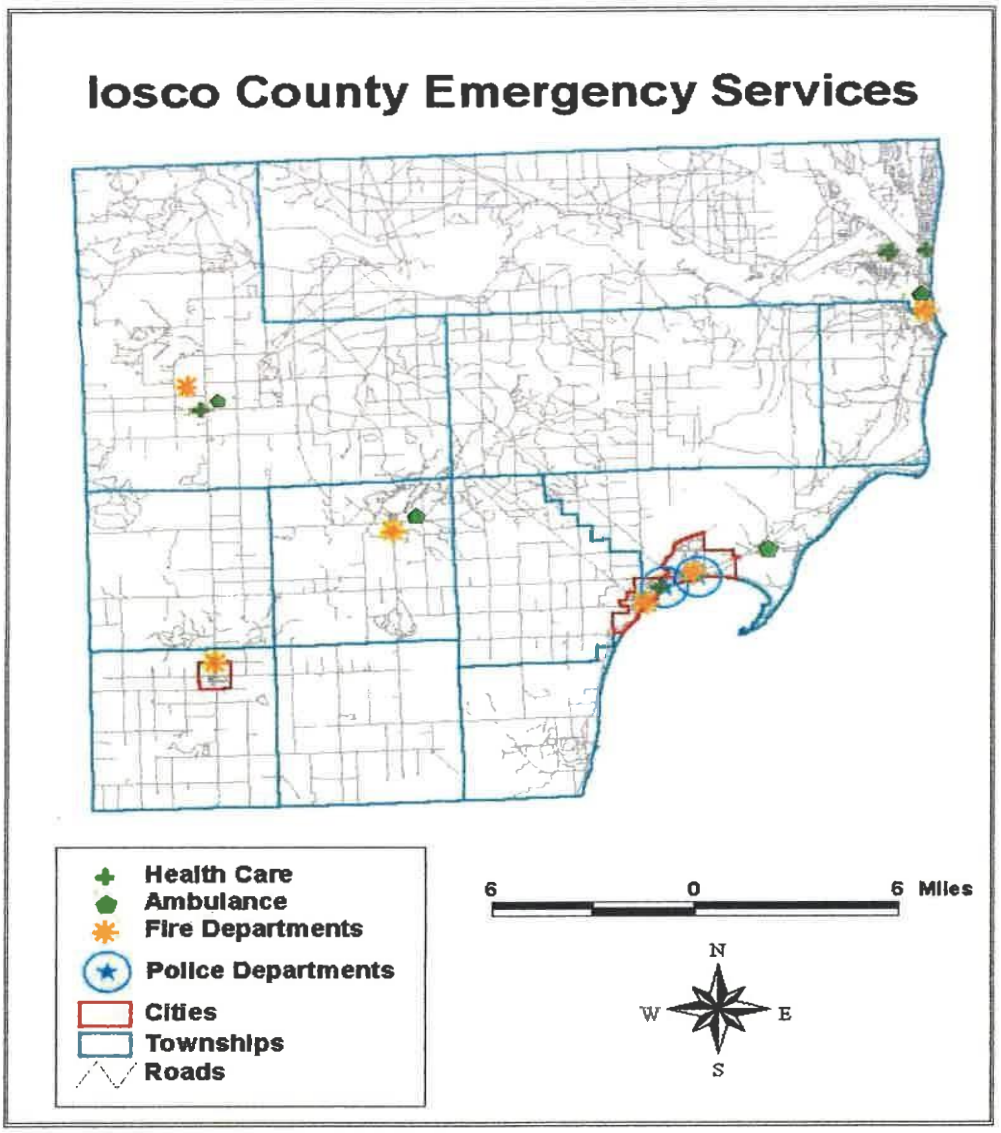
Iosco County Emergency Services Coverage
MAP 3.10



Government Facilities

Government facilities may have a large impact on how emergencies are handled. They provide services to the public such as shelter in times of natural disasters. They also serve as a way to distribute information on how to handle emergency circumstances.

Government Offices and Facilities (Main Office Locations)
Iosco County
422 West Lake Street
P. O. Box 838
Tawas City, MI 48764-0838
989-362-4212 – County Board of Commissioners
989-362-6511 – County Clerk

Townships:

Stephanie Wentworth, Supervisor
Alabaster Township
1716 South US-23
Tawas City, MI 48763-9542
989-362-3171

Janice Baldwin, Supervisor
AuSable Township
311 5th Street
AuSable, MI 48750
989-739-9169
989-739-0696 – Fax
supervisor@ausabletownship.net

James Svoboda, Supervisor
Baldwin Township
1119 Monument Road
Tawas City, MI 48763
989-362-3742
989-362-7438 - Fax
supervisorbaldwintwp@baldwintownship.net

Christopher Stone, Supervisor
Burleigh Township
8906 Alabaster Road
Whittemore, MI 48770
989-756-2424

Todd Torrey, Supervisor
Grant Township
4049 Indian Lake Road
National City, MI 48758
989-469-3177

Jim Baier, Supervisor
Oscoda Township
110 South State Street
Oscoda Township, MI 48750
989-739-4971

Fred Lewis, Supervisor
Plainfield Township
P. O. Box 247
415 East Main
Hale, MI 48739
989-728-2811
supervisor@plainfieldtwpmi.com

Jeff Jakubik, Supervisor
Reno Township
6672 Miller Road
Whittemore, MI 48770
989-756-3475

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Fred Strauer, Supervisor
Sherman Township
3165 Alabaster Road
Turner, MI 48765
989-362-6032

Paul Westcott, Supervisor
Tawas Township
27 S. McArdle Road
Tawas City, MI 48763
989-362-3771

Mark Nunn, Supervisor
Wilber Township
3120 Sherman
East Tawas, MI 48730
989-362-5410
www.wilbertownship.com

Cities

Blinda Baker, City Manager
City of East Tawas
760 Newman Street, P. O. Box 672
East Tawas, MI 48730
989-362-6161
bbaker@easttawas.com

Annge Horning, City Manager
City of Tawas City
550 W. Lake Street, PO Box 568
Tawas City, MI 48764-0568
989-362-8688
989-362-2521 – Fax
manager@tawascity.org

Ron Dorcey, Mayor
City of Whittemore
503 S. Bullock
Whittemore, MI 48770
989-756-3011

EDUCATIONAL FACILITIES

There are four (4) school districts covering territory in Iosco County plus the Iosco County Intermediate School District. The school districts include the Hale Area Schools, Oscoda Area Schools, Tawas Area Schools and Whittemore Prescott Area Schools. Overall, there are six elementary schools, three junior high schools and four high schools in the county. There are two parochial schools in Iosco County: Holy Family Catholic in East Tawas and Emanuel Lutheran in Tawas City. Adult education classes are offered throughout the county through the public school systems. Alpena Community College offers classes in Oscoda and Alpena. Kirtland Community College is in Roscommon, Mid-Michigan Community College in Harrison, and Delta Community College in Saginaw. Four year colleges within commuting distance of Iosco County include Northwood Institute in Midland, Saginaw Valley State University in Saginaw, and Central Michigan University in Mount Pleasant. Saginaw Valley and Central Michigan Colleges also offer local extension classes in Iosco County. Extension classes are also offered by Michigan State University and University of Michigan at Saginaw Valley.

The Iosco Intermediate School District offers specialized services such as alternative education and vocational-technical training. In addition, the public high schools operate vocational training programs.

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Hale Area Schools
311 N. Washington
Hale, MI 48739
989-728-7661
www.haleschools.net

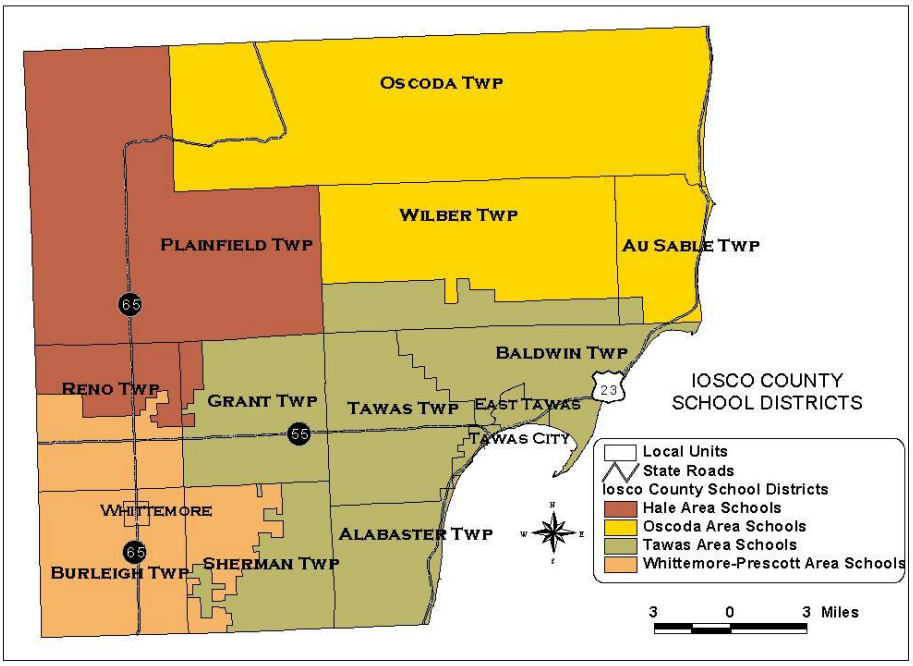
Tawas Area Schools
245 W. M-55
Tawas City, MI 48763
989-362-4481
www.tawas.net

Iosco Intermediate School District
27 N. Rempert Road
Tawas City, MI 48763
989-362-3006
www.ioscoresa.net

Oscoda Area Schools
3550 River Road
Oscoda, MI 48750
989-739-2023
www.oscodaschools.org

Whittemore Prescott Area Schools
8970 Prescott Road
Whittemore, MI 48770
989-756-2500
www.wpas.net

Iosco County School Districts
MAP 3.11



Service Agencies

Utilities, Sewer and Water: DTE Energy provides Iosco County with natural gas, Consumers Power Company provides electricity and SBC provides most phone services. Century Telephone serves the Whittemore area, the Sand Lake area and the Hale area. Broadband Internet service is provided by Charter Communications and Merit Fiber, and wireless broadband is provided by M33Access. Several

population centers in the county have sewer and water systems. The Huron Shore Regional Utility Authority currently provides water service to East Tawas, Tawas City, AuSable Township, Oscoda Township, and part of Baldwin Township. In 1996, a new water transmission line, elevated storage tanks and booster pump stations linking the Tawas Bay water plant to Oscoda/AuSable was placed in service. The former Wurtsmith Air Force Base is also connected into the Oscoda/AuSable water system.

At present water can be treated from Lake Huron at a rate of more than 5.4 million gallons per day (MGD). There are two water towers in the Tawas area, each with a capacity of 500,000 gallons. Additional storage of 500,000 gallons is available for peak demand periods in a 32 foot ground storage tank in East Tawas. There are three elevated tanks (with 1,900,000 gallons of total storage capacity) and distribution mains located within Oscoda/AuSable. On the former Base there are two elevated tanks (each with 300,000 gallons storage capacity) and distribution mains.

The Tawas Utilities Authority operates a wastewater treatment and collection system serving East Tawas, Tawas City and a portion of Baldwin Township. The industrial Park in Baldwin Township is also connected to the system. The facility is a secondary activated sludge treatment process with a 2.4 MGD capacity. Oscoda Township operates a wastewater treatment and collection system which serves the Oscoda/AuSable area. AuSable Township contracts with Oscoda Township for service. The remainder of the county is served by individual on-site water wells. The remainder of the county, except for the Hale community area in Plainfield Township, is served by individual onsite septic field systems. In Hale, and Oscoda there are municipal collection systems with facilitative lagoon treatment facilities.

Transportation

There are three (3) major highways in Iosco County, two State and one federal, which are identified below. US-23 and M65 are north-south trunk lines, while M55 is the major east-west trunk line. Access to the area via I-75 is at Standish, only 35 miles from East Tawas and Tawas City. The remaining road networks are maintained by the county and local governments. There are approximately 234 miles of primary roads and 663 miles of local roads in the county.

General aviation and/or freight air service is available at the airports outside of East Tawas and at the former Air Base in Oscoda. There is an additional airport near Hale. The Iosco County Airport (East Tawas) features a tower and rotating beacon and uses a Unicom system on frequency 122.8 for communication. The runway is lighted, paved, 75 feet wide and 4,800 feet long. There is one staff member who attends the facility 7 days a week from 9-5, and other services are available after hours. The airport has a Class B state rating. Since the closure of Wurtsmith Air Force Base, the Oscoda runway facilities have been reopened for private and commercial traffic and designated as the Oscoda Wurtsmith Airport. The airport has a Class C State rating. The runway is 11,800 feet long, 200 feet wide and is lighted. There is an ILS/DME (Instrument Landing System/ Distance Measuring Equipment) system in operation and VOR (Visual Omni Range) facilities are available. There is also an Automated Weather Observation System in operation.

There are several ports and marinas along the eastern coast of Iosco County. Rail freight service is provided throughout northern Michigan by Lake State Railrway and its rail system, with its headquarters located in Saginaw. Transit services are provided by the Iosco Transit Corporation (ITC) via a fleet of shuttle buses, with its headquarters located in Baldwin Township.

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Michigan Department of Transportation
Alpena Transportation Service Center
1540 Airport Rd.
Alpena, MI 49707
989-356-2231
Fax: 989-354-4142
Doug Wilson, Manager

Iosco County Road Commission
3939 W. M-55,
Tawas City, MI 48763
989-362-4433

Railroads
Lake State Railway Co
750 N. Washington Ave
Saginaw, MI 48607
989-393-9800 (also Emergency number)
Fax: 989-757-2134
www.lsrc.com

Airports
Iosco County Airport
1131 Aulerich Road
East Tawas, MI 48730
989-362-4214

Oscoda-Wurtsmith Airport
3961 E. Airport Drive
Oscoda, MI 48750
989-739-1111

Field of Dreams Airport
6221 W. Curtis
Hale, MI 48739
989-728-3101

Public Transportation
Iosco Transit Corporation (ITC)
1036 Aulerich Rd.
East Tawas, MI 48730
Pauline Ferns, Director
989-362-8101
Ioscotransit@live.com

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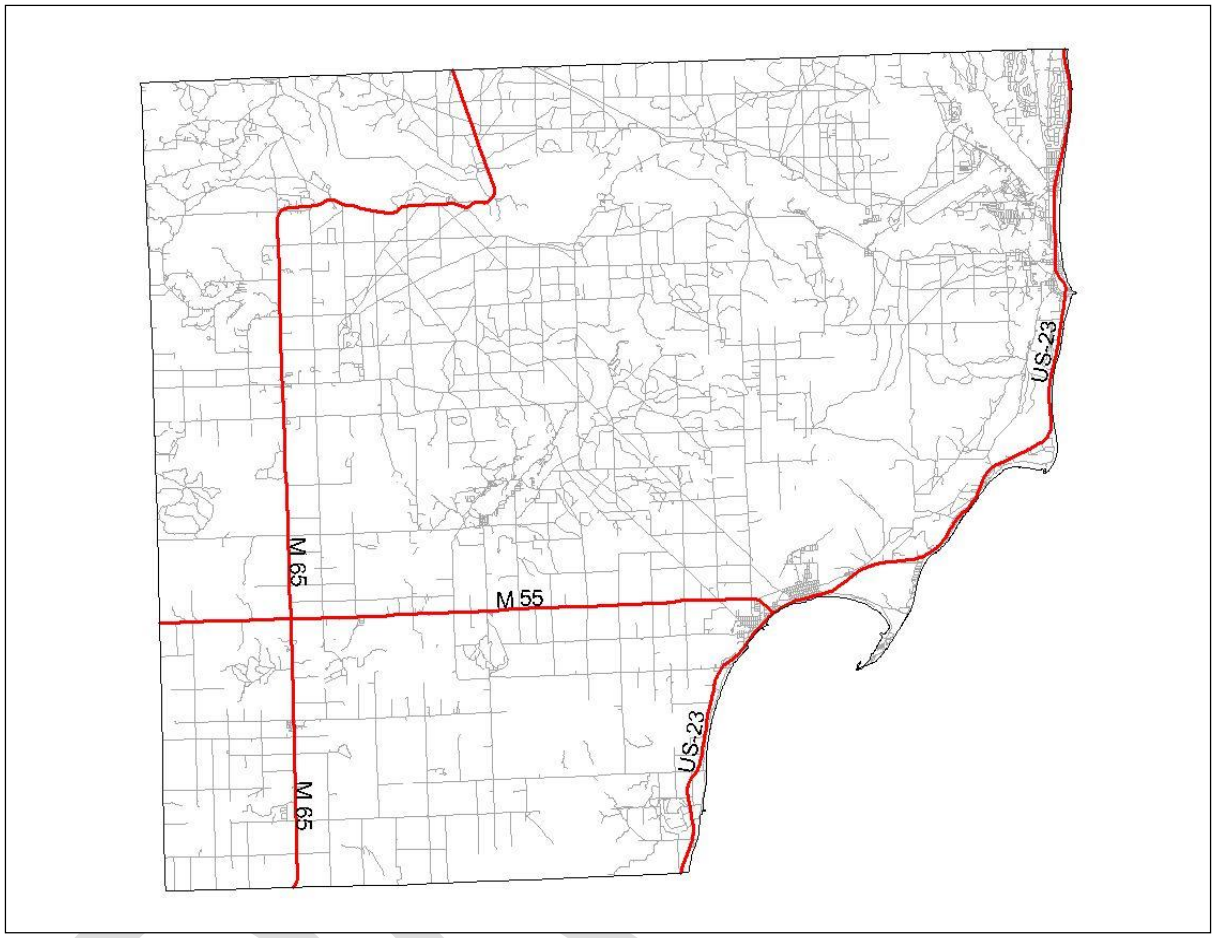
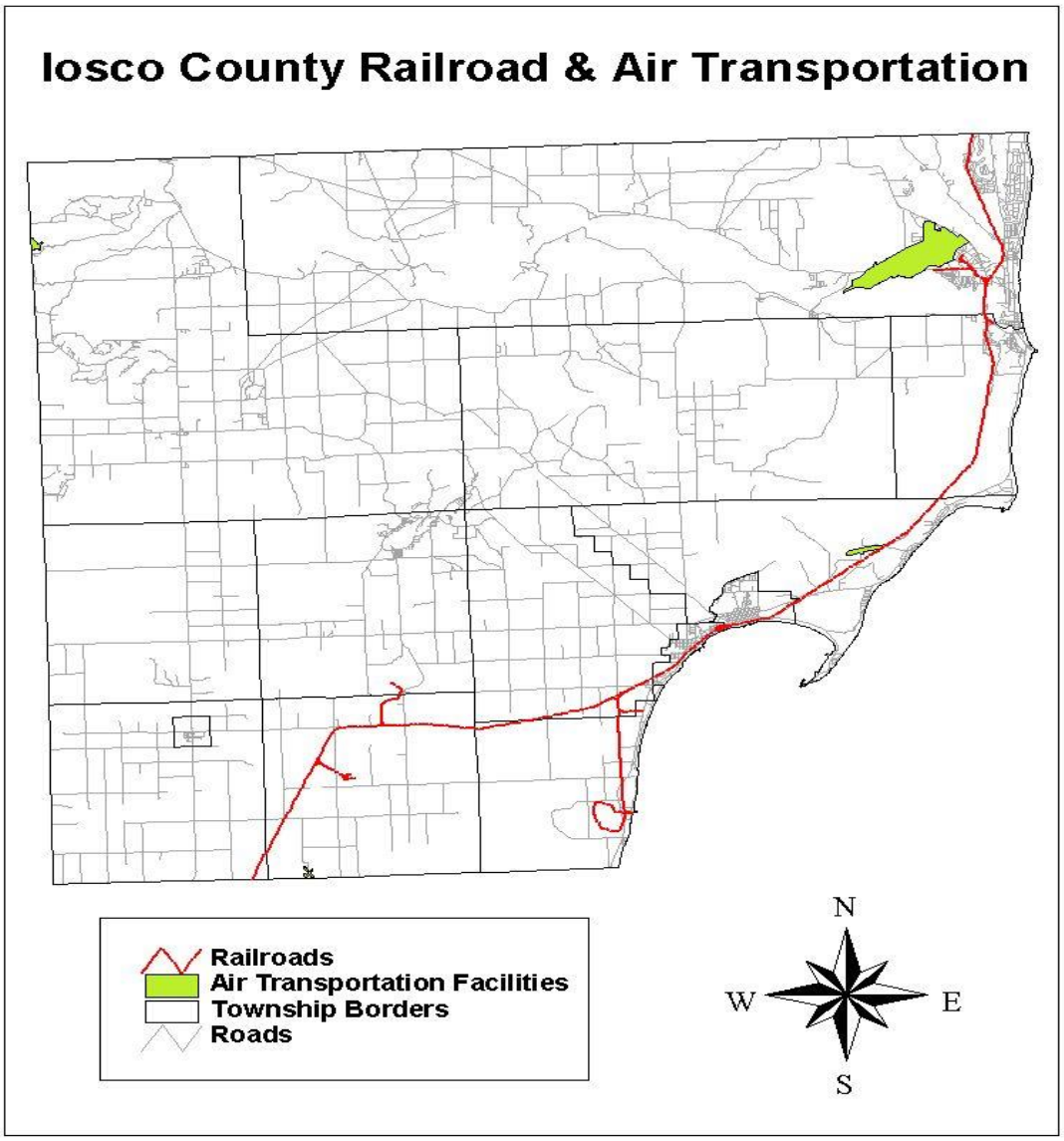
Iosco County Primary Road System

MAP 3.12



Iosco County Railroad & Air Transportation
MAP 3.13



<u>IOSCO COUNTY (2010 population: 25,887)</u>
www.Iosco.M33access.com

Iosco County Drain Commissioner
420 W. Lake Street
Tawas City, MI 48764
989-984-1052
Gary Adams, Drain Commissioner

The mission of this office is to provide for the health, safety and welfare of Iosco County citizens, the protection of surface waters and the environment, and to promote the long-term environmental

sustainability of Iosco County by providing storm water management, flood control, soil erosion controls and education. The office is particularly relevant for hydrological hazards.

Iosco County/District Health Department
Iosco County Building Annex
420 West Lake Street, P. O. Box 98
Tawas City, MI 48764
989-362-6183
Fax: (989) 343-1892

Public Health services in Iosco County are provided by District Health Department No.2 which also provides services for Alcona, Ogemaw and Oscoda Counties. The Iosco county branch is located in Tawas City in the Iosco County Building Annex. The Health Department offers an array of services including but not limited to home care services, immunizations, nutrition, WIC, family planning, health education and public health emergency preparedness. The Health Department's Environmental Health Division issues permits and licenses for food service establishments, campgrounds, tattoo parlors, onsite water wells, septic and drain field systems. This Division also provides inspections of the above mentioned systems and enforces local environmental health regulations.

Michigan State University Extension – IOSCO Office
420 West Lake Street, P. O. Box 599
Tawas City, MI 48764
989-362-3449
Msue.iosco@county.msu.edu
The office is involved in various educational and outreach activities involving agriculture and health. They should be valuable in events concerning such matters, such as droughts, pandemics, etc.

Economic Development Forum
420 West Lake Street
Tawas City, MI 48763
www.Iosco.net
Information regarding the Iosco County Economic Development Forum can be found on the Iosco County website. It is listed as a Department and not a stand-alone office.

Iosco County Planning Commission
420 West Lake Street
Tawas City, MI 48763
www.Iosco.net/government/planning-commission
The mission of the Iosco County Planning Commission is to assist with the creation of a healthy, safe and sustainable community of choice, through leadership, education, partnerships and stewardship of resources and assets. It is accessible via the County's website.

Iosco County Road Commission
3939 West M-55
Tawas City, MI 48763
989-362-4433
Bruce Bolen, Road Commission Manager
bolenb@ioscoroads.org

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www.ioscoroads.org
The Iosco County Road Commission uses their expertise, energy, and funds to provide the safest and most convenient road system possible, and contributes to economic development and the high quality of life throughout the county. Their goal is to maintain a county road system that is safe and convenient for public travel and to manage the roadside environment, with a view toward preservation.

AUTHORITIES, CENTERS, PROGRAMS, ETC. THAT ADDRESS VARIOUS HAZARDS

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

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

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

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

whereby local health departments and emergency management officials contact the Michigan State police Emergency Management Division, and state health officials who recommend to the Governor that a formal request for the SNS is made to the Center for Disease Control (CDC).

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

School Safety Information Act: 102 P.A. 1999

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

Michigan Office of Safe Schools

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

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

Michigan State Agencies

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

Nuclear Attack

Iosco County is not in an area known to be a specific nuclear attack target. However, mitigation of a Nuclear Attack on the local level is limited to preparation for personal, community, and infrastructure preparations. Ongoing participation by the community in general preparative activities, such as those of the Red Cross, Fire Drills, Scouting, 4-H, Private Industry, Homeland Security, Advisory Bulletins from the MSU Extension Office, and personal storm protection by citizenry contribute to a general personal readiness that would be extremely useful should threat of a nuclear attack occur.

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Earthquakes
In January 1990, Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, was signed into law. This EO requires that appropriate seismic design and construction standards and practices be adopted for any new construction or replacement of a federal building or federally-funded building during or after an earthquake.

Weather Hazards (General)

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

National Weather Service Watches/Warnings
The National Weather Service issues severe thunderstorm watches for areas when the meteorological conditions are conducive to the development of severe thunderstorms. People in the watch area are instructed to stay tuned to National Oceanic and Atmospheric Administration (NOAA) weather radio and local radio or television stations for weather updates, and watch for developing storms. Once radar or a trained Skywarn spotter detects the existence of a severe thunderstorm, the National Weather Service will issue a severe thunderstorm warning. The warning will identify where the storm is located, the direction in which it is moving and the time frame during which the storm is expected to be in the area. Persons in the warning area are instructed to seek shelter immediately. The State and local government agencies are warned via the Law Enforcement Information Network (LEIN), NOAA weather radio and the Emergency Managers Weather Information Network (EMWIN). Public warning is provided through the Emergency Alert System (EAS). The National Weather Service stations in Michigan transmit information directly to radio and television stations, which in turn pass the warning on to the public. The National Weather Service also provides detailed warning information on the Internet through the Interactive Weather Information Network (IWIN).

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

Severe Weather Awareness Week
Each spring, the Emergency Management Division, Michigan Department of State Police, in conjunction with the Michigan Committee for Severe Weather Awareness, sponsors Severe Weather Awareness Week. This annual public information and education campaign focuses on such severe weather events as tornadoes, thunderstorms, hail, high winds, flooding and lightning. Informational materials on

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lightning hazards are disseminated to schools, hospitals, nursing homes, other interested community groups, facilities, and the public.

Tornado National Weather Service Watches/Warnings

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

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

Tornado Warning Systems

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

Michigan Office of Fire Safety

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

Fire Safety Rules for Michigan Dormitories

Even before the Seton Hall University dormitory fire in January, 2000, the State Fire Safety Board took action to enhance the fire and life safety protection of Michigan's college and university dormitories. On

December 21, 1999 two new sets of rules took effect governing the construction, operation, and maintenance of school, college and university instructional facilities and dormitories. These sets of rules were updated to meet the most current nationally recognized standards from the National Fire Protection Association. The new rules adopted the 1997 edition of NFPA 101, Life Safety Code. NFPA standards provide the minimum requirements necessary to establish a reasonable level of fire and life safety and property protection from hazards created by fire and explosion.

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

Wildfires

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

Approximately 65% of Iosco County is forested. The majority of this land is held in trust by the state and federal governments, known as the AuSable State Forest and Huron National Forest, respectively. Between 1970 and 1996, the U.S. Forest Service responded to 2,727 wildfires in the Huron National Forest. Approximately 25% of the Forest is located in Iosco County. A fair estimate due to the high amount of pine forests in the County would be that the County would have experienced 680 fires over this period or 25 per year. Between the period of 1981-2000 data from Michigan Dept. of Natural Resources for "Lands under MDNR Jurisdiction" show Iosco County had had 63 reported fires, or on average 6 per year. When fires in the Huron National Forest are added to MDNR number, on average the county had 31 forest fires per year.

The end of March thru the beginning of June is typically the time frame with the greatest chance for wildfire conditions. High pressure systems often set up over the Great Lakes States in April and May to create a condition of low relative humidity (less than 25%) and warm daily temperatures (above 60° F). In addition, volatile fuel types (Jack Pine and Red Pine) are at record low needle moistures. However spring is not the only time wildfires occur. The Northeastern Lower Peninsula of Michigan historically experiences a drought every 10 years during the months of August and September. See Figure below. Most wildfires are human caused and have their origins on private property.

