Kalkaska County Michigan

Natural Hazards Mitigation Plan 8/10/2016

Networks Northwest
Talent / Business / Community

TABLE OF CONTENTS

I. ACKNOWLEDGEMENTS

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

Each jurisdiction within Kalkaska County is a continuing participant in the update of the Plan. The following is a list of key contributors who were instrumental in the development of the Kalkaska County Natural Hazards Mitigation Plan:

- Kalkaska County Emergency Management Coordinator
- Kalkaska County Equalization Department
- Kalkaska County Commission on Aging
- Kalkaska County Road Commission
- District Health Department #10
- American Red Cross

Others

- Michigan Department of Natural Resources
- Kalkaska County Sheriff's office
- Kalkaska Memorial Health Center
- NOAA – Gaylord office
- Village of Kalkaska

II. LETTER OF TRANSMITTAL

Mike Sobocinski
Michigan State Police Emergency Management Division
7150 Harris Drive
Dimondale, Michigan 48821

PO Box 30634
Lansing MI 48909

Dear Mr. Sobocinski:

Enclosed, please find the Kalkaska County Natural Hazards Mitigation Plan. This Plan has been updated in conjunction with the County Emergency Management Staff, Task Force Members, the public, and the State of Michigan. The Plan lays out the process of evaluating the potential natural hazards, land use, and mitigation strategies to protect lives and property in the County.

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

Under adoption of the Natural Hazards Mitigation Plan for Kalkaska County there will be no property acquisitions allowed in Kalkaska County under the current 2007 plan. If in any future review of the plan the Kalkaska County Board of Commissioners feels that the property acquisition portion of the Natural Hazards Mitigation Plan needs to be reinstated they will be the governing body that reserves the right to do so. The Kalkaska County Hazards Mitigation Plan will be reviewed and revised as needed by the Emergency Management Coordinator. The plan will be reviewed on an annual basis.

Thank you for your time and consideration. If you have any questions, please feel free to contact the Kalkaska County Emergency Services Coordinator, Mike Thompson (231) 258-3334

Sincerely,

County Board of Commissioners

THIS PAGE LEFT INTENTIONALLY BLANK

Kalkaska County Resolution of Adoption

RESOLUTION 2016-42

Kalkaska County
Natural Hazard Mitigation Plan Adoption Resolution

WHEREAS; Kalkaska County, Michigan has experienced risks that may damage commercial, residential and public properties, displace citizens and businesses, close streets and impair infrastructure, and present general public health and safety concerns; and

WHEREAS; Kalkaska County has developed the Kalkaska County Natural Hazard Mitigation Plan that outlines the counties options to reduce damages and impacts from natural and technological hazards; and

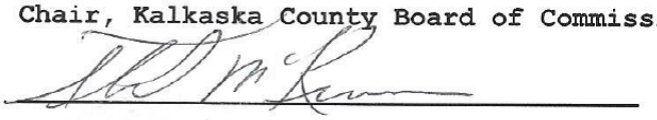
WHEREAS; the Natural Hazard Mitigation Plan has been reviewed by residents, business owners, and federal, state and local agencies, and has been revised where appropriate to reflect their concerns;

NOW, THEREFORE, BE IT RESOLVED THAT: The Natural Hazard Mitigation Plan is hereby adopted as an official plan of Kalkaska County, Michigan

Motioned by Buchanan; Supported by Hart. Roll call vote: Buchanan, yes; Hart, yes; Cox, yes; Crambell, yes; Fisher, yes; Stein, yes; McKinnon, yes. 7 yeas. 0 nays. **Carried.**

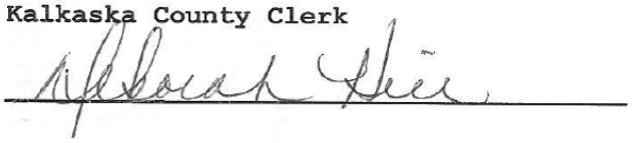
Passed this 9th day of November, 2016

Chair, Kalkaska County Board of Commissioners **Date**



11-9-2016

Kalkaska County Clerk **Date**



11-9-2016

III. PREFACE

Hazard mitigation is any action taken before, during, or after a disaster to permanently eliminate or reduce the long-term risk to human life and property from natural and technological hazards. This procedure is an essential element of emergency management, along with preparedness, response, and recovery. Emergency management includes four phases: a community prepares for a disaster; responds when it occurs; and then there is a transition into the recovery process, during which mitigation measures are evaluated and adopted. The evaluation improves the preparedness posture of the County for the next incident, and so on. When successful, mitigation will lessen the impacts of natural hazards to such a degree that succeeding incidents will remain incidents and not become disasters.

The mission of the Kalkaska County Natural Hazard Mitigation Plan is to permanently eliminate or reduce long-term risks to people and property from natural hazards so that county assets such as transportation, infrastructure, commerce, and tourism can be sustained and strengthened. This can be accomplished through collaborative efforts/activities amongst agencies within Kalkaska County.

Mitigation allows repairs and reconstruction to be completed after an incident occurs in such a way that does not just restore the damaged property as quickly as possible to pre-disaster conditions. This process is needed to ensure that such cycles are broken, that post-disaster repairs and reconstruction take place after damages are analyzed, and that sounder, less vulnerable conditions are produced. Through a combination of regulatory, administrative, and engineering approaches, losses can be limited by reducing susceptibility to damage.

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

Table 1: Community Benefit of a Natural Hazard Mitigation Plan

Community Benefits of a Natural Hazard Mitigation Plan
Protection of the public health and safety
Preservation of essential services
Prevention of property damage
Preservation of the local economic base

This process will help ensure that Kalkaska County remains a vibrant, safe, enjoyable place in which to live, raise a family, maintain a tourist base, and continue to conduct business.

IV. EXECUTIVE SUMMARY

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

To meet this requirement, the Michigan State Police administered federally provided funding to encourage regional cooperation in the development of individual county Natural Hazards Mitigation Plans. The ***Northwest Michigan Hazard Mitigation Planning Project*** **update** was coordinated by the Networks Northwest with Leelanau County being the Fiduciary. The update included Antrim, Kalkaska, Missaukee, Wexford, Grand Traverse, Leelanau, Benzie, and Manistee counties. Networks Northwest worked with the Task Forces to update plans for these counties, which includes a general community profile, a comprehensive inventory of existing hazards, a hazard analysis, goals and objectives, and feasible mitigation strategies to address the prioritized hazards.

The Kalkaska County Natural Hazards Mitigation Plan focuses on natural hazards such as drought, wildfires, flooding, shoreline erosion, ground subsidence/landslides, thunderstorms and high winds, and severe winter weather, and was created to protect the health, safety, and economic interests of the residents and businesses by reducing the impacts of natural hazards through planning, awareness, and implementation. Through this Plan, a broad perspective was taken in examining multiple natural hazards mitigation activities and opportunities in Kalkaska County. Each natural hazard was analyzed from a historical perspective, evaluated for potential risk, and considered for possible mitigative action.

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

Table2: Planning Goals for Kalkaska County

Natural Hazards Mitigation Planning Goals for Kalkaska County
Goal 1: Increase local participation in natural hazards mitigation
Goal 2: Integrate natural hazards mitigation considerations into the County's comprehensive planning process
Goal 3: Utilize available resources and apply for others for natural hazards mitigation projects
Goal 4: Develop and complete natural hazards mitigation projects in a timely manner

Table 3: Priority Areas for Kalkaska County

Natural Hazards Mitigation Priority Areas
Priority Area 1: (County) Potential of severe thunderstorms and high and straight line winds, and tornadoes Mitigation Strategies: ***Severe Weather - High Winds and Tornadoes***
Priority Area 2: (County) Potential wildfire/urban interface area Mitigation Strategies: ***Wildfire***
Priority Area 3: (County) Potential of severe winter weather with snow and ice hazards Mitigation Strategies: ***Extreme Winter Weather***
Priority Area 4: (Rugg Dam and Antrim - Rugg Pond area of the Rapid River) Potential of dam failure with a low possibility of flooding Mitigation Strategies: ***Flood/Flash Flood***

Table 4: Mitigation Strategies for Kalkaska County

Frequent Natural Hazard	Mitigation Strategies
Severe Storms - High Winds and Tornadoes	
	• Pursue the opportunity for grants to purchase weather radios and educate individuals about the weather radios.
	• Promote underground utilities within and outside the Kalkaska city limits.
	• Public education for trailer, mobile, and modular homes to ensure safety; research if wind lift is taken into account for these homes.
	• Continue to assess and seek comment on the forecasting from the National Oceanic and Atmospheric Administration.
Extreme Winter Weather	
	• Emergency Operations Center has response information about available shelters and is in the process of signing contracts with churches, township halls, fire halls, and the Kaliseum for additional shelter space.
	• Continue enforcement of building code regarding snow load limits through the permitting process
	• Public education through letting people know what they need to do to prepare for severe weather. Can utilize the Commission on Aging and the Sheriff's Department
	• Public awareness regarding roof shoveling through public service announcements
Flood/Flash Flood	
	• Continual maintenance and upkeep of the dam which is owned by the County.
	• County committed to maintaining the dam.
Wildfire	
	• Acquire appropriate fire suppression equipment for response
	• Prescribed burns and surface fuels management projects
	• Public education utilizing programs such as the National Fire Protection Association FireWise program, and Michigan DNR resources
Additional Mitigation Strategies	
	• Work on a multi-hazard warning plan.
	• Work with other governmental entities, organizations, businesses, and the public.

V. Planning Process

The Northwest Michigan Council of Governments (NWMCOG) assists local units of governments in all areas of hazard mitigation planning, including drafting and submitting a competitive application, establishing a local planning team, facilitating planning meetings, drafting the final document and facilitating the submission and approval/adoption process.

Several preliminary meetings were held with key staff members from Kalkaska County, and the Northwest Michigan Council of Governments (NWMCOG). In coordination with Kalkaska County Emergency Management staff, Northwest Michigan Council of Governments (NWMCOG) staff facilitated a Kalkaska County Hazard Mitigation public informational open house on March 31st 2014. From those present at the open house, a Local Planning Team (LPT) was developed that would meet regularly throughout the planning process.

The Kalkaska County Multi-Hazard Mitigation planning team met a total of ten times between March 2014 and March 2016 in Planning team work sessions. The public was given the opportunity to both attend and participate at each of the planning team work sessions.

Table 5: Kalkaska County Hazard Mitigation Update Meetings

Meetings		
Meeting Type	Date	Location
LPT Meeting #1	March 31st 2014	Kalkaska County Government
LPT Meeting #2	April 21st 2014	Kalkaska County Government
LPT Meeting #3	May 21st 2014	Kalkaska County Government
LPT Meeting #4	June 23rd 2014	Kalkaska County Government
LPT Meeting #5	August 25th 2014	Kalkaska County Government
LPT Meeting #6	September 29th 2014	Kalkaska County Government
LPT Meeting #7	March 23rd 2015	Kalkaska County Government
LPT Meeting #8	April 27th 2015	Kalkaska County Government
LPT Meeting #9	May 18th 2015	Kalkaska County Government
LPT Meeting #10	June 29th 2015	Kalkaska County Government

Northwest Michigan Council of Governments (NWMCOG) Staff received input from both the LPT as well as from members of the public throughout the planning process which was incorporated into the plan update. Northwest Michigan Council of Governments (NWMCOG) staff presented the planning team with multiple drafts of the plan update throughout the planning process. After the planning team reviewed the “Final Draft” of the plan it was made available to the public at multiple locations via multiple media outlets for public review and comment from May 8th, 2016 to May 18th, 2016.

The Local Planning Team (LPT) was charged with providing oversight to the planning process as well as providing input on areas of expertise. In addition, the (LPT) was developed to provide a wide array of perspectives ranging from the townships and municipalities, to County and State agencies.

Furthermore, it is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000) that (LPT) members must be active participants. The Kalkaska County MHMP update (LPT) members were actively involved on the following ways:

- Attending the MHMP update meetings
- Providing available GIS data and historical hazard information
- Reviewing and providing comments on the draft plans
- Identifying and Profiling Hazards
- Development of the Risk Assessment
- Developing mitigation goals and strategies
- Coordinating and participating in the public input process
- Reviewing and providing comments on the draft plans
- Coordinating the formal adoption of the plan by the county

Jurisdictions

Table 6: Participating Jurisdictions

Participating Jurisdictions
Kalkaska County
Village of Kalkaska
Bear Lake Township
Blue Lake Township
Boardman Township
Clearwater Township
Coldsprings Township
Excelsior Township
Garfield Township
Kalkaska Township
Oliver Township
Orange Township
Rapid River Township
Springfield Township

Table 7 below lists the memebers of the Local Planning Team and their affiliations.

Table 7: Members of LPT

Members of Local Planning Team		
Name, Last	**Name, First**	**Affiliation**
Bissonette	Christine	Kalkaska Memorial Health Center
Bradley	Greg	Kalkaska County Library
Cameron	Steven	MI DNR
Campbell	Kathy	Kalkaska County Equalization Dept
Collins	Cheryl	MI Dept. of Health and Human Services
DeCastro LT	Mike	Michigan State Police - EMHSD
DeVol	Abe	Sheriff - Kalkaska County Sheriff Dept. - deceased
Dierck	Dani	American Red Cross
Dupuie	Joe	Kalkaska EMS
Elliot (ret)	Bill	MSP EMHSD
Foley	Mark	American Red Cross
Foley	Jerry	American Red Cross
Frashier	Dylan	Kalkaska Memorial Health Center
Haner	Brett	Health Dept, Distr. #10
Hiller	Bill	Kalkaska County Construction Codes
Hogerheide	Derek	Kalkaska Twp. Fire Dept
Israel (ret)	Dave	Kalkaska County Sheriff Dept.
Kimball	Debbie	Kalkaska County Commission on Aging
Laskowski (ret)	Mark	Kalkaska County Emergency Management
Rogers	John	Kalkaska County Road Commission
Sheneman	Tom	Kalkaska County Equalization Dept
Sherwood	Karen	Kalkaska Public Schools
Snyder	Debbie	Kalkaska County Commission on Aging
Snyder	Debbie	Kalkaska County Commission on Aging
Stockwell	Troy	MI Dept. of Health and Human Services
Wagner SGT	Dave	Kalkaska County Sheriff Dept
Whiteford	Pat	Sheriff - Kalkaska County Sheriff Dept.
Woods	Michael	NWMCOG
Yost	Scott	Kalkaska Village Manager

VI. PURPOSE OF THE PLAN

In 2000, the Disaster Mitigation Act shifted the Federal Emergency Management Agency's (FEMA) scope of work to promoting and supporting prevention, or what is called hazard mitigation planning. FEMA requires government entities to have natural hazards mitigation plans in place and updated on a 5-year cycle as a condition for receiving grant money related to natural hazard remediation.

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

Table8: Steps in the planning process

Steps in the Planning Process
Creation of a Local Planning Team
Identification of natural hazards and risks
Identification of natural hazards mitigation goals and objectives for emergency management programs
Selection of evaluation criteria
Selection of mitigation strategies using locally chosen criteria
Preparation of draft plan
Public Comment
Completion of the final plan
Adoption of final plan

What is a Hazard?

A **hazard** is an event or physical condition that has potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss. This plan focuses on natural hazards such as drought, earthquakes, extreme temperatures, wildfires, urban and riverine flooding, high or wind driven waters that cause shoreline flooding and erosion, ground subsidence/ landslides, thunderstorms and high winds, tornadoes, and winter weather hazards. This Plan is intended to be a resource for building coordination and cooperation within a community for local control of future mitigation and community preparedness.

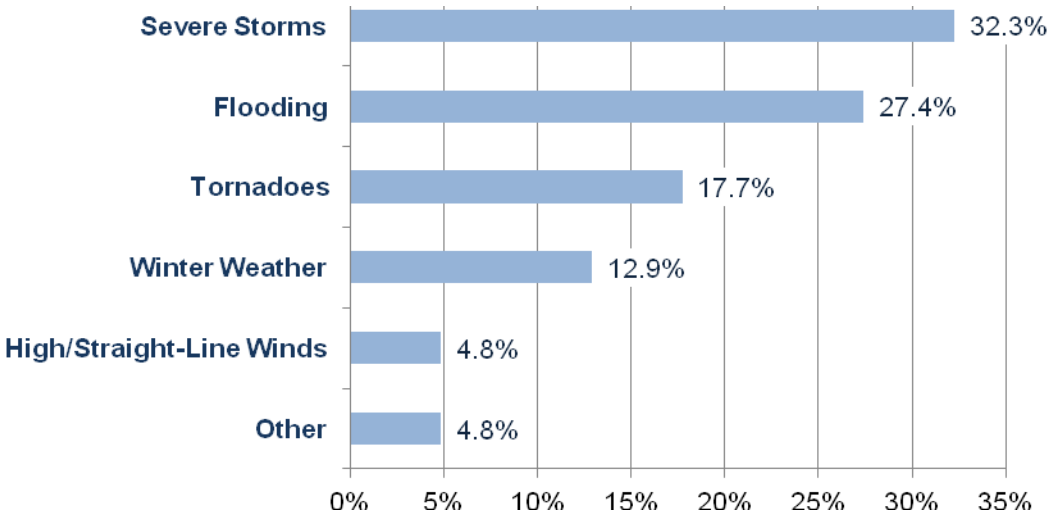
Table 9: Principle Natural Hazards in Northern Lower Michigan

Principle Natural Hazards in Northern Lower Michigan
Severe Storms (Thunderstorms, Winter storms)
High Winds
Tornadoes
Extreme Temperatures
Flooding
Shoreline Hazards
Dam Failures
Drought
Wildfires
Invasive Species
Subsidence

Source: FEMA

Percent of natural hazard events for all formal disaster declarations in the State of Michigan (1953 – 2014)

Figure 1: Disaster Declarations for the State of Michigan



Source: FEMA

What is Mitigation?

