

Alpena County HAZARD MITIGATION PLAN



2021

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ALPENA COUNTY HAZARD MITIGATION PLAN 2021

Alpena County, Michigan

Prepared for:

Alpena County
and the
Jurisdictions in Alpena County

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Chapter 1 Introduction

Introduction

Throughout the world communities are impacted by natural, technological, and human-related hazards. Natural hazards occur when the natural processes of the environment interact with the resources and assets in the communities. These hazards include storms, floods, and wildfires. In 2018, the National Weather Service reported the United States experienced 530 fatalities, 1,378 injuries, \$35,849,320,000 in property damage, and \$5,102,540,000 in crop damage due to natural hazards. Technological hazards take place when the existing technology fails. These types of hazards include hazardous material spills, structural fires, infrastructure failures, and transportation accidents. The final hazard, human-related, occurs as a product of human activities, such as chemical or biological attacks and cyber-attacks. Depending on many characteristics, such as geographical location and land use practices, these hazards have the potential to cause death, injuries, damage to property, infrastructure and the environment, and disruption to economic and social activities. These hazards also have the potential to become disasters. However, governments, organizations, businesses, and the public can reduce the impacts from hazards through hazard mitigation efforts.

Hazard mitigation planning allows communities to create long-term plans to reduce or eliminate the impacts that hazards have on the community's population, economy, and natural environment. These plans identify and inventory potential hazards, assess the risks and vulnerabilities from hazards, and develop hazard mitigation strategies. Through plan preparation and mitigation efforts, communities are able to better protect public safety and facilities, remove structures from hazard prone areas, accelerate recovery time after disasters, increase hazard education and awareness, and create partnerships.

The Stafford Act, as amended by the Disaster Mitigation Act of 2000, requires state, tribal, and local governments to develop and adopt FEMA-approved hazard mitigation plans to receive certain types of non-emergency disaster assistance. Every five years, jurisdictions must update their plans and re-submit them for FEMA approval to maintain eligibility. The Northeast Michigan Council of Governments (NEMCOG) assisted seven counties in the Northeastern Lower Peninsula of Michigan to update their 2014 hazard mitigation plans.

In Alpena County, NEMCOG worked with the Emergency Services Coordinator/911 Director and Local Emergency Planning Committee (LEPC) to review and update Alpena County's 2014 Hazard Mitigation Plan. The plan update focused on natural, technological, and human-related hazards to increase public awareness about hazards and hazard mitigation, maintain the county's grant eligibility, maintain the county's compliance with state and federal legislative requirements for hazard mitigation plans, and to develop projects and policies that can be implemented to reduce or prevent future disasters and improve public safety.

Summary of Plan Contents

The Alpena County Hazard Mitigation Plan Update identifies the county's hazards, analyzes the hazards based on the county's current conditions, assesses its risk and vulnerability, identifies the communities' goals and objectives, identifies, evaluates and prioritizes the alternatives for hazard mitigation strategies, selects and recommends feasible mitigation strategies, and documents the plan's progress towards mitigating its hazards. The hazard mitigation strategies within the plan are intended to be integrated into other planning documents.

Specific Plan Updates

Chapter 1: Introduction

- Reviewed and updated the summary of plan contents, specific plan updates, and planning process sections.

Chapter 2: Environment

- Reviewed and updated information in the climate, discharge permits, and sites of environmental contamination sections.

Chapter 3: Community Profile

- Reviewed and updated population and housing demographics, and economic indicators.

Chapter 4: Land Use Characteristics

- Reviewed and made minor changes to the chapter.

Chapter 5: Community Services and Facilities

- Reviewed and updated the county facilities, agencies in Alpena County, public safety (law enforcement, Alpena Combat Readiness Training Center, fire services), medical facilities, media, libraries, solid waste disposal, public water and wastewater supplies, utility services, educational system, transportation network, public transit, and early warning systems.

Chapter 6: Hazard Identification and Assessments

- Reviewed and updated all of the natural, technological, and human-related hazards.
- Combined the hazard identification and risk and vulnerability assessment chapters.
- Reviewed and updated the evaluation criteria. The “Potential for Damage” criterion was separated into two evaluation criteria: “Damage Capacity” and “Affected Area.” The hazard rankings were reviewed and updated with the new evaluation criteria.

Chapter 7: Goals and Objectives

- Reviewed and updated the goals and objectives. A goal and its corresponding objectives regarding geographic information system (GIS) data sets was added.

Chapter 8: Mitigation Strategies and Priorities

- Reviewed and updated the mitigation action and implementation strategies. Several action items were moved to the multi-hazard mitigation action and implementation strategies category, multiple actions were updated, eight actions were added to the plan, and eighteen actions were removed.

Chapter 9: Plan Maintenance

- Reviewed and made minor changes to the chapter.

Planning Process in Alpena County

In 2005, Alpena County prepared its first hazard mitigation plan and updated it in 2014. In 2019, NEMCOG began working with the Emergency Services Coordinator/911 Director and the LEPC to review and update Alpena County’s 2014 Hazard Mitigation Plan. The LEPC is made up of representatives from local governments, law enforcement, fire departments, community organizations, and local, state and federal agencies (Table 1-1).

Table 1-1 Alpena County LEPC Membership	
Name	Title
Mark Hall	Emergency Services Coordinator
Burt Francisco	Previous Emergency Services Coordinator (resigned July 2019)
Robert Adrian	Chair, Alpena County Board of Commissioners (2020)
Brad McRoberts	Chair, Alpena County Board of Commissioners (2019)
John Kozlowski	Alpena County Commissioner
Steve Kieliszewski	Alpena County Sheriff
John Grimshaw	MSP Alpena Post Commander
Joel Jett	Chief, Alpena Police Department
Bill Forbush	Chief, Alpena Fire Department
Tim Wade	Alpena County Fire Representative
Mike Nowak	City of Alpena Elected Official Representative
Matt Radocy	Public Health Representative District 4
Eric Thompson	MidMichigan Hospital Representative
Tonya Rouse	NE Michigan Medical Control Representative
Larry Orcutt	Director, Alpena County Road Commission

Community Involvement

The neighboring and local jurisdictions, stakeholders, and public were involved during the drafting phase of the hazard mitigation plan and during the completion of the draft plan before it was adopted. Information was disseminated to the communities and public through public meetings, news releases, and email. Representatives from Alpena County, the City of Alpena, and the Townships of Alpena, Green, Long Rapids, Maple Ridge, Ossineke, Sanborn, Wellington and Wilson participated in updating the mitigation action and implementation strategies tables and reviewing the draft plan (Table 1-2). Representatives from CRTC Fire, the Michigan Department of Natural Resources, Alpena Township Fire Department, City of Alpena Fire Department, Green Township Fire Rescue, and District Health Department #4 reviewed and updated the mitigation actions and implementation strategies for hazardous material transportation, wildfires, structural fires, extreme temperatures, and public health emergencies.

The planning process educated community leaders and residents about hazard awareness, which assisted communities in making informed decisions. Additionally, the process strengthened partnerships between local governments, planning commissions, emergency services, public agencies and private entities. These partnerships allowed for the facilitation of communication and the pooling of resources.

Table 1-2 Jurisdiction Participation Status		
Jurisdiction	Representative	Participation Status
Alpena County	Tammy Sumerix-Bates, Executive Manager, Brad McRoberts, Board of Commissioner; Robert Adrian, Board of Commissioner, John Kozlowski, Board of Commissioner	Continuing Participant
City of Alpena	Rachel Smolinski, City Manager	Continuing Participant
Ossineke Township	Kenneth Lobert, Supervisor	Continuing Participant
Sanborn Township	Kenneth Gauthier, Supervisor	Continuing Participant
Green Township	Eric Smith, Supervisor	Continuing Participant
Maple Ridge Township	John Male, Supervisor	Continuing Participant
Alpena Township	Nathan Skibbe, Supervisor	Continuing Participant
Long Rapids Township	Todd Precord, Supervisor	Continuing Participant
Wellington Township	Ron Lucas, Supervisor	Continuing Participant
Wilson Township	Dan Hibner, Supervisor	Continuing Participant
Other Agencies		
Name	Title	Agency
Mark Hansen	Forest Fire Officer	Michigan Department of Natural Resources
Jeremy Wohlford	Senior Master Sgt./CRTC Fire Chief	CRTC Alpena Fire
Dave Robbins	Fire Chief	Alpena Township Fire Department
Rob Edmonds	Deputy Chief- Training Officer	City of Alpena Fire Department
Tim Wade	Assistant Fire Chief	Green Township Fire Rescue
Matt Radocy	Emergency Services Coordinator	District Health Department 4

Public Participation Survey

The Emergency Services Coordinator/911 Director and LEPC commissioned a regionwide survey to gain input and feedback regarding the perceptions and opinions about natural, technological, and human-related hazards, and the preferred methods and techniques to reduce risk and losses from hazards. The region includes Alpena, Alcona, Crawford, Montmorency, Oscoda, Otsego, and Presque Isle Counties. The regionwide survey was available online and hard copies were available at the Alpena County's Emergency Management Office for the public, neighboring jurisdictions, and stakeholders from August 12, 2019 through November 19, 2019. Press releases were issued to inform the communities about the availability of the survey in *The Alpena News*, *Weekly Choice*, *The Montmorency County Tribune*, and the *Petoskey News*. On August 12, 2019, a link to the survey and a request to forward the link to other individuals was sent to the LEPC, Alpena County Board of Commissioners, and the local jurisdictions' manager, supervisors, and clerks as well as the surrounding counties and local governments.

Fifty-five completed surveys were received for Alpena, Alcona, Crawford, Montmorency, Oscoda, Otsego, and Presque Isle Counties (see results below). See Appendix A for the survey results specific to individuals residing in Alpena County and a link to the regionwide survey. Participants were asked a number of different questions, including their concern levels for natural, technological, and human-related hazards, their perception of the county's preparedness level for each hazard, identification of community assets, and their approval/disapproval of various mitigation approaches. Lastly, participants were asked to provide suggestions to improve hazard mitigation. The county evaluated and incorporated both the regional survey results and the county specific survey results during the plan update.

Approximately 65.5% of respondents have not received information about how to make their household safer from natural, technological, or human-related hazards. The respondents who had received information indicated it came from the American Red Cross, FEMA, the Alpena County Emergency Management Office, Otsego County Emergency Management Office, USDA/Forest Service, DTE Energy, the Firewise program, insurance companies and CERT. The majority of respondents indicated the internet, mail, and television were the most effective ways to distribute information, followed by radio, newspaper, and public workshops/meetings. About 60.0% of respondents indicated they have not experienced a hazard event in the last five years. The respondents who had experienced a hazard indicated they had experienced flooding, snowstorms/winter storms, a hurricane, and straight-line winds/windstorms.

Natural Hazards

Respondents are very concerned or somewhat concerned about the following hazards:

- Snow/ice storms: 78.2%
- Windstorm/high winds: 72.7%
- Extreme cold: 65.5%
- Wildfires: 56.4%
- Tornadoes: 43.6%

Respondents are not very concerned or not concerned about the following hazards:

- Drought: 50.9%
- Floods: 49.1%
- Extreme heat: 41.8%

Approximately 38.2% of respondents were neutral regarding their concern for thunderstorms. Additionally, respondents indicated they were concerned about milfoil in the lakes, earthquakes, mass shootings and disease outbreaks.

Respondents feel the region is best prepared to handle snow/ice storms (74.6%), extreme cold (69.1%), thunderstorms (65.5%), and windstorms/high winds (40.0%). Respondents are unsure if the region is prepared to handle drought (49.1%), extreme heat (40.7%), tornadoes (40.0%), and wildfires (36.4%). About 40.7% of respondents were evenly split (least prepared or unsure) in how prepared the region is to handle flooding.

Technological Hazards

Respondents are very concerned or somewhat concerned about the following hazards:

- Communications failures: 81.8%
- Power failures: 80.0%
- Structural fires: 78.2%
- Oil and gas accidents: 74.5%
- Hazardous material spills: 69.1%
- Road accidents: 67.3%
- Water or wastewater treatment system failures: 44.4%
- Air transportation accidents: 43.6%

Respondents are not very concerned or not concerned about the following hazards:

- Railroad accidents: 66.0%
- Dam failures: 61.1%
- Water transportation accidents: 52.7%
- Terrorism/sabotage: 43.6%

Respondents feel the region is best prepared to handle road accidents (81.8%), structural fires (70.4%), power failures (54.6%), hazardous material spills (48.2%), and oil and gas accidents (48.2%).

Respondents feel the region is least prepared to handle terrorism/sabotage (65.5%), water transportation accidents (45.5%), communications failures (38.9%), and air transportation accidents (36.4%). Respondents were unsure how prepared the region is to handle dam failures (53.7%), railroad accidents (51.9%), and water or wastewater treatment system failures (47.3%).

Human-Related Hazards

Respondents are very concerned or somewhat concerned about the following hazard:

- Cyber-attacks: 59.3%

Respondents are not very concerned or not concerned about the following hazard:

- Chemical or biological attacks: 47.3%

Respondents feel the region is least prepared to handle cyber-attacks (58.2%) and chemical or biological attacks (55.6%).

Community Assets

Respondents ranked the following community assets from the most vulnerable to the least vulnerable to the hazard impacts:

1. Human (death/injuries)
2. Infrastructure (damage or loss of bridges, utilities, schools, etc.)
3. Economic (business closures, job losses, etc.)
4. Environmental (damage or loss of forests, waterways, etc.)
5. Governance (ability to maintain order and/or provide public amenities and services)
6. Cultural/Historic (damage or loss of libraries, museums, fairgrounds, etc.)

Regulatory Approaches

Respondents supported the following approaches to reduce risk and loss associated with disasters:

- Improving the disaster preparedness of local schools (98.2%)
- Taking steps to safeguard the local economy following a disaster (96.4%)
- Creating an inventory of at-risk buildings and infrastructure (94.4%)
- Making their home more disaster-resilient (89.1%)
- Disclosing natural hazard risks on real estate transactions (87.3%)
- Policies to prohibit development in areas subject to natural hazards (83.3%)
- Protecting historical or cultural structures (71.7%)
- The use of tax dollars to reduce risk and losses from natural disasters (70.4%)
- Regulatory approaches (68.5%)
- Non-regulatory approaches (57.4%)

Respondents recommended increasing public outreach and education efforts, improving wildfire protection, bringing specialists into the communities to assist in mitigating hazards, enforcing reasonable and consistent fire codes, increasing funding to enhance essential public safety services, developing a rapid marine response to boaters in danger on Lake Huron, increasing milfoil awareness at local lakes, providing training opportunities, increasing security for cyber communications, installing broadband throughout the entire counties, limiting oil transport under/through/on the Great Lakes, being proactive with trimming and removing trees, strengthening local government partnerships, and increasing support for emergency services.

Meetings

During the preparation of the draft plan, LEPC meetings were held for participants to provide input and feedback through facilitated discussions that gained a consensus (Appendix B). All meetings of the LEPC were open to the public. Notices of the public meetings were sent to LEPC members and local community officials. In addition to the LEPC meetings, discussions and additional meetings were held.

Kick off Meeting

On April 9, 2019, NEMCOG provided an overview of the hazard mitigation planning process and information about the grant match to the representatives of the LEPC. Attendees included Brad McRoberts, John Kozlowski, Steve Kieliszewski, Tonya Rouse, Joel Jett, John Grimshaw, Larry Orcutt, Mike Nowak, Robert Adrian, Burt Francisco, Andy Marceau, Tammy Sumerix-Bates, and NEMCOG staff, Christina McEmber.

NEMCOG Board of Directors' Meeting

On April 18, 2019, NEMCOG staff gave a brief status update about the hazard mitigation process to the NEMCOG Board of Directors. Attendees included Dan Gauthier (Alcona County Board of Commissioner), Dave Karschnick (Alpena County Board of Commissioner), John Wallace (Cheboygan County Board of Commissioner), James Kargol (Emmet County Board of Commissioner), Kyle Yoder (Oscoda County Board of Commissioner, Chair), Robert Pallarito (Otsego County Board of Commissioner), Carl Altman (Presque Isle County Board of Commissioner, Vice Chair), Adam Poll (City of Alpena Planning and Development Director), Marisue Moreau (Northeast Michigan Consortium/Michigan Works!), Robert Heilman (NEMCOG Board of Directors' Chair), Doug Baum (City of Grayling, Crawford County, Manager), Dave Post (Village of Hillman, Montmorency County, Manager), Bill Wishart (City of Gaylord, Otsego County, Mayor), Norman Brecheisen (Livingston Township, Otsego County, Supervisor), and NEMCOG staff, Diane Rekowski, Theresa Huff, Karen Cole, and Christina McEmber.

Region 7 Healthcare Coalition Meeting

On April 22, 2019, NEMCOG and the Emergency Services Coordinator/911 Director met with the Regional Coordinator for the Region 7 Healthcare Coalition to discuss the hazard mitigation plan update. Attendees included Burt Francisco, Mark Becmer, and NEMCOG staff, Nico Tucker and Christina McEmber.

Plan Review and Update Meetings

On October 8, 2019, NEMCOG met with the LEPC to review and update the 2014 Alpena County Hazard Mitigation Plan. The committee reviewed and updated the county's hazard rankings based on their social impact, likelihood of occurrence, and administrative potential. The LEPC elevated the county's risk for riverine flooding, shoreline flooding, and extreme temperatures. The committee also reviewed and updated the plan's goals and objectives and determined a goal and its corresponding objectives regarding the county's geographic information system should be added. Finally, the committee reviewed the hazard mitigation action and implementation strategies. The committee determined if the actions were still relevant and updated the priority status, responsible agencies, financial/technical resources, current progress, and future status. Attendees included Matthew Radocy, Timothy Wade, Mike Nowak, John Kozlowski, Brad McRoberts, Larry Orcutt, Mark Hall, Tammy Bates, Kim Elkie, Pam Susan, and NEMCOG staff, Christina McEmber and Rick Deuell.

On January 14, 2020, NEMCOG met with the LEPC to review and update the hazard ranking evaluation criteria, hazard ranking table, and the hazard mitigation action and implementation strategies. The LEPC determined the damage potential evaluation criteria should be separated into two evaluation criteria: damage capacity and affected area. The weight from the original evaluation criteria was split evenly between the new categories. After modifying the evaluation criteria, the LEPC reviewed the hazard ranking table and determined the county's risk for infrastructure failure and public health emergencies should be elevated, while the risk for fixed site hazardous materials, dam failure, transportation accident, and terrorism/sabotage/weapons of mass destruction should be reduced. Finally, the LEPC continued reviewing the mitigation action and implementation strategies to determine if they were still relevant and to update the priority status, responsible agencies, financial/technical resources, current progress, and future status. The LEPC determined multiple action items were ongoing/long-term projects, a strategy regarding emergency plans for floodplain areas was added, and seven action items were removed since they have been completed or are no longer relevant. Additionally, the LEPC recommended the Emergency Services Coordinator/911 Director set up meetings with special interest groups (e.g. fire departments, hazardous materials team, district health department, etc.) to review the specialized mitigation action and implementation strategies. Attendees included Matthew Radocy, Timothy Wade, Rob Edmonds, John Kozlowski, Joel Jett, Larry Orcutt, Mark Hall, Tammy Bates, Kim Elkie, John Grimshaw, Steven Kieliszewski, Robert Adrian, Tanya Rouse, Jacob Kamyszck, David Robbins, Andy Marceau, and NEMCOG staff, Christina McEmber.

NEMCOG Board of Directors' Meeting

On December 19, 2019, NEMCOG staff provided a status of county hazard mitigation plan updates and explained the approval process. Attendees included Dan Gauthier (Alcona County Board of Commissioner), Dave Karschnick (Alpena County Board of Commissioner), Daryl Peterson (Montmorency County Board of Commissioner), Kyle Yoder (Oscoda County Board of Commissioner, Chair), Robert Pallarito (Otsego County Board of Commissioner), Carl Altman (Presque Isle County Board of Commissioner, Vice Chair), Adam Poll (City of Alpena Planning and Development Director), Marisue Moreau (Northeast Michigan Consortium/Michigan Works!), Robert Heilman (NEMCOG Board of Directors' Chair), Bruno Wojcik (Briley Township, Montmorency County, Supervisor), Scott McLennan

(City of Rogers City, Presque Isle County, Mayor), Doug Baum (City of Grayling, Crawford County, Manager), Dave Post (Village of Hillman, Montmorency County, Manager), Norman Brecheisen (Livingston Township, Otsego County, Supervisor), and NEMCOG staff, Diane Rekowski, Theresa Huff, Karen Cole, Steve Schnell, Nico Tucker, Denise Cline and Christina McEmber.

Draft Plan

The 2021 draft Alpena County Hazard Mitigation Plan was made available to the surrounding counties, local governments, agencies, and the public for review and comment. Due to restrictions imposed by the Governor's office to reduce the number of cases of COVID-19, a virtual public meeting was held. The meeting was noticed per County procedures: on the website with the meeting access information, on the county's calendar, and on a monthly calendar posted at the public entrance of the courthouse. It was also posted on NEMCOG's website. Draft plans were posted on both the county and NEMCOG's website, and paper copies were available at the Alpena County Courthouse. On June 11, 2020, the public meeting access information and a link to the draft plan was emailed to the local jurisdictions' manager, supervisors, clerks, and Board of Commissioners for review and comment. The link was also emailed to the surrounding counties and local governments (Presque Isle, Montmorency, Oscoda, and Alcona Counties; Rust, Hillman, Montmorency, Metz, Bismarck, Krakow, Presque Isle, Mitchell, Caledonia, Alcona, and Clinton Townships). The local jurisdictions, and surrounding counties and local governments were requested to forward the meeting access information and draft plan to other interested parties.

On July 16, 2020, a public hearing was held to receive comments and suggestions on the draft plan. During the meeting, no comments and suggestions were offered for the plan. Additionally, no comments or suggestions were received via email, mail, or phone. Finally, the next steps in the planning process were discussed. Attendees included Robert Adrian, Mark Hall, Chief Joel Jett, Chief Bill Forbush, Chris Komst, Matt Radocy, Sheriff Steve Kieliszewski, Tammy Sumerix-Bates, Kim Elkie, and NEMCOG staff, Christina McEmber.

The draft plan was submitted to the Michigan State Police and FEMA for approval before adoption by the Alpena County Board of Commissioners and local municipalities.

INSERT DATE, the Alpena County LPT approved a motion to recommend adoption of the 2021 Alpena County Hazard Mitigation Plan by the Alpena County Board of Commissioners and all local municipalities within Alpena County.

Plan Adoption

INSERT DATE, the 2021 Alpena County Hazard Mitigation Plan received "approvable pending adoption" status from the State and FEMA. A public notice was posted to inform residents when the County Board of Commissioners would be considering adoption of the draft plan.

INSERT DATE, NEMCOG presented the 2021 Alpena County Hazard Mitigation Plan to the Alpena County Board of Commissioners for adoption and the plan was adopted (**Appendix C**). After adoption by the county, the local jurisdictions were notified about the county's adoption of the plan and were requested to also adopt the plan (**Appendix C**).

Incorporation of Plans, Studies, and Technical Information

NEMCOG staff reviewed relevant plans, maps, studies, and reports. Federal, state, regional, and local government sources were reviewed to update the county's community profile. These sources included the U.S. Census Bureau, zoning ordinances, master plans, recreation plans, capital improvement plans, parcel maps, aerial photography, Michigan Department of Natural Resources' Michigan Resource Information System land use/land cover information, USGS topographic maps, the National Oceanic and Atmospheric Administration's National Centers for Environmental Information Data Center, the USDA's Soil Surveys, NRCS soils maps, Michigan Department of Transportation, Michigan Hazard Analysis, Michigan Hazard Mitigation Plan, local hazard analysis, flood insurance rate maps, emergency management plans, Michigan Department of Environment, Great Lakes, and Energy, U.S. Forest Service, Michigan State Police Emergency Management and Homeland Security Division, and Bureau of Fire Services.

GIS was used as a public education and decision tool throughout the planning process. Data sets were used to analyze existing conditions and potential future scenarios. Specialized maps, such as community hazards, land cover/use, and infrastructure, were used during the drafting phase of the plan. The maps assisted in identifying community characteristics, vulnerable populations, and hazard areas.

Chapter 2 Environment

Overview

Northern Michigan's natural environment provides various recreational opportunities, while also placing constraints on land development in critical and sensitive areas that are costly to remediate when altered. For example, flooding and soil erosion issues have increased when wetlands have been filled and forests have been cleared. When planning for future developments, local governments should consider the land's characteristics to prevent hazards caused by land alterations.

Alpena County covers 1,695 square miles (363,520 acres) and is 27.5 miles wide from east to west and 24 miles from north to south. It is bordered by Lake Huron, and Presque Isle, Montmorency, and Alcona Counties. The county is 72 miles east of Gaylord on M-32, 72 miles south of Cheboygan on U.S. 23, and 66 miles north of Tawas on U.S. 23.

Alpena County is composed of eight townships, a city, a census designated place, and ten unincorporated places in the Northeastern Lower Peninsula of Michigan (Figure 2-1):

- City of Alpena (county seat)
- Ossineke (census designated place)
- Bolton (unincorporated place)
- Cathro (unincorporated place)
- Flanders (unincorporated place)
- Herron (unincorporated place)
- Hubbard Lake (unincorporated place)
- Lachine (unincorporated place)
- Lakewood (unincorporated place)
- Leer (unincorporated place)
- Long Rapids (unincorporated place)
- Spratt (unincorporated place)
- Alpena Township
- Green Township
- Long Rapids Township
- Maple Ridge Township
- Ossineke Township
- Sanborn Township
- Wellington Township
- Wilson Township

The City of Alpena, and Sanborn and Alpena Townships are located along Lake Huron. Lakewood and Rockport are small coastal communities north of Alpena Township. The town of Hubbard Lake is located in Ossineke Township and the town of Ossineke is located at the corner of Nicholson Hill Road and U.S. 23 in Sanborn Township. The town of Ossineke is the primary location for Sanborn Township's commercial, governmental, and institutional land uses.

Climate

Alpena County's climate is influenced by its topography and its proximity to Lake Huron. Temperature data from the Midwest Regional Climate Center indicates the climate along the immediate Lake Huron shore is semi-marine in nature and lacks many of the temperature extremes found only a few miles inland.

The County's summer months have a daily average of more than 15 hours of daylight for outdoor activities and the temperatures have been recorded as high as 104 degrees Fahrenheit. The winter months have uniform day-to-day temperatures. Sub-zero temperatures have been recorded as early as November 22 and as late as April 2 but have their highest frequency during February. Thunder Bay and Thunder Bay River are usually free of ice by the first week in April, but water temperatures remain low enough to produce diurnal sea breezes during the middle of the day with a subsequent reduction in maximum temperatures on many days during the spring and summer.

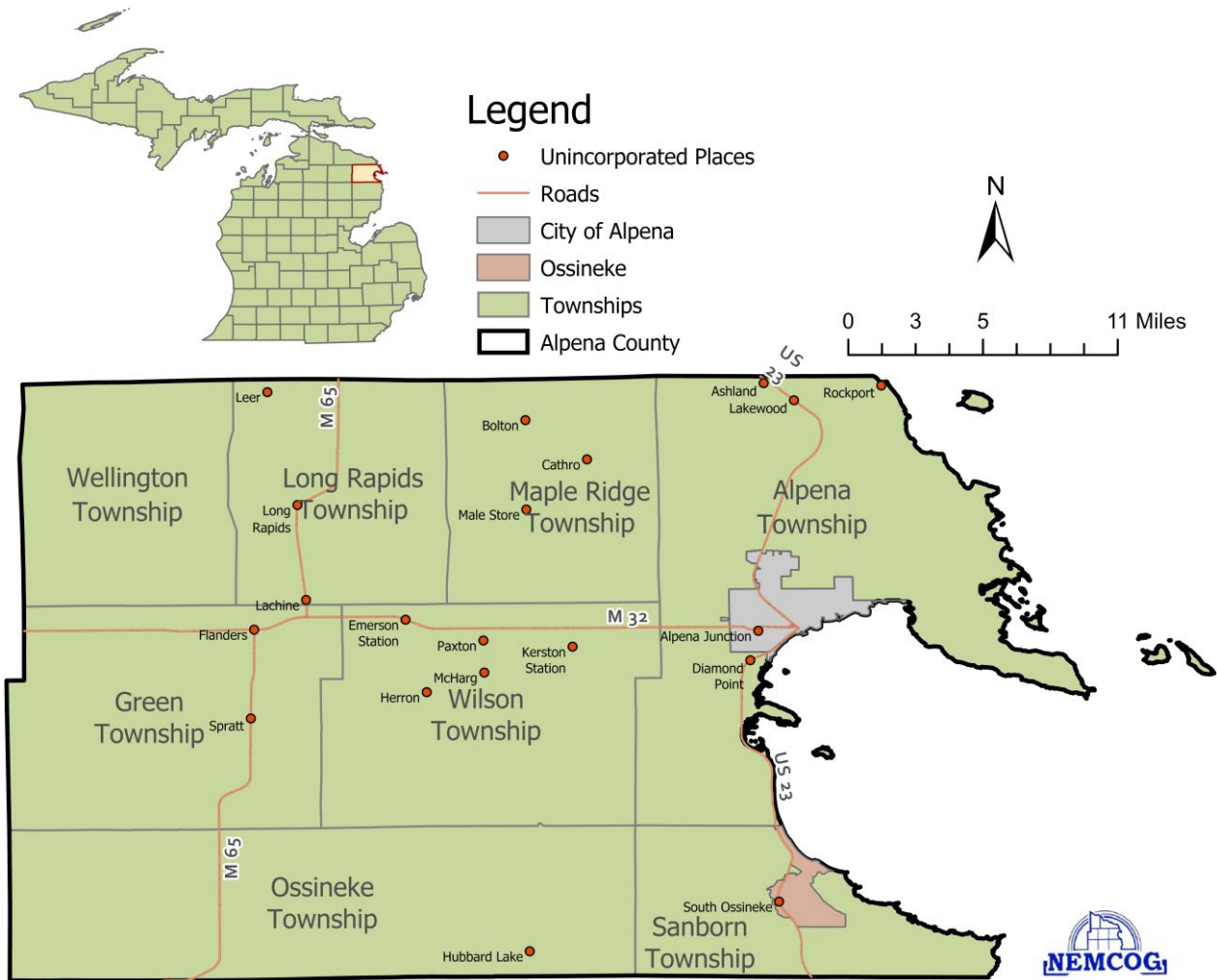


Figure 2-1 Alpena County Location Map

Precipitation is well distributed throughout the year. Most winter precipitation is in the form of snow, while summer precipitation is the result of showers or thundershowers during June, July, and August. The 30-year annual average precipitation is 30.03 inches (includes the snowfall liquid equivalent). The 30-year average annual snowfall is 57.6 inches. Prevailing winds are from the northwest with the exception of May and June when southeasterly winds predominate. Information on severe weather can be found in Chapter 6: Hazard Identification.

According to the National Aeronautics and Space Administration, Earth’s climate has been warming over the past century at an unprecedented rate due to human activities. Carbon dioxide and other gases are trapping heat, which is causing the earth to warm. According to the *Planning for Community Resilience in Michigan: A Comprehensive Handbook*, Michigan is predicted to experience more frequent and severe storms, increases in winter and spring precipitation, less precipitation as snow and more as rain, reduced ice cover on the Great Lakes, an extended growing season, more flooding events with risks of erosion, an increase in the frequency and length of severe heat events, and an increase in drought and wildfires. According to the Michigan State Climatologist’s Office Alpena County’s 30 year (1981-2010) average July temperature is 0.5 degrees warmer, the average January temperature is 0.6 degrees

warmer, the average annual precipitation is 1.71 inches higher, and the average annual snowfall is 9.6 inches less than the last 30 year average.

Topography and Geology

Alpena County is located on the northeastern edge of the Michigan Basin, and its topography consists of strongly sloping and choppy areas, gently undulating areas, low swell or ridges, level plains, small areas of swampy soils, moraines, and numerous streams and lakes. The elevation ranges from 577 to 1,140 feet above mean sea level, which is a difference of 560 feet above the level of Lake Huron.

The county features karst topography in its northern section, which is characterized by sinkholes, underground drainage, and caves (Figure 2-2). It occurs when the bedrock dissolves and the surface rock collapses into the cavity, which can cause tremors that may be reported as earthquakes. New sinkholes take several decades to appear on the surface. In the county, sinkholes range in size from less than 10 feet to more than 1,300 feet in diameter. According to the *USGS Summary of Hydrogeologic Conditions by County for the State of Michigan*, karst sinkhole lakes include Devil's Lake, Long Lake, Fitzgerald Lake, and Mindack Lake. Geologists believe a hinge-line fault serves as a pathway for subterranean drainage and interconnects several sinkholes and sinkhole-controlled lakes before emptying into Lake Huron at El Cajon Bay.

Groundwater contamination from agricultural byproducts, nitrates, infectious diseases, septic systems and sediments has been documented in the County's karst topography. Historically, the karst produced sinkholes were used as dump sites and may still be used in that manner today. Additionally, agricultural drainage from pastures, feedlots, bean, potato, corn and small grain fields enter the aquifers through karst produced swallow holes, sinkholes and fractures. Protection and preservation of the County's karst features will also protect the groundwater.



Figure 2-2 Northern Michigan Karst Areas

Soils

Well-drained soils are most suitable for development and do not have a high-water table. Adequate drainage minimizes storm water impacts and allows septic fields to operate efficiently. Adequate depths to the water table prevent groundwater contamination from septic systems. The Natural Resource Conservation Service completed a detailed soil survey of Alpena County and the soil survey maps were acquired from the Michigan Department of Natural Resources MIRIS program to analyze the county's soils.

Hydric Soils and Steep Slopes

The soil types and slopes should be considered when planning for land use types and intensities (Figure 2-3). Hydric soils are located adjacent to streams and creeks and are classified as poorly drained and very poorly drained. During part of the growing season, these soils are saturated, flooded or ponded,

which makes them poor soils for building site development and sanitary facilities. The high-water table limits the construction of basements and may classify the soils as wetlands, which would require a wetland permit for development. The cost to develop areas with hydric soils and steep slopes is greater than the cost of developing in less constrained areas since hydric soils and steep slopes require severe building constraints and special design considerations, such as erosion control measures, slope stabilization, and on-site water retention. If developed improperly, the environmental impacts would be considerable.

Water Resources

There are 68 natural and artificial water bodies scattered throughout Alpena County that range from under one acre to thousands of acres (Table 2-1). The largest water body in the county is Fletcher Pond Hydroelectric Reservoir, which covers 5,310 acres in Alpena County (Green Township) and 3,660 acres in Montmorency County. The largest natural lake is Long Lake (Alpena Township), which covers 2,750 acres. Other large water bodies include Beaver Lake, Turtle Lake, Devils Lake #1 and #2, Seven Mile Pond, Ninth Street Pond, Mud Lake, Grass Lake, Crooked Lake, Lake Winyah (Maple Ridge Township) and Middle Lake. In Alpena Township, there is a peninsula that juts into Lake Huron to form Thunder Bay and the mouth of the Thunder Bay River, which is a premiere fishing spot. The township also has several islands off the shoreline that include Thunder Bay Island, which is the home to a Coast Guard Station. Alpena County encompasses the Thunder Bay River Watershed and the Lake Huron Coastal Watershed (Figure 2-4).

Table 2-1 Alpena County Surface Water Composition		
Origin of Surface Water	Number of Water Bodies	Area in Acres
Natural Lakes and Ponds	38	1,631
Natural Lake with a Dam	2	3,415
Artificial Lake	1	26
Artificial Pond	20	11
Hydroelectric Reservoirs	5	7,389
Fish and Wildlife Flooding	1	900
Source: NEMCOG		

The Thunder Bay River Basin’s drainage area is 1,244 square miles and drains about three quarters of Alpena County. The Main Branch of the Thunder Bay River flows from Montmorency County across Alpena County into Lake Huron. The South Branch of the Thunder Bay River flows from the south of the county to the north and was dammed to create Fletcher Pond Hydroelectric Reservoir (Green Township). Wolf Creek and the Lower South Branch of the Thunder Bay River drain southern Alpena County. The North Branch of the Thunder Bay River flows from Presque Isle County through the northern portion of Alpena County. All three branches of the Thunder Bay River empty into Seven Mile Lake, which is a hydroelectric reservoir.

The North Branch of the Thunder Bay River and Truax Creek bisect Wellington Township. The South Branch of Thunder Bay River and Wolf Creek flow through Ossineke and Wilson Townships. The main branch and North Branch of the Thunder Bay River bisects Long Rapids Township. Green Township is bisected by the South Branch of the Thunder Bay River. The City of Alpena and Alpena Township are bisected by the Thunder Bay River.

The majority of the county has a groundwater depth of at least 50 feet below the soil surface but may be shallower depending on the land use type (e.g. lakes, streams, wetlands, etc.). In the areas of the county that have shallow water tables, the drinking wells are also shallow, which means there is a greater risk for groundwater contamination.

Other sources of groundwater contamination include pesticides, fossil fuels, and road salt. If stored and used properly, these substances do not pose a serious threat to groundwater; however, spills, leaky storage tanks, accidental discharge or misapplication, unprotected salt storage facilities, and road runoff increase the risk for groundwater contamination. Throughout the county, a wide variety of contaminants have been detected in the groundwater, which means the entire county is vulnerable to groundwater contamination. Therefore, land use planning should consider groundwater depths since it is expensive and difficult to remove contaminants from the water.

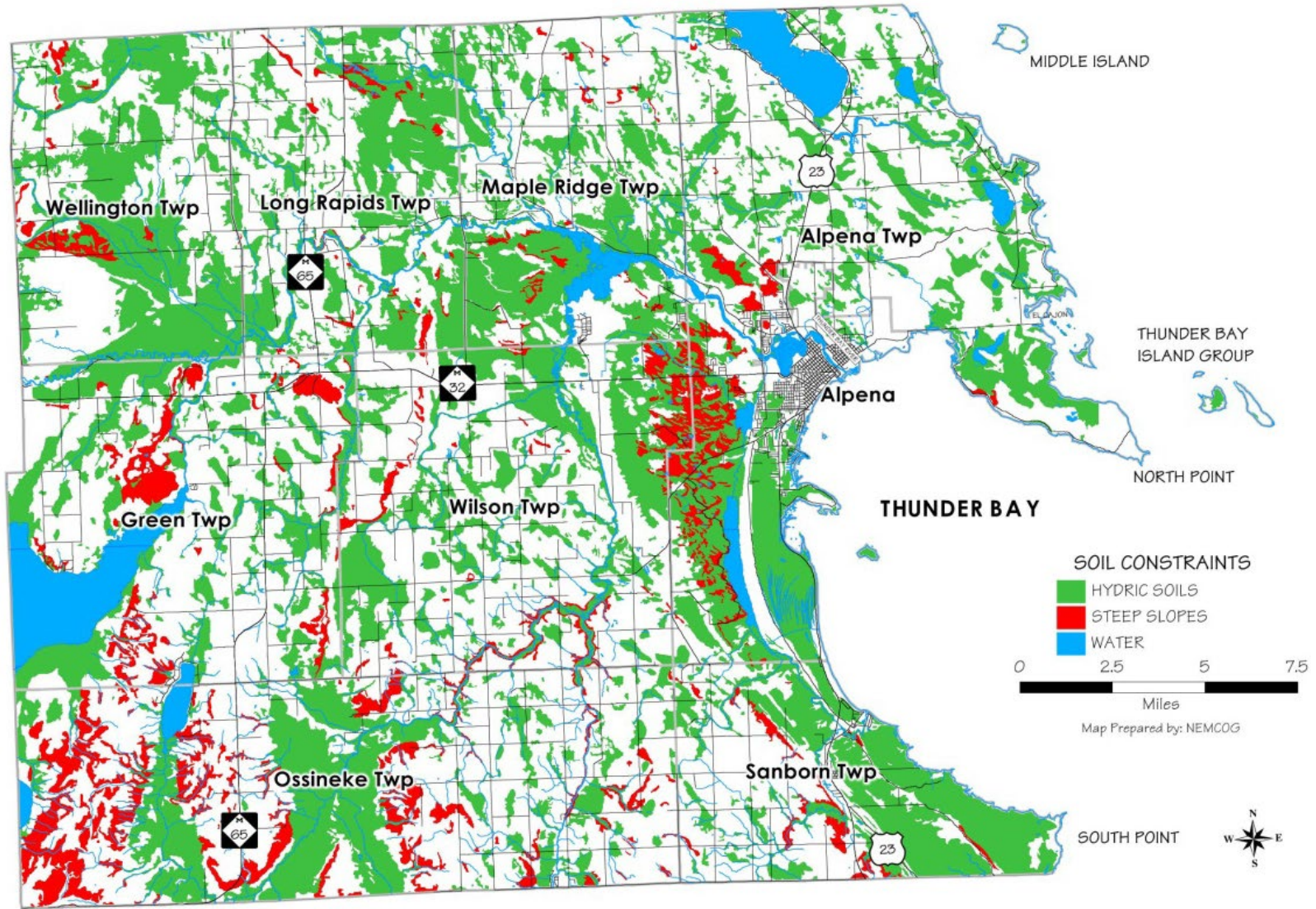


Figure 2-3 Hydric Soils and Steep Slopes

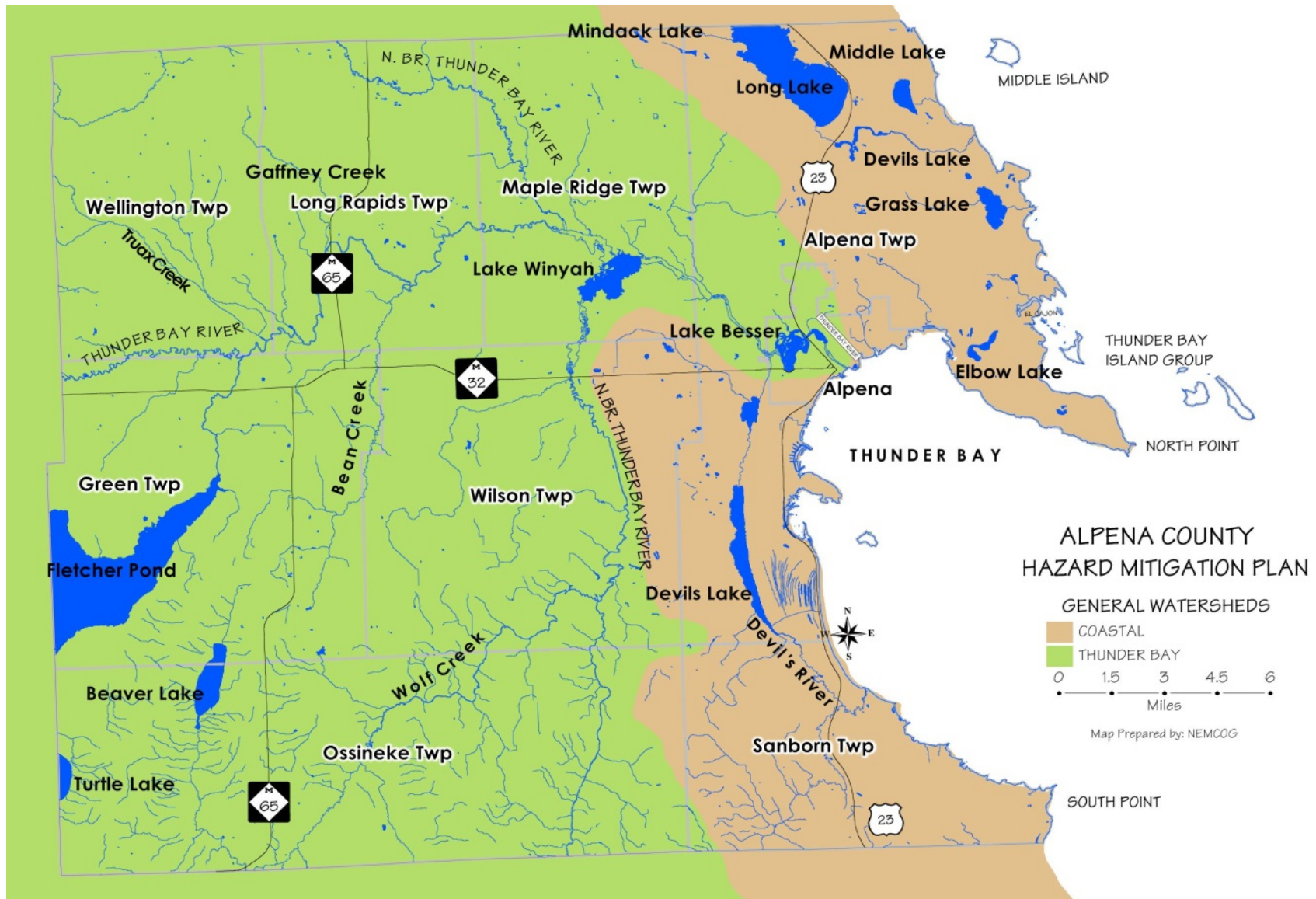


Figure 2-4 Alpena County Watersheds

Wetlands

A wetland is an area where water is found, either on the surface or near the surface, at any time during the year. Poorly drained soils and hydrophytic vegetation is also present. Wetlands are often referred to as marshes, swamps, or bogs. Michigan residents are becoming increasingly aware of the value of wetlands since they improve water quality of lakes and streams by filtering nutrients, organic chemicals, and toxic heavy metals. Wetlands are also related to high water tables and serve to discharge or recharge aquifers. By absorbing excess water when river levels are high and releasing water when levels are low, wetlands help prevent floods and droughts.

There are numerous wetland areas scattered throughout Alpena County totaling over 36 thousand acres. In addition to the many inland wetland areas, Alpena County has significant coastal wetlands scattered along its 61 miles of Lake Huron coastline (Figure 2-5, Figure 2-6). These wetlands provide nesting habitat and feeding areas for migratory birds and help slow shoreline erosion by dissipating wave energy.

Forestlands

Forestlands are the largest land cover/use in the county since they cover approximately 53% of the county's total land area (Figure 2-7, Figure 2-8). Approximately 16% of the land is state-owned, 3% is county/municipality-owned, and 81% is privately-owned (includes corporations). Major forest species include Aspen (29%), Elm/Ash/Cottonwood (17%), Northern White Cedar (16%), and Maple/Beech/Birch (13%). Other species include Oak/Hickory (8%), Red Pine (6%), Balsam Poplar (3%), Jack Pine (2%), White Spruce (2%), Balsam Fir (1%), Exotic Softwoods Group (1%), Eastern White Pine (1%), and Red Maple/Upland (1%).