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Drought Conditions for Northern Michigan

TABLE 3.4

Year	Month	Drought Condition
1970	August	Extreme
1971	September	Severe
1976	August	Severe
1976	September	Extreme
1979	September	Extreme
1980	August	Severe
1981	July	Severe
1983	July	Extreme
1987	July	Extreme
1989	July	Extreme
1989	September	Extreme
1991	August	Severe
1998	July	Extreme
1998	August	Severe
1998	September	Severe
2001	July	Severe
2002	September	Extreme
2004	September	Extreme
2007	August	Severe
2007	September	Extreme
2010	March	Extreme

Shaded months include years with 2 or more months at a severe or higher drought
Information provided by National Oceanic and Atmospheric Administration:
http://lwf.ncdc.noaa.gov/oa/climate/research/drought/palmer-maps/

MDNR has kept information for statistical fires by station name. The West Branch Station, which helps oversee Western Iosco County, had 203 fires for the time period of 1992-2003. A majority of the wildfire response within Iosco County lies with the local Fire Departments and the US Forest Service. From 1978-2005 the US Forest Service recorded 299 wildfires occurring within Iosco County and from 2006-2013, 170 wildfires. Since the late nineties the DNR does not cover a majority of Iosco County for wildfire response. They only cover lands west of M-65.

Most wildfires are small in size due to the coordinated response efforts between local fire departments, US Forest Service and Michigan DNR. However this is not always the case. The table below is a sample of larger wildfires that have occurred in almost every township within Iosco County. As recently as 1998, a wildfire in Tuttle Marsh in Wilbur Township damaged several industrial buildings and burned over 127 acres of forest. On July 29, 2007 the Galion Fire in Wilbur Township consumed 587 acres in approximately 5 hours. During that time frame, four homes and a number of various outbuildings were destroyed. Approximately $275,100 was spent in suppression costs for the fire that was started by an abandoned bonfire.

Iosco County Historical Wildfires

TABLE 3.5

Fire Name	Township	Year	Acres
Vaughn Creek	Plainfield	2003	54
Exhaust Fire	Oscoda	2010	270
Airport Fire	Baldwin	1998	68
Fuelbreak Fire	AuSable	1998	62
4411 Fire	Oscoda	2000	74
Aldrich Fire	Plainfield	2003	532
Railroad Fire	Tawas/Alabaster	2002	24
Galion Fire	Wilbur	2007	587

Iosco County can reduce its vulnerability to wildfires by participating in multi-state and interagency mitigation efforts.

Scrap Tire Fires

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

Riverine and Urban Flooding

National Flood Insurance Program

For many years, the response to reducing flood damages followed a structural approach of building dams, levees and making channel modifications. However, this approach did not slow the rising cost of flood damage, plus individuals could not purchase insurance to protect themselves from flood damage. It became apparent that a different approach was needed. The National Flood Insurance Program (NFIP) was instituted in 1968 to make flood insurance available in those communities agreeing to regulate future floodplain development. As a participant in the NFIP, a community must adopt regulations that: 1) require a permit for any "development" within the 100-year floodplain; 2) require any new residential construction within the 100-year floodplain to have the lowest floor, including the basement, elevated above the 100-year flood elevation; 3) allow non-residential structures to be elevated or dry flood proofed (the flood proofing must be certified by a registered professional engineer or architect); and 4) require anchoring of manufactured homes in flood prone areas. The community must also maintain a record of all lowest floor elevations or the elevations to which buildings in flood hazard areas have been flood proofed. In return for adopting floodplain management regulations, the federal government makes flood insurance available to the citizens of the community. In 1973, the NFIP was amended to mandate the purchase of flood insurance as a condition of any federally regulated, supervised or insured loan on any construction or building within the 100-year floodplain.

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The following shoreline local units of government within Iosco County are recognized by FEMA as participants in the National Flood Insurance Program: the cities of East Tawas and Tawas City and the townships of Alabaster, AuSable, Baldwin and Oscoda. These communities have all had their floodplain areas officially mapped and are in compliance with the NFIP. There are six (6) inland townships in the county, however, that are not yet signed into NFIP. They are Burleigh, Grant, Plainfield, Reno, Sherman and Wilber.

Michigan Flood Hazard Regulatory Authorities

Land Division Act, 591 P.A. 1996, as amended by 87 P.A. 1997

The Land Division Act governs the subdivision of land in Michigan. The Act requires review at the local, County and state levels to ensure the land being subdivided is suitable for development. From a flood hazards viewpoint, a proposed subdivision is reviewed by the County Drain Commissioner for proper drainage, and for floodplain impacts by the Department of Environmental Quality, Water Resources Division.

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

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

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

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

The State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 31) restricts residential occupation of high-risk flood hazard areas and ensures that other occupations do not obstruct flood flows. A permit is required from the Department of Environmental Quality for any filling, grading, or occupation of a riverine 100-year floodplain. In general, construction and fill may be permitted in the portions of the floodplain that are not floodway, provided local ordinances and building standards are met. (Floodways are the channel of a river or stream and those portions of the floodplain adjoining the channel which are reasonably required to carry and discharge the 100-year flood. These are areas of moving water during floods.) New residential construction is specifically prohibited in the floodway. Non-residential construction may be permitted in the floodway, although a hydraulic analysis may be required to demonstrate that the proposed construction will not harmfully affect the stage-discharge characteristics

of the watercourse. The Act does not apply to watersheds that have a drainage area of less than two square miles. Those small watersheds are considered to be local drainage systems and do not fall under Part 31.

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

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

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

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

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

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

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

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

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

The Dam Safety Unit within the Water Resources Division, Department of Environmental Quality, has the primary responsibility to ensure dam safety within the state. Following the September, 1986 flood in

central Lower Michigan, the current Dam Safety Act was passed to ensure that dams are built and maintained with necessary engineering and inspections for safety of the public and the environment. The Department of Environmental Quality is required to review applications involving construction, reconstruction, enlargement, alteration, abandonment and removal for dams that impound more than five acres of water and have a height of six feet or more.

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

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

Local River Management Act, 253 P.A. 1964

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

Floodplain Service Program

The need to identify a flood hazard area before construction is essential to the goal of flood hazard mitigation. The Department of Environmental Quality regularly provides floodplain information to public and private interests as part of its Floodplain Service Program under the Water Resources Division. The goal of the program is to provide 100-year floodplain information to interested parties so that informed purchase or development decisions can be made.

Dam Failures

Both the MDEQ and the Federal Energy Regulatory Commission (FERC) classify and regulate dams in Michigan. Under state and federal legislation, certain dam owners are required to develop a survey of the downriver area, develop flood-prone area maps and develop emergency action plans (EAPs). Furthermore, the FERC requires the owners of such dams to exercise these plans; the MDEQ has initiated an effort to encourage owners of state-regulated dams to voluntarily perform exercises of their EAPs. In Michigan, well over 100 dams are covered by Emergency Action Plans. Dams in Michigan are regulated by Part 315 of The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Part 315, Dam Safety provides for the inspection of dams. This statute requires the MDEQ to rate each dam as either "high," "significant," or "low" hazard potential, according to the potential downstream impact if the dam were to fail (not according to the physical condition of the dam). The MDEQ has identified and rated over 2,400 dams. Dams over six feet in height that create an impoundment with a surface area of five acres or more are regulated by this statute. Dam owners are required to maintain an EAP for "high" and "significant" hazard potential dams. Owners are also required to coordinate with local emergency management officials to assure consistency with local emergency operations plans. Dams regulated by FERC, such as hydroelectric power dams, are generally exempt from this statute. The FERC licenses water power projects (including dams) that are developed by non-federal entities, including individuals, private

firms, states and municipalities. Under provisions of the Federal Power Act and federal regulations, the licensee of the project must prepare an EAP. This plan must include a description of actions to be taken by the licensee in case of an emergency. Inundation maps showing approximate expected inundation areas must also be prepared. Licensees must conduct a functional exercise at certain projects, in cooperation with local emergency management officials.

Shoreline Flooding and Erosion

Flooding and erosion along Michigan's 3,200 mile long Great Lakes shoreline is typically caused by high Great Lakes water levels, storm surges, or high winds. Shoreline flooding and erosion are natural processes that occur at normal and even low Great Lakes water levels. During periods of high water, however, flooding and erosion are more frequent and serious causing damage to homes, businesses, roads, water distribution and wastewater treatment facilities, and other structures in coastal communities. Windstorms and differences in barometric pressure can temporarily tilt the surface of a lake up at one end as much as eight feet. This phenomena is called a storm surge and can drive lake water inland over large areas.

There is a 10% or higher chance of shoreline flooding in a year. In nearly every decade, high water levels on the Great Lakes have caused significant damage and impact to Michigan coastal communities. In some decades high water levels last longer than one year. The most recent high water period began in 1997 and resulted in the Great Lakes being at or near record levels set in the mid-1980s'. In response to the threat of severe shoreline flooding and erosion, the U.S. Army Corps of Engineers (USACE), at the request of the Governor, implemented its Advance Measures Program to assist Michigan shoreline communities in their flood and erosion mitigation efforts. (See Programs and Initiatives section for more details.) To date, over 20 Michigan jurisdictions have taken advantage of this program.

Prior to that, the record-high lake levels in 1985-86 culminated in a Governor's disaster declaration for 17 shoreline counties. The USACE implemented its Advance Measures Program, and the State of Michigan implemented three shoreline flooding and erosion mitigation programs aimed at reducing future flood impacts on shoreline communities and homeowners. (See Programs and Initiatives section.) During 1972-73, high water levels caused flooding in over 30 counties, resulting in an excess of $50 million in public and private damage. Thousands of people were forced to evacuate their homes. Similar high water level flooding occurred in the early 1950s and late 1960s, also resulting in millions of dollars worth of damage to shoreline communities.

Many of the same events that influence Riverine Flooding occur simultaneously as Shoreline Flooding. Iosco County was granted Presidential Declaration of Disaster in 1978, and again in 1985 for Riverine and Shoreline Flooding. Although the Great Lakes are currently near an all time low level, the probability they will rise again is a certainty.

Drought

U.S. Geological Survey

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

The site presents a map that is continually updated through an automated analysis of USGS stream gauging stations. Additional drought-related links can be accessed through the Michigan-specific web

page: http://waterwatch.usgs.gov/new/index.php?m=dryw&r=mi by clicking on the map (or proceeding directly to the specific web page at http://mi.water.usgs.gov/midroughtwatch.php).

Fixed Site Hazardous Material Incidents (including explosions and industrial accidents)

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

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

Hazardous Material Transportation Incidents

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

Local Emergency Planning Committees (LEPC)
One of the major provisions of SARA Title III is the establishment of Local Emergency Planning Committees (LEPCs) for designated planning districts. The LEPCs are responsible for developing emergency response plans for communities that have facilities in their jurisdiction subject to SARA Title III emergency planning requirements. The LEPC is the primary mechanism through which local SARA Title III planning, training and exercising activities are implemented. Michigan has 88 designated LEPCs – one for each of the 83 counties and 5 in major cities. Nearly 2,800 facilities across the state have been identified as being subject to Title III emergency planning provisions. A facility is subject to SARA Title III provisions if extremely hazardous substances (as determined by the U.S. Environmental Protection Agency) are present at the facility in quantities at or above the minimum threshold quantities established in Section 302 of the Act.

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

Federal Hazardous Material Transportation Regulations

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

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

Hazardous Materials Transportation Uniform Safety Act:
The federal Hazardous Materials Transportation Uniform Safety Act (HMTUSA), enacted in 1990, provides funding for the training of emergency responders and the development of emergency response plans for both fixed site facilities and transportation-related incidents. (This funding mechanism under the HMTUSA is referred to as Hazardous Material Emergency Preparedness [HMEP] grants.) In Michigan, the HMTUSA/HMEP program is coordinated and implemented by the Emergency Management Division, Department of State Police.

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

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

Oil and Natural Gas Well Accidents

Local Emergency Capability
Communities that may be affected by oil or natural gas well accidents should have adequate procedures in their Emergency Operations Plans to address the unique types of problems associated with this hazard, including rescue and evacuation. Affected communities must work closely with company officials and surrounding jurisdictions to ensure compatibility of procedures for a fast, coordinated response. Mitigation possibilities include the use of community zoning regulations to provide suitable

open, unoccupied "buffer" areas around refineries and compressor stations. Michigan Department of Environmental Quality regulations provide for buffer zones around wells and treatment and storage facilities.

Pipeline Accidents (Petroleum and Natural Gas)

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

Protection of Underground Facilities Act / MISS DIG Program
Michigan's first line of defense against pipeline and other utility line breaks from construction excavation is the "MISS DIG" Program established with the passage of Act 53 in 1974 – The Protection of Underground Facilities. MISS DIG System, Inc., is a 24-hour utility communications system that helps contractors comply with the state law (Act 53) which requires notification of utilities at least three working (but not more than 21 calendar) days before commencing excavation, tunneling, demolishing, drilling or boring procedures, or discharging explosives for a project. When properly administered and followed, the MISS DIG safety system does an excellent job of minimizing pipeline and utility line accidents.

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

Pipeline Safety Regulation in Michigan

TABLE 3.6

Pipeline Type	Jurisdiction	Applicable Code	Inspected by
Inter-state natural gas	USDOT/OPS	49 CFR Part 192	MPSC Gas Safety Intrastate
Inter-state natural gas	State of MI/MPSC	Michigan Gas Safety Standards	MPSC Gas Safety
Liquid Petroleum	USDOT/OPS	49 CFR Parts 193/195	USDOT/OPS
Gathering Lines*	MDEQ/GSD	Oil/Gas Administrative rules under Part 165, 1994 P.A. 451	

*Note: Gathering lines are run from a production facility (i.e., well) to a pre-processing plant (i.e., dehydration facility, separator, compression station). Source: Michigan Public Service Commission, Gas Safety Office

Local Emergency Capability
Procedures in the Emergency Operations Plans address the unique types of problems associated with this hazard, including specific functions such as rescue and evacuation. Communities work closely with

company officials and surrounding jurisdictions to ensure a fast, coordinated response. Mitigation possibilities include the use of community zoning regulations to provide suitable open, unoccupied "buffer" areas around pipelines, storage fields, refineries and compressor stations.

Nuclear Power Plant Accidents
Mitigation of nuclear power plant hazards on the local County level is primarily limited to the detection of radiation, alerting the public, and providing directions for evacuation and/or housing – the latter three issues are addressed in other sections of this mitigation action item section of the mitigation plan.

Infrastructure Failures

Infrastructure Failures in Iosco County
Infrastructure failures are common in Iosco County. The most common infrastructure failure is loss of power.

Power outages are increasing due to a reduction in tree trimming, multiple ownership of transmission lines and a change in policy for emergency repairs. However, because of the rural nature of the community, and the hardy nature of most residents, these types of incidents seldom cause a serious problem in Iosco County. As in other communities, special populations such as the elderly, handicapped, and adult foster care homes must be given special consideration when these types of events occur.

There have been no recent significant infrastructure failures in Iosco County. Typically the infrastructure failures occur when there are thunderstorms, ice storms, or wind storms and power lines are downed. In most cases the power is restored in a matter of hours but in some cases power has been out for a week at a time in parts of the County.

In the spring of 1995, many residents of Baldwin Township were without power for more than a week. This was caused by extremely high winds coming in off Lake Huron and downing trees and power lines throughout the area. The county on average experiences three power outages caused by high winds or sleet per year which result in power being out for extended periods of time lasting up to a week. In the fall of 2005 high winds downed over 75 power lines and resulted in large area power outages for over 24 hours and isolated pockets for up to a week. In 2006 a sleet storm caused power outage in Tawas and East Tawas resulting in over 8,000 homes being without power for up to 24 hours and the temperatures dropping into the low teens.

Most of Iosco County's infrastructure failures are secondary hazards caused by other major events such as floods, windstorms, snow and ice storms. The main infrastructure failures are power outages, which are normally restored in a matter of hours. However, if the power were out for a longer period of time, the local chapter of the American Red Cross would be called to set up temporary shelters.

<u>Water/Electrical Infrastructure Failure</u>
The Federal Clean Water Act regulates the discharge from community wastewater collection and treatment systems. The regulatory aspects of the Act that pertain to municipalities have been delegated to the MDEQ Surface Water Quality Division for surface water discharge facilities, and the MDEQ Waste Management Division for groundwater discharge facilities. Authority for the oversight of planning, facility design review, and construction permitting of sewerage systems collection, transportation and treatment facilities, is derived from Part 41 of the Michigan Natural Resources and Environmental Protection Act (451 P.A. 1994) and Administrative Rules promulgated under authority of Part 41. The

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

Electrical system

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

Telecommunications System

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

Surface Drainage Systems

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

Water Distribution Systems

Michigan's public water supplies are regulated under the Federal Safe Drinking Water Act. The Michigan Department of Environmental Quality (MDEQ), as a primary agency for the Federal government, provides supervision and control of Michigan's public water supplies (including their operation and physical improvements) under the Michigan Safe Drinking Water Act (399 P.A. 1976).

The MDEQ Drinking Water and Radiological Protection Division regulates, through a permit process, the design, construction and alteration of public water supply systems. Water supply construction must be

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

Public Health Emergencies

Michigan Department of Community Health

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

U.S. Centers for Disease Control and Prevention

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

Michigan Pandemic Influenza Plan

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

- command and management
- crisis communications
- surveillance
- laboratory testing

- community containment
- infection control in health care facilities
- vaccines and antivirals/medical management
- data management
- border/travel issues
- recovery

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

Transportation Accidents

Air Transportation

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

National Transportation Safety Board

The National Transportation Safety Board (NTSB) is an independent federal agency responsible for promoting aviation, highway, railroad, marine, pipeline, and hazardous materials transportation safety. The NTSB is mandated to investigate significant transportation accidents, determine the probable cause of such accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies that are involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations and statistical reviews. Although the NTSB has no regulatory or enforcement powers, it has nonetheless been successful in seeing the adoption and implementation of over 80% of its transportation accident recommendations.

An example of an NTSB recommendation being implemented is the agreement between the FAA and the Boeing Aircraft Company to redesign the rudder system on the company's popular 737 jetliners and to replace the rudder valve system in every one of the 737 jets in service. The rudder retrofit program cost Boeing nearly one-quarter of a billion dollars. (The 737 rudder system came under close scrutiny of the NTSB after crashes of 737s in 1991 and 1994 had resulted in over 150 deaths. The NTSB believed that the rudder system on the two jets might have been a contributing factor in the crashes.)

Bus Safety

School bus safety programs and initiatives generally fall into two categories: 1) driver skill enhancement, competency training and 2) physical inspections of bus mechanical and safety equipment. The Motor Carrier Division, Michigan Department of State Police, inspects all school buses and other school transportation vehicles (21,000 units) on an annual basis. In addition, all school bus drivers in Michigan

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must take and pass a bus driver education and training program, and then take regular refresher courses to maintain their certification to operate a school bus. School bus drivers must also pass an annual medical examination.

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CHAPTER 4: HAZARD ANALYSIS

Natural Hazards-Severe Summer Weather

HAIL

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

Hazard Description

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

Hailstorms in Iosco County

48 Hail events were reported by the National Climatic Data Center (NCDC) for Iosco County, Michigan between 01/01/1950 and 07/31/2014. There were no damages estimated; however, the data from these events is incomplete as not all damages that occurred have been reported.

Hail Overview

Iosco County averages approximately 30 thunderstorms per year, but only 10-15 storms per decade produce measurable hail. However, there has been an increase over the past decade with 25 events occurring in Iosco County. As a result of NCDC's reports with no reported damages/deaths/injuries Iosco County would be considered a low-risk county for these events.

LIGHTNING

The discharge of electricity from within a thunderstorm.

Hazard Description

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

Lightning is a random and unpredictable product of a thunderstorm's tremendous energy. The energy in the storm produces an intense electrical field like a giant battery, with the positive charge concentrated at the top and the negative charge concentrated at the bottom. Lightning strikes when a thunderstorm's electrical potential (the difference between its positive and negative charges) becomes great enough to overcome the resistance of the surrounding air. Bridging that difference, lightning can jump from cloud to cloud, cloud to ground, ground to cloud, or even from the cloud to the air surrounding the

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thunderstorm. Lightning strikes can generate current levels of 30,000 to 40,000 amperes, with air temperatures often superheated to higher than 50,000 degrees Fahrenheit (hotter than the surface of the sun) and speeds approaching one-third the speed of light.

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

Lightning deaths are usually caused by the electrical force shocking the heart into cardiac arrest or throwing the heartbeat out of its usual rhythm. Lightning can also cut off breathing by paralyzing the chest muscles or damaging the respiratory center in the brain stem. It takes only about one-hundredth of an ampere of electric current to stop the human heartbeat or send it into ventricular fibrillation. Lightning can also cause severe skin burns that can lead to death if complications from infection set in.

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

Location of Lightning Strikes:

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

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

Unfortunately, lightning prevention or protection in an absolute sense is impossible. However, the consequences of lightning strikes have been diminished (both in terms of deaths and injuries and property damage) through the implementation of programs and initiatives.

<u>Lightning Events in Iosco County</u>

Three (3) lightning events were reported by the National Climatic Data Center (NCDC) for Iosco County, Michigan between 01/01/1950 and 12/31/2015. The estimated damages were in the amount of $15,000; however, more importantly, six injuries were reported as a result of these events.

On 7/04/2003 lightning struck a large business sign, which shattered and fell on several cars below the sign. Four persons were treated for injuries and released as a result of this event.

On 7/05/2005 two canoers were injured when they attempted to take cover under a tree and were struck by lightning. They suffered burns and were transported to Flint for treatment.

Thunderstorm Hazards – Lightning Overview

With only three reported events over the past 65 years, Iosco County would be considered to be a low-risk area for these events. However, due to the potential impact and destruction of lightning, it has been included in the summer severe weather events, which has been given a high priority to address.

TORNADOS

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

Hazard Description

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

Tornado Intensity

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

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The Enhanced Fujita Scale of Tornado Intensity

TABLE 4.1

F-Scale Number	Intensity Description	Wind Speed (mph)	Type/Intensity of Damage
EF-0	Gale tornado	65-85 mph	**Light damage**. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1	Moderate Tornado	86-110 mph	**Moderate damage.** The lower limit is the beginning of hurricane wind speed; roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2	Strong Tornado	111-135 mph	**Considerable damage.** Roofs torn off well-constructed houses; foundation of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3	Severe Tornado	136-165 mph	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; foundations blown away some distance.
EF-4	Devastating tornado	166-200 mph	**Devastating damage.** Whole frame houses, well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF-5	Incredible Tornado	200 mph+	**Incredible damage**. Strong frame houses lifted off foundations and carried considerable distances; automobile sized missiles fly through the air in excess of 100 meters; high-rise buildings have significant structural deformation; incredible phenomena will occur

Source: Storm Prediction Center

<u>Tornado Events in Iosco County</u>

Fourteen (14) 7 TORNADO(s) were reported in Iosco County, Michigan between 01/01/1950 and 12/31/2015. Of the reported tornadoes, five were of major consequence (greater than $50,000 in reported damages), eight were of minor consequence (less than $50,000 in total reported damages) and one tornado had no reported damages as a result if its actions. The two major events were EF-2 and EF-3 storms and are described as follows:

On 6/08/1953 an F2 tornado swept through Big Island Lake killing four and injuring 13, making it one of the 10 deadliest tornadoes to go through Michigan. The tornado swept a 31 mile path through the County causing power outages and destroying numerous buildings and crops in addition to the deaths and injuries.

On 3/271991 an EF-3 tornado swept through the northwestern corner of Iosco County, where it destroyed homes and downed power lines causing fires to occur in Iosco and several other counties. Damages for

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the tornado were estimated at $2,500,000, which included downed homes, damaged trees, and fires resulting of the fire.

Tornadoes Overview

Iosco County has experienced 14 tornadoes since 1950 or about one tornado every 4.5 years. However, only three tornadoes have been reported in the past 20 years. However, more tornadoes are being reported in Michigan in the recent years and it is anticipated that this trend will continue. Due to the destructive nature of these events, this hazard has been given a high priority to address.

SEVERE WINDS

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

Hazard Description

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

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

Wind Events in Iosco County

Sixty-four (64) severe wind events were reported by the National Climatic Data Center (NCDC) for Iosco County, Michigan between 01/01/1950 and 12/31/2015. These included high winds, thunderstorm winds, and severe winds. While many of these events occurred during thunderstorms, they were not limited to thunderstorm activity.

On 7/13/1995 thunderstorm winds did widespread tree damage across lower Michigan, including all but the extreme southeast portion of Iosco County, with well over 100 trees down. Most of the trees brought down were the largest and healthiest, as they had the highest tops and heaviest foliage. Widespread damage to residences, cottages, garages, and vehicles was caused by falling trees, while the winds damaged and destroyed docks and boats on the lee shores of county lakes. Consumers Power Company estimated over 100 miles of phone and power lines were downed in the County and electrical service remained out to thousands of homes and cottages for periods ranging from a few days to over a week. Average wind gusts in most areas were estimated to be in the 65-80 mph range. There was over $50 million in damages throughout Michigan that resulted from this storm.

Severe Winds Overview

Figures from the National Weather Service indicate that severe winds occur more frequently in the southern half of the Lower Peninsula than any other area in the State. On an average, severe wind events can be expected 3-4 times per year in the northern Lower Peninsula. These figures refer to winds from thunderstorms and other forms of severe weather not tornadoes.

The recent trend in weather conditions has been an increase annual severe winds in Iosco County. Severe winds are considered to be a severe weather activity, which was given a high priority to address.

FOG

Condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.

Hazard Description

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

Haze and Smog

Haze occurs when dust, smoke and other pollutant particles obscure the normal clarity of the sky. It occurs when dust and smoke particles accumulate in relatively dry air. When weather conditions block the dispersal of smoke and other pollutants, they concentrate and form a usually low-hanging shroud that impairs visibility and may become a respiratory health threat, as well as make safe driving more difficult. Dense haze caused by industrial pollution is also known as smog. This hazard may cause public health problems, so it is mentioned in this subsection but is not given particular emphasis since this plan has more of an emergency management focus. It is noted here as an area of potential overlap and future coordination with other agencies. The Michigan Department of Community Health and the Michigan Department of Natural Resources may do more with this issue in the future, if the effects become severe enough. Since it may be possible that climate change issues cause this to be a more frequent and ongoing concern in Michigan, it is mentioned here. In general, however, air quality has generally improved since the effects of the Clean Air Act, other legislation, regulatory measures, and shifts away from heavy industry in Michigan's economy.

Smoke-producing hazards may have an effect that seems visually comparable to fog. For example, wildfires, hazardous materials incidents, structural fires, major transportation accidents, or industrial accidents may produce clouds of smoke that can obscure visibility and increase the risk of transportation accidents.

Hazard Analysis

In considering severe and high-impact meteorological events, attention can easily become focused on the more dramatic storms. Tornadoes and hurricanes for example, are readily recognized by the general public and the meteorological community alike for their devastating consequences. Fog, on the other hand, does not lend itself as readily to this categorization. Yet, both in cost and casualties, fog has consistently impacted society, and in particular the transportation sector - sometimes with deadly consequences. Fog has played a contributing role in several multi-vehicle accidents over the past several

years. While statistics suggest that highway accidents and fatalities, in general, have fallen, that trend is not evident with respect to accidents and fatalities caused by fog.

Fog can be very dangerous because it reduces visibility. Although some forms of transport can penetrate fog using radar, road vehicles have to travel slowly and use more lights. Localized fog is especially dangerous, as drivers can be caught by surprise. Fog is particularly hazardous at airports, where some attempts have been made to develop methods (such as using heating or spraying salt particles) to aid fog dispersal. These methods have seen some success at temperatures below freezing.

One major fog event is estimated to occur in Michigan approximately every two years. Property damage can be significant for vehicles, although real property and structures are usually unaffected. Fog has not yet been identified as one of the most significant hazards in any of Michigan's local hazard mitigation plans.

Fog Overview

No major events have occurred in Iosco County in recent years. One major fog event is estimated to occur in Michigan approximately every two years. Property damage can be significant for vehicles, although real property and structures are usually unaffected. Thus, while fog has not impacted the residents of Iosco County in recent years, it is not unforeseeable that fogs could impact the County in the future. However, fog is not considered to be a severe weather event and was not given a high priority to address.

EXTREME TEMPERATURES (HEAT)

Prolonged periods of very high temperatures, often accompanied by exacerbating conditions such as high humidity and lack of rain.