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

VI. COMMUNITY PROFILE

In Kalkaska County, state forestland constitutes a majority of the area. There are over 80 inland lakes and 225 miles of streams and rivers that provide activities for fishermen, campers, boaters, and canoeists. The population and labor force of Kalkaska County continues to grow.

There has not been any major infrastructure development, nor major hazard mitigation efforts, in the county, since the Plan was last visited in 2007.

This community data is provided to describe Kalkaska County for planning and implementing the mitigation strategies.

Table 10: Geographic features for Kalkaska County

Feature	Measure	Percent
Area in Water	16,000 acres	6.9%
Forest Lands	126,900 acres	54.5%
Wetlands	27,412 acres	11.8%
Farmland	62,406 acres	26.8
Operating Farms	494	NA

Source: US Agricultural Census, 2012; County Data

The total County population is **17,153**. The projected growth for 2020 is 19,573. The population numbers from the 2010 Census for the **12 Townships and 1 Village** covered by this plan are:

Table 11: Kalkaska County Population

Township/City/Village	Population	Township/City/Village	Population
Bear Lake Township	667	Kalkaska Township	2,707
Blue Lake Township	387	Oliver Township	281
Boardman Township	1,530	Orange Township	1,233
Clearwater Township	2,444	Rapid River Township	1,145
Cold Springs Township	1,464	Springfield Township	1,523
Excelsior Township	953	Village of Kalkaska	2,020
Garfield Township	804		

Source: U.S. Census Bureau, 2008-2012 American Community Survey

- There are approximately 12,136 *Housing Units* in Kalkaska County with an average household size of 2.3 people per household.
- The percentage of residents 65 years and over was 16.8% of the population.
- The percentage of residents 19 years and under was 24.8% of the population.
- The number of residents over 65 with a disability was 38.9% of the population.
- The total number of residents with a disability was 16.2% of the population.
- The number of residents that have a language barrier or are linguistically isolated was 0.3% of the population.
- February 2014 Poverty level:
    - $19,790 Family of 3
    - $11,670 Family of 1

Table 12: Poverty Statistics for Kalkaska County

Poverty	Statistics
Families in poverty	12.2%
Income less than $15,000	16.4%
Population in poverty	16.2%

Source: U.S. Census Bureau, 2008-2012 American Community Survey

Table 13: Economic Census for Kalkaska County

Industry Description	Number of Establishments	Number of Employees
Manufacturing	12	423
Wholesale trade	21	168
Retail trade	53	521
Information	9	32
Real estate, rental, leasing	8	40
Professional, scientific, technical services	19	48
Administrative, support, waste management, remediation services	13	NA
Educational services	NA	NA
Health care, social assistance	27	491
Arts, entertainment, recreation	5	NA
Accommodation and food services	31	325
Other services (except public administration)	39	162

Source: US Census Bureau: County Business Patterns 2008-2012

VII. Hazard Identification

Hazard Profiles

The first element of the risk assessment is to identify hazards that could impact the county. To facilitate the planning process, several Federal, State, and local sources were employed to ensure that the natural hazards are identified prior to assessment. After developing a list of hazards, the planning team vetted the hazards based on event history, vulnerability of buildings, infrastructure, and people. After the list was narrowed it was compared to the current publications to determine if new hazards were being considered or if some should be deleted.

The Planning Team developed the following list of hazards that were identified in the Kalkaska County Hazard Mitigation Plan Update Risk Assessment:

Table 14 – Complete List of Kalkaska County Hazards

Complete List of Kalkaska County Hazards				
Flooding and Flash Floodng	Wildfire	Tornado	Severe Thunderstorms and Damaging Winds	Hail
Severe Winter Weather	Drought	Pandemic	-	-

Table 15 – Hazards Omitted from Last Publication

Hazards Omitted from Last publication
Landslides/Erosion. Removed due to few to no recorded occurrences

Severe Summer Storms

Severe thunderstorms are defined as thunderstorms with one or more of the following characteristics: strong winds, large damaging hail, or frequent lightning. Severe thunderstorms most frequently occur in Michigan during the spring and summer months, but can occur in any month of the year at any time of day.

Hazard Definition - Hail Storm

Also the product of a thunderstorm, hail is formed when water droplets are carried through the updrafts and downdrafts of the cloud mixing with other water droplets until a pellet of ice is formed that can no longer be supported by the updrafts. When this occurs the ice pellets or hailstones fall to the ground. Most hail pellets in Michigan ranges in size from pea size to golf ball size however larger hailstones have been reported on a more infrequent basis.

Hazard Definition - Windstorms (Straight-lined Winds)

Windstorms can occur at any time through the year; however most commonly are experienced with severe thunderstorms in warm weather months. Windstorms most commonly include downbursts, tornadoes, and straight lined winds. These hazards are defined as events with wind speeds greater than 60 miles per hour.

Tornado

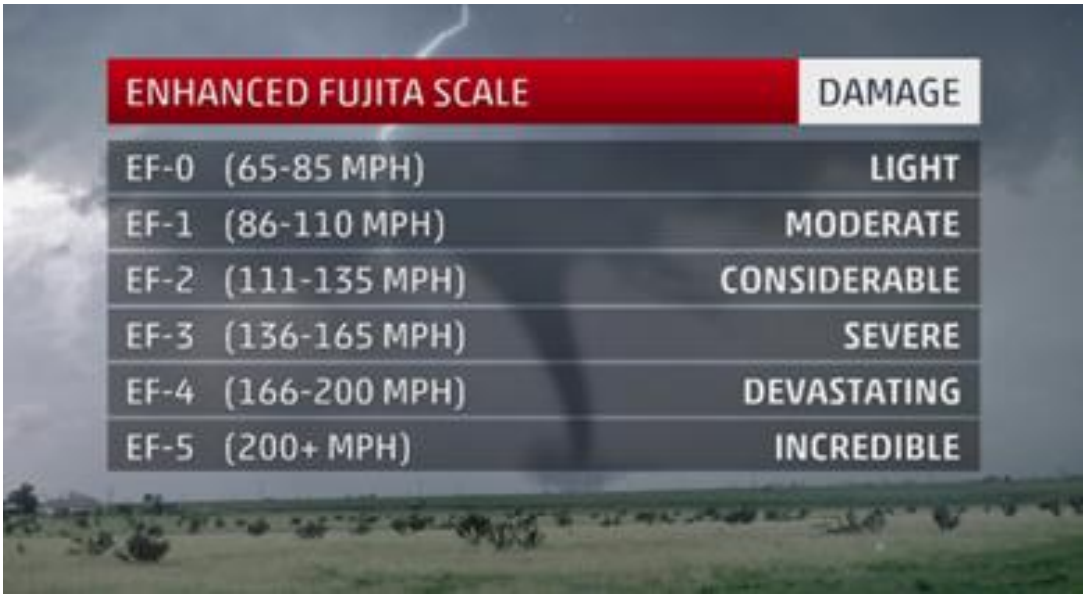
Hazard Definition

A tornado is defined as a violently rotating column of air in contact with the ground and independent from a cumulonimbus cloud. The can be categorized as “weak”, “strong”, and “violent”; with weak tornadoes often having a thin, rope-like appearance and rotating wind speeds no greater than about 110 MPH.

The typical strong tornado often has what is popularly considered a more “classic” funnel-shaped cloud associated with the whirling updraft and rotating wind speeds varying from 110 to 200 MPH. Violent tornadoes are capable of leveling a well-anchored, solidly constructed home however less than 2 percent of all tornadoes usually form in association with mesocyclones, a strong rotating updraft usually associated with a super cell, which tend to occur with the most intense events in the thunderstorm spectrum.

Tornadoes are most likely to occur within Kalkaska County in the warm, humid months of May, June, July and August. Most tornadoes occur during the warmest parts of the day, in the late afternoon and early evening with over 80% of tornadoes occurring between noon and midnight.

The magnitude of tornadoes is measured according to the Enhanced Fujita Scale, commonly known as the “F” Scale. This scale displays the magnitude of a particular tornado based on several criteria including amount of destruction, wind speeds, and other data collection after the affected area has been assessed.



Flooding and Flash Flooding

Hazard Definition

Flooding is the overflowing of water into land areas that are normally dry. For the most part flooding can be predictable however flood events flooding can occur quickly and at random. In working with floodplain management, the Federal Emergency Management Agency uses the “100-year Flood.” The 100-year flood is a delineated area of land where at least a one percent (1%) chance may be unpredictable in such cases as dam or levee failure or flash chance of future flooding exists.

With this amount of uncertainty, a 100-year flood event could occur more often than once in 100 years. The 100-year floodplain standard is commonly used by federal, state, and local agencies, as well as the National Flood Insurance Program (NFIP) as the standard for floodplain management.

A flash flood is a rapid rise along a stream or low-lying urban area due to rain, levee or dam failure, rapid snowmelt, ice jams and similar causes. Flash flooding can also occur when slow moving or multiple thunderstorms occur over the same area. The effect of a flash flood is often greater in areas with inadequate storm sewers and storm drainage system.

Drought

Hazard Definition

Although the definition of a drought varies from location to location, a simple definition of the hazard is a prolonged period of dry weather due to a deficiency in precipitation. Drought is further defined as meteorological, agricultural, hydrological, and socioeconomic, Meteorological drought refers to a period of dry weather associated with lack of precipitation, agricultural drought refers to crop damage as a result of drought, hydrological drought refers to a drop in surface and groundwater levels as a result of drought, and socioeconomic drought refers to impacts on humans individually or collectively.

Wildfire

Hazard Definition

A wildfire is essentially an uncontrolled fire spreading through vegetative fuels over a large area. Wildfires can be caused by natural causes such as lightning, but area often times caused by humans. There are essentially four types of wildfire or stages of wildfire including ground, surface, crown, and spotting. Ground fire is the starting of a wildfire and usually due to the small size of the fire, it may be difficult to detect until it has reached the surface stage. The surface fire generally burns approximately four feet in height and the difficulty of extinguishing the fire is associated with potential nearby fuels.

Once a fire begins burning the tops of trees it is known as a crown fire. This fire can be extremely difficult to control due to winds which may cause spotting. Spotting is caused by the throwing or blowing of large embers of crown fire or surface fire ahead of a wildfire. Spotting makes the controlling of a fire extremely difficult depending on wind speeds, etc. Smoke created by wildfire may also propose a risk to wildlife, persons and property.

Severe Winter Weather

Hazard Definition -Blizzards

A blizzard includes strong winds averaging or frequently gusting to, or above, 35 miles an hour and very low visibility due to blowing or falling snow. These are the most dangerous winter storms and can be especially severe when combined with temperatures below freezing.

Hazard Definition - Ice Storms

Ice storm conditions are most common when a rain event occurs and air temperature exceeds 32 degrees Fahrenheit, but the surface temperature remains at or below freezing. When the precipitation meets the surface and structures, ice accumulations occur. The National Weather Service defines an ice storm as accumulations of ice greater than ¼ inches.

Hazard Definition - Sleet

Sleet forms when precipitation originating as rain travels through freezing temperatures causing the precipitation to freeze before reaching the ground. Generally, sleet storm events are shorter in duration than ice storms, and generally have lower impacts.

Hazard Definition – Extreme Cold

While there is no clear definition of “extreme cold”, the tem can be generally defined as temperatures well below zero degrees Fahrenheit. Exposure to extremely cold temperatures can cause frostbite, hypothermia, and can be life threatening if exposure is prolonged. In addition, extremely cold conditions can cause damage to infrastructure, homes, automobiles, etc., if proper measures are not taken for cold weather preparation. Extreme cold is also associated with wind chill. Wind Chill is the term used to describe the rate of heat loss on the human body resulting from the combined effect of low temperature and wind. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. While wind chill will take heat away from an object faster, it cannot cool that object below the actual temperature.

Pandemic and Infectious Disease
Hazard Definition
Any disease caused by the entrance, growth, and multiplication of bacteria or protozoans in the body; a germ disease. It may not be contagious. Sometimes, as distinguished from contagious disease, such a disease can be communicated by germs carried in the air or water, and thus spread without contact with the patient, as measles.

Table 16 – Geographic Location of Hazards by Jurisdictions

Hazards Identified by Jurisdiction								
	Flooding and Flash Flooding	**Wildfire**	**Tornado**	**Severe Thunderstorms and Damaging Winds**	**Hail**	**Severe Winter Weather**	**Drought**	**Pandemic**
Kalkaska County	X	X	X	X	X	X	X	X
Village of Kalkaska	X	X	X	X	X	X	X	X
Bear Lake Township	X	X	X	X	X	X	X	X
Blue Lake Township	X	X	X	X	X	X	X	X
Boardman Township	X	X	X	X	X	X	X	X
Clearwater Township	X	X	X	X	X	X	X	X
Coldsprings Township	X	X	X	X	X	X	X	X
Excelsior Township	X	X	X	X	X	X	X	X
Garfield Township	X	X	X	X	X	X	X	X
Kalkaska Township	X	X	X	X	X	X	X	X
Oliver Township	X	X	X	X	X	X	X	X
Orange Township	X	X	X	X	X	X	X	X
Rapid River Township	X	X	X	X	X	X	X	X
Springfield Township	X	X	X	X	X	X	X	X

Data Methodology and Map Development
Kalkaska County staff identified the critical facilities and infrastructure on the base map with the Northwest Michigan Council of Governments' GIS staff then digitizing the facilities as point files. Natural hazards points, polygons, and population centers data was then added to the base maps utilizing the following:

Table 17: Critical Facilities and Infrastructure in Kalkaska County

1	Airstrip
11	Bridges – 9 on the County system, 2 on the State
3	Communications Facilities – MDOT, KCRC, Sheriff
1	Community Shelter

2	Dams – South Boardman, Rugg Pond
7	Fire Stations
8	Government Buildings
1	Hospital Facility -- Primary physicians per 100,000 population
4	Industrial Facilities
3	Police Stations
1	Recreational Facility (Kaliseum)
1	School System with various buildings – Forest Area, Kalkaska, Rapid City
6	Utility Facilities
1	Water and Sewage Treatment Facility • Water: 10.3% public system or private company; 89.9% individual wells; • Sewer: 10.3% public sewer; 87.3% individual septic/cesspool; 2.4% other
1	Water Well/Tower

Source: Kalkaska County Data

National Climatic Data Center (NCDC) Records

In addition staff also utilized historical storm event data for several hazards that are available from the National Climatic Data Center (NCDC). NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. When NCDC records were not available for a given hazard, other credible national, state or local sources were utilized.

Flood Data

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

National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is an important shelter from the desolation of flooding. The NFIP is a program of the Federal Emergency Management Agency (FEMA). FEMA provides assistance to states for disaster preparedness, response, recovery, and mitigation. Through this program, FEMA offers flood insurance opportunities to communities that agree to regulate development in flood-prone areas.

Despite billions of dollars spent to prevent flooding, rainfalls and rivers increasingly continue to impact our lives and livelihoods. Yet even after tragic and costly flood events occur, development still encroaches onto the floodplain and into flood-prone lowlands. Property owners who repeatedly file claims for the same structures are draining the National Flood Insurance fund.

The map below shows the only community within Kalkaska County that participates in the National Flood Insurance Program (NFIP). The table 18 below identifies the communities within Kalkaska County that are currently participating in the National Flood Insurance Program (NFIP).

Search Results—Products for **ORANGE**

FEMA has not completed a study to determine flood hazard for the selected location; therefore, a flood map has not been published at this time.