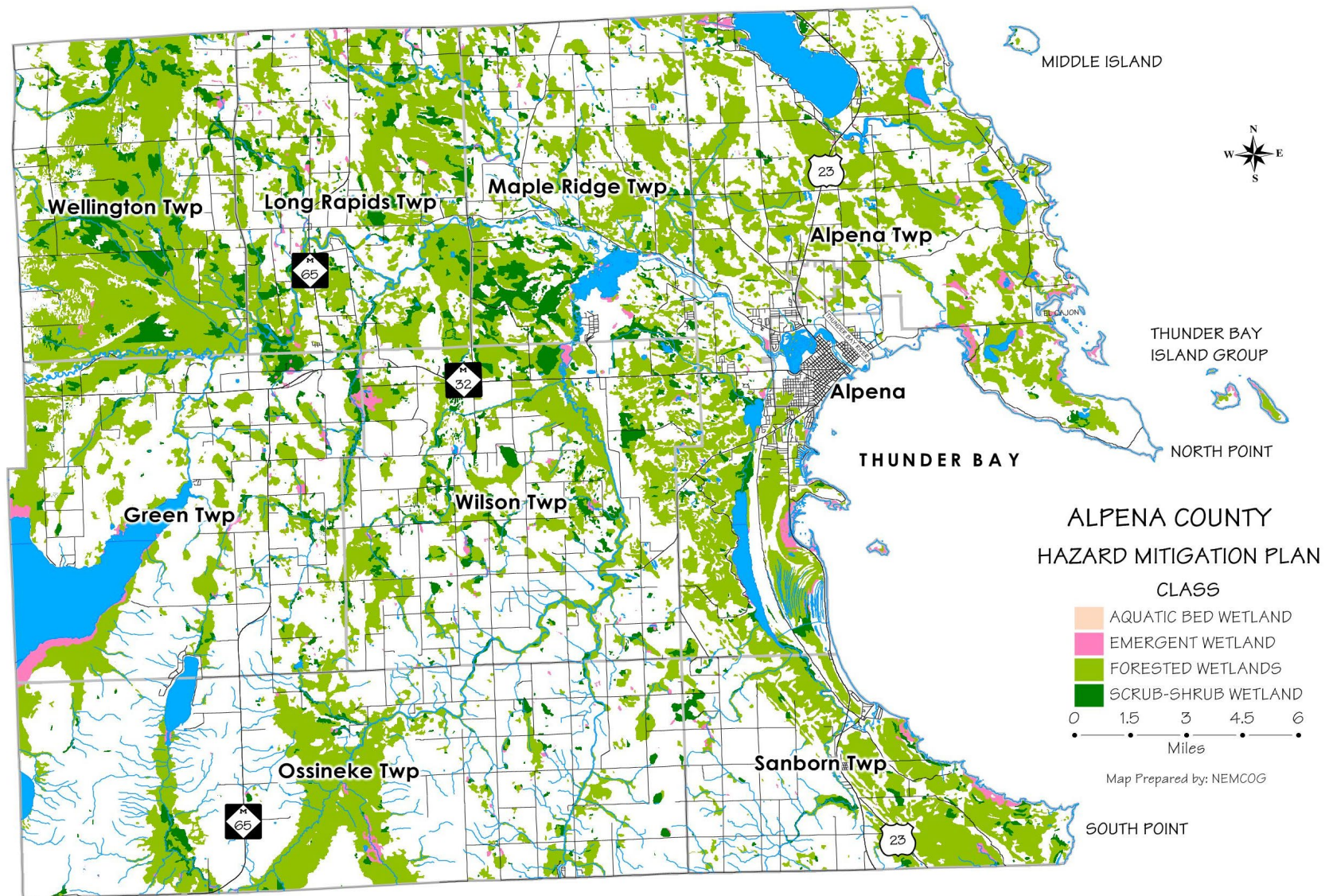


Figure 2-5 Alpena County's Coastal and Inland Wetlands

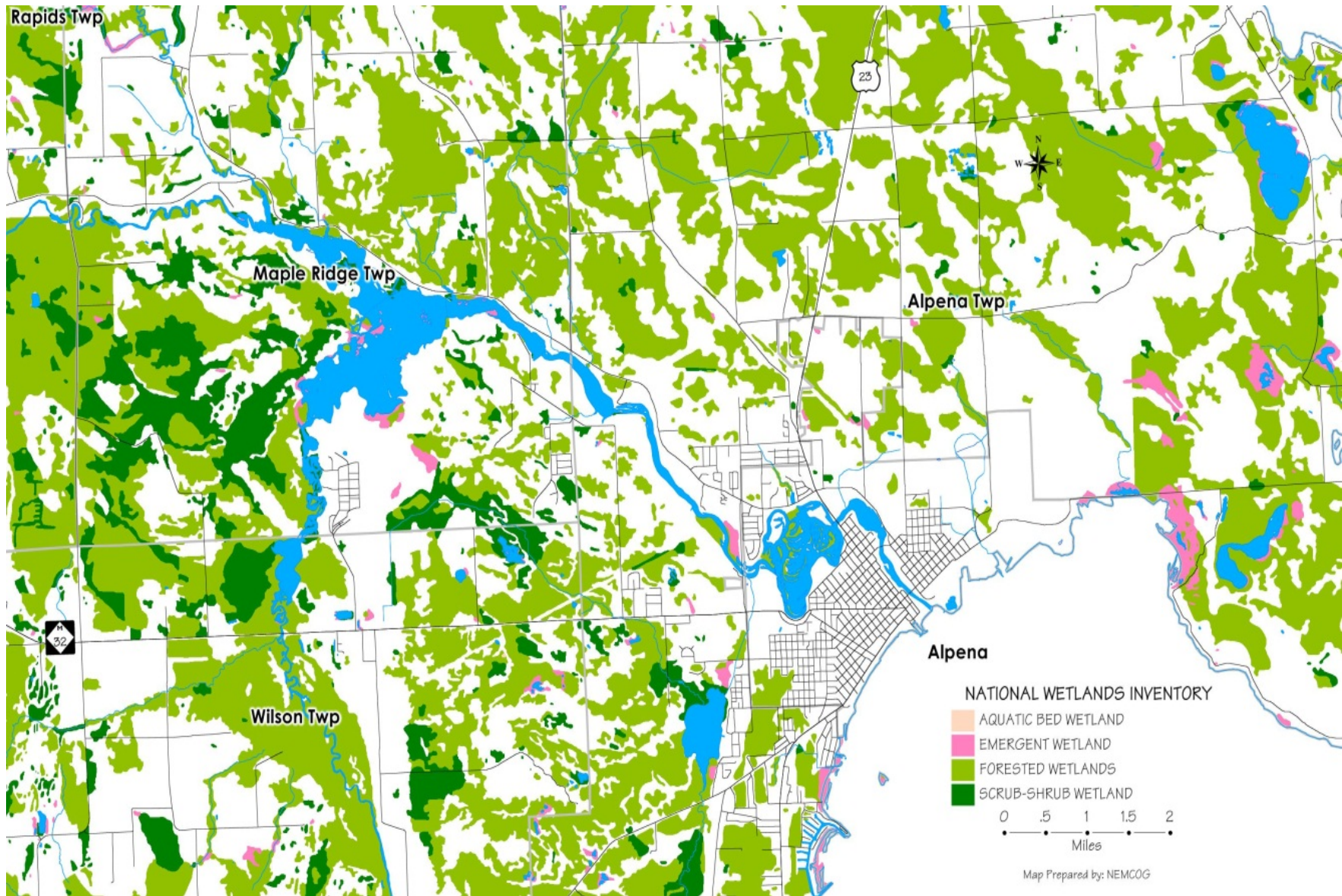


Figure 2-6 City of Alpena's Coastal and Inland Wetlands

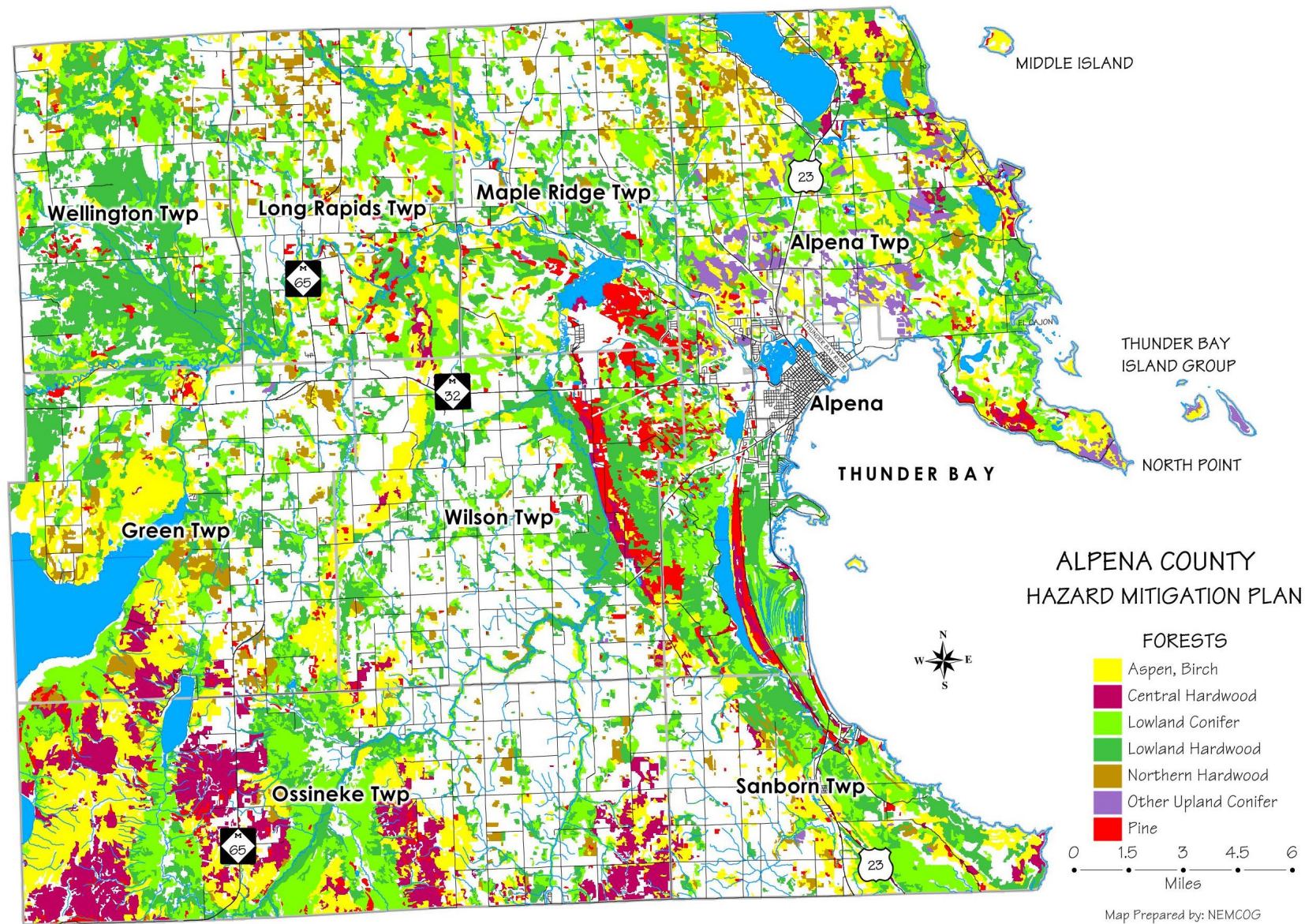


Figure 2-7 Alpena County's Forest Lands

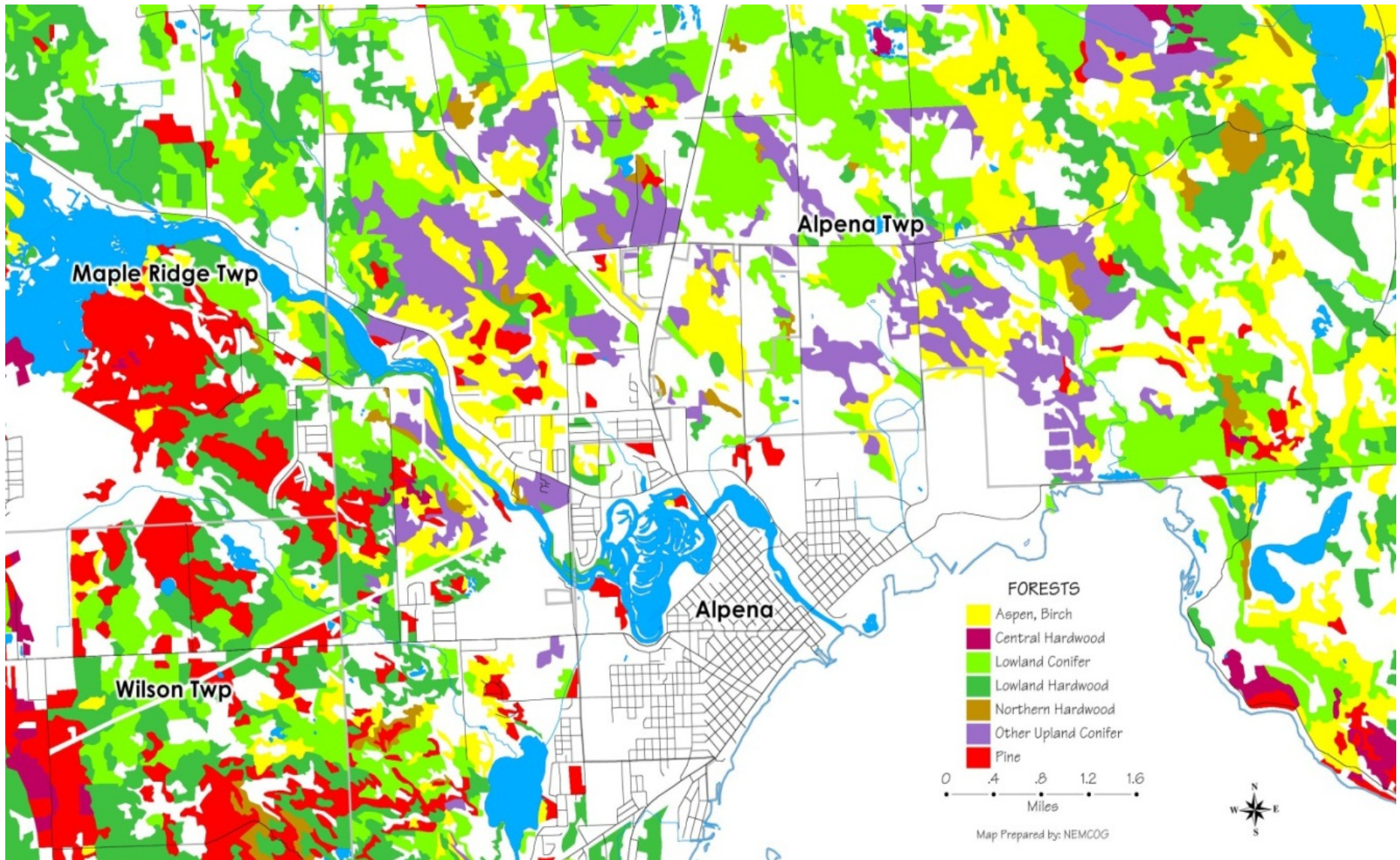


Figure 2-8 City of Alpena Forest Lands

Discharge Permits

Surface Water (National Pollutant Discharge Elimination System) Permits

The State of Michigan controls the discharge of pollutants from waste and wastewater into Michigan's surface waters through the National Pollutant Discharge Elimination System (NPDES) permitting process. This process imposes effluent limitations and other necessary conditions to protect the environment and meet State and Federal regulations. Alpena County has 33 NPDES permits that have been issued (Table 2-2).

Table 2-2 Surface Water (NPDES) Permits, Alpena County				
Site Name	Address	Site Type	Permit Number	Expiration Date
Alpena Biorefinery	412 Ford Avenue	Industrial; Standard Wastewater	MI0058997	10/1/16
Alpena Biorefinery	412 Ford Avenue	Industrial; Standard Wastewater	NEC186519	7/17/21
Alpena Co Regional Airport	1617 Airport Road	Industrial	MIS210266	4/1/22
Alpena CRC-Herron Rd HRRR	Herron Road	Construction Site	MIR115354	11/7/23
Alpena CRC-Wolf Creek Rd	Wolf Creek Road	Construction Site	MIR115425	1/14/24
Alpena WWTP	210 Harbor Drive	Municipal Sanitary- Public	NEC186477	4/6/21
Alpena WWTP	210 Harbor Drive	Municipal Sanitary- Public	MI0022195	10/1/21
Ameri-Shred Ind Corp-Alpena	3490 US 23 North	Industrial	MIS210265	4/1/22
ATI Casting Service	615 McKinley Street	Industrial	NEC186337	6/9/20
ATI Casting Service LLC	615 McKinley Avenue	Industrial	NEC157933	6/2/20
Bay Mfg Corp-Alpena	3750 US 23 North	Industrial	MIS210264	4/1/22
Benjey North	108 East Herman Street	Industrial	NEC157645	7/18/19
Besser Co	801 Johnson Street	Industrial	MIS211043	4/1/22
Cheboygan Cement-Alpena BP	400 Commerce Drive	Industrial	MIS210263	4/1/22
Conveyor Systems Inc	167 North Industrial Highway	Industrial	MIS210710	4/1/22
Decorative Panels Intl-Alpena	416 Ford Avenue	Industrial	MI0002500	10/1/16
Federal Express Corp-APNA	2070 M-32 West	Industrial	NEC186537	10/11/21
Great Lakes Maritime Center	500 West Fletcher Street	Industrial	MIG250479	4/1/18
Lafarge-Alpena	1435 Ford Avenue	Industrial	MI0001988	10/1/17
Lees Auto Parts-Alpena	5221 US 23 North	Industrial	MIS220057	4/1/22
Nemroc Inc-Alpena	800 Bolton Street	Industrial	MIS210057	4/1/22
Nor-Tech Ind Corp-Alpena	3800 US 23 North	Industrial	MIS210385	4/1/22
Panel Processing Inc-Alpena	120 North Industrial Highway	Industrial	NEC157944	8/11/20
PCI	3810 US 23 North	Industrial	MIS210284	4/1/22

Table 2-2 Surface Water (NPDES) Permits, Alpena County				
Site Name	Address	Site Type	Permit Number	Expiration Date
Quest Industrial Corp-Alpena	1995 Hamilton Road	Industrial	MIS210262	4/1/22
R E Glancy Inc-Alpena	3502 Wessel Road	Industrial	MIG490152	4/1/20
Ren-Tech Ind Corp-Alpena	3580 US 23 North	Industrial	MIS210277	4/1/22
Specification Stone Products	1009 Long Lake Avenue	Industrial	MIG490151	4/1/20
Specification Stone Products	1009 Long Lake Avenue	Industrial	MIS210998	4/1/22
Steel Craft Inc-Alpena	1086 East Hamilton Road	Industrial	MIS210275	4/1/22
Thunder Bay Tree Service LLC	1172 Halley	Pesticide	MIG031060	2/1/22
UPS-Alpena	1847 M-32 W	Industrial	NEC157876	3/12/20
Via-Tech Corp-Lachine	11715 M-32 West	Industrial	MIS210468	4/1/22

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

Groundwater Discharge Permit

The State of Michigan regulates the discharge of wastes and wastewaters into the ground or groundwater system through the groundwater discharge permit program. Field staff review effluent and groundwater data and inspect discharge facilities. The issuance of a groundwater permit does not authorize the violation of local, state, or federal regulations, nor does it remove the obligation to obtain other permits or government approvals. According to the Michigan Department of Environment, Great Lakes, and Energy (EGLE), there are two groundwater discharge permits issued in Alpena County: Lakeshore Estates MHP and Team Elmers Alpena Quarry.

Air Discharge (Renewable Operating Permit/Title V) Permits

Sites of Environmental Contamination

The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended regulates facilities of environmental contamination in Michigan. The Remediation and Redevelopment Division of EGLE works toward managing and revitalizing sites of environmental contamination to protect the environment. The division administers two programs: Environmental Remediation (release of hazardous substances from facilities) and Leaking Underground Storage Tanks (release of hazardous substances from underground storage tanks).

The facility inventory database has information for Sites of Environmental Contamination (Part 201), Leaking Underground Storage Tanks (Part 213), and Baseline Environmental Assessments (BEA). The Baseline Environmental Assessment documents the existing contamination and allows a facility to be acquired and/or operated without being held liable for the existing contamination. In Alpena County, the facility inventory database reports the following:

- 98 sites with completed Baseline Environmental Assessments
- 75 sites listed as Sites of Environmental Contamination (Part 201)
- 57 sites listed as Leaking Underground Storage Tanks (Part 213)

Chapter 3 Community Profile

Population

The U.S. Census Bureau reports Alpena County has a population of 28,730 people, which is an 8.3% decline since 2000 (Table 3-1). Additionally, the majority of the municipalities experienced a population decline with Wellington Township (-13.5%), the City of Alpena (-10.4%), and Wilson Township (-10.1%) experiencing the greatest declines. Ossineke Township experienced a 3.4% population increase.

The majority of the County’s population is concentrated in Alpena Township and the City of Alpena, which influences the County’s population density figure of 50.2 persons per square mile. If the City of Alpena and Alpena Township are removed from the calculation, the population density becomes 21.3 persons per square mile for the seven remaining townships.

Table 3-1 Alpena County and Local Municipality Populations, 2000-2017

Municipality	2000 Population	2010 Population	2017 Population	Percent Change 2000-2017
Alpena County	31,311	29,598	28,730	-8.3%
City of Alpena	11,311	10,483	10,123	-10.4%
Alpena Township	9,781	9,060	8,834	-9.7%
Green Township	1,205	1,228	1,138	-5.6%
Long Rapids Township	1,019	1,010	989	-2.9%
Maple Ridge Township	1,715	1,690	1,676	-2.3%
Ossineke Township	1,761	1,675	1,821	3.4%
Sanborn Township	2,149	2,116	2,029	-5.7%
Wellington Township	296	307	256	-13.5%
Wilson Township	2,074	2,029	1,864	-10.1%

Source: U.S. Census Bureau
 Note: Green text indicates increase, Red text indicates decline

Seasonal Population Estimate

It is difficult to determine the number of seasonal residents, visitors, and tourists in the county. However, an approximate estimate for the number of seasonal residents can be obtained by multiplying the number of seasonal housing units (2,073) by the average number of persons per household (2.20) to get a seasonal population estimate of 4,561 persons. When the seasonal population estimate is combined with the U.S. Census Bureau’s population figure, the County’s population becomes 33,291. Unfortunately, this population estimate does not include seasonal visitors or tourists who stay in motels, campgrounds, or family homes.

Age Distribution

The U.S. Census Bureau reports 52.7% of Alpena County’s population is 45 years or older (Table 3-2). Since the County’s population has been decreasing since 1980, the shift towards an older population is most likely due to the existing residents becoming older. The 45-64 year old age group is the most populous in most of the municipalities, while the 65 years and older age group is the largest group in Wellington Township.

Between 2000 and 2017, the median age of residents in Alpena County increased from 40.4 to 47.6 years, while the State’s median age increased from 35.5 to 39.6 years (Figure 3-1, Table 3-2). Since the county is aging at a faster rate than the State, the County’s population will have a greater need for accessible social and medical services. Additionally, all of the municipalities have a higher median age than the State with Alpena Township having the highest median age and the City of Alpena having the lowest median age.

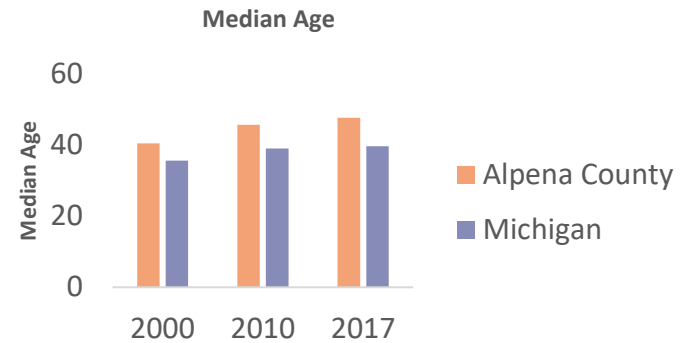


Figure 3-1 Alpena County Median Age

Table 3-2 Alpena County's Age Distribution by Municipality													
Municipality	< 5 Yrs.	%*	5-19 Yrs.	%*	20-24 Yrs.	%*	25-44 Yrs.	%*	45-64 Yrs.	%*	65 Yrs. & >	%*	Median Age
City of Alpena	565	5.6	1,767	17.5	666	6.6	2,413	23.9	2,660	26.3	2,052	20.3	42.1
Alpena Township	219	2.5	1,344	15.1	382	4.3	1,625	18.3	2,973	33.7	2,291	26.0	52.4
Green Township	56	4.9	197	17.3	35	3.1	212	18.6	379	33.4	259	22.8	49.3
Long Rapids Township	48	4.9	101	10.2	80	8.1	165	16.7	392	39.6	203	20.5	51.7
Maple Ridge Township	66	3.9	313	18.7	63	3.8	371	22.2	538	32.1	325	19.3	46.1
Ossineke Township	180	9.9	300	16.5	85	4.7	381	20.9	456	25.0	419	22.9	42.9
Sanborn Township	133	6.6	400	19.7	98	4.8	464	22.9	605	29.8	329	16.2	42.5
Wellington Township	10	3.9	32	12.5	12	4.7	54	21.1	72	28.2	76	29.6	52.1
Wilson Township	52	2.8	294	15.8	127	6.8	276	14.9	743	39.9	372	19.9	49.3
Alpena County	1,329	4.6	4,748	16.6	1,548	5.4	5,961	20.8	8,818	30.7	6,326	22.0	47.6
Michigan	571,999	5.8	1,910,417	19.3	723,180	7.3	2,396,359	24.1	2,748,380	27.7	1,575,233	15.8	39.6

*Figure shows the percentage each age grouping represents of the local unit’s total population.
Source: U.S. Census Bureau

Disability Status

Disabled status data is estimated by the American Community Survey and is based on a sample (Table 3-3). A person was classified as having a disability if they had a sensory, physical, mental, self-care, going outside the home, or an employment disability. Approximately 35.8% of Alpena County's population is classified as having some type of disability. There are approximately 5,221 people between the ages of 18 and 64 years who have a disability with ambulatory disabilities and cognitive difficulties being the most common.

Table 3-3 Disability Status in Alpena County	
Status Type	Number of Persons
Population under 5 years with a disability	38
With a hearing difficulty	19
With a vision difficulty	19
Population 5-17 years with a disability	438
With a hearing difficulty	15
With a vision difficulty	31
With a cognitive difficulty	288
With a ambulatory difficulty	57
With a self-care difficulty	47
Population 18-64 years with a disability	5,221
With a hearing difficulty	595
With a vision difficulty	479
With a cognitive difficulty	1,295
With a ambulatory difficulty	1,350
With a self-care difficulty	493
With an independent living difficulty	1,009
Population 65+ years with a disability	4,983
With a hearing difficulty	1,130
With a vision difficulty	427
With a cognitive difficulty	551
With a ambulatory difficulty	1,431
With a self-care difficulty	476
With an independent living difficulty	968
Source: American Community Survey 2017	

Housing Stock

According to the U.S. Census Bureau, Alpena County has 16,031 housing units with 12,789 occupied units and 3,242 vacant units (Table 3-4). Since the County's population is concentrated in Alpena Township and the City of Alpena, these municipalities have the most housing units at 5,102 and 5,075, respectively. The county has 2,073 vacant housing units that are classified as seasonal, which are primarily located in Ossineke, Green, and Wellington Townships. Seasonal housing presents unique challenges when mitigating hazards since their geographical location makes them more susceptible to wildfires and flooding.

Jurisdiction	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Vacant Units (%)	Seasonal Housing Units	Seasonal Units* (%)
Alpena County	16,031	12,789	3,242	20.2	2,073	12.9
City of Alpena	5,075	4,604	471	9.3	101	2.0
Alpena Township	5,102	4,137	965	18.9	547	10.7
Green Township	877	485	392	44.7	340	38.8
Long Rapids Township	679	458	221	32.5	154	22.7
Maple Ridge Township	941	691	250	26.6	176	18.7
Ossineke Township	1,071	686	385	35.9	340	31.7
Sanborn Township	1,049	799	250	23.8	196	18.7
Wellington Township	232	116	116	50.0	99	42.7
Wilson Township	1,005	813	192	19.1	120	11.9

*Percent of total housing
Source: US Census Bureau

Generally, older housing units are more likely to need renovations and the City of Alpena and Alpena County have housing rehabilitation programs to assist low income homeowners. In Alpena County, the majority of the structures were built between 1960 and 1979 (Table 3-5). However, 37.9% of the structures were built prior to 1960, while 14.5% of those structures were built prior to 1940. According to the U.S. Census Bureau, approximately 29.4% of the structures in the City of Alpena were built prior to 1940.

Year Structure Built	Percent
2000 or later	8.2%
1990-1999	8.8%
1980-1989	10.2%
1960-1979	34.9%
1940-1959	23.4%
1939 or earlier	14.5%

Source: American Community Survey 2017

Selected Economic Indicators for Alpena County

As the County’s population has declined, the number of people in the labor force has also declined from 14,199 persons in 2010 to 13,582 persons in 2017 (Figure 3-2). Historically, the unemployment rate in Alpena County has been lower than the State and the surrounding counties.



Figure 3-2 Unemployment Rate

Median Income

According to the U.S. Census Bureau, Alpena County’s median household income is \$40,954, which is 77.8% of the State’s median income and 71.0% of the national median income (Table 3-6). In the county, people between the ages of 25 and 64 years make more than the County’s overall median household income (Table 3-7).

The median household incomes in Northeast Michigan are expected to remain lower than the State of Michigan since the region has a higher proportion of older individuals than the State and the region’s economy is reliant on the service and tourism industries, which tend to have seasonal employment opportunities and low incomes. As younger people move out of the region in search of steady, year-round employment with higher incomes, the region may experience a continued decline in median household income and an increase in an older population.

Table 3-6 Median Household Income	
Place	2017
Alcona County	\$39,424
Alpena County	\$40,954
Cheboygan County	\$42,876
Crawford County	\$42,666
Montmorency County	\$39,152
Oscoda County	\$36,833
Otsego County	\$50,823
Presque Isle County	\$43,758
State of Michigan	\$52,668
United States	\$57,652

Source: U.S. Census Bureau

Table 3-7 Median Household Income by Age Group in Alpena County	
Age	Median Household Income
15-24 years	\$21,302
25-44 years	\$44,809
45-64 years	\$47,345
65+ years	\$35,107

Source: U.S. Census Bureau - American Community Survey

Poverty Rates

Poverty remains an issue in Alpena County with approximately 9.9% of families living in poverty (Table 3-8). When children are present, the poverty rate increases to 19.3%. When a female householder is present, the rate increases to 31.7% and to 46.3% if there are children under 18 in the household. Since 2000, the poverty rate for householders aged 65 and older has decreased from 6.9% to 3.9%.

Table 3-8 Poverty Rates 2017	
Category	Percent
Families	9.9
All families w/related children under 18	19.3
Married couple families	4.7
Married couple families w/related children under 18	6.5
Female householder, no husband present	31.7
Female householder, no husband present w/ related children under 18	46.3
Householder 65+ years	3.9

Source: U.S. Census Bureau– American Community Survey

Agriculture

According to the USDA's 2012 Census of Agriculture County Profile for Alpena County, the number of farms in the county has decreased from 573 farms in 2009 to 458 farms in 2012 (Table 3-9). Despite the decline in the number of farms, the amount of farmland has increased from 58,947 acres in 2009 to 69,274 acres in 2012. The 2012 County Profile found the market value of the products sold to be \$23,653,000 with \$9,507,000 in crop sales and \$14,146,000 in livestock sales.

Table 3-9 Alpena County Agricultural Statistics	
Total farm production expenses	\$21,042,000
Organic Program certified farms	8 farms
Cropland transitioning to Organic Program certified farms	1 farm
Total livestock inventory	12,424 animals
Revenue by milk from cows	\$11,784,000
Revenue by Grains, oilseeds, dry beans, and dry peas	\$7,467,000
Forage Land used for hay and haylage, grass silage, and greenchop	19,843 acres
Source: 2012 USDA Census of Agriculture	

Chapter 4 Land Use Characteristics

Land Cover/Use

The 1978 Michigan Resource Information Systems (MIRIS) land cover/use classification categories were used to map the county's existing land use and assist in defining the county's vulnerable areas and populations (Figure 4-1, Table 4-1). The MIRIS map was updated with aerial photographs, extensive field checking, and existing land use maps from the City of Alpena, and Ossineke, Maple Ridge, Wilson, Long Rapids, Green, Alpena, and Sanborn Townships. Approximately 12% of the county's land is composed of public lands. Minimal development has occurred in the county; therefore, no significant changes in development have occurred since the previous plan update.

Land Cover/Use	Acres	Percent
Residential	12,436	3.3%
Commercial	1,221	0.3%
Industrial/Extractive/Transportation	5,259	1.4%
Institutional/Recreational	2,194	0.6%
Agricultural	65,442	17.2%
Non-Forested Uplands	26,538	7.0%
Upland Forest	85,676	22.5%
Lowland Forest	141,831	37.3%
Wetlands	25,690	6.8%
Surface Water	14,115	3.7%

Source: MIRIS Data, updated from local sources, 2019

Residential

The residential land use category includes single family homes, duplexes, multi-family low rise residential, multi-family medium and high rise residential, and mobile home parks. The largest concentration of residential development is located in the City of Alpena and around its periphery in Alpena Township. Smaller concentrations of residential development are found around Ossineke (Sanborn Township), Hubbard Lake (Ossineke Township) and Lachine (Long Rapids Township).

The majority of the shoreline of Long Lake (Alpena Township), Mud Lake/Sunset Lake (Alpena Township), Lake Winyah (Maple Ridge Township), Beaver Lake (Long Rapids Township), portions of Thunder Bay River, along the Lake Huron shoreline at Partridge Point Peninsula (Alpena Township), south of Squaw Bay (Alpena Township) to Ossineke, and Huron Bay (Alpena Township) south to Potter Point (Alpena Township) have high concentrations of residential development. Within the interior of the county, residential development occurs along the county roads as large parcels are split into smaller ones.

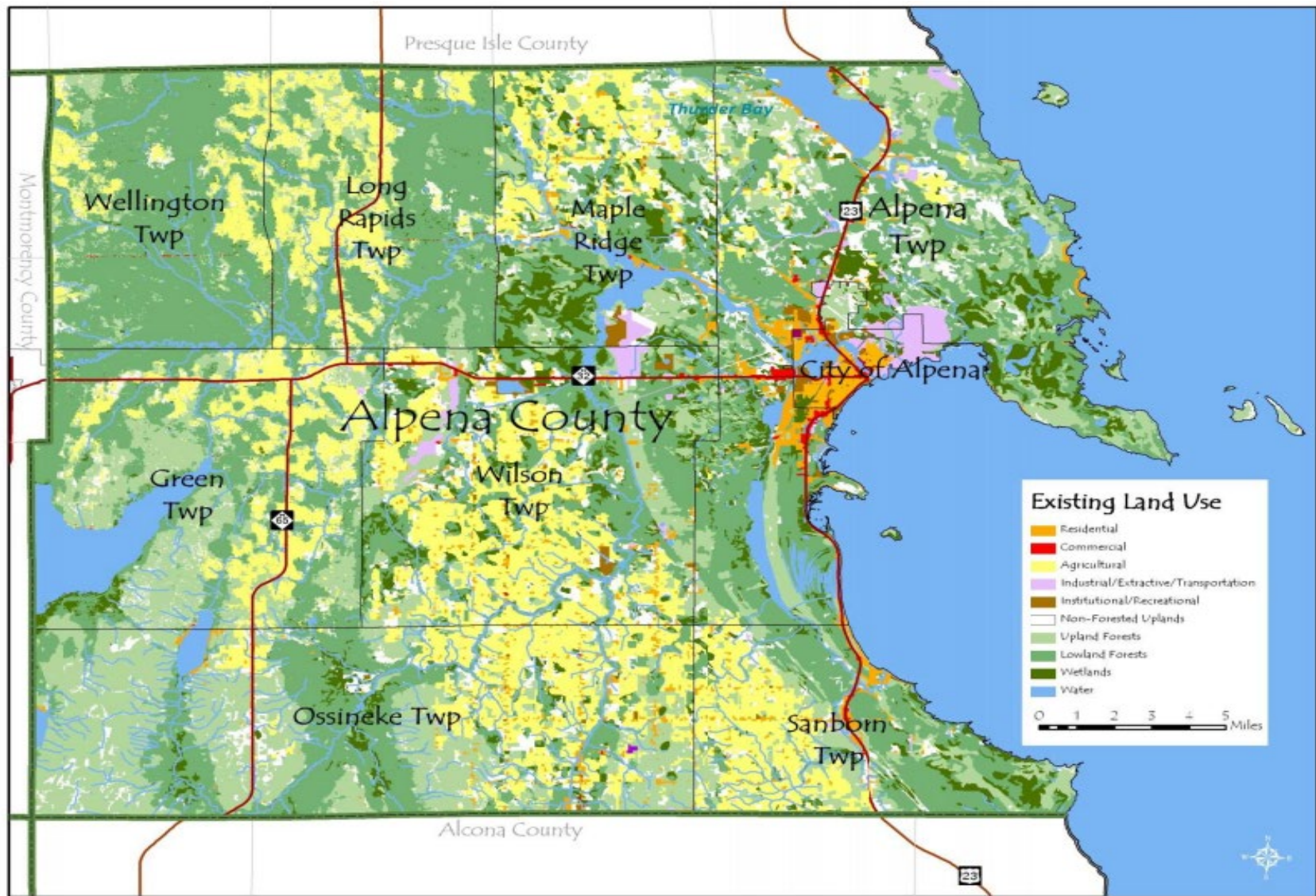


Figure 4-1 Alpena County Land Cover/Use

Commercial

Commercial land use includes central business districts, shopping centers and malls, strip commercial, compact neighborhood stores surrounded by noncommercial uses, and parking areas for commercial businesses. Commercial uses are primarily located in the City of Alpena along M-32 and U.S. 23 North, on U.S. 23 South in Alpena Township, and in Ossineke (Sanborn Township). Small nodes of commercial uses (e.g. convenience stores) can be found at primary crossroads throughout the county.

Industrial/Extractive/Transportation

Industrial/Extractive/Transportation land use includes extractive industries, manufacturing and industrial parks, light industries that fabricate or package products, oil & gas drilling and production facilities, lumber mills, chemical plants, brick-making plants, large power facilities, waste product disposal areas, areas of stockpiled raw materials, and transportation facilities. Most of the industrial land use is located in the northern parts of the City of Alpena and adjacent township areas. This category includes the Lafarge Corporation quarry and cement processing facility (Alpena Township), the Alpena Regional Airport (Maple Ridge and Wilson Townships) and the Paxton Quarry (Alpena Township).

Institutional/Recreational

Institutional/Recreational land use includes education, government, religious, health, correctional, military, and indoor and outdoor recreational facilities, cemeteries, and parking areas. The majority of the land use in this category includes Alpena Community College (Alpena Township), MidMichigan Medical Center-Alpena (Alpena Township), Alpena High School and facilities (Alpena Township), and the Combat Readiness Training Center (Alpena Township).

Agricultural

Agricultural land use includes land used for food and fiber production (e.g. croplands, orchards, confined feeding operations, permanent pasture lands, farmsteads, green house operations, etc.), and land used for non-food livestock (e.g. horse training areas). Most of the agricultural land is located on soils that bisect the county from northwest to southeast. Wilson (13,871 acres), Ossineke (11,438 acres), Green (8,727 acres), and Long Rapids (8,171 acres) Townships have the largest extent of agricultural lands. The predominant land cover in Long Rapids and Wilson Townships is agricultural.

Non-Forested Uplands

Non-Forested Uplands include barren land, herbaceous open land, shrubland, abandoned farms, clearings resulting from logging operations, and reclaimed mining areas. Herbaceous open land is subject to continuous disturbance (e.g. mowing, grazing, or burning) and has a variety of grasses, sedges, and clovers. Shrubland is land in transition from open land to forestlands, and includes blackberry, raspberry briars, dogwood, willow, sumac, wild cherry and serviceberry.

Upland Forests

Upland Forests include maple, beech, aspen, birch, white spruce, blue spruce, eastern hemlock, red, white and jack pine, and balsam fir. The predominant land cover in Green and Ossineke Townships is upland forest. In Ossineke Township, the Alpena State Forest covers approximately seven square miles.

Lowland Forests

Lowland Forests are located along the coastal regions (e.g. Wolf Creek and Beaver Creek Watersheds) and in Wellington Township. These forests include lowland conifers (e.g. northern white cedar, black spruce, tamarack, white spruce, black spruce, and eastern hemlock) and lowland hardwoods (e.g. ash, cottonwood, elm, balsam fir, and red maple). Lowland forests are the predominant land cover type in

Alpena, Maple Ridge, Sanborn, and Wellington Townships. In Wellington Township, there is an extensive lowland area known as Long Swamp.

Wetlands

Wetlands include marshes, mudflats, wooded swamps, non-vegetated mud flats, areas of hydrophytic vegetation, and shallow areas along rivers, lakes, and ponds.

Surface Water

Surface Water covers approximately 13,032 acres of the county and includes lakes, reservoirs, impoundments, ponds, rivers, and streams. Fletcher Pond (Green Township), Long Lake (Alpena Township), Lake Winyah (Maple Ridge Township), Devils Lake (Alpena Township), Beaver Lake (Long Rapids Township), Turtle Lake (Ossineke Township), Grass Lake (Alpena Township), Middle Lake (Alpena Township), Mud Lake (Alpena Township) and the three branches of the Thunder Bay River are the major surface waters in the county.

Chapter 5 Community Services and Facilities

Overview

Community services and facilities play an important role in maintaining and improving quality of life. The location and level of some services, such as public water, public wastewater and fiber optic lines, determine the types and intensities of development within a community. These services may be sufficient for the needs of the current population; however, a hazard event may require the construction of new services and facilities. This construction is costly and is best avoided through future planning.

The majority of the population and infrastructure of Alpena County is located in the City of Alpena and Alpena Township (Figure 5-1). Since there are population pockets scattered throughout the county, local communities work cooperatively to provide essential services, such as fire and ambulance.

County Government

The Alpena County Board of Commissioners meets on the last Tuesday of each month, unless posted otherwise, in the County Annex Building. The county is represented by eight commissioners. There are many county departments, including county clerk, home improvement, equalization department, treasurer, sheriff, and emergency management.

Minor Civil Divisions

Alpena County consists of eight townships and one city.

- Alpena Township is located at 4385 U.S. 23 North in Alpena
- Green Township is located at 2650 Calcut Road in Lachine
- Long Rapids Township is located at 5310 M-65 N in Lachine
- Maple Ridge Township is located at 6000 W. LaComb Road in Alpena
- Ossineke Township is located at 10615 Nicholson Hill Road in Hubbard Lake
- Sanborn Township is located at 12025 U.S. 23 South in Ossineke
- Wellington Township is located at 5848 Collins Road in Lachine
- Wilson Township is located at 6120 Herron Road in Herron

- City of Alpena is located at 208 North First Avenue in Alpena

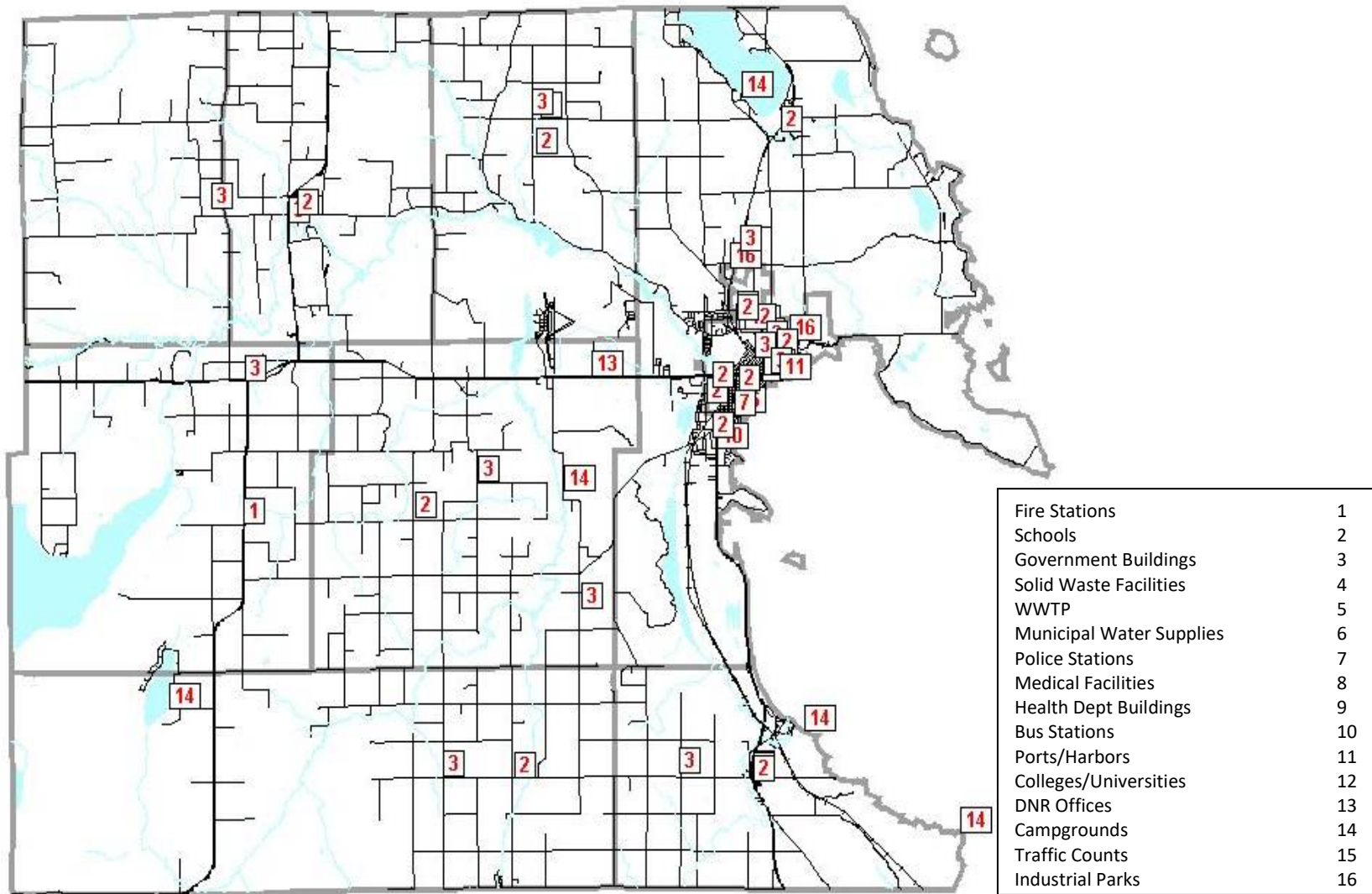


Figure 5-1 Alpena County's Infrastructure

Public Safety

Law Enforcement

Alpena County Sheriff's Office, 320 Johnson Street in Alpena

- Service area: Areas in the county that do not have municipal police departments (28,405 people)
- Staff: 13 deputies (one open part-time Deputy position), 15 corrections officers (one open full-time Corrections Officer position)
- Equipment: 2,500cc Honda ATVs, 700cc UTV with tracks/enclosed heated cab, 600cc Polaris, 600cc Artic Cat, 17ft Fiberglass Center Console with trailer, 20ft Aluminum Flat Bottom with Jet Drive and trailer, 24ft Safe Boat with enclosed cabin and trailer, Inflatable Rescue Craft (housed at Alpena TWP North), Inflatable Rescue Craft (housed at Alpena City Fire), Towable Rescue sled with tires or skis (can be used behind ATV or snowmobile), 8ft Single axle trailer, 22ft enclosed trailer, 24ft enclosed trailer, 20ft enclosed trailer-fitted for search and rescue, speed radar trailer with message board, Ford 550 Incident Command Truck, Ford Ambulance-Fitted for Dive Team, Misc. Dive equipment for Dive Team
- Alpena County Jail: 69 bed capacity (November 2017: residents voted to construct, operate, furnish, and equip a new jail for the county. The new jail is under construction as of 2020.)

City of Alpena Police Department, 501 W Chisholm in Alpena

- Service area: 8.86 square miles (9,963 people)
- Staff: 10 patrol officers, 3 sergeants (one open position), 1 detective/sergeant, 1 lieutenant, 4 open positions
- Equipment: 8 utility vehicles, 2 bike patrols

The Michigan State Police-Alpena Post #74, 3283 W. Washington in Alpena

- Service area: Alpena, Alcona, Montmorency, Presque Isle, and Oscoda Counties
- Staff: 21 certified troopers, 5 sergeants, 2 detective/sergeants, 1 motor carrier officer, 1 lieutenant, 5 open positions
- Equipment: 22 utility vehicles

Law Enforcement Division, Michigan Department of Natural Resources

- Service area: Alpena County (~30,000 people)
- Primarily tasked with conservation law enforcement; however, assist local law enforcement
- Staff: 2 full-time conservation officers
- Equipment: 2 ATVs, 4 snowmobiles, 2 small watercraft, 1 large watercraft

Fire Departments

Alpena Fire Department/Alpena County EMS, 501 W Chisholm Street and 2201 U.S. 23 South in Alpena

- Service area: City of Alpena for fire, all hazard response, County for EMS (30,000 people)
- Staff: 27 authorized full-time staff (3 open positions)
- Equipment: 3 fire engines, 1 ladder truck, 7 ambulances, 3 utility vehicles, 2 small watercraft, 1 ice rescue unit, 2 ALS non-transport units ("echo")

Alpena Township Fire Department, 2201 U.S. 23 South in Alpena

- Service area: 125 square miles (10,000 people)
- Staff: 7 full-time staff, 21 part-paid staff, 6 open positions
- Equipment: 3 fire engines, 1 tanker, 3 ambulances, 1 grass rig, 1 ATV, 1 ice rescue unit

Maple Ridge Fire Department, 6010 Lacombe Road in Alpena

- Service area: Maple Ridge Township except Thunder Bay Village (1,642 people)
- Staff: 2 part-paid staff, 5 open positions
- Equipment: 1 fire engine, 1 tanker, 1 ambulance, 1 grass rigs, 1 snowmobile, 2 large watercraft, 1 ice rescue unit (hovercraft)

Sanborn Township Fire Department, 12011 U.S. 23 South in Ossineke

- Service area: Sanborn Township (2,000 people)
- Staff: 8 part-paid staff, 4 open positions
- Equipment: 2 fire engines, 1 tanker, 1 rescue ambulance, 1 grass rig

Green Township Fire Department, 1500 Moores Landing Road in Lachine

- Service area: Green Township (1,800 people)
- Staff: 18 paid-on call, 2 open positions
- Equipment: 1 fire engine, 2 tankers, 1 grass rig, 1 airboat/ice unit, 1 ice rescue unit, rescue trailer

Long Rapids Township Fire Department, 5310 N M-65 Highway in Lachine

- Service area: 81 square miles in Long Rapids Township and E. ½ of Wellington Township (1,400 people)
- Staff: 20 part-time staff
- Equipment: 1 fire engine, 1 tanker, 1 grass rig, 1 Utility vehicle, 1 ATV, 1 small watercraft

Wilson Township Fire-Rescue, 3746 King Settlement Road in Alpena

- Service area: 79.81 square miles (2,029 people)
- Staff: 15 part-paid staff, 5 open positions
- Equipment: 1 fire engine, 1 tanker, 1 emergency response vehicle

Hubbard Lake Fire Department, 1545 Hubert Road in Hubbard Lake (Alcona County)

- Service area: 144 square miles (~2,500-3,000 people)
- Staff: Full-time volunteers with some compensation, 6 open positions
- Equipment: 1 fire engine, 2 tankers, 1 grass rig, 1 ice rescue unit, ice rescue suits/sled, jaws, air bags

Michigan Department of Natural Resources Office, 4343 M-32 in Alpena

- Service area: Alpena County (30,000 people)
- Staff: 1 full-time staff member, 3 part-paid staff
- Equipment: 2 grass rigs (1 800-gallon capacity, 1 150 gallon capacity; both equipped with Class “A” foam), 1 utility vehicle, 1 ATV, 1 snowmobile, 1 tilted truck/450 LPG John Deere Dozer, ¾ ton 4x4 pick up

Alpena Combat Readiness Training Center

- Service area: Alpena Combat Readiness Center, 2nd Alarm Wilson Township 19 and response to 19 mutual aid agreements (up to 3,000 residents)
- Acts as the Region 7 Regional Hazmat Response Team
- Staff: 28 full-time staff, 5 open positions
- Equipment: 1 Pierce P-22 500 gallons of agent, 1 KME P-26 4000 gallons of agent, 1 6-pack F-250 2 wheel drive, 1 Kawasaki Mule 4 seater grass rig, 1 14ft V water rescue boat with 15 HP motor, 1 RDB “banana boat” and ice rescue trailer with 15 suits, 2 P-23 Crash rescue vehicles, 5 3,300 gallons of agent including C-6 ARFF foam, P-30 Medium Rescue with rescue equipment, F-450 small rescue with rescue and medical equipment, Chief 1 command vehicle, Mobile Command Trailer, Bauer Portable Air Trailer, Technical Rescue Trailer for confined space, High angle rescue, advance DECON trailer, spill response trailer, Hazmat trailer

Government Facilities: Alpena Combat Readiness Training Center

The Alpena Combat Readiness Training Center (Alpena CRTC) is a certified Joint National Training Center that handles the Air Force-related functions of the National Guard. It is co-located with the Alpena County Regional Airport (Wilson Township’s northern border and Maple Ridge Township’s southern border), sharing functional assets including two runways and air navigation equipment. The Alpena CRTC manages the operational aspects of the airspace used by units training at Alpena CRTC and Camp Grayling. While the Alpena CRTC does not have any flying units of its own, it supports organizations from all branches of the military throughout the US and coalition partners. Specific to Alpena CRTC are facilities for firefighter training, munitions storage, bulk jet fuel storage, Combat Aviation Patrol capable shelters and maintenance, Joint Terminal Attack Controllers to support range activities, a large aircraft parking apron, operations support facilities for transient units, aircraft maintenance hangars, billeting, dining, and recreational assets. The Alpena CRTC hosts the fourth-largest National Guard Bureau training operation, known as Northern Strike. The CRTC also has self-contained facilities large enough to house 3,000 persons, up to a maximum of 6,000 persons under emergency conditions. For more information, The Joint Land Use Study for Camp Grayling and Alpena Combat Readiness Training Center can be found at <http://www.discovernortheastmichigan.org/jlus.asp>.