Hazard Description

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

Iosco County is susceptible to extreme heat. The temperate climate of southern Michigan, combined with the unsettling effect of Lake Huron, make for extreme deviations in temperature. 50-degree swings in the temperature in a 24-hour period are not uncommon. These events occur regularly depending on the year.

Extreme Heat Events in Iosco County

1 extreme heat event were reported by the National Climatic Data Center (NCDC) for Iosco County, Michigan between 1/1/1950 and 12/31/2015.

8/01-8/09/2001 Excessive Heat was a problem the first two weeks in August across all of northern Michigan. Temperatures reach the mid to upper 90s, on average, a few days each year; however, for a 5 day (8/5 - 8/9) stretch overnight low temperatures failed to fall below the lower 70s in most areas. This very humid air mass was unusual for northern Michigan, an area that typically sees cool nighttime temperatures and for this reason has very few homes with air conditioners. No heat related deaths or injuries were reported; however, most outdoor events were modified due to the forecasts of hot and humid conditions. County fairs sent animals home, yet still there were livestock losses at fairs in Otsego

and Alcona counties. Attendance at county fairs was well below normal and this was attributed to the heat

Hazard Description

Prolonged periods of extreme heat can pose severe and often life-threatening problems for Iosco County's citizens. Extreme summer weather is characterized by a combination of very high temperatures and humid conditions. When persisting over a long period of time, this phenomenon is commonly called a heat wave. The major threats of extreme summer heat are **heatstroke** (a major medical emergency), and **heat exhaustion**. **Heatstroke** often results in high body temperatures, and the victim may be delirious, stuporous, or comatose. Rapid cooling is critical to preventing permanent neurological damage or death. Heat exhaustion is a less severe condition than heatstroke, although it can still cause problems involving dizziness, weakness and fatigue. **Heat exhaustion** is often the result of fluid imbalance due to increased perspiration in response to the intense heat. Treatment generally consists of restoring fluids and staying indoors in a cooler environment until the body returns to normal. Other, less serious risks associated with extreme heat are often exercise-related and include heat syncope (a loss of consciousness by persons not acclimated to hot weather), and heat cramps (an imbalance of fluids that occurs when people unaccustomed to heat exercise outdoors).

How our bodies respond to heat is impacted by a combination of the air temperature and the relative humidity. Hydration and cooling needs are different for a 90°F day with 30% humidity versus a 90°F day with 90% humidity. The NWS has devised a measurement system known as the heat index (HI) to estimate the temperature a person is exposed to over a common temperature and humidity range. The NWS will initiate alert procedures when the HI is expected to exceed 105°- 110°F for at least two consecutive days. The chart below shows the HI that corresponds to the actual air temperature and relative humidity.

Because the combined effects of high temperatures and high humidity are more intense in urban centers, heatstroke and heat exhaustion are a greater problem in cities than in suburban or rural area. Nationwide, approximately 170 deaths a year are directly attributable to extreme heat. In Michigan, approximately 7% of weather-related fatalities (about 5 deaths per year) are attributed to extreme heat (according to the Michigan Department of Community Health and the National Weather Service). Extreme summer heat is also hazardous to livestock and agricultural crops, and it can cause water shortages, exacerbate fire hazards, and prompt excessive demands for energy. Roads, bridges, railroad tracks and other infrastructure are susceptible to damage from extreme heat (due to the effects of thermal expansion of the materials).

Air conditioning is probably the most effective measure for mitigating the effects of extreme summer heat on people. Unfortunately, many of those most vulnerable to this hazard do not live or work in air-conditioned environments, especially in major urban centers where the vulnerability is highest. The use of fans to move air may help some, but recent research indicates that increased air movement may actually exacerbate heat stress in many individuals.

Extreme Heat Overview

While there have been minimal excessive heat conditions, high heat events occur annually in Iosco County and are a risk to the resident and visitors. Air conditioning is probably the most effective measure for mitigating the effects of extreme summer heat on people. Unfortunately, many of those most vulnerable to this hazard (children, elderly, and homeless individuals, and the critically ill) do not have access to air-conditioned environments. Excessive heat is considered to be a severe weather event, which was given a high priority to address.

Natural Hazards-Severe Winter Weather

ICE/SLEET STORMS

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

Hazard Description

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

Ice and Sleet Storms in Iosco County

A total of four ice/sleet storms were reported by the NCDC for Iosco County, Michigan between 1/1/1950 and 12/31/2015. Minimal damages of $50,000 were estimated as a result of these storms; however, the data from these events is incomplete as not all damages that may have occurred have been reported.

Ice and Sleet Storms Overview

One of the biggest problems resulting from ice and sleet storms is loss of power. The weight of the ice causes power lines to snap and break. Sometimes it can take days to restore power. If this happens temporary shelters may need to be set up. The local chapter of the American Red Cross would be called. Also with the power loss would come loss of heat, which could cause death from hypothermia especially with the elderly population. Another problem caused by ice and sleet storms would be debris cleanup. The weight of the ice could cause tree limbs to snap and break.

Approximately 87% of ice storms occur during the months of January, February, March and April, when conditions are most conducive for the development of ice and sleet. Ice/sleet storms are considered to be severe weather events, which were given a high priority to address. Because of their intensity and their impact on accessibility severe winter weather events were given a high priority to address.

SNOWSTORMS

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

Hazard Description

As a result of being surrounded by the Great Lakes, Michigan experiences large differences in snowfall in relatively short distances. The annual mean accumulation ranges from 30 to 170 inches of snow. The highest accumulations are in the northern and western parts of the Upper Peninsula. In Lower Michigan,

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the highest snowfall accumulations occur near Lake Michigan and in the higher elevations of northern Lower Michigan.

Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds (35+ miles per hour) bearing enormous amounts of snow. Most of the snow accompanying a blizzard is in the form of fine, powdery particles that are wind-blown in such great quantities that, at times, visibility is reduced to only a few feet. Blizzards have the potential to result in property damage and loss of life. Just the cost of clearing the snow can be enormous.

The western Upper Peninsula experiences the most snowstorms in Michigan each year. The western half of the Lower Peninsula also experiences a relatively large number of snowstorms. One reason for this is the "lake effect", a process by which cold winter air moving across Lakes Michigan and Superior picks up moisture from the warmer lake waters, resulting in significant snowfall amounts in the western part of the state.

Snowstorms in Iosco County

There have been a total of 43 events in the snowstorm category (blizzards, winter storms, winter weather, and heavy snows) from 1/1/1950 to 12/31/2014. No damages or human-related injuries were reported as a result of these storms; however, the data from these events is incomplete as not all damages that may have occurred were reported. Following are examples of the different types of snowstorms in this category that have affected the County.

Blizzard-On 1/2/1999 to 1/3/1999 an intense winter storm which developed over the southern plains lifted northeastward across lower Michigan from the evening of the 2nd through the morning of the 3rd producing blizzard conditions across the region. Winds increased steadily during Saturday the 2nd…with heavy snow starting to lift across northern lower Michigan during the afternoon and early evening hours. The snow reached eastern upper Michigan overnight. System snows tapered off during the morning of the 3rd.

Snowfall totals generally ranged from 8 to 14 inches across Chippewa and Mackinac counties of eastern upper Michigan. Across northern lower Michigan…snowfall totals generally ranged from 10-to 18 inches…with localized totals around 20 inches. Wind gusts of around 35 mph were common during the peak of the storm…with some gusts of 40 to 50 mph reported along Lake Huron shoreline where winds were onshore. The strong winds caused extensive blowing and drifting of the snow and greatly limited visibilities. Drifts as high as 6 to 8 feet were reported across portions of the region.

The heavy snow…reduced visibilities and widespread blowing and drifting caused very hazardous driving conditions. Many side roads remained impassable into the 4th.

Heavy snows-On 2/08/2001 south winds intersecting a warm front that extended across the southern Great Lakes region triggered an area of heavy snow across portions of northern lower Michigan. The snowfall began late in the evening on the 7th. However, the snowfall did not become heavy until the early morning hours of the 8th. By noon on the 8th, 12-hour snowfall amounts totaled greater than 6 inches across portions of northern lower Michigan. The heaviest snow fell across northern Roscommon, Ogemaw and Iosco Counties, where accumulations ranged from 12 to 15 inches.

Winter storms-on 2/27/1997 a surface low tracking across the lower Great Lakes and an upper low crossing northern lower Michigan combined to bring heavy snows to the region. Snow occasionally fell at

the rate of 1 to 2 inches per hour. Strong winds combined with snow to cause significant blowing and drifting…with near whiteout conditions at times. Total snowfall across the county ranged from 6 to 10 inches.

Winter weather-On 11/10/2006 to 11/11/2006 a potent upper level disturbance produced a period of intense snowfall across most of northern lower Michigan, centered on the evening of the 10th. Thunder and lightning accompanied the snow for several hours. The snow was very sloppy and wet, with snow-to-liquid ratios around 6-1. Thus, though the precipitation was heavy, snowfall amounts were generally only 3 to 6 inches, or a bit under the warning criteria. However, the weight of the snow brought down a number of tree limbs and power lines across the region. Parts of Presque Isle, Wexford, and Missaukee Counties were without power for 48 hours.

Snowstorms Overview

Of the 43 reported winter storms, most of them have occurred within the past 20 years, or about 2 major winter events per year. Severe snowstorms affect every Michigan community. While the number of events has not resulted in a large number of deaths/injuries Iosco County, due to the nature of these events snowstorms are considered to be severe weather events, which were given a high priority to address.

EXTREME TEMPERATURES (COLD)

Prolonged periods of very low temperatures, often accompanied by exacerbating conditions such as heavy snowfall and high winds.

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

Iosco County is susceptible to extreme cold. The temperate climate of southern Michigan, combined with the unsettling effect of Lake Huron, make for extreme deviations in temperature. 50-degree swings in the temperature in a 24-hour period are not uncommon. These events occur regularly depending on the year.

Extreme Cold Events in Iosco County

Three (3) extreme cold events were reported by the National Climatic Data Center (NCDC) for Iosco County, Michigan between 1/1/1950 and 12/31/2015.

On 2/4/2007 to 2/5/2007 exceptionally old air surged into Northern Michigan. High temperatures on the 4th were around zero, with low temperatures that night from five to ten below zero. Gusty northwest winds produced hazardous wind chills of 20 to 30 below zero, along with blowing and drifting snow. Many area schools closed on the 5th, due to the extreme cold and poor road conditions.

On 1/6/2014 to 1/7/2014 one of the most brutal cold air outbreaks in recent memory-the coldest since at least January 1994-plunged into the Great Lakes region. Near-to below-zero temperatures were accompanied by blustery northwest winds. Away from the warming influence of Lake Michigan, wind chills sunk to 30 below or colder. The coldest wind chills were observed were 44 below near Cedarville, 39 below near Engadine, 36 below at Sault Ste Marie, and 33 below at West Branch and Houghton Lake.

All of these were reached in the morning hours of the 7th. As a result, school closings were widespread across northern Michigan on the 7th.

Hazard Description

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

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

Hypothermia usually occurs in one of two sets of circumstances. One situation involves hypothermia associated with prolonged exposure to cold while participating in outdoor sports such as skiing, hiking, or camping. Most victims of this form of hypothermia tend to be young, generally healthy individuals who may lack experience in dealing with extreme cold temperature. The second situation involves a particularly vulnerable person who is subjected to only a moderate, indoor cold stress. A common example would be that of an elderly person living in an inadequately heated home. In such circumstances, hypothermia may not occur until days or perhaps weeks after the cold stress begins.

The special vulnerability of elderly persons to hypothermia has become readily apparent. Over half of the approximately 700 persons who die each year due to cold exposure are 60 years of age or older, even though this age group only represents about 20% of the country's population. This remarkable statistic may be due, in part, to the fact that elderly persons appear to perceive cold less well than younger persons and may voluntarily set thermostats to relatively low temperatures. In addition, high energy costs and the relative poverty among some elderly people may discourage their setting thermostats high enough to maintain adequate warmth. Because many elderly people live alone and do not have regular visitors, the cold conditions may persist for several days or weeks, thus allowing hypothermia to set in.

Babies and very young children are also very vulnerable to hypothermia. In addition, statistics indicate that death due to cold is more frequent among males than females in virtually all age groups. Part of that may be explained by differences in risk factors, and part may be due to different rates of cold exposure between the sexes.

Extreme Cold Overview

While there have been minimal conditions with excessive cold, cold events occur annually in Iosco County and are a risk to the residents. Unfortunately, many of those most vulnerable to this hazard (children,

elderly, and homeless individuals, and the critically ill) may not have access to sufficiently heated environments. Excessive cold is considered to be a severe weather event, which was given a high priority to address.

Hydrological Hazards

DAM FAILURES

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

Hazard Description

A dam failure can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Dam failures occur not only during flood events, which may cause overtopping of a dam, but also as a result of misoperation, lack of maintenance and repair, or vandalism. A common form of dam failure occurs when tree roots disrupt the integrity of an earthen dam. Water can pass through the dam where the soil has been broken apart by the roots. Such failures can be catastrophic because they occur unexpectedly, with no time for evacuation.

In Michigan, all dams over 6 feet high that create an impoundment with a surface area of more than 5 acres are regulated by Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act (451 P.A. 1994), as amended. This statute requires the Michigan Department of Environmental Quality (DEQ) to rate each dam as either a low, significant, or high hazard potential this rating system is based solely on the potential downstream impact if the dam were to fail, and is not according to the physical condition of the dam.

The National Inventory of Dams lists 14 dams within Iosco County with four (4) of these dams identified as High Hazard Potential Dams and one (1) identified as a Significant Hazard Potential Dam. The definitions for these ratings by Michigan Law (Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act) are as follows:

"High hazard potential dam" means a dam located in an area where a failure may cause serious damage to inhabited homes, agricultural buildings, campgrounds, recreational facilities, industrial or commercial buildings, public utilities, main highways, or class I carrier railroads, or where environmental degradation would be significant, or where danger to individuals exists with the potential for loss of life.

"Significant hazard potential dam" means a dam located in an area where its failure may cause damage limited to isolated inhabited homes, agricultural buildings, structures, secondary highways, short line railroads, or public utilities, where environmental degradation may be significant, or where danger to individuals exists.

Dam Failures in Iosco County

On 4-15-2014, the Wraco Lodge Dam collapsed causing water to flow into an already flooded Muskegon River. The dam was considered to be a low risk dam as this additional water caused the wash out of several roads, but did not cause any damage to property or harm to human life.

Dam Failure Overview

According to the National Inventory of Dams Iosco County has four (4) dams that are rated as a High Hazard Potential Dams and one (1) dam rated as a Significant Hazard Potential Dam. The four High Hazard Potential Dams that are located in Iosco County are: Cooke, Loud, Five Channel, and Foote. The Significant Hazard Potential Dam is Rodman Dam. The Federal Emergency Response Commission (FERC) has emergency planning oversight of the dams. Dam owners are required to maintain an emergency action plan (EAP) for significant and high hazard potential dams. Owners are also required to coordinate with local emergency management officials to assure consistency with local emergency operations plans. Dam failures have been given a high priority to address and a study to determine the status of the dams is included in the plan.

RIVERINE FLOODING

The overflowing of rivers, streams, drains and lakes due to excessive rainfall, rapid snowmelt or ice.

Hazard Description

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

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

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

Ice Jams

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

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

Monthly Mean Precipitation (Liquid Equivalent in Inches) in Iosco County 1930-2015

TABLE 4.2

Month	Iosco County	
	1930-2000	2001-2015
January	1.81	1.72
February	1.43	1.81
March	2.16	1.80
April	2.69	3.42
May	2.96	3.37
June	3.39	3.52
July	3.00	2.93
August	3.41	2.81
September	3.26	2.78
October	2.54	2.91
November	2.47	2.20
December	1.92	2.26
Annual Average	31.04	31.53

Source: National Weather Service

The data from the past 15 years does not suggest a significant change in the precipitation patterns from the previous 80 years.

Riverine Flooding in Iosco County

One flood incident was reported by the NCDC for Iosco County, Michigan between 1/1/1950 and 8/31/2004.

On 9/26/2005 persistent rain and embedded thunderstorms produced heavy rain in part of central and lower Michigan. An observer in St. Helen reported 5.79 inches of rain in the 24 hours preceding 8 am EDT on the 26th. Five inches of rain fell on Lupton, with 3.66 inches in Gladwin. The West Branch of the Rifle River rose out of its banks near the City of West Branch, though no property damage was reported. Significant flooding of side roads occurred in parts of Iosco County. Damages of $4,000 were reported regarding this event.

Riverine and Urban Flooding Overview

Currently there are only five townships of Iosco County that are eligible to purchase flood insurance from the National Flood Insurance Program (NFIP). Flooding concerns are a concern and as a result there is a project being proposed to help monitor the water levels of the inland bodies of water.

GREAT LAKES SHORELINE FLOODING AND EROSION

Hazard Description

Flooding and erosion along Michigan's 3,200 mile long Great Lakes shoreline is typically caused by high Great Lakes water levels, storm surges, or high winds. Shoreline flooding and erosion are natural processes that occur at normal and even low Great Lakes water levels. During periods of high water, however, flooding and erosion are more frequent and serious causing damage to homes, businesses, roads, water distribution and wastewater treatment facilities, and other structures in coastal communities. Windstorms and differences in barometric pressure can temporarily tilt the surface of a lake up at one end as much as 8 feet. This phenomena is called a storm surge and can drive lake water inland over large areas.

Shoreline Erosion and Control in Iosco County

There is a 10% or higher chance of shoreline flooding in a year. In nearly every decade, high water levels on the Great Lakes have caused significant damage and impact to Michigan coastal communities. In some decades high water levels last longer than one year. The most recent high water period began in 1997 and resulted in the Great Lakes being at or near record levels set in the mid-1980s'. In response to the threat of severe shoreline flooding and erosion, the U.S. Army Corps of Engineers (USACE), at the request of the Governor, implemented its Advance Measures Program to assist Michigan shoreline communities in their flood and erosion mitigation efforts. (See Programs and Initiatives section for more details.) To date, over 20 Michigan jurisdictions have taken advantage of this program.

Prior to that, the record-high lake levels in 1985-86 culminated in a Governor's disaster declaration for 17 shoreline counties. The USACE implemented its Advance Measures Program, and the State of Michigan implemented three shoreline flooding and erosion mitigation programs aimed at reducing future flood impacts on shoreline communities and homeowners. (See Programs and Initiatives section.) During 1972-73, high water levels caused flooding in over 30 counties, resulting in an excess of $50 million in public and private damage. Thousands of people were forced to evacuate their homes. Similar high water level flooding occurred in the early 1950s and late 1960s, also resulting in millions of dollars worth of damage to shoreline communities.

Many of the same events that influence Riverine Flooding occur simultaneously as Shoreline Flooding. Iosco County was granted Presidential Declaration of Disaster in 1978, and again in 1985 for Riverine and Shoreline Flooding. Although the Great Lakes are currently near an all-time low level, the probability they will rise again is a certainty.

Shoreline Flooding and Erosion Control Overview

Varying levels of Lake Huron is important to the economy and safety of many of the residents in Iosco County. With a large number of residences, both seasonal and fulltime, being located on the lakefront, it is important to monitor the level and erosion of the lake. Included in the plan is a proposed study to monitor the erosion of Lake Huron to determine what measures, if any, are needed to protect the homes on the shores of Lake Huron.

DROUGHT

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

Hazard Description

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

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

These direct impacts can further result in indirect impacts to a community, such as reduced revenue due to income losses in agriculture, retail, tourism and other economic sectors; declines in land values due to physical damage from the drought conditions and decreased functional use of the property, and possible loss of human life due to extreme heat, fire, and other heat-related problems.

Two common measurement tools of dry weather conditions are the Palmer Drought Indices (including the Palmer Drought Severity Index and the Palmer Hydrological Drought Index) and the Crop Moisture Index. The Palmer Drought Severity Index is a good long-term drought monitoring tool. It is a monthly index that indicates the severity of a wet or dry spell. This index is based on average temperature and rainfall information for a particular location in a formula to determine dryness. It uses a value of 0 for the normal amount of rainfall in a particular location, and drought is shown in terms of negative numbers, for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought. Any value above 0 demonstrates that there has been above normal amounts of precipitation. This index can be used for indicating lake levels and surface water supply abnormalities but is not all that good for monitoring climatic impacts on vegetation, especially crops.

The Crop Moisture Index (CMI) evaluates short-term moisture conditions across crop producing regions. The CMI measures how much moisture is in the plant root zone of the soil. This index is based on the mean temperature and total precipitation that occurs each week, as well as the CMI from the previous week. The CMI changes as quickly as the weather changes. A heavy rainstorm can dramatically change the CMI for a region. Since this index changes so quickly and in response to a single weather event, the CMI is not considered a good long-term drought measurement tool.

Droughts/Drought Related Events in Iosco County

While drought occurs periodically, in Iosco County, the Palmer Drought Index indicated drought conditions reached extreme severity only 2% of the time. There were no drought events reported in Iosco County between 1/1/1950 and 8/31/ 2014.

Drought Overview

As 70 percent of Iosco County consists of forested lands, the biggest problem drought presents is the increased threat of wildfire. A drought impacted landscape could quickly turn a small fire into a raging out of control blaze. Wildfires could destroy homes, businesses, and other property located in the County's rural residential areas.

A drought could also impact the agricultural areas of the County, alter the quantity and quality of crops, livestock and other agricultural activities, resulting in severe economic and social hardships throughout the County.

Transportation Hazards

TRANSPORTATION ACCIDENTS: AIR, LAND, AND WATER

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

Hazard Description

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

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

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

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

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

Air Transportation

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

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

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

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

Land Transportation

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

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

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

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

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

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

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

Another MDOT program that can help improve rail safety is the Michigan Rail Loan Assistance Program. Established under Act 117, P.A. 1997, this program was initiated to help finance capital improvements on Michigan's rail infrastructure. Although the program is designed primarily to help preserve and improve rail freight service, any improvements made to the rail infrastructure that serves passenger rail service can only help improve passenger rail safety. Track rehabilitation is one of the eligible projects that can be funded under this program, and the safety value of a project is one of the primary selection criteria. (The Iosco County road map and a map of Michigan's Rail system are included in this section. On the Rail map, Iosco County is highlighted in yellow.)

National Transportation Safety Board

The National Transportation Safety Board is an independent federal agency responsible for promoting aviation, highway, railroad, marine, pipeline, and hazardous materials transportation safety. The NTSB is mandated to investigate significant transportation accidents, determine the probable cause of such accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews. Although the NTSV has no regulatory or enforcement powers, it has nonetheless been successful in seeing the adoption and implementation of over 80% of its transportation accident recommendations.

An example of an NTSB recommendation that is being implemented is the recent agreement between the FAA and the Boeing Aircraft Company to redesign the rudder system on the company's popular 737 jetliners and to replace the rudder valve system in every one of the 3,200 737 jets now in service. The rudder retrofit program will cost Boeing nearly one-quarter of a billion dollars. (The 737 rudder system came under close scrutiny of the NTSB after crashes of 737s in 1991 and 1994 resulted in over 150 deaths. The NTSB believes the rudder system on the two jets might have been a contributing factor in the crashes.)

Transportation Overview

Transportation impacts the lives of all the residents of Iosco County. Whether it is going to work, school, or the grocery store, having a safe route is critical. Transportation was given a high priority and several actions were included in the plan update to address transportation matters.

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Hazardous Material Incidents

HAZARDOUS MATERIAL INCIDENTS - TRANSPORTATION

An uncontrolled release of hazardous materials during transport, capable of posing a risk to health, safety, property or the environment.

Hazard Description

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

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

Hazardous Material Incidents: Transportation Overview

Although there have not been any significant hazardous materials transportation incidents, there have been many minor petroleum and hazardous materials spills throughout the years. Most major highways within the county are primarily two lanes and interstates. These routes are heavily congested in the summer months and often icy or impassible in the winter. It is certainly only a matter of time before a serious hazardous materials incident occurs on a county roadway, railway, or waterway.

OIL/GAS WELL INCIDENT

An uncontrolled release of oil or gas, or the poisonous by-product hydrogen sulfide, from wells.

Hazard Description

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

The petroleum and natural gas industry is highly regulated and has a fine safety record, but the threat of accidental releases, fires and explosions still exists. In addition to these hazards, many of Michigan's oil and gas wells contain extremely poisonous hydrogen sulfide (H2S) gas. Hydrogen sulfide is a naturally occurring gas mixed with natural gas or dissolved in the oil or brine and released upon exposure to

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atmospheric conditions. Over 1,300 wells in Michigan have been identified as having H2S levels exceeding 300 parts per million (ppm).

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

Physiological Response to H2S

TABLE 4.3

10ppm	Beginning eye irritation
50-100 ppm	Slight conjunctivitis and respiratory tract irritation after 1 hour exposure
100 ppm	Coughing, eye irritation, loss of sense of smell after 2-15 minutes. Altered respiration, pain in the eyes and drowsiness after 15-30 minutes followed by throat irritation after 1 hour. Several hours of exposure results in gradual increase in severity of these symptoms and death may occur within the next 48 hours.
200-300 ppm	Marked conjunctivitis and respiratory tract irritation after 1 hour of exposure.
500-700 ppm	Loss of consciousness and possibly death in 30 minutes to 1 hour.
700-1000 ppm	Rapid unconsciousness, cessation of respiration and death.
1000-2000 ppm	Unconsciousness at once, with early cessation of respiration and death in a few minutes. Death may occur even if the individual is removed to fresh air at once.

Oil and Gas Well Accidents Overview

There are 443 oil and natural gas wells in Iosco County along with 35.2 miles of gas pipeline. This is a relatively small quantity when compared with state leader, Otsego County, with over 5700 wells. Of almost as great a concern is the fact that a combination of multiple organizations and individuals own the wells. As a general rule, most gas companies prefer to respond to incidents involving their wells themselves – and in the vast majority of cases that is what happens. Because gas companies often have controlled burns, and deal with wells on a daily basis, it is impossible to ascertain how many incidents have actually occurred in the county. However, there is still the possibility that an emergency response agency could find themselves in the situation of responding to an incident at a gas well. Responders must understand the dangers associated with HS2 and must have a working knowledge of these wells that are in their areas of responsibility.

Petroleum and Natural Gas Pipeline Accidents

An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide, from a pipeline.

Hazard Description

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

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

While it is true that the petroleum and natural gas industries have historically had a fine safety record, and that pipelines are by far the safest form of transportation for these products, the threat of fires, explosions, ruptures, and spills nevertheless exists. In addition to these hazards, there is the danger of hydrogen sulfide (H2S) release. These dangers (fully explained in the Oil and Natural Gas Well Accidents section) can be found around oil and gas wells, pipeline terminals, storage facilities, and transportation facilities where the gas or oil has a high sulfur content. Hydrogen sulfide is not only an extremely poisonous gas, but is also explosive when mixed with air at temperatures of 500 degrees Fahrenheit or above.

Petroleum and Natural Gas Pipeline Accidents in Iosco County

Petroleum and Natural Gas Pipeline Accidents Overview

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

Because petroleum and natural gas pipeline accidents are an inevitable occurrence, affected local communities must be prepared to respond to the accident, institute necessary protective actions, and coordinate with federal and state officials and the pipeline company emergency crews to effectively manage and recover from the accident. That can best be accomplished through collaborative planning, training, and exercising of emergency procedures with all potentially involved parties.

HAZARDOUS MATERIAL INCIDENTS - FIXED SITE AND PROPANE STORAGE SITES

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

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

Hazard Description (Hazardous Material Incidents)

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

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

Hazard Description-Industrial Accidents

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

Hazardous Material Incidents/Industrial Accidents in Iosco County

Hazardous Material Incidents/Industrial Accidents Overview

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

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

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

Superfund Amendments and Reauthorization Act (SARA), Title II

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

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

Nuclear Power Plant Accidents

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

Hazard Description

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

Nuclear Power Plant Failures Overview

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

Iosco County does not have a nuclear power plant located within 50 miles and is not within the Secondary EPZ or ingestion pathway zone. Thus, they are not required to have a plans in place for that zone. The closest active Nuclear Power Plant is located within the US is 142 miles, which is the Point Beach Nuclear Plant in Wisconsin, and the closest nuclear plant in Michigan is 169 miles, which is the Palisades Nuclear Generating Station.

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Technical Failures

INFRASTRUCTURE FAILURES

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

Hazard Description

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

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

Communication Loss

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

The county has come up with a few ideas to help solve this problem. They suggested that Mutual aid assistance for failures in utility and communications systems (including 9-1-1) could help alleviate the problem. Alternative 9-1-1 access could be done through radio operators whose homes are identified through special markings. Also, they could use generators for backup power at critical facilities. Finally, the replacement or renovation of aging structures and equipment (to make as hazard-resistant as economically possible).