Show **all prod** this area

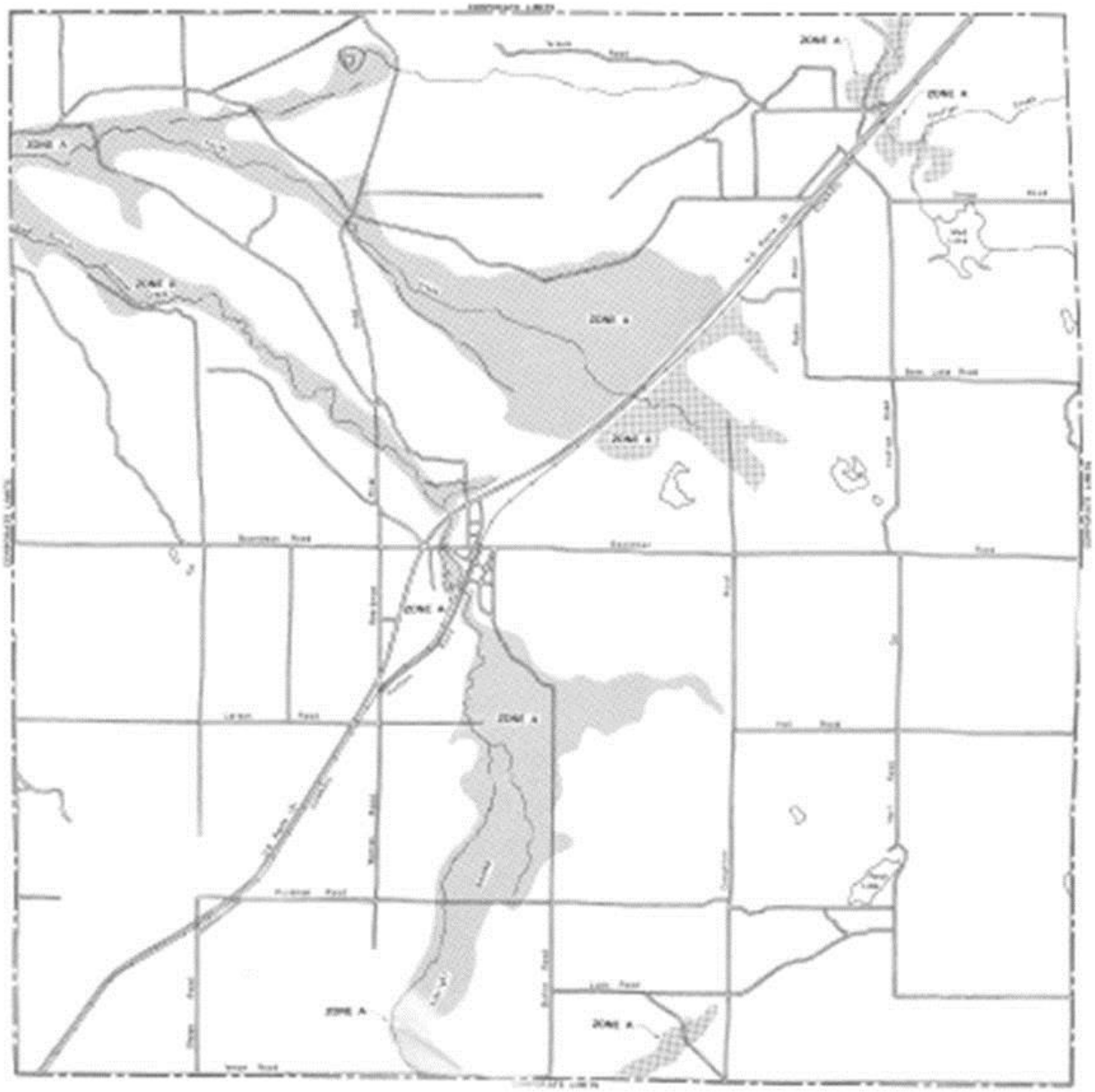
Locator Map

Share This Page.

Table 18:NFIP Participating Communities in Kalkaska County

Community Name	Community ID	County	Participating in the National Flood Insurance Program (NFIP)? as of 2/18/15		Initial FHBM (if applicable)	Initial FIRM (if applicable)	Current Eff Map Date (if applicable)	Entry Date
-	-	-	Participating?	FEMA Map?	-	-	-	-
Village of Kalkaska		KALKASKA	No					
Bear Lake Township		KALKASKA	No					
Blue Lake Township		KALKASKA	No					
Boardman Township	260430a	KALKASKA	Yes					1977
Clearwater Township		KALKASKA	No					
Coldsprings Township		KALKASKA	No					
Excelsior Township		KALKASKA	No					
Garfield Township		KALKASKA	No					
Kalkaska Township		KALKASKA	No					
Oliver Township		KALKASKA	No					
Orange Township		KALKASKA	No					
Rapid River Township		KALKASKA	No					
Springfield Township		KALKASKA	No					

The map below is an image of the DFIRM map for Boardman Township that show the location of floodplains.



Currently, Boardman Township is the only community in Kalkaska County that participates in the NFIP in the form of updating NFIP flood maps. According to an official database associated with the National Flood Insurance Program, Kalkaska County has no properties currently designated as suffering from repetitive losses in insured flood events.

Description of Local NFIP and floodplain management activities

- An overlay has been created for the floodplain area.
- Township passed a zoning ordinance that states any buildings to be built are required to have heavier footings.
- Any existing homes have to acquire flood insurance.

Fire Data

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

Tornadoes

National Weather Service and National Climatic Data Center (NCDC)

Damaging Winds

National Weather Service and National Climatic Data Center (NCDC)

Large Hail

National Weather Service and National Climatic Data Center (NCDC)

Winter Weather

National Weather Service and National Climatic Data Center (NCDC)

Landslide/Erosion

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

Other hazards

Other hazards such as earthquakes may occur in northwest Michigan communities, but are not considered to be substantial risks.

Natural Hazards Recorded Events

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

- Weather/Climate Events, Information, Assessments
- Climatology and Extreme Events
- NOAA Storm Event Database; 1950 to present, local storm reports, damage reports, events checked for Kalkaska County included: Flood (Flash Flood, Flood, Lakeshore Flood), Hail (Hail), Snow and Ice (Blizzard, Extreme Cold/Wind Chill, Freezing Fog, Frost/Freeze, Heavy Snow, Ice Storm, Lake-effect Snow, Sleet, Winter Storm, Winter Weather), Tornado (Tornado, Funnel Cloud), Thunderstorm and High Wind (Heavy Rain, High Wind, Lightning, Strong Wind, Thunderstorm Wind), Wildfire (Wildfire)

The following list includes the frequency, dates, and descriptions of the most severe natural hazard events that have occurred within Kalkaska County, according to the NOAA Storm Event Database; January 1950 – August

2014. *Extreme Winter Weather* includes events with ice covering, property damage, and/or up to/over 12 in. of snow. *Severe Thunderstorm* include 50 knot winds + and property damage figures.

Flash Flooding 2007-2016

Table 19: Flash Flood Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K

Flooding 2007-2016

Table 20: Flood Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K

Hail 2007-2016

Table 21: Hail Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
SIGMA	KALKASKA CO.	MI	06/14/2008	20:40	EST-5	Hail	0.75 in.	0	0	0.00K	0.00K
HOUSEMAN	KALKASKA CO.	MI	06/15/2008	17:57	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
SPENCER	KALKASKA CO.	MI	05/20/2013	13:51	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
SHARON	KALKASKA CO.	MI	08/02/2015	14:50	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Severe Winter Weather 2007-2016

Table 22: Severe Winter Weather Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	275.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/27/2007	13:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/04/2007	01:00	EST-5	Extreme Cold/wind Chill		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/25/2007	10:30	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	04/04/2007	07:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	04/07/2007	18:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/27/2007	08:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/01/2007	16:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/28/2007	14:00	EST-5	Heavy Snow		0	0	0.00K	0.00K

KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/10/2008	20:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/29/2008	21:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/10/2008	00:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/17/2008	09:00	EST-5	Ice Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/16/2008	09:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/30/2008	20:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/01/2008	00:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/06/2008	11:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/21/2008	01:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/28/2008	06:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/08/2009	15:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/15/2009	01:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/17/2009	07:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/18/2009	18:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/21/2009	08:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	03/08/2009	17:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/09/2009	01:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/01/2010	00:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/02/2010	00:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/05/2010	12:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/07/2010	18:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K

KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/11/2010	21:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/06/2011	11:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/20/2011	16:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/01/2011	23:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	03/22/2011	17:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	04/19/2011	16:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/01/2012	15:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/12/2012	17:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/17/2012	19:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	03/02/2012	19:00	EST-5	Heavy Snow		0	0	250.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/23/2012	17:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/20/2012	07:00	EST-5	Winter Storm		0	0	25.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/30/2013	16:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/19/2013	06:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/23/2013	08:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	11/26/2013	23:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/06/2014	21:00	EST-5	Extreme Cold/wind Chill		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/14/2014	12:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/13/2015	11:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	02/19/2015	00:00	EST-5	Extreme Cold/wind Chill		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	12/28/2015	17:00	EST-5	Winter Storm		0	0	0.00K	0.00K

KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/09/2016	19:00	EST-5	Winter Storm		0	0	0.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	01/18/2016	03:00	EST-5	Lake-effect Snow		0	0	0.00K	0.00K
Totals:								0	0	275.00K	0.00K

Severe Thunderstorms and Damaging Winds 2007-2016

Table 23: Thunderstorms and Damaging Wind Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	577.00K	0.00K
DARRAGH	KALKASKA CO.	MI	06/02/2007	18:11	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
HOUSEMAN	KALKASKA CO.	MI	06/08/2007	00:31	EST-5	Thunderstorm Wind	52 kts. EG	0	0	1.50K	0.00K
HOUSEMAN	KALKASKA CO.	MI	04/25/2008	21:25	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.50K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	10/27/2010	10:00	EST-5	High Wind	55 kts. EG	0	0	5.00K	0.00K
KALKASKA	KALKASKA CO.	MI	05/28/2012	21:15	EST-5	Thunderstorm Wind	58 kts. EG	0	0	25.00K	0.00K
DARRAGH	KALKASKA CO.	MI	07/27/2014	12:55	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
RAPID CITY	KALKASKA CO.	MI	08/02/2015	15:42	EST-5	Thunderstorm Wind	60 kts. EG	0	0	540.00K	0.00K
Totals:								0	0	577.00K	0.00K

Tornado 2007-2016

Table 24: Tornado Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								1	1	1.260M	0.00K
CROFTON	KALKASKA CO.	MI	10/18/2007	18:35	EST-5	Tornado	EF2	1	1	1.100M	0.00K
DARRAGH	KALKASKA CO.	MI	09/01/2014	12:47	EST-5	Tornado	EF1	0	0	160.00K	0.00K
Totals:								1	1	1.260M	0.00K

** Governor and Presidential Hazard Declaration*

Drought 2007-2016

Table 25: Drought Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K

Wildfire 2007-2016

Table 26: Wildfire Events

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	125.00K	0.00K
KALKASKA (ZONE)	KALKASKA (ZONE)	MI	05/18/2010	13:30	EST-5	Wildfire		0	0	125.00K	0.00K
Totals:								0	0	125.00K	0.00K

In May, 2010 a controlled burn on an artillery range became uncontrolled as winds increased through the area. The Range 9 Fire burned 1,100 acres of mostly grassy areas on the Camp Grayling grounds, but also crossed over the boundary line at one point and destroyed 4 seasonal homes in Blue Lake Township, resulting in an estimated $125,000 in property damage.

Pandemics or other Public Health Emergencies

Naturally occurring pandemics may cause widespread precautions around the world. District Health Department #10 created a pandemic plan that serves Kalkaska County is used as a template for responding to a large-scale outbreak of influenza and other highly infectious respiratory diseases.

Probability of Natural Hazards

Natural hazards such as hail, thunderstorm and high wind, tornadoes, snow and ice, flooding, and shoreline erosion that will affect Northwest Michigan is a perennial concern. The magnitude and severity depends on the season, which determines temperature, moisture in the air, ice cover on the lakes, etc. Additionally, the severity of an event is directly proportional with tourist activity throughout the year, the pace of residential development, and an increasing base population that affects overall land use in the region. The events recorded indicate that natural hazard events may be happening more frequently, but the geographic impact of the natural hazards' impact has remained the same in Kalkaska County.

The areas where natural hazards overlap in Kalkaska County may include heavy snow that causes trees and power lines down, and then melting, rain and flooding. Rising water levels with high winds can cause coastal landslides/debris flow/erosion.

Table 27: Probability of Natural Hazards

Probability of Natural Hazards								
	Flooding and Flash Flooding	**Wildfire**	**Tornado**	**Severe Thunderstorms and Damaging Winds**	**Hail**	**Severe Winter Weather**	**Drought**	**Pandemic**
Kalkaska County	Low	Low	Medium	Medium	Medium	High	Low	Low
Village of Kalkaska	Low	Low	Medium	Medium	Medium	High	Low	Low
Bear Lake Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Blue Lake Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Boardman Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Clearwater	Low	Low	Medium	Medium	Medium	High	Low	Low

Township								
Coldsprings Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Excelsior Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Garfield Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Kalkaska Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Oliver Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Orange Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Rapid River Township	Low	Low	Medium	Medium	Medium	High	Low	Low
Springfield Township	Low	Low	Medium	Medium	Medium	High	Low	Low

Overall Summary of Each Jurisdictions Vulnerability to Hazards

The table below describes in detail each jurisdiction's vulnerability to each hazard that has been identified by the local planning team.

Table 28: Overall Summary of Each Jurisdictions Vulnerability

Overall Summary of Each Jurisdictions Vulnerability			
	Severe Winter Weather	**Severe Thunderstorms and Damaging Winds and Hail**	**Tornado**
Kalkaska County	The County experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	**Kalkaska County has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.**	Kalkaska County has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There are only two (2) recorded tornadoes in the county since 2007.
Village of Kalkaska	The Village of Kalkaska experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential	The Village of Kalkaska has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually	The Village of Kalkaska has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic

	of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Bear Lake Township	Bear Lake Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Bear Lake Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Bear Lake Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Blue Lake Township	Blue Lake Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Blue Lake Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Blue Lake Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Boardman Township	Boardman Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down	Boardman Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk	Boardman Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited

	towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	of infrastructure damage from downed power lines from falling trees and limbs.	or extensive area. There has been one (1) recorded tornado in the township since 2007.
Clearwater Township	Clearwater Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Clearwater Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Clearwater Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Coldsprings Township	Coldsprings Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Coldsprings Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Coldsprings Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There has been one (1) recorded tornado in the township since 2007.
Excelsior Township	Excelsior Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a	Excelsior Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed	Excelsior Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been

	significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	power lines from falling trees and limbs.	no recorded tornadoes in the township since 2007.
Garfield Township	Garfield Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Garfield Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Garfield Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Kalkaska Township	Kalkaska Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.	Kalkaska Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Kalkaska Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Oliver Township	Oliver Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions	Oliver Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Oliver Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.

	cause driving hazards		
Orange Township	Orange Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards	Orange Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	OrangeTownship has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Rapid River Township	Rapid River Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards	Rapid River Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Rapid River Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.
Springfield Township	Springfield River Township experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards	Springfield River Township has a historical record of high wind events. Severe winds or straight line winds that sometimes occur during severe thunderstorms can be very damaging to a community. Severe winds have the potential to cause loss of life from property damage and flying debris. Damage from straight line winds is more widespread than tornadoes and usually affects multiple counties. There is also risk of infrastructure damage from downed power lines from falling trees and limbs.	Springfield Township has a medium vulnerability to tornadoes. Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There have been no recorded tornadoes in the township since 2007.

Kalkaska County Natural Hazards Task Force and Public Input

The Natural Hazards Task Force comprised of the County's Local Planning Team (LPT) which is a collection of first responders and local, regional, and state public entities that ensure the readiness of County entities by recommending equipment purchases, training and exercises, and public education on preparedness issues. The Task Force meetings were scheduled monthly in 2014 and 2015, held in the Village of Kalkaska, and open to the public. Participants analyzed and updated the hazard priority maps, goals & objectives, hazard priority areas, mitigation measures, and the action agenda items.

- Potential fire areas; fire loads; look over fire incident maps
- Snow load in the snow belt of Blue Lake and Cold springs Townships
- High Winds/Severe Thunderstorms affecting camp areas (Kalkaska RV campground, church camps on Manistee Lake and Grass Lake); the State forest area is 48% of the county.

Natural Hazards Priority Areas were narrowed to the top 3 significant hazards according to the Task Force. The priority areas have not changed since the original plan was last visited in 2007.

Top Three Natural Hazards Priority Areas

***1. Countywide:* Potential of Extreme Winter weather**

The County experiences frequent heavy snow events due to its location in a "snow-belt" area. Heavy snow events have the potential of shutting down towns and businesses for a significant period of time. Blowing and drifting snow with blizzard conditions cause driving hazards.

2. Potential of Severe Thunderstorms, High Winds, and Hail

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

3. Countywide: Potential of *Tornadoes*

Tornadoes are high-profile hazards that can cause catastrophic damage to a limited or extensive area. There are no recorded tornado touchdowns in this area, but there is concern of the potential regarding utility facilities.

Other Hazards of significant concern:

4. Wildfire/Urban interface

The forest types that are most fire prone are located in this area. Additional factors that increase fire risk include lightning and human factors are the number of persons residing in, camping in, or traveling through an area.