Early Warning & Siren Systems

Alpena County uses RAVE and eight active sirens to warn county residents and visitors (Figure 5-2). Additionally, the Emergency Alert System broadcasts over every radio and television station; however, satellite tv may not broadcast local information. The county’s warning system is manually activated and is not connected to the weather system. Alpena County participates in Smart911. However, large land holdings in the northwest and southern regions of the county (e.g. hunt clubs) are unserved by any form of telecommunication, which makes it difficult for residents and visitors to call or be contacted during emergencies.

Legend

-  Warning Sirens
 -  City of Alpena
 -  Ossineke
 -  Unincorporated Places
- Roads
-  State Trunkline
 -  County Primary
 -  City Major

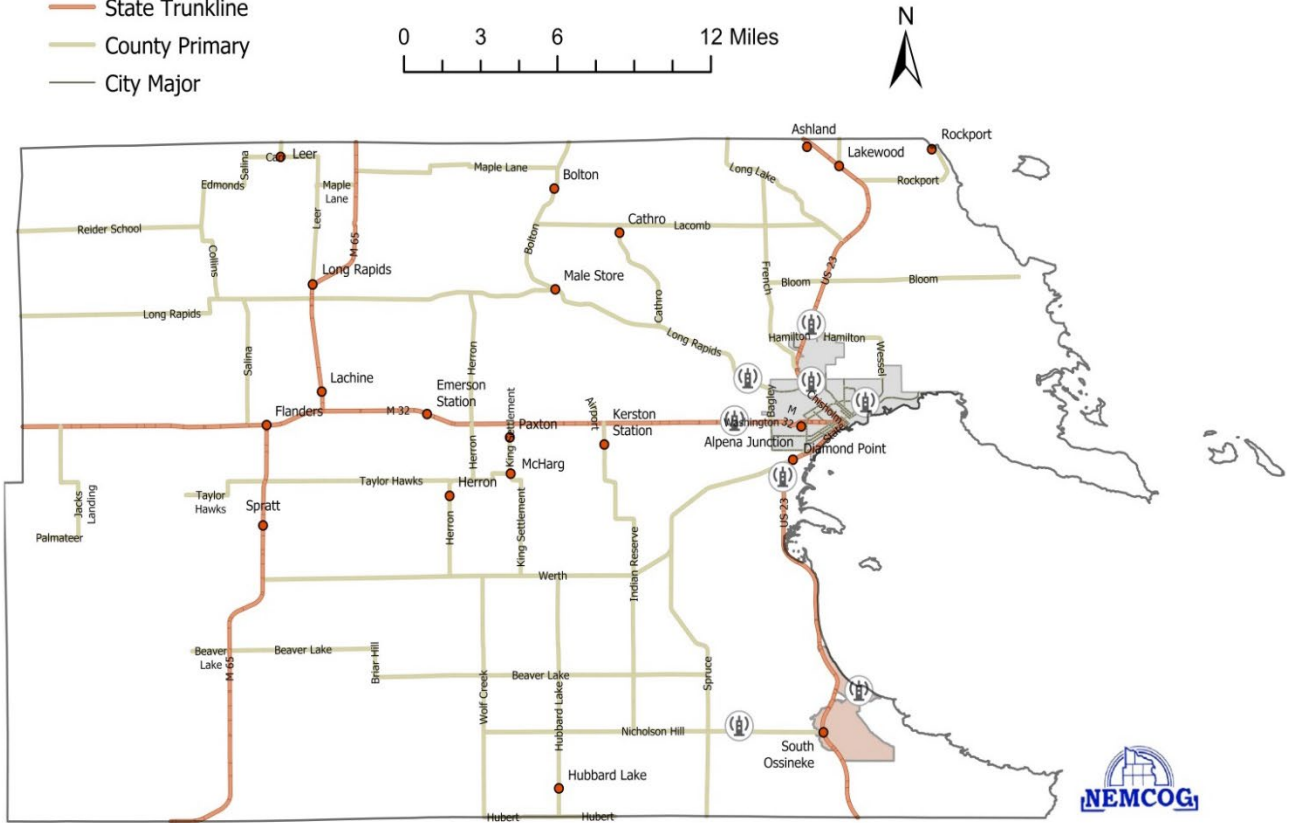


Figure 5-2 Alpena County's Siren Warning System

Medical Facilities

MidMichigan Medical Center-Alpena is located at 1501 W. Chisholm Street in Alpena and is the federally designated rural Regional Referral Center for Northeast Michigan and part of the University of Michigan Health Systems. The hospital has 139 beds and a staff of approximately 1,000 employees, 100 physicians, and 200 volunteers. The hospital has two medical/surgical units, air and ambulance services, and provides hyperbaric chamber therapy, kidney dialysis, specialized cancer treatments, behavioral treatments, and sleep disorder treatments.

District Health Department #4 provides services to Alpena, Cheboygan, Montmorency and Presque Isle Counties and has offices in Alpena (100 Woods Circle), Cheboygan (825 S. Huron Street), Atlanta (12519 State Street), and Rogers City (106 E. Huron Street). Services include personal health services, home health services, environmental health services and health education.

Northeast Michigan Community Mental Health provides support services to developmentally disabled persons and persons needing mental health services in Alpena, Alcona, Montmorency, and Presque Isle Counties. In addition, the Van Wagoner VA Clinic is located at 180 N State Street in Alpena and provides primary care to veterans. Alpena County also has eleven assisted living facilities.

Thunder Bay Community Health Service provides primary care to the residents of Alpena, Montmorency, Cheboygan, Otsego, Oscoda, and Presque Isle Counties. The facility is staffed by four physicians, eight physician assistants, and five nurse practitioners. The clinic is fully equipped with x-ray and laboratory capabilities, and a pharmacy. There are also three dentists, two eye doctors, fourteen social workers, and one counselor.

Region 7 Healthcare Coalition serves seventeen counties in Northern Michigan. Some of the coalition's responsibilities include functioning as the regional resource for hospitals and medical control authorities, coordinating the efforts to develop a comprehensive all-hazards medical preparedness plan, and coordinating the efforts to enhance the medical system and its services.

To activate the Region 7 Medical Coordination Center:

- Dial 1-989-732-5141
- During the call include your name and contact number, your agency or hospital, the reason for requesting the resource, the exact location where you need the resource delivered, and who will accept and sign for the resource.

Public Water and Wastewater Supplies

Public water and wastewater is available throughout the City of Alpena, portions of Alpena Township and along M-32 through Wilson Township to the Alpena County Airport. The county's only water and wastewater treatment plants are located in the City of Alpena. The City of Alpena Filtration Plant supplies water, while the City of Alpena Water Recycling Plant treats all wastewater in the public system. The remainder of the county is served by individual wells and septic tanks for which permits must be obtained from District Health Department #4. In Green Township, a residential development located on the eastern portion of the Village of Hillman receives public water and sewer services from the village.

Thunder Bay is the source for all public water in Alpena County. A groundwater investigation conducted in 1966 by W.G. Keck & Associates determined that there is not a water bearing formation in the area adequate to serve as a source for municipal supply. The plant draws water using two intake lines: one located approximately 1,000 feet from shore in 10 feet of water and the second located approximately 2,000 feet from shore in 17 feet of water. The rated capacity of the intake pipe is 8 million gallons per day at 2.52ft/sec. The treatment plant has a firm capacity of 6.0 million gallons per day with a maximum daily demand of 3.04-million gallons per day. The average daily demand is 1.98-million gallons per day.

Once the water enters the treatment plant, it takes 12 hours to complete the treatment cycle. During the process, at least 50,000 samples are collected and analyzed per year and fluoride, phosphate, and flocculant aides are added. The plant laboratory is certified by the State of Michigan to test for Total and Fecal Coliform bacteria, which are the primary indicator organisms for water quality. The facility also tests for chlorine (disinfectant), pH, hardness, alkalinity, turbidity, fluoride, and other possible contaminants as required.

One 750 KVA diesel powered (1034 HP) generator is available to operate the entire water treatment plant to produce the necessary electricity to meet the city's needs during a power failure. The auxiliary generator is exercised quarterly.

Treated water storage is as follows:

- 1-million gallon ground storage at the Water Treatment Plant
- 750,000 gallons at Ninth Avenue elevated tower
- 750,000 gallons at North Industrial elevated tower
- 500,000 gallons at Alpena Township M-32 elevated tower
- 500,000 gallons at Alpena Township Piper Road elevated tower
- 300,000 gallons at the Alpena Township U.S. 23 South elevated tower

The original water recycling treatment plant became operational in 1953 and many of the treatment units remain in use today. In 1972, the plant was upgraded to improve pollutant removal capability. Using grant funds from the USEPA, secondary treatment was added to the facility. A biological treatment process called Activated Sludge was used to enhance removal of dissolved pollutants from the wastewater. This addition improved pollutant removal rates and the plant regularly achieves 90 to 95% pollutant removal efficiency.

The Alpena Water Recycling Plant has a defined service area of 25-mile radius around the plant and serves 4,798 customers in the City of Alpena and 2,013 customers in Alpena Township. The treatment plant has an average design capacity of 5.5 million gallons per day with a maximum pumping capacity of 7.2 million gallons per day. The average daily treatment is 2.3 million gallons per day. The water recycling plant management staff regulates commercial and industrial wastewater discharges.

Solid Waste Disposal

Alpena County is a member of the Montmorency-Oscoda-Alpena Solid Waste Management Authority (MOASWMA) The MOASWMA landfill in Montmorency County is the primary destination for the county's solid waste. Industrial waste is transported to Waste Management's Landfill in Waters, Michigan. Although the Lafarge Corporation owns and operates its own landfill, many other industries have found ways to recycle all or portions of their wastes.

The Alpena Resource Recovery Program is administered by NEMCOG and is overseen by the Alpena Resource Recovery Board that includes representation from various political jurisdictions. The program includes the Resource Recovery Facility (RRF) located on M-32 and a number of full-time drop off sites located in the City of Alpena and various outlying areas. The primary funding source for the program is a surcharge fee per household.

Utilities

The county’s utility system includes the publicly-owned and operated water and wastewater systems, and private suppliers of electric, natural gas, and telecommunications (Table 5-1).

Table 5-1 Alpena County Utility System		
Utility	Company	Service Area
Natural Gas	DTE Gas	Alpena Township, Maple Ridge Township, Sanborn Township, Wilson Township
	Presque Isle Electric & Gas Co-op	Green Township, Long Rapids Township, Maple Ridge Township, Ossineke Township
	Liquefied Propane, Fuel Oil, Wood, Corn, Pellets	Green Township, Ossineke Township
Electricity	Alpena Power Company	Alpena Township, Maple Ridge Township, Ossineke Township, Sanborn Township, Wilson Township, Green Township (only in isolated cases)
	Presque Isle Electric & Gas Co-op	Alpena Township, Green Township, Long Rapids Township, Maple Ridge Township, Ossineke Township, Wellington Township, Wilson Township
	Consumers	Ossineke Township, Sanborn Township
Telecommunications	Telephone: Frontier Cellular Service: Numerous providers Internet: Numerous providers Cable: Charter Communications, Allband Multimedia	Countywide
Water and Sewer	City of Alpena Water/Wastewater Utility	City of Alpena, Alpena Township, Wilson Township
Source: Michigan Department of Licensing & Regulatory Affairs (Michigan Public Service Commission), 2019		

Educational System

Alpena Public Schools serve the entire county and a small portion of Presque Isle County. The school system is part of the Alpena-Montmorency-Alcona Educational Service District; which is composed of Alpena, Montmorency, and Alcona Counties. A portion of Green Township is served by Hillman Community Schools. The Intermediate School District includes Alpena, Montmorency, and Alcona Counties. According to the *Standard and Poor’s School Evaluation Services*, Alpena Public Schools had a 2018 enrollment of 3,937 students and a student to teacher ratio of 19.76. All Alpena Public Schools buildings and facilities are linked by a fiber optic network.

Over the past 32 years, the number of students enrolled in the public schools has declined (Table 5-2). Between 1980 and 2018, enrollment dropped from 7,655 students in 1980 to 3,937 enrolled in 2018 (49% decline). Given the current age distribution in Alpena County, the downward trend in school enrollment is likely to continue.

Table 5-2 Alpena Public Schools				
School	School Type	Location	Enrollment 2011-2012	Enrollment 2015-2016
Besser School	Elementary	375 Wilson St – City of Alpena	348	425
Ella White School	Elementary	201 N. Ripley – City of Alpena	402	465
Hinks School	Elementary	7667 U.S. 23 N. – Alpena Twp.	193	156
Lincoln School	Elementary	309 W. Lake St. - City of Alpena	162	173
Sanborn School	Elementary	12170 U.S. 23 S. Sanborn Twp.	205	183
Wilson School	Elementary	4999 Herron Rd. – Wilson Twp.	261	225
Thunder Bay Junior High	Middle School	3500 West Third Ave – Alpena Township	995	881
Alpena Senior High	Secondary	3303 South Third St. – City of Alpena	1286	1309
Aces Academy	Alternative	700 Pinecrest Street – City of Alpena	173	121
Pied Piper Opportunity Center	Special Education	444 Wilson Street – City of Alpena	34	23
Source: National Center for Educational Statistics				

Alternative education choices include homeschooling and three private schools: Immanuel Lutheran School, All Saints School, and Seventh Day Adventist School (Table 5-3). Bingham Arts Academy, a no-cost charter school, closed in 2014.

Table 5-3 Alpena County Private Schools				
School	School Type	Location	Enrollment 2011-2012	Enrollment 2015-2016
All Saints School	K-6	500 N. 2nd Ave. – City of Alpena	102	81
Seventh Day Adventist School	K-7	4029 US 23 – City of Alpena	9	6
Immanuel Lutheran School	PreK-8	355 Wilson Street – City of Alpena	102	79
Source: National Center for Educational Statistics				

ACES Academy

ACES Academy (Alternative Choices for Educational Success) is located in the former Oxbow Elementary School in Alpena. ACES Academy offers community, adult and alternative education programs. Its alternative education component serves students who have difficulty with the regular program at Alpena High School. The adult education program helps adults earn a high school diploma equivalent (GED). In 2015-2016, 121 full and part time high school students were enrolled at ACES.

Pied Piper Opportunity Center

Pied Piper Opportunity Center is owned and operated by the Alpena-Montmorency-Alcona Educational Service District. The school is located on Wilson Street and serves students who are moderately cognitively impaired, severely cognitively impaired, severely multiply impaired, and autistic impaired. Students range in age from 3 to 26 years. The school provides individualized instructional programs in personal care, independent living, language, vocational, academic, and social-emotional education. Pupils are served at the center, at home, or in the hospital.

Alpena Community College

Alpena Community College (ACC), a two-year institution, operates two higher education campuses plus outreach activities in area public schools. The Main Campus is in the City Alpena and the Huron Shores Campus is located at the former Wurtsmith Air Force Base in Oscoda, Michigan. ACC has 75 programs of study and offers degree completion programs, vocational training and community enrichment classes to residents of Alpena County and Northeast Michigan. In 2017, there were 1,611 students enrolled, 50 full time faculty and 75 part-time faculty. The Madeline Briggs University Center (MBUC) houses offices for Ferris State and Northwood Universities to make completion programs available for selected bachelor and master's degrees. Additionally, ACC has an early college program that allows high school students to take college courses during their junior year to earn college credits and degrees.

Northeast Michigan Career and Technical Education Center

The Tech-Ed Center is located in the Alpena High School and provides career and technical programs to students from Alpena, Alcona, Hillman, Atlanta, Posen and Rogers City high schools and ACES Academy. Adults may also participate in programs that range from studies in agri-science to computer specialists.

Libraries

George N. Fletcher Library

The George N. Fletcher Library is located in Alpena's downtown within a building that was constructed in 1974, was fully remodeled in 1997, and expanded into an adjacent building in 2002. Library services include books, magazines, newspapers, compact discs, audiotapes, films, videocassettes and an art lending library. Inter-library loan services and computers with Internet access are available for public use. Programs include READ (adult literacy program), Job Launch (resume writing, etc.), Books and Brown Bags (lunch hour book review), the Foundation Grants Center, story hours, and a summer book club. Visually and physically impaired individuals are accommodated by the library's special materials circulation. Special Collections include Alpena County and surrounding counties genealogy sources, the Michigan Room where Michigan reference materials are available, the Foundation Center Collection that includes private & public foundation listings and grants & funding sources. In 2004, the Thunder Bay National Marine Sanctuary & Underwater Preserve established an agreement with the library to jointly manage the Thunder Bay Sanctuary Research Collection, one of the collections on Great Lakes history.

The Stephen Fletcher Library

The Stephen Fletcher Library is located on Alpena Community College's campus and provides a range of library services to college students and the public. The library also provides internet access to patrons and an inter-library loan system.

Media

The *Alpena News* is located in the City of Alpena and is circulated six days a week. Other newspapers circulated in the county include the Detroit News/Detroit Free Press, the Bay Times, USA Today, Alcona Review (in Ossineke Township), Montmorency County Tribune (in Green Township), and various advertising media.

Cable television service is available throughout much of Alpena County from Charter Communications; however, the rural portions of the county cannot receive cable service. WBKB-TV has an office in the county. A wide array of radio stations can be received throughout Alpena County, including WATZ-AM/FM, WGZR-AM/FM, WHSB-FM/Bay 108 and WGFM (Rock 105 & 95.5).

Transportation Network

Roadways

Alpena County does not have an interstate highway, but is served by U.S. 23, which runs along Lake Huron from Mackinaw City to Standish (Figure 5-3). M-32 runs in an east-west direction and connects Alpena with Gaylord and I-75. M-65, running north and south, bisects the western portion of the county. State and federal highways include approximately 72 miles of M-32, M-65 and U.S. 23. The county also supports 205.5 miles of local primary roads and 454.5 miles of local secondary roads.

In the City of Alpena, the major east-west artery is M-32, which has a 2017 annual average daily traffic count of 7,988 vehicles and the major north-south artery is U.S. 23 with an annual average daily traffic count of 7,459-13,587. In Alpena Township, M-32 is the major east-west artery with a 2017 annual average daily traffic count of 19,917 vehicles and the major north-south artery is U.S. 23 with an annual average daily traffic count between 5,627 and 13,118 vehicles. Concentrations of residential development are served by Golf Course Road, French Road, Bagley Road, Grant Road, Genshaw Road, Hobbs Road and Werth Road in Alpena Township. In Green Township, the 2017 annual average daily traffic volume for M-32 is between 4,283 and 5,337 vehicles, and for M-65, it is 1,481 vehicles. In Long Rapids Township, the primary east-west transportation routes are Long Rapids Road and M-32, and the major north-south artery is M-65 with a 2017 annual average daily traffic count of 1,837 vehicles. In Ossineke Township, the major north-south artery is M-65 with a 2017 annual average daily traffic count of 1,450 vehicles. In Sanborn Township, the primary north-south artery is U.S. 23 with a 2017 annual average daily traffic count of 5,627 vehicles. In Wilson Township, the principal east-west artery is M-32, which has a 2017 annual average daily traffic count of 5,095 vehicles. The main transportation routes in Maple Ridge Township are Long Rapids Road, Bolton Road, and Cathro Road.

Public Transportation

Thunder Bay Transportation Authority

The Thunder Bay Transportation Authority (TBTA) provides scheduled public transportation services to the residents of Alpena, Alcona, and Montmorency Counties, and a small portion of Presque Isle County. The authority operates with a fleet of 40 vehicles and 4 hybrid trolley buses. In 2017, the TBTA completed its new garage and maintenance facility. Alpena Dial-A-Ride Transportation (DART) is operated as an on-demand transportation service by TBTA, which consists of seven wheelchair-lift equipped buses.

Indian Trails, Incorporated

Indian Trails provides statewide public transportation services seven days a week. The bus route follows U.S. 23 through Alpena County with a southbound run in the morning and northbound run in the

afternoon. Buses are wheelchair lift equipped and have space set aside to accommodate wheelchairs. The Michigan Department of Transportation subsidizes this service for areas in Northern Michigan.

Rail Service

Freight rail service is provided by the Lake State Railroad Company. Rail service is used to deliver raw materials and products to and from the heavy industrial areas. No passenger service is offered. Alpena is at the end of the rail line, and Lake State Railroad has only one in-bound and one out-bound train Monday through Saturday. Although the volume of freight is expected to increase, no extension or expansion of the line is anticipated. The rail bridge over the Thunder Bay River was replaced in July 2002 with a loan from the Michigan Department of Transportation.

Air Transportation

Regional air service is available at Alpena County Regional Airport (Phelps Collins), which is located in Maple Ridge and Wilson Townships. There is a 9,001 foot and a 5,028 foot concrete runway and state of the art communication and radar systems. The airport can accommodate any type of commercial or military aircraft and is a U.S. Customs Port of Entry. It also houses the Combat Readiness Training Center (CRTC) of the Michigan National Guard, which jointly maintains a crash-rescue unit, tower operations, and assists in snowplowing. Passenger service is provided by Skywest Airlines and charter services are provided by Aviation North. Air freight service is provided by FED-EX and UPS. Medivac services are provided by North Flight of Traverse City, Wings of Mercy and Life Flight. The airport is administered by the Airport Manager, as a county department. Available fuel includes 100 LL and Jet-A.

















In 2019, construction began on a new airport terminal, parking lot and ramp improvements. The new terminal will be 12,900 square feet and all power lines will be underground. The new terminal will improve baggage handling, reduce airliner ground time, provide more efficient TSA screening and baggage x-ray, and have a passenger boarding bridge. The former terminal building will be renovated.

Marine Facilities

Alpena has two channels used for Great Lakes shipping: the NOAA Port of Alpena and the Lafarge Corporation. The annual shipping season for Alpena Harbor is from mid-March to mid-December. Cement and concrete are the major commodities being shipped out of Alpena with the major receipts being coal, lignite, crude materials, and nonmetal minerals. Alpena Shipwreck Tours utilize the Port of Alpena. The DPI Dock is a private dock that is used to unload coal for the DPI-Alpena Hardboard facility's generator. DPI does not export any shipments by cargo lake freighter. The West Dock for the Fletcher Paper Company is not being utilized after the company closed in 2000. There is no unified port authority in Alpena to facilitate and manage port communication and navigation between ships and the various docks. Waterway communication is handled by the individual docks under US Coast Guard enforcement.

The City of Alpena Marina is a full-service, public marina that can accommodate seasonal and transient boats. The marina is sheltered by a breakwall and access to Lake Huron is made via the mouth of the Thunder Bay River. The marina contains approximately 177 slips with full power and water services, launch ramps, courtesy docks, a fuel station, restrooms and shower facilities, a fish cleaning station, a pump-out station, a store, a maintenance/repair facility, and office building. Winter storage and boat launching services are also available.

Legend

-  Port
-  Airport
-  Unincorporated Places
-  Rivers
-  Lakes
-  Railroads
-  Uncoded Road
-  State Trunkline
-  County Primary
-  County Local
-  City Major
-  City Minor
-  City of Alpena
-  Ossineke
-  Townships
-  Alpena County

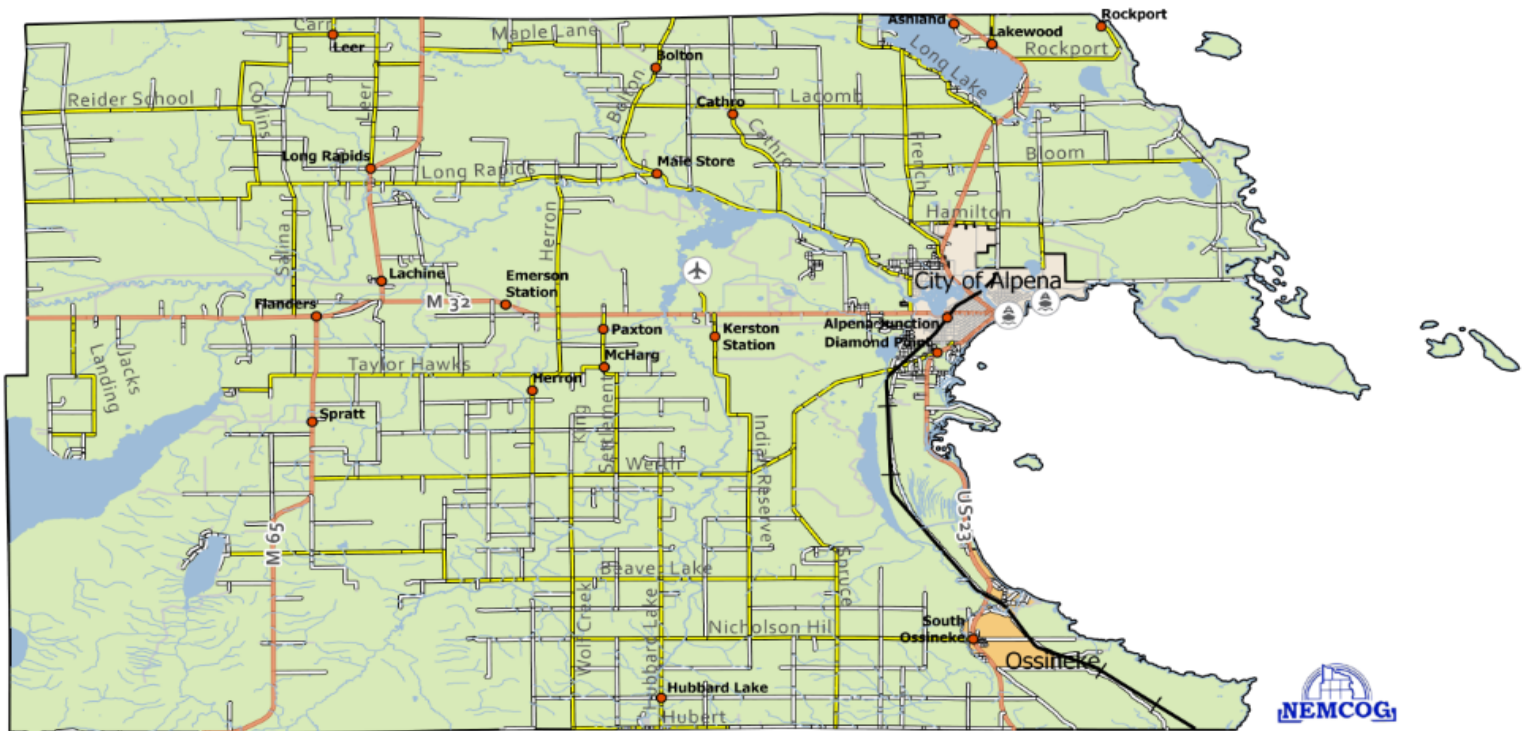
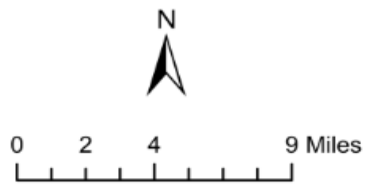


Figure 5-3 Alpena County Transportation Network

County Facilities

Alpena County owns 78 buildings throughout the county, which have an accumulative replacement value of approximately \$52 million. The Alpena County Courthouse is a 19,600 square foot building located at 720 West Chisholm and occupies one city block. It houses offices for the Clerk, Register of Deeds, Equalization, Treasurer, Circuit Court, Commissioners Offices, County Coordinator, and MIS Director.

The Alpena County Annex Building is located across the street from the courthouse at 719 West Chisholm. The 25,800 square foot building houses Probate Court, the Commissioners' meeting room, Friend of the Court, Family Division Circuit Court, District Court, Prosecuting Attorney and other offices.

The Department of Corrections and 911 Services are located at 703 West Chisholm in a 6,400 square foot building. The Alpena County Sheriff's Office and County Jail are located at 320 Johnson Street in a 17,044 square foot building. The Family Independence Agency is located at 711 West Chisholm Street in a 19,308 square foot single level office building, which opened in 1991.

Significant recreation properties owned by Alpena County include the Fairgrounds, the Plaza Pool and tennis courts, Northern Lights Arena, Beaver Lake Park/Campground, Long Lake Park/Campground, Sunken Lake Park/Campground and Manning Hill Park. More information can be found in the Joint Recreation Plan for Alpena County, Charter Township of Alpena, Green Township, Ossineke Township, and Wilson Township at <http://www.discovernortheastmichigan.org/docview.asp?did=629>.

Community Capability

Overview

Currently, the communities in Alpena County have limited capability in implementing the hazard mitigation action and implementation strategies. The communities will use a combination of staff, elected officials, appointed officials (e.g. planning commission) and contractual services to provide some level of prevention and educational activities. However, current budget constraints do not allow the communities to hire more staff.

Planning and Zoning

In January 2000, Alpena County re-established a County Planning Commission after being dissolved in 1985. The county does not administer zoning since the City of Alpena and all townships except Wellington Township have exercised their authority under state statutes to administer their own planning and zoning. Each community has a zoning administrator, a planning commission, and a zoning board of appeals. The planning commissions are responsible for overseeing the master plan, recreation plan, and zoning ordinance. The townships rely on elected officials to conduct township business, manage finances, and make policy decisions. Alpena Township also has a full-time support staff to run township operations (e.g. Department of Public Works). The City of Alpena has a planning and zoning department, engineering department, department of public works, building department, fire and police department, and parks and recreation department.

Planning and Zoning are the principal tools used by local communities to manage growth, preserve community character, direct development away from hazardous areas, protect property values, enhance economic viability, and provide developers with the flexibility to arrange structures on properties. Since planning and zoning are not retroactive, they have minimal effect on older

developments. Additionally, they have the potential to create public controversy, variance requests, and zoning modifications. However, planning and zoning are used to establish and implement a community's goals and desired future. Building codes can work with and against planning and zoning since the codes provide guidance on how to build in both compatible and incompatible land use areas.

The master plan analyzes the existing conditions of a community, incorporates public input, and generates goals to establish the community's desired future. It includes a section on the future land use of the community, which is designed to guide land use decisions over time. The future land use section contains information about the future land use categories, important resource areas in need of protection, special issue areas (e.g. utility service areas, waterfront development, roads, etc.), compatible and incompatible land uses, and a map that depicts the development types and densities envisioned by the community. Zoning, capital improvement plans, and recreation plans implement the master plan.

Zoning ordinances and zoning maps are local laws that regulate how property can be developed and are used by communities to implement their master plans through the regulation of development types, intensity and location. Communities can use zoning to implement hazard mitigation strategies for land use development, such as developing standards for private/public road construction, driveway standards, and creating development requirements.

Capital improvement plans guide communities' major public expenditures for the next five years and can be used to create a project timeline to implement hazard mitigation strategies.

Public Safety

Alpena County has an Emergency Management Office that operates the countywide 911 system and oversees the Local Emergency Planning Committee. The Alpena County Sheriff's Office operates under the County Board of Commissioners. All townships provide fire and rescue services either on their own or under a cooperative agreement.

Infrastructure

Alpena County's drain commissioner works with communities and landowners regarding drainage and flooding issues. The county maintains and operates three campgrounds, the county fairgrounds in the City of Alpena, and the Alpena Regional Airport. The County Road Commission works in conjunction with the townships to manage the local road network, while the Michigan Department of Transportation is responsible for State and Federal highways. In Alpena Township, development is limited based on the availability of water and sewer services.

Chapter 6 Hazard Identification and Assessments

Overview

The Alpena County Emergency Management Office is tasked with managing the threats from the county's natural, technological, and human-related hazards. Hazard identification allows communities to develop mitigation, preparedness, response, and recovery activities to protect life and property.

Alpena County's risk and vulnerability assessments were determined based on the county's environment, demographics, economy, land use, and critical facilities and services, its hazard identification, community input, and the weighted hazard ranking process recommended in *Publication #207*. The assessments were used to determine if a hazard poses a risk to the county, inform the mitigation goals and objectives, and to guide emergency management official(s) in setting annual priorities and goals for resource allocation, mitigation strategies, and preparedness techniques. However, the risk and vulnerability assessments are not a reliable indicator for the occurrence of any hazard.

According to the National Oceanic and Atmospheric Administration's National Centers for Environmental Information data center (NOAA), Alpena County has had 236 natural storm events with approximately \$1.2 million in estimated damages between June 1955 and April 2019.

Natural Hazards

Ice and Sleet Storms

Description

Ice and sleet storms are storms that generate sufficient quantities of ice or sleet that result in hazardous conditions and/or property damage. Ice storms occur when cold rain freezes on contact with the surface and coats the ground, trees, buildings, and overhead wires with ice. Often times, ice storms are accompanied by snowfall, which sometimes causes extensive damage, treacherous conditions, and power loss. On the other hand, sleet storms are small ice pellets that bounce when hitting the ground or other objects. It does not stick to trees or wires but can cause hazardous driving conditions. When electric lines are down, households are inconvenienced, and communities experience economic loss and the disruption of essential services.

According to the *2019 Michigan Hazard Mitigation Plan*, Michigan has 16 average annual ice and sleet storm events with 0.2 average annual deaths, 0.5 average annual injuries, and \$11.4 million in average annual property and crop damage.

Location

Ice and sleet storms are a regional event that is not confined to geographic boundaries and can affect several areas at one time. Also, the severity of the ice and sleet storms may range across the affected areas. All of Alpena County is at risk to the occurrence and impacts from ice and sleet storms.

Previous Occurrences

Alpena County has had two reported ice storms with one occurring in 2001 and one occurring in 2005. No deaths, injuries, or property/crop damage occurred from these events. Power lines were able to

sustain the weight of the ice and roads were extremely icy. Both events were coupled with snow, which means there is the potential for ice and sleet storm events to be reported as snowstorm events.

Probability of Future Occurrences

Since 2001, there have been two reported ice storm events in Alpena County. This data shows approximately 1 event would occur every 9.5 years. However, it should be noted that both events occurred in the early 2000's. Additionally, not all of the ice and sleet storms may have been reported based on the lack of injuries, deaths, and extensive damages. Therefore, the number of ice and sleet storm events and damages may be higher.

Extent

Ice and sleet storms can be measured based on the amount of damages. Neither event that was reported to NOAA by trained spotters had any deaths, injuries, or damages.

Vulnerability Assessment

Walking can cause injuries from falls that may result in fractures or broken bones. Ice accumulation can cause damage to communication and power infrastructure, which can result in power outages. Icy roads can cause traffic accidents, which may result in injuries and loss of life. Heating shelters and evacuations may be required if power outages last a long time. Power outages and ice covered roads can limit access to food and basic supplies since businesses would have to close and the roads would not be travelable.

Snowstorms

Description

Snowstorms are periods of rapid snow accumulation with high winds, cold temperatures, and low visibility that have the potential to shut down towns and cities. Blizzards are the most perilous snowstorms and are characterized by low temperatures, strong winds, and enormous amounts of fine, powdery snow. Snowstorms have the potential to reduce visibility, cause property damage and loss of life.

According to the *2019 Michigan Hazard Analysis*, Michigan has 360 snowstorms with 0.1 average annual deaths, 0.1 average annual injuries, and \$1.9 million in average annual property and crop damage. Michigan experiences large differences in snowfall over short distances due to the Great Lakes. The average annual snowfall accumulation ranges from 30 to 200 inches with the highest accumulations in the northern and western parts of the Upper Peninsula. In Lower Michigan, the highest snowfall accumulations occur near Lake Michigan and in the higher elevations. For example, the average snowfall ranges from 141 inches in the Gaylord area to 57.6 inches in Alpena County.

Location

Snowstorms are regional events that are not confined to geographic boundaries and can affect several areas at one time with varying severity depending on factors such as elevation and wind patterns. All of Alpena County is at risk to the occurrence and impacts from snowstorms.

Previous Occurrences

Since 1996, there have been 71 winter storm events, including heavy snowstorms, blizzards, winter weather, and winter storms reported in Alpena County. There have not been any deaths, injuries, or crop damage reported for any of the events. The Blizzard of 1978 impacted the county as well as the state. However, the presence of the Thunder Bay decreased the severity of the weather pattern by

deflecting the storm to either the northeast or southwest. On March 1, 2007, a winter storm event caused \$4,000 in property damage since strong winds and wet snow caused downed power lines and drifting snow. School districts closed early on March 1 and stayed closed through March 2. On April 11, 2007, a winter storm caused \$6,000 in property damage that brought down tree limbs and power lines in Alpena County. On March 2, 2012, a heavy snow event caused \$100,000 in property damage since wet snow brought down trees and power lines. The event caused power outages and warming shelters were opened to aid those without power or heat.

Extent

Snowstorms can be measured based on snowfall accumulations or damages. The 30-year average annual snowfall in Alpena County is 57.6 inches with Alpena County Regional Airport reporting the highest seasonal snowfall at 146 inches during the 1985 season. On March 1, 2007, Alpena County had \$4,000 in property damages caused by a winter storm and on April 11, 2007, the county had \$6,000 in property damages caused by a winter storm. On March 2, 2012, Alpena County had \$100,000 in property damages caused by heavy snow.

Probability of Future Occurrences

Since 1996, there have been 71 winter storm events in Alpena County. It should be noted that winter storm events refer to heavy snowstorms, blizzards, winter weather, and winter storms. This data shows approximately 1 event will occur every 0.3 years though winter weather hazards can fluctuate from year to year. For example, there were six reported events in 2006 and no reported events in 2017.

Vulnerability Assessment

All existing and future buildings and populations are at-risk for snowstorms. Downed trees and branches can cause damage to buildings and other structures. The weight of snow on roofs can cause the roofs to collapse and ice dams can cause water damage to buildings. Additionally, cold temperatures can freeze pipes in buildings that can rupture and leak. Salting can cause damage to the roads and sidewalks. The weight of snow accumulations on communication and power infrastructure can cause power outages. Shoveling snow can cause heart attacks. During and immediately after a snowstorm, the driving conditions are dangerous since blowing snow, ice, and slush can create slippery roads. Blizzards can create whiteout conditions that result in low to no visibility. Stranded motorists may get hypothermia or frostbite. Heating shelters and evacuations may be required if power outages last a long time. Power outages and snow covered roads can limit access to food and basic supplies since businesses would have to close and the roads would not be travelable.

Riverine, Flash, and Urban Flooding

Description

Riverine flooding occurs when rivers, streams, and lakes naturally overflow into adjacent floodplains due to prolonged, intense rainfall, rapid snowmelt or ice jams. Flooding can damage or destroy property, disable utilities, destroy crops and agricultural lands, make roads and bridges impassable, and cause public health and safety concerns. Floods occur in the early spring, but also occur in the winter due to ice jams, and during the summer or fall from severe thunderstorms. Flooding caused by severe thunderstorms has a greater impact on watercourses with smaller drainage areas.

Flash floods differ from riverine floods in extent and duration. Flash floods are brief, high velocity flows in small streams or normally dry creeks. These floods are generally the result of intense thunderstorms and often carry large amounts of debris.

Urban flooding occurs when water flows into low-lying areas because development has occurred in the floodplains and the natural landscape is no longer able to properly disperse the water due to the increased area of impervious surfaces such as paved surfaces and building rooftops. This flooding occurs from a combination of excessive rainfall, snowmelt, saturated ground, and inadequate drainage, and is becoming more common in Michigan. Since development is occurring in floodplains, the natural landscape is unable to properly disperse water. For example, the Washington Bridge that crosses the Thunder Bay River acts as a dam during periods of high water, which causes water to backup and flood. This flooding is exacerbated from the debris left in the river from the demolition of the previous bridge, which makes the MidMichigan Medical Center- Alpena and the nearby residential, commercial, and industrial developments vulnerable to flooding. Urban flooding also has the potential to overflow onto docks or other structures with electricity running to them, which increases the risk for an electric shock drowning. Additionally, storm and sanitary sewers are unable to handle the water flows associated with storm events.

According to the *2012 Michigan Hazard Analysis*, Michigan tends to have a major flood event every two years with minor local flood events occurring annually. The 2012 Analysis also reports the annual flood-related damages are estimated to be between \$60 and \$100 million. From 1975-2010, Michigan experienced eleven flood disasters that resulted in both a Presidential Major Disaster Declaration and a Governor’s Disaster Declaration, and nine that resulted only in a Governor’s Disaster Declaration.

Location

FEMA mapped the principal flood hazard areas in Alpena County and completed a Countywide Flood Insurance Study and County Digital Flood Insurance Rate Maps. The principal flooding hazard potential is generally restricted to Alpena Township and the City of Alpena along the Lake Huron shoreline within the sub-watersheds of the Lower Thunder Bay River, Devil’s River, and around Sunset and Devils Lakes.

Maps indicate a 100 year flood potential around Sunset Lake. Figure 6-1 shows areas with a 100 year flood potential in orange. Drainage and flooding continue to be a problem in the Fletcher Creek watershed, and around Trucky, French and Golf Course Roads. Flood zones have not been identified in Long Rapids or Wellington Townships.

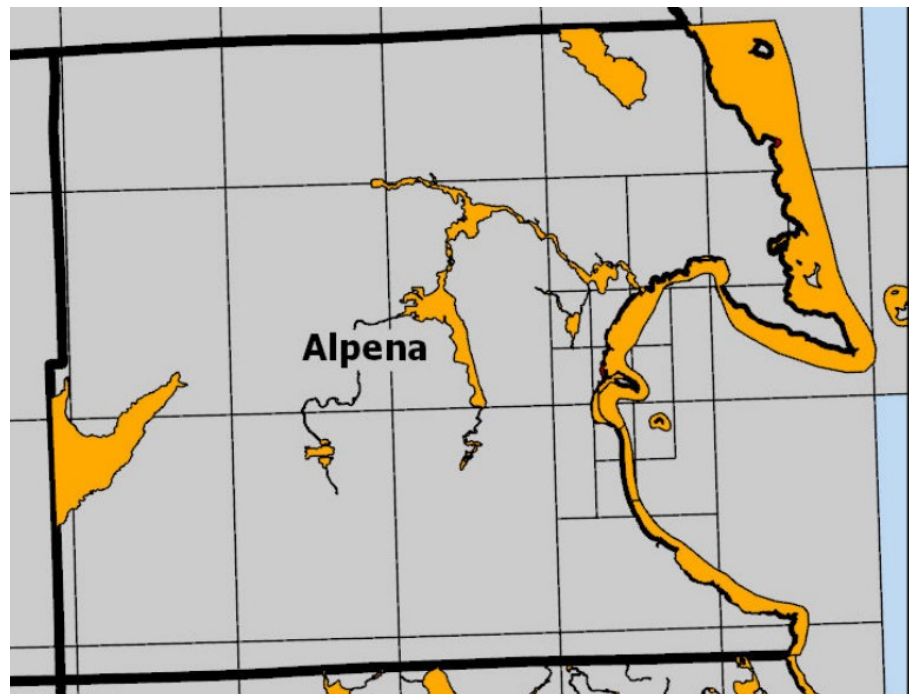


Figure 6-1 Alpena County 100-year flood potential

Previous Occurrences

The county received a Governor's Disaster Declaration on April 1, 1998 for flooding. Rapid snowmelt, intense rains, and ice jams in the Thunder Bay River Basin caused severe downstream flooding in the northeast section of the county. The event began on April 1st and continued into April 4th. Residents were evacuated from 80 homes, and 221 homes and 5 businesses were damaged. In a subdivision in the northwest side of the City of Alpena, a railroad grade had been acting as a dike and was washed out, causing water from a bordering drainage area to flood the subdivision. Flood waters had a depth of 5-6 feet and majorly damaged 40 homes, 3 businesses, with 70 homes having lesser damages. In the rest of the county, there were 5 homes with major damage, and 85 homes with varying amounts of damage. Over 50 roads across the county were partially closed due to varying amounts of wash out, and damage to bridge, culverts, and related infrastructure. Damage to the roads and related infrastructure was estimated at around \$5,700,000. The event's residential structure damage was estimated at \$900,000. In addition, a Small Business Administration Declaration was granted to provide low-interest disaster loans to the home and business owners impacted by the flooding. In response to this event, the Alpena Intergovernmental Drainage Committee developed the *Fletcher Creek Flood Study* to analyze the flood event, identify problem areas, and make recommendations to mitigate the drainage issues.

Probability of Future Occurrences

According to NOAA, one flood event has been reported in Alpena County in 1998. This data shows approximately 1 event would occur every 22 years. It should be noted there may be a lack of reporting for flooding events, which means the number of flood events may be higher. Additionally, the number of events may increase due to the changing climate conditions.

Extent

In Alpena County, flood extent can be measured by the amount of property damage. On April 1, 1998, the county experienced a flood event that caused \$900,000 in residential structure damages, and \$5,700,000 in road and related infrastructure damage. The event occurred from rapid snowmelt and intense rains. The county may see an increase in the number of flood events and the severity of flooding due to an increase in rain and snowfall due to climate change, the backwater effect from the current high water levels of the Great Lakes, and the soil moisture content. The county's wetlands assist in preventing floods through the collection and storage of stormwater and floodwaters.

Vulnerability Assessment

The riverine and urban flooding events analyzed in this section relate to the natural and built environments. Flooding due to a dam failure is analyzed in the dam failure section of this chapter. Existing buildings may experience flooding if they are located in the county's floodplains.

Within Alpena County, the following number of structures are located within specified areas:

Flood Zone A (areas subject to inundation by the 1% annual chance flood event determined using approximate methodologies) is primarily found along the Thunder Bay River and Fletcher Pond. A total of 37 structures (residential and a few recreational resorts) are located in Flood Zone A around Fletcher Pond. There are 274 structures located in Flood Zone A along the Thunder Bay River. These structures are primarily residential outside of the Alpena city limits, however they consist of a mix of residential, institutional, recreational, and commercial structures inside the Alpena city limits.

Flood Zone AE (areas subject to inundation by the 1% annual chance flood event determined by detailed methods) is primarily found along the Lake Huron shoreline and Long Lake. There are approximately 139

structures (residential) in this flood zone around Long Lake. Along Lake Huron, there are approximately 122 structures in Flood Zone AE primarily found south of the City of Alpena.

Flood Zone AO (designated in areas with high flood velocities such as alluvial fans and washes) is found along the Lake Huron shoreline and US 23 to Squaw Bay. There are 138 residential structures located within this zone.

Flood Zone AH (areas subject to inundation by 1% annual chance shallow flooding - usually areas of ponding - where average depths are between one and three feet) is found near Squaw Bay. Only one structure appears to be in this zone.

Areas designated with a 0.2% annual chance flood hazard are found along Lake Huron south of the city limits and around North Point. There are 97 structures within this zone (primarily residential). A significant non-residential structure within this zone is the City of Alpena sewage treatment plant.

The number of structures within the specified flood zones was obtained by downloading the GIS shapefiles from the FEMA Flood Map Service Center and using ArcGIS to overlay the flood zones onto aerial imagery. The structures falling within the zones were counted using a visual survey. However, it should be noted that only structures which are visible were counted. Structures which are not visible due to leaf-on aerial imagery are not included in this estimate. It should be assumed that the number of actual structures within these flood zones could be between 20-30% higher than the estimate.