Infrastructure Failures Overview

Most of Iosco County's infrastructure failures are secondary hazards caused by other major events such as floods, windstorms, snow and ice storms. The main infrastructure failures are power outages, which are normally restored in a matter of hours. However, if the power were out for a longer period of time, the local chapter of the American Red Cross would be called to set up temporary shelters.

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Fire Hazards

WILDFIRES

An uncontrolled fire in grass or brushlands, or forested areas.

Hazard Description

Contrary to popular belief, lightning strikes are not a leading cause of wildfires in Michigan. Today, lightning causes only 2 percent of all wildfires, and the rest are caused by human activity. Outdoor burning is the leading cause of wildfires in Michigan. Debris burning was responsible for 32 percent of the wildfires in Michigan in 1999. Incendiary, or intentional, fires accounted for another 12 percent of the total wildfires.

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

Wildfires in Iosco County

There has been one significant wildfire in Iosco County from 1/1/1950 to 12/31/2015. However, each year there are numerous small fires that could be major fires if they were to go unchecked.

On 7/29/2007 a fast developing wildfire burned between 200 and 600 acres in Wilber Township, nine miles northwest of Tawas City. Jack pine trees were the primary fuel source for the fire. Approximately 100 people were evacuated from their homes and three homes were damaged. The fire was contained that evening.

Given the appropriate weather, fuels (dry and dead grasses, tree debris, etc.) and topography, any fire can develop into a significant wildfire.

Wildfire Overview

Iosco County has a major portion of the County located within state and federally-owned forested lands. As a result, the U.S. Forest Service and Michigan Department of Natural Resources (MDNR) closely monitor weather conditions for wildfires. Wildfires were also identified as a high priority in the plan, which has resulted in several projects being included in the plan to mitigation the damages caused by wildfires.

STRUCTURAL FIRES

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

Hazard Description

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

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Direct property losses due to fire exceed $9 billion per year – and much of that figure is the result of structural fire.

According to the Federal Emergency Management Agency's National Fire Data Center, residential fires represent 74% of all structural fires and cause 80% of all fire fatalities. Approximately 85% of those fatalities occur in single- family homes and duplexes. Perhaps the most tragic statistic of all is that over 40% of residential fires and 60% of residential fatalities occur in homes with no smoke alarms.

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

A major challenge facing the Michigan fire service is the lack of a state-mandated fire safety code and code enforcement program for all occupancies.

Structural Fires in Iosco County

Structural Fires Overview

Major events occur every year, beyond the ordinary single-home fires that happen in every community. Since historic areas are less well-fireproofed and tend to have greater densities, the risk of major fire impacts appears to be higher. Fires were identified as a high priority to address in the plan, and several projects were identified to mitigate the effects of structural fires.

SCRAP TIRE FIRES

A large fire that burns scrap tires being stored for recycling/re-use.

Hazard Description

Michigan generates some 7.5 to 9 million scrap tires each year. Although responsible means of disposal have become more common, tire dumps of the last forty years present environmental and safety hazards that will last into the foreseeable future. By 2001, the State of Michigan had identified a total in excess of 24 million scrap tires in disposal sites scattered around the state.

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

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

Scrap Tire Fires in Iosco County

Iosco County has not had a significant tire fire in recent memory, and the scrap tires that were identified in 2001 have since been removed from the County.

Scrap Tire Overview

With the elimination of scrap tire sites within Iosco County, this hazard has been greatly reduced. As there are old tires located at car dealerships and other sites, this hazard has not been completely eliminated.

Seasonal Population Increase

SEASONAL POPULATION INCREASE

A population, in the county, beyond the normal level of people to which resources are allocated.

Hazard Description

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

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

Iosco County is no exception to seasonal population spikes in the summer, deer season, and to a lesser extent, the winter months. On top of permanent population in 2010 of 25,887, Iosco County has approximately 10,000 housing units classified as seasonal and/or recreational.

Seasonal Population Increases in Iosco County

With the power outages across the country in the summer of 2003, Iosco County experienced a high influx of people from the Detroit area going to their seasonal homes. The emergency management office reported that there were low supplies of food and stresses on emergency services in Iosco County.

Seasonal Population Increase Overview

Seasonal population increase will continue to be a problem in Iosco County unless there are preventative measures taken to solve it. The population of Iosco County is projected to steadily increase and with budget cuts, Iosco County is finding it hard to maintain the status quo for emergency services. The seasonal population influx will only make the situation harder to manage. Also, infrastructure problems in southern Michigan can be a factor that directly affects Iosco County.

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Civil Disturbances

CIVIL DISTURBANCES

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

Hazard Description

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

The first type, demonstrations of protest, usually contains some level of formal organization or shared discontent that allows goal oriented activities to be collectively pursued. This first category includes political protests and labor disputes. Many protest actions and demonstrations are orderly, lawful, and peaceful, but some may become threatening, disruptive, and even deliberately malicious (on the part of at least some of those involved either in the protest itself or in reaction to the protest). It is only the latter type of event that should properly be classified as a civil disturbance. The destruction of property, interruption of services, interference with lawful behaviors of ordinary citizens and/or emergency responders, the use of intimidation or civil rights violations, and threats or actual acts of physical violence may all occur during civil disturbance events. Actual Michigan events have included the willful destruction of property and impeded property access during labor strikes, and heated conflicts between opposing participants at political rallies or issue-driven demonstrations. Different risks and forms of disturbance are connected with the nature and perceived importance of the cause, the degree of organization among those who are active in the protest, and the amount of group cohesion among those who are involved.

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

Common problems include the widespread destruction of property, numerous types of assault and disorderly conduct, and criminal victimization. It should also be noted that many persons who are normally law-abiding may temporarily behave in unusually aggressive ways during these events, often prompted by an understandably defensive anxiety about the disorder and behavior exhibited by the deviant minority, but also possibly exacerbated by a level of alcoholic intoxication as well as the

temptation by some to engage in appealing deviant behaviors that under normal circumstances of social control would not be selected. Many citizens remain law-abiding, but may remain in the area of a civil disturbance either because they live in the area, have activities (including social and recreational ones) that they wish to continue engaging in, have legitimate business to conduct, or because they are curious or concerned and wish to observe or witness the situation as it occurs. The majority of such law-abiding citizens will leave the area in an orderly way when given clear instructions by a legally-recognized authority to do so. There are cases in which hooliganism may become combined with protest, and thus complicate the situation for law enforcement personnel. In some circumstances, elements of protest are added only by a small minority of participants after the disturbances have already begun, but in other circumstances, protest activity may arise out of concerns regarding the extent and nature of pre-emptive law enforcement activities that were intended to prevent a civil disturbance.

The third type, riots, may stem from motivations of protest, but lacks the organization that formal protests include. Although legitimate and peaceful protests may spontaneously form when people gather publicly with the perception that they already share certain values and beliefs, riots tend to involve violent gatherings of persons whose level of shared values and goals is not sufficiently similar to allow their collective concerns or efforts to coalesce in a relatively organized manner. Instead, there tends to be a diffuse sense of shared discontent, but relatively few norms to shape these strivings into clearly coherent action. For example, widespread discontent within a community that is sufficiently cohesive may quickly take on a set of shared leaders and clear organization, such as a march or chant that is clearly in the form of a protest or demonstration, but in an area that doesn't have the same cohesiveness and shared norms and values, a relatively chaotic form of expression may take place instead, involving assaults, intimidation, and unlawfully destructive expressions of discontent, possibly including the victimization of innocent citizens or businesses who have been selected by part of the crowd to function as scapegoats during their expression of discontent. In addition to the sentiments of discontent that may have sparked the initial activities, however, elements of hooliganism may emerge and even come to predominate, as certain persons may attempt to exploit the social disorder for their own individual ends. In other cases, elements of legitimate protest may also form within this type of civil disturbance, and pockets of organized protest may help to channel and contain the negative elements of hooliganism, looting, etc. that might otherwise threaten all area residents. The complexity of these events for law enforcement can be very great, demanding carefully calculated efforts to analyze the nature of the disturbance, and difficult decisions about how to approach and possibly involve the numerous types of persons, gatherings, groups, and behaviors that may have the potential to either mitigate or exacerbate the situation.

The fourth type of civil disturbance, insurrection, involves a deliberate collective effort to disrupt or replace the established authority of a government or its representatives, by persons within a society or under its authority. Some prison uprisings may fall into this category, although others may more properly be classified as riots or protests, depending upon the presence and extent of specific goals and organization, and the type of action used in achieving such goals. An insurrection has the deliberate goal of either replacing established authorities with a new distribution of power, or with the destruction of established power structures in favor of (usually temporary) anarchy or a smaller-scale set of recognized criminal (gang), ethnic, or other group networks and power structures. The latter circumstances tend to involve disturbances that exist on a relatively small scale, such as in a single local area or involving a prison network or "cult compound" (or any other similarly self-aware group or subculture with identified collective interests and a network that allows rapid communication). However, larger-scale insurrections are also possible, involving issues of class conflict or other widespread social inequalities, highly divisive political issues, or other important large-scale events that disrupt the social equilibrium because they illuminate areas in which cultural values are not sufficiently shared throughout the society or region that

is experiencing the conflict, disruption, or strain. In many cases, this kind of large-scale social strain has developed gradually over time, and involves an entire series of compromises, concessions, and migrations that may temporarily relieve the disruptive social and value conflicts, only to reemerge after another period of changes and population growth has caused a breakdown in previous arrangements. This description of the causes of social discontent applies to many protests and riots, as well as insurrection. In cases involving the formation or emergence of significant subcultures or counterculture, such as during the Vietnam era, or when dominant values break down or fail to be established on important key issues or mores, there is the potential for insurrection on a larger scale. The Civil War of 1861-1865 was one such instance, in which the authority of the federal government was either accepted or rejected by various states which then aligned themselves in opposition to each other. Between these two extremes (of a purely localized civil disturbance and a national civil war) are numerous other possibilities for regional, political, class, or ethnic conflicts that may involve one or more categories of citizen in conflict with others. Examples could include prisoners versus law enforcement personnel, a countercultural group versus the establishment, or a violent political activist group in conflict with selected representatives of a contrary viewpoint. (Some such actions may overlap with those of terrorism, q.v.)

Civil Disturbance In Iosco County Overview

Civil disturbances occur rarely in Iosco County. However, with the ever increasing threats throughout society, this is a growing problem that cannot be resolved at the local level. Should a major event occur, the Michigan State Police, and possibly other law enforcement details will have to be called in to assist the local public safety personnel.

NUCLEAR ATTACK

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

Hazard Description

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

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

of the “Cold War” and the closure of the base. There still may be a small threat to the former base because it could still be reused for B-52 MStratfortress bomber operations in case the current Stratfortress base is destroyed. The airfield could also have the potential for terrorism/sabotage and is being looked at under that category.

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

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

Hazard Analysis

Understanding Nuclear Weapons

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

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

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

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

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

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

Effects of Nuclear Weapons

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

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

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

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

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

MASS FIRE results from the ignition of thousands of individual fires by a bomb's thermal pulse, combined with widespread destruction from its blast. Over a period of hours, small fires merge and feed on damaged buildings and debris. Controlling these fires would be very difficult, due to damaged water mains, destroyed fire-fighting equipment, and blocked roads. The result is an extremely intense fire that can

spread quickly and reach very high temperatures. Mass fire may significantly expand the area devastated by a bomb, destroying areas that might otherwise be only lightly damaged by other types of effects.

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

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

Nuclear Attack Overview

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

Hazard Mitigation Alternatives for Nuclear Attack

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

(Note: Should a nuclear attack occur, the emergency management will be taken over by the Department of Homeland Security.)

SABOTAGE (TERRORISM)

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

Hazard Description

Sabotage/terrorism can take many forms or have many vehicles for delivery, including: 1) bombings; 2) assassinations; 3) organized extortion; 4) use of nuclear, chemical, radiological, and biological weapons; 5) information warfare; 6) ethnic/religious/gender intimidation (hate crimes); 7) state and local militia groups that advocate overthrowing the U.S. Government; 8) eco-extremism, designed to destroy or disrupt specific research or resource-related activities; and 9) widespread and organized narcotics smuggling and distribution organizations. Because sabotage/terrorism objectives are so widely varied, so

too are the potential targets of such actions. Virtually any public facility or infrastructure, or place of public assembly, can be considered a potential target. In addition, certain types of businesses engaged in controversial activities are also potential targets, as are large computer systems operated by government agencies, banks, financial institutions, large businesses, health care facilities, and colleges/universities.

One of the first acts of domestic sabotage/terrorism ever carried out occurred in Michigan on May 18, 1927, in Bath. A disgruntled taxpayer and farmer detonated 1,000 pounds of explosives under the newly constructed Bath Consolidated School killing 38 students and 3 teachers and injuring 58 others. The perpetrator then blew himself up, along with the school superintendent. As tragic as that event was, it could have been worse were it not for the fact that half of the explosives failed to detonate as planned, which certainly would have killed many more students and teachers. Concentrated activities to prevent terrorist activities have become even more vital with the passage of time and in the wake of the 9/11 events of destruction in New York City and Washington D.C. Many more resources may anticipate to be mobilized to prevent terrorist activities in the near future.

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

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

Sabotage Overview

Even though there have not been any recently recorded sabotage/terrorism events occurring recently in Iosco County, the Emergency Management staff has regularly scheduled training events to address these circumstances. With the ever-growing threat of local acts, the County is working to prepare their personnel should an event occur.

Public Health Emergencies

PUBLIC HEALTH EMERGENCIES

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

Hazard Description

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

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

Public Health Emergencies in Iosco County

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

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

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

Public Health Emergency Overview

Michigan has had several large-scale public health emergencies in recent history, but fortunately nothing that caused widespread severe injury or death. One of Michigan's most serious emergencies to hit Michigan occurred in 1973 when a local farmer fed polybrominated biphenyls (PBB) laced feed to his dairy herd. Michigan Chemical Corporation had accidentally supplied the Michigan Farm Bureau Services with sacks of fire-proofing chemical PBB, which is known to cause cancer, genetic mutation, and birth defects, and the PBB was inadvertently substituted for magnesium oxide (commonly used in antacid tablets used for human consumption) in a custom dairy feed # 402. During the crucial eight-month period between the farmer's first observations and the discovery of the accident, serious contamination had already occurred. By 1975 the state had quarantined more than 500 farms. Condemned for slaughter were more than 17,000 cattle; 3,415 hogs; 1.5 million chickens and 4.8 million eggs. The 1973 PBB contamination incident is unprecedented in U.S. history, but the long-term implications of contamination may be less than was feared.

In the 1980s, the state health department confirmed that 95 percent of Michigan's population had PBB in their bodies from eating beef, drinking milk or consuming other products from contaminated farms. A cancer epidemic was feared. Although one has not occurred, so far anyway, studies do show the most exposed families have increased breast and digestive cancer, and lymphoma. Among the effects observed in the exposed populations the daughters of the most highly exposed women began menstruation, on average, before they reached their twelfth birthdays.

Similarly, the northern Michigan water and sewer infrastructure disaster of 1994 is also unprecedented in scope, magnitude, and public health and safety implications for the affected communities. These events, though unusual, have heightened awareness of the broad nature of threats that can result in a public health emergency. Such emergencies no longer simply involve the spread of disease, but rather can arise out of a variety of situations and circumstances.

In 2001, Michigan health officials were introduced to the emerging health threats posed by foot-and-mouth disease and the West Nile encephalitis virus. Although foot-and-mouth disease is a highly contagious disease that only affects animals, a widespread outbreak such as that which occurred in parts of the United Kingdom in the spring of 2001 could have significant public health implications for humans as well, due to the potentially large numbers of dead animal carcasses that would have to be disposed of to prevent disease outbreaks. The Michigan Department of Agriculture and Rural Development, in conjunction with numerous other federal, state and local agencies and the agriculture industry, continues to monitor the foot-and-mouth disease situation and take the necessary steps to prevent the introduction and spread of the disease in the United States.

Geological Hazards

EARTHQUAKES

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

Hazard Description

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

The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Most casualties result from falling objects and debris. Disruption of communications systems, electric power lines, gas, sewer and water mains can be expected. Water supplies can become contaminated by seepage around water mains. Damage to roadways and other transportation systems may create food and other

resource shortages if transportation is interrupted. In addition, earthquakes may trigger other emergencies such as fires and hazardous material spills, thereby compounding the situation.

Earthquake Overview

No severely destructive earthquake has ever been documented in Michigan. However, several mildly damaging earthquakes have been felt since the early 1800s. The exact number is difficult to determine, as scientific opinion on the matter varies. With most of these earthquakes, damage (if any) was limited to cracked plaster, broken dishes, damaged chimneys, and broken windows. (Biggest Michigan threats would be to pipelines, buildings that are poorly designed and constructed, and shelving, furniture, mirrors, gas cylinders, etc. within structures that could fall and cause injury or personal property damage)

The greatest impact on Iosco County would probably come from damage to natural gas and petroleum pipelines. If the earthquake occurs in the winter, areas of the state could be severely impacted by fuel shortages - which could translate into temporary shortages in Iosco County.

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

In January 1990, Executive Order (EO) 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, was signed into law. This EO requires that appropriate seismic design and construction standards and practices be adopted for any new construction or replacement of a federal building or federally building during or after an earthquake.

Iosco County is not in an area designated as high risk to ground movement; yet by encouraging awareness of the hazards of poor construction practices and/or routine evaluations of existing structures for deficiencies, vulnerabilities can be identified and repaired before loss is sustained.

There is some chance of a moderate earthquake over the next few decades, which might be strong enough to damage some property and underground infrastructure.

SUBSIDENCE

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

Hazard Description

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

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

Mine Subsidence

In Michigan, the primary cause of subsidence is underground mining. Although mine subsidence is not as significant a hazard in Michigan as in other parts of the country, many areas in Michigan are potentially vulnerable to mine subsidence hazards. Mine subsidence is a geologic hazard that can strike with little or no warning and can result in very costly damage. Mine subsidence occurs when the ground surface collapses into underground mined areas. In addition, the collapse of improperly stabilized mine openings is also a form of subsidence. About the only good thing about mine subsidence is that it generally affects very few people, unlike other natural hazards that may impact a large number of people. Mine subsidence can cause damage to buildings, disrupt underground utilities, and be a potential threat to human life. In extreme cases, mine subsidence can literally swallow whole buildings or sections of ground into sinkholes, endangering anyone that may be present at that site. Mine subsidence may take years to manifest. Examples of collapses occurring decades after mines were abandoned have been documented in several areas of the country.

Michigan's Mining Experience

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

Copper Mining

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

Iron Ore Mining

Michigan's Lake Superior region has been home to significant iron ore mining operations since the mid-1800s. The iron producing areas are referred to as ranges, since the iron deposits generally occur on the slopes or at the base of remnants of ancient mountain ranges. Michigan has three ranges: 1) Gogebic Range, which extends from Gogebic County into Wisconsin; 2) Marquette Range, in Marquette County; and 3) Menominee Range, in Dickinson and Iron Counties. Most near-surface iron deposits in these three ranges have been exhausted, so underground mining has become the primary extraction technique. Nearly two billion tons of iron ore have been extracted from these areas. Unfortunately, economics have forced the closure of many of the underground iron mining operations, although one five counties of Baraga, Dickinson,
Gogebic, Iron, and Marquette.

Salt/Solution Mining

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

Gypsum Mining

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

Coal Mining

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

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

Mine Subsidence Problem in Michigan

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

occurs and damage or destruction results.

Subsidence Overview

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

DRAFT

CHAPTER 5: ANALYSIS OF ALTERNATIVE ACTIONS

Prior to the development of the mitigation strategies, goals and objectives were developed. Upon the development of the goals and objectives, mitigation actions were then determined, based on the six categories of mitigation actions. Below are the goals and objectives, and the mitigation action categories as determined for the 2007 Hazard Mitigation Plan. Revised goals and objectives for the 2015 Plan, as determined by the Iosco County Hazard Mitigation Plan Advisory Committee, will appear in Chapter 5: Action Plan.

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

GOAL 1: Protect Public Health and Safety

OBJECTIVES

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

GOAL 2: Minimize damage to public and private property

OBJECTIVES

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

GOAL 3: Maintain essential services

OBJECTIVES

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

GOAL 4: Manage growth/development

OBJECTIVES

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

The next steps in the 2007 hazard mitigation planning process were 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. This step will also be utilized in the 2015 Plan and will be located in Chapter 5: Action Plan.

2007 Mitigation Strategies

1. **Prevention**-government administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
2. **Property Protection**-actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from a hazard area.
3. **Public Education and Awareness**-actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.
4. **Natural Resource Protection**-actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
5. **Emergency Services**-actions that protect people and property during and immediately after a disaster or hazard event.
6. **Structural Projects**-actions that involve the construction of structures to reduce the impact of a hazard.

Below is a table that identifies the 2007 Implementation strategy by hazard. Each item includes a brief description of the mitigation strategy, the priority to complete the strategy, that status of the strategy (ongoing, complete, in process, and not started), and the outcome of the strategy. The outcome includes the accomplishments and the agency responsible for the accomplishments.)