5. Rugg Dam and Antrim (Rugg) Pond area of the Rapid River

Rugg Dam is considered a potentially "high hazard" dam due to the height of the head and the size of the impoundment (per information provided by the Kalkaska County Soil and Water Conservation District) According to the 2012 State Hazard Mitigation report, a "high hazard" dam indicates there is at least some development downstream, in the dam's "hydraulic shadow". Should failure occur, damages will be greater from flash flood types of events than they would from gradual floodplain inundation.

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

Emergency Warning System Coverage

One siren is located in the Village of Kalkaska and is an audible warning device effective for the village and local environs only. It is used for tornado warning and is used each time the Kalkaska Township Fire Department is dispatched. There are no other public warning sirens in the County. The County would also utilize (per the warning section of the County Emergency Plans), public notification via EAS alerts over TV/Radio/NOAA Weather Radio; door-to-door, and telephonic contact for warning.

The range for the Counties Warning Siren Coverage extends throughout the entire Village of Kalkaska. All other areas are not served by warning sirens.

Economic Impact Analysis

The total Damaging Events’ Costs recorded since 1950 with the National Oceanic and Atmospheric Administration for Kalkaska County, the region, and the state are as follows:

Table 29: Damage Cost by Natural Hazard

Kalkaska County	Known Property Damage Cost
Flood	$20,000
Hail	NA
Extreme Winter Weather	$40,000
Tornado	$1,152,500
Thunderstorm and High Wind	$206,000
Wildfire	$125,000

The Kalkaska County Equalization Department calculated each Priority Area’s economic value through the State Equalized Values (SEV) for real and personal property (residential and commercial). The following includes 2010 Census data and 2014 SEV dollar amount times two (estimated fair market values) for each priority area. According to the 2014 Northwest Michigan Season Population Analysis, assume a 17% increase to account for the average seasonal population within the county.

Table 30: Geographic Economic Value

Priority Area(s)	Geography	Population	State Equalized Value
	Kalkaska County	16,751	$1,545,711,388
4	Rugg Dam and Antrim Pond Area	approximately 100	$2,029,800

VIII. NATURAL HAZARDS MITIGATION GOALS AND OBJECTIVES

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

Specific goals and objectives have been established based upon the community's natural hazards analysis, as well as input from the Task Force participants and the public through meetings, posting of the draft plan with a request for comments in the local newspaper and on the NWMCOG website, and the presentation of the plan to the Kalkaska County Planning Commission.

Goal 1: Increase local awareness and participation in natural hazards mitigation strategies

- Encourage cooperation and communication between planning and emergency management officials
- Encourage additional local governmental agencies to participate in the natural hazards mitigation process
- Encourage public and private organizations to participate

Goal 2: Integrate natural hazards mitigation considerations into the community's comprehensive planning process

Enforce and/or incorporate natural hazards mitigation provisions in building code standards, ordinances, and procedures; and into the county's comprehensive master plan

- Integrate natural hazards mitigation into the capital improvement planning process so that public infrastructure does not lead to development in natural hazards areas
- Encourage county agencies to review local roads, bridges, dams, and related transportation infrastructure for natural hazards vulnerability

Goal 3: Utilize available resources and apply for additional funding for natural hazards Mitigation

- Provide a list of desired community mitigation measures to the State for possible future funding
- Encourage the application for project funding from diverse entities

Goal 4: Develop and complete natural hazards mitigation projects in a timely manner

- Encourage public and business involvement in natural hazards mitigation projects

IX. IDENTIFICATION AND SELECTION OF MITIGATION STRATEGIES

Selection of Feasible Mitigation Strategies

A set of evaluation criteria was developed to determine which mitigation strategies were best suited to address the identified problems in Kalkaska County.

- The measure must be technically feasible.
- The measure must be financially feasible.
- The measure must be environmentally sound and not cause any permanent, significant environmental concerns.
- The measure must be acceptable to those participating in the strategy and/or primarily impacted by the strategy.

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

Priority 1. Countywide: Potential of Severe Thunderstorms, High Winds, and Tornadoes

Severe Thunderstorm, High Winds, and Tornado Mitigation Strategies

- Pursue the opportunity for grants to purchase weather radios and educate individuals about the weather radios.
- Promote underground utilities within and outside the Kalkaska city limits.
- Public education for trailer, mobile, and modular homes to ensure safety; research if wind lift is taken into account for these homes.
- Suggest that events, campgrounds, and others have an evacuation plan

Priority 2. Countywide: Potential Wildfire/Urban interface areas

Wildfire Mitigation Strategies

- Acquire appropriate fire suppression equipment for response
- Prescribed burns and surface fuels management projects
- Public education utilizing programs such as the National Fire Protection Association FireWise program, and Michigan DNR resources

Priority 3. Countywide: Potential of Extreme Winter weather

Snow Load and Ice Build Up Mitigation Strategies

- Emergency Operations Center has response information about available shelters and is in the process of signing contracts with churches, township halls, fire halls, and the Kaliseum for additional shelter space.
- Continue enforcement of building code regarding snow load limits through the permitting process.
- Public education and awareness.
- Utilize the Commission on Aging and the Sheriff's Department.
- Public awareness regarding roof shoveling through public service announcements.

Priority 4. Rugg Dam and Antrim (Rugg) Pond area of the Rapid River

Flood Mitigation Strategies

- Assessment of flood threat and dam inspections results
- Research a flood warning system
- Public education and awareness
- Building code enforcement
- Mapping of flood prone areas.
- Identify structures in those flood prone areas

X. PARTICIPATION IN THE DEVELOPMENT OF THE KALKASKA COUNTY NATURAL HAZARDS MITIGATION PLAN

The opportunities for public review and comment as well as review by other governmental entities took place in the month of May. In addition to having the opportunity to attend the LPT meetings as described in the planning process section of this plan, the public also had the opportunity to review and comment on the DRAFT plan prior to the adoption process online at the Kalkaska County Website and/or in the Kalkaskian Leader.

- The Natural Hazards Mitigation Plan was presented to the Kalkaska County Planning Commission and County Board of Commissioners, where the meetings are posted in the newspaper and are open to the public.

- During development of the plan, all townships and the village were provided the opportunity to formally comment on plan drafts and other related materials. They were given the opportunity via mailings of both meeting notices and draft copies of the plan for comment. Notification was also provided to them that the plans were posted on the NWMCOG website and could be reviewed there. While most jurisdictions did not provide formal written comments, they did provide county staff (particularly the county emergency manager) with feedback via other informal means. This feedback took the form of phone calls, emails and conversations that occurred at various non-mitigation related meetings throughout the county. This information was provided back to NWMCOG staff by the county staff and used in development of the plan, including the risk assessment and community profile sections.

In addition, the townships and villages (whether or not they have their own zoning) have indicated to the county emergency manager that they will follow the county's lead in identifying mitigation projects and developing grant applications to fund those projects. Land use issues associated with those projects (where applicable) will be handled by each jurisdiction that controls zoning in the project area.

Community planning services are provided by the professional staff of the Kalkaska County Planning & Zoning/Soil Erosion Department. The Department assists communities in developing plans and zoning ordinances, provides resource information and technical assistance, and convenes communities to address land use issues of common interest. The Kalkaska County Planning Commission coordinates and reviews local zoning and master plans to ensure consistency across jurisdictional boundaries. Building permits are issued by the Kalkaska County Construction Code Department.

The Townships/Villages in the priority areas include:

Bear Lake Township
Blue Lake Township– Zoning
Boardman Township – Zoning
Clearwater Township– Zoning
Cold Springs Township
Excelsior Township
Garfield Township– Zoning
Kalkaska Township
Oliver Township
Orange Township
Rapid River Township– Zoning
Springfield Township
Village of Kalkaska – Zoning

Table 31: Plan Participation

County/Township/Others	Zoning	Participation
Kalkaska County	Yes	Task Force meetings, review of draft plans: Conservation District Emergency Management Coordinator Equalization Department Planning Commissioners Zoning Administrator
Bear Lake Township	No	See last bullet point paragraph
Blue Lake Township	Yes	See last bullet point paragraph

Boardman Township	Yes	See last bullet point paragraph
Clearwater Township	Yes	See last bullet point paragraph
Cold Springs Township	No	See last bullet point paragraph
Excelsior Township	No	See last bullet point paragraph
Garfield Township	Yes	See last bullet point paragraph
Kalkaska Township	No	See last bullet point paragraph
Oliver Township	No	See last bullet point paragraph
Orange Township	No	See last bullet point paragraph
Rapid River Township	Yes	See last bullet point paragraph
Springfield Township	No	See last bullet point paragraph
Village of Kalkaska	Yes	See last bullet point paragraph

XI. IMPLEMENTATION OF THE KALKASKA COUNTY NATURAL HAZARDS MITIGATION PLAN

Natural Hazards Mitigation Plan Managers and Technical Assistance

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

- Kalkaska County Government
- Townships, cities, and villages
- Kalkaska County Conservation District
- Kalkaska County Road Commission
- Conservation Resource Alliance
- Watershed Center Grand Traverse Bay
- Michigan State University Extension
- Michigan Department of Environmental Quality
- Michigan Department of Natural Resources
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture Natural Resources Conservation Service
- American Red Cross
- Local Hospitals
- Insurance Companies
- Real Estate Companies
- Natural Gas and Electric Companies
- Pipeline Companies
- Fiber Optic and Broadband Cable Companies

Funding the Implementation of the Plan

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

- Federal Emergency Management Administration – Hazard Mitigation Grant Program
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture Natural Resources Conservation Service
- U.S. Department of Agriculture Rural Development: Rural broadband opportunity – high speed telecommunication funding from the Public Telecommunications Facilities
- Planning and Construction grants
- U.S. Department of Housing and Urban Development
- Michigan Department of Environmental Quality
- Michigan Department of Natural Resources
- National Oceanic and Atmospheric Administration
- Community/Regional Foundations

Action Agenda

Following is summary for accomplishing the **recommended natural hazards mitigation actions** for Kalkaska County.

Table 32: Benefit to Cost Analysis Legend

Cost Benefit Analysis		
Prioritization	**Cost**	**Benefit to Cost Ratio**
Prioritization ÷ Cost = Benefit to Cost Ratio		
High =3	Low =1	$3
Medium =2	Low =1	$2
High =3	Medium =2	$1.5
High =3	High =3	$1
Medium =2	Medium =2	$1
Low =1	Low =1	$1
Medium =2	High =3	$0.67
Low =1	Medium =2	$0.50
Low =1	High =3	$0.33

High Benefit

Medium Benefit

Low Benefit

Table 33: Recommended Mitigation Actions

Priority and Action Strategies	Responsible Parties	Timeframe	Prioritization	Cost	Cost/Benefit
Priority Area 1: High Winds and Tornado Mitigation					
a. Pursue the opportunity for grants to purchase weather radios and educate individuals about them	Emergency Management Coordinator Emergency Responders, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	1-3 years after adoption of the plan	High=3	Low=1	+3
b. Promote underground utilities within and outside the Kalkaska city limits	Zoning Administrator County Building Inspector Utility Companies, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	Ongoing	High=3	Low=1	+3

c. Public education for trailer, mobile, and modular homes to ensure safety; research if wind lift is taken into account for these homes	County Building Inspector Emergency Management Coordinator Zoning Administrator Realtors, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	1-3 years from adoption of the plan	High=3	Medium=2	+1.5
d. Suggest that events, campgrounds, and others have an evacuation plan	Emergency Management Coordinator Fire and Emergency Response, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	Ongoing	High=3	Low=1	+3
Priority Area 2: Wildfire Mitigation					
a. Acquire appropriate fire suppression equipment for response	Emergency Management Coordinator Fire and Emergency Departments MI Department of Natural Resources, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	1-3 years from adoption of the plan	Medium=2	High=3	+.67
b. Prescribed burns	Emergency	1-5 years from	Medium=2	High=3	+.67

and surface fuels management projects	Management Coordinator County Planning Fire and Emergency Departments MI Department of Natural Resources	adoption of the plan			
c. Public education utilizing programs such as the National Fire Protection Association FireWise program, and Michigan DNR resources	County Planning County Building Inspector Emergency Management Coordinator, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	1-3 years from adoption of the plan	Medium=2	Medium=2	+1
Priority and Action Strategies	**Responsible Parties**	**Timeframe**			
Priority Area 3: Snow and Ice Mitigation					
a. Emergency Operations Center has response information about available shelters and is in the process of signing contracts with churches, township halls, fire halls, and the Kaliseum for additional shelter space	Emergency Management Coordinator County Building Inspector, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	Ongoing	Low=1	Medium=2	+.5
b. Continue enforcement of building code regarding snow limits through the permitting process	County Building Inspector, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River	Ongoing	Low=1	Medium=2	+.5

	Township, Springfield Township, Rapid City, South Boardman.				
c. Public education on extreme weather preparation	Emergency Management Coordinator Sheriff Department Commission on Aging, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.	Ongoing	Low=1	Low=1	+1
d. Public awareness regarding roof shoveling through pubic service announcements	County Building Inspector Emergency Management Coordinator Housing Authority, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman, Media.	Ongoing	Low=1	Low=1	+1
Priority Area 4: Flood Mitigation					
a. Continual maintenance and upkeep of Rugg Pond Dam	County Board of Commissioners County Planning Commission, Emergency Management Coordinator Zoning Administrator Department of Public Works, Kalkaska County, Village of Kalkaska, Bear Lake Township, Blue Lake Township, Boardman Township, Clearwater Township, Coldsprings Township, Excelsior Township, Garfield Township, Kalkaska Township, Oliver	Ongoing	Low=1	High=3	+.33

	Township, Orange Township, Rapid River Township, Springfield Township, Rapid City, South Boardman.				

Additional Mitigation Strategies

- Work on a multi-hazard warning plan.
- Work with other governmental entities, organizations, businesses, and the public.

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

- Inventory shoreline erosion sites.
- Reduce the magnitude of overland stormwater runoff to streams.
- Minimize the change of terrestrial vegetation types from forest/shrub species to turf species.
- Utilize maps for potential flood areas and wetlands.
- Work to stop wetland and other types of lowland filling.
- Protect critical riparian areas.
- Limit habitat fragmentation by maintaining compact communities.
- Adequate setbacks for buildings.
- Minimize development clearings by landowners.
- Establish riparian buffers along waterways.
- Establish and support stormwater best management practices.
- Reduce the amount of impervious surfaces in the watershed, especially in areas of high groundwater recharge.
- Regularly inform the public about the watershed, activities, study findings, successes/example projects, and opportunities for contribution.
- Provide focused information to residents, visitors, local governments, and other target groups on priority topics.
- Involve the citizens, public agencies, user groups and landowners in implementation of the watershed plan through meetings and workshops with individuals or groups.

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

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

XII. Monitoring and Evaluation, and Plan Maintenance

The Kalkaska County Natural Hazards Mitigation Plan will be reviewed and revised as needed by the Emergency Management Coordinator. Because Kalkaska County is a dynamic, changing county with population growth, it is expected that the plan should be reviewed on an annual basis.

To assess the effectiveness of the Plan, some questions to ask include: 1) How many and which mitigation strategies were developed? Implemented? 2) Did any new natural hazards events take place the past year to report? This review would be administered by the Emergency Management Coordinator with the Local Emergency Planning Committee, the County Planning Commission, and the public. If changes are needed, the plan will be presented to the Task Force participants for revisions.

Although review of the plan will occur annually, and a formal revision may not be needed each year, a new edition of the plan will be expected within every five-year period. New additions of the plan will be based on annual reviews, monitoring, evaluation, and an accumulation of official feedback and public input. When it is appropriate to publish a revised version of the plan, the Task Force participants shall again be involved in the revision process. Each new edition of the plan will again be officially adopted by the Kalkaska County Board of Commissioners.

Throughout the five-year planning cycle, the Kalkaska County Emergency Management Director will reconvene the Multi-Hazard Mitigation planning committee to monitor, evaluate, and update the plan on an annual basis.

Additionally, a meeting will be held in early in 2019 to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

The committee will review the county goals and objectives to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified. The parties responsible for the various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the Kalkaska County Multi-Hazard Mitigation Plan Update during the five-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions and or approval. The plan will be updated via written changes, submissions and the committee deems appropriate and necessary, and as approved by the county commissioners.

Implementation

The results of this plan will be incorporated into ongoing planning efforts since many of the mitigation projects identified as part of this planning process are ongoing. This hazard mitigation plan will be made available to the agencies responsible for updating each of the plans identified in this plan. County Emergency Management will ensure that each time any of these plans are updated that some members of the Hazard Mitigation planning team will be present at these meetings to provide input and incorporate the goals of this plan into other planning mechanisms. Doing this will ensure an ongoing body of local planners that will not only serve on the counties hazard mitigation planning team but will also act as liaisons back to their individual communities.

Each Participating jurisdiction is responsible for developing an individual process for integrating hazard mitigation actions into their communities other planning mechanisms.

Continued Public Involvement

Continued public involvement is critical to the successful implementation of the mitigation strategies. Comments from the public on the updated plan will be received and forwarded to the planning team for discussion. Education efforts for hazard mitigation will be ongoing. The public will be notified of annual Mitigation Planning Team review meetings periodic through notices in the local newspaper.