Structures that have flooded have the potential to be damaged, destroyed, and compromised. After the flood event(s), they may develop mold, have foundation damage, and may rot. The presence of mold will increase the health risk for people with breathing conditions. Businesses may have to close to fix damages and potentially lay off employees. Floodwaters can conceal dangerous conditions, such as damaged electrical wires, debris, and diseases. Electrical wiring on docks may become damaged from a flood, which increases the risk for electric shock. The contaminants and pollutants in floodwaters can degrade watersheds, and cause diseases, infections, and injuries to people traversing or playing in the waters. Flooding can damage roads and bridges, overflow sewers, and cause vehicles to crash. Roads may be closed for extended periods of time, which would impact traffic flow and emergency response times. Floodwaters can also cause erosion along inland lakes and streams, which can degrade habitats. Depending on the severity of flooding, residents may be evacuated.

National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) to reduce the impact of flooding on private and public structures by providing affordable insurance. The program is administered by FEMA and requires participating communities to adopt and enforce floodplain management ordinances that meet or exceed the NFIP minimum requirements. In addition, if communities participate in the Community Rating System (CRS), residents and business owners can receive reduced flood insurance premiums.

When NFIP was created, it included discounted policies that paid at rates that did not reflect the true flood risk of the properties. The Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) required FEMA to eliminate certain subsidies and it set limits on the amount that rates may increase. However, the Homeowner Flood Insurance Affordability Act of 2014 repealed some of the provisions in BW-12 and included gradual rate increases to properties receiving subsidized rates until the premium reaches its full-risk rate, adding a surcharge to all policies, and having a Flood Insurance Advocate to advocate for fair treatment of NFIP policyholders.

According to the *Federal Emergency Management Agency Community Status Book Report* for Michigan, the City of Alpena, and Alpena, Maple Ridge, and Sanborn Townships are participating in the National Flood Insurance Program. Ossineke, Wilson, Green, and Long Rapids Townships are not participating in the program at this time after researching the program and reviewing current community conditions (e.g. Long Rapids Township is not in a designated flood zone). Wellington Township does not participate in the program since a hazard area has not been identified in the township. Alpena Township has been participating in the program since 1983. The Michigan DNR manages the floodplain area in Maple Ridge Township.

In 2011, the principal flood hazard areas for Alpena County were mapped by FEMA and in 2012, FEMA completed a Countywide Flood Insurance Study and Digital Flood Insurance Rate Maps for the county. The principal flooding hazard potential is generally restricted to Alpena Township and the City of Alpena along the Lake Huron shoreline, within the sub-watersheds of the Lower Thunder Bay River, Devil's River and around Sunset and Devils Lakes. Maps indicate a 100-year flood potential around Sunset Lake. Drainage and flooding continue to be a problem in the Fletcher Creek watershed, and around Trucky, French and Golf Course Roads. According to information in the official FEMA/NFIP database as of October 2019, Alpena County does not have any properties that have qualified for the repetitive-loss category.

Tornadoes

Description

A tornado is a violently rotating column of air that extends from a thunderstorm to the ground and can occur any time during the day and year. It can only be seen if water droplets, dust, and debris form a funnel. The funnel cloud can have winds that reach up to 300 miles per hour with an interior air pressure that is 10-20% below the surrounding atmosphere's pressure. The length of a tornado path is approximately 16 miles, but there have been tracks reported up to 200 miles. Tornado path widths are generally less than one-quarter mile wide. When a tornado travels over water, it is called a waterspout. Tornadoes are the most violent of the atmospheric storms since they have the potential to destroy buildings, uproot trees, hurl objects, and cause loss of life. According to NOAA and the National Weather Service's Storm Prediction Center, tornadoes cause approximately 60 deaths and hundreds of millions of dollars in property damage each year.

According to the *2019 Michigan Hazard Mitigation Plan*, Michigan is located on the northern fringe of the nation's tornado belt and has a statewide expected annual loss of about \$19.6 million due to tornadoes. Michigan also has an average of 18 tornadoes, approximately 4 deaths, and approximately 50 injuries per year. Between 1999 and 2019, Michigan has had 314 reported tornado events with 52.9% as EF0 (weak) or EF1 (moderate), 38.9% reported as F0 or F1 (weak), 6.7% as EF2 (significant) or EF3 (severe), and 1.6% as F2 (strong). In Northern Michigan, tornados are most likely to occur in the summer months, although some have occurred in the spring and fall.

Measuring Tornadoes

Prior to 2007, the United States used the Fujita Scale to measure the intensity of tornadoes (Table 6-1). The Fujita Scale used mathematical interpolation to assign wind estimate guesses to a damage scale. In 2007, the United States began using the Enhanced Fujita Scale to measure the intensity of tornadoes since the wind estimates are more associated with the degree of tornado storm damage than the Fujita Scale (Table 6-1).

Location

Tornadoes are a regional event that are not confined to geographic boundaries and can affect several areas at one time. Also, the magnitude of tornadoes may range across the affected areas. All of Alpena County is at risk to the occurrence and impacts from tornadoes. It should be noted that it is impossible to predict where and with what magnitude a tornado will touchdown.

Table 6-1 Fujita Scale and Enhanced Fujita Scale			
Fujita Scale	Fujita Scale Wind Estimate (MPH)	Enhanced Fujita Scale	Enhanced Fujita Scale Wind Estimate (MPH)
F0	< 73	EF0	65-85
F1	73-112	EF1	86-110
F2	113-157	EF2	111-135
F3	158-206	EF3	136-165
F4	207-260	EF4	166-200
F5	261-318	EF5	Over 200

Source: National Oceanic and Atmospheric Administration/National Weather Service Storm Prediction Center, May 2019

Previous Occurrences

Between 1961 and 2007, Alpena County has had fifteen tornadoes and one waterspout, which caused \$594,250 in property damage (Table 6-2). No deaths, injuries, or crop damage occurred as a result of these tornadoes. The most destructive tornadoes touched down on October 18, 2007 and caused \$485,000 worth of damage. The waterspout occurred on June 25, 1998 and did not have any reported deaths, injuries, or property and crop damage.

Probability of Future Occurrences

Between 1961 and 2007, Alpena County has had fifteen tornadoes and one waterspout. This data shows that approximately one tornado event would occur every 3.8 years and one waterspout would occur every 22 years. Historical data shows that the City of Alpena, and Ossineke, Maple Ridge, Long Rapids, and Alpena Townships have a higher risk for a tornado event (Table 6-2).

Table 6-2 Tornado Storm Events in Alpena County, January 1961-April 2019							
Date	Time	Jurisdiction	F-Scale	Deaths	Injuries	Property Damage	Crop Damage
8/5/1961	1039 CST	Alpena Township	F0	0	0	0	0
7/20/1964	1815 CST	Ossineke Township	F1	0	0	\$25,000	0
7/22/1967	1755 CST	City of Alpena	F1	0	0	\$2,500	0
6/7/1971	1335 CST	City of Alpena	F1	0	0	0	0
4/19/1980	1700 CST	Alpena Township	F0	0	0	\$250	0
6/21/1982	1730 CST	Ossineke Township	F0	0	0	\$250	0
8/12/1988	1350 EST	Green Township	F1	0	0	\$25,000	0
8/16/1988	745 CST	Ossineke Township	F0	0	0	\$250	0
9/3/1988	1415 CST	Maple Ridge Township	F0	0	0	0	0

Table 6-2 Tornado Storm Events in Alpena County, January 1961-April 2019

Date	Time	Jurisdiction	F-Scale	Deaths	Injuries	Property Damage	Crop Damage
6/17/1992	1605 EST	Ossineke Township/Caledonia Township, Alcona County	F1	0	0	\$25,000	0
6/17/1992	1605 EST	Ossineke Township/Mitchell Township, Alcona County	F1	0	0	\$25,000	0
6/9/2001	1726 EST	Alpena County Regional Airport (Maple Ridge Township)	F0	0	0	0	0
6/13/2004	1745 EST	Lachine (Long Rapids Township)	F0	0	0	\$6,000	0
10/18/2007	1725 EST-5	Lachine (Long Rapids Township)	EF2	0	0	\$240,000	0
10/18/2007	2000 EST-5	Hubbard Lake (Ossineke Township)	EF2	0	0	\$245,000	0

Source: National Oceanic and Atmospheric Administration, National Centers for Environmental Information, May 2019

Extent

Based on the Fujita Scale, Alpena County’s most damaging tornadoes occurred in Lachine and Hubbard Lake with winds ranging from 111-135 mph. There were no injuries or deaths, but the event caused \$485,000 in property damages.

Vulnerability Assessment

All of Alpena County’s existing and future buildings, population, and infrastructure are at-risk and vulnerable to tornadoes. Buildings and above ground infrastructure in a tornado’s path will be damaged and/or destroyed. Older buildings and light construction structures (houses) have a greater risk of damage. Buildings adjacent to a tornado’s path may have no to little damage dependent on the amount and type of debris hurled from a tornado at the adjacent buildings. Through a FEMA study in 1999, it was found that mobile homes, homes with crawlspaces, and building with large spans (schools, gyms, factories, theaters, etc.) are more susceptible to damage from tornadoes. Schools are vulnerable to tornadoes due to the number of students and employees in the buildings. Tornadoes can close roads due to debris on the road or road damage/destruction from the tornado. Tornadoes can cause injuries or death when people are in or near the tornado’s path (e.g. picked up by the tornado or struck by debris). Individuals in buildings may have injuries or die if they are trapped in a building struck by a tornado or are struck by debris or falling objects. Tornadoes can contaminate water supplies, cause fires, and cause hazardous material spills (pipeline or septic tanks) or gas leaks. If a tornado damages businesses or infrastructure, it will cause economic losses in the county since businesses will have to close and the cost of repairs will impact the business. Tornadoes can also cause power outages. Governments will have to spend money for search and rescue teams, shelters, and clean-up efforts. Also, structural and vegetative debris storage areas may become filled to capacity.

Extreme Temperatures (Extreme Heat and Extreme Cold)

Description

Prolonged periods of very high or very low temperatures are often accompanied by other extreme meteorological conditions, such as high humidity, drought, heavy snowfall, or high winds. Extreme heat or extreme cold primarily affect the most vulnerable segments of the population, such as the elderly, children, impoverished individuals, and people in poor health.

Nationwide, there have been approximately 175 deaths per year that are attributable to extreme heat according to the *2019 Michigan Hazard Analysis*. The threats from extreme heat are heatstroke, heat exhaustion, sunstroke, muscle cramps, heat exhaustion, and fatigue. It is hazardous to livestock and agricultural crops, causes water shortages, exacerbates fire hazards, exacerbates respiratory problems, prompts excessive energy demands, and causes infrastructure failures. Urban areas experience the most serious extreme heat with the combined high temperatures and high humidity that produce a heat-island effect. According to the *2019 Michigan Hazard Mitigation Plan*, Michigan has 11 average annual extreme heat events with 0.4 average annual deaths and 41 average annual injuries.

In the United States, approximately 700 people die each year as a result of severe cold temperature-related causes according to the *2019 Michigan Hazard Analysis*, with a significant number of deaths occurring due to illnesses or disease that are negatively impacted by severe cold weather, such as stroke, heart disease, and pneumonia. Exposure to extreme cold temperatures can be life threatening and can cause hypothermia and frostbite. According to the *2019 Michigan Hazard Mitigation Plan*, Michigan has 35 average annual extreme cold events with one death, 9.4 average annual injuries, and \$6.4 million in average annual property and crop damage. Extreme cold affects transportation modes and power utilities, resulting in dead vehicle batteries and loss of power/heat.

Measuring Extreme Temperatures (Extreme Heat and Extreme Cold)

Extreme heat is measured with the National Weather Service's Heat Index Chart (Figure 6-2). The chart uses relative humidity and air temperature to determine the likelihood of heat disorders with prolonged exposure or strenuous activity. Individuals are unable to shed excess heat from their bodies when they experience prolonged exposure to hot temperatures, which results in heat disorders.

Extreme cold is measured with the windchill index, which is a measure of the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body and reduces the external and internal body temperatures. Figure 6-3 shows the NOAA Wind Chill Chart as it corresponds to various temperatures and wind speeds.

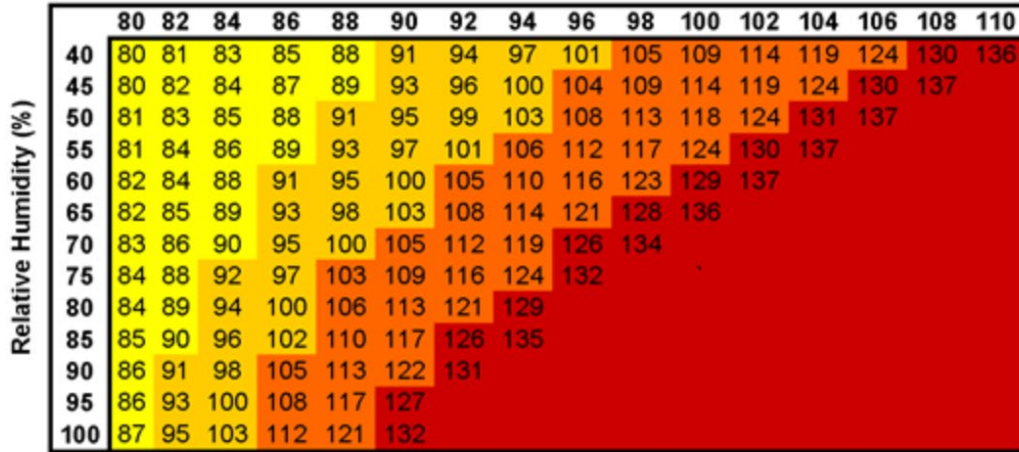
Location

Extreme temperatures are a regional event that are not confined to geographic boundaries and range in severity across the affected areas. All of Alpena County is at risk to the occurrence and impacts from extreme temperatures.

NOAA's National Weather Service

Heat Index

Temperature (°F)



Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

- Caution
 Extreme Caution
 Danger
 Extreme Danger

Figure 6-2 National Weather Service Heat Index Chart



Wind Chill Chart

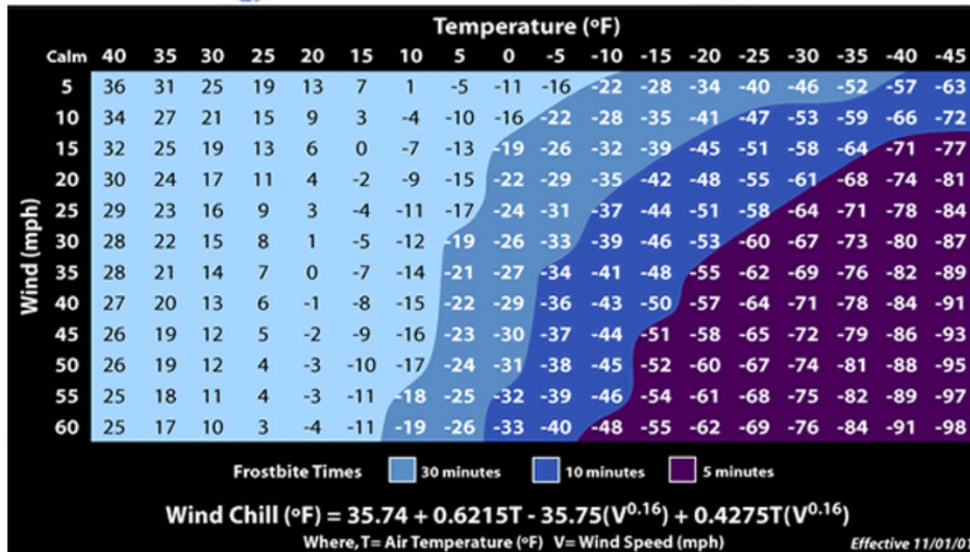


Figure 6-3 NOAA Wind Chill Chart

Previous Occurrences

A comparison between average maximum/minimum temperatures and extreme maximum/minimum temperatures assists in understanding the risk for extreme temperatures in the county. Figure 6-4 shows the average maximum temperatures and extreme maximum temperatures in Alpena County between 1916 and 2020 from the Western Regional Climate Center, Alpena County Regional Airport (200164). Figure 6-5 shows the average minimum temperatures and extreme minimum temperatures in Alpena County between 1916 and 2020 from the Western Regional Climate Center, Alpena County Regional Airport (200164). Figure 6-6 shows the average maximum temperatures and extreme maximum temperatures in Alpena County between 1872 and 2020 from the Western Regional Climate Center, Alpena Wastewater Treatment Plant (200169). Figure 6-7 shows the average minimum temperatures and extreme minimum temperatures in Alpena County between 1872 and 2020 from the Western Regional Climate Center, Alpena County Wastewater Treatment Plant (200169).

Alpena County has had two extreme heat events (one was in 2001 and one was in 2018). It should be noted that extreme heat events refer to heat and excessive heat events in NOAA's NCEI database. The events did not have any deaths, injuries, or property and crop damages. The events consisted of hot and humid conditions that caused outdoor events to be modified (county fairs sent animals home) and attendance at outdoor events to be lower than normal.

Alpena County has had three extreme cold events (one was in 2007, one was in 2014, and one was in 2015). The events did not have any deaths, injuries, or property/crop damages. The low temperatures caused schools to close. However, since cold temperatures typically occur during winter months, many events may have gone unrecorded.

AVERAGE AND EXTREME MAXIMUM TEMPERATURES IN ALPENA COUNTY

DATA FROM THE ALPENA COUNTY REGIONAL AIRPORT

■ Average Maximum Temperature (F) ■ Average Extreme Maximum Temperature (F)

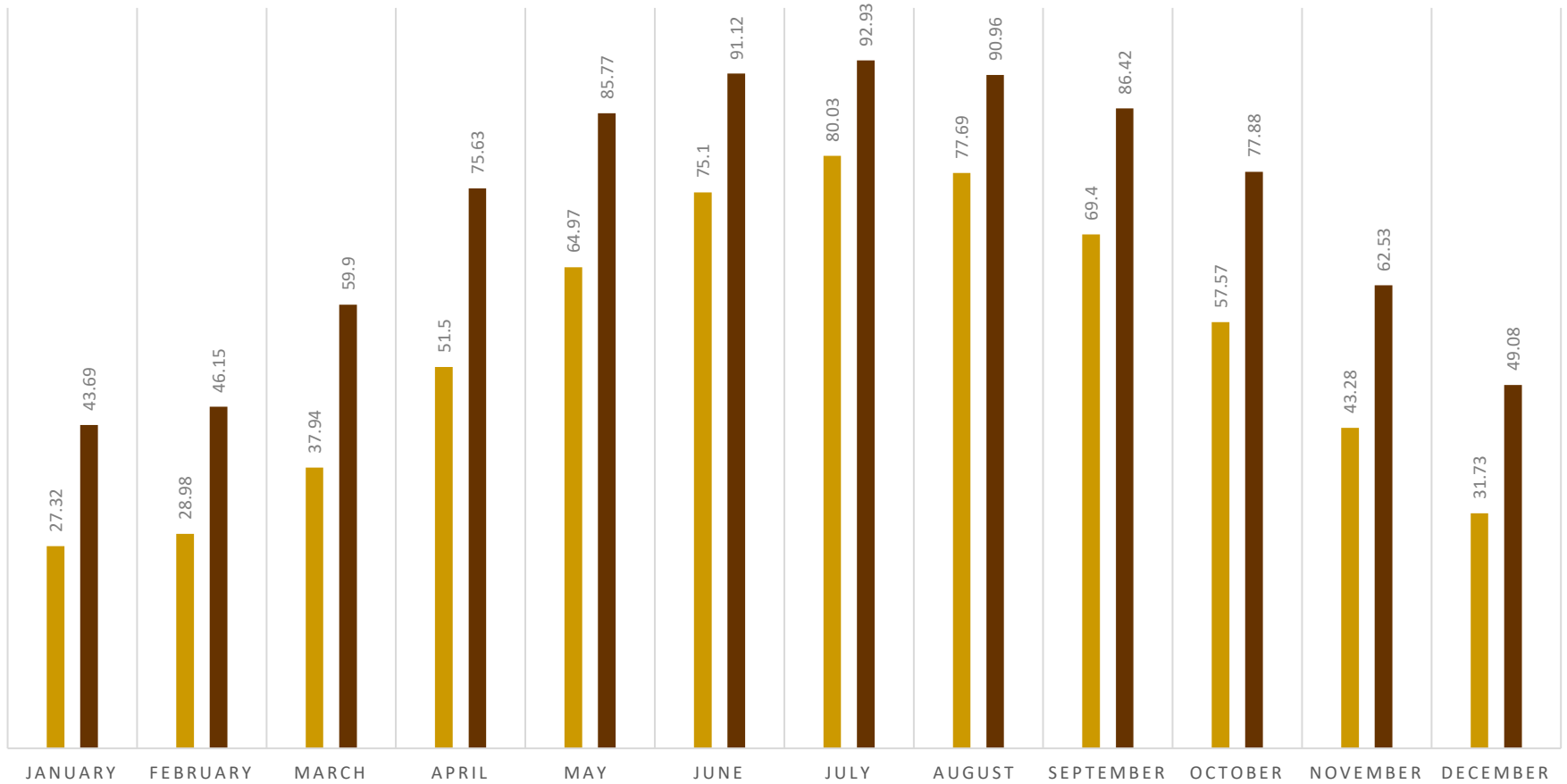


Figure 6-4 Average and Extreme Maximum Temperatures at the Alpena County Regional Airport

AVERAGE AND EXTREME MINIMUM TEMPERATURES IN ALPENA COUNTY

DATA FROM ALPENA COUNTY REGIONAL AIRPORT

■ Average Minimum Temperature (F)
 ■ Average Extreme Minimum Temperature (F)



Figure 6-5 Average and Extreme Minimum Temperatures at Alpena County Regional Airport

AVERAGE AND EXTREME MAXIMUM TEMPERATURES IN ALPENA COUNTY

DATA FROM THE ALPENA WASTEWATER TREATMENT PLANT

■ Average Maximum Temperature (F)
 ■ Average Extreme Maximum Temperature (F)

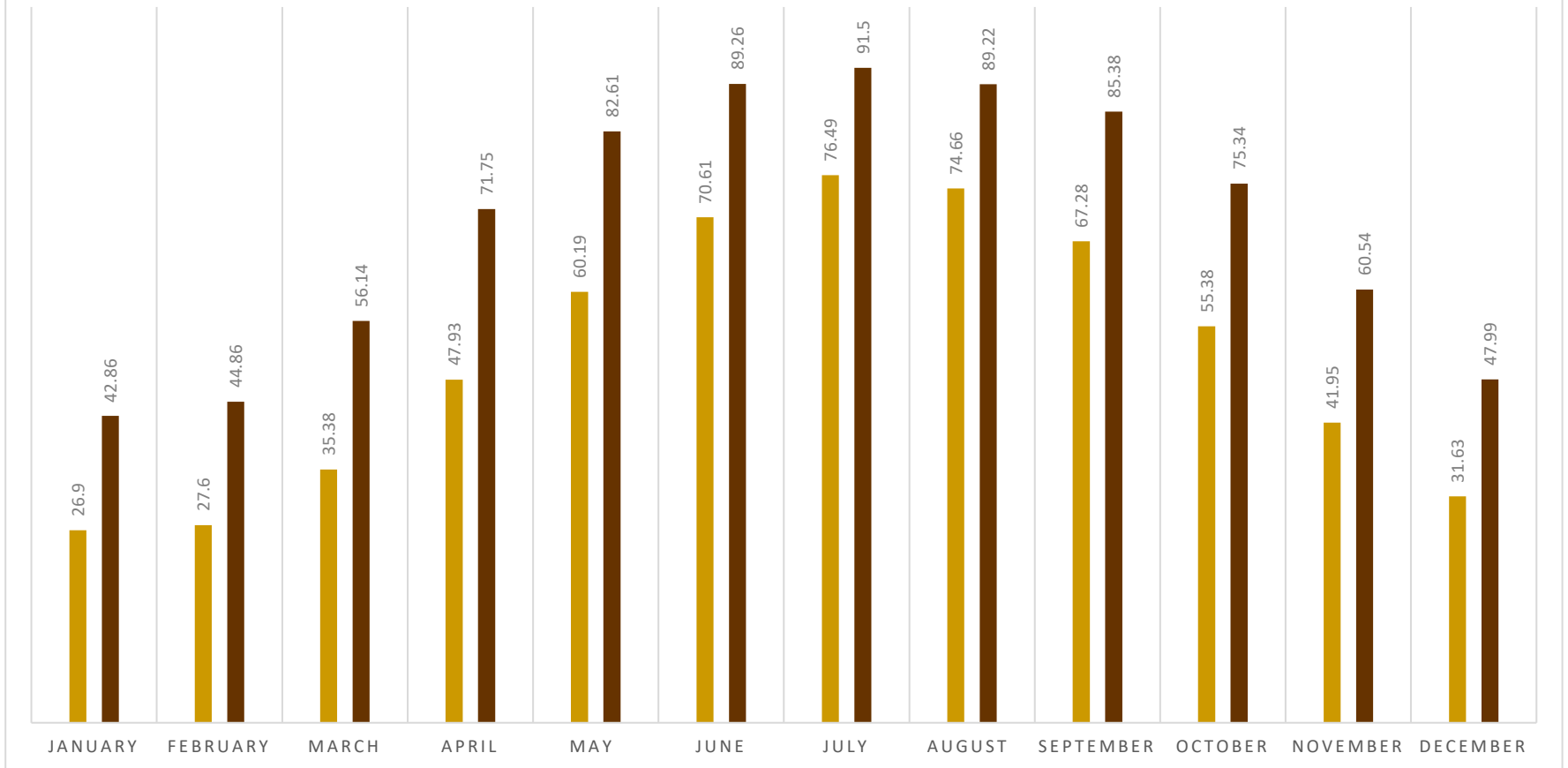


Figure 6-6 Average and Extreme Maximum Temperatures at the Alpena Wastewater Treatment Plant

AVERAGE AND EXTREME MINIMUM TEMPERATURES IN ALPENA COUNTY

DATA FROM ALPENA WASTEWATER TREATMENT PLANT

■ Average Minimum Temperature (F)
 ■ Average Extreme Minimum Temperature (F)

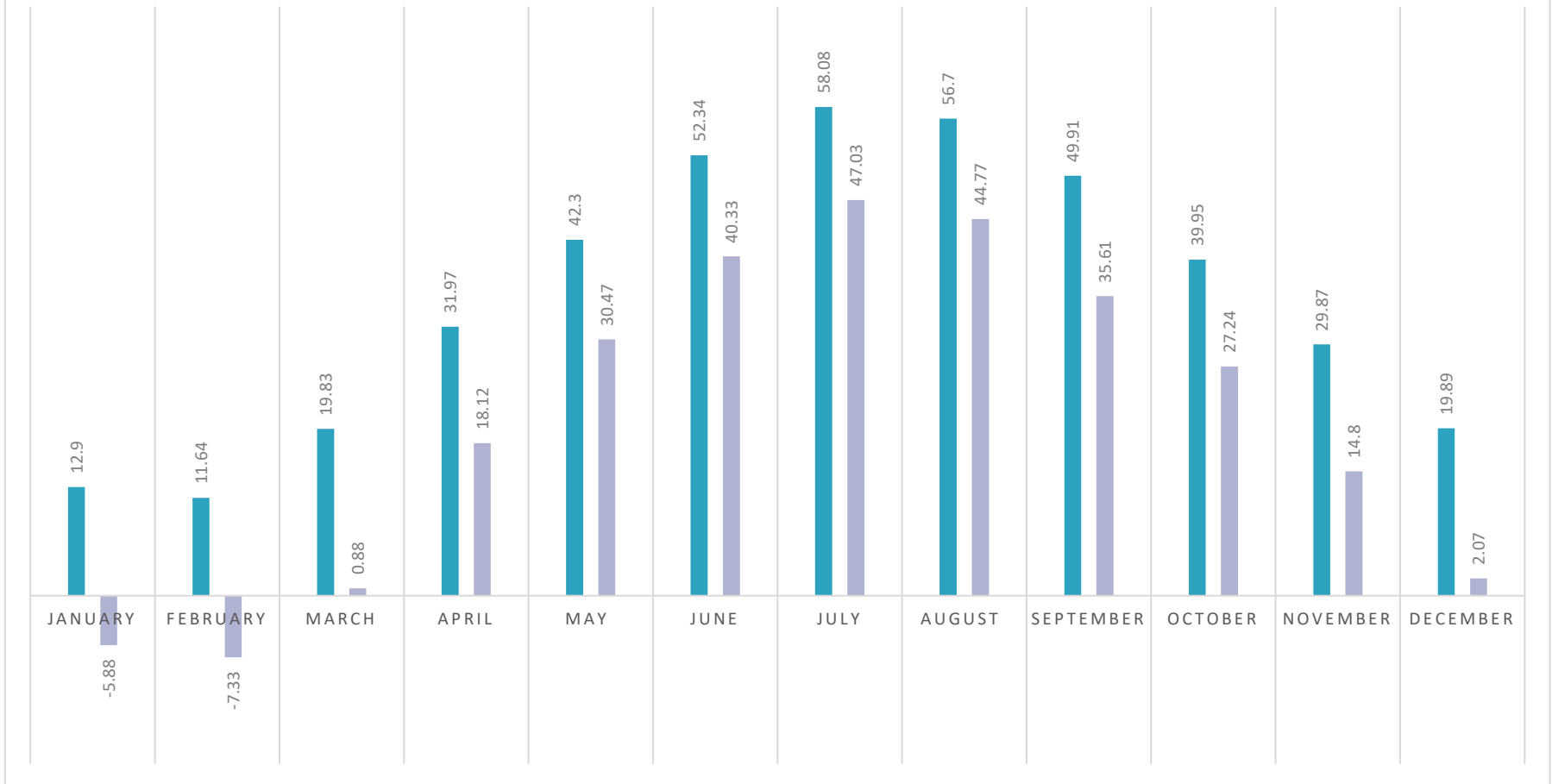


Figure 6-7 Average and Extreme Minimum Temperatures at the Alpena Wastewater Treatment Plant

Probability of Future Occurrences

Since 2001, there have been two extreme heat events in Alpena County. This data shows approximately 1 extreme heat event would occur every 9.5 years.

Since 2007, there have been three extreme cold events in Alpena County. This data shows approximately 1 event would occur every 4.3 years. Since extreme cold events tend to occur during the winter months and are coupled with blustery winds and snowstorms, these events may have been reported as other hazards or not at all, which means there may have been more extreme cold events in the county.

Extent

Extreme heat temperatures can be defined by record highs and the National Weather Service Heat Index. On July 13, 1936, the highest recorded temperature was 106 degrees Fahrenheit at the Alpena County Regional Airport. This temperature correlates to danger or extreme danger of having a heat disorder from prolonged exposure or strenuous activity (Figure 6-2). However, it should be noted that hotter events are possible. The City of Alpena experiences an urban heat island effect due to its impervious surfaces that retain heat, but the city is actively planting trees to combat heat.

Extreme cold temperatures can be defined by record lows and the National Weather Service Wind Chill Index. On February 17, 1979, the lowest recorded temperature was -37 degrees Fahrenheit at the Alpena County Regional Airport. This temperature correlates to frostbite exposure of 5-30 minutes (Figure 6-3). However, it should be noted that colder events are possible.

Vulnerability Assessment

All of Alpena County's existing and future buildings, population, and infrastructure are at-risk and vulnerable to extreme temperatures (extreme heat and extreme cold).

Extreme heat has little effect on buildings and infrastructure. However, in rare cases, buildings can collapse or buckle. Utility infrastructure can fail and cause power outages, or put stress on utility service due to an increase in the usage of air-conditioning units. Heat can also cause pavement to expand. Elderly adults, and young children are more susceptible to heat disorders since older adults are more likely to be on medications or have chronic illnesses that affect their body's ability to regulate heat, and young children rely on others to keep them cool and hydrated. Athletes and outdoor workers are also susceptible since they are more likely to become dehydrated. Low income populations are susceptible since they may not have or be able to afford an air conditioning system for their home. Extreme heat negatively impacts air quality by increasing the amount of pollutants in the air, which can aggravate existing respiratory illnesses, and can decrease lung function after long-term exposure to high temperatures. Water quality is impacted by heating up waterbodies or heating up the runoff that drains into them. This hotter water may degrade the water resources as well as kill fish, macroinvertebrates, and vegetation.

Extreme cold temperature events can cause pipes to freeze and burst in buildings, broken water mains, and stress to concrete and asphalt, which is costly to repair. After exposure to extreme cold temperatures, individuals may get frostbite or hypothermia, or they could die. Elderly, children, and individuals without access to an adequate heat source are considered to be at a higher risk to the impacts from extreme cold events. Additionally, extreme cold events could cause power outages and potentially result in carbon monoxide-related deaths due to the indoor usage of gas-powered furnaces and alternative heating sources. Risks for structural fires also increase with the use of alternative

heating and power sources. Business and school operations would be disrupted since people are advised to remain indoors to reduce their exposure.

Severe Winds (Derecho)

Description

A derecho is a long-lived windstorm that is associated with fast-moving severe thunderstorms that occur during the spring or summer; however, can occur any time of the year. According to The National Severe Storms Laboratory, winds in excess of 58 miles per hour are considered to be a derecho. Severe windstorms down trees, cause damage to homes, businesses, power lines, and agricultural crops, and may require temporary sheltering of individuals without power for extended periods of time.

According to the *2019 Michigan Hazard Mitigation Plan*, the statewide average annual number of severe wind events is 395 with 2 average annual deaths, 13 average annual injuries, and an expected annual loss of \$51.3 million. Windstorms occur in all areas of Michigan, although more often along the lakeshore and in central and southern Lower Michigan. On average, severe wind events can be expected 2-3 times per year in the Upper Peninsula, 3-4 times per year in the northern Lower Peninsula, and 5-7 times per year in the southern Lower Peninsula. Along the Great Lakes shoreline, strong winds regularly occur and occasionally have gusts over 74 miles per hour when in conjunction with a storm front according to *Publication #207* (p. 32-33).

In the Northern Lower Peninsula, *the 2019 Michigan Hazard Mitigation Plan* states on average there are 2 average annual events, 0.2 average annual deaths, 2.6 average annual injuries, and approximately \$4.7 million in property and crop damage per year. For example, during September 26-27, 1998, Northern Lower Michigan experienced severe thunderstorms that produced strong winds that damaged or destroyed homes, businesses and public facilities, and downed trees and power lines.

On April 30, 1984, another windstorm struck the entire Lower Peninsula and resulted in winds up to 91 mph in some areas. The storm caused severe shore erosion, and damaged 6,500 buildings, 300 mobile homes, and 5,000 vehicles. The storm also resulted in 1 death, several injuries, and over 500,000 customers without power.

Another storm event that moved across Michigan occurred on November 10-11, 1998. This storm was the strongest storm ever recorded in the Great Lakes with wind gusts of 50-80 miles per hour and a peak gust of 95 miles per hour reported on Mackinac Island. It damaged buildings, downed trees and power lines, killed one person, and left over 500,000 people without power. By the morning of November 11, the winds had pushed so much water into Lake Huron that the water level on Saginaw Bay bottomed out 50" below chart datum, which exposed and dried up one-half of the bay bed. As the wind died down, the water level in the Saginaw Bay rose to its normal level.

Measuring Severe Winds

The Beaufort Wind Scale is used to describe wind strength through observation. Table 6-3 shows the Beaufort Wind Scale.

Location

Severe winds are a regional event that is not confined to geographic boundaries and can affect several areas at one time. Also, the severity of the winds may range across the affected areas. All of Alpena County is at risk to the occurrence and impacts from severe winds.

Table 6-3 Beaufort Wind Scale			
Force	Wind Speed (knots)	Description	Specifications for use on Land
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind varies
2	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Dust, leaves, and loose paper lifted; small tree branches move
5	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	-
12	64+	Hurricane	-

Previous Occurrences

According to the USDA’s *Soil Survey of Alpena County, Michigan*, thunderstorms occur about 32 days each year. Since 1955, there have been 94 high wind and thunderstorm wind events reported in the county, with the majority of events occurring in the summer. The events caused 3 injuries, about \$353,000 in property damages, but did not cause any deaths or crop damage.

Between 2006 and 2011, there were six strong wind events with five associated with thunderstorm activity and incurring \$96,000 in estimated damages. Between 2015 and 2018, there were three strong wind events reported with two associated with thunderstorms and \$56,000 in estimated damages. The most severe windstorm occurred on June 19, 1955 with wind speeds up to 88 mph in Alpena County.

Extent

Winds are measured by wind speed and the amount of damage. Severe winds (derecho) refer to thunderstorm winds and high winds in NOAA’s NCEI database. The most severe windstorm in Alpena County occurred on June 19, 1955 with wind speeds up to 88 mph. The event did not have any deaths, injuries, or property and crop damages. However, a windstorm on June 17, 1992 had 3 injuries, but the wind speed was not reported. On August 27, 1993, a windstorm had \$100,500 in property damages, but the wind speed was not reported. On July 18, 2005, a windstorm caused \$75,000 in property damages with wind speeds ranging from 50-52 mph. On July 8, 2016, a windstorm caused \$30,000 in damages with wind speeds ranging from 52-55 mph. However, stronger winds and higher damage estimates are possible.

Probability of Future Occurrences

Since there have been 94 high wind and thunderstorm wind events reported in the last 65 years, the data shows approximately 1 event would occur every 0.7 years.

Vulnerability Assessment

All existing and future buildings and populations are at-risk to severe winds. Severe winds have the potential to blow shingles, siding, awnings, and other features off buildings. Falling trees and tree limbs can damage structures as well as cause timber damage that would result in a loss of timber production. Severe winds can pick up objects and hurl them through the air, which may result in damage to structures or harm to people. Sometimes, structures can be blown off their foundations. Severe winds can also blow down communication infrastructure, utility poles, and aboveground power lines. Businesses may have to close due to power outages. Severe winds may also cause damage to agricultural operations.

Wildfires

Description

A wildfire is an unplanned, uncontrolled fire in grassland, brushland, or forested areas. Wildfires can occur in any forest type under dry conditions; however, some forest types are more susceptible to wildland fires. For example, jack and red pine forest stands have a high risk for wildfires, while oak and white pine forest stands have a moderate risk. The primary cause of wildfires is from human activities, specifically burning outdoor debris. Wildfires cause destruction to property and timber resources, and injures or loss of life to wildlife and persons living or recreating in wildfire prone areas. Long-term effects include scorched and barren land, soil erosion, landslides/mudflows, water sedimentation, and loss of recreational opportunities.

Historically, Michigan's landscape has been shaped by wildfire; however, over the last several decades, the current landscape has transformed from wildland to residential development. With the increase in residential development in and around rural areas prone to wildfires, there is an increase in the potential for loss of life and property damage. Unfortunately, rural areas do not have enough fire suppression forces available to protect every structure from wildfires.

In Michigan, approximately 600 wildfires are reported each year with the majority occurring in April, May and June. In 2018, the Michigan DNR reported there were 301 fires and as of June 2019, there were 168 fires. In Alpena County, the majority of the burns are caused from debris burns followed by equipment burns.

Location

According to the MIRIS Land Cover/Use Inventory, about 7% of Alpena County is covered with jack, red, and white pine and oak forest stands, which have a high fire risk (Figure 6-8). These stands are located in Wilson, Alpena, Green, and Ossineke Townships. These lands are primarily state forests and hunt clubs with some residential areas.

Previous Occurrences and Probability of Future Occurrences

Between 2001 and 2012, the Michigan DNR reports there were 135 wildfires in Alpena County that burned 303 acres (not including wildfires suppressed by the U.S. Forest Service or local fire departments). According to the Michigan DNR Wildland Fire Interactive Map, Alpena County has had 57 wildland fire incidents between 2015 and June 2019. Fires from Oscoda County were included since Oscoda County is adjacent to Alpena County and fires in either county can cross political boundary lines.

Since Alpena County has had 192 events reported in the last 19 years, approximately one event will occur every 0.09 years. The following are past significant wildfire events.

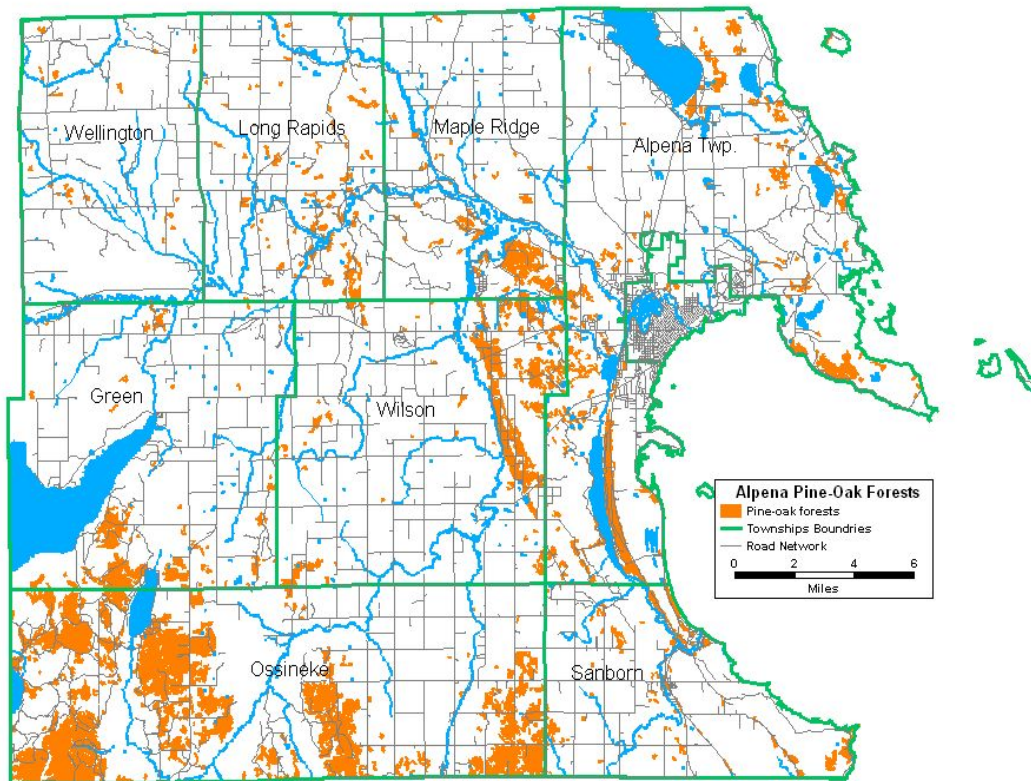


Figure 6-8 Pine Oak Forests in Alpena County

July 1911 – Au Sable-Oscoda Fire: Wildfires occurred across the Northeastern Lower Peninsula, causing \$1.5 million in damages and several casualties. 1,800 residents were evacuated from the towns of Oscoda and Au Sable. Fire damages were estimated at \$100,000 in Alpena, \$300,000 in Waters, and \$500,000 in Oscoda and Au Sable. 40 railroad cars and two bridges were lost in Grayling.

May 1980 – Mack Lake Fire: A wildfire destroyed 44 homes and buildings in Oscoda County. The fire also forced the evacuation of 1,500 people, killed one firefighter, and caused \$2 million in total property and timber loss.

May 1999 – Northern Lower Peninsula: The Michigan DNR fought nearly 40 wildfires that were fueled by dry conditions. In Oscoda County, an 850-acre fire burned in the Huron-Manistee National Forest.

April 30- first week of May 2000 - Mio (Oscoda County): Extremely dry conditions caused a wildfire near Mio that consumed ~ 5,200 acres in the Huron-Manistee National Forest before being contained a week later. Nearly 300 firefighters and two aerial water tankers were deployed. The fire prompted the evacuation of approximately 30 persons, but did not cause any injuries or structural damage.

April 30 to May 1, 2006 – Oscoda County: An individual burning brush in a fire pit ignited a wildfire in Hughes Lake and southeast winds of 10 to 20 mph spread the fire northwest from Hughes lake. Almost 300 personnel were involved in fighting the fire since crews were flown in from New Mexico and Montana. Approximately 5,950 acres of timber and brushland were burned south of M-72, east of M-

18, and west of M-33. Sixteen structures and seven vehicles were destroyed with property damage estimated at \$600,000 (not including costs incurred from fighting the fire that were greater than \$800,000). Evacuations were ordered as far as southeast Crawford County.

Extent

Extent can be measured by the number of acres burned and the cost of property damage. The costliest fire occurred in July 1911 with \$100,000 in damages. Recent fires tend to be caused by debris burns and equipment burns. These fires range in 0.1-2.2 acres burned. Wilson, Alpena, Green, and Ossineke Townships have pine-oak forest stands, which have a high wildfire risk. Generally, these lands are located in state forests and in hunt clubs. Campfires and debris burns may increase the number of wildfires.

Vulnerability Assessment

Since wildfires can spread across political boundaries, all of Alpena County's existing and future buildings and populations, and its neighboring counties are at-risk to wildfires. About 14% of Alpena County is composed of pine-oak forest stands, which have a high wildfire risk. Wildfires burn property and structures, which results in high damage costs. Additionally, wildfires can cause death or injuries for people who become trapped in the fire or who are fighting the fire. Wildfires can cause a loss in timber production and agricultural revenue from the fire damaging timber supplies and agricultural products, and killing livestock. Communication and power infrastructure can be damaged by wildfires, which would result in power outages, reduced/a loss of warning notifications to the public, and the inability to call for emergency services. Also, residents and businesses may have to evacuate and find shelter.

Great Lakes Shoreline Flooding and Erosion

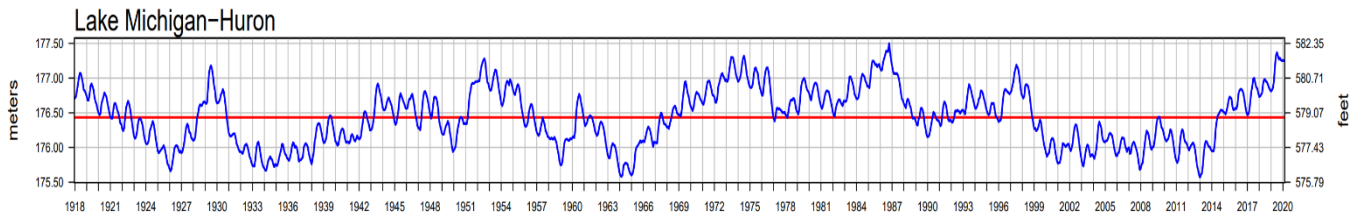
Description

Flooding and erosion issues are natural processes that occur on the Great Lakes due to wind, waves, water levels, precipitation levels, seiches, and human activities. They have the potential to threaten life, health, and property. For example, the removal of soil from erosion activities may expose the foundations of structures or underground utility pipes, as well as cause roadways to become unstable and crack. Additionally, seiches, windstorms that tilt the surface of a lake, can cause lake water to travel inland over large areas. Unfortunately, humans build structures in flood prone areas along the shorelines that alter the natural landscape and increase the number of people and structures in hazard prone areas.

Michigan has over 3,200 miles of coastline with about 4.7 million people living in the counties along the shoreline. The State has developed a coastal management program to protect shoreline resources, identify development areas and hazardous areas, and improve public access to the coastline. The program is administered by the Department of Environment, Great Lakes & Energy (EGLE). EGLE estimates approximately 10% of the Great Lakes shoreline is prone to flooding and has identified 125 municipalities along the Great Lakes shoreline that have high-risk erosion areas where new permanent structures must comply with building setbacks to minimize the extent and magnitude of flooding and erosion issues.

In nearly every decade, high water levels on the Great Lakes have caused significant damage to Michigan coastal communities (Figure 6-9). In the early 1950s and late 1960s, high water levels resulted in flooding that caused millions of dollars in damages to shoreline communities. Between 1972 and 1973, high water levels caused flooding in over 30 counties and resulted in an excess of \$50 million in public and private damages since thousands of people were forced to evacuate their homes. Between 1985 and 1986, high lake levels culminated in a Governor's disaster declaration for 17 shoreline counties. The

Army Corps of Engineers (USACE) implemented its Advance Measures Program, and the State implemented three shoreline flooding and erosion mitigation programs aimed at reducing future flood impacts. In 1997, the USACE implemented its Advance Measures Program to assist Michigan shoreline communities with their flood and erosion mitigation efforts. In 2019, record high water levels were



recorded on the Great Lakes. The Army Corps of Engineers forecasts the water levels on Lake Michigan-Huron will begin reaching record highs between April 2020 and August 2020.

Figure 6-9 Lake Michigan-Huron Water Levels 1918-2020
 Source: U.S. Army Corps of Engineers, Retrieved March 2020
 Blue: Monthly Mean Level; Red: Long Term Annual Average

Location

Alpena County has approximately 24 miles of shoreline along Lake Huron. In addition, the county has large lakes, ponds, and the Thunder Bay River and its tributaries. Alpena Township, the City of Alpena, and Sanborn Township are the most at risk for Great Lakes flooding and erosion.

Previous Occurrences and Probability of Future Occurrences

According to Michigan Sea Grant’s Great Lakes Current Incident database, Alpena County has not had any incidents since 2002. It should be noted the database was started in 2002, and it was more difficult to gather incident-related information, and rip currents were not recognized as occurring on the Great Lakes before the early 2000’s. Therefore, incidents may not have been recorded in the database or were reported as different hazards. In the early 2000’s, low water levels existed in Lake Huron (dropped about 5 feet). The water levels remained below the long-term annual average until 2014 when they began to rise above the long-term average.