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
A. Multi-Hazard Actions			
Enhance and expand a public education program for all natural hazards that threaten the community.	High	Ongoing	Announcements (including Public Service Announcements (PSAs) on WHNN, and WKJC, information also distributed through Emergency Management Office and Health Department.
Produce and distribute family emergency preparedness information relating to all natural hazards affecting the County.	High	Ongoing	Information available on Health Department website, Emergency Management website, and through media blasts on the local radio stations (WHNN, and WKJC).
Continue to develop Emergency Response Team program to help prepare for all hazard events in the county.	High	Ongoing	Sheriff Dept. received grants to purchase boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for teams available, fiber optic cables available throughout County.
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.	High	Ongoing	Health dept. and US Fire Service provide press releases during emergencies for multiple events.
Enhance and expand an all hazards education and awareness program in schools, which includes classroom presentations and incorporating wildfire and weather hazard preparedness into school curriculums.	Med.	Ongoing	Emergency Management has lock down drills, Police and Fire Departments also provide training.
Ensure that the County and individual communities have adequate equipment, staff, and training to respond to transportation-related accidents specific to their needs.	Med.	Ongoing	There is a portable electronic digital sign used in times of emergency, response teams have boats, ORV (over the road vehicles), snowmobiles available in times of emergency. Items purchased through grants. Training providing to response teams, including dive team. Equipment provided has allowed for better/quicker response times.
Conduct workshops at community gatherings to encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	Med.	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Communities will work with the Federal Emergency Management Agency (FEMA) to identify flood plains.	Med.	Ongoing	County completed in 2014, with zone changes made. Map updates made. Continuous process with the ever changing flood patterns.
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.	Med.	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Develop plans to identify and inform persons of "Safe Areas" during festivals/events. (include signs and directions to shelters)	Med.	In Progress	Portable electronic digital sign purchased that is used during special events.
Communities will acquire and maintain an adequate level of emergency power generators to supply emergency water needs, wastewater processing, emergency communications, emergency health care, and shelters.	Med.	In Progress	Multiple emergency generators have been purchased by the health dept., and the emergency management dept. Homeland Security funds were utilized to purchase generators.
Ensure key gasoline stations have the capacity to pump gasoline during power outages.	Med.	In Progress	Several gas stations have purchased generators (Oscoda and Lincoln). Field suppliers are also utilized that will bring fuel to emergency/first responder vehicles in times of disaster.
Work with power companies to inventory condition of power line right-of-ways, and identify priority sections to clear branches and trees from power lines. The end goal is to create and maintain a disaster-resistant landscape in public rights-of-way.	Med.	Ongoing	Power company contracts with tree service to address tree /limb concerns. Power lines are combined and buried in places of high wind to reduce power outages.
Enforce a balanced system of ordinances that protect the community as-a-whole while respecting the rights of individuals.	Low	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Acquire portable/changeable message signs to direct crowds and provide information.	Low	In Progress	First sign purchase in 2012.
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).	Low	Ongoing	The Geographic Information System (GIS) was purchased in 2011 and given to the County's Equalization Department. County Equalization Department is in need of assistance in learning the GIS capabilities.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Identify optimal staffing levels for County and community needs – seek funding to meet optimal levels	Low	Ongoing	Staffing levels were initially completed through surveys. This is ongoing, with the ever changing personnel climate and the need to reassess required jobs.
Individual communities should prepare future land use plans and capital improvement programs to plan for their future needs.	Low	Ongoing	Local master plans are required to be updated every five years per Michigan Planning Enabling Act of 2008, capital improvement plans done annually with local budgets.
Where feasible and cost effective (more densely populated areas) bury and protect power and utility lines.	Low	In Progress	Phone and fiber optic cables are buried. Power lines are buried on a very limited basis due to costs.
B. National Security Threat (Sabotage/Terrorism)			
Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a sabotage/terrorism/WMD attack.	High	Ongoing	Done county-wide several times since last HMP was completed. Several facilities have completed their own assessments.
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Implementing school safety and violence prevention programs.	Med.	Ongoing	Fire Dept. staff and Michigan State Police Community Service Troopers meet with schools on a regular basis.
Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.	Med.	Ongoing	Plans kept on site. Grant funding available in last 4 years through Readiness Emergency Management in School (REMS) Program.
Providing legitimate channels of political and public expression.	Med.	Not Started	Not Applicable, available as a constitutional right.
The development and testing of internal emergency plans and procedures by businesses and organizations.	Low	Ongoing	Annually completed at water treatment facility as well as other facilities throughout the County. All Sara III site plans are reviewed regularly. Sheriff's Dept. has plans that are monitored by OSHA and MIOSHA.
Establishing avenues of reporting (and rewards) for information preventing terrorist incidents and sabotage.	Low	Ongoing	Crimestoppers is present and will offer rewards as appropriate. Incident command classes-See Something, Say Something are available.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, etc. that would get in the way or be left over following an attack or incident. The area may simultaneously need to be treated as a crime scene, site of urban search and rescue, area of hazardous materials, and/or a public health threat.)	Low	Ongoing	Written and oral Memoranda of Understanding (MOU) are in the County for: Alternate Care Centers (ACC), wrecking companies, and DPW storage areas.
Consistent use of computer data back-up systems and anti-virus software.	Low	Ongoing	Done in-house as standard practice.
C. Wildfire			
Create and enforce local ordinances that require burn permits and restrict campfires and outdoor burning.	High	Ongoing	All burn permits in the County are issued by the State.
Training and exercises for response personnel.	High	Ongoing	Training opportunities are available every March, April-just prior to the burn season.
Media broadcasts of fire weather and fire warnings.	High	Ongoing	National Weather Service offers weather and fire warnings, as does the Department of Natural Resources (DNR), the US Forest Service. These are also available online.
Mutual aid pacts with neighboring communities.	High	Ongoing	Agreements are in place between the US Forest Service and the local communities.
Residents should be instructed on proper evacuation procedures, such as wearing protective clothing (sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards.	High	Ongoing	The US Forest Service offers classes for both groups and individuals, including training at homes.
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
The creation of fuel breaks (areas where the spread of wildfires will be slowed or stopped due to removal of fuels, or the use of fire-retardant materials/vegetation) in high-risk forest or other areas.	High	Ongoing	US Forest Service has prescribed burns and fuel breaks.
Prescribed burns and fuel management (thinning of flammable vegetation, possibly including selective logging to thin out some areas. Fuels cleared can be given away as firewood or chipped into wood chips for distribution.)	High	Ongoing	US Forest Service has prescribed burns and fuel breaks.
Residents should plan several escape routes away from their homes - by car and by foot.	Med.	Ongoing	US Forest Service offers Safe Home Plan training for these circumstances.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Public education on smoking hazards and recreational fires.	Med.	Ongoing	Smokey the Bear initiative as well as daily burn notices and daily fire danger status reports.
Use of fire spotters, towers, planes.	Med.	Ongoing	DNR and US Forest Service.
Proper maintenance of property in or near wildland areas (including short grass; thinned trees and removal of low-hanging branches; selection of fire-resistant vegetation; use of fire resistant roofing and building materials; use of functional shutters on windows; keeping flammables such as curtains securely away from windows or using heavy fire-resistant drapes; creating and maintaining a buffer zone (defensible space) between structures and adjacent wild lands; use of the fire department's home safety inspections; sweeping/cleaning dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards; keeping woodpiles and other combustibles away from structures; use of boxed or enclosed eaves on house; thorough cleaning-up of spilled flammable fluids; and keeping garage areas protected from blowing embers).	Med.	Ongoing	DNR and US Forest Service.
Safe disposal of yard and house waste rather than through open burning.	Med.	Ongoing	This is accomplished through burn permits, which explain what is allowed and not allowed to be burned.
Keep handy household items that can be used as fire tools; a rake, axe, hand/chainsaw, bucket and shovel. Install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each floor of buildings and homes. Test monthly and change the batteries two times each year. Teach family members how to use the fire extinguisher.	Med.	Ongoing	PSA grants from US Forest Service as well as local fire departments who offer smoke alarms for businesses and homes.
Post fire emergency telephone numbers.	Med.	Complete	Posted throughout the County-911.
Efficient response to fallen power lines.	Med.	Ongoing	The fire service (local fire departments) are responsible until the power company shows up.
GIS mapping of vegetative coverage, for use in planning decisions and analyses through comparison with topography, zoning, developments, infrastructure, etc.	Med.	Ongoing	The Geographic Information System (GIS) was purchased in 2011 and given to the county's Equalization Department. In addition, DNR field offices also have some GIS capabilities.
Proper storage and use of flammables, including the use of flammable substances (such as when fueling machinery). Store gasoline, oily rags and other flammable materials in approved safety cans. Stack firewood at least 100 feet away and uphill from homes.	Med.	Ongoing	Safe Home Plan offered through local fire departments is available to residents and businesses.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
When Wildfire threatens, residents should be instructed to carry and listen to battery-operated radios for reports and evacuation information, and follow the instructions given by local officials. Cars should be backed into garages or parked in an open space facing the direction of escape, with doors and windows closed and the key in the ignition. Garage windows and doors should be closed but left unlocked. If residents have time, they can take steps to protect their homes by closing windows, vents, doors, venetian blinds and heavy drapes; removing lightweight curtains; shutting off gas at the meter; turning off pilot lights; opening fireplace damper; closing fireplace screens; moving flammable furniture into the center of the home away from windows and sliding-glass doors; and turning on a light in each room to increase the visibility of homes in heavy smoke. Outside, residents can seal attic and ground vents with pre-cut plywood or commercial seals, turn off propane tanks, place combustible patio furniture inside, connect the garden hose to outside taps, set up a portable gasoline-powered pump, place lawn sprinklers on the roof and near above-ground fuel tanks, wet the roof, wet or remove shrubs within 15 feet of the home, and gather fire tools.	Med.	Ongoing	DNR, local fire service and US Forest Service all offer training.
Proper maintenance and separation of power lines. Ask the power company to clear branches from power lines.	Low	Ongoing	Power company contracts with tree service to address tree /limb concerns. Power lines are combined and buried in places of high wind to reduce power outages.
Arson prevention activities, including reduction of blight (cleaning up areas of abandoned or collapsed structures, accumulated junk or debris, and with any history of flammable substances stored, spilled, or dumped on them).	Low	Ongoing	Arson tip hotline, local ordinances on property maintenance codes.
Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.	Low	Ongoing	Safe Home Plan offered through local fire departments is available to residents and businesses.
Including wildfire safety information in materials provided by insurance companies to area residents.	Low	Ongoing	Insurance companies provide to homeowners/renters.
Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.	Low	Ongoing	Local fire departments have fire suppression regulations included in local building codes.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Keeping roads and driveways accessible to vehicles and fire equipment—driveways should be relatively straight and flat, with at least some open spaces to turn, bridges that can support emergency vehicles, and clearance wide and high enough for two-way traffic and emergency vehicle access (spare keys to gates around property should be provided to the local fire department, and an address should be visible from the road so homes can be located quickly).	Low	Ongoing	Local fire department codes and regulation, including the use of Knox Box for gaining access to buildings.
Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.	Low	Not Started	Not necessary.
Proper maintenance and storage of motorized equipment that could catch on fire.	Low	Not Started	Not applicable.
Have adequate water supplies for emergency firefighting (in accordance with NFPA standards). For residents, identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool or hydrant; have a garden hose that is long enough to reach any area of the home and other structures on the property; install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least 50 feet from the home; consider obtaining a portable gasoline powered pump in case electrical power is cut off.	Low	Ongoing	ISO requirements, and FD water points for fires. Mutual aid for additional water.
Avoid building structures on hilltop locations, where they will be at greater risk from wildfires (in addition, hillsides facing south or west are more vulnerable to increased dryness and heat from sun exposure) and use of proper setbacks from slopes (outside of the "convection cone" of intense heat which would be projected up the slope of the hill as a wildfire "climbs" it).	Low	Not Started	Not Applicable
Organizing neighborhood wildfire safety coalitions (to plan how the neighborhood could work together to prevent a wildfire).	Low	Not Started	Not addressed
Obtaining insurance.	Low	Ongoing	Homeowners that have mortgages are encouraged (required) to have homeowners insurance. Certain segments of the population that do not have mortgages, do not carry insurance.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
D. Infrastructure Failure			
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Mutual aid assistance for failures in utility and communications systems (including 9-1-1).	High	Ongoing	911, Sheriff Department have mutual aid agreements with adjoining counties. Local public works departments have agreements as well.
Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.	High	In Progress	Networking with Council on Aging. 911 has list of persons.
Use of generators for backup power at critical facilities.	High	In Progress	911 has generators. Fire departments do not have generators to date.
Tree-trimming programs to protect utility wires from falling branches. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)	High	Ongoing	Power company contracts with tree service to address tree /limb concerns. Power lines are combined and buried in places of high wind to reduce power outages.
Alternative 9-1-1 access through radio operators whose homes are identified through special markings.	Med.	Not Started	No longer applicable with today's technologies.
Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (1-800-482-7171).	Med.	Ongoing	Information available at local building departments, and when acquiring zoning permits. Utilities offer local training.
Regular maintenance and equipment checks.	Med.	Ongoing	Each municipality is responsible for maintaining equipment.
Redundancies in utility and communications systems, especially "lifeline" systems.	Med.	Ongoing	Mutual aid agreements with other municipalities, working with local agencies on the transfer of systems.
Burying electrical and phone lines, where possible, to resist damage from severe winds, lightning, ice, and other hazards.	Med.	In Progress	Phone and fiber optic cables are buried. Power lines are buried on a very limited basis due to costs.
Protecting electrical and communications systems from lightning strikes.	Med.	Complete	911 has been protected from lightning strikes since before 2005.
Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).	Low	Ongoing	Each municipality responsible for own systems.
Separation and/or expansion of sewer system to handle anticipated stormwater volumes.	Low	Ongoing	Combination sewers not found in the County. Upgrades/expansions occur as needed.
"Rolling blackouts" in electrical systems that will otherwise fail completely due to overloading.	Low	Ongoing	Utility company works with local municipalities on the rolling blackouts.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Replacement or renovation of aging structures and equipment (to be made as hazard-resistant as economically possible).	Low	Ongoing	Completed by local municipality and utility companies.
E. Structural Fire			
Code existence and enforcement.	High	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Public education and school programs (especially about the use of stoves, heaters, fireworks, matches/lighters, etc.)	High	Ongoing	Completed through local police and fire departments. (Emergency Management works with local fire departments.)
Proper installation and maintenance of heating systems (especially those requiring regular cleaning, those using hand-loaded fuels such as wood, or using concentrated fuels such as liquid propane).	High	Ongoing	Local Fire Department offer training to local residents/businesses. Information also available through Public Service Announcements (PSAs).
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Proper maintenance of power lines, and efficient response to fallen power lines.	High	Ongoing	Power company contracts with tree service to address tree /limb concerns. Power lines are combined and buried in places of high wind to reduce power outages.
Improved and continuing training for emergency responders, and provision of equipment for them.	High	Ongoing	Training is secured through Homeland Security Grants and continuing education grants/ programs.
Enforced fireworks regulations.	Med.	Ongoing	Local ordinance and state regulations enforced by local and state law enforcement.
Safe and responsible use of electric and "space" heaters (placed at least 3 feet from objects, with space near hot elements free of combustibles).	Med.	Ongoing	Training is secured through Homeland Security Grants and continuing education grants/programs. PSAs also provided to general public.
Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, and recreation areas, and other appropriate sites.	Med.	Ongoing	Plans kept on site. Grant funding available in last 4 years through Readiness Emergency Management in School (REMS) Program.
Posting of fire emergency telephone numbers in accessible places.	Med.	Complete	Posted throughout the County-911.
Safe installation, maintenance, and use of electrical outlets and wiring.	Med.	Ongoing	Through local building permit/inspection process.
Education and practice of safe cigarette handling and disposal (also candles, fireworks, campfires, holiday lights)	Med.	Ongoing	Fire Departments, local PSAs.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Landlords and families can install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each level of homes (to be tested monthly, with the batteries changed twice each year). Family members and residents should know how to use a fire extinguisher.	Med.	Ongoing	Local Fire Departments have smoke alarm installation programs and offer training for utilization of fire extinguishers. Media (PSAs) provide information on the changing/disposal of batteries.
Pre-planned escape routes and fire alert responses.	Med.	Ongoing	Fire Department education programs offer this training.
Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and proper storage of flammable items). Residents should inspect chimneys at least twice a year and clean them at least once a year.	Low	Ongoing	Safe Home Plan offered through local fire departments is available to residents and businesses.
Proper workplace procedures, training and exercising, and handling of explosive and flammable materials and substances.	Low	Ongoing	Safe Home Plan offered through local fire departments is available to residents and businesses.
Defensible space around structures in fire-prone wildland areas.	Low	Ongoing	US Forest Service has information on this, as well as through PSAs.
Transportation planning that provides roads, overpasses, etc. to maximize access and improve emergency response times, and evacuation potential, for all inhabited or developed areas of a community (not just designing for the minimum amount of road capacity to handle normal traffic volumes in the community.) This includes transportation access <u>within</u> developed sites (shopping malls, stadiums, office & commercial parking lots, etc.)	Low	Ongoing	Local law enforcement offers some planning, which is also being provided by MSP.
Elimination of clandestine methamphetamine laboratories through law enforcement and public education.	Low	Ongoing	Law enforcement (MSP, Sheriff, and local PDs).
Condominium-type associations for maintaining safety in attached housing/building units or multi-unit structures.	Low	Ongoing	Associations are created with the construction of all condominiums and townhomes.
Control of civil disturbances and criminal activities that could lead to arson.	Low	Ongoing	Local law enforcement.
Designs that include the use of firewalls and sprinkler systems (especially in tall buildings, dormitories, attached structures, and special facilities).	Low	Ongoing	Local building officials inspect and enforce.
Obtaining insurance.	Low	Ongoing	Homeowners that have mortgages are encouraged (required) to have homeowners insurance. Certain segments of the population that do not have mortgages, do not carry insurance.
F. Flood (Riverine and Urban)			
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Accurate identification and mapping of flood-prone areas.	High	Ongoing	Municipalities work in cooperation with FEMA and the National Flood Insurance Program (NFIP).
Enforcement of basic building code requirements related to flood mitigation.	High	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Regional/watershed cooperation.	High	Ongoing	County Road Commission works with Department of Natural Resources (DNR) and Department of Environmental Quality (DEQ)
Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.	High	Ongoing	Road Commissions and local Department of Public Works (DPW) staffs are responsible, but most work is limited as it is done with grant funds.
Public awareness of the need for permits (MDEQ Part 31) for building in floodplain areas.	High	Ongoing	Local Building Departments regulate the building and bring the awareness forward through PSAs and other forms of notification.
Employing techniques of erosion control within the watershed area (proper bank stabilization, techniques such as planting of vegetation on slopes, creation of terraces on hillsides, use of riprap boulders and geotextile fabric, etc.).	High	Ongoing	County issues erosion control permits.
Dredging and clearance of sediment and debris from drainage channels.	High	Ongoing	Local drain commissioner
Protection (or restoration) of wetlands and natural water retention areas.	Med.	Ongoing	DNR/DEQ responsible for this.
Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).	Med.	Ongoing	County issues erosion control permits.
Flood plain management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.	Med.	Ongoing	Local building departments work with FEMA on flood plain management.
Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.	Med.	Ongoing	Plans kept on site. Grant funding available in last 4 years through Readiness Emergency Management in School (REMS) Program.
Improved/updated floodplain mapping.	Med.	Ongoing	Communities and residents work with FEMA to provide updated information on local floodplains.
Detection and prevention/discouragement of illegal discharges into storm-water sewer systems, from home footing drains, downspouts and sump pumps.	Med.	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Public education and flood warning systems.	Med.	Ongoing	There is an Emergency Action Plan for each dam in the County, there are sirens located throughout the County, the Emergency Broadcast System is utilized as appropriate, DNR provides information, as does the US Fire Service.
Training for local officials on flood fighting, floodplain management, floodproofing, etc.	Med.	Ongoing	Emergency Management, FEMA and DEQ all offer classes to the public and local officials. Classes can be online and/or classroom and include instruction on sandbagging, and other floodplain management issues.
Participating in the Community Rating System (CRS).	Med.	Ongoing	The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.
Trained, equipped, and prepared search and rescue teams.	Med.	Ongoing	Sheriff Dept. received grants to purchase boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for team available, fiber optic cables available throughout County.
Wetlands protection regulations and policies.	Med.	Ongoing	Army of Corp of Engineers (ACE) and DEQ set policies for wetlands.
Inclusion of safety strategies for flooded areas in driver education classes and materials.	Med.	Ongoing	Emergency Management office is responsible for the creation of strategies, which includes weatherspotting.
Obtaining insurance.	Med.	Ongoing	Homeowners that have mortgages are encouraged (required) to have homeowners insurance. Certain segments of the population that do not have mortgages, do not carry insurance.
Installing (or re-routing or increasing the capacity of) storm drainage systems, including the separation of storm and sanitary sewage systems.	Med.	Ongoing	Each municipality responsible for own systems. Combination sewers not found in the County. Upgrades/expansions occur as needed.
Road closures and traffic control in flooded areas.	Med.	Ongoing	Portable message boards available through EM office. EM office, Road Commission, and Law Enforcement work in unison on these matters.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).	Med.	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Increased coverage and use of NOAA Weather Radio.	Med.	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.	Med.	Not Started	Structures have not been identified.
Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.	Low	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Joining the National Flood Insurance Program	Low	Ongoing	Local municipalities work with FEMA.
Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).	Low	Ongoing	County Drain Commission works with property owners.
Farmland and open space preservation.	Low	Ongoing	Identified in local Master Plans, regulated by staffs.
Back-up generators for pumping and lift stations in sanitary sewer systems, and other measures (alarms, meters, remote controls, switchgear upgrades) to ensure that drainage infrastructure is not impeded.	Low	In Progress	Multiple emergency generators have been purchased by the health dept., and the emergency management dept. Homeland Security funds were utilized to purchase generators.
Use of check valves, sump pumps and backflow preventers in homes and buildings.	Low	Ongoing	Local building codes identify, local code officials enforce.
Elevation of flood-prone structures above the 100-year flood level.	Low	Ongoing	Local building codes, FEMA and NFIP requirements.
Higher engineering standards for drain and sewer capacity.	Low	Ongoing	DEQ regulations.
Real estate disclosure laws.	Low	Ongoing	Local or state real estate laws.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Control and securing of debris, yard items, or stored objects (including oil, gasoline, and propane tanks, and paint and chemical barrels) in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.	Low	Ongoing	Local ordinances, DEQ regulations on storage of chemicals.
Purchase or transfer of development rights – to discourage development in floodplain areas.	Low	Not Started	N/A
Stormwater management ordinances or amendments.	Low	Ongoing	Local municipalities, DEQ, FEMA, ACE
Formation of a watershed council.	Low	Complete	Local watershed councils formed: Coastal Watershed, and Whitney Watershed.
Elevating mechanical and utility devices above expected flood levels.	Low	Ongoing	Done as appropriate.
Monitoring of water levels with stream gauges and trained monitors.	Low	Ongoing	Local, state, and federal agencies involved. AuSable river is gauged.
Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.	Low	Ongoing	Local building codes.
Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.	Low	Ongoing	Local municipalities.
Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).	Low	Ongoing	Local building codes.
G. Shoreline Flooding and Erosion			
Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).	High	Ongoing	County issues erosion control permits.
Public education and flood warning systems.	High	Ongoing	There is an Emergency Action Plan (EAP) for each dam in the County, there are sirens located throughout the County, the Emergency Broadcast System is utilized as appropriate, DNR provides information, as does the US Fire Service.
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Accurate identification and mapping of flood-prone areas.	High	Ongoing	Working with FEMA.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Enforcement of basic building code requirements related to flood mitigation.	High	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Trained, equipped, and prepared search and rescue teams.	High	Ongoing	Sheriff Dept. received grants to purchase boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for team available, fiber optic cables available throughout County.
Floodplain/coastal zone management – planning acceptable uses for areas prone to flooding (comprehensive planning, zoning, open space requirements, subdivision regulations, land use and capital improvements planning).	Med.	Ongoing	FEMA and local codes and code enforcement.
Reduction of elevated or alternative roads that are affected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.	Med.	Ongoing	Road Commissions and local Department of Public Works (DPW) staffs are responsible, but most work is limited as it is done with grant funds.
Joining the National Flood Insurance Program	Med.	Ongoing	Local municipalities work with FEMA.
Participating in the Community Rating System (CRS).	Med.	Ongoing	The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.
Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).	Med.	Ongoing	Local building and zoning codes.
Increased coverage and use of NOAA Weather Radio.	Med.	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Monitoring of water levels with stream gauges and trained monitors.	Med.	Ongoing	Local, state, and federal agencies involved. AuSable river is gauged.
Real estate disclosure laws.	Med.	Ongoing	Local or state real estate laws.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Elevating mechanical and utility devices above expected flood levels.	Low	Ongoing	Done as appropriate.
Road closures and traffic control in flooded areas.	Low	Ongoing	Portable message boards available through EM office. EM office, Road Commission, and Law Enforcement work in unison on these matters.
Control and securing of debris, yard items, or stored objects (including oil, gasoline, and propane tanks, and paint and chemical barrels) in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.	Low	Ongoing	Local ordinances, DEQ regulations on storage of chemicals.
Obtaining insurance.	Low	Ongoing	Homeowners that have mortgages are encouraged (required) to have homeowners insurance. Certain segments of the population that do not have mortgages, do not carry insurance.
Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).	Low	Ongoing	Local building codes.
Elevation of flood-prone structures above the 100-year flood level.	Low	Ongoing	Local building codes, FEMA and NFIP requirements.
Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.	Low	Ongoing	Local building codes.
Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.	Low	Not Started	Structures have not been identified.
H. Winter Weather Hazards			
Maintaining adequate road and debris clearing capabilities.	High	Ongoing	County Road Commission and Michigan Department of Transportation (MDOT).
Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.	High	Ongoing	County Road Commission (installed on M-55), MDOT.
Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)	High	Ongoing	Power company contracts with tree service to address tree /limb concerns. Power lines are combined and buried in places of high wind to reduce power outages.
Organizing outreach to isolated, vulnerable, or special-needs populations.	High	Ongoing	Health dept. and US Fire Service provide press releases during emergencies for multiple events.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Producing and distributing family emergency preparedness information relating to severe winter weather hazards	High	Ongoing	Emergency Management Office through local media.
Establishing heating centers/shelters for vulnerable populations.	High	Ongoing	Emergency Management, Red Cross, and Salvation Army work together.
Include safety strategies for severe weather events in driver education classes and materials	Med.	Ongoing	Private driver instruction agencies and trucking companies who are responsible for driver education address this matter.
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	Med.	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc.	Med.	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Increased coverage and use of NOAA Weather Radio	Med.	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Farmer preparedness to address livestock needs/problems.	Low	Ongoing	MSU Extensions.
Pre-arranging for shelters for stranded motorists/travelers, and others.	Low	Ongoing	Emergency Management, Red Cross, and Salvation Army work together.
Using surge protectors on critical electronic equipment.	Low	Ongoing	Fire Departments, 911 staff, and local building departments.
Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow. Some storage areas will definitely be needed for snow removal during blizzards.)	Low	Ongoing	Written and oral Memoranda of Understanding (MOU) are in the County for: Alternate Care Centers (ACC), wrecking companies, and DPW storage areas.
Home and public building maintenance to prevent roof and wall damage from "ice dams."	Low	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Special arrangements for payment of heating bills.	Low	Ongoing	Department of Human Resources, local non-profit agencies, local utility companies.
Buried/protected power and utility lines.	Low	In Progress	Phone and fiber optic cables are buried. Power lines are buried on a very limited basis due to costs.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Housing/landlord codes enforcing heating requirements	Low	Ongoing	Local municipalities, building and code enforcement officials.
I. Dam Failure			
Ensuring consistency of dam Emergency Action Plan (EAP) with the local Emergency Operations Plan (EOP).	High	Ongoing	Emergency Management has completed plans on the dams, local dam owners working with EM to endure compliance of EAP.
Public awareness and warning systems.	High	Ongoing	There is an Emergency Action Plan (EAP) for each dam in the County, there are sirens located throughout the County, the Emergency Broadcast System is utilized as appropriate, DNR provides information, as does the US Fire Service.
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	High	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Trained, equipped, and prepared search and rescue teams.	Med.	Ongoing	Sheriff Dept. received grants for the purchase of boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for team available, fiber optic cables available throughout County.
Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).	Med.	Ongoing	Emergency Management, local building codes.
Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.	Med.	Ongoing	Plans kept on site. Grant funding available in last 4 years through Readiness Emergency Management in School (REMS) Program.
Real estate disclosure laws that identify a home's location within a dam's hydraulic shadow.	Med.	Ongoing	Local, state, and federal agencies involved.
Increased coverage and use of NOAA Weather Radio	Med.	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Garnering community support for removal or repair of dams in disrepair.	Low	Not Started	Not applicable.
Greater local support for/assistance with dam inspections and enforcement of the Dam Safety Program (Part 315 of the Natural Resources and	Low	Not Started	Not applicable.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Environmental Protection Act) requirements and goals.			
Constructing emergency access roads to dams.	Low	Complete	Roads are in place.
Obtaining insurance.	Low	Ongoing	Homeowners that have mortgages are encouraged (required) to have homeowners insurance. Certain segments of the population that do not have mortgages, do not carry insurance.
Pump and flood gate installation/automation.	Low	In Progress	Van Etten Dam is still manually operated.
J. Tornados and Severe Winds			
Using appropriate wind engineering measures and construction techniques (e.g. structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced entry and garage doors, window shutters, waterproof adhesive sealing strips, and interlocking roof shingles) to strengthen public and private structures against severe wind damage.	High	Ongoing	Local building codes and code enforcement.
Proper anchoring of manufactured homes and exterior structures such as carports and porches.	High	Ongoing	Local codes are used, such as zoning codes, building codes, property maintenance codes.
Establishing safe and appropriate locations for temporary debris disposal sites.	Med.	Ongoing	Written and oral Memoranda of Understanding (MOU) are in the County for: Alternate Care Centers (ACC), wrecking companies, and DPW storage areas.
Securing loose materials, yard, and patio items indoors or where winds cannot blow them about.	Med.	Ongoing	Emergency Management and PSAs.
Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds, or broken power or phone lines that had frozen or been weighted down by fallen branches and trees.)	Low	Ongoing	Written and oral Memoranda of Understanding (MOU) are in the County for: Alternate Care Centers (ACC), wrecking companies, and DPW storage areas.
Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.	Low	In Progress	No safe areas in public areas to date. Mobile home parks have started the process.
K. Lightning			
Installing Lightning protection devices on the community's communication infrastructure.	High	Complete	911 has been protected from lightning strikes since before 2005.
Using Surge protectors on critical electronic equipment	Med.	Ongoing	Fire Departments, 911 staff, and local building departments.

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
L. Drought			
Measures or ordinances to prioritize or control water use (especially when needed to fight fires).	High	Ongoing	Local mutual aid agreement, measures in place to secure additional water elsewhere, will shut off pumps.
Encouragement of water saving measures by consumers (especially during irrigation and farming)	High	Complete	Water Plant constructed in 1991 to resolve these matters.
Anticipation of potential drought conditions, and preparation of drought contingency plans.	Med.	Ongoing	US Forest Service, DNR
Designs and plans for water delivery systems that include a consideration of drought events.	Med.	Complete	Water Plant constructed in 1991 to resolve these matters.
Obtaining Agricultural Insurance	Low	Ongoing	Individually obtained, by property owners.
Storage of water for use in drought events (especially for human needs during extreme temperatures).	Low	Not Started	Not applicable.
M. Hail			
Using structural bracing, window shutters, laminated glass in window panes, and hail resistant roof shingles to minimize damage to public and private structures.	High	Not Started	Low priority for county officials. Must be done personally.
Pre-planning for debris management staging and storage areas. (Debris is usually vegetation such as branches that have fallen under the impact of hail, or broken power or phone lines).	High	Ongoing	Written and oral Memoranda of Understanding (MOU) are in the County for: Alternate Care Centers (ACC), wrecking companies, and DPW storage areas.
N. HAZ/MAT Transportation			
Training, planning, and preparedness for hazardous material incidents along roadways and railways (in addition to fixed site emergencies).	High	Ongoing	Local Emergency Planning Committee (LEPT), Emergency Management staff and Local Fire Departments provide the necessary training, planning, and preparedness.
Enforcement of weight and travel restrictions for truck traffic.	High	Ongoing	Road Commission, Sheriff's Department, and MSP.
Compliance with and enforcement of USDOT and MDOT regulations regarding hazardous materials transport.	High	Ongoing	MSP
Public warning systems and networks.	High	Ongoing	There is an Emergency Action Plan (EAP) for each dam in the County, there are sirens located throughout the County, the Emergency Broadcast System is utilized as appropriate, DNR provides information, as does the US Fire Service.
Evacuation plans and community awareness of them.	High	Ongoing	Emergency Management Director

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).	High	Ongoing	Emergency Alert System (EAS) for weather-related emergencies distributed with the assistance of a grant (2010-2012). EM-NET System in place to warn of emergencies (tested weekly), use of smart phones that have weather alert system applications.
Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.	Med.	Ongoing	Private driver instruction agencies and trucking companies who are responsible for driver education address this matter.
Road closures and traffic control in accident areas.	Med.	Ongoing	Law Enforcement and Fire Departments
Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.	Med.	Ongoing	Emergency Manager and Health Dept. staff have held presentations at critical care facilities for both the employees, and families.
Proper planning, design, maintenance of, and enhancements to designated truck routes.	Med.	Ongoing	MDOT, and local/county municipality
Trained, equipped and prepared local hazardous materials emergency response teams.	Med.	Ongoing	Sheriff Dept. received grants to purchase boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for team available, fiber optic cables available throughout County.
Trained, equipped, and prepared search and rescue teams.	Med.	Ongoing	Sheriff Dept. received grants to purchase boats, portable electronic signs purchased to warn travelers of hazards, wireless router for POD (point of distribution) in emergencies, Slowscan photos capabilities, classes for team available, fiber optic cables available throughout County.
Elimination of rolling drug and methamphetamine laboratories through law enforcement and public education	Med.	Ongoing	Law enforcement (MSP, Sheriff, and local PDs).
Improved design, routing, and traffic control at problem roadway areas.	Low	Ongoing	Road Commission and MDOT
Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).	Low	Ongoing	Railroad companies, MDOT
Use of ITS (intelligent transportation systems) technology.	Low	Ongoing	Usage of permanent and portable message board signs, Road Commissioner, and EM

IOSCO COUNTY IMPLEMENATION STRATEGY TABLE: 2007-2015			
Mitigation	**Priority**	**Status**	**Outcomes**
Locating schools, nursing homes, and other special facilities away from major hazardous material transportation routes.	Low	Ongoing	FD
Long-term planning to provide more connector roads for reduced congestion of arterial roads.	Low	Ongoing	Local Master Plans

CHAPTER 6: ACTION PLAN

Through a systematic process, that included the review of all action items identified in the Iosco County 2007 Hazard Mitigation Plan (2007 Plan) and the possible mitigation strategies as identified in the 2007 Local Hazard Mitigation Planning Workbook (Workbook), the Iosco County Hazard Mitigation Planning Committee (ICHMPC) was able to identify the following actions to be the most effective hazard mitigation strategies for Iosco County's 2016 Hazard Mitigation Plan. These include mitigation actions identified in the 2007 Plan that have not been completed and are still considered to be relevant, as well as new strategies that have been identified by the ICHMPC during this planning process.

The ICHMPC initiated the selection process with a review of the goals and objectives as identified in the 2007 Plan and modified them to fit the needs of Iosco County in 2016 and beyond. These goals and objectives are listed below.

GOAL 1: Protect Public Health and Safety

OBJECTIVES

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

GOAL 2: Minimize damage to public and private property

OBJECTIVES

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

GOAL 3: Maintain essential services

OBJECTIVES

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

GOAL 4: Manage growth/development

OBJECTIVES

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

DRAFT

The action plan items from the 2007 Plan were then evaluated and those items that were deemed complete or no longer applicable were eliminated from this plan (see review of all 2007 items in Chapter 5.) The ICHMPC then began review of the mitigation strategies as identified in the Workbook. After reviewing and identifying over 300 possible mitigation strategies (many of them duplicate strategies for multiple hazards) the ICHMPC was able to combine and/or eliminate duplicate strategies to reduce the number of possible strategies to 44. The final list of 44 strategies is found in Appendix C. The list of original strategies is found in Appendix D.