XIII. NATURAL HAZARDS MITIGATION PLAN ADOPTION RESOLUTION

(The remainder of this page intentionally left blank)

XIV. APPENDICES

Appendix A

Glossary of Mitigation Planning Terms

Alluvial fan: A gently sloping fan-shaped landform created over time by the deposition of eroded sediment and debris.

Base Flood: A flood having a one percent chance of being equaled or exceeded in any given year.

Coastal high hazard area: An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms.

Disaster: A major detrimental impact of a hazard upon the population and economic, social, and built environment of an affected area.

Exposure: The number, types, qualities, and monetary values of various types of property or infrastructure and life that may be subject to an undesirable or injurious hazard event.

Flood Insurance Rate Map: As defined under the National Flood Insurance Program, an official map of the community on which the administrator of the Flood Insurance Administration has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

Floodplain or flood prone area: Any land area susceptible to being inundated by water from any source.

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

Fuel: Combustible plant material, both living and dead, that is capable of burning in a wildland situation; any other flammable material in the built environment that feeds a wildfire.

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

Hazard identification: The process of defining and describing a hazard, including its physical characteristics, magnitude and severity, probability and frequency, causative factors, and locations or areas affected.

Hydric Soils: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (a situation in which oxygen is absent from the environment) conditions in the upper part of the soil.
Lifeline systems: Public works and utilities such as electrical power, gas and liquid fuels, telecommunications, transportation, and water and sewer systems.

Major disaster: As defined in the Stafford Act, “any natural catastrophe or, regardless of cause, any fire, flood, or explosion in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of states, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.”

Mitigation: Sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards and their effects. Note that this emphasis on long-term risk distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery.

Multiple-objective management: A holistic approach to floodplain management (or the management of other hazards) that emphasizes the involvement of multiple distinct interest in solving land use problems related to the hazardous area.

Natural hazard: Hurricanes, tornadoes, storms, floods, tidal wave, tsunamis, high or wind-driven waters, volcanic eruptions, earthquakes, snowstorms, wildfires, droughts, landslides, and mudslides.

One hundred year flood: The flooding event that has a one percent chance of occurring in a particular location in any given year. While this is the most common reference point statistically because it is used for regulatory purposes in the National Flood Insurance Program, the same language applies in referring to other actual or hypothetical events in terms of their statistical probabilities.

Risk: The potential losses associated with a hazard, defined in terms of expected probability and frequency, exposure, and consequences.

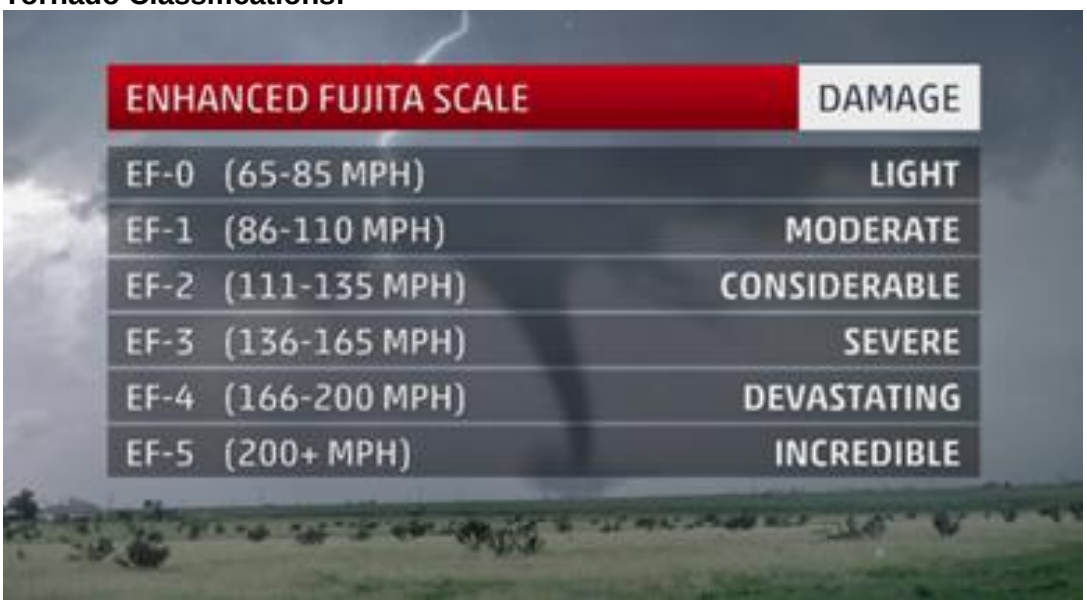
Risk assessment: A process or method for evaluating risk associated with a specific hazard and defined in terms of probability and frequency of occurrence, magnitude and severity, exposure, and consequences.

Special flood hazard area: Land in the floodplain within a community subject to one percent or greater chance of flooding in any given year.

Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288, as amended by P.L. 100-707), which provides the greatest single source of federal disaster assistance.

Structure: A walled and roofed building, including a storage tank for gas or liquid, that is principally above ground, as well as a manufactured home.

Tornado Classifications:



Urban Wildfire: A fire moving from a wildland environment, consuming vegetation as fuel, to an environment where the fuel consists primarily of buildings and other structures.

Urban/wildland interface: A developed area, also known as the "I-zone," occupying the boundary between an urban or settled area and a wildland characterized by vegetation that can serve as fuel for a forest fire.

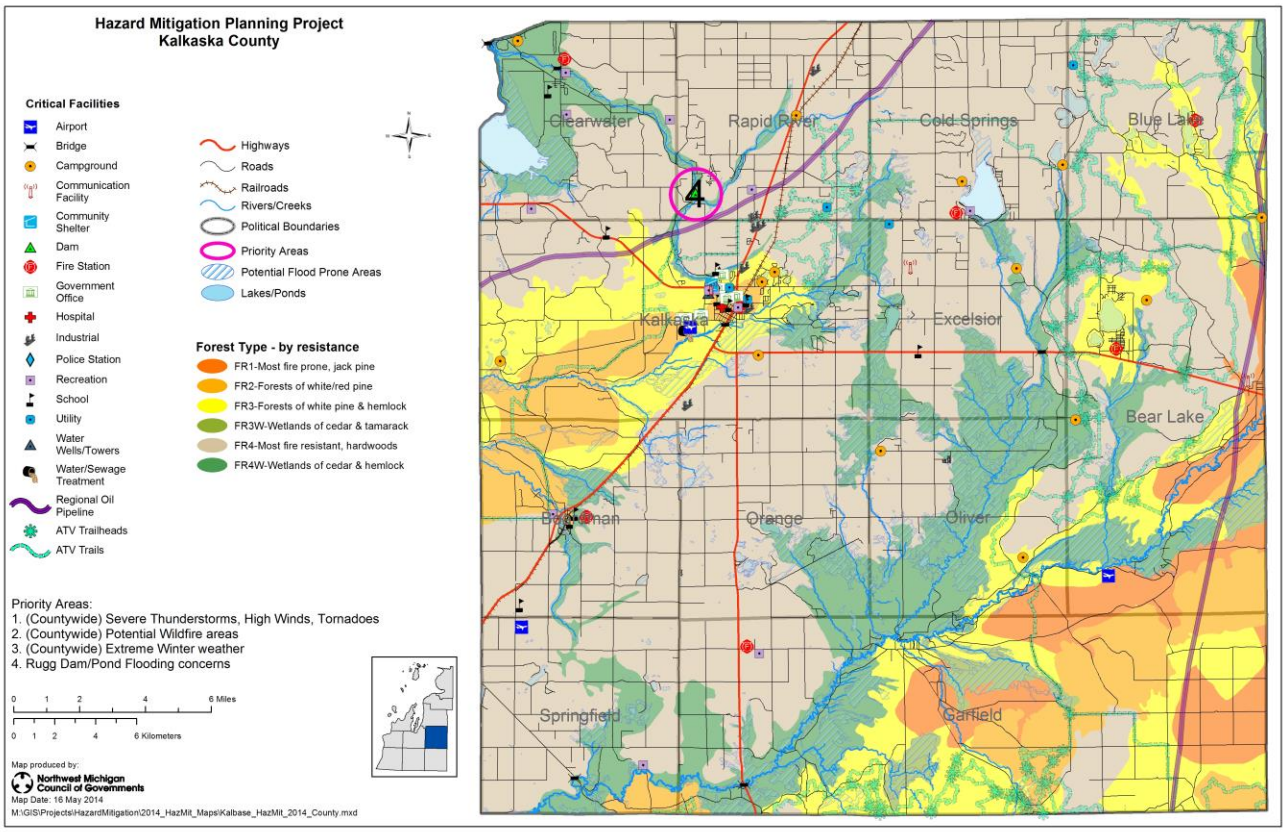
Vulnerability: The level of exposure of human life and property to damage from natural hazards.

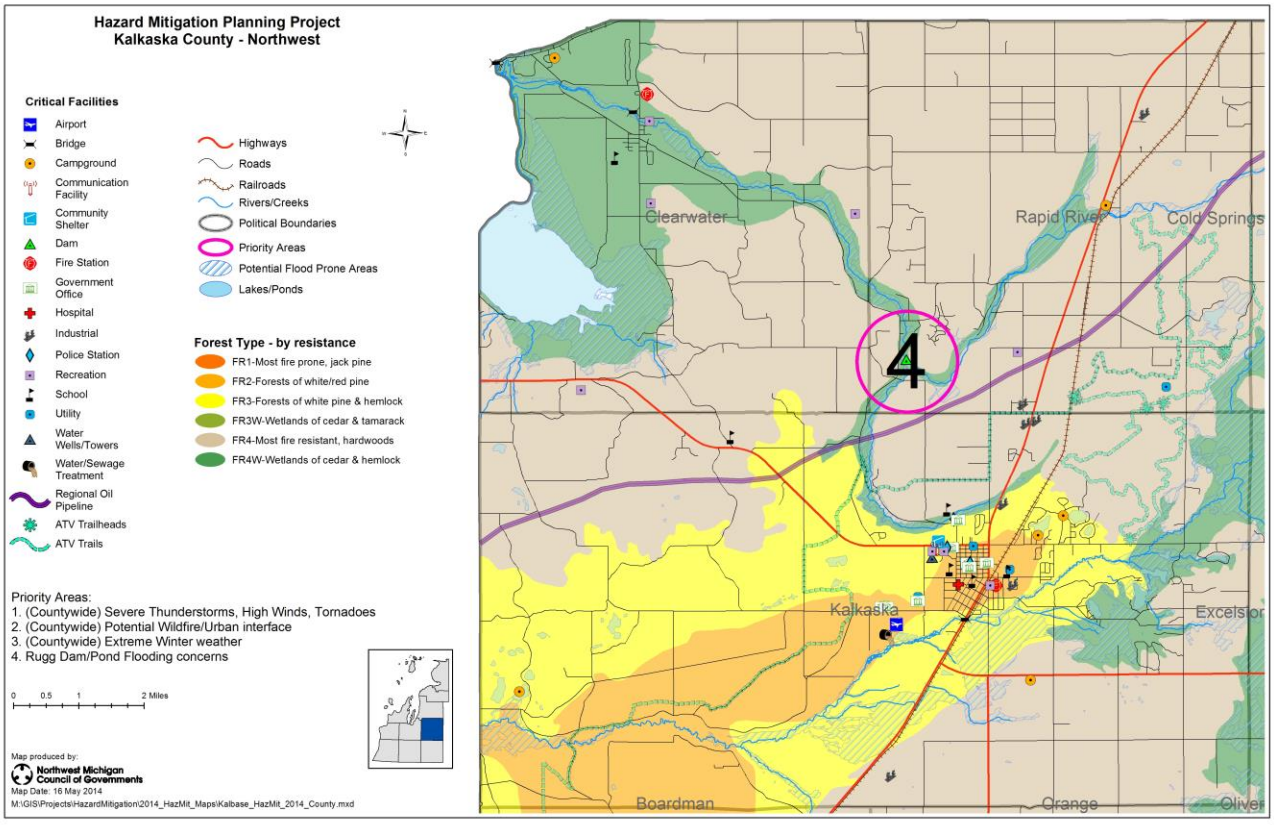
Watershed management: The implementation of a plan or plans for managing the quality of flow of water within a watershed, the naturally defined area within which water flows into a particular lake or river or its tributary. The aims of watershed management are holistic and concern the maintenance of water quality, the minimization of stormwater runoff, the preservation of natural flood controls such as wetlands and pervious surface, and the preservation of natural drainage patterns. Watershed management is, in many ways, an enlargement of most of the concerns that underlie floodplain management.

Wildland: An area in which development has not occurred with the exception of some minimal transportation infrastructure such as highways and railroads, and any structures that are widely spaced and serve largely recreational purposes.

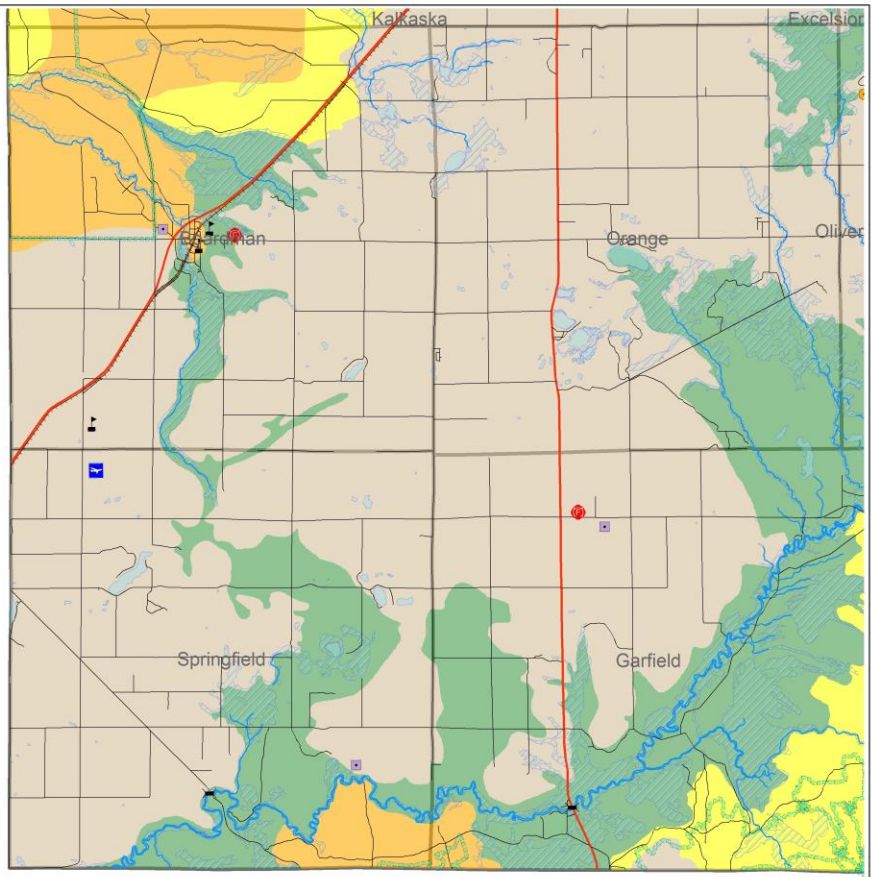
Appendix B

Detailed Maps





Hazard Mitigation Planning Project
Kalkaska County - Southwest



Critical Facilities

- Airport
- Bridge
- Campground
- Communication Facility
- Community Shelter
- Dam
- Fire Station
- Government Office
- Hospital
- Industrial
- Police Station
- Recreation
- School
- Utility
- Water Wells/Towers
- Water/Sewage Treatment
- Regional Oil Pipeline
- ATV Trailheads
- ATV Trails

- Highways
- Roads
- Railroads
- Rivers/Creeks
- Political Boundaries
- Priority Areas
- Potential Flood Prone Areas
- Lakes/Ponds