Since the Great Lakes’ water levels go through cyclical high and low water periods, the future occurrence of this hazard is not easy to predict. Additionally, seasonal water fluctuations due to water runoff can impact the future occurrence of this hazard. In Lake Huron, the average amount of seasonal runoff is about one foot.

Extent

Extent can be measured by the amount of damage caused to buildings and infrastructure. Alpena County has not had any recently recorded incidents of Great Lakes shoreline flooding and erosion. Therefore, no damage has been reported. Extent can also be measured by the number of injuries or fatalities. According to the 2019 Hazard Analysis, Alpena County has had between 0-1 incidents from 2002-2019. Additionally, the 2019 Hazard Analysis classified Alpena County as a low risk erosion hazard area and a low shoreline recession risk. For many years, Alpena County has implemented remediation activities to reduce erosion along the shoreline, and instituted land use policies and regulations to protect developments and the natural environment.

Vulnerability Assessment

The buildings and infrastructure in Alpena Township, the City of Alpena, and Sanborn Township are most at-risk to Great Lakes shoreline flooding and erosion. The waves and winds from Lake Huron can

remove sand or soil from buildings, which causes a loss in property, and exposes foundations and underground utilities. Structures can also become closer to the waters or become perched on bluffs, which could cause the structures to end up in Lake Huron. The foundations and utilities may experience water damage, extreme temperatures, and become unstable. High water levels can also wash out roads and cause them to crack, become unstable, and slough. This damage has the potential to cause vehicles or equipment to go into Lake Huron. Road closures have the potential to cause longer emergency response times. Low water levels on Lake Huron can impact shipping companies since they may be forced to lighten loads on their freighters to avoid running aground in channels and ports, and reducing drafts. Low water levels also have the potential to shut down ferry services, and call for more dredging projects that are expensive and cause an issue of where to appropriately dispose of contaminated sediments.

Lightning

Description

Lightning is a discharge of electricity in the atmosphere between the clouds, air, or ground to equalize the charged regions in the atmosphere. It is still being debated how the electrical charges build up in the clouds. Lightning generally occurs during thunderstorms; however, it can occur without a thunderstorm, such as during intense forest fires and heavy snowstorms. Lightning that occurs without nearby rain is most likely to cause forest fires.

In the United States, approximately 100,000 thunderstorms occur annually according to the *2019 Michigan Hazard Analysis*. According to the National Weather Service Storm Data, in the last 10 years (2009-2018), the U.S. has averaged 27 lightning fatalities and 243 injuries. The *2019 Michigan Hazard Analysis* reports lightning on average damages more structures and kills and injures more people in the U.S. per year than tornadoes or hurricanes despite being perceived as a minor hazard.

The *2019 Michigan Hazard Analysis* compiled the following statistics from NOAA and the National Lightning Safety Institute (NLSI) for the period of 1959-1994:

- The majority of lightning strikes had one victim (91%)
- The majority of lightning strikes occurred during the summer months: June (21%), July (30%), and August (22%)
- Most lightning strikes occur between 2 p.m. and 6 p.m.

The NLSI estimates that 85% of lightning victims are children and young men (aged 10-35 years) engaged in recreation or work-related activities. Approximately 10% of lightning strike victims die, and 25% of survivors suffer serious long-term after-effects, such as memory and attention deficits, sleep disturbance, fatigue, dizziness, and numbness. Additionally, the NLSI estimates that annual lightning damage to property exceeds \$4-5 billion in the United States.

Michigan's lightning deaths and injuries are fairly consistent with the national trends in terms of location of deadly or injury-causing strikes (Table 6-4, Table 6-5). According to the National Weather Service records through the mid-2000s, Michigan has incurred 101 lightning deaths, 711 lightning injuries, and 810 lightning casualties (deaths and injuries combined). During 1959-1995, Michigan was ranked 2nd nationally (behind Florida) in lightning injuries and 12th nationally in lightning deaths. During 1998-2008, Michigan was ranked 13th in the number of lightning deaths.

Location

Lightning is not confined to geographic boundaries and is a regional event. Since lightning occurs randomly, it is impossible to predict where lightning will occur and how severe it will be. All of Alpena County is at risk to the occurrence and impacts from lightning.

Table 6-4 Lightning Related Deaths in Michigan, 1959-July 2005		
Number of Deaths	Location	Percent of Total
29	Open fields, ball fields	29%
26	Under trees (not golf)	26%
11	Boats / water-related	11%
10	Golf course	10%
4	Near tractors / heavy equipment	4%
2	At telephone	2%
19	Other location / unknown	19%
Source: Storm Data, National Climatic Data Center; 2019 Michigan Hazard Analysis		

Table 6-5 Lightning Related Injuries in Michigan, 1959-July 2005		
Number of Injuries	Location	Percent of Total
243	Open fields, ball fields	34%
104	Under trees (not golf)	15%
35	Golf course	5%
26	Boats / water-related	4%
20	Near tractors / heavy equipment	3%
19	At telephone	3%
264	Other location / unknown	37%
Source: Storm Data, National Climatic Data Center; 2019 Michigan Hazard Analysis		

Previous Occurrences

Alpena County has had one lightning event reported to NOAA. The event occurred on July 18, 2005 and had one injury where a lightning strike at a campground shocked a man who was taking down an awning. The event did not have any deaths, or property and crop damage.

Probability of Future Occurrences

Since there has been one lightning event reported in the last 15 years, the data shows that approximately one event would occur every fifteen years. However, not all lightning events may have been reported since events with injuries, deaths, and extensive damages tend to be the only ones reported. Therefore, the number of lightning events and damages may be higher.

Extent

One method to measure lightning extent is by flash density even though not all flashes result in a lightning strike. In Alpena County, there are 1.5 to 6 flashes per square mile per year on average according to Vaisala, Inc. Another way to measure lightning extent is by the amount of damage reported. Unfortunately, no damage was reported to NOAA for the lightning event in Alpena County.

Vulnerability Assessment

All existing and future buildings, exposed infrastructure, and populations are at risk from lightning events since it may cause structural and wildland fires, loss of electrical and telecommunications equipment, and damage to buildings or vehicles from falling trees struck by lightning. People that work outside or participate in outdoor recreation activities are at a higher risk to be struck by lightning.

Hailstorms

Description

Hailstorms occur when a severe thunderstorm produces hail that falls to the ground. Hail is formed when the updrafts of the storm carries water droplets above the freezing level, where they form into rounded or irregular lumps of ice that range from the size of a pea to the size of a grapefruit. When the weight of the hail is no longer supported by the air, it falls to the ground and has the potential to batter crops, dent automobiles, and injure people and wildlife. Sometimes, large hail appears before a tornado since it is formed in the area of a thunderstorm that tornadoes are most likely to form.

According to the *2019 Michigan Hazard Mitigation Plan*, Michigan has on average 191 hailstorms with an expected annual statewide loss of about \$16.6 million, no deaths, and approximately 1 injury per year. Despite damaging hail occurring in every part of Michigan, the areas of the state most prone to severe thunderstorms (e.g. southern half of the Lower Peninsula) are also most prone to large and damaging hail. The majority of hailstorms occur during the growing season from May through August when crops have the greatest potential to be damaged by hail.

According to the *2012 Michigan Hazard Analysis*, the National Weather Service began recording hail activity in Michigan in 1967. The National Weather Service issues forecasts for severe thunderstorms with sufficient warning time to allow residents to take appropriate action to reduce the effects of hail damage to vehicles and some property. However, little can be done to prevent damage to crops. For example, during September 26-27, 1998, a line of severe thunderstorms moved across northern Lower Michigan producing hail up to 2" in diameter, destroying an estimated 30,000-35,000 bushels of apples at area farms, and damaging several homes and vehicles.

Measuring Hailstorms

Hailstorms are categorized using the TORRO Hailstorm Intensity Scale, which ranges from H0 (Hard Hail) to H10 (Super Hailstorms).

Location

Hailstorms are regional events that frequently accompany thunderstorms, and are not confined to geographic boundaries. The severity of hailstorms may range across the affected areas. All of Alpena County is at risk to the occurrence and impacts from hailstorms. According to the National Weather Service, Alpena County is in an area of the United States that has on average two days of hailstorm events per year.

Previous Occurrences

Between September 1960 and April 2019, Alpena County had 47 hailstorms reported to NOAA. None of the events caused deaths, injuries, or property damage. The most severe hailstorm occurred on July 8, 2016 with two inch hail that caused \$100,000 in crop damages.

Probability of Future Occurrences

With 47 events reported in the past 60 years, Alpena County experiences approximately one event every 1.3 years. However, not all hailstorm events and damages may have been reported to NOAA, which means the number of events and damages may be higher.

Extent

The greatest extent hail reported in Alpena County was 2 inches, which is correlates to H6 (Destructive) on the TORRO Hailstorm Intensity Scale. According to the scale, hailstones of this size are equivalent to a golf ball and can damage ground aircraft and brick walls.

Vulnerability Assessment

All existing and future buildings, exposed infrastructure, and populations are at risk from hailstorms since hail causes damage to roofs, brick walls, glass, landscaping, crops, and cars. Hail can also damage roads, sidewalks, bridges, and above ground utilities. Hail has the potential to cause injury and death, and populations are advised to take shelter when an event occurs.

Drought

Description

Drought is a consequence of a natural reduction in the amount of expected precipitation over an extended period of time, usually a season or more in length. Drought differs from normal arid conditions found in low rainfall areas since the aridity is a permanent characteristic in the arid areas. The severity of a drought depends on its location, duration, geographical extent, and the water supply demands from human activities and vegetation. Due to the multi-faceted nature of droughts, it is difficult to define, and assess when and where it will occur.

Some of the severe impacts that droughts have on communities and regions include:

- Water shortages for human consumption, power generation, recreation and navigation, and industrial, business and agricultural uses
- Reduction in quality and quantity of crops
- Reduction of water quality in lakes, streams, and other natural water bodies
- Malnourished wildlife and livestock
- Increase in wildfires and wildfire-related losses
- Decline in tourism in areas dependent on water-related activities
- Decline in land values due to the impact of drought conditions on the economic or functional use of the property
- Reduction in tax revenue due to income losses from the agriculture, retail, tourism, and other industry sectors
- Increase in insect infestations, plant disease and wind erosion
- Potential loss of life due to food shortages, extreme heat, fire, increased pollutant concentrations in surface water, and diminished sewage flows

According to the *2012 Michigan Hazard Analysis*, drought is a natural part of Michigan's climate and can be exacerbated by heat during the warmer months. The *2019 Michigan Hazard Mitigation Plan* states Michigan has 3 average annual drought events with no deaths or injuries, and greater than \$7 million in annual property and crop damage. The most common type of drought is agricultural drought, where severe soil-moisture deficits lead to serious consequences for crop production.

In the late 1980's, Michigan experienced a drought that caused an estimated \$40 billion in damages from agricultural losses, river transportation disruption, water supply shortages, wildfires, and other related economic impacts across the Central and Eastern portions of the United States. Communities

instituted temporary water use restrictions and a state task force was formed to study the drought and formulate mitigation strategies. In June 1988, the Governor issued a statewide outdoor burning ban to prevent potential wildfires. Between 1989 and 1990, the Northeastern Lower Peninsula experienced drought conditions for eight months in a row.

Between 1998 and 2003, Michigan experienced another drought that caused an estimated \$6-9 billion in damage from Texas to the Carolinas, over \$1 billion in damage in the Eastern U.S. in 1999, and over \$4 billion in damages and costs in the South-Central and Southeastern U.S. in 2000. The northeastern and southwestern areas of the Lower Peninsula experienced 9 to 10 months of drought conditions between 1999 and 2000. In 2001, the drought/heat wave damaged or destroyed one-third of Michigan's fruit, vegetable, and field crops, which resulted in a U.S. Department of Agriculture Disaster Declaration for 82 of the state's counties. In addition, Southeast Michigan experienced water shortages, which resulted in local officials issuing periodic water usage restrictions. In September 2002, Michigan communities were under water use restrictions and the agricultural yields were estimated to be less than 50%, while counties in eastern Michigan were declared agricultural disaster areas.

Measuring Droughts

Two main methods to measure drought are the Palmer Drought Severity Index (PDSI) and the U.S. Drought Monitor. The PDSI was the first comprehensive drought index and the U.S. Drought Monitor is a newer index that combines quantitative measures with input from experts in the field.

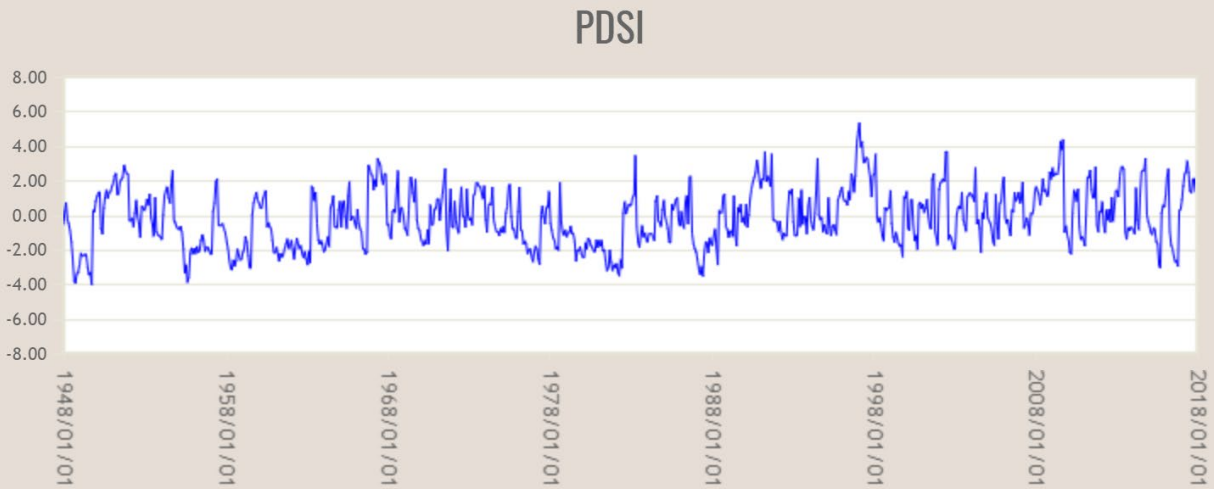
The Palmer Drought Severity Index (PDSI) responds to weather conditions that have been abnormally dry or abnormally wet and is calculated with precipitation and temperature data, and the local available water content of the soil. The index's scale ranges from -6.0 (dry) to +6.0 (wet), where zero is normal. Alpena County has two atlas stations that maintain PDSI information: one at the Alpena Wastewater Treatment Plant (Alpena WWTP) and one at the Alpena County Regional Airport (Alpena CO RGNL AP). The stations show Alpena County's coastal and inland areas are currently experiencing a moderate wet period (Figure 6-10).

The U.S. Drought Monitor classifies droughts into four categories from least intense (D1) to most intense (D4) and has an additional category for drought watch (D0). Drought watch (D0) results in short-term dryness with slowed planting, slowed crop and pasture growth, and some lingering water deficits. Moderate Drought (D1) results in some crop and pasture damage, low streams, reservoirs, or wells, some water shortages, and voluntary water-use restrictions. Severe Drought (D2) results in crop or pasture losses, common water shortages, and water restrictions. Extreme Drought (D3) results in crop and pasture losses, widespread water shortages and water restrictions. Exceptional Drought (D4) results in water emergencies with widespread crop and pasture losses, and a shortage of water in reservoirs, streams, and wells.

Location

A drought is a regional event that is not confined to geographic boundaries and can affect several areas at one time. Also, the severity of the drought may range across the affected areas. All of Alpena County is at risk to drought occurrence and impacts. Agricultural lands are found in Green Township (8,727 acres), Ossineke Township (11,438 acre), Wilson Township (13,871 acres), and Long Rapids Township (8,171 acres). There are small agricultural areas in Ossineke, Maple Ridge, and Sanborn Townships.

Results for ALPENA WWTP (200169) between 1/1/1948 and 12/31/2017 and aggregated by month.



Results for ALPENA CO RGNL AP (200164) between 10/21/1916 and 12/31/2017 and aggregated by month.

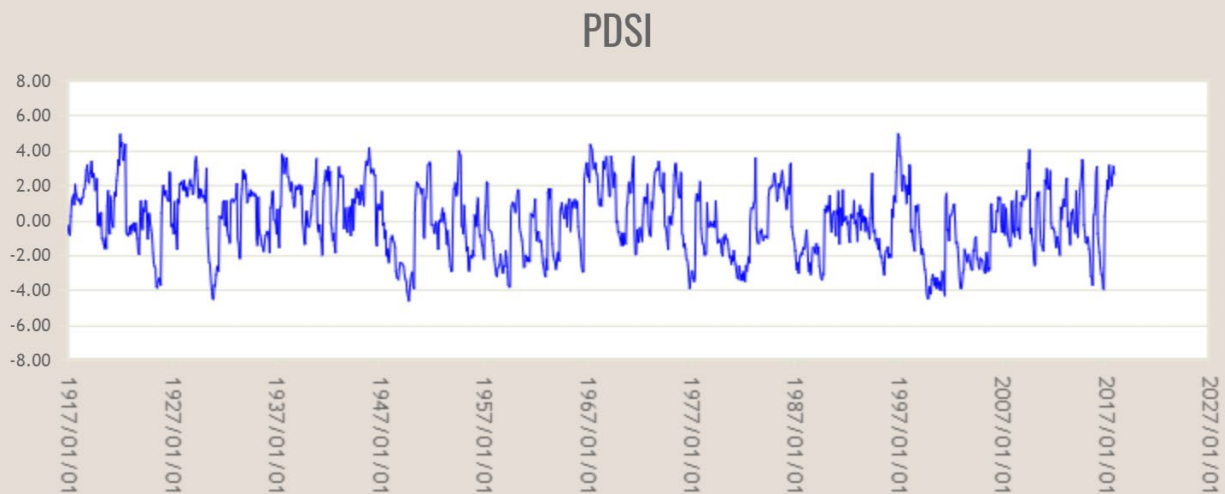


Figure 6-10 Palmer Drought Severity Index for Alpena Wastewater Treatment Plant (Alpena WWTP) and Alpena County Regional Airport (Alpena CO RGNL AP)

Source: The National Drought Mitigation Center's Drought Risk Atlas

Previous Occurrences

The amount of precipitation received each year has the potential to inform the impact drought may have on the county. Alpena County's 30 year average annual precipitation is 30.3 inches and its 30 year average annual snowfall is 57.6 inches.

In Michigan, droughts are monitored and analyzed through its ten climate divisions. According to the *2019 Michigan Hazard Analysis*, Alpena County is part of Climate Division 4, along with Alcona, Cheboygan, Crawford, Iosco, Montmorency, Ogemaw, Oscoda, Otsego, Presque Isle, and Roscommon Counties. The U.S. Drought Monitor for Climate Division 4 shows the division's area tends to be

abnormally dry with some moderate and severe droughts throughout the years (Figure 6-11). Between 1895 and 2018, 51% of the years did not have any drought months in Climate Division 4 according to the *2019 Michigan Hazard Analysis*. The most extreme drought in this climate division occurred in February 1931 with a Palmer Index of -6.13. The division also had droughts in the following time periods: 1895-1896 (15 months), 1908-1911 (37 months), 1913-1915 (21 months), 1925-1926 (10 months), 1930-1931 (12 months), 1948-1949 (17 months), 1955-1956 (12 months), 1963-1964 (8 months), 1976-1977 (11 months), 1989-1990 (8 months), 1998-1999 (11 months), and 1999-2001 (21 months).

On March 2, 1977, Alpena County received a Presidential Drought Emergency Declaration during the 1976-77 drought in the Great Plains, Upper Midwest, and West. The drought conditions contributed to wildfires, crop damage, and low water levels in Michigan’s Great Lakes.

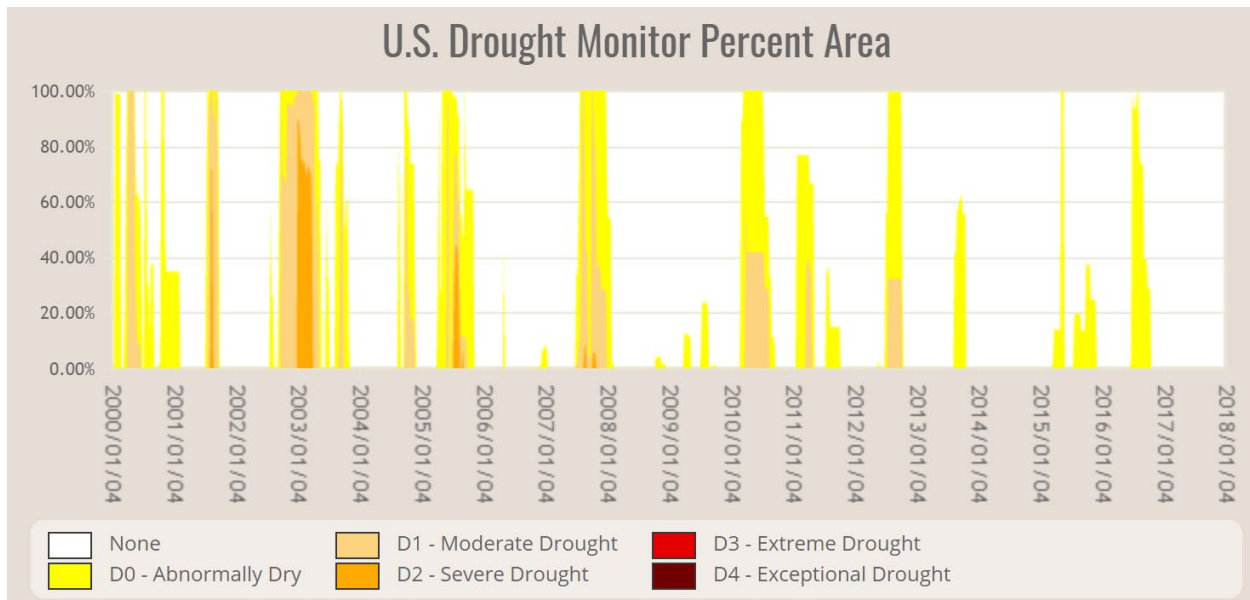


Figure 6-11 U.S. Drought Monitor Percent Area for Climate Division 4
 Source: The National Drought Mitigation Center’s Drought Risk Atlas

Probability of Future Occurrences

Due to the limited amount of data available for droughts, an exact probability is difficult to calculate. However, based on the U.S. Drought Monitor Index, Alpena County experienced drought in 16 out of the 18 years on record, which equates to an 88% chance that a drought will occur each year. It is difficult to predict future occurrences of drought in the county since multiple factors, such as climate change, precipitation, humidity, and temperature can influence drought conditions. However, droughts are more likely to occur in the summer months when the higher temperatures increase evaporation rates. Based on the data from the U.S. Drought Monitor Index, abnormally dry conditions are predicted for future drought occurrences in the county, which would result in slowed planting, slowed crop and pasture growth, a reduction in livestock production, and some water deficits.

Extent

Generally, the county experiences abnormally dry conditions that fall into the drought watch category on the U.S. Drought Monitor. The most severe droughts occurred in 2001, 2003, 2005, and 2007. Despite not experiencing exceptional droughts, the county does have the potential to experience them in the future.

Vulnerability Assessment

It is difficult to quantify drought conditions since droughts do not have specific boundaries and are dependent on the weather-related factors. In Alpena County, impacts from droughts include a reduction in crop and livestock production, an increased potential for wildfires, a reduction in farm products, a reduction in timber production, and loss of tourism with a decrease in watercraft access to Lake Huron and large inland lakes. Drought conditions may increase the risk for wildfires, which would require residents to be warned and/or evacuated. Droughts can also impact the county's public health through the reduction of the quality and quantity of available water for drinking, business operations, and recreational, agricultural, and forestry management activities. While droughts have not been severe enough to fully deprive the county of water, it is possible. Additionally, droughts may impact food prices and may result in food product shortages since farming occurs in the county.

Karst Sinkholes (subsidence)

Description

Depressions, cracks, and sinkholes in the ground surface pose an immediate threat to people and property. The sudden collapse of the ground surface to form depressions and sinkholes can take many days to a few years to develop and range from several days to years until the ground movements stabilize. Subsidence depressions may damage structures with low strain tolerances, such as dams, nuclear reactors, and utility infrastructure.

In Alpena County, the most prevalent subsidence features are the Karst sinkholes. These sinkholes occur when the bedrock dissolves and the surface rock collapses into the cavity, which can cause tremors that may be reported as earthquakes.

Location

Karst sinkholes are found in Alpena, Maple Ridge, and Long Rapids Townships. According to the *USGS Summary of Hydrogeologic Conditions by County for the State of Michigan*, karst sinkhole lakes include Devil's Lake, Long Lake, Fitzgerald Lake, and Mindack Lake. Geologists believe a hinge-line fault serves as a pathway for subterranean drainage and interconnects several sinkholes and sinkhole-controlled lakes before emptying into Lake Huron at El Cajon Bay.

Previous Occurrences and Probability of Future Occurrences

Although many sinkholes are on private lands, there are some open to the public. Stevens Twin Sinks, Bruski Sink, Rockport State Park Sinks, Sunken Lake, Mystery Valley, and Misery Bay Sink are accessible via trail or kayak. The Stevens Twins Sinks and Bruski Sink, and Mystery Valley (Presque Isle County) are part of the Thunder Bay Karst Preserve.

It is difficult to determine an exact probability or predict the future occurrence of Karst sinkholes in the county since multiple factors, such as bedrock composition, precipitation and snowfall, and drainage rates, influence when a sinkhole occurs.

Extent

The collapse of a sinkhole is a localized natural hazard that takes several decades to appear. In Alpena County, sinkholes range in size from less than 10 feet to more than 1,300 feet in diameter. Three massive sinkholes in Northern Alpena County are owned by the Michigan Karst Conservancy. The Stevens Twin Sinks unit is a 31 acre parcel with two sinkholes separated by a fragile saddle ridge. Each sinkhole is about 200 feet in diameter and 85 feet deep. The Bruski Sink unit is a 2.5 acre parcel.

Historically, Bruski Sink was used as an illegal trash dump and had a depth of 75 feet, but when the trash was removed by Michigan Karst Conservancy volunteers, the sink grew in depth to 112 feet.

Vulnerability Assessment

Any area in Alpena County that has bedrock with Traverse Group (Devonian limestone and shale) over Detroit River Group (contains anhydrite and gypsum) are at risk of Karst sinkholes since the minerals in the Detroit River Group rocks erode and create a cavern that the Traverse Group collapses into. Karst subsidence can expose groundwater to rapid contamination since geologists believe a hinge-line fault connects several sinkholes and sinkhole controlled lakes, and provides subterranean drainage to Lake Huron at El Cajon Bay. Historically, the karst sinkholes were used as dump sites and may still be used in that manner today. Groundwater contamination from agricultural byproducts, nitrates, infectious disease, septic systems, and sediments has been documented in the county's karst sinkholes. Additionally, agricultural drainage from pastures, feedlots, bean, potato, corn, and small grain fields can enter the aquifers through karst produced swallow holes, sinkholes, and fractures. Protection and preservation of the County's karst features will also protect the groundwater. The populations most at risk from this hazard are located in industrial areas, residential areas that have been constructed over active or abandoned mines with underground cavities near the surface, and areas where extensive amounts of groundwater have been withdrawn. Despite not having a recent reported occurrence of a Karst sinkhole, this hazard has the potential to occur in the future.

Technological Hazards

Dam Failure

Description

A dam is either man-made or constructed by wildlife, and controls the flow of water for agriculture, flood-control, artificial lakes, municipal water supplies, and energy generation. A dam failure occurs when an impoundment either collapses or fails which results in flash flooding downstream or water pouring over the top of the dam during a flood event. This failure may be due to poor operation, lack of maintenance, or vandalism of the dam. Dam failures can result in loss of life and extensive damage to property and natural resources since they occur unexpectedly.

According to EGLE, there are 2,500 dams in Michigan with 813 regulated by Part 307, Inland Lake Levels, and 235 regulated by Part 315, Dam Safety of The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The dams regulated by Part 307 have a court issued order that establishes the level at which the lake is to be maintained; while the dams regulated by Part 315 are over 6 feet in height and over 5 acres are impounded during the design flood. Additionally, the Federal Energy Regulatory Commission (FERC) regulates 99 hydroelectric dams under the Federal Power Act. Since 1888, EGLE has documented approximately 302 dam failures in Michigan with an estimated average annual property and crop damage of \$0.3 million.

Part 315 requires EGLE staff to determine the hazard potential classification for each dam according to the potential downstream impact the dam would have if it failed and to establish an inspection schedule. Dam inspections are required every three to five years for state regulated dams based on their hazard potential rating. For dams classified with a high or significant hazard potential, dam owners are required to prepare and maintain emergency action plans. Additionally, owners are required to have the local emergency management coordinators review the plans for consistency with local emergency operations plans before the owners submit the emergency action plan to EGLE.

The FERC licenses and inspects private, municipal, and state hydropower projects. The FERC requires every applicant to develop and file an emergency action plan with the Regional Engineer unless granted a written exemption. The plan describes the actions that will be taken to moderate or alleviate a problem at the dam and the actions that will occur to respond to dam incidents or emergencies. It also includes inundation maps that identify critical infrastructure and at-risk populations. A yearly comprehensive review of the emergency action plan is conducted, which may include a functional exercise with local emergency management officials.

Location

Dams are located in the City of Alpena, and Alpena, Green, and Maple Ridge Townships (Figure 6-12). The Ninth Street Dam in the City of Alpena, the Four Mile Dam in Alpena Township, and the Norway/Seven Mile Dam in Maple Ridge Township have high hazard potentials. The Upper South Dam in Green Township has a low hazard potential.

Hubbard Lake Dam is located in Caledonia Township (Alcona County) along the southern border of Alpena County. This dam is owned by Thunder Bay Power Company and has a low hazard potential. However, it is required to have an emergency action plan. For more information on this dam, see the Alcona County Hazard Mitigation Plan.

Previous Occurrences and Probability of Future Occurrences

Alpena County has not had any previous reported dam failures. According to the National Inventory of Dams, Alpena County has four dams with an average age of 102 years (Table 6-6). Based on the aging infrastructure, there is a potential for a dam failure. The Ninth Street Dam, Four Mile Dam, and Norway Point/Seven Mile Dam have emergency action plans. Proper dam maintenance procedures may be able to predict and prevent the possibility of a future event.

Further analysis will only focus on the Ninth Street Dam, Four Mile Dam, and Norway Point/Seven Mile Dam since these dams have high hazard potentials in the county. The Upper South Dam has a low hazard potential and is not required to have an emergency action plan. Therefore, the Upper South Dam will not be further analyzed at this time.

Extent

The Ninth Street Dam, Four Mile Dam, and Norway/Seven Mile Dam are owned by the Thunder Bay Power Company and have high hazard potentials. Inundation maps for each of the dams estimate the duration and extent of flooding if these dams fail (Figures 6-13 to 6-17). Ninth Street Dam is located in the City of Alpena and Four Mile Dam is located in Alpena Township, which is where Alpena County's major population center is located. Norway Point/Seven Mile Dam is located in Maple Ridge Township. Despite not having a previous dam failure, all three dams are over 95 years old (Ninth Street Dam is 111 years old, Four Mile Dam is 119 years old, and Norway/Seven Mile Dam is 97 years old) and have the potential to fail.

Vulnerability Assessment

The Ninth Street Dam, Four Mile Dam, and Norway/Seven Mile Dam are owned by the Thunder Bay Power Company and have high hazard potentials. Inundation maps for each of the dams estimate the duration and extent of flooding if these dams fail (Figures 6-5 to 6-9). The maximum flood inundation would submerge the downtown and residential area of the City of Alpena to a depth of at least 3 feet within 3.5 hours after breaching. This breach would cause approximately 80% of Alpena's developed area to experience some degree of flooding. Also, there are power substations located near Four Mile Dam that would be vulnerable to flooding if the dam failed. The Norway Point/Seven Mile Dam is

located four miles from the City of Alpena and the Four Mile Dam is located about three miles from the City of Alpena. Additionally, both dams are located approximately three miles from the Alpena County Regional Airport and the Alpena Combat Readiness Training Center within the general flight path of that facility.

A flood event due to a dam failure would prevent access to buildings, carry people and vehicles away, cause businesses to lose their businesses and inventories, and residents to lose their houses and belongings. Buildings would be damaged, destroyed, and compromised, and would develop mold, rot, and foundation damage from floodwaters. The presence of mold would increase the health risk for populations with breathing conditions. Floodwaters may damage roads, bridges, electrical systems, communication systems, overflow sewers, and impact natural gas tanks where they are at-risk for fire or explosions. Roads may be close for long periods of time, which would impact traffic flow and emergency response times. Floodwaters also can conceal damaged electrical wires and debris. Contaminants and pollutants in the floodwaters can degrade watersheds, and increase the population's risk for diseases, infections, and injuries. Flooding from a dam failure would be costly. Possible evacuation procedures should be put in place, and residents and visitors should be aware of evacuation routes.

Table 6-6 Alpena County Dams

	Name	Height (ft)	Storage (acre-feet)	Location	Regulatory Agency	Dam Type	Year Completed	Dam Purpose	Hazard Potential
1	Ninth Street Dam	24	6,000	Thunder Bay River	Federal	Public Utility	1910	Hydroelectric	High
2	Four Mile Dam	27	900	Thunder Bay River	Federal	Public Utility	1902	Hydroelectric	High
3	Norway Point/Seven Mile Dam	43	27,550	Thunder Bay River	Federal	Public Utility	1924	Hydroelectric	High
4	Upper South Dam	20	55,000	Thunder Bay River	Federal	Public Utility	1930	Hydroelectric	Low

Source: National Inventory of Dams, Retrieved July 2019

Dam, Wetlands, and Water Resources Locations Alpena County

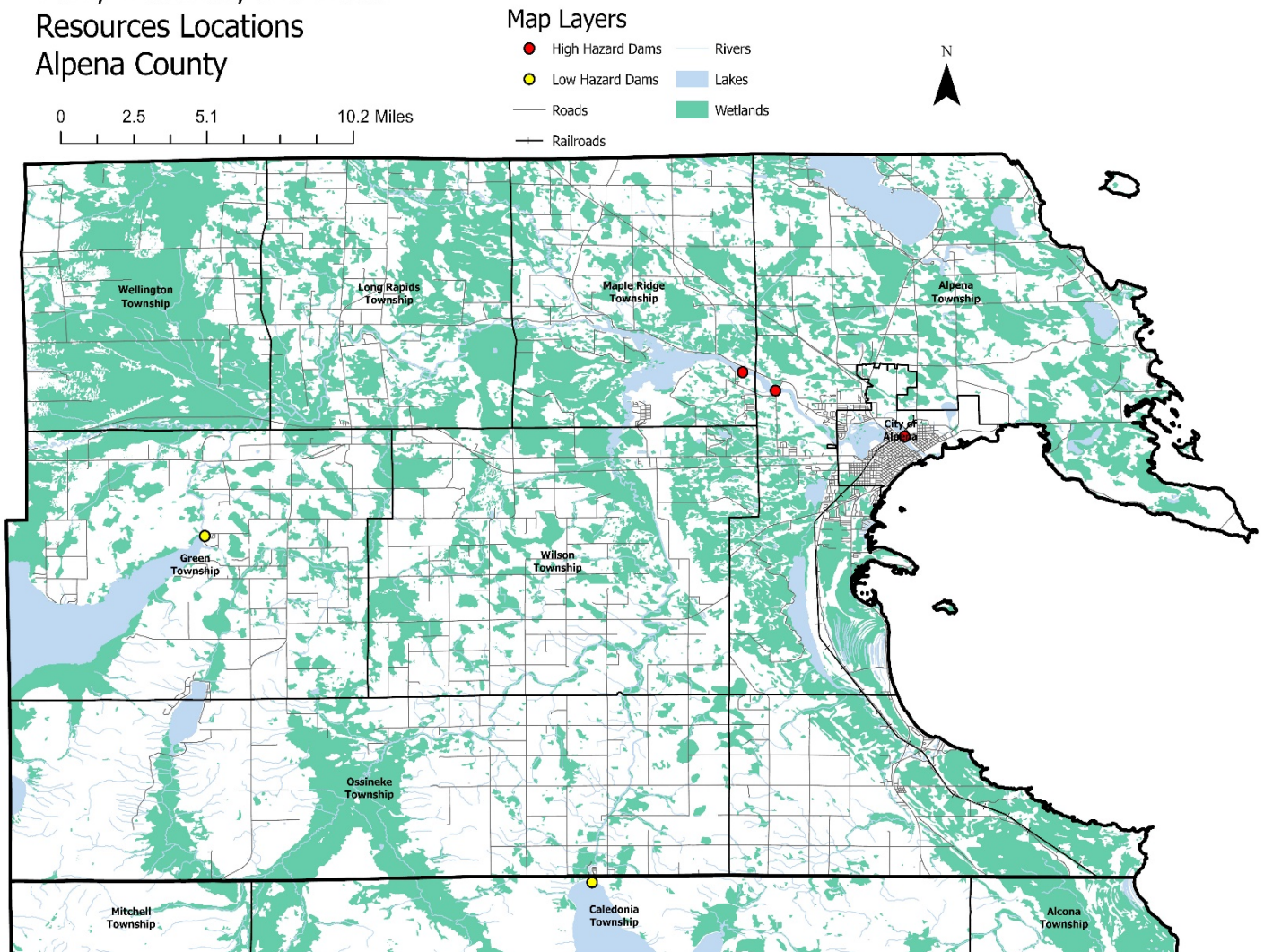


Figure 6-12 Dam, Wetlands, and Water Resources Locations

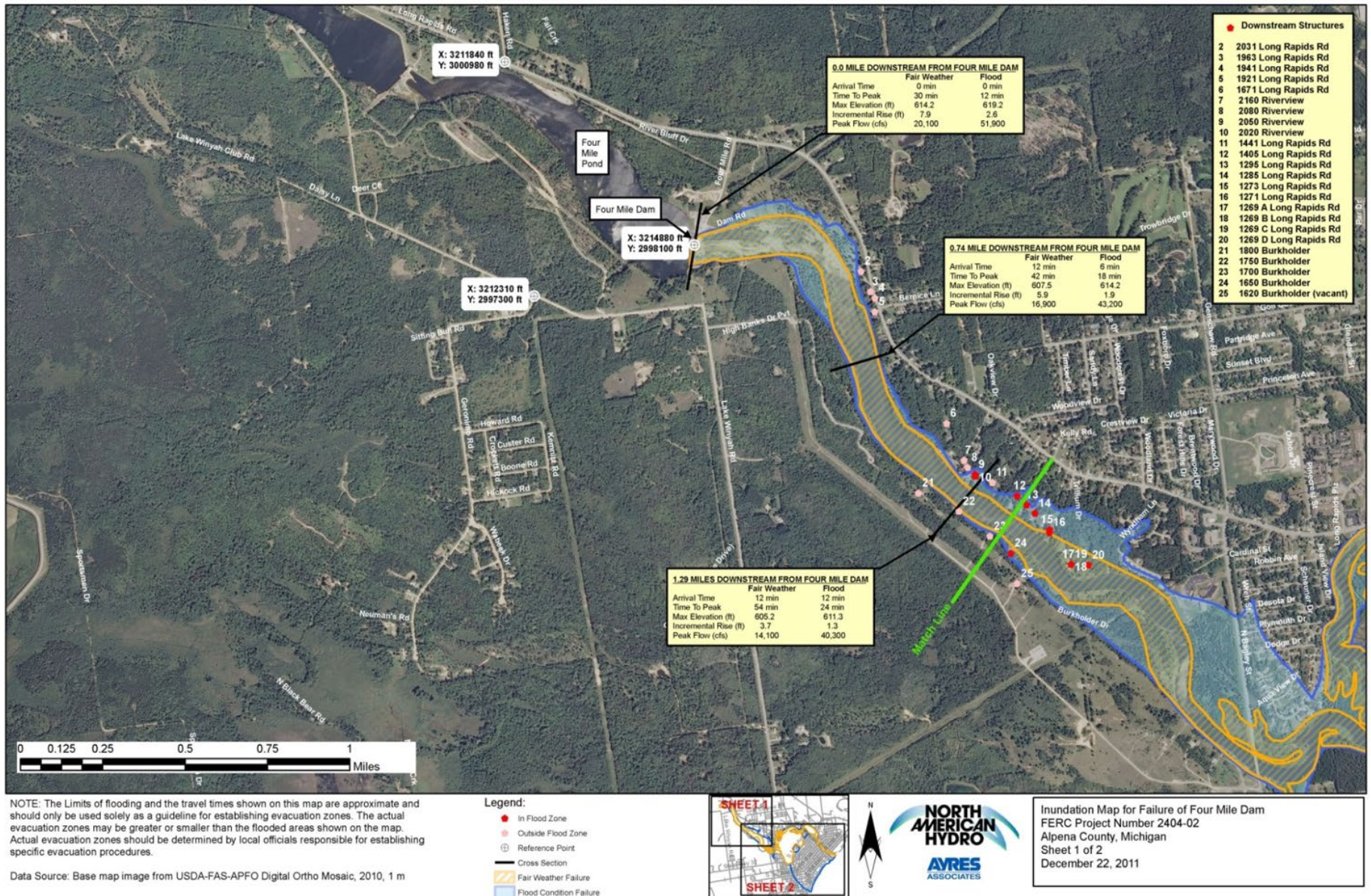
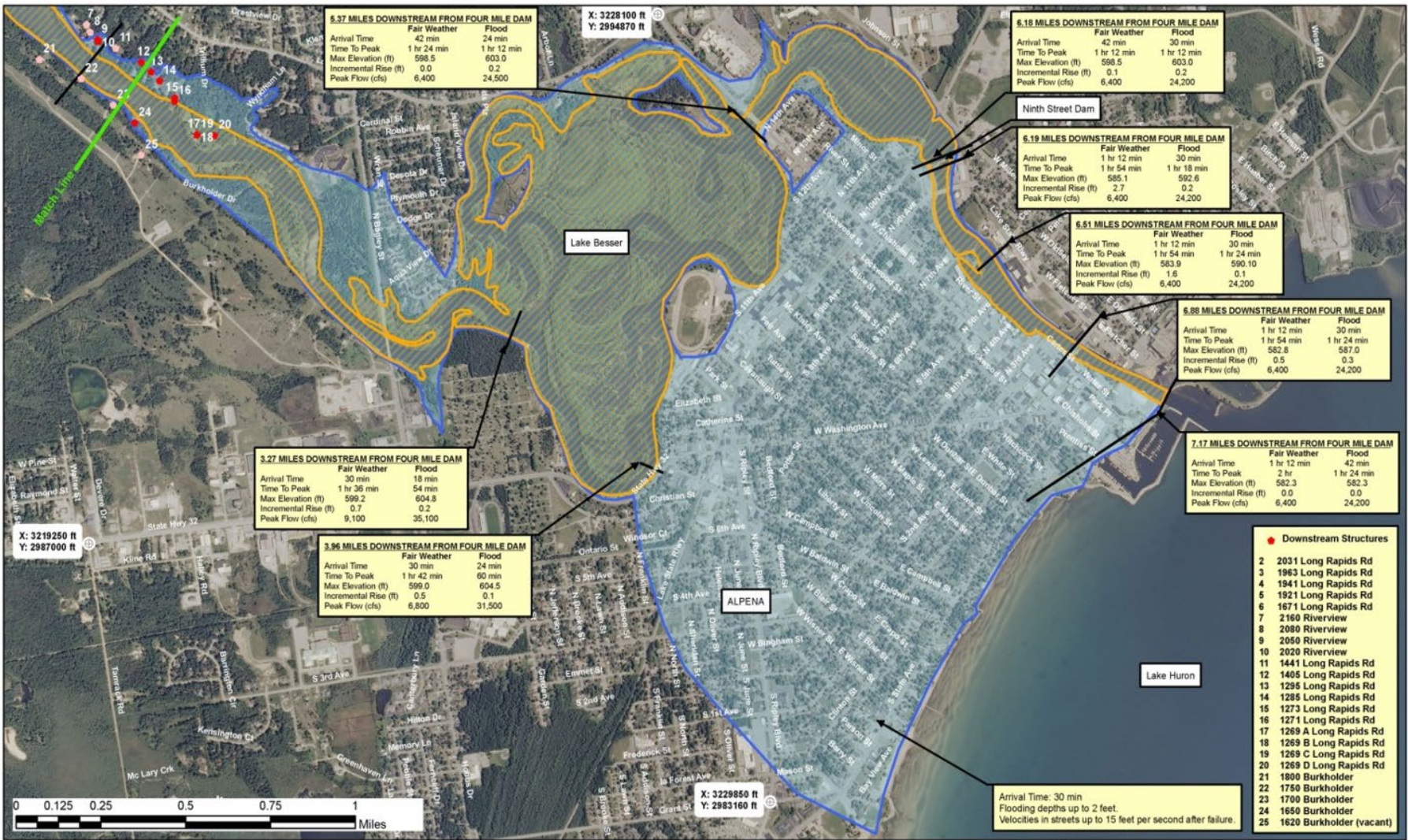


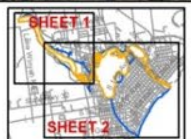
Figure 6-13 Four Mile Dam Failure Inundation Map



NOTE: The Limits of flooding and the travel times shown on this map are approximate and should only be used solely as a guideline for establishing evacuation zones. The actual evacuation zones may be greater or smaller than the flooded areas shown on the map. Actual evacuation zones should be determined by local officials responsible for establishing specific evacuation procedures.

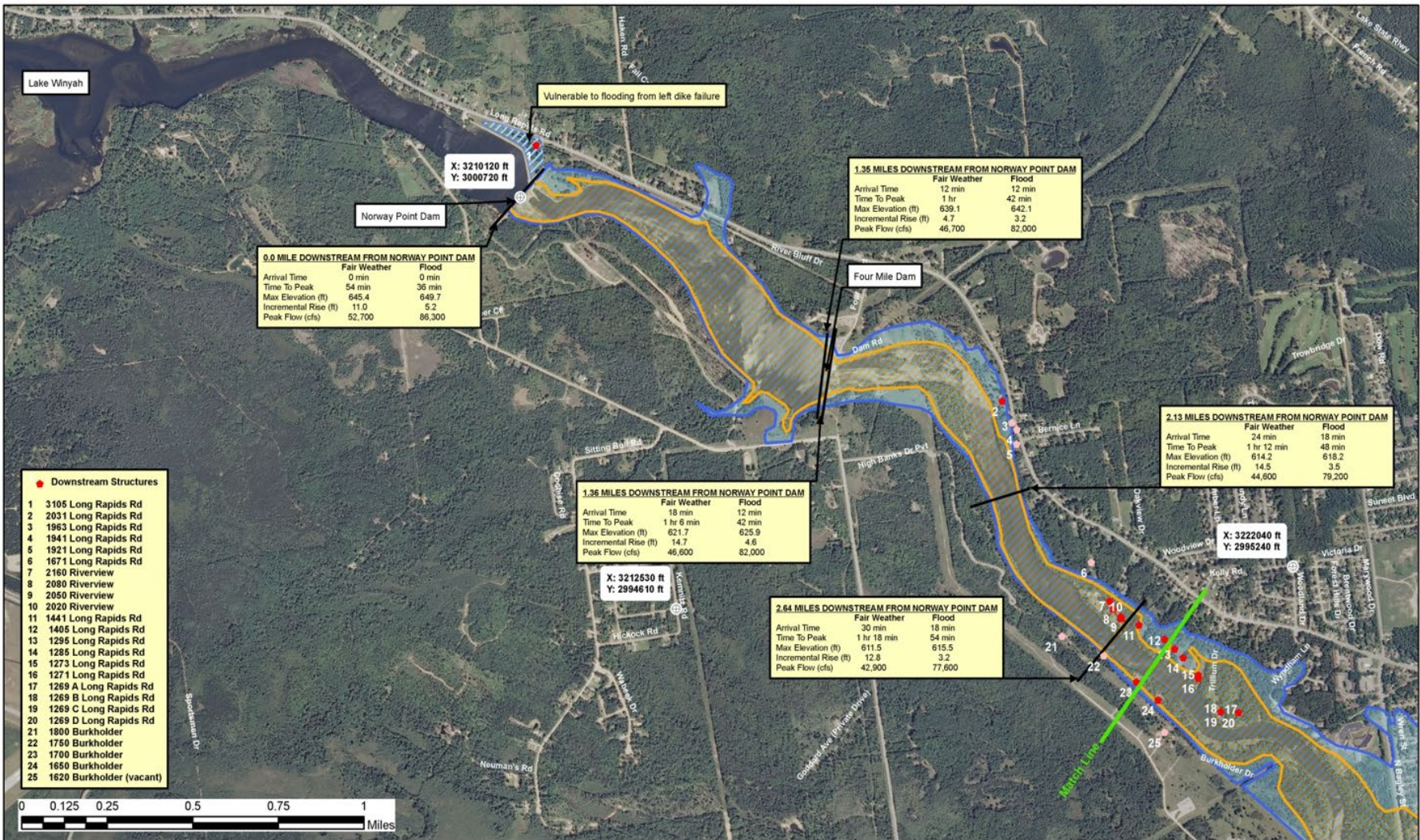
Data Source: Base map image from USDA-FAS-APFO Digital Ortho Mosaic, 2010, 1 m

- Legend:**
- In Flood Zone
 - Outside Flood Zone
 - ⊕ Reference Point
 - Cross Section
 - ▭ Fair Weather Failure
 - ▭ Flood Condition Failure



Inundation Map for Failure of Four Mile Dam
 FERC Project Number 2404-02
 Alpena County, Michigan
 Sheet 2 of 2
 December 22, 2011

Figure 6-14 Four Mile Dam Failure Inundation Map



NOTE: The Limits of flooding and the travel times shown on this map are approximate and should only be used solely as a guideline for establishing evacuation zones. The actual evacuation zones may be greater or smaller than the flooded areas shown on the map. Actual evacuation zones should be determined by local officials responsible for establishing specific evacuation procedures.