The ICHMPC was asked to identify hazard mitigation projects/processes that address the items on the list. The projects/processes that would have a positive impact on human life/safety would be designated as high priority projects. Projects that impact human life/safety, but to a lesser degree or impact property, have been given a medium priority and projects that have minimal impact were given a moderate priority. Moderate priority projects are found in Appendix E. All projects that were identified are included in Appendix E.

Multiple action identified in the 2016 Plan have been purposely re-worded to be less specific than in the 2007 Plan, which allows those items to address multi-hazard actions rather than the hazard-by-hazard approach in the previous Plan. Activities not previously identified in the 2007 Plan have been labeled as "NEW" in their descriptions. Project costs are based on 2016 estimates.

HIGH PRIORITY HAZARD MITIGATION ACTIONS

Item 1

Purchase of all-hazard warning sirens-located throughout the County, as needed to reach the entire population of the County.

Action: Complete a study to determine the quantity and location of all-hazard warning sirens. Purchase additional warning sirens to be located throughout the County to notify the residents of impending hazards. Sirens to include battery back-ups. The warning sirens will be one of multiple methods of notifying the residents of the hazards.

- Location: County-wide
- Lead Agency: Iosco County Emergency Management (Iosco County EM)
- Participating Agencies: Iosco County, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants
- Project Cost: $25,000 per siren
- Schedule: 2017 to completion
- Priority: High
- Benefit(s): Residents, businesses, and visitors of Iosco County will receive warning of impending hazards and time to get to safety, if needed.

Item 2

Purchase of generators-to be used for back-up power for warning sirens, municipal buildings, and other critical County facilities.

Action: Inventory the facilities within the County that are in need of generators. Develop criteria for the hierarchy of the distribution of the generators. Purchase generators to be used for back-up power at specified sites within the County to provide power during power outages.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, East Tawas, Plainfield Township
- Hazards Addressed: Infrastructure Failure
- Potential Funding Source(s): Grants
- Project Cost: $50,000 to $100,000. Costs will vary as the generators will vary in size due to the size of the buildings they will serve.
- Schedule: 2017 to completion
- Priority: High
- Benefit(s): The generators will provide power to critical facilities, thereby keeping the local governments, and warning systems in operation during power outages.

Item 3 (NEW)

Develop a list of alternative power sources to be used in lieu of back-up generators for critical facilities during power failures.

Action: Work with various agencies throughout the region to develop a list of alternative power sources that can be used in lieu of purchasing generators.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: National Guard
- Hazards Addressed: Infrastructure Failure
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016
- Priority: High
- Benefit(s): These alternative power supplies would be used at critical facilities during power outages when generators are not available.

Item 4

Purchase of weather radios-NOAA-schools, municipal buildings, nursing homes and other care facilities, hospitals and other healthcare facilities.

Action: Purchase of weather radios that will provide notification of hazardous conditions to the inhabitants of specified buildings throughout the County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants, local municipalities

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- Project Cost: $15,000 (Units are $50 each, with an estimate of 300 units needed.)
- Schedule: Ongoing
- Priority: High
- Benefit(s): Occupants of the buildings that have these radios will be warned of hazardous conditions prior to the events.

Item 5 (NEW)
Purchase of warning system (CodeRED or similar) for both cell phones and land lines. Important for land lines as cell coverage not available throughout the County.
Action: Purchase of a phone notification program that would notify any phone within the County of hazardous situations.

- Location: County-wide
- Lead Agency: Iosco County Central Dispatch
- Participating Agencies: Iosco County EM
- Hazards Addressed: All hazards, also child abduction and other non-hazardous notifications
- Potential Funding Source(s): Grants
- Project Cost: $25,000
- Schedule: 2016/17
- Priority: High
- Benefit(s): All phone users within the County would be notified of hazardous or critical situations such as storms or amber alerts.

Item 6
Protect Critical Facilities/Structures from Lightning Damage and other hazards
Action: Protect critical facilities/structures from lightning strike damage and other hazards with the installation of lightning rods and proper grounding and install/maintain surge protection on critical electronic equipment.

- Location: County-wide
- Lead Agency: Iosco County OEM
- Participating Agencies: Iosco County Building Department, Plainfield Township Building Department
- Hazards Addressed: all hazards
- Potential Funding Source(s): OEM Budget, grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Facilities and critical equipment will be protected from effects of lightning strikes, thereby keeping critical facilities operational during hazard events.

Item 7
Work with fuel suppliers to develop a list of stations that can distribute gas during power outages and other emergencies. Will also need to develop a list for natural gas distributors.
Action: Develop a list of fuel suppliers (both liquid and natural gas) that will be accessible during power outages and other emergency situations where gas is needed.

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- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: Severe weather conditions, infrastructure failure (power outages)
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016/2017
- Priority: High
- Benefit(s): Critical care facilities, in-home special needs patients and other owners of generators will have access to fuel during lengthy power outages.

Item 8

Promote the need to develop emergency evacuation plans for special events, schools, governmental agencies, large employers, and businesses.

Action: Encourage the development of emergency evacuation plans for special events and buildings that house large populations. The emergency evacuation plans would provide a more organized approach to egress in times of crisis.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools, and special event coordinators
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): By developing a plan a more orderly departure will be utilized during times of emergency, which could result in the saving of lives and/or reducing injuries.

Item 9

Promote the need to complete disaster awareness/emergency planning, including but not limited to major storm events, public health emergencies, or hazard material spills, for special events, schools, governmental agencies, large employers, and businesses.

Action: Encourage the development of disaster awareness/emergency plans for special events and buildings that house large populations. The disaster awareness/emergency plans can be used for multiple reasons and would provide a more organized method to address disasters or other times of crises.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools, and special event coordinators
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA

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- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): By developing a plan, information would be made available to attendees of events or occupants of a building on how to address or where to go in emergency situations.

Item 10 (NEW)
Work with unique, cultural, or special needs population representatives on providing notification in times of severe weather or other emergency situations.
Action: Develop a notification system that the unique, cultural, or special needs population representatives can utilize, and can then notify others, during times of severe weather or other emergency situations.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, Department of Health and Human Services
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016/2017
- Priority: High
- Benefit(s): The unique, cultural, or special needs populations can receive sufficient warning of any hazardous situation.

Item 11 (NEW)
Locate/Study/Assess all dams, both publicly and privately-owned to determine structure functionality.
Action: Locate all dams within the County to determine if dams are structurally sound and assess what requirements, if any, are needed for the dam.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Drain Commission and Iosco County Road Commission, MDEQ
- Hazards Addressed: Flooding, Infrastructure failure
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Completing a study will update a list of all publicly and privately-owned dams in the County. The assessment will determine what dams if any are in a state of disrepair and a potential danger to structures in the dams' shadows. This will also allow the EM and DEQ to update their records for the dams within the County and for the EM to update his Emergency Action Plans for each of the dams.

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Item 12

Planting of "live" snow fences along major roads in the County.

Action: Plant trees along specified sections of major roads to create a live snow fence and reduce/ eliminate drifting on the highways.

- Location: Site specific, as determined by the Iosco County Road Commission, Michigan Department of Transportation (MDOT), and Iosco County Police Departments, Fire Departments, and EMS Departments
- Lead Agency: Iosco County Road Commission
- Participating Agencies: MDOT
- Hazards Addressed: Severe weather conditions
- Potential Funding Source(s): Iosco County Road Commission, MDOT
- Project Cost: TBD
- Schedule: 2017/2018
- Priority: High
- Benefit(s): Motorists on these roads will benefit with the reduced drifting and better road conditions during the winter months.

Item 13

Training for first responders on all hazards.

Action: Facilitate ongoing training to maintain responders' certifications/job requirements.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department, CERT Team, Rescue Team
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Trained personnel to handle dangerous situations in the County.

Item 14

Promoting the need to develop Family Disaster Plans and the creation of Family Disaster Kits. (Especially critical for medical personnel and first responders so that they can be comfortable leaving their family in times of crises.)

Action: Obtain the information to be disseminated. Provide multiple avenues to distribute the information to the residents of Iosco County. Possible avenues can include county website, EM website, Public Service Announcements, flyers at various public facilities.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: District Health Department No. 2
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA

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- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): Families better prepared for disasters. First responders and medical responders would be more comfortable leaving their families in times of crises.

Item 15
Purchase of portable traffic directional sign(s)-to direct traffic during severe weather conditions, hazmat conditions, or high volume traffic conditions.
Action: Identify the need to purchase additional portable traffic directional signs. Investigate the sources for purchasing the signs and the possible sources of funding to purchase the signs.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Road Commission
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants, local governmental agencies
- Project Cost: $17,500
- Schedule: Ongoing
- Priority: High
- Benefit(s): By redirecting traffic away from hazardous situations, further problems may be averted.

Item 16
Wildfire training-for front line personnel.
Action: Specialized training offered by DNR, US Forest Service to local public safety personnel.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County public safety personnel, Michigan Department of Natural Resources (MDNR), US Forest Service
- Hazards Addressed: Wildfires
- Potential Funding Source(s): Local governmental agencies
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Wildfire damages should be reduced due to better training and mitigation measures taken such as the creation of fuel breaks.

Item 17 (NEW)
Firewise training-for communities.
Action: Encourage communities to participate in Firewise training.

- Location: County-wide
- Lead Agency: Iosco County EM

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- Participating Agencies: MDNR, US Forest Service, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: Wildfires, structural fires
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): The number of fires/damages resulting from the fires would be reduced as a result of the training/education.

Item 18
Installation of location identification markers on all County recreational waterways.
Action: Acquire and install markers along recreational waterways for identification purposes.

- Location: Recreational waterways within the County
- Lead Agency: Iosco County EM
- Participating Agencies: MDNR, Iosco County Sheriff's Department, Marine Division, Consumers Energy, US Forest Service, service groups such as the Boys Scouts of America
- Hazards Addressed: Public Health and Safety
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): The markers will allow all users of the waterways to identify their location in a more precise manner in case of a life/death emergency.

MEDIUM PRIORITY HAZARD MITIGATION ACTIONS

Item 1 (NEW)
Enhance the warning and monitoring of systems in the Huron Shore Water Treatment Plant and surrounding infrastructure.
Action: Installation of cameras in critical locations in and around the Huron Shore Water Treatment Plant.

- Location: Huron Shore Water Treatment Plant
- Lead Agency: Iosco County EM
- Participating Agencies: Huron Shore Regional Utility Authority
- Hazards Addressed: Sabotage/terrorism, severe weather conditions, and dam failures
- Potential Funding Source(s): Grants
- Project Cost: $20,000
- Schedule: TBD
- Priority: Medium
- Benefit(s): The visual monitoring of remote facilities and the entrance to the main facility could reduce the potential for harm. This would also allow for monitoring of remote facilities during weather related emergencies.

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Item 2 (NEW)
Complete a Community Wildfire Protection Plan for the County.
Action: Seek a grant through the Department of Natural Resources to fund the completion of a Community Wildfire Protection Plan (CWPP) for Iosco County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department, DNR, US Forest Service
- Hazards Addressed: Wildfires
- Potential Funding Source(s): DNR Grant
- Project Cost: $35,000
- Schedule: TBD
- Priority: Medium
- Benefit(s): The CWPP will identify both short-term and long-term goals to reduce wildfires in the County. In addition, measures will be identified that each homeowner can implement to mitigate damages that result from wildfires, and potentially reduce the number of wildfires in the County.

Item 3
Trimming of Tree Branches around Power Lines
Action: Consumers Energy has an ongoing tree trimming initiative along the power line right-of-way.

- Location: County-wide
- Lead Agency: Consumers Energy,
- Participating Agencies:
- Hazards Addressed: all hazards
- Potential Funding Source(s): Annual Budget
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Trimming trees along power lines, roads and streets mitigates damages that occur from summer and winter storm events. Fallen trees and limbs can obstruct passage on streets and roads impeding the passage of emergency vehicles. Fallen trees and limbs that damage power lines can leave vulnerable populations, particularly the elderly and disabled, without heat, air conditioning and electrical power for home medical devices, and leaves residents with residential wells without a source of water. Critical facilities such as urgent care clinics, pharmacies and gas stations can be shut down from a loss of electrical power.

Item 4
Analyze the security at County and local municipal buildings and implement a plan to enhance the security.
Action: Complete an analysis of the security measures for each municipal building and implement a plan to enhance the security.

- Location: Iosco County Courthouse and all local municipal buildings
- Lead Agency: Iosco County EM

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- Participating Agencies: Iosco County Board of Commissioners, East Tawas, Tawas City, and Whittemore
- Hazards Addressed: Civil disturbance and terrorism/sabotage
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): A safer environment would be provided for the employees/visitors of the buildings.

Item 5
Purchase of GIS software to be installed and maintained for use by Iosco County and local governmental agencies.
Action: Purchase Geographical Information Systems (GIS) software that can be installed on Iosco County computers that would be accessible by local governmental agencies, including but not limited to local administrators, public safety personnel, and planning and zoning personnel.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Sheriff's Department, Homeland Security, Tawas Police Authority, Oscoda Township Police, Michigan State Police
- Hazards Addressed: civil disturbances, terrorism/sabotage
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Reduction of acts of violence against the citizens of Iosco County.

Item 6 (NEW)
Establish avenues to report information that could prevent domestic and foreign terrorism/ incidents and sabotage.
Action: Establish additional avenues to report information to assist in the prevention of domestic and foreign terrorism/incidents and sabotage.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Sheriff's Department, Homeland Security, Tawas Police Authority, Oscoda Township Police, Michigan State Police
- Hazards Addressed: civil disturbances, terrorism/sabotage
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Reduction of acts of violence against the citizens of Iosco County.

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Item 7

Investigate the use of Intelligent Transportation Systems (ITS) for public warning and emergency information purposes.

Action: Investigate opportunities to coordinate with MDOT on sites within the County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Road Commission, MDOT
- Hazards Addressed: Transportation and Transportation-Hazmat Incidents
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2017
- Priority: Medium

Benefit(s): ITS is a comprehensive tool that provides information to motorists as well as law enforcement officials, which allows them to make safer, more coordinated, and smarter use of transportation systems.

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CHAPTER 7: FOLLOW-UP

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

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

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

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

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

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

- Updates to the plan.
- The Iosco County plan has been web posted along with contact information that allows any citizen to read it and provide feedback.

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- Develop informational mailings to be distributed to the public about mitigation efforts in the county and updates made to the plan.
- Develop mitigation flyers or mailings that contain mitigation activities and action items that promote reducing damages and risks of natural hazards.

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APPENDIX A –
IOSCO COUNTY ADVISORY COMMITTEE SIGN-IN SHEETS

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IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 3-17-16

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
Blinda Baker	Blinda A. Baker	City of East Tawas	6
LORNA Ganci	Lorna Ganci	Oscoda Township	20
Matt Jurczyk	Matt Jurczyk	Huron Shore Water Plant	5
Brian Golden	[illegible]	Iosco County EMS	∅
Fred Lewis	[illegible]	Plainfield Township	50
Ron Dorcey	Ronald W. Dorcey	Mayor City of Whittemore	45
Jeffery Webster	Jeffy Webs	W.F.D. Burleigh Township	45
KELLY KAMPP	Kelly Kampp	IOSCO ARES/RACES	35
ED ROHN	Ed R	IOSCO E.M.	—
Cori Upper	Cori Upper	District Health Dept No. 2	—
Robert Rae	Robert Rae	IOSCO 911	—
Timothy Dean Haskin	Timothy Dean Haskin	Tawas Township	16

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 1-14-16

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
Sally Krueger	Sally Krueger	Wilber Twp.	21
Lorna Gauci	Lorna Gauci	Oscoda Township	20
Lisa Sutton	[illegible]	AuSable Township	20
Brian Golden	[illegible]	Iosco County EMS	0
Matt Juriczyk	Matt Juriczyk	Huron Shore Water Plant.	17
Ed Rohn	Ed Rohn	Iosco Co E.M.	0
Lori Upper	Lori Upper	District Health Dept. No. 2	0
Rick Mikulski	[illegible]	Sherman Twp	34
Fred Lewis	[illegible]	Plainfield Twp.	40
Timothy Dean Haskin	[illegible]	Tawas Township	12
Blinda Baker	Blinda Baker	City of East Tawas	6

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 12-17-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
ED ROHN	Ed Rohn	Iosco Co. EM	—
Cori Upper	Cori Upper	District Health Dept. No. 2	—
Fred Lewis	Fred Lewis	Plainfield Twp.	45
Brian Golden	[illegible]	Iosco County EMS	
SALLY KRUEGER	Sally Krueger	Wilber Twp	21
Blinda Baker	Blinda Baker	City of East Tawas	6
Rick Mikulski	Rick Mikulski	Sherman Twp	34
Tim Haskin	Timothy Haskin	Tawas Township	16
Robert Rae	Robert Rae	Iosco 911	0

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 11-11-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
Robert Rae	Robert Rae	Iosco 911	—
ED ROHN	ED R	Iosco Co. EM	—
KELLY KAMPP	Kelly Kampp	Iosco co ECRO	
Brian Golden	[illegible]	Iosco County SHS	∞
Matt Jurczyk	Matt Jurczyk	Huron Shore Water Plant	6
LORNA Ganci	Lorna Ganci	Oscoda Township	20
SALLY KRUEGER	Sally Krueger	Wilber Township	21
JOHN MOEHRING	John A. Moehring	Iosco BOC	3
Timothy Dean Haskin	Timothy Dean Haskin	Tawas Township	12

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 10-15-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
SALLY KRUEGER	Sally Krueger	Wilber Twp	21
ED ROHN	E. R	Iosco E.M.	—
Blinda Baker	Blinda Baker	City of East Tawas	5
Matt Jurczyk	Matt Jurczyk	Huron Shore Water Plant	5
Tim Haskin	[illegible]	Tawas Township	10
LORNA Ganci	Lorna Ganci	Oscoda Township	20
Brian Golden	[illegible]	Iosco County EMS	∅

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 9-24-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOO	—
SALLY KRUEGER	Sally Krueger	Wilber Twp.	21
Rick Mikulski	[illegible]	Sherman Twp	26
LORNA Ganci	Lorna Ganci	Oscoda Township	20
ED ROHN	[illegible]	IOSCO CO EM	—
JOHN MOEHRING	John Moehring	IOSCO BOC	3
TIM HASKIN	Timothy Gary Haskin	TAWAS TOWNSHIP	12
Robert Rae	[illegible]	IOSCO 911	—

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date AUG 27, 2015

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
Lesa Sytsma	[illegible]	A Sylvan Twp	20
SALLY KRUEGER	S Krueger	Wilber Twp.	21
Robert Rae	[illegible]	Iosco 911	0
Fred Lewis	[illegible]	Plainfield Twp.	40
Blinda Baker	Blinda C Baker	City of East Tawas	8
Tim Haskin	Tim Haskin	Tawas Township	10
ED ROHN	[illegible]	IOSCO CO. EM	—

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date July 16, 15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
Matt Jurczyk	Matt Jurczyk	Huron Shore Water Plant	4
Ralph Boudreau, Jr.	Ralph Boudreau	Iosco Co SO.	6
Sally Krueger	Sally Krueger	Walker Township	21
Fred Lewis	Fred Lewis	Plainfield Township	45
Robert Rose	Robert Rose	IOSCO 911	0
Timothy Dean Haskin	Timothy Dean Haskin	Tawas Township	-12-
Rick Mikulski	Rick Mikulski	Sherman Twp	
Lance Sutton	[illegible]	Alabaster Twp	80
Peter Myers	Peter Myers	Tawas Hospital	4
John Moehring	John Moehring	IOSCO BOC	4
Cori Upper	Cori Upper	District Health Dept. No 2	—
Lorna Gancs	Lorna Gancs	Oscoda Township	20
Ed Rohn	Ed Rohn	Iosco Co EM	—

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 6-11-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernal	[illegible]	EMCOG	—
LORNA GANCI	Lorna Ganci	Oscoda Township	20
Lesa Sutton	[illegible]	AuSable Township	20
Robert Rae	[illegible]	Iosco 911	0
Brian Golden	[illegible]	Iosco County EMS	0
JOHN MOEHRING	John Moehring	IOSCO 30C	4
ED RUHL	[illegible]	IOSCO CO. EM	—
Cori Upper	Cori Upper	DHD#2	—
Tim Haskin	[illegible]	Tawas Township	12
SALLY KRUEGER	Sally Krueger	Wilber Twp.	12

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 5-13-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
Ron Leslie	Ronald J. Leslie	City of East Tawas	2
Lorna Ganci	Lorna Ganci	Oscoda Township	70
Lisa Sutton	[illegible]	AuSable Twp	20
Tim Haskin	Timothy Lee Haskin	Tawas Township	14
ED Rohn	[illegible]	Iosco Co. E.M.	—
Brian Golden	[illegible]	Iosco Co. EMS	0
Cori Upper	Cori Upper	District Health Dept. No 2	0
Robert Rae	[illegible]	Iosco 911	0

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 4-30-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
Cori Lipper	Cori Lipper	DHD# 2	—
Brian Golden	[illegible]	Iosco County EMS	
Fred Lewis	[illegible]	Plainfield Twp.	50
ED Roth	[illegible]	Iosco Co EM	—
Ron Dorcey	Ronald W Dorcey	City of Whittemore	40
Jeff Webster	Jeff Webster	W.F.D.	
Robert Rae	[illegible]	Iosco 911	—
Leisa Sutton	[illegible]	AuSable Twp	20
LORNA GANCI	Lorna Ganci	Oscoda Township	—
TIM HASKIN	Tim Haskin	Tawas Township	12
JOHN MOEHRING	John Moehring	IOSCO BOC	

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 3-12-15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
Cori Upper	Cori Upper	DND #2	—
Bill Deckett	Bill Deckett	E. Tawas F.D	~~6~~
ED ROHN	Ed Rohn	IOSCO CO. EM	—
Ron Leslie	Ron Leslie	City of East Tawas	4
JOHN MOEHRING	John Moehring	IOSCO BOC	6
Ron Doscey	Ronald W Doscey	Mayor of Hattamer	40
Matt Jurczyk	Matt Jurczyk	Huron Shore Water Plant	5
ALLAN MacGregor	Allan MacGregor	IOSCO Sheriff's Office	8
ROBERT RUL	Robert Rul	IOSCO 911	0
LORNA GANCI	Lorna Ganci	Oscoda Township Zoning	20
Timothy Dean Haskin	Timothy Dean Haskin	Tawas Township Trustee & Plan-Zoning Comm	10
SALLY KRUEGER	Sally Krueger	Wilber Township Trustee	22
Lisa Sutton	Lisa Sutton	AuSable Township Superintendent	20
BJ Roach	BJ Roach	MSP - REMMSD	—
Tom Clement	Tom Clement	Reno Township	40

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

Date 2/26/15

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernat	Bill Ernat	EMCOG	—
ED Rohn	Ed Rohn	Iosco Co. EM	—
John Moehring	John Moehring	Board of Commissioner	4
Bill Deckett		ETFD	—
Ron Leslie	Ronald J Leslie	City of East Tawas	4
Matt Juriczyk	Matt Juriczyk	Huron Shore Water Plant / Oscoda Twp	5
Allan MacGregor	Allan MacGregor	Iosco County Sheriff's office	6
Ronald Dorsey	Ronald W Dorsey	Mayor City of Whitemore	40
Cori Upper	Cori Upper	District Health Dept No 2	—
Leisa Sutton	[illegible]	AuSable Township	25
BJ Rogers	[illegible]	MSP- EMHSD	—
Sally Krueger	Sally Krueger	Wilber Twp	22
Jim Svoboda	Jim Svoboda	Baldwin Twp	12

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

January 15, 2015

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
JOHN MOEHRING	John A. Moehring	IOSCO BOARD of COMMISSIONERS	6
Cori Upper	Cori Upper	District Health Dept. No 2	
BJ Roach	BJ Roach	MSP-EMHSD	—
RON LESLIE	Ronald J Leslie	CITY OF EAST TAWAS (MGR)	3
Joe Alyea		USFS	Ø
Bill Deckett	Bill Deckett	East Tawas Fire D.	6
Brian Golden		Iosco County EMS	0
RALPH J. BOURGEAU JR.	Ralph J. Bourgeau	IOSCO COUNTY SHERIFF'S OFFICE	6
ED ROHN	Ed Rohn	IOSCO CO. EMERG. MGMT	N/A
Fred Lew..	Fred Lew	Plainfield Township	~~25~~ 50
Robert Roe	Robert Roe	Iosco 911 Dispatch	0
Bill Ernst	Bill Ernst	EMCOG	—

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

December 4, 2014

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
BJ Roach	[illegible]	MSP PEMHSD	
Allan MacGregor	[illegible]	IOSCO Sheriffs Office	8
Ralph Boudreau	[illegible]	Iosco Sheriff's Office	Ø
Bill Deckett	[illegible]	ETFD	10
Ron Leslie	[illegible]	City of East Tawas	10
Pat McDougall	[illegible]	St Joseph Hospital	10
ED Rohn	[illegible]	Iosco. Co. EM	N/A
Bill Ernst	[illegible]	EMCOG	—
Persephone Whelan	[illegible]	US Forest Service	N/A
Stephanie Wentworth	[illegible]	Alabaster Township	—
Cori Lepper	Cori Lepper	District Health Dept. No 2	
Brian Golden	[illegible]	Iosco County Ems	10

IOSCO COUNTY
MITIGATION PLAN UPDATE SIGN-IN SHEET

October 16, 2014

PRINTED NAME	SIGNATURE	ORGANIZATION	MILES DRIVEN (Round Trip)
Bill Ernst	Bill Ernst	EMCOG	—
ED ROHN	Ed Rohn	Iosco Co Emerg. Mgmt.	—
Bob Rae	Bob Rae	Iosco 911 Dispatch	38
JOHN MOEHRING	John Moehring	IOSCO BOC, ETFD City of ET	46
Joe Alyea	Joe Alyea	USFS	—
Fred Lewis	Fred Lewis	Plainfield Township	0
ALLAN MacGregor	Allan MacGregor	IOSCO COUNTY Sheriff's Office	46
Christina Curtis	Christina Curtis	American Red Cross	180
RALPH BOWDAGAN	Ralph Bowdagan	Iosco County Sheriff's Office	46

Date: 5/1/2013
Time: 10:[illegible] A.M. TO 12:15 P.M.

IOSCO COUNTY [illegible]RGENCY MANAGEMENT

Locatir [illegible]OMMUNITY C[illegible]
Purpos HAZARD MI[illegible]

Name	Organization	Title/Position	Office Phone	Cell Phone	Email
Jeff Webster	Sheriff WPFD	Sgt (5 mi Rout trip)		989-756-3212	iossio20072@6 m
Robert Rae	Iosco 9-1-1	Director (5 miles)	362-1430	793-4591	director@iosco91
Cos. Upper	District Health 2	EPC	724-6757	989-390-0591	cupper@dhd2.or
Ron Leslie	City of East Tawas	City Mgr	362-6141	989-254-9687	rleslie@east T
Tara Harris	Iosco Ems	EMT-P (6 miles)	362-5589		
Vicki Jones	Iosco Ems	EMT-P (6 miles)	362-5589		
Stephanie Wentworth	Alabaster Twp	Supervisor (10 miles)	3623171	989 909 3193	swent99@a
ED ROHN	Iosco Co. Emerg. Mgmt	Coordinator	362-1423	989-309-9939	EMC@Iosco911.
Fred Lewis	Plainfield Twp	Supervisor (105 mi RT)	728-2811	984-7073	supervisor@plainfieldtwp mi

APPENDIX B –

IOSCO COUNTY LOCAL COMMUNITY SUBSECTIONS

All local communities were encouraged to participate in the update of the Hazard Mitigation Plan ("Plan") update. Their input was requested on two different levels, participation in the Plan itself, and the submittal of two questionnaires that addressed the issues of that particular community.

Participation in the Plan update included attending any of a number of meetings of the Iosco County Hazard Mitigation Planning Committee (ICHMPC), which was used in advisory capacity for the Iosco County data. The ICHMPC met on a monthly basis in order to complete the Plan in a timely manner. The second means to participate was the completion of community questionnaires. The results of the questionnaires are found below and provide feedback on the issues facing each community. Copies of the two questionnaires are included at the end of this section.

Below is a list of the participating communities and their local representatives.