Forest Type - by resistance

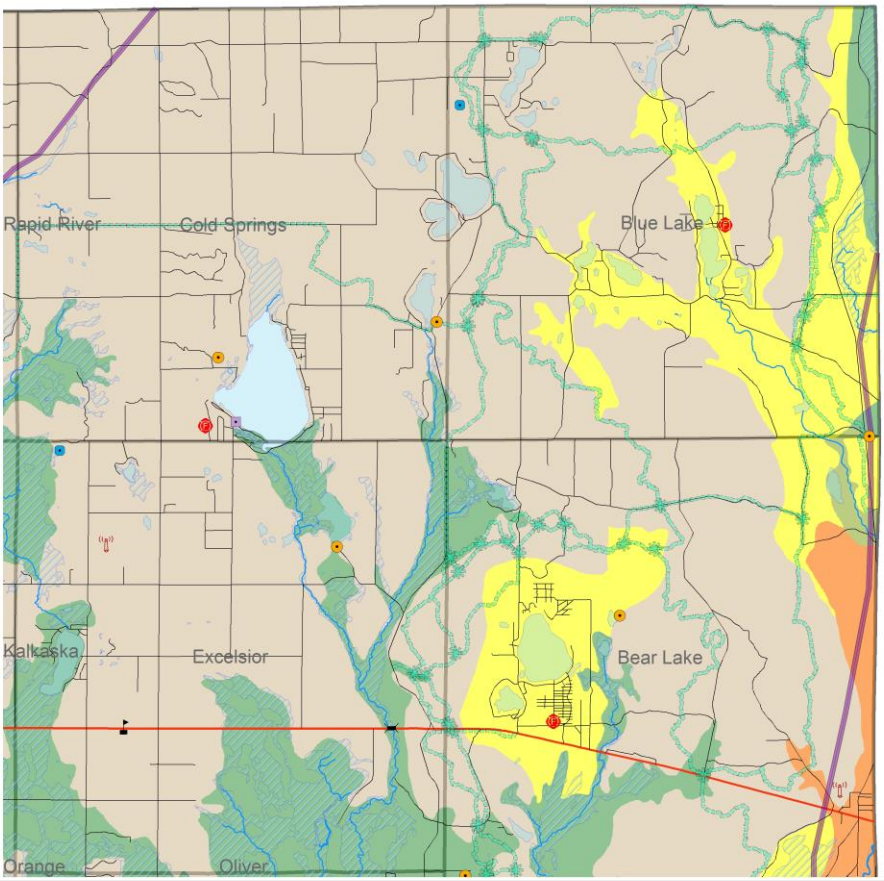
- FR1-Most fire prone, jack pine
- FR2-Forests of white/red pine
- FR3-Forests of white pine & hemlock
- FR3W-Wetlands of cedar & tamarack
- FR4-Most fire resistant, hardwoods
- FR4W-Wetlands of cedar & hemlock

Priority Areas:
1. (Countywide) Severe Thunderstorms, High Winds, Tornadoes
2. (Countywide) Potential Wildfire/Urban interface
3. (Countywide) Extreme Winter weather
4. Rugg Dam/Pond Flooding concerns

0 0.5 1 2 Miles

Map produced by:
Northwest Michigan Council of Governments
Map Date: May 2014
M:\GIS\Projects\HazardMitigation\2014_HazMit_Maps\Kalbase_HazMit_2014_County.mxd

Hazard Mitigation Planning Project
Kalkaska County - Northeast



Critical Facilities

- Airport
- Bridge
- Campground
- Communication Facility
- Community Shelter
- Dam
- Fire Station
- Government Office
- Hospital
- Industrial
- Police Station
- Recreation
- School
- Utility
- Water Wells/Towers
- Water/Sewage Treatment
- Regional Oil Pipeline
- ATV Trailheads
- ATV Trails

- Highways
- Roads
- Railroads
- Rivers/Creeks
- Political Boundaries
- Priority Areas
- Potential Flood Prone Areas
- Lakes/Ponds

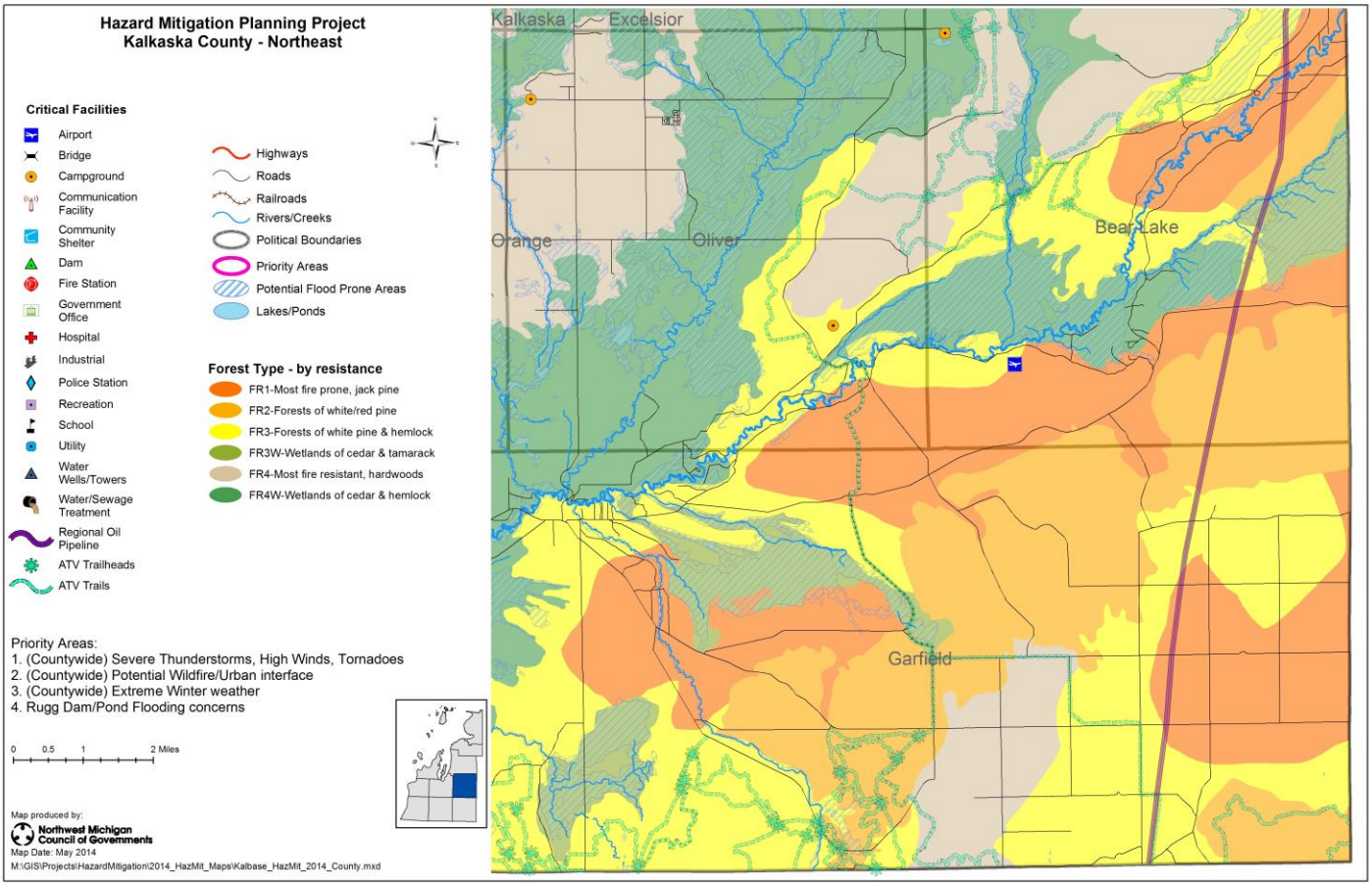
Forest Type - by resistance

- FR1-Most fire prone, jack pine
- FR2-Forests of white/red pine
- FR3-Forests of white pine & hemlock
- FR3W-Wetlands of cedar & tamarack
- FR4-Most fire resistant, hardwoods
- FR4W-Wetlands of cedar & hemlock

Priority Areas:
1. (Countywide) Severe Thunderstorms, High Winds, Tornadoes
2. (Countywide) Potential Wildfire/Urban interface
3. (Countywide) Extreme Winter weather
4. Rugg Dam/Pond Flooding concerns

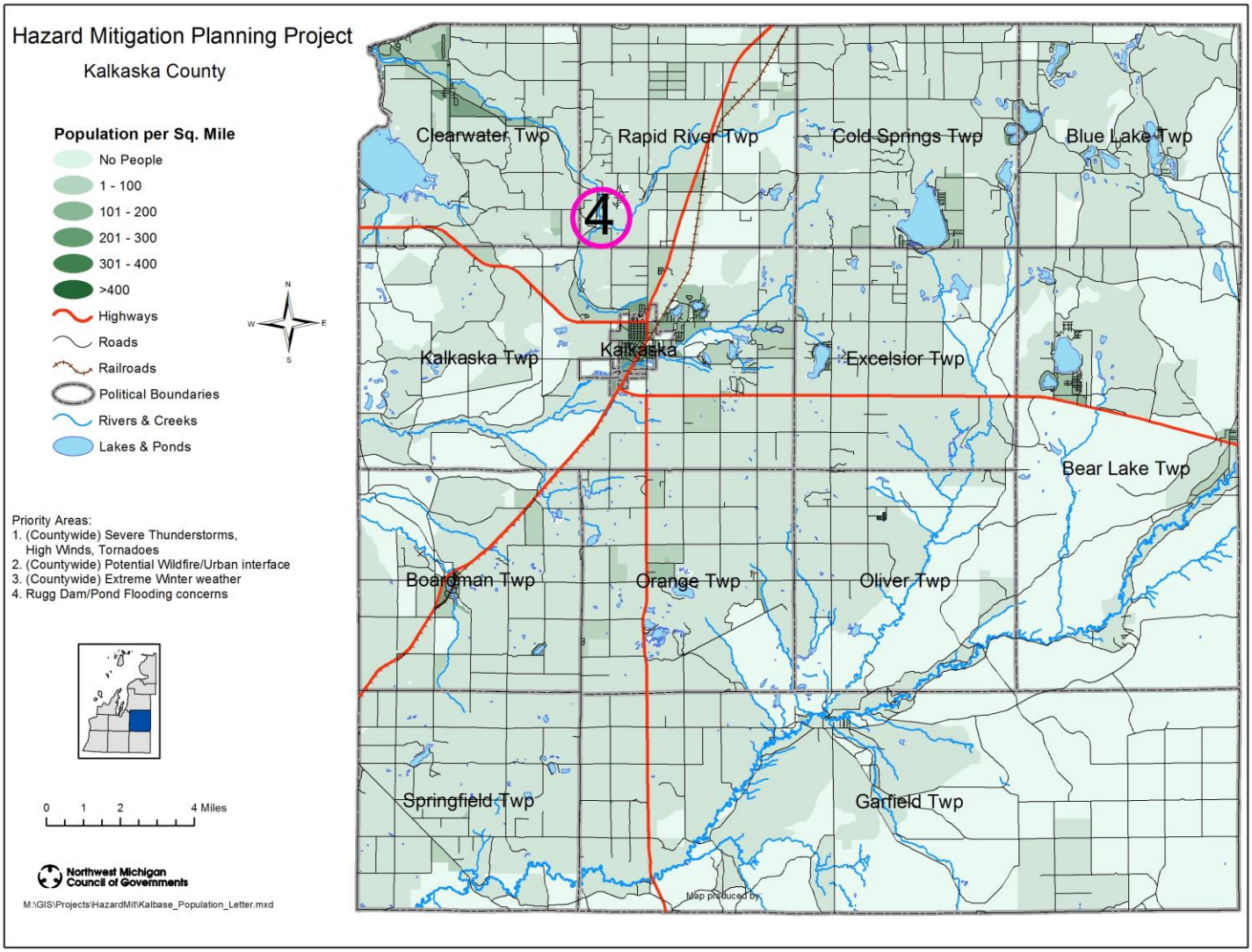
0 0.5 1 2 Miles

Map produced by:
Northwest Michigan Council of Governments
Map Date: May 2014
M:\GIS\Projects\HazardMitigation\2014_HazMit_Maps\Kalbase_HazMit_2014_County.mxd


Hazard Mitigation Planning Project
Kalkaska County - Northeast
Critical Facilities
Airport
Bridge
Campground
Communication Facility
Community Shelter
Dam
Fire Station
Government Office
Hospital
Industrial
Police Station
Recreation
School
Utility
Water Wells/Towers
Water/Sewage Treatment
Regional Oil Pipeline
ATV Trailheads
ATV Trails
Highways
Roads
Railroads
Rivers/Creeks
Political Boundaries
Priority Areas
Potential Flood Prone Areas
Lakes/Ponds
Forest Type - by resistance
FR1-Most fire prone, jack pine
FR2-Forests of white/red pine
FR3-Forests of white pine & hemlock
FR3W-Wetlands of cedar & tamarack
FR4-Most fire resistant, hardwoods
FR4W-Wetlands of cedar & hemlock
Priority Areas:
1. (Countywide) Severe Thunderstorms, High Winds, Tornadoes
2. (Countywide) Potential Wildfire/Urban interface
3. (Countywide) Extreme Winter weather
4. Rugg Dam/Pond Flooding concerns
0 0.5 1 2 Miles
Map produced by:
Northwest Michigan Council of Governments
Map Date: May 2014
M:\GIS\Projects\HazardMitigation\2014_HazMit_Maps\Kalbase_HazMit_2014_County.mxd
Kalkaska
Excelsior
Orange
Oliver
Bear Lake
Garfield

Appendix C

Population Density Map



Appendix D

Risk Assessment Summary Table: KALKASKA COUNTY

HAZARD (Years of Record)	Number of Events	Probability**	Geographic Size Affected	Population Impacted	Specific Priority Area	Estimated Damage (Known Costs)
Flood/Flash Flood (2001, 2006)	2	Frequent	Countywide	17,153	**4**	$20,000
Extreme Winter Weather (1991 – 2014)	116	Frequent			**3**	$590,000
Hail (1963 – 2013)	12	Frequent			**1**	NA
Severe Weather - High Winds/ Thunderstorms (1995 – 2015)	36	Frequent			**1**	$206,000
Tornadoes (1974 – 2007)	7	Rare			**1**	$1,152,500
Wildfires (1981 – 2010)	559	Frequent			**2**	$125,000

***Rare* - Hazard event is likely to occur less than once every 30 years.
Occasional - Hazard event is likely to occur less than once every 5 years, but more often that once every 30 years.
Frequent - Hazard event is likely to occur more than once every 5 years.

Appendix E

Examples of Past Mitigation Projects

Flood Projects	**Tornado/Wind Projects**	**Extreme Cold/Winter/Infrastructure Failure Projects**
Replace culvert with bridge	Modify roof ballast system on airport	Insulate municipal water tower
Install stormwater relief drain	Construct storm shelters in public buildings	Insulate city infrastructure
Upgrade road culvert	Construct storm shelters for homes, facilities	Insulate sanitary/storm sewer mains
Elevate floors of homes	Wind bracing for microwave/radio towers	Insulate water mains
Acquire of floodway properties	Construct mobile home park storm shelter	Bury utility lines
Create retention basin	Wind retrofitting for municipal buildings	Relocate sewer mains
Construct new dike	Wind bracing for school facilities	Reroute power lines under a river
Upgrade bridge over a creek (for greater stream flow)	Upgrade warning sirens**	Install plumbing devices to prevent sewer backup
Install sea wall	Install warning sirens**	Elevate and build casing for generator for EOC
Install rip rap to protect roadway	Purchase/Distribute NOAA radios**	Living snow fences for highways and roadways
Re-route various county drains	Severe weather monitoring systems**	
Purchase back-flow prevention valves	Implement long-term community outreach**	
Construct new drains for flood relief		
Flood study for home acquisition		
Flood study of community's flood risk	**T-storm/Lightning Projects**	**Wildfire Projects**
Flood study for stream, roadways		
Elevate electrical equipment in basements	Lightning protection (grounding/phasing)	Vegetation management for roadways
Floodproof wastewater treatment plant	Purchase/Distribute NOAA radios**	Vegetation mgmt. for urban interface areas of city
Warning sensor for creek/river	Install weather alert monitors**	Vegetation mgmt. for homes in fire prone areas
Warning sensor for dam		Urban Interface Education Program**
Raise manholes above 100-Yr floodplain		
Expand storm sewer network for subdivision		
Excavate floodway channel bypass		
Establish permanent flood elevation benchmarks**		
Increase pump capacity for pump stations		
Remove abandoned dam		
Construct emergency floodway		
Install plumbing devices to prevent sewer backup		

******Denotes Hazard Mitigation Grant Program State Discretionary projects (only 5-10% set aside of HMGP funding)

Appendix F

Resources

Benchmarks 2014, Northwest Michigan Council of Governments

Integrating Human-Caused Hazards Into Mitigation Planning, State and Local Mitigation Planning how-to guide: Federal Emergency Management Agency, September 2002, FEMA 386-7 CD.

Local Hazard Mitigation Planning Workbook: EMD-PUB 207, February 2003, Emergency Management Division, Michigan Department of State Police.

Michigan Hazard Analysis 2012, EMD-PUB 103, July 2012, Emergency Management and Homeland, Security Division / Michigan Department of State Police

National Oceanic and Atmospheric Administration: Weather/Climate Events, Information, Assessments; Climatology and Extreme Events; U.S. Storm Events Data Base; 1950-present, local storm reports, damage reports, etc. from various sources. www.ncdc.noaa.gov

Northwest Michigan County Profiles 2010, Northwest Michigan Council of Governments, November 2002.

Northwest Michigan Council of Governments Website Data, nwm.org.

Planning for a Disaster-Resistant Community: A One-Day Workshop for City and County Planners, Planning Officials, and Consultants: American Planning Association Research Department, American Planning Association, 2002 in cooperation with the Federal Emergency Management Agency, Planning and Mitigation Branch (materials only).