Data Source: Base map image from USDA-FAS-APFO Digital Ortho Mosaic, 2010, 1 m

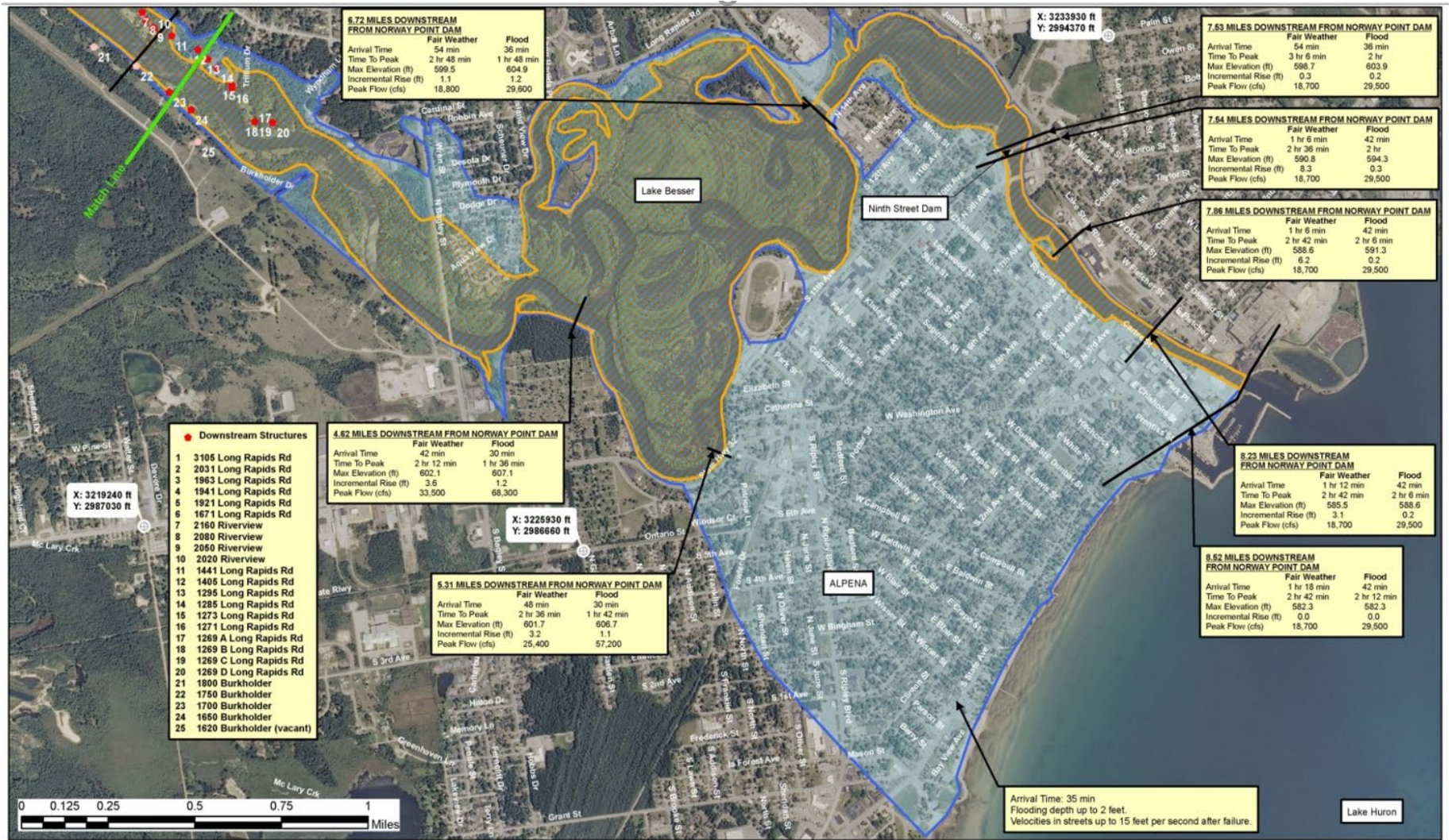
Legend:

- In Flood Zone
- Outside Flood Zone
- ⊕ Reference Point
- Cross Section
- ▨ Fair Weather Failure
- ▩ Flood Condition Failure



Inundation Map for Failure of Norway Point Dam
 FERC Project Number 2404-03
 Alpena County, Michigan
 Sheet 1 of 2
 December 22, 2011

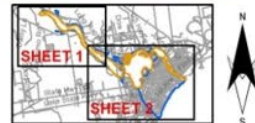
Figure 6-15 Norway Point/Seven Mile Dam Failure Inundation Map



NOTE: The Limits of flooding and the travel times shown on this map are approximate and should only be used solely as a guideline for establishing evacuation zones. The actual evacuation zones may be greater or smaller than the flooded areas shown on the map. Actual evacuation zones should be determined by local officials responsible for establishing specific evacuation procedures.

Data Source: Base map image from USDA-FAS-APFO Digital Ortho Mosaic, 2010, 1 m

- Legend:**
- In Flood Zone
 - Outside Flood Zone
 - ⊕ Reference Point
 - Cross Section
 - ▨ Fair Weather Failure
 - ▩ Flood Condition Failure



Inundation Map for Failure of Norway Point Dam
 FERC Project Number 2404-03
 Alpena County, Michigan
 Sheet 2 of 2
 December 22, 2011

Figure 6-16 Norway Point/Seven Mile Dam Failure Inundation Map



NOTE: The Limits of flooding and the travel times shown on this map are approximate and should only be used solely as a guideline for establishing evacuation zones. The actual evacuation zones may be greater or smaller than the flooded areas shown on the map. Actual evacuation zones should be determined by local officials responsible for establishing specific evacuation procedures.

Data Source: Base map image from USDA-FAS-APFO Digital Ortho Mosaic, 2010, 1 m

NORTH AMERICAN HYDRO

AVRES ASSOCIATES

Inundation Map for Failure of Ninth Street Dam
 FERC Project Number 2404-01
 Alpena County, Michigan
 Sheet 1 of 1
 December 22, 2011

Figure 6-17 Ninth Street Dam Failure Inundation Map

Fixed Site Hazardous Material Accident

Description

Fixed site hazardous material incidents occur when there is an uncontrolled release of hazardous materials from a fixed site that pose risks to health, safety, property, and the environment. Due to technological advances, hazardous materials are present in quantities of concern in business and industry, agriculture, universities, hospitals, utilities, and other facilities. These materials include corrosives, explosives, flammable materials, radioactive materials, poisons, oxidizers, and dangerous gases. Federal and state agencies regulate hazardous materials and many communities have plans and procedures to immediately respond to an incident. Despite precautions taken to ensure careful handling during the manufacture, transport, storage, use, and disposal of these materials, accidental releases are bound to occur.

Location

Alpena County has three SARA Title III sites according to TIER II Manager:

- American Process Energy Recovery, Inc. at 412 Ford Avenue, City of Alpena, Michigan
- Besser Company, Inc. at 801 Johnson St., City of Alpena, Michigan
- Frontier Communications at 223 Lockwood St., City of Alpena, Michigan

Previous Occurrences and Probability of Future Occurrences

Alpena County has not had any 302 emergencies, but there have been some Tier II events at fixed sites. However, there is the potential for an accident at American Process Energy Recovery, Besser Company, Inc., and Frontier Communications. Emergency plans are on file with the Alpena County Emergency Management Office and the LEPC. The County Emergency Management Office maintains and updates Emergency Hazardous Materials Response Plans.

Extent

The extent of a fixed site hazardous material accident can be measured by the location and number of the fixed sites containing hazardous materials. Alpena County has three fixed hazardous material sites in the City of Alpena. Since the city is a population center, the affected area would impact businesses, residences, the population, and the Thunder Bay River.

Vulnerability Assessment

All existing and future buildings, infrastructure, and populations in the City of Alpena are at-risk to a fixed site hazardous material accident. An accident would impact the air and water quality in the city since the sites are near the Thunder Bay River. Individuals affected by the hazardous material may experience chemical burns, nausea, vomiting, disorders of the lungs, kidneys, or liver, and poisoning. An accident could also cause the city to be evacuated and require a need for shelters. It would cause businesses to close and owners may have to pay for repairs caused by the accident. The hazardous material also has the potential to leak into the county's water system and wells, and cause communication and utility infrastructure to fail.

Transportation Accidents (air/land/water)

Description

Transportation crashes or accidents involve air, land or water-based commercial passenger carriers. These accidents can result in mass casualties and tremendous injuries due to large numbers of passengers, unpredictable weather, mechanical failures, and human error. These accidents have the

potential to strain local response and medical services. Airplane accidents tend to occur either during take-off or landing according to the NTSB and airline industry. When responding to these accidents, it may be difficult to suppress the fires, rescue and provide first aid to survivors, establish a mortuary facility, detect the presence of explosive, radioactive, or other hazardous materials, and provide crash site security and crowd control. Water transportation accidents may require underwater rescue and recovery efforts. Vulnerable populations to these hazards include communities near airports, communities with railroad tracks through them, communities with commercial intercity passenger bus or local transit bus service, communities with school bus service, and communities with commercial marine passenger service or along water bodies.

Michigan has approximately 19 commercial passenger airports, more than 130 certified intercity carriers that provide passenger, charter, commuter, and special bus service to 220 Michigan communities with six offering regular route service, an intercity rail passenger system that consists of 568 route miles, along three corridors, serving 22 Michigan communities, 72 local bus transit systems serving 85 million passengers and 20 commercial marine passenger ferries.

Location

The entire county is susceptible to air, land, and water transportation accidents. The air accidents have a greater chance of occurring at the Alpena County Regional Airport in Maple Ridge and Wilson Townships. The water accidents can occur on all waterways (rivers, streams, lakes, etc.) and Lake Huron.

Previous Occurrences and Probability of Future Occurrences

The City of Alpena serves as a regional center and port for air, land, and water transportation modes. Since each transportation mode has its own disaster potential, there is a need for mitigation efforts for these hazards. In January 2018, a vehicle lost control and was struck by a tractor trailer. The accident resulted in one fatality and M-32 was closed for a short period of time. In February 2019, a semi lost control and crashed along U.S. 23. The driver was treated for minor injuries.

Due to sudden, severe storms and the reefs on Lake Huron, there have been many shipwrecks. The greatest concentration of shipwrecks lies near Thunder Bay on Lake Huron and the most significant accident was the sinking of the Edmund Fitzgerald in 1975. Since the 1800's, shipwrecks have decreased dramatically due to better weather prediction and communication abilities, radar technologies, lighthouses, ship lighting, shipping regulations, floating navigation aids, LORAN stations, improved ship designs and construction quality, and U.S. and Canadian Coast Guard stations around the lakes. Additionally, the U.S. Army Corps of Engineers and other agencies dredge the harbors and seaways. Recreation on the lake during the winter also has potential for water transportation accidents. For example, in 2018, a woman died when she fell through the ice on Long Lake in Alpena County.

Extent

All of Alpena County is at-risk for an air, land, or water transportation accident. Air accidents would primarily occur around the airport. Land transportation accidents would primarily occur along the roadways and motorized trails. Water transportation accidents would primarily occur on the county's major lakes, the Thunder Bay River, and Lake Huron. The extent can be measured by the amount of property damages, deaths, and injuries. According to the University of Michigan Transportation Research Institute's *Societal Costs of Traffic Crashes and Crime in Michigan: 2017 Update*, Alpena County has had two fatal traffic crashes, 15 with serious injuries, and property damage for 1,003 out of 1,168 traffic crashes. The average cost of a traffic crash casualty was \$36,663 with the total traffic crash cost

for all 1,168 accidents equaling \$42,822,650. Unfortunately, data is unavailable to quantify the extent of air and water transportation accidents.

Vulnerability Assessment

Alpena County does not have passenger rail service, commercial marine passenger service, or an intercity bus service. However, it does have a public airport, and school bus and specialized public transit services that could result in death and injuries if an accident occurred. An air transportation accident has the potential to cause deaths, injuries, and a large amount of property damage if a plane hits the county's buildings, infrastructure, or year-round and/or seasonal populations. Since the county-owned airport is located in Maple Ridge and Wilson Townships, an accident would have large property damages and high casualties due to the surrounding commercial and residential areas. Land transportation accidents have the potential to cause damage to other vehicles, injuries, and possibly death. Dependent on the severity of the accident, it can cause a road closure that would impact the county's traffic flow patterns and emergency response times. Water transportation accidents can cause death and injuries to individuals as well as high property damage costs. Dependent on the severity of the incident, accidents have the potential to contaminate the water resources.

Structural Fires

Description

Structural fires occur when any fire ignites one or more structures of residential, commercial, industrial, institutional, or other type. These fires are considered to be the most common hazard with most incidents being limited in scale and not having the ability to threaten or harm an entire community. However, fires in facilities, such as hotels, entertainment venues, schools, and hospitals, pose a great risk due to the large number of persons involved.

According to the National Fire Protection Association and the U.S. Fire Administration, the U.S. had 499,000 structure fires and 3,400 civilian fire deaths in 2017 with a national average of 2.3 deaths and 9.3 injuries per 1,000 fires. Michigan generally matches the national trend for structure fires.

From 1975 to 2009, the number of reported fires in Michigan has trended downwards, with annual numbers fluctuating. In 2003, the Fire Marshal Division of the Michigan Department of Licensing and Regulatory Affairs reported nearly 19,000 structural fires occurred in Michigan resulting in 161 deaths, 624 injuries, and \$230 million in estimated damages. In 2006, Michigan's fire death rate was 15.4 persons per million, which ranked it in the middle of all states. In 2017, the U.S. Fire Administration reported that Michigan reported 3.7 deaths and 15.6 injuries per 1,000 fires through the National Fire Incident Reporting System.

Location

All of the existing and future structures in Alpena County are at-risk for a structural fire.

Previous Occurrences and Probability of Future Occurrences

In the 2014 Hazard Mitigation Plan, Alpena County had approximately 100 structural fires per year with approximately 25% of the structures being destroyed. In 2018, Alpena County received 91 fire calls with 51 structural fire calls, 16 vehicle fire calls, and 24 other fire calls according to the National Fire Incident Reporting System for Michigan. There were no fire related deaths or injuries, and the total fire loss amount was \$2,199,775. It is difficult to predict the future occurrence of a structural fire, but data indicates the number of structural fires has decreased over time.

Extent

All existing and future structures are at-risk of a structural fire in Alpena County.

Vulnerability Assessment

All of the existing and future buildings, populations, and infrastructure in Alpena County are at-risk of a structural fire. The county has aging housing stock and infrastructure that was built under building codes and rules for fire prevention that are no longer in effect today. Aged electrical lines increase a buildings risk for structural fires. Also, buildings without smoke and carbon monoxide detectors increase the risk for deaths. If not contained, the structural fires can turn into wildfires.

Alpena County relies on a network of township paid and non-paid fire departments, which means there is a lack of full-time professional firefighters who are available to conduct fire inspections and take other preventive measures to lessen the threat of structural fires in outlying rural areas. Therefore, efforts in Alpena County are directed at fire suppression. Additionally, some communities may not have fire prevention codes and rely on the State Rules for Fire Prevention, while other communities have developed local ordinances. However, the costs of compliance for existing buildings may be prohibitive for business owners, yet it would be beneficial for new construction to comply with both State building code and State Rules for Fire Prevention.

Infrastructure Failures

Description

Infrastructure provides essential services, such as electric power, heating, air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation. Infrastructure failures occur when public or private utility infrastructure becomes temporarily disabled. These failures can occur at any time and last from a few seconds to weeks. Infrastructure failures also cause widespread economic losses to businesses and industries, limit security, and alter lifestyles. Generally, the elderly, children, impoverished individuals, and people in poor health are most impacted by infrastructure failures. For example, people unable to afford generators or have access to fireplaces will have more difficulty getting through a failure.

Since infrastructure is becoming more complex and interdependent, these failures can be large in scope and magnitude. For example, a power outage during extreme heat and cold events has the potential to cause a person to die in their homes which creates a public safety emergency, and it may cause water or wastewater treatment systems to become inoperable which may result in a public health emergency. Additionally, Northern Michigan has fewer infrastructure networks than urban areas; however, a failure affects a larger geographical area since residences and businesses are spread out.

Michigan's infrastructure is aging, which is affecting maintenance funding and user demand. Additionally, Michigan's codes and standards for the design, construction, and operation of public and private utility infrastructure require a minimum level of structural integrity and operational performance, which is not adequate to protect infrastructure during a disaster. In 2018, the State of Michigan established the Michigan Infrastructure Council to develop a 30 year statewide strategic framework to address the need for infrastructure improvements in Michigan. More information can be found at the following website: <https://www.michigan.gov/mic>.

Location

Since the population and businesses are spread throughout Alpena County, the entire county is susceptible to infrastructure failures. Even though the county has a large amount of forested areas, infrastructure does traverse these areas.

Previous Occurrences and Probability of Future Occurrences

In 2004, a large area of Northeast Michigan temporarily lost phone service due to a beaver cutting through a fiber optic line. The potential for an incident does exist based on the age of the county's infrastructure and the availability of funding for maintenance efforts.

Extent

Since the City of Alpena and Alpena Township account for approximately 66.0% of the residences in Alpena County, an infrastructure failure would affect the largest number of people. Additionally, water and sewer lines run to the airport, which would also impact residents in Wilson Township. The rest of the county's infrastructure is spread over a large geographic area and a failure would cause a large area to be impacted.

Vulnerability Assessment

In Alpena County, the electrical system consists of above ground power transmission lines. If these lines are damaged, a power outage would occur over a large area in the county due to its rural nature. Since the majority of the population is located in the City of Alpena and Alpena Township, a failure in these areas would impact the greatest number of people. Depending on the time of year, a power outage would require heating stations or cooling stations be set up. A power outage would also impact the individuals who have medical issues that require machines or refrigerated medicine. A water and sewer infrastructure failure would impact the businesses and residences in Alpena Township, the City of Alpena, and Wilson Township. A failure would have the potential to negatively impact the Thunder Bay River and local water sources. Additionally, a failure would impact businesses and residences. Contaminated drinking water can cause health issues, such as gastrointestinal illnesses and cancer. Also, there are spots in the county not covered by cell phone service due to its topography and lack of infrastructure. Businesses, residents, and visitors would not be able to contact family and friends, or call for emergency services if the existing communication infrastructure fails. Damage to the roads would cause them to be closed until fixed. These road closures would increase drive times and emergency response times.

Transportation Hazardous Material Accident

Description

A transportation hazardous material incident is an uncontrolled release of hazardous materials during transport that poses risks to health, safety, property, and the environment. All modes of transportation (e.g. highway, railroad, seaway, airway, and pipeline) are carrying thousands of hazardous material shipments on a daily basis through local communities. A transportation accident involving any of the hazardous material shipments could cause a local emergency that would affect the immediate vicinity of the accident site or a small portion of the surrounding community. The Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation regulates over 1 million daily shipments of hazardous materials in the United States.

All areas in Michigan are vulnerable to a hazardous material transportation incident with Southern Michigan being more vulnerable due to its highly concentrated populations. The State has experienced

numerous small scale incidents that are responded to by local fire departments and hazardous material teams. Fortunately, Michigan has not experienced large scale incidents.

Location

The City of Alpena, and Wilson, Green, Long Rapids, Alpena, and Sanborn Townships are vulnerable to transportation hazardous material accidents.

Previous Occurrences and Probability of Future Occurrences

Alpena County has not had any major accidents reported, but may have had minor accidents that were not reported. However, there is potential for an accident since M-32, M-65, and U.S. 23 run through the county. M-32 and U.S. 23 intersect in the City of Alpena, and M-32 and M-65 intersect at two locations in Green Township.

Extent

The extent of a transportation hazardous material accident can be measured by the location of an incident. M-32, M-65, and U.S. 23 are the most susceptible to a transportation hazardous material accident since these are the major thoroughfares in the county.

Vulnerability Assessment

Since Alpena County has numerous transportation routes (highways, railroad, and waterways), there is a large amount of hazardous material shipments that occur on a daily basis. However, the county has improved roads and developed a truck plan to remove trucks from residential areas to reduce the potential for an accident. Existing and future buildings, infrastructure, and populations located along the major roadways, M-32, M-65, and U.S. 23, are at-risk for a transportation hazardous material accident. An accident has the potential to leak material into the county's surface water and groundwater systems, which would impact wells. Additionally, an accident could cause damage to buildings near the road, and damage communication and utility infrastructure that could cause power outages and a loss of communication lines. Dependent on the severity of the incident, individuals may experience chemical burns, nausea, vomiting, poisoning, and disorders of the body's organ systems. Businesses may close and a spill could cause the soil around businesses and residences to become contaminated.

Oil and Gas Accidents (well and pipeline)

An oil and gas accident occurs when there is an uncontrolled release of oil or gas, or the poisonous by-product hydrogen sulfide, from production wells or from a pipeline that causes property damage, environmental contamination, injuries and loss of life. Michigan is a major consumer and producer of oil and natural gas products that are transported and stored throughout the state. The State has the greatest underground natural gas storage capacity in the nation and supplies natural gas to its residents and neighboring states. However, these underground pipelines have the potential to leak, rupture, and explode, which puts many communities at risk. In Michigan, oil and natural gas wells are located in 63 counties in the Lower Peninsula. Between 1927 and 2009, there have been 56,525 oil and natural gas wells drilled in Michigan with about half of them producing oil and gas. As of 2012, Michigan wells have produced approximately 1.4 billion barrels of crude oil and 6 trillion cubic feet of gas. Despite being highly regulated and having a fine safety record, the threat of oil and gas well accidental releases, fires, and explosions still exists. Additionally, unplugged abandoned wells impact the health and safety of surrounding communities since they have the potential to allow natural gas to flow underground and accumulate in nearby buildings, contaminate nearby water wells, and leak into soils and the water system.

In addition, well and pipeline accidents have the potential to release hydrogen sulfide, which is a poisonous gas that explodes when mixed with air temperatures of 500 degrees or above. Hydrogen sulfide gases can be found around oil and gas wells, pipeline terminals, storage facilities, and transportation facilities where the gas or oil have a high sulfur content. Hydrogen sulfide has a “rotten egg” odor in concentrations from .03 parts per million (ppm) to 150 ppm, while in larger concentrations it paralyzes the olfactory nerves, so the odor is no longer an indicator of the hazard. Over 1,300 wells in Michigan have been identified as having hydrogen sulfide levels exceeding 300 ppm. At concentrations of 700 ppm, one breath of hydrogen sulfide can kill. Hydrogen sulfide can cause the failure of high-strength steels and other metals, which requires all company and government responders to be familiar with the emergency procedures and the kind of materials safe for use in sour gas well response.

Location

Oil and gas pipelines run through the eastern and western portions of Alpena County, and the wells are located in the southwestern portion of the county (Green, Ossineke, and Wilson Townships).

Previous Occurrences and Probability of Future Occurrences

Alpena County has not had any reported major incidents; however, the potential for an incident does exist.

Extent

According to 2017 data from EGLE, Alpena County had 1,038 oil and gas wells with 38 active, 112 plugging approved, 872 producing and 16 temporarily abandoned. The gas processing facilities in the well fields are connect to the wells with numerous small, low pressure gas lines. Even though Alpena County has not had any major reported incidents, the possibility of an oil and gas well and pipeline accident does exist.

Vulnerability Assessment

The existing and future buildings and populations near the oil and gas well and pipelines are at-risk if there is an oil and gas well and/or pipeline accident. These accidents consist of accidental releases, fires, and explosions that would cause damage and/or destruction to the buildings, infrastructure, and natural areas around the event. Oil and gas well and pipeline accidents have the potential to contaminate water wells and spread into the surface water and groundwater systems. These accidents can also negatively impact air quality through the release of hydrogen sulfide that can accumulate in oil and gas wells, pipeline terminals, storage facilities, transportation facilities, and nearby buildings. Hydrogen sulfide can cause paralysis of the olfactory nerves, burns, death, and the failure of high strength metals.

Scrap Tire Fires

Description

Scrap tires end up in either dumps or recycling facilities, some of which have more than several hundred thousand tires. The tires provide fuel for fires since the shape of a tire allows air to flow into the interior of a pile of tires, which renders standard firefighting practices nearly useless. Scrap tire fires impact the air, soil and water quality since the burning tires release hazardous compounds into the air, and the tires’ oily residue can seep into the ground and water system. Sometimes, the burning oil can spread the fire to adjacent areas and burn for months. These fires can cause an area to become a Superfund site.

Although infrequent, scrap tire fires can become a major hazard affecting entire communities due to the difficulty in extinguishing them and the expensive cleanup. Scrap tires differ from conventional fires since small scrap tire fires can require significant resources to control and extinguish, the costs of fire management are beyond what local governments can absorb, the environmental consequences are significant, and the Rubber Manufacturers Association reports that a fire can convert a standard passenger vehicle tire into about two gallons of oily residue.

According to the EPA and the Rubber Manufacturers Association, approximately 290 million tires are discarded in the United States each year, with approximately 80% of the tires being reused or recycled. As of 2017, Michigan generates approximately 10 million scrap tires annually according to EGLE. At the time of the 2014 update, Michigan had more than 24 million scrap tires at disposal sites throughout the state.

Location

The collection of scrap tires can occur throughout Alpena County. According to the *2012 Michigan Hazard Analysis*, Alpena County has two scrap tire disposal sites with a total of 100,250 tires.

Previous Occurrences and Probability of Future Occurrences

There have been no recorded scrap tire fires in Alpena County. According to EGLE, Browning Ferris IND of Michigan had a collection site application that lapsed in 1991, L&N Environmental and L&N Environmental Recyc were registered as collection sites in 1993, Presque Isle Corp was registered as a collection site in 1999, and Northern MI Scrap Tire Disposal Service and Glawe Equipment Co were registered as collection sites in 2010. It is difficult to predict the occurrence of a scrap tire fire, but with tires being collected at area collection sites, and in areas that few people may know about, there is a potential for a scrap tire fire in the future.

Extent

Extent can be measured by the number of acres burned and property damage costs. Since Alpena County has not had a reported scrap tire fire, data is not available to determine the number of acres burned, property damage, and cost to fight the fire. However, there is a potential for an event to occur at collection sites or in an area of the county that few people know has a stockpile of tires.

Vulnerability Assessment

If a scrap tire fire were to occur in the county, all of the county's existing and future buildings and populations would be at-risk. Additionally, neighboring counties would also be at-risk since the fires are difficult to control and can spread across political and geographical boundaries. Depending on the location of a scrap tire fire, it has the potential to cause a wildfire. Similar to wildfires, scrap tire fires burn property and structures, and have the potential to cause death and injuries for people who become trapped in the fire or are fighting the fire. Scrap tire fires also have high costs due to property damage and firefighting needs. Scrap tire fires can cause a loss in timber production, agricultural revenue, and businesses from the fire damaging timber supplies, agricultural products, killing livestock, and damaging businesses. Communication and power infrastructure can be damaged by the fires resulting in power outages, reduced/loss of warning notifications to the public, and the inability to call for emergency services. Also, residents and businesses may have to evacuate and find shelter.

Human-related Hazards

Sabotage/Terrorism/Nuclear Attack

Description

Sabotage and terrorism involve an intentional, unlawful use of force or violence against persons or property to intimidate or coerce a government or the civilian population to further political, social, or religious objectives. Since sabotage/terrorism objectives are widely varied, the potential targets are also varied. Any public facility, infrastructure, controversial business, assembly place, large computer systems operated by government agencies, financial institutions, healthcare facilities and colleges/universities can be considered a potential target. Regardless, terrorists seek the greatest possible media exposure to frighten as many people as possible. Sabotage/terrorism techniques include bombings, assassinations, organized extortion, use of nuclear, chemical and/or biological weapons, information warfare, ethnic/religious/gender intimidation (hate crimes), state and local militia groups that advocate to overthrow the U.S. Government, eco-fanaticism (destruction or disruption of research or resource-related activities), and narcotics smuggling and distribution organizations.

A nuclear attack is any hostile action taken against the United States that involves nuclear weapons and results in property destruction and/or loss of life. Nuclear weapons are powerful explosive devices that can devastate an area. The entire United States is subject to the threat of a nuclear attack; however, the strategic importance of military bases, population centers and certain types of industries place these areas at a greater risk. With the end of the Cold War, the threat of a nuclear attack against the U.S. diminished slightly with the dismantling of nuclear warheads aimed at U.S. targets. However, the number of countries capable of developing nuclear weapons continues to grow despite the ratification of an international nuclear non-proliferation treaty. Additionally, nuclear weapons have the potential to be acquired and/or developed by terrorist organizations.

Even though a nuclear attack is unlikely in Michigan, the extent of destruction and casualties from a nuclear weapon still make this hazard a possibility. Unfortunately, there is no way to assess the probability of a nuclear attack and most mitigation strategies would originate from and be prompted by federal initiatives and defense priorities. However, some things should be considered, such as the ability to shelter or evacuate people, maintain government functions and social services, protect critical computer and communications systems, and create redundancies in infrastructure and critical services.

Location

The Alpena Combat Readiness Training Center (CRTC) is located at the Alpena County Regional Airport and has the greatest risk for terrorism, sabotage, and nuclear attack.

Previous Occurrences and the Probability of Future Occurrences

In the last 15 years, Alpena County has not had any recorded incidents of terrorism/sabotage/nuclear attack. However, an event does have the potential to occur dependent on furthering political, social, and religious interests. Unfortunately, it is impossible to predict when an event will occur and how severe it will be.

Extent

The extent of a terrorism/sabotage/nuclear attack can be measured by the amount of damage that occurs. Since an event has not occurred in the county, no injuries, deaths, or damages have been incurred. If an event did occur, there would be a high impact on the infrastructure, buildings, and population.

Vulnerability

Terrorism/Sabotage/Nuclear Attack will have severe impacts over a large geographic area and will have a serious financial impact on residents and businesses. Since the CRTC is located at the Regional Airport,

an attack on the CRTC would damage the buildings and infrastructure on the base and at the airport. Additionally, the people present on the base and in the airport have a higher chance of becoming injured or losing their life. Depending on the type of terrorism/sabotage/nuclear attack event, the neighboring jurisdictions' buildings, infrastructure, and populations may be impacted. Alpena County's neighboring counties would have their emergency management services impacted since the CRTC assists in addressing their hazardous materials accidents.

Public Health Emergency

Description

Public health emergencies occur when there is a widespread and/or severe epidemic, contamination incident, bioterrorist attacks, or other situation that negatively impacts the health and welfare of the public. These emergencies include disease epidemics, large-scale food or water contamination incidents, extended periods without adequate water and sewer services, harmful exposure to chemical, radiological or biological agents, and large-scale infestations of disease-carrying insects or rodents. A common characteristic of public health emergencies is that they impact or have the potential to impact a large number of people either statewide, regionally, or locally in scope and magnitude. These health emergencies can occur as primary events or as secondary events from another hazard or emergency (e.g. flood, tornado, or hazardous material incident).

Throughout the years, there have been many pandemics. For example, there was an outbreak of severe acute respiratory syndrome (SARS) in 2003. This virus was a new coronavirus that resulted in over 8,000 infections and a 10% mortality rate around the world. Additionally, a new strain of H1N1 was detected in 2009, which had approximately 300,000 deaths. Older people were less likely to get sick from this disease since they had derived immunity from a flu strain that had circulated in the mid-20th century. Since 2012, Middle East respiratory syndrome (MERS), a coronavirus, has been reported in 27 countries where there have been approximately 2,494 people infected and 858 deaths. In 2017, the World Health Organization (WHO) put SARS and MERS on its priority pathogen list to spur further research into coronaviruses.

On March 11, 2020, the WHO declared the SARS-CoV-2 (COVID-19) outbreak a pandemic. The new coronavirus had not been previously identified in humans and does not have a vaccine or treatment. It was first reported in China on December 31, 2019. In early 2020, COVID-19 began impacting numerous countries around the globe. In response, countries and some states in the U.S. instituted bans and restrictions on travel, instituted nationwide lockdowns, closed schools and businesses, requested study abroad students return to their countries, transitioned from in-person to online classrooms, cancelled/postponed events (e.g. conferences, concerts, sporting events, commencement ceremonies, etc.), requested people call before arriving at hospitals, instituted bans on the number of people that can gather in one area, instituted social distancing of six feet between individuals, and some churches temporarily suspended services. Some citizens responded by purchasing supplies en masse, which caused some supply shortages. On March 13, 2020, the U.S. declared COVID-19 a national emergency and began developing a sweeping relief package, which was signed by President Trump on March 27, 2020. On March 23, 2020, Michigan announced an order for all Michigan businesses and operations to temporarily suspend in-person operations that are not necessary to sustain or protect life, and to stay home unless they are part of the critical infrastructure workforce, engaging in outdoor activities, or performing necessary tasks (e.g. going to the grocery store). On March 28, 2020, President Trump approved Governor Whitmer's request for a Major Disaster Declaration in Michigan, which allows Michigan to participate in FEMA programming.

Location

Public health emergencies do not have geographic boundaries and can affect all of Alpena County.

Previous Occurrences and Probability of Future Occurrences

As of November 25, 2020, Michigan has had 324,779 confirmed COVID-19 cases and 8,761 deaths, and Alpena County has had 478 confirmed cases and 16 deaths. It is impossible to predict when a major event will occur or how severe it will be. However, a pandemic has a higher probability of occurring in areas where there is a high population density and during cold weather.

Extent

The extent of a public health emergency can be determined by the number of cases and deaths, and the amount of money spent to prepare for and respond to public health threats. In Alpena County, District Health Department #4 works with local, state, and federal agencies to prepare for and respond to public health threats. It has developed emergency operations plans for the four counties it serves and trains health department employees and other agencies in NIMS compliant Incident Command Management systems. Additionally, District Health Department #4 is a member of the Region 7 Healthcare Coalition, which coordinates efforts to develop a comprehensive all-hazards medical preparedness plan. Between March 10, 2020 and November 24, 2020, Alpena County administered 6,404 tests for COVID-19 with 286 positive tests.

Vulnerability Assessment

A public health emergency will have a severe impact over a large geographic area or in densely populated areas. Additionally, the hazard will have a serious financial impact on residents and businesses. In extreme cases, travel may be prevented, and businesses and schools will be closed. If businesses close for extended periods of time, employees will lose wages and the ability to pay their bills, and the businesses will lose revenue, which may cause them to go out of business and employees to lose their jobs. At risk-populations include individuals who are at higher risk of severe complications from infectious diseases (older adults, pregnant women, children, people with pre-existing medical conditions), individuals with limitations that impact their ability to receive and respond to information, individuals who rely on personal care assistance, individuals with transportation needs, and individuals who have difficulty coping in new environments.

Civil Disturbance

Description

Civil disturbances occur from collective behavior that results in lawbreaking, a perceived threat to public order, or the disruption of essential functions. Large portions of a community may be encompassed by civil disturbances and require the involvement of multiple community agencies to respond to the disturbance. Some facilities that may be adversely impacted by civil disturbances include government buildings, military bases, colleges/universities, businesses, hospitals, and police and fire facilities. There are four types of civil disturbances:

- **Protests:** Formal organization of demonstrations to achieve collective goals that are threatening, disruptive, and malicious (e.g. political protests, labor disputes, etc.). Sometimes these events result in property destruction, service interruptions, and interference with law-abiding citizens and emergency responders.
- **Hooliganism:** Unorganized, unlawful acts by either an individual or a collective that are inspired by crowds (e.g. disorder following sporting events and college parties, “block parties,” etc.). These acts cause property destruction, assaults, disorderly conduct, and criminal victimization. Sometimes hooliganism can include elements of protest.

- **Riots:** A disorganized, violent gathering of people that involve assaults, intimidation, and property destruction. Sometimes, individuals attempt to exploit the disorder (e.g. looting, arson, etc.).
- **Insurrection:** A deliberate effort to disrupt or replace the established government or its representatives (e.g. prison uprisings, political conflicts, ethnic conflicts, etc.).

Large-scale civil disturbances rarely occur; however, they are usually an offshoot of labor disputes with a high degree of animosity between two dissenting parties, high profile/controversial judicial proceedings, the implementation of controversial laws or other governmental actions, resource shortages caused by a catastrophic event, disagreements between special interest groups over a particular issue or cause, or a perceived unjust death or injury to a person held in high esteem by a particular segment of society.

Location

The City of Alpena and Alpena Township have the greatest risk for civil disturbances.

Previous Occurrences and Probability of Future Occurrences

Alpena County has not had any incidents of civil disturbances. However, the county has had peaceful demonstrations. For example, in 2019, approximately 100 members and supporters of People for Social Justice marched and held a vigil to call for the release of immigrant children in U.S. custody being detained in holding facilities. In the future, an event may occur due to political, social, and religious interests. Unfortunately, it is impossible to predict when an event will occur and how severe it will be.

Extent

The extent of civil disturbances can be measured by the amount of damage that occurs. Since an event has not occurred in the county, no injuries, deaths, or damages have been incurred.

Vulnerability

Civil disturbance events will have noticeable impacts and financial burdens on residents and businesses in Alpena Township and the City of Alpena since these areas are where the majority of the population is located, and would attract crowds and provide high profile media coverage.

Alpena County Hazard Map

The Alpena County Hazard Map (Figure 6-18) indicates the hazard potentials for areas and land uses. Hazards shown on this map are oil and gas wells, high-risk forest areas, flood prone areas, main transportation routes, critical facilities and infrastructure, contaminated sites, and dams. Residential areas were also included to identify vulnerable populations. The local jurisdiction hazard maps (Figures 6-19 to 6-26) show the hazards in each jurisdiction. The hazard maps display high wildfire risk areas as pine, oak, and aspen-birch forest types