City of East Tawas: Ron Leslie, Blinda Baker, Bill Deckett
City of Tawas City: Gus Oliver
City of Whittemore: Ron Darcey, Jeff Webster
Alabaster Township: Stephanie Wentworth
Au Sable Township: Leisa Sutton
Baldwin Township: Jim Svoboda
Burleigh Township: Christopher Stone, Jeff Webster
Grant Township:
Oscoda Township: Robert Stalker II, Lorna Ganci
Plainfield Township: Fred Lewis
Reno Township: Jdff Jakubik
Sherman Township: Rick Mikulski
Tawas Township: Paul Wescott, Timothy Haskin
Wilber Township: Sally Keueger, Mark Nunn

It should be noted that the language within this Appendix was shaped by the EMC and EMCOG staff, in order to better reflect FEMA planning requirements, and thus was not a verbatim response provided by these local representatives.

DRAFT

1. **Does your community have large seasonal shifts in population? Are there a significant number of seasonal homes in the community? What is the reason for the large influx of population? Does the influx of population create a threat to your community, and if so why?**

City of East Tawas: Yes. Yes. Summer residents/tourists. No.

City of Tawas City: Yes. Yes. Summer homes. No.

City of Whittemore: No. No. NA. NA.

Alabaster Township: **No response**.

Au Sable Township: Yes. Yes. Tourism. No.

Baldwin Township: No. Yes. Unknown. No.

Burleigh Township: No. No. No. No.

Grant Township: **No response**

Oscoda Township: Yes. Yes. Tourism-summer. No.

Plainfield Township: Yes. Yes. Resort lake. No.

Reno Township: Yes. Yes. No. No.

Sherman Township: No. No. NA. NA.

Tawas Township: No. No. NA. NA.

Wilber Township: No. Yes. No. No.

2. **Are there any annual events held in the community that attract large numbers of people? If so, describe the event(s), location, dates and approximate attendance.**

City of East Tawas: Yes. Perch1ville-February-7500 people, 4th of July Parade-5000 people, Summerfest-2nd weekend in July-1500 people, , Uncork'd & Untap'd Wine Festival-1st Saturday of August-1500., Blues by the Bay-4th weekend of August-2000 people, Arts & Craft Fair- Labor Day weekend-3500 people, Triathlon-2nd Weekend of September-2000 people.

City of Tawas City: Yes. Perchville-February-7500 people, Tawas Point Birding Festival-May-1500 people, Shoreline Arts & Craft-Memorial Day Weekend-2000 people, 4th of July Celebration-5000 people, SummerFest-July-1000 people, Blues by the Bay-August-2000 people, Uncork'd & Untap'd Wine Festival-August-1500, Antiques on the Bay-August-1000 people, Arts & Craft Fair- Labor Day weekend-3500 people, 3D Festival of Races Triathlon-September-2000 people, Tuesday Night Live-throughout the summer-300 people/week, Farmers' Market-throughout the summer-500 people/week.

City of Whittemore: Yes. Memorial Day Parade-300+ families, Summer-Saturday night Stock Car Races-500+ families

Alabaster Township: **No response**

Au Sable Township: Yes. 4th of July-doubles local population

Baldwin Township: Yes. Unknown.

Burleigh Township: No. No.

Grant Township: **No response**

Oscoda Township: Yes. Art on the Beach, Paul Bunyan Festival.

Plainfield Township: Yes. Labor Day, 4th of July, Memorial Day, County Fair-July, Michigan Mud Jam-August, Balloon Fest-September

Reno Township: No. NA.

Sherman Township: No. NA.

Tawas Township: No. NA.

Wilber Township: No. NA.

DRAFT

3. Please rate the following natural hazards 1-10, with 1 being a low threat to your community and 10 a high threat. Hazards are considered events that can cause death or injury, damage property or the environment, or disrupt business or services.

	A	B	C	D	E	F	G	H
City of East Tawas:	8	2	7	2	4	1	3	2
City of Tawas City:	4	4	7	3			3	
City of Whittemore:	5	1	6	1		1		
Alabaster Township:	**No Response**							
Au Sable Township:	7	10	8	10			3	
Baldwin Township:	5	5	5	5			1	
Burleigh Township:	2	1	3	1	1	1	1	1
Grant Township:	**No Response**							
Oscoda Township:	6	9	5	8	7	3	2	1
Plainfield Township:	10	10	8	1			1	
Reno Township:	8	1	9	1			5	
Sherman Township:	8	5	9	1	1	1	8	4
Tawas Township:	4	6	4	1	1	1	3	1
Wilber Township:	6	7	5	1			1	

A-Severe Summer Weather; B-Wildfires; C-Severe Winter Weather; D-Riverine Flooding; E-Shoreline Erosion; F-Earthquakes; G-Drought; H-Subsidence

DRAFT

4. Please rate the following technological hazards 1-10, with 1 being a low threat to your community and 10 a high threat.

	A	B	C	D	E	F	G	H	I	J	K
City of East Tawas:	2	1	7	1	4	2	4	2	1	10	8
City of Tawas City:	3	1	4	1	1	5		6	1		
City of Whittemore:	1	1	2	1	1	5		1	1		
Alabaster Township:	**No Response**										
Au Sable Township:	3	10	10	8	8	10		10	7		
Baldwin Township:	1	2	1	1	1	1		1	1		
Burleigh Township:	1	1	1	1	1	1	1	4	1	1	4
Grant Township:	**No Response**										
Oscoda Township:	1	8	6	1	1	3	3	6	1	4	1
Plainfield Township:	4	2	3	1	1	5		6	1		
Reno Township:	1	1	7	1	2	10		10	1		
Sherman Township:	1	1	5	3	3	7	1	7	3	5	1
Tawas Township:	2	1	1	1	1	4	1	3	1	1	2
Wilber Township:	1	2	2	2	1	3		1	1		

A-Civil Disturbance; B-Dam Failure; C-Infrastructure Failure; D-Nuclear Attack; E-Terrorism/Sabotage; F-Pipeline/Oil/Gas Well Fixed Site Hazmat Incident; G-Seasonal/Major Population Change; H-Transportation/Transportation Hazmat Accident; I-Nuclear Power Plant Failure; J-Public Health Emergency; K-Structural or Scrap Tire Fire

DRAFT

5. **What type of hazard (natural or technological) do you feel your community is best prepared for? Why?**

City of East Tawas: Wildfires/structural fires- excellent fire department & mutual aid agreement; severe winter weather-shelter in place, Department of Public Works does excellent with snow removal.

City of Tawas City: Weather-related hazards-City has sufficient and capable personnel to address these matters; civil disorder-law enforcement handles minor disobedience issues; transportation accidents-addressed by local fire department.

City of Whittemore: Infrastructure failure/transportation accidents/ HazMat releases all handled by local fire department.

Alabaster Township: **No response**

Au Sable Township: Wildfires/extreme cold/snow & ice-public safety personnel has addressed in the past.

Baldwin Township: Infrastructure failure-personnel has been trained for and addressed events.

Burleigh Township: Transportation accidents/HazMAT/fire-fire department has been trained and addressed events.

Grant Township: **No response**

Oscoda Township: Natural disasters-probability and planning potential.

Plainfield Township: Wildfires-active, trained, and equipped fire department.

Reno Township: Structural fires-fire department from Whittemore plus mutual aid.

Tawas Township: Shelter is available for emergencies.

Wilber Township: Infrastructure failure (roads)-alternate roads have been identified; pipeline accidents-Michcan to address (most lines not in heavily populated areas); dam failure-little exposure to populated areas.

6. **What type of hazard (natural or technological) do you feel your community is least prepared for? Why?**

City of East Tawas: All other hazards-insufficient personnel, equipment, or financial resources to address them effectively.

City of Tawas City: Nuclear attack-insufficient training.

City of Whittemore: All other hazards-insufficient funding.

Alabaster Township: **No response**

Au Sable Township: All other hazards-insufficient training/experience.

Baldwin Township: Natural disasters-lack or warning to prepare.

Burleigh Township: Hazards that cause the relocation of families.

Grant Township: **No response**

Oscoda Township: Technical hazards-cannot plan for them.

Plainfield Township: Nuclear events.

Reno Township: Infrastructure failures-cannot keep up with the maintenance costs.

Sherman Township: Severe winter weather-dependent upon other agencies to respond.

Tawas Township: No plan for natural disasters.

Wilber Township: Nuclear attack.

7. Please identify mitigation measures that would benefit your community.

City of East Tawas: Generators for the community center and city hall, which can be used as a shelter; a notification system to the residents when a hazard or any emergency occurs; education for the public on responding to hazards.

City of Tawas City: Additional funds to provide training for emergency personnel, equipment, and additional emergency personnel.

City of Whittemore: **No response.**

Alabaster Township: **No response.**

Au Sable Township: Improved communication system to inform public on hazardous events, and an improved education program to educate the public on the hazards and the warning systems in place.

Baldwin Township: Improved direction on eligibility/fundability of projects

Burleigh Township: Generator for fire hall to be used as an emergency shelter.

Grant Township: **No response.**

Oscoda Township: Development of emergency action plans for dams (and making them available to local authorities); elimination of blighted buildings and other measures to reduce wildfires; increase the use of NOAA weather radios for severe weather events; site emergency plans to address fixed site HazMAT incidents; and acquisition of a portable message board for transportation/transportation HazMAT incidents.

Plainfield Township: An improved notification system to warn the public of hazards/events; wildfire training and community awareness; creation of a shelter to be used during severe weather events.

Reno Township: Increase in public safety personnel to address rising number of accidents and vandalism.

Sherman Township: Replacement of bridge over the East Branch of AuGres River on Whittemore Road; trimming of tree branches near utility lines, thereby reducing the number of power outages; promote the emergency shelter location in times of emergency; work with public utilities and private entities to develop a map identifying the location of pipelines within the county/township.

Tawas Township: Measures to address-severe summer and winter events, improved equipment to address wildfires and structural; measures to address transportation accidents

Wilber Township: Services are good.

IOSCO COUNTY
QUESTIONNAIRE

Municipality _____ **Person Completing Form** _____
Title _____

1. **Does your community have large seasonal population shifts?** _____

2. **Are there a significant number of seasonal homes in your community?** _____

3. **If you are aware, do you know the primary reason for the large influx of population?**
_____
_____

4. **Does the influx of population create a threat to your community, and if so, why?**
_____
_____

5. **Are there annual events held in the community that attract large numbers of people?** _____

6. **If so, please describe the event(s), location, dates, attendance, and targeted population.**
_____
_____

7. **Please rate the following natural hazards 1-10, with 1 being a low threat to your community and 10 being a high threat to your community. Hazards are considered events that can cause death or injury, property damage, environmental damage, or disrupt business or services.**

Drought	_____	**Severe Winter Weather**	_____
Subsidence	_____	**Severe Summer Weather**	_____
Wildfires	_____	**Shoreline Erosion**	_____
Earthquake	_____	**Riverine Flooding**	_____

8. **Please rate the following human related/technical hazards 1-10, with 1 being a low threat to your community and 10 being a high threat to your community.**

Civil Disturbance	_____	**Transportation/Hazmat Accident**	_____
Dam Failure	_____	**Public Health Emergency**	_____
Infrastructure Failure	_____	**Major Population Change**	_____
Nuclear Attack	_____	**Nuclear Power Plant Failure**	_____
Terrorism/Sabotage	_____	**Scrap Tire and Structural Fire**	_____

Hazmat/Oil/Gas Well/Pipeline Accident _____

9. **Which hazard(s), natural or technical, are your community best prepared to deal with? Why?**
_____
_____
_____

10. Which hazard(s), natural or technical, are your community least prepared to deal with? Why?

_____
_____
_____

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

_____
_____
_____

12. Are you aware of any properties that have experienced flood damage to their homes on multiple times as a result of flood waters? If so, what is the address?

_____
_____
_____

13. When was your land use plan last updated? Is there any reference to the Hazard Mitigation Plan? If so, how? If not, why?

_____
_____
_____

For the purposes of consistency between the County and the municipalities in determining hazards, the following definitions were used by the County.

IOSCO COUNTY
HAZARD MITIGATION PLAN
HAZARD DEFINITIONS

Civil Disturbance-Collective behavior that results in a significant level of law breaking, perceived threat to public order, or disruptive essential functions and quality of life.

Dam Failure-The collapse or failure of a structure that results in downstream flooding.

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

Earthquake-A shaking or trembling of the crust of the earth, caused by the breaking and shifting of the rock beneath the surface.

Extreme Temperatures-Prolonged periods of very high or very low temperatures, often accompanied by other extreme meteorological conditions.

Fog-Condensed water vapor in cloudlike masses lying close to the ground and limiting visibility.

Hail-Atmospheric water particles from thunderstorms form into rounded or irregular lumps of ice that fall to the earth.

Hazardous Material Incident- Fixed Site-An uncontrolled release of hazardous materials from a fixed site capable of posing a risk to life, health, safety, property, or the environment.

Hazardous Material Incident-Transportation-An uncontrolled release of hazardous materials during transport, capable of posing a risk of life, health, safety, property or the environment.

Ice and Sleet Storm-A storm that generates sufficient quantities of ice and sleet to result in hazardous conditions and/or damage of property.

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

Infrastructure Failure-The failure of critical public or private utility infrastructure that results in a temporary loss of essential functions and/or services.

Lightning-The discharge of electricity from within a thunderstorm.

Major Population Change-An increase in the population due to a special event or time of year that causes the population of the area to increase twofold or greater.

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

Nuclear Power Plant Failure-An actual or potential release of radioactive material at a commercial nuclear power plant, in sufficient quantity to constitute a threat to the health and safety of the off-site population.

Oil and Gas Well Accident- An uncontrolled release of oil or natural gas, or the poisonous by-product hydrogen sulfide from production wells.

Pipeline Accident-An uncontrolled release of petroleum or natural gas, or the poisonous by-product hydrogen sulfide from a pipeline.

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

Riverine Flooding-The overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snow or ice melt.

Sabotage- the act of destroying or damaging something deliberately so that it does not work correctly.

Scrap Tire Fire-A large fire that burns scrap tires being stored for recycling or re-use.

Severe Summer Weather-Summer weather events that include one or more of the following events: drought, extreme heat, fog, hail, lightning, severe wind, thunderstorm, and/or tornado.

Severe Wind-Non-tornadic winds of 58 miles per hour (mph).

Severe Winter Weather-Winter weather events that include one or more of the following events: extreme cold, fog, hail, ice and sleet storm, lightning, severe wind, and snowstorm.

Shoreline Erosion-Low lake levels that cause erosion, and other wave and current action that threatens life, health, and property in shoreline areas, including storm surges, rip currents, and the recession of shoreline areas.

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

Structural Fire-A fire of any origin that ignites one or more structures causing the loss of life and/or property,

Subsidence-The lowering or collapsing of a land surface, caused by natural or human-induced activities that erode or remove subsurface support.

Terrorism-"…activities that involve violent…or life-threatening acts…that are a violation of the criminal laws of the United States or any State and appear to be intended (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the

conduct of a government by mass destruction, assassination, or kidnapping" Federal Criminal Code. 18 U.S.C.←2331

Thunderstorm-Weather systems accompanied by strong winds, lightning, heavy rain, hail, or tornadoes.

Tornado-An intense rotating column of wind (greater than 58 mph) that extends from the base of a severe thunderstorm to the ground.

Transportation Accident-A cause or accident involving an air, land, or water-based commercial passenger carrier. These accidents may also include automotive crashes when they involve a large number of vehicles or in some manner cause the shut-down of a major road for a significant period of time.

Wildfire-An uncontrolled fire in grasslands, brushlands, or forested areas.

MUNICIPALITY _____

PERSON COMPLETING FORM _____

IOSCO COUNTY
FOLLOW-UP QUESTIONNAIRE

1. Please identify the hazards that have the most impact on your municipality and what action(s) could be used to help mitigate their impact. Please rank the impacts in order of impact to the municipality. Please use the following hazards for your responses:

Severe Summer Weather	Pipeline Accidents	Transportation Accidents
Wildfires	Earthquakes	Scrap Tire and Structural Fires
Major Population Changes	Infrastructure Failure	Dam Failures
Shoreline Erosion	Fixed Site Hazmat Incident	Nuclear Attack
Public Health Emergencies	Terrorism/Sabotage	Riverine Flooding
Oil & Gas Well Accidents	Civil Disturbances	Nuclear Power Plant Accident
Subsidence	Drought	Transportation Hazmat Incident
Severe Winter Weather		

A. Hazard _____

Mitigation measure_____

B. Hazard _____

Mitigation measure_____

C. Hazard _____

Mitigation measure_____

D. Hazard _____

Mitigation measure_____

E. Hazard _____

Mitigation measure_____

APPENDIX C -
IOSCO COUNTY FINAL MITIGATION STRATEGIES

1. Public early warning systems and networks.
2. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
3. Joining the National Flood Insurance Program.
4. Installing (or re-routing or increasing the capacity of) storm drainage systems, including the separation of storm and sanitary sewage systems.
5. Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.
6. Enhanced security and anti-terrorist/sabotage/civil disturbance measures.
7. "Harden" critical infrastructure systems to meet seismic design standards for "lifelines."
8. Ensure that the County and individual communities have adequate equipment, staff, and training to respond to transportation-related accidents specific to their needs.
9. 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 broadcast information on hazard events.
10. Communities will acquire and maintain an adequate level of emergency power generators to supply emergency water needs, wastewater processing, emergency communications, emergency health care, and shelters.
11. Ensure key gasoline stations have the capacity to pump gasoline during power outages.
12. Work with power companies to inventory condition of power line right-of-ways, and identify priority sections to clear branches and trees from power lines. The end goal is to create and maintain a disaster-resistant landscape in public rights-of-way.
13. Acquire portable/changeable message signs to direct crowds and provide information.
14. 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).
15. Consistent use of computer data back-up systems and anti-virus software.
16. The creation of fuel breaks (areas where the spread of wildfires will be slowed or stopped due to removal of fuels, or the use of fire-retardant materials/vegetation) in high-risk forest or other areas.
17. Arson prevention activities, including reduction of blight (cleaning up areas of abandoned or collapsed structures, accumulated junk or debris, and with any history of flammable substances stored, spilled, or dumped on them).
18. Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.
19. Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.
20. Have adequate water supplies for emergency firefighting (in accordance with NFPA standards). For residents, identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool or hydrant; have a garden hose that is long enough to reach any area of the home and other structures on the property; install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least

50 feet from the home; consider obtaining a portable gasoline powered pump in case electrical power is cut off.

21. Protecting electrical and communications systems from lightning strikes.
22. Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).
23. Landlords and families can install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each level of homes (to be tested monthly, with the batteries changed twice each year). Family members and residents should know how to use a fire extinguisher.
24. Transportation planning that provides roads, overpasses, etc. to maximize access and improve emergency response times, and evacuation potential, for all inhabited or developed areas of a community (not just designing for the minimum amount of road capacity to handle normal traffic volumes in the community.) This includes transportation access <u>within</u> developed sites (shopping malls, stadiums, office & commercial parking lots, etc.)
25. Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
26. Employing techniques of erosion control within the watershed area (proper bank stabilization, techniques such as planting of vegetation on slopes, creation of terraces on hillsides, use of riprap boulders and geotextile fabric, etc.).
27. Floodplain/coastal management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
28. Detection and prevention/discouragement of illegal discharges into storm-water sewer systems, from home footing drains, downspouts and sump pumps.
29. Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
30. Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
31. Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
32. Elevation of flood-prone structures above the 100-year flood level.
33. Purchase or transfer of development rights – to discourage development in floodplain areas.
34. Monitoring of water levels with stream gauges and trained monitors.
35. Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.
36. Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.
37. Dry/wet floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
38. Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.
39. Using surge protectors on critical electronic equipment.
40. Home and public building maintenance to prevent roof and wall damage from "ice dams."

41. Pump and flood gate installation/automation.
42. Using appropriate wind engineering measures and construction techniques (e.g. structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced entry and garage doors, window shutters, waterproof adhesive sealing strips, and interlocking roof shingles) to strengthen public and private structures against severe wind damage.
43. Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
44. Use of ITS (intelligent transportation systems) technology.

APPENDIX D -
IOSCO COUNTY POSSIBLE MITIGATION STRATEGIES

Thunderstorm Hazards

1. Increased coverage and use of NOAA Weather Radio.
2. Producing and distributing family emergency preparedness information relating to thunderstorm hazards.
3. Public education and awareness of thunderstorm dangers.
4. Training and increased use of weather spotters.
5. Public early warning systems and networks.
6. Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
7. Buried/protected power and utility lines.
8. Inclusion of safety strategies for severe weather events in driver education classes and materials.
9. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
10. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds.)
11. Using structural bracing, window shutters, laminated glass in window panes, and hail-resistant roof shingles to minimize damage to public and private structures.
12. Pre-planning for debris management staging and storage areas. (Debris is usually vegetation such as tree branches that have fallen under the impact of hail, or broken power or phone lines that had frozen or been weighted down by ice or fallen branches.)
13. Using surge protectors on critical electronic equipment.
14. Installing lightning protection devices on the community's communications infrastructure.
15. Using appropriate wind engineering measures and construction techniques (e.g. structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced entry and garage doors, window shutters, waterproof adhesive sealing strips, and interlocking roof shingles) to strengthen public and private structures against severe wind damage.
16. Proper anchoring of manufactured homes and exterior structures such as carports and porches.
17. Establishing safe and appropriate locations for temporary debris disposal sites.
18. Securing loose materials, yard, and patio items indoors or where winds cannot blow them about.
19. Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
20. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds, or broken power or phone lines that had frozen or been weighted down by fallen branches and trees.)

Drought

21. Measures or ordinances to prioritize or control water use (especially when needed to fight fires).
22. Encouragement of water-saving measures by consumers (especially during irrigation and farming).
23. Designs and plans for water delivery systems that include a consideration of drought events.

Winter Weather Hazards

24. Increased coverage and use of NOAA Weather Radio.
25. Producing and distributing family emergency preparedness information relating to severe winter weather hazards.
26. Including safety strategies for severe weather events in driver education classes and materials.
27. Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
28. Buried/protected power and utility lines.
29. Establishing heating centers/shelters for vulnerable populations.
30. Organizing outreach to isolated, vulnerable, or special-needs populations.
31. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
32. Pre-planning for debris management staging and storage areas. (Debris is usually the snow and ice itself, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. Some storage areas will definitely be needed for snow removal during blizzards.)
33. Home and public building maintenance to prevent roof and wall damage from "ice dams."
34. Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow.)
35. Proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc.
36. Farmer preparedness to address livestock needs/problems.
37. Pre-arranging for shelters for stranded motorists/travelers, and others.
38. Maintaining adequate road and debris clearing capabilities.
39. Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.
40. Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow. Some storage areas will definitely be needed for snow removal during blizzards.)

Extreme Temperatures

41. Organizing outreach to vulnerable populations during periods of extreme temperatures, including establishing and building awareness of accessible heating and/or cooling centers in the community, and other public information campaigns about this hazard.
42. Increased coverage and use of NOAA Weather Radio.
43. Housing/landlord codes enforcing heating requirements.
44. Special arrangements for payment of heating bills.

Wildfires

45. Proper maintenance of property in or near wildland areas (including short grass; thinned trees and removal of low hanging branches; selection of fire-resistant vegetation; use of fire resistant roofing and building materials; use of functional shutters on windows; keeping flammables such as curtains securely away from windows or using heavy fire-resistant drapes; creating and maintaining a buffer

zone (defensible space) between structures and adjacent wild lands; use of the fire department's home safety inspections; sweeping/ cleaning dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards; keeping woodpiles and other combustibles away from structures; use of boxed or enclosed eaves on house; thorough cleaning-up of spilled flammable fluids; and keeping garage areas protected from blowing embers).

46. Safe disposal of yard and house waste rather than through open burning.
47. Use of fire spotters, towers, planes.
48. Keep handy household items that can be used as fire tools; a rake, axe, hand/chainsaw, bucket and shovel. Install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each floor of buildings and homes. Test monthly and change the batteries two times each year. Teach family members how to use the fire extinguisher.
49. Post fire emergency telephone numbers.
50. Organizing neighborhood wildfire safety coalitions (to plan how the neighborhood could work together to prevent a wildfire).
51. Residents should plan several escape routes away from their homes - by car and by foot.
52. Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.
53. Arson prevention activities, including reduction of blight (cleaning up areas of abandoned or collapsed structures, accumulated junk or debris, and with any history of flammable substances stored, spilled, or dumped on them).
54. Public education on smoking hazards and recreational fires.
55. Proper maintenance and separation of power lines. Ask the power company to clear branches from power lines.
56. Efficient response to fallen power lines.
57. Training and exercises for response personnel.
58. GIS mapping of vegetative coverage, for use in planning decisions and analyses through comparison with topography, zoning, developments, infrastructure, etc.
59. Media broadcasts of fire weather and fire warnings.
60. Create and enforce local ordinances that require burn permits and restrict campfires and outdoor burning.
61. Mutual aid pacts with neighboring communities.
62. Prescribed burns and fuel management (thinning of flammable vegetation, possibly including selective logging to thin out some areas. Fuels cleared can be given away as firewood or chipped into wood chips for distribution.)
63. The creation of fuel breaks (areas where the spread of wildfires will be slowed or stopped due to removal of fuels, or the use of fire-retardant materials/vegetation) in high-risk forest or other areas.
64. Keeping roads and driveways accessible to vehicles and fire equipment—driveways should be relatively straight and flat, with at least some open spaces to turn, bridges that can support emergency vehicles, and clearance wide and high enough for two-way traffic and emergency vehicle access (spare keys to gates around property should be provided to the local fire department, and an address should be visible from the road so homes can be located quickly).
65. Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.
66. Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.
67. Proper storage and use of flammables, including the use of flammable substances (such as when fueling machinery). Store gasoline, oily rags and other flammable materials in approved safety cans. Stack firewood at least 100 feet away and uphill from homes.

68. Have adequate water supplies for emergency firefighting (in accordance with NFPA standards). For residents, identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool or hydrant; have a garden hose that is long enough to reach any area of the home and other structures on the property; install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least 50 feet from the home; consider obtaining a portable gasoline powered pump in case electrical power is cut off.
69. Obtaining insurance.
70. Including wildfire safety information in materials provided by insurance companies to area residents.
71. Residents should be instructed on proper evacuation procedures, such as wearing protective clothing (sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards.
72. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Dam Failures

73. Ensuring consistency of dam Emergency Action Plan (EAP) with the local Emergency Operations Plan (EOP).
74. Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).
75. Public awareness and warning systems.
76. Obtaining insurance.
77. Greater local support for/assistance with dam inspections and enforcement of the Dam Safety Program (Part 315 of the Natural Resources and Environmental Protection Act) requirements and goals.
78. Increased coverage and use of NOAA Weather Radio
79. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
80. Constructing emergency access roads to dams.
81. Pump and flood gate installation/automation.
82. Real estate disclosure laws that identify a home's location within a dam's hydraulic shadow.
83. Trained, equipped, and prepared search and rescue teams.
84. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Riverine and Urban Flooding/Shoreline Flooding and Erosion

85. Accurate identification and mapping of flood-prone areas.
86. Floodplain/coastal zone management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
87. Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.

88. Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
89. Wet floodproofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
90. Elevation of flood-prone structures above the 100-year flood level.
91. Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
92. Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
93. Public awareness of the need for permits (MDEQ Part 31) for building in floodplain areas.
94. Inclusion of safety strategies for flooded areas in driver education classes and materials.
95. Employing techniques of erosion control within the watershed area (proper bank stabilization, techniques such as planting of vegetation on slopes, creation of terraces on hillsides, use of riprap boulders and geotextile fabric, etc.).
96. Dredging and clearance of sediment and debris from drainage channels.
97. Protection (or restoration) of wetlands and natural water retention areas.
98. Enforcement of basic building code requirements related to flood mitigation.
99. Formation of a watershed council.
100. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
101. Obtaining insurance.
102. Joining the National Flood Insurance Program. **VERY IMPORTANT!**
103. Participating in the Community Rating System (CRS).
104. Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).
105. Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
106. Installing (or re-routing or increasing the capacity of) storm drainage systems, including the separation of storm and sanitary sewage systems.
107. Farmland and open space preservation.
108. Elevating mechanical and utility devices above expected flood levels.
109. Improved/updated floodplain mapping.
110. Real estate disclosure laws.
111. Public education and flood warning systems.
112. Monitoring of water levels with stream gauges and trained monitors.
113. Increased coverage and use of NOAA Weather Radio.
114. Training for local officials on flood fighting, floodplain management, floodproofing, etc.
115. Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.
116. Road closures and traffic control in flooded areas.
117. Trained, equipped, and prepared search and rescue teams.
118. Control and securing of debris, yard items, or stored objects (including oil, gasoline, and propane tanks, and paint and chemical barrels) in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.