Platte River Watershed Management Plan, Benzie County Conservation District, April 2002.

State and Local Mitigation Planning how to guide: Understanding Your Risks, identifying hazards and estimating losses: Federal Emergency Management Agency, August 2001, FEMA 386-2.

Appendix G

Community Capabilities Assessment

County Name	Kalkaska						
Reviewer	Mike Thompson						
CAPABILITIES	**WE HAVE ONE**	**THIS PLAN IS AVAILABLE ONLINE**	**POINT PERSON IS ON PLANNING TEAM**	**POINT PERSON SHOULD BE ON PLANNING TEAM**	**POINT PERSON CONTACT**	**LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN**	**HOW COULD THIS CAPABILITY BE IMPROVED?**
Local Planning Plans and Tools							
Capital Improvement Plan							Consider Developing a Capital Improvement Plan
Redevelopment Plan							Consider Developing a Redevelopment plan
Growth Management Plan							Consider Developing a Growth Management Plan
Emergency Operations Plan	X		X		M THOMPSON		
County / Local Emergency Plan	X		X		M THOMPSON		
County / Local Recovery Plan							Consider Developing a Local Recovery Plan
Local Mitigation Plan	X		X		MTHOMPSON		
Economic Development Plan							Consider Developing an Economic Development Plan
Land-use Plan							Consider Developing a Land-Use Plan
Pandemic or Public Health Incident Response Plan	X		X		B HANER		
Transportation Plan	X				R KEYES		
School Disaster Plan							Consider Developing School Disaster Plans
Environment and Natural Resources Plan	X				M RANDOLF		
Strategy Implementation Plan							Consider Developing a Strategic Implementation Plan
County Parks Plan	X				B CRAMBEL		
Water / Watershed Management Plan	X				K VANHORN		
SWCD Local Water Management Plan							Consider Developing a Local Water Management Plan
Wildfire Plan							Consider Developing a Wildfire Plan
Critical Facilities Plan (Mitigation/Response/Recovery)	X		X		M THOMPSON		
College Campus Plans	N/A						N/A
Evacuation Route Map / Plan							Consider Developing an Evacuation Route Map/Plan
Critical Facilities Inventory	X		X		MTHOMPSON		

Vulnerable Population Inventory	X				J RZEPECKI		
Soil Conservations Plans	X				M RANDOLF		
Continuity Operations Plan							Consider Developing a Continuity Operations Plan
Storm Water Plan							Consider Developing a Storm Water Plan
National Flood Insurance Program							Consider Participating in National Flood Insurance Program (NFIP)
Emergency Response Plan	X		X		M THOMPSON		
Emergency Action Plan	X		X		M THOMPSON		
Groundwater Protection Plan	X		X		K VANHORN		
Wellhead Protection Plan							Consider Developing Wellhead Protection Plans
Snow Removal Plan							Consider Developing a Snow Removal Plan
Communications Plan	X				D WAGNER		
Regional Development Plans	X	X	X		Tad Erickson	Framework For Our Future	
NFIP Floodplain Management Plan							Consider Developing an NFIP Floodplain Management Plan
Emergency Response Plan for Nuclear Generating Plant							N/A
Local Planning Assistance Mock-Hazard Plan							Consider Developing a Local Planning Assistance Mock-Hazard Plan
Road Closure Plan	X		X		J ROGERS		
Human Quarantine Plan	X		X		B HANER		
Wildfire Integrated Response Plan							Consider Developing a Wildfire Integrated Response Plan
National Fire Plan							Consider Developing a National Fire Plan
Water Emergency and Conservation Plan							Consider Developing a Water Emergency and Conservation plan
Community Needs Assessment							Consider Developing a Community Needs Assessment
CAPABILITIES	**WE HAVE ONE**	**THIS PLAN IS AVAILABLE ONLINE**	**POINT PERSON IS ON PLANNING TEAM**	**POINT PERSON SHOULD BE ON PLANNING TEAM**	**POINT PERSON CONTACT**	**LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN**	**OTHER POINT PERSON CONTACT**
Policies / Ordinance							
Zoning Ordinance	X				K VANHORN		
Building Code	X				B HILLER		
Planning Ordinance	X				B HILLER		
Bluff Land Ordinance							Consider Adopting a Bluff Land Ordinance in Applicable
Fire Code	X				B HILLER		
Floodplain Ordinance							Consider Adopting a Floodplain Ordinance
Subdivision Ordinance							Consider Adopting a Subdivision Ordinance
Nuisance Ordinance	X				TOWNSHIPS		

Storm Water Ordinance							Consider Adopting a Storm Water Ordinance
Drainage Ordinance							Consider Adopting a Drainage Ordinance
County Park Ordinance	X				M BOLE		
Site Plan Review Requirements	X						Consider Adopting a Site Plan Review Requirements guide
Karst Ordinance							Consider Adopting a Karst Ordinance
Shoreland Ordinance							Consider Adopting a Shoreland Ordinance
City Ordinance							N/A
Steep Slope Ordinance							Consider Adopting a Steep Slope Ordinance
Soil Erosion Control Ordinance							Consider Adopting a Soil Erosion Control Ordinance
Sanitary Sewage Treatment System Ordinance / Solid Waste Management Plan & Ordinance	X						
Historic Preservation Ordinance							Consider Adopting a Historic Preservation Ordinance if applicable
Land Use Ordinance	X				TOWNSHIPS		
Methamphetamine Lab Ordinance							Consider Adopting a Methamphetamine Lab Ordinance
Wild & Scenic River District							Consider Creating a Wild & Scenic River District if applicable
CAPABILITIES	**WE HAVE ONE**		**POINT PERSON IS ON PLANNING TEAM**	**POINT PERSON SHOULD BE ON PLANNING TEAM**	**POINT PERSON CONTACT**	**LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN**	**OTHER POINT PERSON CONTACT**
Local Staff/ Departments							
Building Code Official	X				W HILLER		
Building Inspector	X				M HILL		
Mapping Specialist (GIS)	X				T SHENEMAN		
Engineer							N/A (Responsibilities Covered by Kalkaska County Road Commission)
Land Use Planner	X				K VANHORN		
Public Works Official	X				M BOLE		
Emergency Management Coordinator / Emergency Management Program	X		X		M THOMPSON		
NFIP Floodplain Administrator	X				D. FARRIER		Consider creating a NFIP Floodplain Administrator role
Bomb and/or Arson Squad	X		X		D HOGERHEIDE		
Emergency Response Team	X		X		D WAGNER		
Hazardous Materials Expert							Consider creating a Hazardous Materials Expert Role
Local Emergency Planning Cmte	X		X		M THOMPSON		
County Emergency Mgmt Cmsn	X		X		M BUCHANAN		

Sanitation Department (or Solid Waste)						Consider developing a Sanitation Department if applicable.
Transportation Department	X			R KEYES		
Economic Development Department						Consider creation of an economic development department if applicable.
Environmental Health Department						Consider creation of a environmental health department
Public Works Department	X			M BOLE		
Building Department	X			W HILLER		
Housing Department						Consider creation of a housing department if applicable
Planning Department	X					
Zoning Department	X			K VANHORN		
Planning Consultant						Consider utilizing a planning consultant if applicable
Regional Development Commission	X	X		Networks Northwest		
Historic Preservation						Consider creation of ahistoric preservation committee or authority
Public Health Coordinator/Department	X			B HANER		
Water / Watershed Planner						Consider developing a watershed planner position if applicable
Critical Infrastructure Planner						Consider developing a critical infrastructure plane position if applicable.
City Administrator						N/A
County Administrator						Consider Creation of a county administrator position if applicable
County Assessor	X			CONTRACTED		
Environment Services Department						Consider creation of an environmental services department if applicable
Citizen Planning Team	X			M THOMPSON		
Soil & Water Conservation District						Consider creation of a soil & water conservation district if applicable
Sheriff's Department	X	X		P WHITEFORD		
Management Information Systems						Consider purchasing and managing a management information system (MIS)
Social Services						Consider Developing a social services department if applicable
County Commissioners	X	X		M BUCHANAN		
Fire Department	X	X		D HOGERHEIDE		
Red Cross	X			M POWERS		
Hospitals (involved)	X	X		J DUPUIE		
Public Library	X			B CHAPLIN		
Department of Health	X			T STOCKWELL		
Human Services	X			T STOCKWELL		
County Auditor						Consider creation of a counter auditor position if applicable
Environmental Quality Board						Consider creation of an environmental quality board if applicable
Watershed Districts						Consider creation of a watershed district if applicable

Community Awareness & Emergency Response (CAER)						
Police Department	X			G ARTRESS		
Township Representatives	X	X		M BUCHANAN		
Technical Committee						Consider creation of a technical committee if applicable
County Attorney	X			M PERREAULT		
CAPABILITIES	**POINT PERSON IS ON PLANNING TEAM**	**POINT PERSON SHOULD BE ON PLANNING TEAM**		**POINT PERSON CONTACT**	**LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN**	**OTHER POINT PERSON CONTACT**
State of Michigan						
Michigan DNR	X			M JANISSE		
Michigan Department of Agriculture						Consider mutually beneficial ways to partner with these organizations
Michigan Department of Transportation						Consider mutually beneficial ways to partner with these organizations
Michigan Department of Public Safety						Consider mutually beneficial ways to partner with these organizations
Michigan Pollution Control Agency (MPCA)						Consider mutually beneficial ways to partner with these organizations
MI MSP EMHSD	X			LT DECASTRO		
MI DHHS	X			T STOCKWELL		
Michigan Department of Health						Consider mutually beneficial ways to partner with these organizations
Michigan State Police	X			LT LATOR		
Michigan National Guard						Consider mutually beneficial ways to partner with these organizations
CAPABILITIES	**POINT PERSON IS ON PLANNING TEAM**	**POINT PERSON SHOULD BE ON PLANNING TEAM**		**POINT PERSON CONTACT**	**LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN**	**OTHER POINT PERSON CONTACT**
National Organizations						
National Weather Service	X			J KEYSOR		
U.S. Forest Service						Consider mutually beneficial ways to partner with these organizations
U.S. EPA						Consider mutually beneficial ways to partner with these organizations
U.S. Fish and Wildlife Service						Consider mutually beneficial ways to partner with these organizations
U.S. Army Corps of Engineers						Consider mutually beneficial ways to partner with these organizations
U.S. Geological Survey						Consider mutually beneficial ways to partner with these organizations
Federal Emergency Management Agency (FEMA)						Consider mutually beneficial ways to partner with these organizations
USDA Natural Resources Conservation						Consider mutually beneficial ways to partner with these organizations

Appendix H

Status report on action items in Previous Kalkaska County Hazard Mitigation Plan

Priority and Action Strategies	Responsible Parties	Timeframe	Status
Priority Area 1 Thunderstorm, High Winds, Tornado Mitigation Strategies:			
a. Pursue the opportunity for grants to purchase weather radios and educate individuals about them	Emergency Management Coordinator Emergency Responders	1-3 years after adoption of the plan	Continue to monitor and search for funding
b. Promote underground utilities within and outside the Kalkaska city limits	Zoning Administrator County Building Inspector Utility Companies	Ongoing	Continue to promote with each interaction
c. Public education for trailer, mobile, and modular homes to ensure safety; research if wind lift is taken into account for these homes	County Building Inspector Emergency Management Coordinator Zoning Administrator Realtors Townships, City, Villages	1-3 years from adoption of the plan	Emergency Manager to speak at MTA's, senior citizens, etc. New EM is developing program
d. Continue to assess and seek comment on the forecasting from the National Oceanic and Atmospheric Administration	Emergency Management Coordinator Fire and Emergency Response	Ongoing	Utilize NWS programs at events with good successes
Priority Area 2 Wildfire Mitigation Strategies:			
a. Educate people about the MI Department of Natural Resources recommendations which is a joint local government and MDNR initiative; pass out information when development proposals are submitted	MI Department of Natural Resources Zoning Administrator Emergency Management Coordinator	1-3 years from adoption of the plan	Discuss at each meeting with the DNR, etc. New EM is developing program
b. Educate landowners about fuel safety	Emergency Management Coordinator Zoning Administrator County Building Inspector County Conservation District Fire and Emergency Response	Ongoing	Utilize Firewise program and speak to groups. Program developing
c. Real estate agents distribute information at time of sale	Realtors	Ongoing	No action at this point. New EM will promote
Priority Area 3 ***Snow and Ice Mitigation Strategies:***			
a. Emergency Operations Center has response information about available	Emergency Management Coordinator Zoning Administrator	1-3 years from adoption of the plan	Continuing effort to secure sheltering agreements.

shelters and is in the process of signing contracts with churches, township halls, fire halls, and the Kaliseum for additional shelter space	County Building Inspector Townships, City, Villages		Ongoing
b. Continue enforcement of building code regarding snow limits through the permitting process	County Building Inspector Townships, City, Villages	Ongoing	Enforcement action continues
c. Public education by letting people know what they need to do to prepare for severe weather.	Emergency Management Coordinator Sheriff Department Commission on Aging Townships, City, Villages	Ongoing	Utilize county website; promote Do1Thing, etc. Continuing efforts.
d. Public awareness regarding roof shoveling through pubic service announcements	County Building Inspector Emergency Management Coordinator Housing Authority Townships, City, Villages Media	Ongoing	Local PSA's have not been developed. New EM will promote. Continuing
Priority Area 4 ***Flood Mitigation Strategies:***			
a. Continual maintenance and upkeep of the dam which is owned by the County	County Board of Commissioners County Planning Commission Emergency Management Coordinator Zoning Administrator Department of Public Works	Ongoing	Annual inspection and reports completed times. Continuous work and inspections.
b. County committed to maintaining the dam	County Board of Commissioners	Ongoing	Discussions at Board meetings with residents on a regular basis. Ongoing and continuous.

Appendix I

Local Planning Team (LPT) Meeting Agendas and Sign in Sheets

Kalkaska County Local Planning Team Agenda

For the: June 29, 2015 Meeting

Start Time: 10:00 a.m.

Location: Kalkaska MDOT/EOC

1. Introductions
2. Approval of the Agenda
3. Approval of the May 2015 meeting minutes
4. Old Business:
   - By-Law changes and adoption
   - Hazard-Mitigation plan
5. New Business
6. Member Reports
7. Public Comment
8. Adjournment

June 29, 2015 LPT Meeting

	Name:	Sign
1	M. Laskowski	
2	Joe Dipvie	
3	Dylan Frashier	
4	Dave Wagner	
5	Greg Bradley	
6	Bret Haver	
7	Troy Stockwell	
8	Derek Hogerheide	
9	Bill Hillen	
10	Pat Whitefield	
11	Mark Foley	
12	Jerri Foley	
13	Mike Woods	
14	Abe Dahl	
15	Debbie Snyder	

Let Our Resources Work For You.

Northwest Michigan Council of Governments

Workforce • Business • Community

VOLUNTEER/IN-KIND CONTRIBUTIONS

County: Kalkaska
Event Name: Kalkaska LPT Meeting
Date: 5/15/15 Time (duration): _____
Description of Activity: _____

This document certifies that attendees (signed below) offered match assistance, as formally agreed upon by each County, to the Northwest Michigan Hazard Mitigation Planning Project. The time spent on this project was funded from non-federal grant sources.

NAME	Bill-out rate* per hour	Miles** (Round Trip)	Hours attended	EMAIL	SIGNATURE	Total Value *(NWMCOG fills out)*
Mark Laskowski						
Bret Haner					Bret Haner	
Troy Stockwell						
Mike DeCastro						
Mark Foley						
Jim Fox						
Dave Wagner						
Dylan Frashier					Dylan M. Frashier	
Scott Yost						
Joe Dupuie					Joe	
Greg Rizzardi						
John Rogers						
Debbie Snyder						
Deb Kimball						
K. Campbell						
M. Laskowski						
					Grand TOTAL	

*NOT wage-rate. If a bill-out rate is not offered, the NWMCOG will utilize the Bureau of Labor Statistics rate of $20.00/hour rate for *Community Volunteers.*
Information retrieved from http://www.bls.gov/oes/2010/may/oes_mi.htm Updated August 10, 2011.

**Mileage rates will be calculated utilizing the Internal Revenue Service's standard rate of 56.5 cents per mile.
http://www.irs.gov/uac/Newsroom/2013-Standard-Mileage-Rates-Up-1-Cent-per-Mile-for-Business,-Medical-and-Moving

Kalkaska County Local Planning Team Agenda

For the: May 18, 2015 Meeting

Start Time: 10:00 a.m.