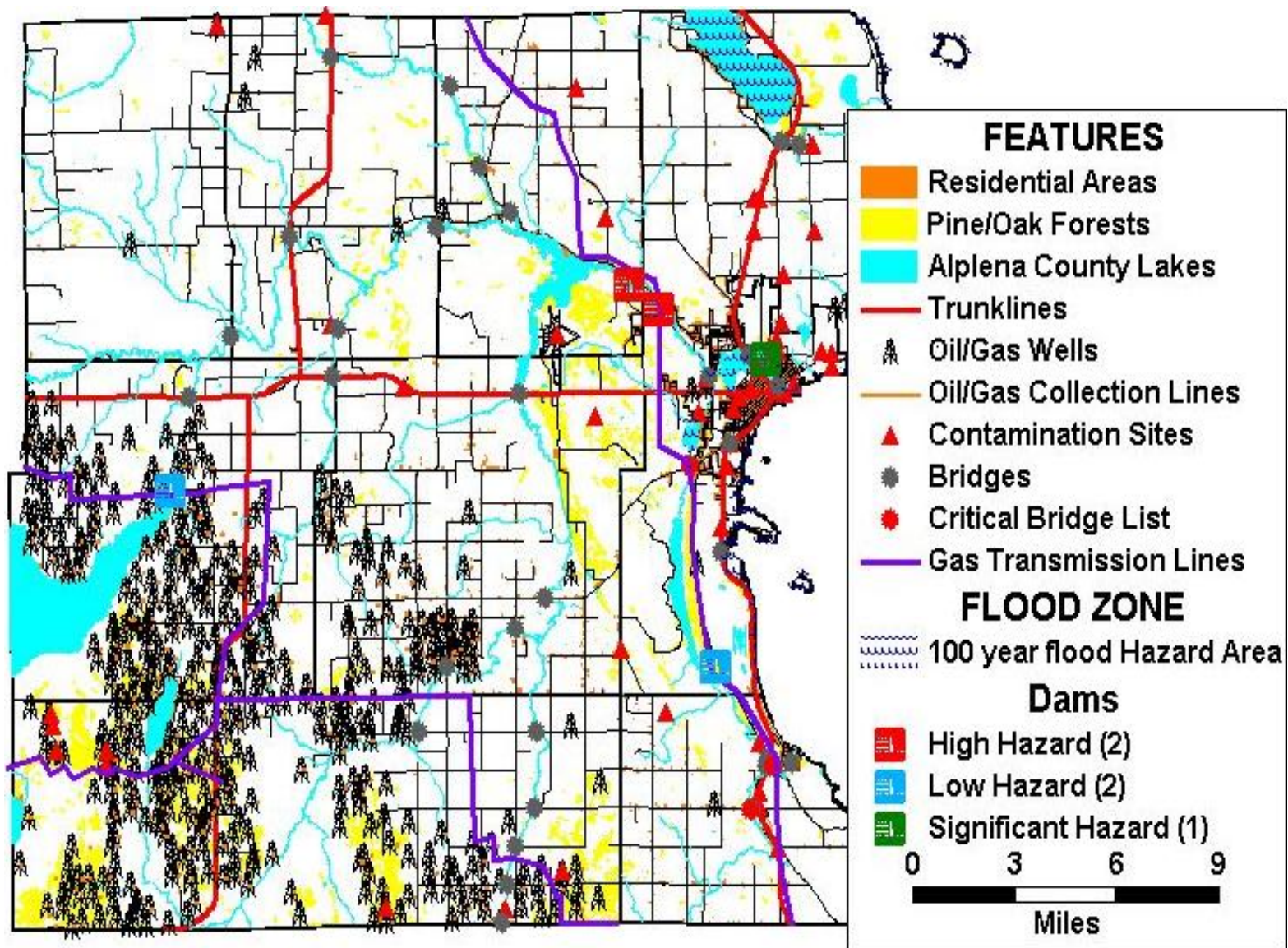


Figure 6-18 Alpena County Hazard Map

Alpena Township Hazards Map

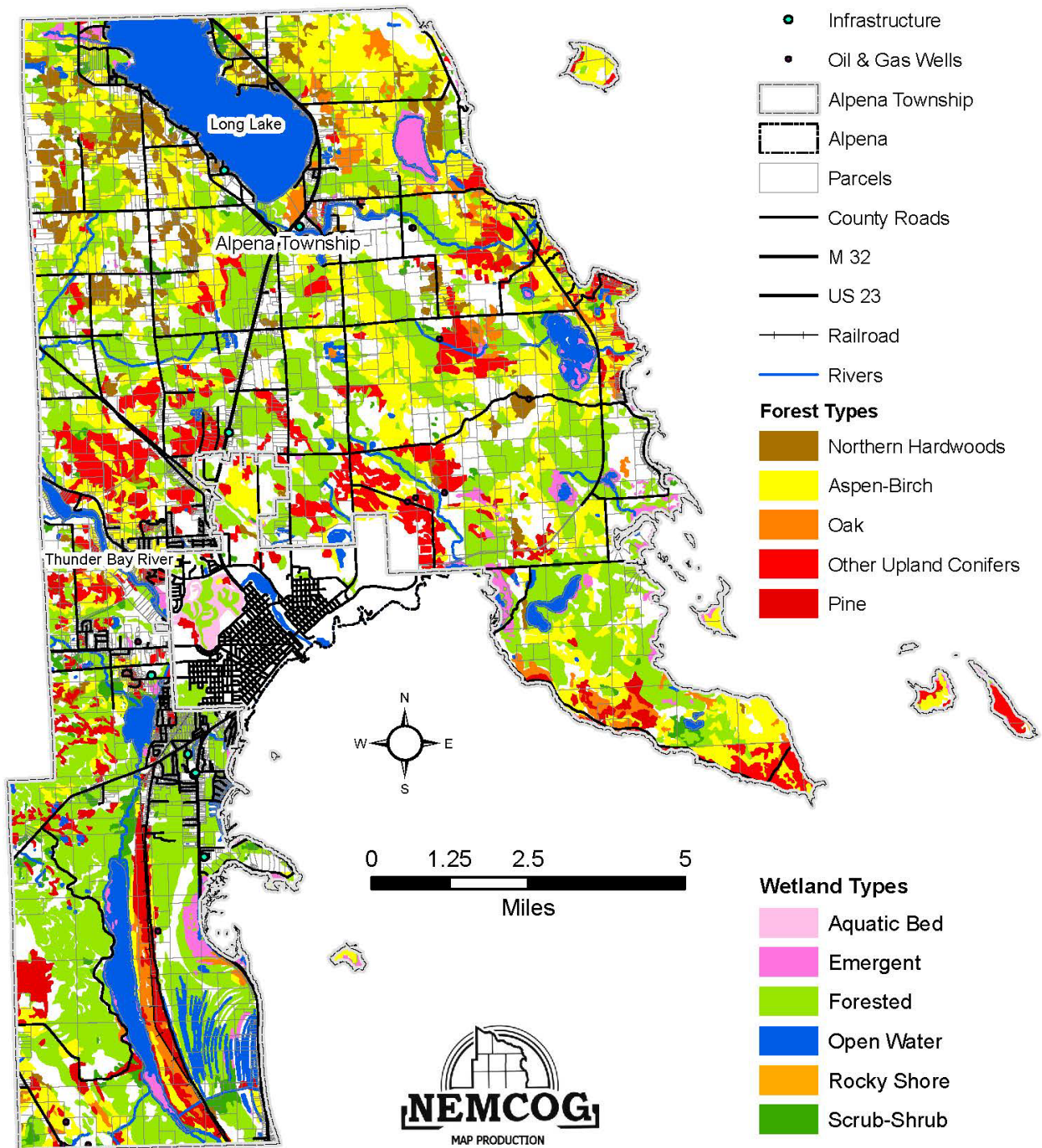


Figure 6-19 Alpena Township Hazards Map

Green Township Hazards Map

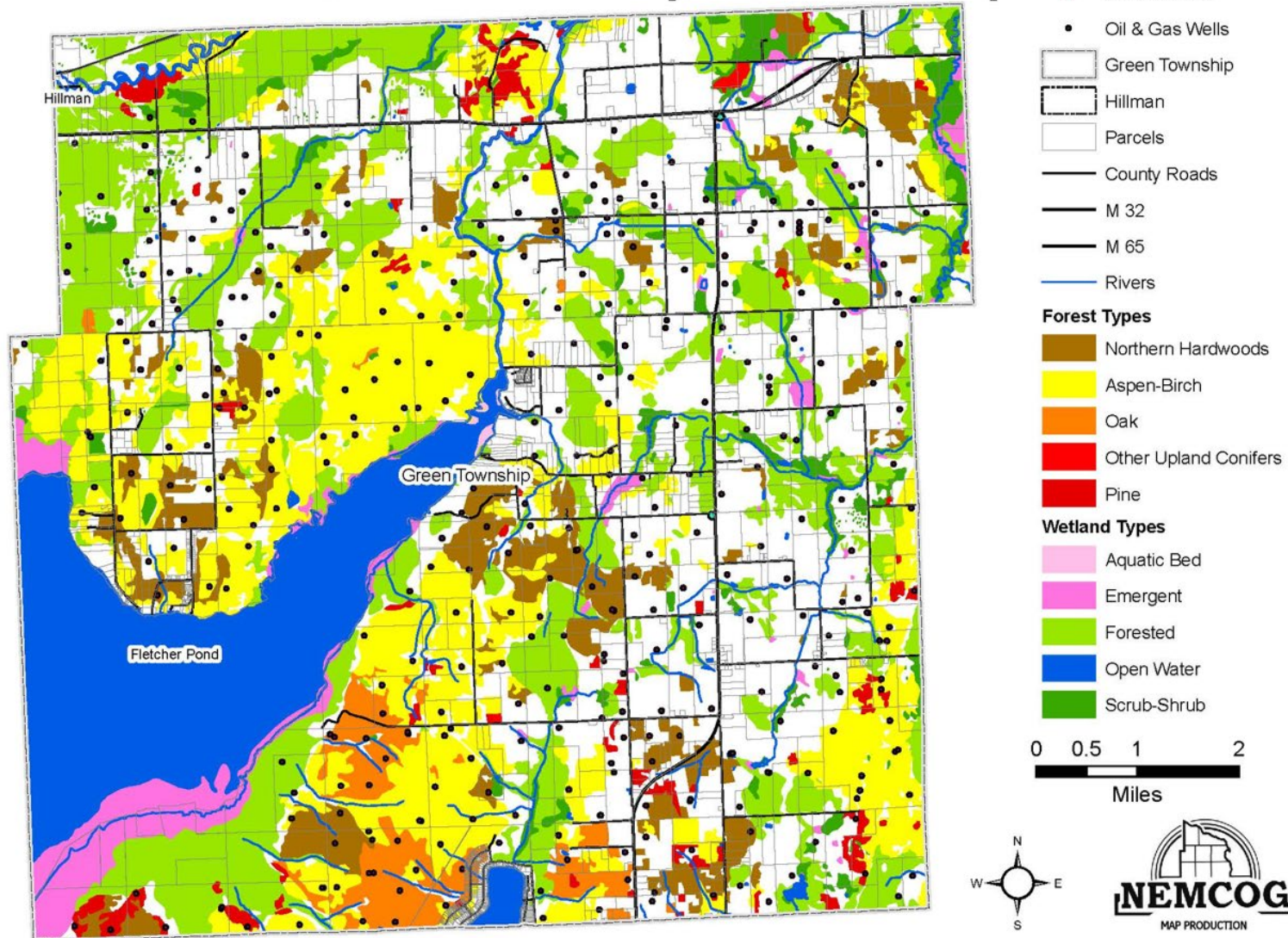


Figure 6-20 Green Township Hazards Map

Maple Ridge Township Hazards Map

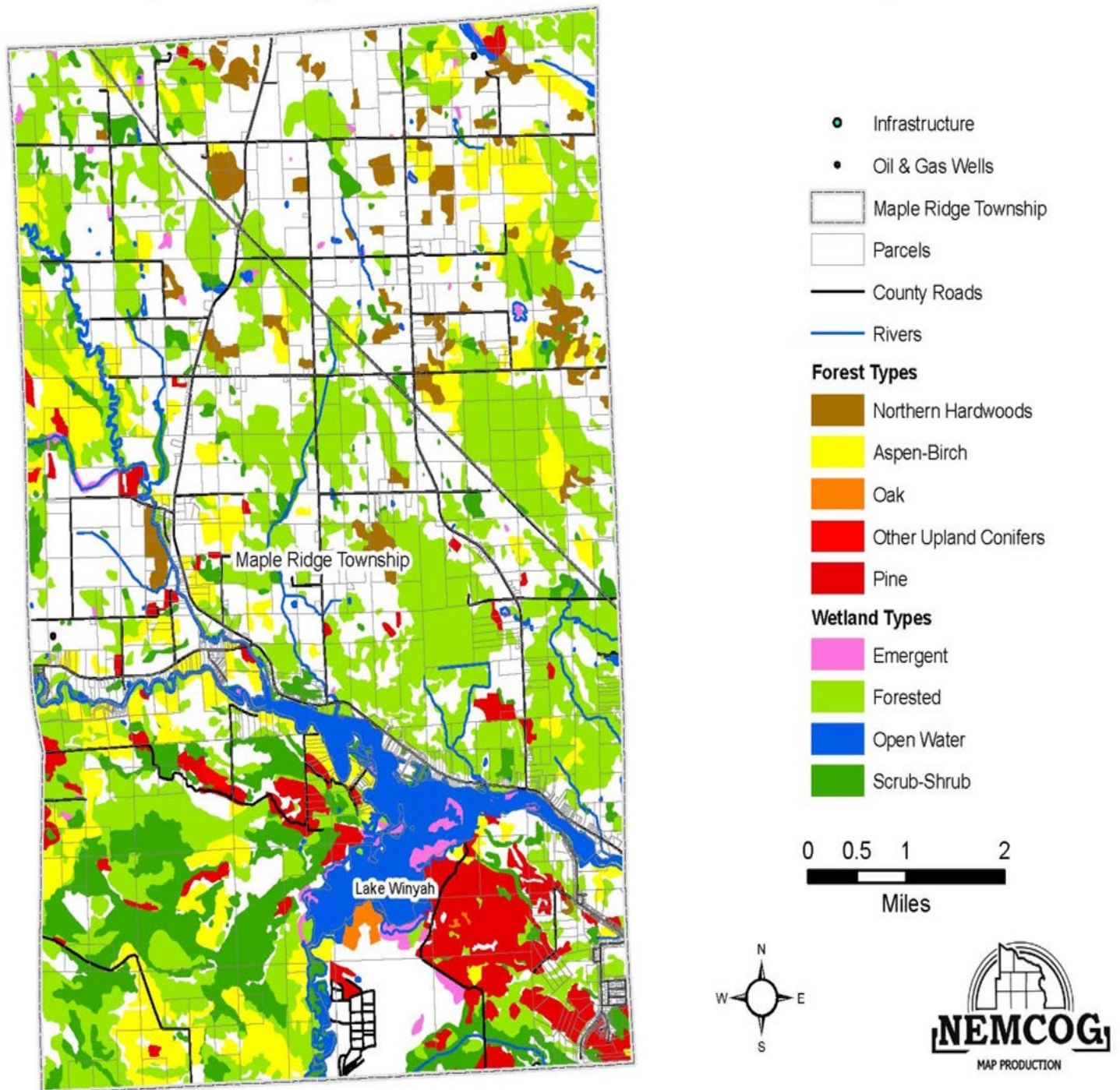


Figure 6-21 Maple Ridge Township Hazards Map

Long Rapids Township Hazards Map

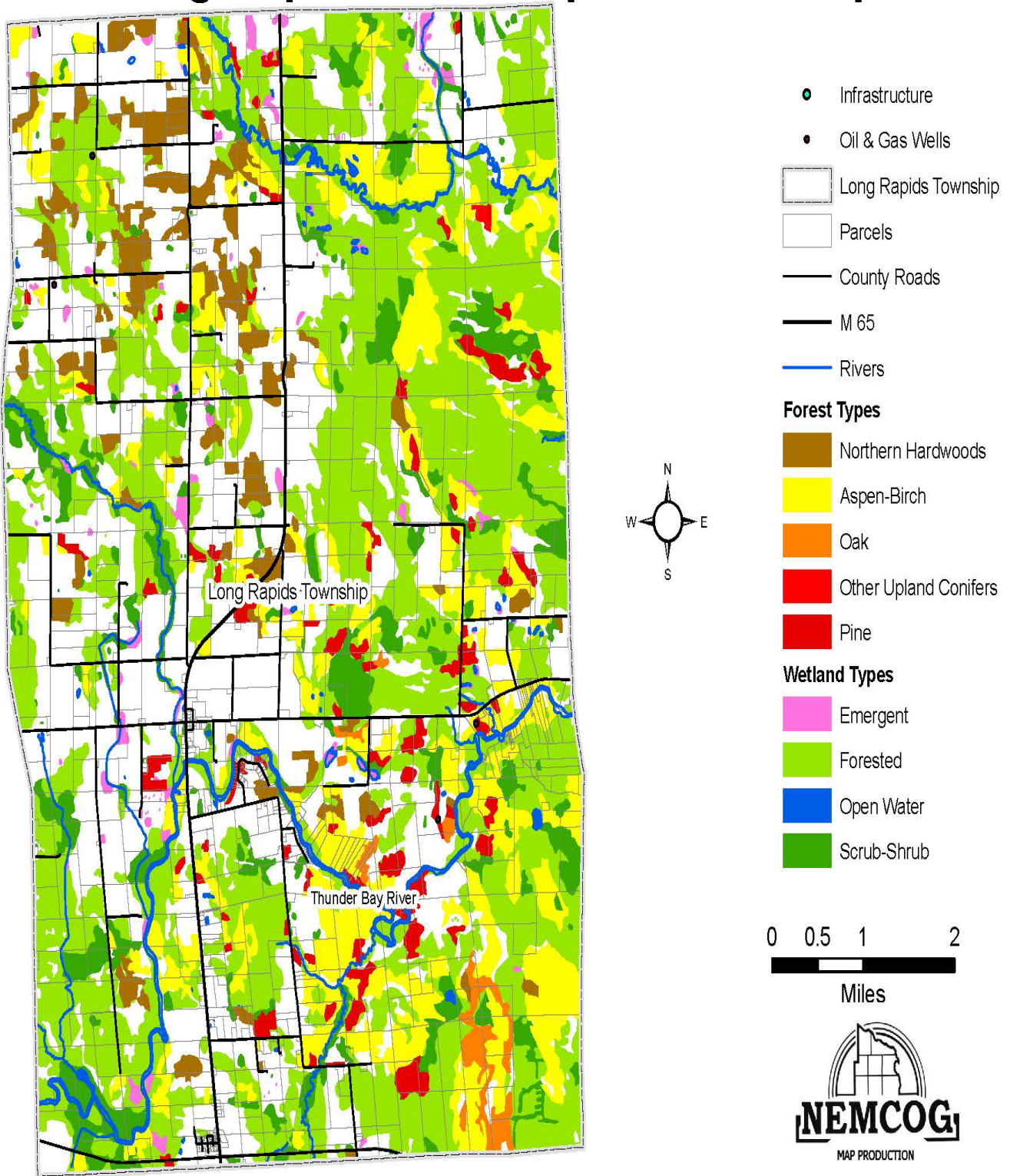
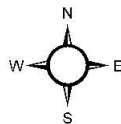
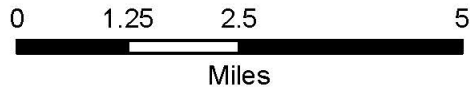
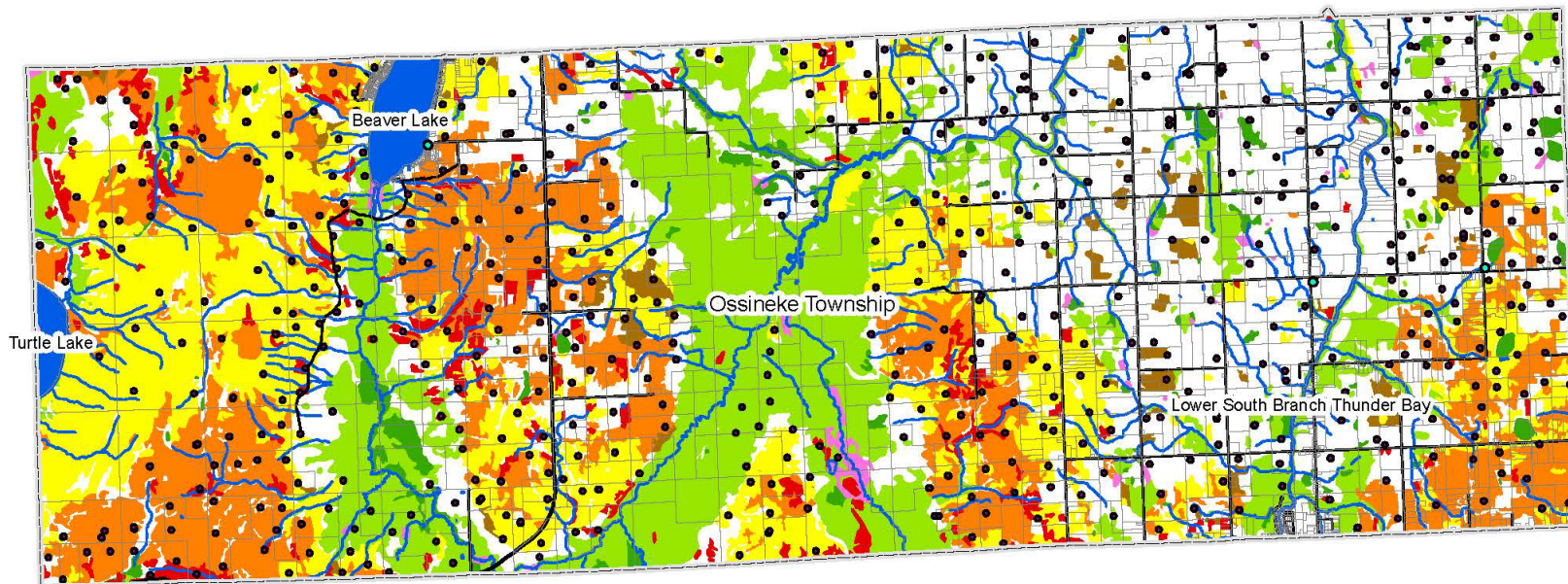


Figure 6-22 Long Rapids Township Hazards Map

Ossineke Township Hazards Map



- | | | |
|---------------------|-------------------------|----------------------|
| ● Infrastructure | Forest Types | Wetland Types |
| ● Oil & Gas Wells | ■ Northern Hardwood | ■ Aquatic Bed |
| ▭ Ossineke Township | ■ Aspen-Birch | ■ Emergent |
| ▭ Parcels | ■ Oak | ■ Forested |
| — County Roads | ■ Other Upland Conifers | ■ Open Water |
| — M 65 | ■ Pine | ■ Scrub-Shrub |
| — Rivers | | |

Figure 6-23 Ossineke Township Hazards Map

Sanborn Township Hazards Map

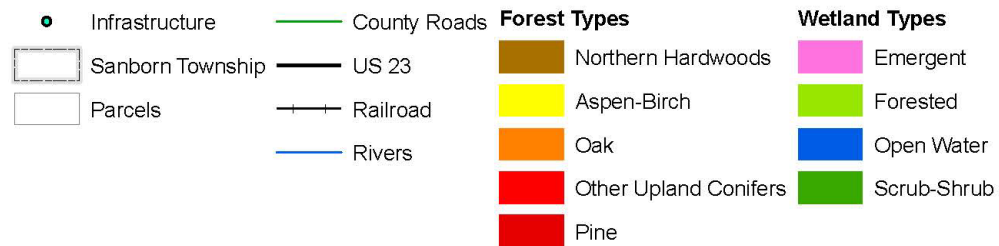
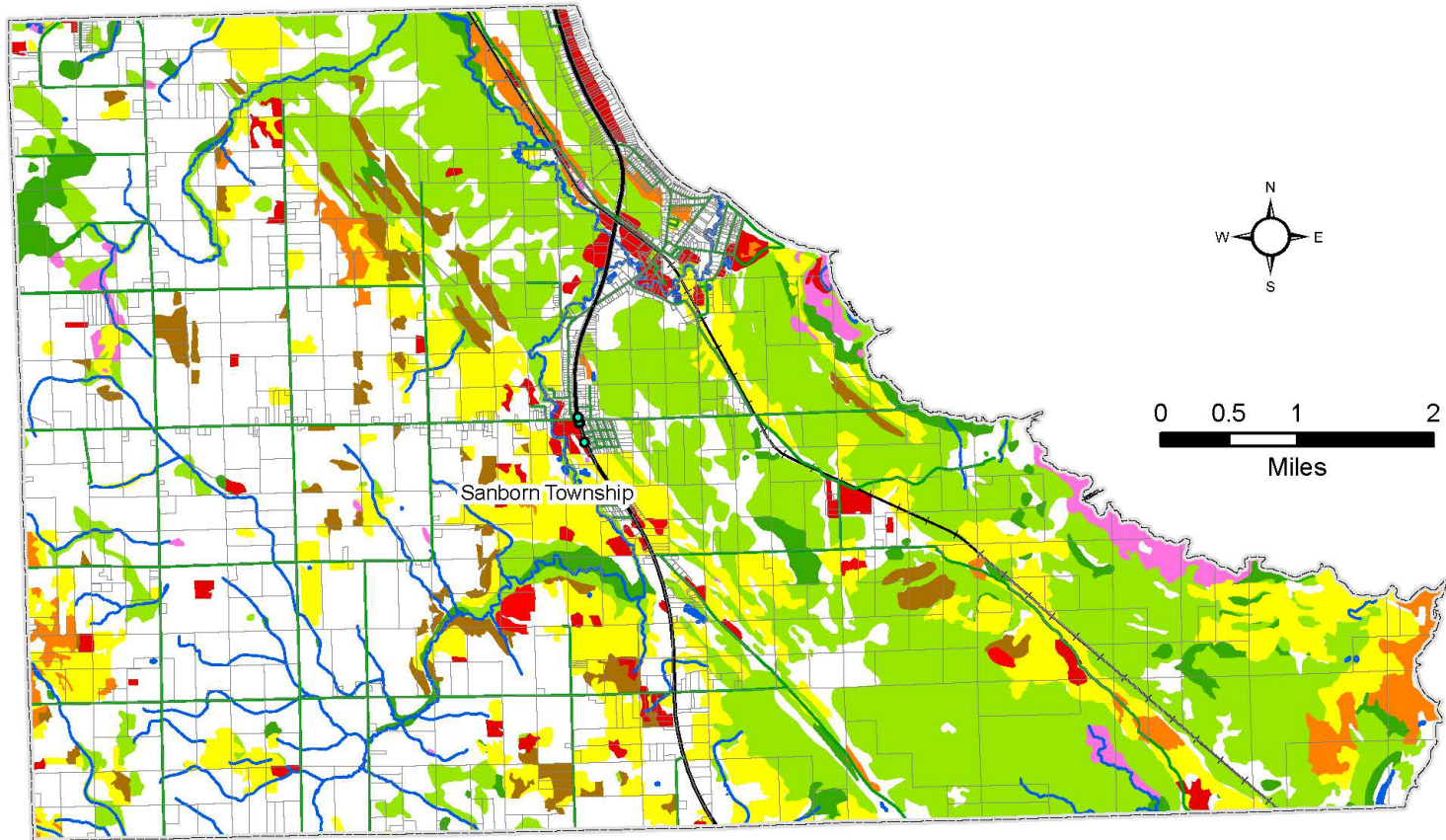


Figure 6-24 Sanborn Township Hazards Map

Wellington Township Hazards Map

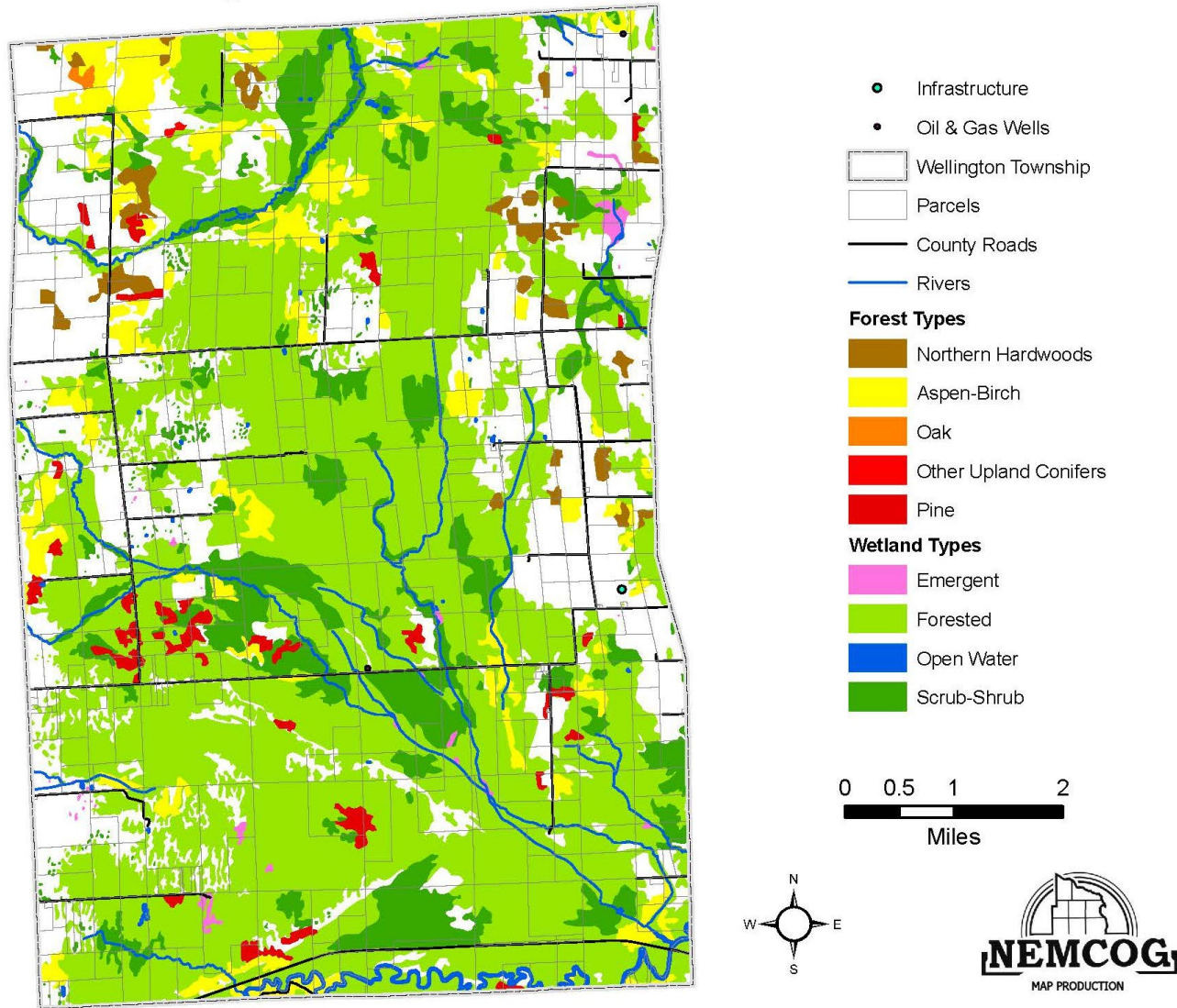


Figure 6-25 Wellington Township Hazards Map

Wilson Township Hazards Map

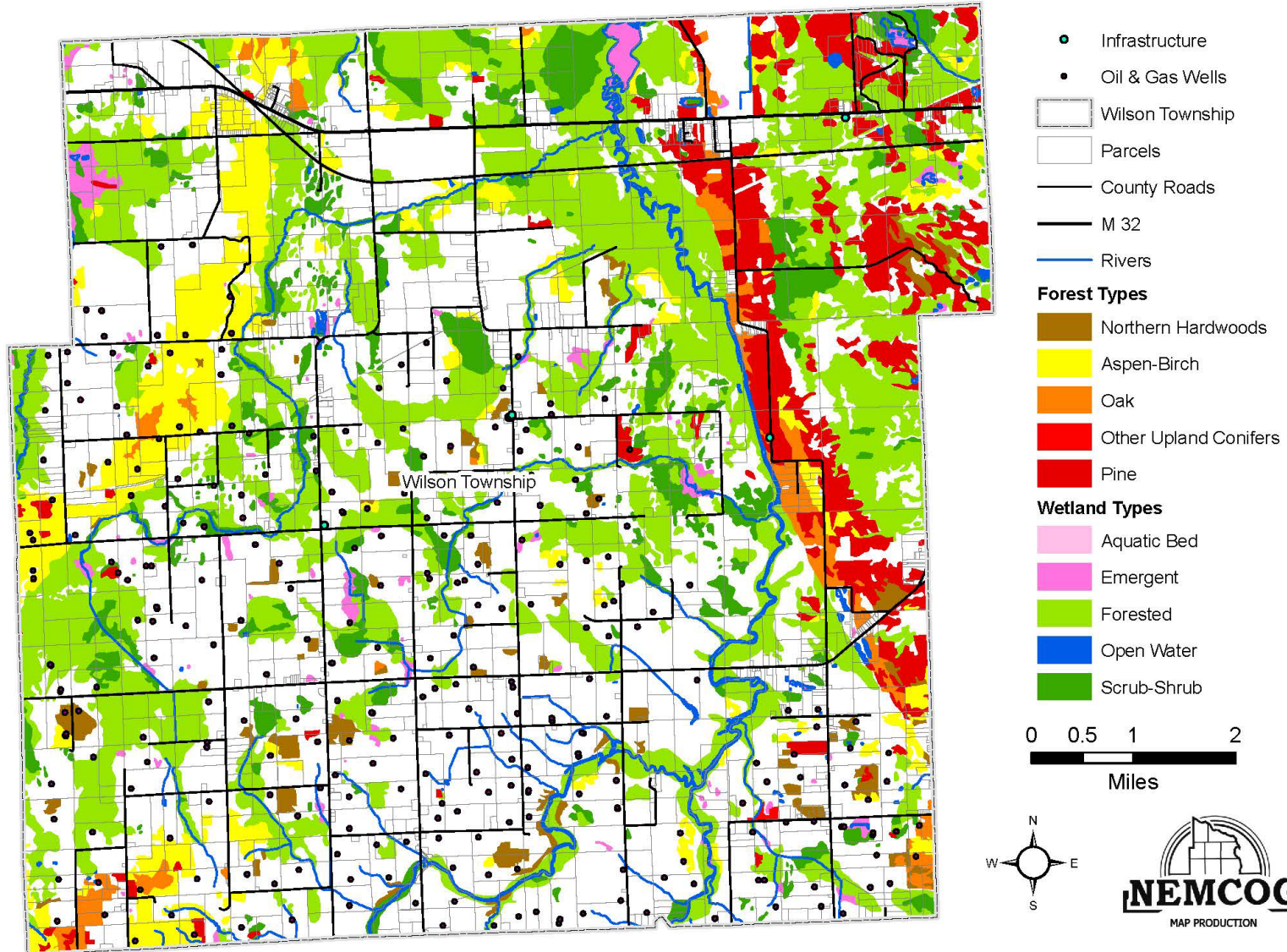


Figure 6-26 Wilson Township Hazards Map

Hazard Ranking Methodology

After identifying which hazards pose a risk in Alpena County, the LEPC ranked the hazards based on the Priority Risk Index to determine which hazards pose the greatest threat to the county (Table 6-7). Then, the LEPC evaluated the ranked hazards based on their risk and vulnerabilities. It should be noted the sleet and ice storm events, and snowstorm hazard events are displayed as winter weather hazards in the Priority Risk Index.

To begin the hazard ranking process, the county's LEPC selected evaluation criteria by determining which aspects were of most concern to the community. The LEPC assigned a level of importance ranging from "Always Important to "Not Worth Considering" for each aspect. The following evaluation criteria were considered: likelihood of occurrence, damage capacity, affected area, speed of onset, percent of population affected, population impact, economic impacts, duration of threat, seasonal risk pattern, environmental impact, predictability of the hazard, ability to mitigate, availability of warning systems, public awareness, corollary effects, interagency cooperation, and response capability. The LEPC rated likelihood of occurrence, damage capacity, population impact, ability to mitigate, public awareness, and response capability as "Always very important." The LEPC rated affected area, percent of population affected, economic impacts, environmental impact, availability of warning systems, corollary effects, and interagency cooperation as "Usually Important." The LEPC rated seasonal risk pattern as "Sometimes important," and speed of onset, duration of threat, and predictability of hazard as "Rarely important." After reviewing the 2014 hazard mitigation plan's evaluation criteria used for the Priority Risk Index, the LEPC decided to replace the damage potential evaluation criterion with the damage capacity and affected area evaluation criteria.

After the rating process for the evaluation criteria, the LEPC selected the following nine evaluation criteria:

- **Likelihood of Occurrence:** The frequency a particular hazard event occurs. The more frequent the event occurs, the greater potential there will be damage and a negative impact on the community.
- **Damage Capacity:** The destructive capacity of the hazard. While the destructive capacity of some hazard events (e.g. floods and tornadoes) is immediate and readily apparent, some hazards may have significant destructive capacity that is less obvious since it occurs over an extended period of time (e.g. extreme temperatures and drought).
- **Affected Area:** The size of the geographic footprint that a hazard affects. The larger the area affected, the greater the impact a hazard has on a community; even though the size of an area does not indicate the destructive potential of a hazard. For example, a blizzard may affect an entire state, while a flood may affect a portion of a municipality.
- **Population Impact:** The percent of the county's population that may be affected directly or indirectly by a hazard event.
- **Ability to Mitigate:** The relative ease a particular hazard event can be mitigated through the application of structural and/or non-structural mitigation strategies. The easier it is to mitigate a hazard, the less likely the hazard will pose a threat (e.g. loss of life and property damage) to the community in the future.

- **Public Awareness:** The ease at which the public can be notified about a hazard event. Hazards that have little or no available warning systems tend to be a public safety issue for the population. This criterion does not address the current level of public awareness in the community.
- **Response Capability:** The assets and resources that are needed to respond to a hazard event. The more assets and resources a community has in place, the less impact a hazard will have on a community.
- **Interagency Cooperation:** The amount of cooperation needed to handle a hazard event. Smaller or localized events will require less interagency cooperation and coordination than large-scale or multiple affected area events.
- **Economic Impacts:** The monetary damages incurred from a hazard event that include public and private damages. Direct physical damage costs and indirect impact costs, such as lost business and tax revenue, are included in this criterion.

Then, the LEPC assigned relative weights to each evaluation criteria to express the criterion’s level of important in analyzing the hazard. The relative weights were converted into percentages since the sum of the weights must equal 100%. Since the damage potential criterion was assigned a relative weight of 15% in the 2014 hazard mitigation plan, the LEPC decided to split the weight evenly between the damage capacity and affected area evaluation criteria. After determining the impact each evaluation criterion has on each hazard, the LEPC created evaluation scales for each evaluation criterion. The point values on the scales ranged between 1 and 10 and were assigned based on the criterion’s relative severity and negative impacts. These scales can be found below.

Finally, the LEPC used a spreadsheet to rank the county’s hazards based on the evaluation scales for each criterion (Table 6-7). The spreadsheet calculated the hazard’s score, and the scores were ranked from highest to lowest to determine the hazard’s ranking in the Priority Risk Index Table. The LEPC elevated the county’s risk for riverine flooding, shoreline flooding, extreme temperatures, infrastructure failure, and public health emergencies, while reducing the county’s risk for fixed site hazardous materials, dam failure, transportation accident, and terrorism/sabotage/weapons of mass destruction.

The following evaluation criterion point values were used to evaluate each hazard:

Likelihood of Occurrence

Excessive Occurrence (Occurs one or more times per year)	10 pts
High Occurrence (Occurs every 2-3 years)	7 pts
Medium Occurrence (Occurs every 5 years)	4 pts
Low Occurrence (Potential yearly occurrence)	1 pt
Unable to be Determined	0 pts

Damage Capacity

High Capacity	10 pts
Medium Capacity	7 pts
Low Capacity	4 pts
No Capacity	1 pt
Unable to be Determined	0 pts

Affected Area

Entire Area (Impacts all or most of the county)	10 pts
Large Area (Impacts ½ to ¾ of the county)	7 pts
Moderate Area (Impacts less than ½ of the county)	4 pts
Small Area (Impacts a small area in the county)	1 pt
Unable to be Determined	0 pts

Population Impact

75% to 100% of the population impacted	10 pts
50% to 74% of the population impacted	7 pts
25% to 49% of the population impacted	4 pts
1% to 24% of the population impacted	1 pt
No Population Impact	0 pts

Ability to Mitigate

Easy to Mitigate (Variety of structural/non-structural measures)	10 pts
Possible to Mitigate (Some structural/non-structural measures)	7 pts
Difficult to Mitigate (Limited structural/non-structural measures)	4 pts
Impossible to Mitigate (Impossible to mitigate future events)	1 pt

Public Awareness

Significant Value (Awareness will save lives and/or property)	10 pts
Some Value (Awareness may save lives and/or property)	7 pts
Limited Value (Awareness will have limited effects)	4 pts
No Value (Awareness does not have an effect)	1 pt

Response Capability

Sufficient Resources	10 pts
Some Resources	7 pts
Minimal Resources	4 pts
No Resources	1 pt

Interagency Cooperation

Total Cooperation (All agencies and jurisdictions)	10 pts
Significant Cooperation (Multiple agencies and jurisdictions)	7 pts
Moderate Cooperation (Several agencies and jurisdictions)	4 pts
Limited Cooperation (Single agency and jurisdiction)	1 pt
No Cooperation	0 pts

Economic Impacts

Significant Impact (Over \$500,000 in monetary damages incurred)	10 pts
Medium Impact (\$300,001 to \$500,000 in monetary damages incurred)	7 pts
Low Impact (\$100,000 to \$300,000 in monetary damages incurred)	4 pts
Minimal Impact (Less than \$100,000 in monetary damages incurred)	1 pt
No Impact	0 pts

Table 6-7 Alpena County Priority Risk Index

Rank	Hazard	Evaluation Criteria									Score
		Likelihood of Occurrence (25%)	Damage Capacity (7.5%)	Affected Area (7.5%)	Population Impact (15%)	Ability to Mitigate (20%)	Public Awareness (5%)	Response Capability (5%)	Interagency Cooperation (5%)	Economic Impacts (10%)	
1	Infrastructure Failure	7	6	7	8	8	7	5	5	7	7.08
2	Great Lakes Shoreline Flooding and Erosion	8	10	8	4	7	7	4	2	10	7.00
3	Public Health Emergency	5	10	10	8	5	8	7	5	10	6.95
4	Extreme Temperatures (extreme heat and extreme cold)	8	9	10	5	7	8	3	2	6	6.83
5	Riverine, Flash, and Urban Flooding	6	10	10	4	7	7	4	4	10	6.75
6	Winter Weather Hazards (sleet and ice storms, and snowstorms)	10	7	10	2	7	8	3	5	4	6.68
7	Structural Fires	10	7	3	5	7	8	2	1	7	6.65
8	Fixed Site Hazardous Materials Accidents	7	8	3	7	7	7	7	4	5	6.43
9	Transportation Hazardous Materials Accident	7	7	10	3	7	7	7	1	4	6.03
10	Dam Failure	1	10	4	7	7	7	6	7	10	5.75
11	Wildfires	6	6	10	3	5	8	6	3	6	5.60
12	Severe Winds (derecho)	7	5	10	4	5	6	2	3	5	5.53
13	Sabotage/Terrorism/Nuclear Attack	2	10	8	7	3	3	6	7	10	5.30
13	Tornadoes	2	6	10	7	5	10	8	5	4	5.30
15	Transportation Accidents (air/land/water)	10	8	1	0	6	2	8	5	1	5.23
16	Oil and Gas Accident (well and pipeline)	5	3	7	1	7	4	4	4	4	4.55
17	Lightning	8	1	10	1	2	2	1	1	1	3.68
17	Drought	3	7	10	3	1	3	2	1	7	3.68
19	Scrap Tire Fires	2	1	1	1	10	10	1	1	1	3.50
20	Hailstorms	5	5	10	1	1	5	1	1	4	3.48
21	Civil Disturbance	1	1	4	1	10	1	1	1	1	3.03
22	Karst Sinkholes (subsidence)	1	1	4	1	1	1	1	0	1	1.18

Risk and Vulnerability Assessment Summaries

The county's risk and vulnerability assessments can be found in Table 6-8. The goal of the risk assessment is to determine where the hazard exists, its frequency, and its impact. The county's risk was determined by the likelihood of occurrence, damage capacity, affected area, and the ability to mitigate the hazard. The risk is classified as follows:

- **High Probability/High Impact:** The hazard will most likely happen and has a high potential to affect existing and future buildings and populations.
- **Low Probability/High Impact:** The hazard has a small chance of happening and has a high potential to affect existing and future buildings and populations.
- **High Probability/Low Impact:** The hazard will most likely happen and has a low potential to affect existing and future buildings and populations.
- **Low Probability/Low Impact:** The hazard has a small chance of happening and has a low potential to affect existing and future buildings and populations.

The vulnerability assessment determines where the population and critical facilities overlap with the hazards. This assessment evaluated the county's population concentrations, age-specific populations, development pressures, housing types, agricultural presence, sprawl, and other issues that may increase the county's vulnerability to specific hazards. The county's vulnerability was evaluated based on the population impact, public awareness, response capabilities, interagency cooperation, and economic impacts. The vulnerability is classified as follows:

- **Severe:** The hazard event will have severe impacts over a large geographic area or in densely populated areas and will have a serious financial impact on residents and businesses.
- **Noticeable:** The hazard event will have confined impacts and financial burdens on residents and businesses.
- **Minor:** The hazard event will have minimal impacts and financial burdens on residents and businesses.

Table 6-8 Alpena County's Risk and Vulnerability Assessment Summaries

Rank	Hazard	Risk Assessment	Vulnerability Assessment
1	Infrastructure Failure	Low Probability/High Impact	Severe
2	Great Lakes Shoreline Flooding and Erosion	High Probability/High Impact	Noticeable
3	Public Health Emergency	High Probability/High Impact	Severe
4	Extreme Temperatures (extreme heat and extreme cold)	High Probability/Low Impact	Minor
5	Riverine, Flash, and Urban Flooding	High Probability/Low Impact	Noticeable
6	Winter Weather Hazards (sleet and ice storms, and snowstorms)	High Probability/Low Impact	Noticeable
7	Structural Fires	High Impact/High Probability	Noticeable
8	Fixed Site Hazardous Materials Accidents	Low Probability/High Impact	Severe
9	Transportation Hazardous Materials Accident	Low Probability/High Impact	Noticeable
10	Dam Failure	Low Probability/High Impact	Severe
11	Wildfires	Low Probability/High Impact	Severe
12	Severe Winds (derecho)	Low Probability/High Impact	Noticeable
13	Sabotage/Terrorism/Nuclear Attack	Low Probability/High Impact	Noticeable
13	Tornadoes	Low Probability/High Impact	Noticeable
15	Transportation Accidents (air/land/water)	High Probability/Low Impact	Minor
16	Oil and Gas Accident (well and pipeline)	Low Probability/High Impact	Severe
17	Lightning	Low Probability/Low Impact	Noticeable
17	Drought	Low Probability/High Impact	Noticeable
19	Scrap Tire Fires	Low Probability/High Impact	Minor
20	Hailstorms	Low Probability/High Impact	Noticeable
21	Civil Disturbance	Low Probability/High Impact	Minor
22	Karst Sinkholes (subsidence)	Low Probability/Low Impact	Minor

Chapter 7 Goals and Objectives

Overview

The community goals and objectives for Alpena County were developed through the analysis of the county's existing social and economic conditions, critical services and facilities, environmental conditions, existing land use, hazard analysis, community input, and risk and vulnerability assessments. The local communities are encouraged to incorporate the hazard mitigation goals and objectives into their other planning activities, such as their master plans and capital improvement plans.

Goals and Objectives

The following goals and objectives will be used to guide hazard mitigation efforts within Alpena County. The goals are broad in nature with slightly more specific objectives. Detailed action items can be found in Chapter 8: Mitigation Strategies and Priorities.

GOAL 1: Protect Public Health and Safety

Objectives

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

GOAL 2: Minimize Damage to Public and Private Property

Objectives

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

GOAL 3: Maintain Essential Services

Objectives

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

GOAL 4: Guide Growth/Development

Objectives

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

GOAL 5: Build partnerships to support emergency response services and hazard mitigation activities on a regional basis.

Objectives

- Continue to work cooperatively with agencies and communities in Alpena County.
- Continue to work cooperatively with agencies and communities in Northern Michigan.
- Develop regional grant applications for hazard mitigation implementation.
- Continue to participate in the Region 7 Homeland Security Board.

GOAL 6: Develop, update, and maintain geographic information system (GIS) data sets

Objectives

- Develop GIS data sets for usage by county officials, the emergency management office, and 911 staff.
- Evaluate data sets annually and update.

Chapter 8 Mitigation Strategies and Priorities

Overview

After determining Alpena County's goals and objectives, hazard mitigation actions were developed based on the following categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. The mitigation action and implementation strategies were prioritized and evaluated to determine the effect they will have on the goals and objectives. During the prioritization process, each action was evaluated based on its social impact, technical feasibility, administrative potential, political impact, legal ramification, environmental impact, overall benefit, and cost effectiveness. The Alpena County LEPC, county, special interest groups (fire departments, hazardous material response team, district health department, etc.), and local governments considered their budgets, available technical resources, and current visions to assess each action item's priority, and current and future progress.

Mitigation Action and Implementation Strategies

In the previous hazard mitigation plan, the mitigation actions and implementation strategies were categorized based on the hazard(s) they addressed (Appendix D). When the LEPC, local governments, and special interest groups (fire department, hazardous material response team, district health department, etc.) reviewed and updated the strategies, they moved many action items to the all-hazard mitigation table, a strategy regarding emergency plans for floodplain areas was added, eighteen action items were deemed no longer relevant in the county (and will be removed from future plans), and many items were determined to be ongoing/long-term projects. The Fall 2020 FEMA review determined this categorization was not adequate since it did not provide a purpose for each mitigation action item. To rectify this issue, the mitigation actions and implementation strategies were re-categorized based on the categories used to develop the action items: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. Additionally, a line item was added under each action item to address which hazard(s) the action item mitigates.

Prevention Action and Implementation Strategies

The purpose of the prevention action and implementation strategies is to address the strategies related to government administrative or regulatory actions and processes that influence how land is developed and buildings are constructed. Also, public activities that reduce hazard losses are included in this category. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations. For each mitigation strategy in this category, the strategies are designed to reduce deaths and injuries, reduce structural damage and deterioration, prevent the interruption of businesses, prevent insurance losses, reduce capital costs for repairs, and reduce the degradation of cultural and natural resources.

1. Review and improve mutual aid assistance for utility and communication systems failures.

Priority Level: High

Hazards Addressed: Infrastructure failure

Responsible Agencies: County Emergency Management Office, County, Alpena, Sanborn, Maple Ridge, and Ossineke Townships (high priority), Green, Long Rapids, and Wilson Townships (low priority), City of Alpena, Wellington Township (medium priority) , Local Fire Departments, State, American Red Cross, Utility Company, Schools

Financial and Technical Resources: Federal Government, Alpena Township, Ossineke Township, Sanborn Township, Local Fire Departments, Maple Ridge Township, City of Alpena (technical: communications expertise/manpower)

Progress/Status: Ongoing/Long term throughout the entire county. Continually evaluating and updating systems. Alpena Township is planning for, considering its budget, implementing the strategy through the DPW, and has mutual aid (countywide, fire department) to address this strategy. The City of Alpena and Sanborn Township incorporate this strategy in its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually evaluated and updated.

2. Develop and maintain a system for mass vaccination and prophylaxis for residents during a pandemic or public health emergency.

Priority Level: High

Hazards Addressed: Public Health Emergency

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena, Wilson, and Ossineke Townships (medium priority), District Health Department, Schools, Federal Government, Salvation Army, Police, American Red Cross, Sanborn and Maple Ridge Townships (high priority), Long Rapids Township (low priority)

Financial and Technical Resources: District Health Department, Federal Government, Alpena Township (technical: location), Maple Ridge Township, City of Alpena (technical: staff support by EMS)

Progress/Status: Ongoing/Long term throughout the entire county. Health Department has a system in place.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually maintained.

3. Develop an infrastructure protection plan to protect undamaged sewer and water systems from flood damaged sections.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena Township (high priority), Local Fire Department, County Road Commission, District Health Department

Financial and Technical Resources: Federal Government, City of Alpena (technical: two PE's on staff)

Progress/Status: Ongoing/Long term throughout the entire county. Coordinating with Suez. Alpena Township incorporates this strategy into its planning process and its budget. The City of Alpena does not have available funding, but incorporates the strategy into its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since the dams are getting older.

4. Maintain the Continuity of Operation Plan to provide alternate management options in the event of the loss of City Hall, the County Courthouse, the Alpena Combat Readiness Training Center, etc.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Sanborn Township (high priority), Alpena, Wilson, Maple Ridge, and Ossineke Townships (medium priority), Green and Long Rapids Townships (low priority), District Health Department

Financial and Technical Resources: Federal Government, County, Local Fire Departments, Ossineke Township

Progress/Status: Ongoing/Long term throughout the entire county. 911 Continuity of Operation Plan and COG plans are being updated; District Health Department has identified secondary and tertiary locations for essential services.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually evaluated and updated.

5. Conduct annual wildfire planning with all fire departments and the Michigan Department of Natural Resources.

Priority Level: High

Hazards Addressed: Wildfire

Responsible Agencies: County Emergency Management Office, Alpena, Ossineke, Wellington, and Green Townships (low priority), Sanborn and Maple Ridge Townships (high priority), City of Alpena, Wilson Township (medium priority), Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, Local Fire Departments, Green Township, Sanborn Township, Maple Ridge Township, City of Alpena (funding, AFD personnel completed \$130/190)

Progress/Status: Ongoing/Long term throughout the entire county. Green Township is an active participant. Sanborn Township incorporates the strategy in its planning process. Maple Ridge Township has wildfire training and equipment.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

6. Seek support and funding to provide more training and exercises for the Health Department's staff.

Priority Level: High

Hazards Addressed: Public Health Emergency

Responsible Agencies: County Emergency Management Office, Alpena and Maple Ridge Townships (high priority), District Health Department, Police, Local Fire Departments, Wilson Township (medium priority)

Financial and Technical Resources: District Health Department, Federal Government, State, Alpena Township (technical)

Progress/Status: Ongoing/Long term throughout the entire county. Seeking funding.

Previous Plans: Not applicable; This item has been added to the 2021 hazard mitigation plan.

7. Continue to evaluate all 302 sites and non-302 sites for potential hazards.

Priority Level: High

Hazards Addressed: Fixed Site Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, Local Government

Financial and Technical Resources: County Emergency Management Office, Local Government

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: Not applicable; This item has been added to the 2021 Hazard Mitigation Plan.

8. Identify adequate water supplies for emergency firefighting. Develop a strategy to construct other water sources in areas lacking water supplies.

Priority Level: High

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, Alpena, Wilson, Sanborn, Long Rapids, and Ossineke Townships (medium priority), Wellington and Maple Ridge Townships (high priority), Local Fire Departments, County Road Commission, Insurance Companies, State, City of Alpena (low priority)

Financial and Technical Resources: State, Federal Government, Alpena Township, Local Fire Departments, Ossineke Township, Sanborn Township, Wellington Township, Long Rapids Township, Maple Ridge Township, City of Alpena (technical: active planning/exercises)

Progress/Status: Ongoing/Long term throughout the entire county. Continual training for other water sources and water drafting. Other water sources are in place. Strategy implemented in Alpena Township. Not an issue in Green Township. Dry hydrants installed in Sanborn Township. No available funding in Wellington Township. Maple Ridge Township has hydrants near the river and creeks.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

9. Expand the community risk reduction program throughout the county to encourage the public to install and maintain smoke detectors and fire extinguishers, provide training to residents about how to use fire extinguishers, and develop education programs related to the use of stoves, heaters, fireworks, electric, and space heaters, matches/lighters, etc.

Priority Level: High

Hazards Addressed: Structural Fires

Responsible Agencies: County Emergency Management Office, County, Alpena, Maple Ridge, and Wellington Townships (high priority), Local Fire Departments, City of Alpena, Ossineke, Wilson, Long Rapids, and Sanborn Townships (medium priority), Green Township (low priority)

Financial and Technical Resources: State, Federal Government, Local Fire Departments, Alpena Township, Ossineke Township, Wellington Township, Long Rapids Township, City of Alpena (technical: will help as needed)

Progress/Status: Ongoing/Long term throughout the entire county. Fire Department and CRR officer responsible. No available funding in Wellington Township. The City of Alpena incorporates this strategy in its planning process and the smoke detector program is in progress with coordination/support from the city CRR staff.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The action item has been modified to combine multiple action items from the previous plans. The priority has changed since the program is in place.

10. Develop a recruitment and retention program for paid and part-paid firefighter and EMS personnel.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena and Sanborn Townships (high priority), Ossineke, Wellington, and Wilson Townships (medium priority), Green, Maple Ridge, and Long Rapids Townships (low priority), Local Fire Departments

Financial and Technical Resources: County, Federal Government, Alpena Township, Local Fire Departments, Ossineke Township, Sanborn Township, City of Alpena (funding, technical: staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Cadet program in place.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has changed since there is a need for paid and part-paid firefighter personnel in the county.

11. Develop a strategy to keep the equipment up to date in the hazardous material response trailer (located at CRTC Fire).

Priority Level: High

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, CRTC Fire, Alpena City Fire

Financial and Technical Resources: County Emergency Management Office, CRTC Fire, Alpena City Fire, County, Local Governments

Progress/Status: Ongoing/Long term throughout the entire county. Beginning stages of strategy development. Strategy will include how county and local governments will provide funding to keep the equipment up to date (e.g. create a hazardous material response budget).

Previous Plans: Not applicable; This item has been added to the 2021 Hazard Mitigation Plan.

12. Improve the capability of agencies to carry-out road closures and to provide traffic control in accident areas.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Scrap Tire Fires, Civil Disturbance

Responsible Agencies: County Road Commission

Financial and Technical Resources: Federal Government, County Road Commission

Progress/Status: Ongoing/Long term throughout the entire county. Road Commission has training and signage.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

13. Review and enforce open burning regulations.

Priority Level: Medium

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: Alpena Township (medium priority), Sanborn and Maple Ridge Townships (high priority), City of Alpena, Green, Wilson, Long Rapids, and Ossineke Townships (low priority), Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: County, Local Fire Departments, State, Alpena Township, Green Township, Sanborn Township

Progress/Status: Ongoing/Long term throughout the entire county. Strategy implemented.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually reviewed and enforced.

14. Review and develop a regional base at Alpena County Regional Airport for air wildfire fighting support.

Priority Level: Medium

Hazards Addressed: Wildfire, Scrap tire fires

Responsible Agencies: County Emergency Management Office, County, Federal Government

Financial and Technical Resources: State, Federal Government, County Emergency Management Office

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has changed since the strategy has the potential to reduce wildfire impacts.