119. Back-up generators for pumping and lift stations in sanitary sewer systems, and other measures (alarms, meters, remote controls, switchgear upgrades) to ensure that drainage infrastructure is not impeded.
120. Detection and prevention/discouragement of illegal discharges into storm-water sewer systems, from home footing drains, downspouts and sump pumps.
121. Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
122. Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.
123. Purchase or transfer of development rights – to discourage development in floodplain areas.
124. Stormwater management ordinances or amendments.
125. Wetlands protection regulations and policies.
126. Regional/watershed cooperation.
127. Use of check valves, sump pumps and backflow preventers in homes and buildings.
128. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Fixed Site Hazardous Material Incidents (including explosions and industrial accidents)

129. Maintaining an active and viable Local Emergency Planning Committee (LEPC).
130. Developing and exercising site emergency plans and community response plans as required under SARA Title III.
131. Development of Risk Management Plans for sites that manufacture, store, or handle hazardous materials, to comply with EPA regulations. (For guidance, see the EPA's CEPPO web site at http://www.epa.gov/swercepp/acc-pre.html .)
132. Training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials.
133. Policies stressing the importance of safety above other considerations.
134. Trained, equipped, and prepared site and local hazardous material emergency response teams.
135. Compliance with/enforcement of Resource Conservation and Recovery Act (RCRA) standards.
136. Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
137. Hazardous material public awareness and worker education programs.
138. Facility and community training and exercise programs.
139. Brownfield cleanup activities.
140. Identification of radioactive soils and high-radon areas
141. Proper separation and buffering between industrial areas and other land uses.
142. Location of industrial areas away from schools, nursing homes, etc.
143. Evacuation plans and community awareness of them.
144. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
145. Public warning systems and networks for hazardous material releases.
146. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
147. Road closures and traffic control in accident areas.
148. Trained, equipped, and prepared search and rescue teams.
149. Compliance with all industrial, fire, and safety regulations.
150. Insurance coverage.

151. Enhanced security and anti-terrorist/sabotage/civil disturbance measures.
152. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Hazardous Material Transportation Incidents

153. Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.
154. Improved design, routing, and traffic control at problem roadway areas.
155. Long-term planning that provides more connector roads for reduced congestion of arterial roads.
156. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
157. Proper planning, design, maintenance of, and enhancements to designated truck routes.
158. Enforcement of weight and travel restrictions for truck traffic.
159. Training, planning, and preparedness for hazardous material incidents along roadways and railways (in addition to fixed site emergencies).
160. Public warning systems and networks.
161. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
162. Use of ITS (intelligent transportation systems) technology.
163. Compliance with and enforcement of USDOT and MDOT regulations regarding hazardous materials transport.
164. Locating schools, nursing homes, and other special facilities away from major hazardous material transportation routes.
165. Road closures and traffic control in accident areas.
166. Trained, equipped and prepared local hazardous materials emergency response teams.
167. Trained, equipped, and prepared search and rescue teams.
168. Evacuation plans and community awareness of them.
169. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Infrastructure Failures

170. Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).
171. Burying electrical and phone lines, where possible, to resist damage from severe winds, lightning, ice, and other hazards.
172. Redundancies in utility and communications systems, especially "lifeline" systems.
173. Mutual aid assistance for failures in utility and communications systems (including 9-1-1).
174. Alternative 9-1-1 access through radio operators whose homes are identified through special markings.
175. Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.
176. Separation and/or expansion of sewer system to handle anticipated stormwater volumes.
177. Use of generators for backup power at critical facilities.
178. Regular maintenance and equipment checks.
179. "Rolling blackouts" in electrical systems that will otherwise fail completely due to overloading.
180. Replacement or renovation of aging structures and equipment (to be made as hazard-resistant as economically possible).
181. Protecting electrical and communications systems from lightning strikes.

182. Tree-trimming programs to protect utility wires from falling branches. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
183. Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (1-800-482-7171).
184. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Oil and Natural Gas Well Accidents

185. Community and operator compliance with industry safety regulations and standards.
186. Awareness of hydrogen sulfide gas dangers and personal protection actions for these dangers.
187. Using buffer strips to segregate wells, storage tanks, and other production facilities from transportation routes and adjacent land uses, in accordance with state regulations, and consistent with the level of risk.
188. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
189. Contingency plans for worker and public protection, including the inclusion of rescue and evacuation procedures for well hazard areas in the local emergency operations plan.
190. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Public Health Emergencies

191. Encouraging residents to receive immunizations against communicable diseases.
192. Increasing public awareness of radon dangers and the prevention efforts that can be taken to reduce concentrations of radon in homes and buildings.
193. Maintaining community water and sewer infrastructure at acceptable operating standards.
194. Providing back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.
195. Demolition and clearance of vacant condemned structures to prevent rodent infestations.
196. Maintaining a community public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks.
197. Increasing public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.
198. Community support of free or reduced-expense clinics and school health services.
199. Preventing public contact with contaminated sites or waters (including floodwaters).
200. Brownfield and urban blight clean-up activities.
201. Pollution control, enforcement, and cleanup; proper disposal of chemicals and scrap materials.
202. Proper location, installation, cleaning, monitoring, and maintenance of septic tanks.
203. Separation of storm and sanitary sewer systems.

Sabotage/Terrorism/Weapons of Mass Destruction (WMD)

204. Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a sabotage/terrorism/WMD attack.
205. Alertness, awareness, and monitoring of organizations and activities that may threaten the community.
206. Implementing school safety and violence prevention programs.
207. Providing legitimate channels of political and public expression.
208. Heightening security at public gatherings, special events, and critical community facilities and industries.

209. Greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings.
210. Training, planning, and preparedness by local law enforcement and other responders for terrorist/sabotage/WMD attacks.
211. The development and testing of internal emergency plans and procedures by businesses and organizations.
212. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
213. Establishing avenues of reporting (and rewards) for information preventing terrorist incidents and sabotage.
214. Consistent use of computer data back-up systems and anti-virus software.
215. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
216. Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, etc. that would get in the way or be left over following an attack or incident. The area may simultaneously need to be treated as a crime scene, site of urban search and rescue, area of hazardous materials, and/or a public health threat.

Population Increase (Seasonal/Event)

217. Provide personnel on a temporary basis to handle greater loads on public services.
218. Provide for emergency equipment to deal with higher call rates.
219. Develop plans for excessive traffic patterns.
220. Ensure water and food supplies can be maintained.
221. Provide training for Law, Fire, and EMS and other emergency services to meet the increased demand.
222. Acquire portable/changeable message signs to direct crowds and provide information.
223. Ensure capacities for water/sewer systems.
224. Maintain infrastructure such as schools, hospitals, prisons, roads, and systems for the disposal of water.
225. Include environmental degradation, air and traffic congestion, and pollution of all kinds, water shortages, increased crowding, and social stress.
226. Provide list of motel/cottages where people can stay. Provide list of alternate housing in surrounding communities.

Civil Disturbances (prison or institutional rebellions, disruptive political gatherings, violent labor disputes, urban protests or riots, or large-scale uncontrolled festivities)

227. Law enforcement training, staffing, and resource provision.
228. Incident anticipation and planning, and video documentation of events for later study and use.
229. Local law enforcement mutual aid, and support from the Michigan State Police and National Guard.
230. It is possible that design, management, integration, and lowered density of poor or blighted areas may reduce vandalism, crime, and some types of riot events. Crime Prevention Through Environmental Design (CPTED) is a field of planning that deals with this.
231. Insure structures and property in risky areas.
232. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
233. Design requirements for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, etc. that take into consideration emergency and security needs.

Earthquakes (biggest Michigan threats would be to pipelines, buildings that are poorly designed and constructed, and shelving, furniture, mirrors, gas cylinders, etc. within structures that could fall and cause injury or personal property damage)

234. Adopt and enforce appropriate building codes.
235. Use of safe interior designs and furniture arrangements.
236. Obtain insurance.
237. "Harden" critical infrastructure systems to meet seismic design standards for "lifelines."
238. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Scrap Tire Fires

239. Policies for regulated disposal and management of scrap tires, and enforcement of regulations related to them (separation of stored scrap tires from other materials; limits on the size of each pile; minimum distances between piles and property lines; covering, chemically treating, or shredding tires to limit mosquito breeding; providing for fire vehicle access to scrap tire piles; training employees in emergency response operations; installation of earthen berms around storage areas; prevention of pools of standing water in the area; control of nearby vegetation; an emergency plan posted on the property; storing only the permitted volume of tires authorized for that site).
240. Proper siting of tire storage and processing facilities (land use planning that recognizes scrap tire sites as a real hazard and environmental threat).
241. Local awareness of scrap tire risk, training and preparedness of responders.
242. Law enforcement to prevent illegal dumping of tires at the site.
243. Pest-control measures for mosquitoes and other nuisances around scrap tire yards.

Structural Fires

244. Code existence and enforcement.
245. Designs that include the use of firewalls and sprinkler systems (especially in tall buildings, dormitories, attached structures, and special facilities).
246. Public education and school programs (especially about the use of stoves, heaters, fireworks, matches/ lighters, etc.)
247. Landlords and families can install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each level of homes (to be tested monthly, with the batteries changed twice each year).
248. Family members and residents should know how to use a fire extinguisher.
249. Proper installation and maintenance of heating systems (especially those requiring regular cleaning, those using hand-loaded fuels such as wood, or using concentrated fuels such as liquid propane).
250. Safe and responsible use of electric and "space" heaters (placed at least 3 feet from objects, with space near hot elements free of combustibles).
251. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
252. Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.
253. Post fire emergency telephone numbers. (**Complete)**
254. Education and practice of safe cigarette handling and disposal (also candles, fireworks, campfires, holiday lights)
255. Measures to reduce urban blight and associated arson (including CPTED?).

256. Proper workplace procedures, training and exercising, and handling of explosive and flammable materials and substances.
257. Pre-planned escape routes and fire alert responses.
258. Improved and continuing training for emergency responders, and provision of equipment for them.
259. Defensible space around structures in fire-prone wildland areas.
260. Proper maintenance of power lines, and efficient response to fallen power lines.
261. Transportation planning that provides roads, overpasses, etc. to maximize access and improve emergency response times, and evacuation potential, for all inhabited or developed areas of a community (not just designing for the minimum amount of road capacity to handle normal traffic volumes in the community.) This includes transportation access <u>within</u> developed sites (shopping malls, stadiums, office & commercial parking lots, etc.)
262. Control of civil disturbances and criminal activities that could lead to arson.
263. Enforced fireworks regulations.
264. Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
265. Condominium-type associations for maintaining safety in attached housing/building units or multi-unit structures.
266. Obtain insurance.
267. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Attack

268. Community awareness of designated fallout shelters and attack warning systems.
269. Developing and promoting workable population protection plans (evacuation and in-place sheltering plans, as appropriate).
270. Construction of concrete safe rooms (or shelters) in houses, trailer parks, community facilities, and business districts.
271. Using laminated glass and other hazard-resistant, durable construction techniques in public buildings and critical facilities.
272. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
273. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including enemy attack).
274. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Power Plant Accidents

275. Proper awareness of, training on, and implementation of radiological emergency procedures (to include both primary and secondary Emergency Planning Zones, as appropriate).
276. Community awareness of designated shelters and accident warning systems.
277. Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including enemy attack).
278. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
279. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Pipeline Accidents (Petroleum and Natural Gas)

280. Locating pipelines away from dense development, critical facilities, special needs populations, and environmentally vulnerable areas whenever possible.
281. Increasing public awareness of pipeline locations and appropriate emergency procedures.
282. Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
283. Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (800 482-7171).
284. Proper pipeline design, construction, maintenance and inspection.
285. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Subsidence

286. Identification, mapping, and preventing or limiting development in old mining areas or geologically unstable terrain.
287. Filling or buttressing subterranean open spaces (such as abandoned mines) to discourage their collapse.
288. Hydrological monitoring of groundwater levels in subsidence-prone areas.
289. Obtain insurance for subsidence hazards.
290. Real estate disclosure laws.
291. Community awareness of subsidence risks and effects.
292. Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Transportation Accidents

293. Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.
294. Improved design, routing, and traffic control at problem roadway areas.
295. Long-term planning that provides more connector roads for reduced congestion of arterial roads.
296. Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
297. Enforcement of weight and travel restrictions for truck traffic.
298. Use of ITS (intelligent transportation systems) technology.
299. Use of designated truck routes.
300. Marine safety and general boater awareness programs.
301. Commercial operator training and skill enhancement programs.
302. Training, planning, and preparedness for mass-casualty incidents involving all modes of public transportation.
303. Trained, equipped, and prepared search and rescue teams.

APPENDIX E -
PROPOSED IOSCO COUNTY ACTION ITEMS

Item 1

Purchase of all-hazard warning sirens-located throughout the County, as needed to reach the entire population of the County.

Action: Complete a study to determine the quantity and location of all-hazard warning sirens. Purchase additional warning sirens to be located throughout the County to notify the residents of impending hazards. Sirens to include battery back-ups. The warning sirens will be one of multiple methods of notifying the residents of the hazards.

- Location: County-wide
- Lead Agency: Iosco County Emergency Management (Iosco County EM)
- Participating Agencies: Iosco County, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants
- Project Cost: $25,000 per siren
- Schedule: 2017 to completion
- Priority: High
- Benefit(s): Residents, businesses, and visitors of Iosco County will receive warning of impending hazards and time to get to safety, if needed.

Item 2

Purchase of generators-to be used for back-up power for warning sirens, municipal buildings, and other critical County facilities.

Action: Inventory the facilities within the County that are in need of generators. Develop criteria for the hierarchy of the distribution of the generators. Purchase generators to be used for back-up power at specified sites within the County to provide power during power outages.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, East Tawas, Plainfield Township
- Hazards Addressed: Infrastructure Failure
- Potential Funding Source(s): Grants
- Project Cost: $50,000 to $100,000. Costs will vary as the generators will vary in size due to the size of the buildings they will serve.
- Schedule: 2017 to completion
- Priority: High
- Benefit(s): The generators will provide power to critical facilities, thereby keeping the local governments, and warning systems in operation during power outages.

Item 3 (NEW)

Develop a list of alternative power sources to be used in lieu of back-up generators for critical facilities during power failures.

Action: Work with various agencies throughout the region to develop a list of alternative power sources that can be used in lieu of purchasing generators.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: National Guard
- Hazards Addressed: Infrastructure Failure
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016
- Priority: High
- Benefit(s): These alternative power supplies would be used at critical facilities during power outages when generators are not available.

Item 4

Purchase of weather radios-NOAA-schools, municipal buildings, nursing homes and other care facilities, hospitals and other healthcare facilities.

Action: Purchase of weather radios that will provide notification of hazardous conditions to the inhabitants of specified buildings throughout the County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants, local municipalities
- Project Cost: $15,000 (Units are $50 each, with an estimate of 300 units needed.)
- Schedule: Ongoing
- Priority: High
- Benefit(s): Occupants of the buildings that have these radios will be warned of hazardous conditions prior to the events.

Item 5 (NEW)

Purchase of warning system (CodeRED or similar) for both cell phones and land lines. Important for land lines as cell coverage not available throughout the County.

Action: Purchase of a phone notification program that would notify any phone within the County of hazardous situations.

- Location: County-wide
- Lead Agency: Iosco County Central Dispatch
- Participating Agencies: Iosco County EM
- Hazards Addressed: All hazards, also child abduction and other non-hazardous notifications
- Potential Funding Source(s): Grants

- Project Cost: $25,000
- Schedule: 2016/17
- Priority: High
- Benefit(s): All phone users within the County would be notified of hazardous or critical situations such as storms or amber alerts.

Item 6

Protect Critical Facilities/Structures from Lightning Damage and other hazards

Action: Protect critical facilities/structures from lightning strike damage and other hazards with the installation of lightning rods and proper grounding and install/maintain surge protection on critical electronic equipment.

- Location: County-wide
- Lead Agency: Iosco County OEM
- Participating Agencies: Iosco County Building Department, Plainfield Township Building Department
- Hazards Addressed: all hazards
- Potential Funding Source(s): OEM Budget, grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Facilities and critical equipment will be protected from effects of lightning strikes, thereby keeping critical facilities operational during hazard events.

Item 7

Work with fuel suppliers to develop a list of stations that can distribute gas during power outages and other emergencies. Will also need to develop a list for natural gas distributors.

Action: Develop a list of fuel suppliers (both liquid and natural gas) that will be accessible during power outages and other emergency situations where gas is needed.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: Severe weather conditions, infrastructure failure (power outages)
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016/2017
- Priority: High
- Benefit(s): Critical care facilities, in-home special needs patients and other owners of generators will have access to fuel during lengthy power outages.

Item 8

Promote the need to develop emergency evacuation plans for special events, schools, governmental agencies, large employers, and businesses.

Action: Encourage the development of emergency evacuation plans for special events and buildings that house large populations. The emergency evacuation plans would provide a more organized approach to egress in times of crisis.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools, and special event coordinators
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): By developing a plan a more orderly departure will be utilized during times of emergency, which could result in the saving of lives and/or reducing injuries.

Item 9

Promote the need to complete disaster awareness/emergency planning, including but not limited to major storm events, public health emergencies, or hazard material spills, for special events, schools, governmental agencies, large employers, and businesses.

Action: Encourage the development of disaster awareness/emergency plans for special events and buildings that house large populations. The disaster awareness/emergency plans can be used for multiple reasons and would provide a more organized method to address disasters or other times of crises.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Hale Area Schools, Oscoda Area Schools, Tawas Area Schools, Whittemore Area Schools, and special event coordinators
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): By developing a plan, information would be made available to attendees of events or occupants of a building on how to address or where to go in emergency situations.

Item 10 (NEW)

Work with unique, cultural, or special needs population representatives on providing notification in times of severe weather or other emergency situations.

Action: Develop a notification system that the unique, cultural, or special needs population representatives can utilize, and can then notify others, during times of severe weather or other emergency situations.

- Location: County-wide

- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County, Department of Health and Human Services
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2016/2017
- Priority: High
- Benefit(s): The unique, cultural, or special needs populations can receive sufficient warning of any hazardous situation.

Item 11 (NEW)
Locate/Study/Assess all dams, both publicly and privately-owned to determine structure functionality.
Action: Locate all dams within the County to determine if dams are structurally sound and assess what requirements, if any, are needed for the dam.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Drain Commission and Iosco County Road Commission, MDEQ
- Hazards Addressed: Flooding, Infrastructure failure
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Completing a study will update a list of all publicly and privately-owned dams in the County. The assessment will determine what dams if any are in a state of disrepair and a potential danger to structures in the dams' shadows. This will also allow the EM and DEQ to update their records for the dams within the County and for the EM to update his Emergency Action Plans for each of the dams.

Item 12
Planting of "live" snow fences along major roads in the County.
Action: Plant trees along specified sections of major roads to create a live snow fence and reduce/ eliminate drifting on the highways.

- Location: Site specific, as determined by the Iosco County Road Commission, Michigan Department of Transportation (MDOT), and Iosco County Police Departments, Fire Departments, and EMS Departments
- Lead Agency: Iosco County Road Commission
- Participating Agencies: MDOT
- Hazards Addressed: Severe weather conditions
- Potential Funding Source(s): Iosco County Road Commission, MDOT
- Project Cost: TBD
- Schedule: 2017/2018
- Priority: High

- Benefit(s): Motorists on these roads will benefit with the reduced drifting and better road conditions during the winter months.

Item 13
Training for first responders on all hazards.
Action: Facilitate ongoing training to maintain responders' certifications/job requirements.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department, CERT Team, Rescue Team
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Trained personnel to handle dangerous situations in the County.

Item 14
Promoting the need to develop Family Disaster Plans and the creation of Family Disaster Kits. (Especially critical for medical personnel and first responders so that they can be comfortable leaving their family in times of crises.)
Action: Obtain the information to be disseminated. Provide multiple avenues to distribute the information to the residents of Iosco County. Possible avenues can include county website, EM website, Public Service Announcements, flyers at various public facilities.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: District Health Department No. 2
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: Ongoing
- Priority: High
- Benefit(s): Families better prepared for disasters. First responders and medical responders would be more comfortable leaving their families in times of crises.

Item 15
Purchase of portable traffic directional sign(s)-to direct traffic during severe weather conditions, hazmat conditions, or high volume traffic conditions.
Action: Identify the need to purchase additional portable traffic directional signs. Investigate the sources for purchasing the signs and the possible sources of funding to purchase the signs.

- Location: County-wide
- Lead Agency: Iosco County EM

- Participating Agencies: Iosco County Road Commission
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants, local governmental agencies
- Project Cost: $17,500
- Schedule: Ongoing
- Priority: High
- Benefit(s): By redirecting traffic away from hazardous situations, further problems may be averted.

Item 16
Wildfire training-for front line personnel.
Action: Specialized training offered by DNR, US Forest Service to local public safety personnel.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County public safety personnel, Michigan Department of Natural Resources (MDNR), US Forest Service
- Hazards Addressed: Wildfires
- Potential Funding Source(s): Local governmental agencies
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): Wildfire damages should be reduced due to better training and mitigation measures taken such as the creation of fuel breaks.

Item 17 (NEW)
Firewise training-for communities.
Action: Encourage communities to participate in Firewise training.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: MDNR, US Forest Service, East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department
- Hazards Addressed: Wildfires, structural fires
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): The number of fires/damages resulting from the fires would be reduced as a result of the training/education.

Item 18
Installation of location identification markers on all County recreational waterways.
Action: Acquire and install markers along recreational waterways for identification purposes.

- Location: Recreational waterways within the County
- Lead Agency: Iosco County EM
- Participating Agencies: MDNR, Iosco County Sheriff's Department, Marine Division, Consumers Energy, US Forest Service, service groups such as the Boys Scouts of America
- Hazards Addressed: Public Health and Safety
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: High
- Benefit(s): The markers will allow all users of the waterways to identify their location in a more precise manner in case of a life/death emergency.

Item 19 (NEW)
Enhance the warning and monitoring of systems in the Huron Shore Water Treatment Plant and surrounding infrastructure.
Action: Installation of cameras in critical locations in and around the Huron Shore Water Treatment Plant.

- Location: Huron Shore Water Treatment Plant
- Lead Agency: Iosco County EM
- Participating Agencies: Huron Shore Regional Utility Authority
- Hazards Addressed: Sabotage/terrorism, severe weather conditions, and dam failures
- Potential Funding Source(s): Grants
- Project Cost: $20,000
- Schedule: TBD
- Priority: Medium
- Benefit(s): The visual monitoring of remote facilities and the entrance to the main facility could reduce the potential for harm. This would also allow for monitoring of remote facilities during weather related emergencies.

Item 20 (NEW)
Complete a Community Wildfire Protection Plan for the County.
Action: Seek a grant through the Department of Natural Resources to fund the completion of a Community Wildfire Protection Plan (CWPP) for Iosco County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: East Tawas Fire Department, Tawas City Fire Department, Grant Township Fire Department, Plainfield Township Fire Department, Oscoda Area Fire Department, Whittemore Fire Department, DNR, US Forest Service
- Hazards Addressed: Wildfires
- Potential Funding Source(s): DNR Grant
- Project Cost: $35,000
- Schedule: TBD
- Priority: Medium

- Benefit(s): The CWPP will identify both short-term and long-term goals to reduce wildfires in the County. In addition, measures will be identified that each homeowner can implement to mitigate damages that result from wildfires, and potentially reduce the number of wildfires in the County.

Item 21
Trimming of Tree Branches around Power Lines
Action: Consumers Energy has an ongoing tree trimming initiative along the power line right-of-way.

- Location: County-wide
- Lead Agency: Consumers Energy,
- Participating Agencies:
- Hazards Addressed: all hazards
- Potential Funding Source(s): Annual Budget
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Trimming trees along power lines, roads and streets mitigates damages that occur from summer and winter storm events. Fallen trees and limbs can obstruct passage on streets and roads impeding the passage of emergency vehicles. Fallen trees and limbs that damage power lines can leave vulnerable populations, particularly the elderly and disabled, without heat, air conditioning and electrical power for home medical devices, and leaves residents with residential wells without a source of water. Critical facilities such as urgent care clinics, pharmacies and gas stations can be shut down from a loss of electrical power.

Item 22
Analyze the security at County and local municipal buildings and implement a plan to enhance the security.
Action: Complete an analysis of the security measures for each municipal building and implement a plan to enhance the security.

- Location: Iosco County Courthouse and all local municipal buildings
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Board of Commissioners, East Tawas, Tawas City, and Whittemore
- Hazards Addressed: Civil disturbance and terrorism/sabotage
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): A safer environment would be provided for the employees/visitors of the buildings.

Item 23
Purchase of GIS software to be installed and maintained for use by Iosco County and local governmental agencies.

Action: Purchase Geographical Information Systems (GIS) software that can be installed on Iosco County computers that would be accessible by local governmental agencies, including but not limited to local administrators, public safety personnel, and planning and zoning personnel.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Sheriff's Department, Homeland Security, Tawas Police Authority, Oscoda Township Police, Michigan State Police
- Hazards Addressed: civil disturbances, terrorism/sabotage
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Reduction of acts of violence against the citizens of Iosco County.

Item 24 (NEW)

Establish avenues to report information that could prevent domestic and foreign terrorism/ incidents and sabotage.

Action: Establish additional avenues to report information to assist in the prevention of domestic and foreign terrorism/incidents and sabotage.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Sheriff's Department, Homeland Security, Tawas Police Authority, Oscoda Township Police, Michigan State Police
- Hazards Addressed: civil disturbances, terrorism/sabotage
- Potential Funding Source(s): TBD
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Medium
- Benefit(s): Reduction of acts of violence against the citizens of Iosco County.

Item 25

Investigate the use of Intelligent Transportation Systems (ITS) for public warning and emergency information purposes.

Action: Investigate opportunities to coordinate with MDOT on sites within the County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Road Commission, MDOT
- Hazards Addressed: Transportation and Transportation-Hazmat Incidents
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2017
- Priority: Medium

Benefit(s): ITS is a comprehensive tool that provides information to motorists as well as law enforcement officials, which allows them to make safer, more coordinated, and smarter use of transportation systems.

Item 26
Inventory safe-rooms at mobile home parks as well as campground sites.
Action: Inventory the existing shelters within the County to create a database of the shelters. Develop a plan to identify which shelters can be used by the residents of the mobile home parks and visitors of campground sites, and where shelters are still desired.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Building Department, Plainfield Township Building Department
- Hazards Addressed: Severe weather conditions
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2018
- Priority: Moderate
- Benefit(s): All residents of the mobile home parks/campgrounds could be safer as they would be provided a safe haven in which to locate during periods of extreme winds/tornadoes.

Item 27
Shoreline erosion measures.
Action: Complete a study to determine potential damages due to flooding.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: FEMA, Army Corps of Engineers, Consumers Energy, MDEQ, Coast Guard, MDNR,
- Hazards Addressed: Shore Erosion
- Potential Funding Source(s): Grants
- Project Cost: TBD
- Schedule: 2018
- Priority: Moderate
- Benefit(s): Measures to control shoreline erosion would be developed, thereby protecting the properties (homes) located on the shoreline.

Item 28
Emergency evacuation awareness for families with pets.
Action: Develop an evacuation awareness plan that would include the identification of centers for people with pets.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: American Red Cross, Humane Society, Iosco County Animal Shelter, MSU Extension
- Hazards Addressed: All hazards

- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2017/18
- Priority: Moderate
- Benefit(s): Pet owners would be informed of shelters/facilities that allow pets.

Item 29
Livestock emergency planning.
Action: Work with local farmers in developing a livestock emergency plan that would allow farmers to receive early warning of oncoming hazardous events in order to relocate their livestock to a safe location prior to the event.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: USDA, MSU Extension, Michigan Department of Agriculture
- Hazards Addressed: All hazards
- Potential Funding Source(s): NA
- Project Cost: NA
- Schedule: 2017
- Priority: Moderate
- Benefit(s): The planning could result in the provision of additional warning to the farming community, which could result in the saving of livestock, thereby saving the farming community from losses.

Item 30
Maintain and equip network of HAM radio operators throughout the County to notify public of hazardous events.
Action: Update the technology and equipment of HAM radio operators throughout the County.

- Location: County-wide
- Lead Agency: Iosco County EM
- Participating Agencies: Iosco County Amateur Radio Emergency Services (ARES), and Iosco County Radio Amateur Civic Emergency Services (RACER)
- Hazards Addressed: All hazards
- Potential Funding Source(s): Grants, local funding
- Project Cost: TBD
- Schedule: Ongoing
- Priority: Moderate
- Benefit(s): Provides another means to spread the word of oncoming hazardous events.