Location: Kalkaska MDOT/EOC

1. Introductions
2. Approval of the Agenda
3. Approval of the April 2015 meeting minutes

4. Old Business

- By-Law Changes and adoption of the by-laws
- Mike Woods for the Hazard Mitigation Plan update
- Member projects- Private businesses with any hazard plans
- Homeland Security Conference
- Yearly plan for the LPT meeting schedule
- Bret Haner – Drive through clinic

5. New Business

- Introduction of the new region 7 Michigan State Police District Coordinator Lt. Michael de Castro
- Overview of grants available to Kalkaska County through R7 Homeland Security
- Private sector membership on the LPT

6. Member Reports
7. Public comment
8. Adjournment

Kalkaska County Local Planning Team

Meeting minutes for May 18, 2015

Present: Bret Haner, Troy Stockwell, Mike de Castro, Mark and Jerry Foley, Dave Wagner, Dylan Frashier, Scott Yost, Joe Dupuie, Greg Bradley, John Rogers, Debbie Snyder, Debbie Kimball, Mark Laskowski, Kathy Campbell.

Meeting called to order at: 10:02 a.m.

Motion to approve agenda by: M. Foley and support by: B. Haner

Motion to approve previous minutes by: M. Laskowski and support by: T. Stockwell

Old business:

Motion made by: D. Kimball with support by D. Frashier to approve the Kalkaska LPT bylaws as read. All yea – zero nay. Post bylaw discussion a motion to rescind the adoption by J. Rogers with support from D. Kimball. All yea – zero nay. Tabled until next meeting.

Much discussion on approving the Kalkaska LPT by- Laws in regards to membership and voting and how many members need to be present to change the by-laws. M. Laskowski will provide a detailed membership list for each annex. Updates to the wording for the (purpose) were presented only recommendation was to include the specific EMPG grant that the LPT works from in the language. The changes and adoption will be made and these issues will be tabled until the next LPT meeting.

Mike Woods with NWMCOG spoke in regards to the Kalkaska Co. Natural Hazards Mitigation Plan. Once the draft is complete there is a 30 day public comment period. Then the plan is sent to the BOC for approval, once the BOC approves the plan it is then sent to MSP and then on to FEMA, this process could take up to 5-6 months. Mike also spoke about grant opportunities under the plan priority areas and flooding should be added to the plan for Kalkaska to also include roads.

Joe Dupuie and Dylan Frashier reported on their experience at the 2015 Great Lakes Homeland Security Conference. Joe spoke on who and how hospitals are rescued in the event of a disaster. Hospital preparedness, freeze dried plasma, national volunteer registry and the speech from the "Lone Survivor". Dylan spoke about generators and having a backup plan for a case were the primary generator is not functioning. Also Kalkaska Sheriff's Office Deputies did a walk through at KMHC to become more familiar with the facility.

Member Projects: NONE

New Business: Mark Laskowski introduced the new R7 district coordinator Lt. Michael de Castro. The lt. spoke about his history in law enforcement. He is new and quickly learning the emergency management side of the MSP and Homeland Security. The Lt. also spoke in regards to unmanned flight requirements with the MSP and if anyone needs to utilize that resource to request it through MSP, there is about a 40-45 minute flight plan. Welcome aboard Lt. de Castro, we look forward to working with you.

Mark Laskowski gave a brief overview of the grants that pertain to Kalkaska County. The current grants that apply to Kalkaska are the LETPA, SHSP and Hazard Mitigation grants. Kalkaska has three projects in the hopper. John Rogers discussed the fuel station project and asked how any of these grants could benefit this project. Mark Laskowski stated counties the size of Kalkaska are likely to receive smaller $10,000 grant awards, all projects have to be approved by the LPT. Also all projects must be aligned with the responder knowledge base and authorized equipment list.

No member reports:

Kalkaska County Local Planning Team

Meeting Minutes for April 27, 2015

Present: Karen Sherwood, Bret Haner, Debbie Snyder, Troy Stockwell, Dylan Frashier, Kathy Campbell, John Rogers, Mark and Jerri Foley, Derek Hogerheide, Mark Laskowski, Pat Whiteford, Joe Dupuie, Mark Laskowski

Old Business:

Discussion of the by-laws continued and John Rogers recommended we add to the definition of the purpose section to include what grant we are working from and the requirements and purpose of the LPT through that grant. Mark Laskowski will make these additions and present them at the next LPT meeting. The by-laws were tabled until the May 18, 2015 meeting.

Homeland Security Conference: Joe Dupuie will be attending the 2015 HS conference on behalf of the LPT for Kalkaska Co. KMHC will also be sending two additional people.

Fire Service Rep: As discussed at the March LPT, Mark Laskowski spoke with Greg Bradley about getting on board the LPT as a fire service rep. Greg said he was interested. Greg will be included in future information and meetings regarding the LPT.

New Business:

LPT Board positions were discussed. Derek Hogerheide volunteered to be the chairman, Joe Dupuie volunteered to be the vice-chair, and Mark Laskowski will be the secretary.

Hazard Mitigation Plan: Mark L. reported Mike Woods from council of governments will be at our next meeting to work on the hazard-mitigation plan, were are on track and will be working on planning and zoning language.

Member Projects: Mark Laskowski asked the members to talk with business owners they may know and get a feel for whom and how many businesses actually have any type of disaster plan for fire, weather, active shooter etc.

Member Reports:

John Rogers discussed support letters for a grant project for the Kniss rd. bridge, no guarantee of funding but the KCRC is working on the grant project. No reported road closures at this time. John reported on upcoming road work projects to include: Rapid City road, Spencer road, Lund road, Old 66, Coster and Shippy roads, Hanson road, and Blue Lake Twp., Brockmeyer and Bebe road, Morrison road and Wood road, these projects will impact 29 miles of road. John also discussed the positive impact Prop 1 would have for our KCRC and increased funding.

Bret Haner: discussed a possible plan and locations for a mass clinic drive through. Bret is going to send a representative to look at the KCRC garage and KTFD Station #7. Further group discussion continued regarding the plan.

Joe Dupuie: discussed the statewide tornado drill; KMHC activated their EOC and participated in the drill. They are working on a list of questions to present in the near future from things they learned from the drill.

Derek Hogerheide: discussed a program to place smoke detectors in home for people that do not have them or need assistance installing them.

KMHC will be working with KSO on doing a walk-through of KMHC for law enforcement personnel to become familiar with the facility.

Mark Laskowski: discussed planning for an upcoming Web-EOC training for new users up to eight people the date is TBD. Trans Canada is holding a safety meeting April 27, 2015. The LPT meeting schedule will be tabled until the May 18, 2015 meeting.

Agenda item for May: John Rogers asked if Mark Laskowski can present info and talk about the specific grants that are available for Kalkaska co. through emergency management and homeland security.

Motion to adjourn: Derek Hogerheide **Support by**: John Rogers

Meeting adjourned at 11:10 a.m.

The next meeting will be: May 18, 2015 at 10:00 a.m. at the Kalkaska MDOT/EOC Garage

Kalkaska County Local Planning Team

Agenda for: April 27, 2015 Meeting 10:00 a.m.

1. By-Laws (discussion, adoption)
2. Appointment of board positions
3. Homeland Security Conference
4. Fire service rep- Greg Bradley
5. Hazard Mitigation Plan – status
6. All annex reports
7. Member projects
8. Open discussion
9. Next meeting
10. Adjournment

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: April 27 2015 **EVENT:** Kalkaska Co. LPT

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
Mark Laskowski		Kalkaska EM	0940	
Dgerthasenede		Kalkaska FD	955	
Mark Foley	Mark E. Foley	Amer. Red Cross	9:55	
Jerri Foley	Jerri L. Foley	AMER. Red Cross	9:55	
John S Rogers	John S Rogers	Kalkaska CRC	9:55	
Kathy Campbell	Kathy A. Campbell	Kalkaska EQ	10:00	11:00
Dylan Frashier	Dylan M. Frashier	KMHC	10:00	
TROY STOCKWELL	Troy Stockwell	KALKASKA DHHS	10:00	
Debbie Snyder	Deborah Snyder	Kalkaska COA	10:00	
Bret Haner	Bret Haner	DHD #10	10:00	
Karen Sherwood	Karen Sherwood	KPSchools	10:15	

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: March 23 2015 **EVENT:** Kalkaska LPT Meeting

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
M. Laskowski		Kalkaska EM	0930	
T. Sheneman		KALKASKA E.O.	1000	
BRAD HEIKKILA		KALKASKA EQ	10AM	
Kathy Campbell	Kathy A. Campbell	Kalkaska EQ	10:00	
Steve Cameron		DNR - TC	10:00	
Joe Dupuie		ICEM	10 00	
Derek Hoeferheide		KALKASKA FD's	955	
John S Rogers		KCRC	955	
Dani Dieseck		American Red Cross	10:00	
ABE DEVOL		KALKASKA S.O.	9:55	
Pat WHITEFORD		KALKASKA S.O.	9:55	
Bret Haner	Bret Haner	DHD #10	9:55	
TROY STACKWELL		KALKASKA DHS	9:55	
Debbie Snyder	Deborah Snyder	Kalkaska COA	9:55	
Dylan Frashier	Dylan M. Frashier	KMHC	10:00	
dfrashier@mhc.net	231-564-3016			

Kalkaska County Local Planning Team

Emergency Management

Invitation

This is an invitation to our local planning team meeting. The purpose of this meeting is to get all of our county stakeholders at the same table. If you are receiving this invitation you are a stakeholder. I cannot stress enough the importance of this meeting. We are in the process of restructuring our LPT. The following is a list of annexes that should be represented regularly at our LPT meetings:

- Kalkaska Schools
- Kalkaska County Board of Commissioners (representative)
- Public Works (DPW, Road Commission)
- Health Department
- Damage Assessment (Equalization, building codes)
- Human Services (DHS, COA)
- Public Information Officer
- Kalkaska Memorial Health Center
- Kalkaska EMS
- Kalkaska Sheriff's Office
- Kalkaska Police
- Kalkaska Central Dispatch
- Kalkaska Fire Services
- Michigan Department of Natural Resources
- American Red Cross
- Kalkaska County Emergency Management
- Michigan State Police – Department of Homeland Security

If you are unable to attend please send a representative in your place.

Please RSVP as soon as possible to laskowski2011@yahoo.com

Date: Monday March 23, 2015

Location: Kalkaska Memorial Health Center – Stone House Education Center 419 S. Coral Street Kalkaska MI, 49646

Time: 10:00 a.m.

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 9-29-14 **EVENT:** Kalkaska LPT Meeting

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
Mark Laskowski		Kalkaska EM	0900	
Pat Whitford		KSC	0937	
Derek Tagenhold		Kalkaska Fire	930	
Bret Haner	Bret Haner	DHD #10	9:30	
Deb Kimball	Debra Kimball	COA	9:33	
David Israel		Kalkaska Sheriff	9:30	

Let Our Resources Work For You.

Northwest Michigan Council of Governments
Workforce • Business • Community

VOLUNTEER/IN-KIND CONTRIBUTIONS

County: Kalkaska
Event Name: Kalkaska LPT / Haz-Mitigation
Date: 09 / 29 / 2014 Time (duration): _____
Description of Activity: _____

This document certifies that attendees (signed below) offered match assistance, as formally agreed upon by each County, to the Northwest Michigan Hazard Mitigation Planning Project. The time spent on this project was funded from non-federal grant sources.

NAME	Bill-out rate* per hour	Miles** (Round Trip)	Hours attended	EMAIL	SIGNATURE	Total Value *(NWMCOG fills out)*
Mark Laskowski		30		laskowsk: 2010@yahoo.		
Doug Hagerhorst		10		dhagerhard@aol.com		
Pat Whiteford		16		PWHITEFORD@KALCOUNTY.COM		
Bret Haner		170			Bret Haner	
Deb Kimball		1		d/KIMBALLG12@HOTMAIL.com		
David Israel		1		disrael@kalcounty.org		
					Grand TOTAL	

*NOT wage-rate. If a bill-out rate is not offered, the NWMCOG will utilize the Bureau of Labor Statistics rate of $20.00/hour rate for *Community Volunteers.*
Information retrieved from http://www.bls.gov/oes/2010/may/oes_mi.htm. Updated August 10, 2011.
**Mileage rates will be calculated utilizing the Internal Revenue Service's standard rate of 56.5 cents per mile.
http://www.irs.gov/uac/Newsroom/2013-Standard-Mileage-Rates-Up-1-Cent-per-Mile-for-Business,-Medical-and-Moving

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 8-25-14 **EVENT:** Kalkaska LPT August 2014

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
Mark Laskowski		Kalkaska EM	0920	
Joe Dupuic		Kalkaska EMS	920	
Dylan Frashier		Kalkaska Memorial	9:20	
Bret Haner		DHD #10	9:25	
TROY STOCKWELL		DHS	9:25	
DEBRA KIMBALL		COA	9:27	
Dabbie Snyder		COA	9:28	

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 6-23-14 **EVENT:** June Kalkaska Co. LPT

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
M. Laskowski		Kalkaska Co	0930	
TROY STOCKWELL		DHS	9:30	
Derek Hogenheide		FD	930	
Mark Foley	Mark E. Foley	ARC	9:30	
Jerri Foley	Jerri Foley	ARC	9:30	
Joe Dupuie	Joe Dupuie	KEU/KMHC	9:30	
Bret Haner	Bret Haner	DHD #10	9:30	
Tom Shenemun	Tom	Kal. EQ	9:30	
Kathy Campbell	Kathy L. Campbell	Kalkaska EQ	9:30	
DEBRA KIMBALL	Debra Kimball	KAL. COA	9:35	
Debbie Snyder	Deborah Snyder	Kal. COA	9:35	

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 6-24-13 **EVENT:** LPT Meeting

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
Mark Laskowski		Kalkaska Co EM	0915	
Cheryl Collins		Kalkaska DHS	0925	
Deborah Snyder		Kalkaska COA	9:30	
Bret Haner		DHD #10	9:30	
Bill Elliott		EMHSD	9:45	

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 5-21-14 **EVENT:** Kalkaska Co. LPT

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
Mark Laskowski		Kalkaska EM	0900	
Jerri Foley	Jerri Foley	Traverse Area Red Cross	9:20	
Mark Foley		N.W. " "	9:26	
TROY STOCKWELL		KALKASKA DHS	9:37	
Mike Woods		NWMC06	" "	
TOM SHENEMAN		KA/KASKA EO	9:30	
Bret Haner	Bret Haner	DHD #10	9:30	
DEB KIMBALL	Debra Kimball	COA	9:35	

KALKASKA COUNTY EMERGENCY OPERATIONS CENTER

SECURITY SIGN-IN SHEET

DATE: 4/21/14 **EVENT:** Kalkaska Co. LPT

PRINTED NAME	SIGNATURE	ORGANIZATION	TIME IN	TIME OUT
M. Laskowski		Kalkaska EMC	0915	
M.L. Woods		NWMCOG	9:15	
Derek Tegerhede		Kalkaska Fire	9:25	
Tom Shoemaker		Kal. E.O		
Bill Hiller	Bill Hiller	KCCC	9:30	
Bret Haner	Bret Haner	DHD #10	9:30	
DEB KIMBALL	Debra L. Kimball	COA	9:30	
Debbie Snyder	Deborah Snyder	Kalkaska COA	9:30	
Connie Farrier	Connie Farrier	KMHC	9:30	
Christine Bissonette	Christine Bissonette	KMHC	930	

Kalkaska County Local Planning Team

Meeting Notes for March 31, 2014

Members Present: Troy Stockwell DHS, Bret Haner DHD, Kathy Campbell Kalkaska Co. Equalization, Tom Sheneman GIS/ Equalization, Mark Laskowski EMC.

Non Members Present: Guest Speaker Mike Woods Regional Planner for the Northwest Michigan Council of Governments.

Meeting Start Time: 0940

Introductions Made: 0940

Laskowski: gave a history of the Hazard Mitigation Plan for Kalkaska County from 2004 to current 2014 status. A documented history will be provided by Laskowski and added to the plan renewal.

Guest speaker: Mike Woods gave a summary and presentation on the Hazard Mitigation plan for Kalkaska County the start of this grant renewal process began in December of 2012 and Leelanau Co. is the grant fiduciary. This included the grant status and how the $15,000 in-kind grant match for Kalkaska County is to be met, Mike will have a sign in sheet and time log for all persons attending these meetings. County rate for hourly employees = hourly rate plus fringe, county commissioners is a $25.00 stipend. Volunteer's rate is audit approved $20/hr. The time frame for completion of this plan renewal will be by May of 2015. Public hearings will be part of the renewal process for public input into private sector input. Mike stated GIS mapping is a large portion of the renewal process and Tom Sheneman stated he would look into the mapping costs and bill out rate for GIS mapping. Fire Wise programs and threat of wildfire was discussed.

Laskowski asked members to review the plan and keep tack of their time they invest into the plan outside of the meetings.

LPT Business: Grant funds of approximately $9,000 for Kalkaska Co. was discussed we have met our 800 MHz radio objective for Kalkaska Co. has been met and all Kalkaska Co. FD have at least one 800 MHz radio. Future grants funds to include possible security for the Crawford one room school house on M-72. LETPA Law project ideas will be provided by KSO to EM for future LETPA grant funds. Laskowski added he will be keeping minutes for all meetings.

Meeting Closed 10:30 a.m.
Respectfully Submitted: M. Laskowski