15. Develop evacuation plans and programs that instruct residents on proper evacuation procedures.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Sabotage/Terrorism/Nuclear Attack, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Alpena and Wilson Townships (low priority), Ossineke Township (medium priority), Sanborn and Maple Ridge Townships (high priority), Local Fire Departments, Police, Civic and Church Groups, Schools

Financial and Technical Resources: County Emergency Management Office, Federal Government, County, U.S. Forest Service, Michigan Department of Natural Resources, Local Fire Departments, Police, State, Sanborn Township

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

16. Review and develop site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, etc.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Riverine, Flash, and Urban Flooding, Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Wildfires, Sabotage/Terrorism/Nuclear Attack, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires, Civil Disturbance

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena and Wilson Townships (medium priority), Green, Long Rapids, and Ossineke Townships (low priority), Local Fire Department, Schools

Financial and Technical Resources: Federal Government, Fire department (technical), City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. Continued liaison with stakeholders. Plans reviewed and updated by each agency. Alpena Township participates in the planning process and has developed an area pre-plan for the facilities. The City of Alpena uses specialized software for preplans in the city and currently have this strategy under budget consideration.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

17. Review the Regional EMS response plan to supplement the county's mass casualty plan.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena, Wellington, Maple Ridge, and Wilson Townships (high priority), Ossineke, Long Rapids, and Sanborn Township (medium priority), Green Township (low priority), Local Fire Department, State, American Red Cross, Medical

Financial and Technical Resources: Federal Government, EMS (technical), fire departments (technical), BLS transport (technical), Ossineke Township, Maple Ridge Township, City of Alpena (technical)

Progress/Status: Ongoing/Long term throughout the entire county. Plan has been recently reviewed and updated; Coordinates with the Region 7 Healthcare Coalition Plan. The City of Alpena and Alpena Township incorporate this strategy into the planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has been reduced since the plan has been completed and is continually reviewed and updated.

18. Increase the Health Department's staffing and support function levels.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, Federal Government, State, Alpena Township (medium priority)

Financial and Technical Resources: District Health Department, Federal Government, State, County

Progress/Status: Ongoing/Long term throughout the entire county. Seeking funding.

Previous Plans: Not applicable; This item has been added to the 2021 hazard mitigation plan.

19. Ensure plans are in place to protect the switchyard at Four Mile Dam and other vulnerable sites from flood damage.

Priority Level: Medium

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, State, Utility Companies

Financial and Technical Resources: Federal Government, State

Progress/Status: Ongoing/Long term throughout the entire county. Coordinating with Consumers, EGLE, and Thunder Bay Power. Plans reviewed annually.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is reviewed annually.

20. Ensure other entities have developed and implemented emergency plans for areas in floodplains (e.g. hospitals, senior centers, county-owned buildings, etc.).

Priority Level: Medium

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Ossineke, Long Rapids, and Wilson Townships (low priority), Alpena Township (medium priority), State, Local Businesses, Medical, Schools, Utility Companies, Maple Ridge Township (high priority)

Financial and Technical Resources: Federal Government, Local Fire Departments, Alpena Township (technical; building official and DPW), City of Alpena (technical: staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Plans currently under review. The City of Alpena and Alpena Township incorporate this strategy into the planning process.

Previous Plans: Not applicable; This item has been added to the 2021 hazard mitigation plan.

21. Promote and employ soil erosion prevention techniques within the watershed.

Priority Level: Medium

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, Alpena, Maple Ridge, and Ossineke Townships (medium priority), Green, Long Rapids, and Wellington Townships (low priority), County Road Commission, Huron Pines, State, Federal Government, City of Alpena (high priority)

Financial and Technical Resources: County, Huron Pines, State, Federal Government, Alpena Township (technical), City of Alpena (funding within the city; technical: certified erosion officer on staff)

Progress/Status: Ongoing/Long term throughout the entire county. Soil Technician is the lead responsible agency. No progress in Green Township

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually evaluated and implemented.

22. Conduct an annual review of school buses and emergency exits, including new features.

Priority Level: Medium

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: State, Schools

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Annual reviews.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

23. Develop a plan for detection and prevention/discouragement of illegal discharges into the stormwater sewer system.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Public Health Emergency, Sabotage/Terrorism/Nuclear Attack

Responsible Agencies: County Emergency Management Office, County, City of Alpena (high priority), Alpena Township (medium priority), Local Fire Departments, State, Ossineke and Wellington Townships (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW, City of Alpena (funding within the city, technical: mapping and data)

Progress/Status: Ongoing/Long term throughout the entire county. Soil Technician is the lead responsible agency. Alpena Township has incorporated this strategy in its ordinance.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually evaluated and implemented.

24. Develop a strategy to provide more mass casualty medical equipment to handle 50 survivors of a heavy jet transport incident.

Priority Level: Medium

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena, Long Rapids, and Wilson Townships (medium priority), Sanborn Township (high priority), City of Alpena, Green, Wellington, Maple Ridge, and Ossineke Townships (low priority), Local Fire Departments, Police, State, Medical

Financial and Technical Resources: State, Federal Government, Local Fire Departments, Sanborn Township, EMS (technical), City of Alpena (technical: active participation, staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Coordination with the Alpena Combat Readiness Training Center (air base) and fire department.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

25. Encourage strict highway speed enforcement.

Priority Level: Medium

Hazards Addressed: Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: Police

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Constantly monitored by law enforcement. Coordination with Michigan State Police.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

26. Research and develop medical airlift plans.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Scrap Tire Fires, Hailstorms

Responsible Agencies: County Emergency Management Office, County, State, Medical

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

27. Research and develop contingency plans for worker and public protection, including rescue and evacuation procedures for oil and natural gas well hazard areas.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Oil and Gas Accidents (well and pipeline)

Responsible Agencies: County Emergency Management Office, Local Fire Departments, State, Utility Company

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Continual responder training.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a priority 1. The priority was changed to streamline the plan.

28. Develop contingency plans for emergency treatment procedures at the Water Production Plant or Water Recycling Plant in the event of a catastrophic event.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Sabotage/Terrorism/Nuclear Attack, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline)

Responsible Agencies: County Emergency Management Office, City of Alpena, Alpena Township (high priority), Ossineke and Sanborn Townships (medium priority), Maple Ridge Township (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW, City of Alpena

Progress/Status: Ongoing/Long term in the City of Alpena and Alpena Township. The responsible agencies are the City's Department of Public Works and the Township Water Department. Ongoing incorporation into the planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually reviewed.

29. Develop and implement a response strategy for terrorist acts.

Priority Level: Low

Hazards Addressed: Sabotage/Terrorism/Nuclear Attack

Responsible Agencies: County Emergency Management Office, County, Alpena and Maple Ridge Townships (high priority), Local Fire Departments, District Health Department, Police, State, City of Alpena, Ossineke Township (medium priority), Wilson and Long Rapids Townships (low priority)

Financial and Technical Resources: County Emergency Management Office, County, Local Fire Departments, State, Alpena Township, DPW, Ossineke Township, City of Alpena (technical: staff support/participation)

Progress/Status: Ongoing/Long term throughout the entire county. Egle mandates for DPW.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed and updated.

30. Review and improve tree trimming and maintenance efforts to prevent limb breakage and to safeguard nearby utility lines.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Winter Weather Hazards (sleet and ice storms, and snowstorms), Severe Winds (derecho), Tornadoes, Transportation Accidents (air/land/water)

Responsible Agencies: County Road Commission, Utility Companies

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Agencies monitor the county to schedule tree trimming and maintenance.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed and maintained.

31. Recommend a study to determine if the removal of the old bridge waste at George Washington Bridge on U.S. 23 is advisable to improve water flow.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena Township (low priority), Insurance Companies, State, Wellington Township (medium priority)

Financial and Technical Resources: County, City of Alpena, Alpena Township (technical), Federal Government, State, NEMCOG

Progress/Status: Ongoing/Long term throughout the entire county. No funding available.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is dependent on funding.

32. Develop a countywide stormwater ordinance.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena Township (medium priority), County Road Commission, State, Wilson Township (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW (technical), City of Alpena (technical)

Progress/Status: Ongoing/Long term throughout the entire county. Drain Commissioner is the lead responsible agency. The City of Alpena has plans in place.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is dependent on funding.

33. Develop and implement a plan to improve the distribution of NOAA radios throughout the community. Promote the use of accessible emergency notification apps.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, National Weather Service, Local Businesses, Civic and Church Groups

Financial and Technical Resources: State, County, Local Governments, Civic and Church Groups, Local Businesses

Progress/Status: Ongoing/Long term throughout the entire county. Under development.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

34. Encourage farmland and open space preservation.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure, Wildfires, Severe Winds (derecho), Tornadoes, Oil and Gas Accidents (well and pipeline), Karst Sinkholes (subsidence)

Responsible Agencies: County, Alpena, Wilson, Long Rapids, and Green Townships (low priority), Ossineke, Maple Ridge, and Wellington Townships (medium priority), Sanborn Township (high priority), State

Financial and Technical Resources: County, Alpena Township (technical), Green Township, Sanborn Township, Wellington Township

Progress/Status: Ongoing/Long term throughout the entire county. Soil Technician is working on implementing strategy. Green Township addresses through its zoning. No available funding in Wellington Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

35. Use available NOAA data to predict the location of potential white-out road hazards and warn motorists of road conditions.

Priority Level: Low

Hazards Addressed: Winter Weather Hazards (sleet and ice storms, and snowstorms), Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, National Weather Service

Financial and Technical Resources: State, County, Local Governments, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since staffing time is more efficiently used in addressing other strategies.

36. Develop a countywide solution to fund fire services.

Priority Level: Low

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, Alpena, Maple Ridge, and Wilson Townships (high priority), Ossineke and Long Rapids Townships (medium priority), Green and Wellington Townships (low priority), Local Fire Departments, Insurance Companies, Civic and Church Groups, Local Businesses

Financial and Technical Resources: County, Alpena Township, Green Township, Ossineke Township, Long Rapids Township

Progress/Status: Ongoing/Long term throughout the entire county. Unbudgeted. Alpena Township incorporates the strategy into their planning process. No progress in Green Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

37. Research and develop DNR GIS layers to include water supply locations, Tier II sites, gas and oil wells, etc.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: County

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually evaluated and updated.

38. Review the current status and obtain the necessary flood insurance for county government facilities.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena and Long Rapids Townships (low priority), Landowners, Insurance Companies, Real Estate Companies, Local Businesses

Financial and Technical Resources: Local Businesses, City of Alpena (funding as needed for City structures)

Progress/Status: Ongoing/Long term throughout the entire county. Annual review of county's insurance requirements.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The action item was specified to focus on the county's government facilities.

39. Develop a program to lower or insulate known water services with freeze-up problems.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Extreme Temperatures (extreme heat and extreme cold), Winter Weather Hazards (sleet and ice storms, and snowstorms)

Responsible Agencies: County Emergency Management Office, City of Alpena, Alpena and Maple Ridge Townships (medium priority), City of Alpena, Sanborn Township (high priority)

Financial and Technical Resources: State, Federal Government, Alpena Township, DPW staff, City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township has educated property owners. The City of Alpena has been working on this strategy.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

40. Develop a contingency plan for source water in case the City's water intake freezes or becomes blocked with frazzle ice.

Priority Level: Low

Hazards Addressed: Infrastructure failure

Responsible Agencies: City of Alpena (medium priority), District Health Department, Alpena Township (high priority)

Financial and Technical Resources: State, Federal Government, Alpena Township, City of Alpena

Progress/Status: Ongoing/Long term in the county. Responsible agency is the City's Department of Public Works. The City of Alpena and Alpena Township incorporate this strategy into the planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

41. Work with insurance companies to provide wildfire safety information to area residents and improve ISO ratings.

Priority Level: Low

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Alpena, Maple Ridge, and Green Townships (low priority), Ossineke and Wilson Townships (medium priority), Sanborn Township (high priority), Local Fire Departments, Insurance Companies, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: State, Federal Government, Local Fire Departments, Green Township, Sanborn Township

Progress/Status: Ongoing/Long term throughout the entire county. Current practice in Green Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The action item has been modified to remove the Firewise program and include ISO ratings. The Firewise program was not able to take off in the county.

42. Develop a strategy to standardize equipment, so all county firefighters can operate the equipment.

Priority Level: Low

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Alpena, Maple Ridge, and Wellington Townships (high priority), Local Fire Departments, Ossineke, Wilson, and Sanborn Townships (medium priority), City of Alpena, Long Rapids Township (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, Local Fire Departments, Ossineke Township, Long Rapids Township, Maple Ridge Township

Progress/Status: Ongoing/Long term throughout the entire county. Alpena and Sanborn Townships incorporate this strategy into its planning process. Attachments have been implemented on fire department resources. Maple Ridge Township has updated to current standards.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. The priority has changed since equipment operation is understood before responding to a call.

43. Hold an annual meeting with the trucking industry and local fire and law enforcement agencies.

Priority Level: Low

Hazards Addressed: Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena, Wilson, Wellington, and Ossineke Townships (low priority), Local Fire Departments, Police

Financial and Technical Resources: Federal Government, Local Fire Departments, Alpena Township (technical)

Progress/Status: Ongoing/Long term throughout the entire county. In progress.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

44. Review procedures for railroad inspections and improve designs at problem railway/roadway intersections.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena, Wellington, Maple Ridge, and Wilson Townships (low priority), Sanborn Township (medium priority), Local Fire Departments, County Road Commission, State, Federal Government

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Unbudgeted.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is dependent on available funding.

45. Meet with the trucking industry and coordinate transport times to avoid school transport times.

Priority Level: Low

Hazards Addressed: Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Police

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

46. Encourage long-term planning to provide more connector roads that reduce the congestion on arterial roads.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena and Sanborn Townships (high priority), City of Alpena, Ossineke Township (medium priority), Wilson and Maple Ridge Townships (low priority), Local Fire Departments, Road County Commission, NEMCOG, Insurance Companies, State, Utility Companies, Federal Government, Landowners, Civic and Church Groups, Medical, Real Estate Companies, Local Businesses

Financial and Technical Resources: Federal Government, Alpena Township, Ossineke Township, Sanborn Township, City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. Implemented when funding is available. This strategy is incorporated into Alpena Township's planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

47. Attend meetings to determine the roles of agencies responding to accidents on Lake Huron.

Priority Level: Low

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena, Wellington, and Wilson Townships (low priority), Local Fire Departments, Police, State, Federal Government, Medical, City of Alpena, Ossineke Township (medium priority)

Financial and Technical Resources: Federal Government, Alpena Township (technical), City of Alpena (technical)

Progress/Status: Ongoing/Long term throughout the entire county. Annual meetings.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. The priority has changed since annual meetings are held.

48. Develop a strategy to bury electrical and phone lines in highly populated areas, when feasible.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Extreme Temperatures (extreme heat and extreme cold), Winter Weather Hazards (sleet and ice storms, and snowstorms), Wildfires, Severe Winds (derecho)

Responsible Agencies: County Emergency Management Office, County, Utility Companies, State, Alpena and Wellington Townships (low priority), Sanborn and Wilson Townships (medium priority),

Financial and Technical Resources: Federal Government, State, Alpena Township (technical)

Progress/Status: Ongoing/Long term in the entire county. Unbudgeted.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is dependent on funding.

Public Education and Awareness Action and Implementation Strategies

The purpose of the public education and awareness action and implementation strategies is to address the strategies related to actions that inform and educate citizens, elected officials, and property owners about hazards and the potential ways to mitigate them. Examples include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs. For each mitigation strategy in this category, the strategies are designed to reduce deaths and injuries, reduce structural damage and deterioration, prevent the interruption of businesses, prevent insurance losses, reduce capital costs for repairs, and reduce the degradation of cultural and natural resources.

1. Develop a strategy to provide the public with “real-time” emergency information.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: County Emergency Management Office, County, State, Local Fire Department

Progress/Status: Ongoing/Long term throughout the entire county. Establishing Facebook and Twitter pages, use of SMART 911/RAVE

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

2. Promote the elimination of clandestine methamphetamine laboratories.

Priority Level: High

Hazards Addressed: Public Health Emergency, Structural Fires, Fixed Site Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, Local Fire Department, Police

Financial and Technical Resources: Federal Government, Local Businesses

Progress/Status: Ongoing/Long term throughout the entire county. Law enforcement's HUNT team is addressing the issue.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

3. Provide safety strategies for flooded areas and severe weather in driver education classes and education materials.

Priority Level: Medium

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Tornadoes, Lightning, Hailstorms

Responsible Agencies: Insurance Companies, Schools

Financial and Technical Resources: Local Businesses, County, State

Progress/Status: Ongoing/Long term throughout the entire county. Continually implemented.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

4. Develop and implement a public education program for all hazards that threaten the county.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, Sanborn and Wellington Townships (high priority), City of Alpena, Alpena, Wilson, Maple Ridge, and Ossineke Townships (medium priority), Green and Long Rapids Townships (low priority), Local Fire Departments, District Health Department, Police, Civic and Church Groups, Insurance Companies, American Red Cross, MSU Extension

Financial and Technical Resources: County, Local Governments, Federal Government, Fire Department (technical), DPW (technical), City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. In Progress, annual public safety days. The City of Alpena has a full-time CRR Office that can support county efforts in conjunction with the City program.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has changed since the strategy is continually reviewed, updated, and implemented.

5. Increase public awareness about the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, Schools, Medical, Civic and Church Groups

Financial and Technical Resources: District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Health Department has a system in place.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

6. Encourage residents to receive immunizations against communicable diseases.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, State, Medical, Civic and Church Groups, American Red Cross

Financial and Technical Resources: District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Health Department has a system in place.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

7. Develop and implement drainage plans for Mud Lake, Devil Lake and Genshaw Golf Course Subdivision. Involve County Drain Commissioner in the development process.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, Alpena and Wellington Townships (medium priority), Insurance Companies, State, Utility Company, Local Businesses, and Real Estate Companies, City of Alpena, Ossineke Township (low priority)

Financial and Technical Resources: Federal Government, County, Alpena Township, State, NEMCOG, City of Alpena (technical: mapping within the city)

Progress/Status: Ongoing/Long term throughout the entire county. A study was completed by the Army Corps of Engineer; however, funding was denied. Alpena Township is the lead responsible agency.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed; however, there is no funding available.

8. Educate the public and implement steps to encourage a "shelter in place" response to Hazmat incidents.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Information is distributed at public events and disseminated through media outlets.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has changed since public awareness has the potential to reduce the hazard's impact.

9. Develop and conduct public education about Tier II sites and products.

Priority Level: Low

Hazards Addressed: Fixed Site Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a priority 5. The priority was changed to streamline the plan.

10. Coordinate the countywide wildfire education program through the distribution of materials via mail and school presentations.

Priority Level: Medium

Hazards Addressed: Wildfires

Responsible Agencies: County Emergency Management Office, Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources, Schools

Financial and Technical Resources: Federal Government, County, State, Local Governments

Progress/Status: Ongoing/Long term throughout the entire county. Presentations target third graders.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has changed since public awareness has the potential to reduce wildfires.

11. Expand community awareness about evacuation plans.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Sabotage/Terrorism/Nuclear Attack, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, Alpena, Wilson, Wellington, and Ossineke Townships (medium priority), Local Fire Departments, City of Alpena, Long Rapids Township (low priority), Maple Ridge Township (high priority)

Financial and Technical Resources: Federal Government, Local Fire Departments (technical), DPW (technical), Ossineke Township, City of Alpena (funding for the city only; technical: planning and mapping), County Emergency Management Office

Progress/Status: Ongoing/Long term throughout the entire county. Facebook and County website postings. The City of Alpena incorporates this strategy into its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

12. Continue maintenance and implementation of the addressing program using the adopted countywide structure addressing ordinance.

Priority Level: Low

Hazards Addressed: Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Wildfires, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena and Wilson Townships (low priority), Ossineke Township (medium priority), Sanborn Township (high priority)

Financial and Technical Resources: County, Alpena Township, Ossineke Township, Sanborn Township, City of Alpena (technical: staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Updating GIS system, County is enforcing ordinance depending on funding. Alpena Township has been providing signs for years. The City of Alpena incorporates this strategy into its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed, updated, and implemented.

13. Continue encouraging residents to develop a Family Disaster Plan, including the preparation of a Disaster Supplies Kit.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, American Red Cross

Financial and Technical Resources: Federal Government, Civic and Church Groups, American Red Cross, County, District Health Department

Progress/Status: Ongoing/Long term throughout the entire county. Information distributed through Facebook Posts and at Public Safety Days.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

14. Increase public awareness about radon dangers and the prevention efforts taken to reduce radon concentrations in homes and buildings.

Priority Level: Low

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department

Financial and Technical Resources: Federal Government, District Health Department

Progress/Status: Ongoing/Long term throughout the entire county. Health Department has a system in place.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

15. Encourage residents to take advantage of the local recycling opportunities (e.g. chemical, tires, electronics, etc.) to control and clean up pollution.

Priority Level: Low

Hazards Addressed: Public Health Emergency, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, District Health Department, Schools, Federal Government, Local Businesses, State

Financial and Technical Resources: District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

16. Promote communities joining the National Flood Insurance Program (NFIP).

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena Township (medium priority), Green, Wellington, and Wilson Townships (low priority), Sanborn Township (high priority), Insurance Companies, Real Estate Company

Financial and Technical Resources: Federal Government, Alpena Township (technical), Sanborn Township, City of Alpena (technical)

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township has been participating since 1983. City of Alpena, and Green and Sanborn Townships participate. Ossineke Township does not participate after reviewing the program and the community's conditions. Long Rapids Township does not participate in NFIP since it is not in a designated flood zone. DNR controls floodplain management program in Maple Ridge Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually evaluated and implemented.

17. Increase public awareness about the need for permits (Part 31 of NREPA) to build in floodplain areas.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, Alpena Township (high priority), State, Green, Wilson, Long Rapids, Maple Ridge, and Ossineke Townships (low priority), City of Alpena (medium priority)

Financial and Technical Resources: Federal Government, State, Alpena Township

Progress/Status: Ongoing/Long term throughout the entire county. Strategy is implemented in Alpena Township and the building official provides technical assistance. Green Township addresses the strategy through zoning.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

18. Produce and distribute family emergency preparedness information and wildfire education materials.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Tornadoes, Oil and Gas Accidents (well and pipeline), Lightning, Scrap Tire Fires, Hailstorms

Responsible Agencies: County Emergency Management Office, American Red Cross, Alpena, Wellington, Wilson, and Ossineke Townships (low priority), Sanborn and Maple Ridge Townships (high priority)

Financial and Technical Resources: State, Federal Government, Local Fire Departments, County Emergency Management Office, County, Alpena Township (technical), Sanborn Township, Maple Ridge Township

Progress/Status: Ongoing/Long term throughout the entire county. Distribution of information at Public Safety Days and schools.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

19. Identify and organize outreach efforts for vulnerable and special needs populations.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Scrap Tire Fires, Hailstorms

Responsible Agencies: County Emergency Management Office, District Health Department, Civic and Church Groups, American Red Cross

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since the strategy is in place and is continually reviewed and updated.

20. Encourage and implement increased coverage and use of NOAA Weather Radios to notify the community during an emergency.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, National Weather Service

Financial and Technical Resources: Federal Government, County, Local Governments

Progress/Status: Ongoing/Long term throughout the entire county. Radio purchase is unbudgeted.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed.

Property Protection Action and Implementation Strategies

The purpose of the property protection action and implementation strategies is to address the strategies related to actions involved in the modification of existing buildings or structures to protect them from a hazard or remove them from a hazardous area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass. For each mitigation strategy in this category, the strategies are designed to reduce structural damage and deterioration, prevent the interruption of businesses, prevent insurance losses, and reduce capital costs for repairs.

1. Coordinate with the health department and local communities to assure proper location, installation, cleaning, monitoring, and maintenance of septic tanks.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Public Health Emergency

Responsible Agencies: Alpena Township (high priority), Ossineke and Wilson Townships (medium priority), Green and Wellington Townships (low priority), District Health Department

Financial and Technical Resources: Federal Government, Alpena Township (technical; assessing, building and DPW departments),

Progress/Status: Ongoing/Long term throughout the entire county. Implemented within software.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has changed since the strategy has become more of a focus.

2. Dredge and clear sediment and debris from drainage channels.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, State, Federal Government, Landowners, Alpena and Ossineke Townships (medium priority), Sanborn Township (high priority), City of Alpena, Wellington Township (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW (technical), Road Commission (technical), Sanborn Township

Progress/Status: Ongoing/Long term throughout the entire county. Dredging is performed, as needed.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually reviewed and implemented.

3. Promote the creation of defensible space around structures in fire-prone wildland areas.

Priority Level: Medium

Hazards Addressed: Wildfires, Scrap Tire Fires

Responsible Agencies: Alpena, Wilson, Long Rapids, and Green Townships (low priority), Sanborn Township (medium priority), Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources, Landowners

Financial and Technical Resources: County, Local Fire Departments, State, Green Township

Progress/Status: Ongoing/Long term throughout the entire county. Current practice in Green Township. Sanborn Township incorporates the strategy in its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

4. Promote and implement fuel management by thinning/selective thinning of vegetation, creating fuel breaks, and using fire-retardant materials/vegetation.

Priority Level: Medium

Hazards Addressed: Wildfires, Scrap Tire Fires

Responsible Agencies: Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: State

Progress/Status: Ongoing/Long term throughout the entire county. Conducted by State fire service.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

5. Inventory and secure debris, yard items or stored objects (including oil, gasoline and propane tanks, and paint and chemical barrels).

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Tornadoes

Responsible Agencies: County Emergency Management Office, Alpena, Wilson, Sanborn, Maple Ridge, and Green Townships (low priority), Local Fire Department, Landowners, City of Alpena (medium priority)

Financial and Technical Resources: Federal Government, Alpena Township

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township is improving containment. No progress in Green Township. The City of Alpena incorporates the strategy into its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

6. Conduct an annual review of available sand, sandbags and other related materials based on long range forecasts.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government, State

Progress/Status: Ongoing/Long term throughout the entire county. Materials are being purchased; MOU is set up.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually evaluated and implemented.

Natural Resource Protection Action and Implementation Strategies

The purpose of the natural resource protection action and implementation strategies is to address the strategies related to actions that minimize hazard losses and preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation. For each mitigation strategy in this category, the strategies are designed to reduce deaths and injuries, reduce structural damage and deterioration, prevent the interruption of businesses, prevent insurance losses, reduce capital costs for repairs, and reduce the degradation of cultural and natural resources.

1. Seek support and funding to clean up environmental contamination sites.

Priority Level: Medium

Hazards Addressed: Public Health Emergency, Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County, Federal Government, Local Businesses, State

Financial and Technical Resources: District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Funding assistance from EGLE.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

2. Explore cost-sharing alternatives between government and private entities to address the ongoing drainage and flooding issues in Fletcher Creek and the adjoining watersheds.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Sanborn Township (medium priority), Alpena and Ossineke Townships (low priority), State, Landowners, Local Businesses

Financial and Technical Resources: Federal Government, County Emergency Management Office, Federal Government, County, City of Alpena (funding for the city only; technical), Alpena Township, Landowners, State

Progress/Status: Ongoing/Long term in the City of Alpena and Alpena Township. The Drain Commissioner is the lead responsible agency.

Previous Plans: This item has been retained from the 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy will be implemented depending on funding.

Emergency Services Action and Implementation Strategies

The purpose of the emergency services action and implementation strategies is to address the strategies related to actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities. For each mitigation strategy in this category, the strategies are designed to reduce deaths and injuries and reduce the interruption of businesses.

1. Continue cooperative efforts between the County Equalization Department and County 911 program.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Wildfires, Tornadoes, Oil and Gas Accidents (well and pipeline)

Responsible Agencies: County Emergency Management Office, Alpena, Long Rapids, Maple Ridge, and Green Townships (low priority), Ossineke and Wellington Townships (medium priority), City of Alpena, Sanborn and Wilson Townships (high priority), Utility Company

Financial and Technical Resources: Federal Government, County, State, Alpena Township (in-house assessing department), Ossineke Township, Wilson Township, Local Fire Departments

Progress/Status: Ongoing/Long term throughout the entire county. Continually making 911 mapping corrections. Alpena Township is updating and maintaining records and producing address signs. The City of Alpena does not have available funding; however, do incorporate this strategy into their planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually evaluated and updated.

2. Continue upgrade protocols in Central Dispatch.

Priority Level: High

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Public Health Emergency, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Drought, Scrap Tire Fires, Hailstorms, Civil Disturbance, and Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Police, Medical

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Continually evaluating and updating protocols.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually evaluated and updated.

3. Promote media broadcasts of fire weather and warnings.

Priority Level: High

Hazards Addressed: Wildfires

Responsible Agencies: County Emergency Management Office, Alpena and Wilson Townships (medium priority), Sanborn and Maple Ridge Townships (high priority), City of Alpena, Green, Wellington, Long Rapids, and Ossineke Townships (low priority), Local Fire Departments

Financial and Technical Resources: County Emergency Management Office, County, Alpena Township (technical), Sanborn Township, Long Rapids Township, Maple Ridge Township

Progress/Status: Ongoing/Long term throughout the entire county. Social media postings, NWS alerts and use of warning sirens. Sanborn Township incorporates the strategy in its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since public awareness has the potential to reduce wildfires.

4. Encourage all fire agencies to mandate S-130, S-190, and S-215 wildland firefighter training and any necessary refresher training updates.

Priority Level: High

Hazards Addressed: Wildfires

Responsible Agencies: County Emergency Management Office, County, Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, County Emergency Management Office, U.S. Forest Service, Michigan Department of Natural Resources, State

Progress/Status: Ongoing/Long term throughout the entire county. Program is in the early development stage.

Previous Plans: Not applicable; This item has been added to the 2021 Hazard Mitigation Plan.

5. Develop a consistent training strategy to support the response to all 302 sites and non-302 sites by the appropriate entities.

Priority Level: High

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure

Responsible Agencies: County Emergency Management Office, Local Government

Financial and Technical Resources: County Emergency Management Office, Local Government

Progress/Status: Ongoing/Long term throughout the entire county. Beginning stages of strategy development.

Previous Plans: Not applicable; This item has been added to the 2021 Hazard Mitigation Plan.

6. Inventory and update equipment in the hazardous material response trailer (located at CRTC Fire).

Priority Level: High

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, CRTC Fire, Alpena City Fire

Financial and Technical Resources: County Emergency Management Office, CRTC Fire, Alpena City Fire

Progress/Status: Ongoing/Long term throughout the entire county. Seeking funding to update equipment.

Previous Plans: Not applicable; This item has been added to the 2021 Hazard Mitigation Plan.

7. Build alliances with surrounding counties to improve 911 redundancies.

Priority Level: High

Hazards Addressed: Infrastructure failure

Responsible Agencies: County Emergency Management Office, County

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Finalizing PSIC project for virtual consolidation of Alpena and Alcona 911 Centers.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

8. Maintain trained, equipped, and prepared local hazardous materials emergency response teams.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena, Wilson, Long Rapids, and Ossineke Townships (medium priority), Sanborn Township (high priority), Local Fire Departments, Wellington and Maple Ridge Townships (low priority)

Financial and Technical Resources: County, Federal Government, Local Fire Departments, Sanborn Township, Long Rapids Township, City of Alpena (funding, technical: staff support and equipment)

Progress/Status: Ongoing/Long term throughout the entire county. CRTC has a trained team. Sanborn Township incorporates the strategy in its planning process. The City of Alpena works with the CRTC and ATFD.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

9. Provide training, planning, and preparedness for mass casualty incidents involving all modes of public transportation.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Transportation Hazardous Materials Accidents, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena, Maple Ridge, and Wilson Townships (high priority), Ossineke, Wellington, Long Rapids, and Sanborn Townships (medium priority), Green Township (low priority), Local Fire Department, Police, Local Businesses, American Red Cross, Medical, Schools

Financial and Technical Resources: Federal Government, Alpena Township (technical), Ossineke Township, Police, Local Fire Departments, EMS (technical), Long Rapids Township, Maple Ridge Township

Progress/Status: Ongoing/Long term throughout the entire county. Continually implemented. Alpena Township incorporates the strategy in its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has changed since the strategy is in place and is continually implemented.

10. Promote and implement solutions to keep roads and driveways accessible for fire equipment.

Priority Level: Medium

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Road Commission, City of Alpena, Alpena, Long Rapids, and Green Townships (low priority), Sanborn and Wilson Townships (medium priority), Ossineke, Maple Ridge, and Wellington Townships (high priority)

Financial and Technical Resources: Federal Government, State, Alpena Township (technical), Ossineke Township, Sanborn Township, Maple Ridge Township, Police, City of Alpena (technical: code enforcement)

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township has incorporated this strategy in its new zoning ordinance and in its IFC 2015. Sanborn address the strategy through its zoning. The City of Alpena currently has this strategy under budget consideration.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

11. Continue to expand the countywide siren system.

Priority Level: Medium

Hazards Addressed: Severe Winds (derecho), Tornadoes, Hailstorms

Responsible Agencies: County Emergency Management Office, County, Alpena Township (high priority), Ossineke, Wilson, Maple Ridge, and Sanborn Township (medium priority), Local Fire Departments, City of Alpena, Green and Long Rapids Townships (low priority)

Financial and Technical Resources: Federal Government, Ossineke Township, Sanborn Township, City of Alpena (technical: staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township has a siren at the township hall and at U.S. 23 South and Bare Pointe. Sanborn Township incorporates this strategy in its planning process.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

12. Develop and conduct exercises for a dam failure.

Priority Level: Medium

Hazards Addressed: Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena, Wellington, and Wilson Townships (medium priority), Ossineke Township (low priority), Local Fire Department, Medical, Maple Ridge Township (high priority)

Financial and Technical Resources: Federal Government, City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. Annual fire department training. The City of Alpena has active staff participation.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The action item was modified from focusing only on the hospital to focusing on all affected areas.

13. Provide trained, equipped, and prepared search and rescue teams.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Dam Failure, Wildfires, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, Ossineke, Maple Ridge, and Sanborn Townships (high priority), Alpena, Wellington, Long Rapids, and Wilson Townships (medium priority), City of Alpena, Green Township (low priority), Local Fire Departments

Financial and Technical Resources: District Health Department, Federal Government, State, County, American Red Cross, Civic and Church Groups, Alpena Township (technical: provide training), Green Township, Ossineke Township, Sanborn Township, Long Rapids Township, Local Fire Departments (technical), Maple Ridge Township, City of Alpena (technical: logistics, equipment/apparatus, medical support, manpower)

Progress/Status: Ongoing/Long term throughout the entire county. Sheriff's Office established and maintains a well-trained SAR team. Alpena Township incorporates this strategy into its planning process and through its fire department staff. Green Township has trained air boat operators and provides assistance, when necessary. Sanborn and Long Rapids Townships incorporate the strategy in its planning process. The City of Alpena cooperates with the Sheriff Office's search and rescue team.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

14. Conduct multi-agency, inter-county emergency management response exercises for fire suppression.

Priority Level: Medium

Hazards Addressed: Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, Alpena, Wilson, Long Rapids, and Sanborn Townships (medium priority), City of Alpena, Wellington and Maple Ridge Townships (low priority), Local Fire Departments, Police, State

Financial and Technical Resources: State, Federal Government, County Emergency Management Office, Local Fire Departments, Sanborn Township, Long Rapids Township, City of Alpena (funding, technical: staff support/participation)

Progress/Status: Ongoing/Long term throughout the entire county. In Progress.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

15. Provide a training exercise for gasoline or propane accidents.

Priority Level: Medium

Hazards Addressed: Oil and Gas Accidents (well and pipeline)

Responsible Agencies: State

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

16. Provide training for airfield emergencies involving all county fire departments.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Structural Fires, Sabotage/Terrorism/Nuclear Attack, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Sanborn Township (high priority), Alpena, Maple Ridge, and Wilson Townships (medium priority), Ossineke and Long Rapids Townships (low priority), Local Fire Departments, Police, State, EMS

Financial and Technical Resources: Federal Government, Alpena Township, Local Fire Departments, Maple Ridge Township, City of Alpena (funding, technical: active participation)

Progress/Status: Ongoing/Long term throughout the entire county. Exercise was held in 2019.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

17. Review the needs of the Alpena Area Hazmat team and the team's interaction with area fire agencies, air base, City, and Alpena Township.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, Alpena and Maple Ridge Townships (high priority), City of Alpena, Wilson, Long Rapids, and Wellington Townships (medium priority), Green and Ossineke Townships (low priority), Local Fire Departments

Financial and Technical Resources: Federal Government, Alpena Township, Local Fire Departments, Long Rapids Township, Maple Ridge Township, City of Alpena (funding, technical: staff, equipment, expertise, active participation)

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a priority 3. The priority was changed to streamline the plan.

18. Provide annual training to County Fire Departments regarding on-site products and how they are handled.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents

Responsible Agencies: County Emergency Management Office, Local Fire Departments

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Airbase is the lead responsible agency.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually evaluated and implemented.

19. Inventory current heavy equipment, wreckers and jaws units within 30 minutes of county locations.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline)

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Annual reviews.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

20. Review inventory and provide back-up generators to maintain community infrastructure at acceptable operating levels during extended power failures.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter

Weather Hazards (sleet and ice storms, and snowstorms), Dam Failure, Wildfires, Severe Winds (derecho), Sabotage/Terrorism/Nuclear Attack, Tornadoes, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Lightning, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena and Maple Ridge Townships (high priority), Ossineke, Long Rapids, and Wilson Townships (medium priority), Utility Companies

Financial and Technical Resources: Local Businesses, Federal Government, Alpena Township, Ossineke Township, Wilson Township, Long Rapids Township, City of Alpena (funding for within city and city infrastructure)

Progress/Status: Ongoing/Long term throughout the entire county. Generators are installed and regularly serviced for 911, communications, and the District Health Department. Wilson Township is working on setting up generators to power the Fire Hall and Township Hall (under budget consideration). DPW has back-up generators. Both halls have back-up generators in Long Rapids Township. Maple Ridge Township has a back-up generator for its fire department.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed, updated, and maintained.

21. Maintain equipment for road closures and traffic control.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Transportation Hazardous Materials Accidents, Dam Failure, Wildfires, Transportation Accidents (air/land/water), Oil and Gas Accidents (well and pipeline), Scrap Tire Fires, Civil Disturbance

Responsible Agencies: County Emergency Management Office, County, Alpena and Long Rapids Townships (medium priority), Ossineke, Wellington, and Wilson Townships (low priority), Local Fire Departments, County Road Commission, City of Alpena, Maple Ridge Township (high priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, Long Rapids Township, Local Fire Departments (technical), City of Alpena (funding for the city only)

Progress/Status: Ongoing/Long term throughout the entire county. Signage Trailer in place and available for major events. The City of Alpena's Public Works Department maintains an inventory of signs and barricades.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

22. Develop a location inventory list and maintain shelter agreements with American Red Cross and local entities.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Extreme Temperatures (extreme heat and extreme cold), Riverine, Flash, and Urban Flooding, Winter Weather Hazards (sleet and ice storms, and snowstorms), Structural Fires, Dam Failure, Wildfires, Tornadoes, Oil and Gas Accidents (well and pipeline), Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Alpena and Maple Ridge Townships (high priority), City of Alpena, Sanborn, Wellington, Ossineke, and Wilson Townships (medium priority), Civic and Church Groups, Salvation Army, American Red Cross, Long Rapids Township (low priority)

Financial and Technical Resources: Civic and Church Groups, County, Alpena Township, Long Rapids Township, Maple Ridge Township, City of Alpena (technical: staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Alpena Township's office is a shelter. Maple Ridge Township has been incorporating this strategy for many years.

Previous Plans: This item has been retained from the 2014 plan, in which it was classified as a medium priority. The priority has changed since the strategy is in place and is continually reviewed and updated.

23. Provide training to fire and emergency personnel to respond to a fuel explosion, fire, or other maritime accident at local marinas.

Priority Level: Low

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Local Fire Departments, State

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since the strategy is covered under another action item.

24. Provide training for large, industrial-related fires.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Structural Fires

Responsible Agencies: County Emergency Management Office, County, Local Fire Departments

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

25. Increase the use of the Alpena CRTC Regional Fire Training Center for county fire departments.

Priority Level: Low

Hazards Addressed: Structural Fires, Fixed Site Hazardous Materials Accidents, Transportation Hazardous Materials Accidents, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Medical

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

26. Identify and review locations where ships can be off-loaded or boarded in case of fire.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Structural Fires, Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, City of Alpena, Alpena and Wellington Townships (low priority), Wilson Township (medium priority), Local Fire Departments, Police, Federal Government, Medical, Local Businesses

Financial and Technical Resources: Federal Government, Local Fire Departments, City of Alpena (technical: active participation)

Progress/Status: Ongoing/Long term throughout the entire county and Alpena Township. Currently under review.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed.

27. Organize and provide a heavy jet training exercise.

Priority Level: Low

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, Alpena and Maple Ridge Townships (low priority), Local Fire Departments, Police, State, Medical, City of Alpena, Wilson and Long Rapids Townships (medium priority)

Financial and Technical Resources: Federal Government, Local Fire Departments, Long Rapids Township, EMS, Maple Ridge Township, City of Alpena (funding, technical: active participation, staff support)

Progress/Status: Ongoing/Long term throughout the entire county. Limited risk in Green Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually implemented.

28. Provide training to firefighters, police and first responders for school bus and commercial bus accidents.

Priority Level: Low

Hazards Addressed: Transportation Accidents (air/land/water)

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena, Wilson, Long Rapids, and Ossineke Townships (medium priority), Sanborn and Maple Ridge Townships (high priority), Green and Wellington Townships (low priority), Local Fire Departments, Police, Schools

Financial and Technical Resources: Federal Government, Alpena Township, Local Fire Departments, Sanborn Township, Long Rapids Township, Maple Ridge Township, City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. Strategy is implemented in Alpena Township. No progress in Green Township. Maple Ridge Township does ongoing training. Strategy completed in the City of Alpena.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has changed since the strategy is in place and continually implemented.

Structural Projects Action and Implementation Strategies

The purpose of the structural projects action and implementation strategies is to address the strategies related to actions involving the construction of structures to reduce the impact from a hazard. Examples include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms. For each mitigation strategy in this category, the strategies are designed to reduce deaths and injuries, reduce structural damage and deterioration, prevent the interruption of businesses, prevent insurance losses, reduce capital costs for repairs, and reduce the degradation of cultural and natural resources.

1. Review and develop strategies to ensure there are redundancies in the utility and communication systems, especially "lifeline" systems.

Priority Level: High

Hazards Addressed: Infrastructure failure

Responsible Agencies: County Emergency Management Office, County, Local Fire Departments, State

Financial and Technical Resources: Federal Government, Local Businesses

Progress/Status: Ongoing/Long term throughout the entire county. Established RACES/ARES programs. County uses 800 MHz system.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a high priority. The priority has not changed since the strategy is continually evaluated and updated.

2. Develop an integrated water supply system using multi-tankers and well-established water supply locations with year-round access.

Priority Level: High

Hazards Addressed: Infrastructure failure, Structural Fires, Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, Sanborn Township (high priority), Alpena, Wilson, Wellington, Long Rapids, and Ossineke Townships (medium priority), American Red Cross, District Health Department, City of Alpena, Maple Ridge Township (low priority)

Financial and Technical Resources: State, Federal Government, Alpena Township, Local Fire Departments, Sanborn Township, Wellington Township, Long Rapids Township, City of Alpena (technical: active participation)

Progress/Status: Ongoing/Long term throughout the entire county. Cooperation between departments. Alpena Township incorporates this strategy into their planning process. Not an issue in Green Township. No available funding in Wellington Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. The priority has not changed since the strategy is continually implemented.

3. Identify key transmission and collection mains within the utility infrastructure with bypass or alternate capacity plans.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Oil and Gas Accidents (well and pipeline)

Responsible Agencies: County Emergency Management Office, City of Alpena, Alpena Township (high priority), Ossineke Township (low priority)

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW, City of Alpena

Progress/Status: Ongoing/Long term in the City of Alpena and Alpena Township. Implemented with ongoing work with the utility liaison.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented.

4. Identify electrical systems that will fail due to overload and develop a “rolling blackout” strategy.

Priority Level: Medium

Hazards Addressed: Infrastructure failure

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments

Financial and Technical Resources: Federal Government, Local Governments, District Health Department, County, American Red Cross, Civic and Church Groups,

Progress/Status: Ongoing/Long term throughout the entire county. Liaison with the Power Company.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually reviewed and updated.

5. Seek funding to provide the necessary crowd control measures for a public health emergency and the necessary storage when the equipment is not in use.

Priority Level: Medium

Hazards Addressed: Public Health Emergency, Civil Disturbance

Responsible Agencies: Sanborn and Maple Ridge Townships (high priority), District Health Department, Federal Government, State, Wilson Township (medium priority), Long Rapids Township (low priority)

Financial and Technical Resources: District Health Department, Federal Government, State, County, Police, Long Rapids Township

Progress/Status: Ongoing/Long term throughout the entire county. Seeking funding.

Previous Plans: Not applicable; This item has been added to the 2021 hazard mitigation plan.

6. Identify and review possible sites for drainage easements.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, Alpena Township (medium priority), Green and Ossineke Townships (low priority), County Road Commission, State, Sanborn Township (high priority)

Financial and Technical Resources: County, Alpena Township, DPW (technical), Road Commission (technical)

Progress/Status: Ongoing/Long term throughout the entire county. The Drain Commissioner is the lead responsible agency. Alpena Township incorporates this strategy in its planning process and works with the road commission. No progress in Green Township.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy is continually evaluated and implemented.

7. Evaluate the capacity of the existing stormwater drainage system and improve where necessary.

Priority Level: Medium

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding

Responsible Agencies: County Emergency Management Office, County, Alpena Township (low priority), County Road Commission, State, City of Alpena (high priority)

Financial and Technical Resources: Federal Government, State, DPW (technical), City of Alpena

Progress/Status: Ongoing/Long term throughout the entire county. The Drain Commissioner is the lead responsible agency. Alpena Township works jointly with the City of Alpena.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. The priority has not changed since the strategy will be continually implemented.

8. Maintain a community public health system with sufficient disease monitoring and surveillance capabilities to protect the population from large-scale outbreaks.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, Federal Government, State, Medical

Financial and Technical Resources: District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Health Department has a system in place.

Previous Plans: This item has been retained from the 2005 and 2014 plan, in which it was classified as a medium priority. The priority has not changed since the strategy is continually implemented and updated, as needed.

9. Develop a plan to elevate mechanical and utility devices above expected flood levels.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Dam Failure

Responsible Agencies: County Emergency Management Office, County, City of Alpena, Alpena Township (medium priority), Ossineke, Wellington, and Wilson Townships (low priority), State, Utility Company, Medical

Financial and Technical Resources: Federal Government, State, Alpena Township, DPW (technical), City of Alpena (funding for city facilities; technical)

Progress/Status: Ongoing/Long term throughout the entire county. No funding available. Alpena Township incorporates this strategy into its planning process and has partially implemented it.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually evaluated and implemented.

10. Research and improve location, design and maintenance of water and sewer systems, including the insulation of critical components to prevent damage from ground freeze.

Priority Level: Low

Hazards Addressed: Infrastructure failure, Extreme Temperatures (extreme heat and extreme cold), Winter Weather Hazards (sleet and ice storms, and snowstorms)

Responsible Agencies: County Emergency Management Office, City of Alpena, Alpena and Sanborn Townships (high priority)

Financial and Technical Resources: State, Federal Government, Alpena Township, DPW staff, Sanborn Township, City of Alpena (funding, technical: data)

Progress/Status: Ongoing/Long term in throughout the county. Implemented in Alpena Township. The City of Alpena has been working on this strategy and it is currently under budget consideration.

Previous Plans: This item has been retained from the 2014 plan, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed and updated.

11. Establish safe and appropriate locations for temporary debris disposal sites.

Priority Level: Low

Hazards Addressed: Great Lakes Shoreline Flooding and Erosion, Riverine, Flash, and Urban Flooding, Structural Fires, Fixed Site Hazardous Materials Accidents, Dam Failure, Wildfires, Severe Winds (derecho), Tornadoes, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, County, County Road Commission, County, Alpena Township (medium priority), County Road Commission, State, Ossineke and Wilson Townships (low priority)

Financial and Technical Resources: Federal Government, State, Fire Department (technical), DPW (technical)

Progress/Status: Ongoing/Long term in the entire county. Continual review of locations. Abundant open space throughout the county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. The priority has not changed since the strategy is continually reviewed and updated, if necessary.

Mitigation Action and Implementation Strategies Removed from the 2021 Plan and all Future Plans

1. Train local officials on flood fighting, floodplain management, and flood proofing.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments, County Road Commission, State, Utility Company, American Red Cross

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. A soil erosion specialist has been hired to implement this strategy.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

2. Develop and implement a strategy to plot all Tier II sites in GIS and Hazard Mitigation software.

Priority Level: High

Responsible Agencies: County Emergency Management Office, Local Fire Departments, State

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Strategy has been completed.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a priority 4.

3. Enforce community and operator compliance with oil/gas industry safety regulations and standards.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, State

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Strategy falls under State jurisdiction.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

4. Implement virtual 911 consolidation efforts with Alcona County.

Priority Level: High

Responsible Agencies: County Emergency Management Office, County

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Partnership with Roscommon, Crawford, Otsego, and Oscoda Counties.

Previous Plans: This item had been retained from the 2014 plan, in which it was classified as a high priority.

5. Expand community support for free or reduced-expense clinics and school health services.

Priority Level: Medium

Responsible Agencies: County, Local Governments, District Health Department, State, Medical, Civic and Church Groups

Financial and Technical Resources: District Health Department

Progress/Status: Removed for the entire county. Unbudgeted

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

6. Develop housing/landlord codes to enforce heating requirements.

Priority Level: Low

Responsible Agencies: Local Governments

Financial and Technical Resources: County, Local Governments, Local Businesses, State

Progress/Status: Removed for the entire county.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a low priority.

7. Improve and/or enact landlord/tenant ordinances.

Priority Level: Low

Responsible Agencies: City of Alpena

Financial and Technical Resources: County, City of Alpena, State

Progress/Status: Removed for the City of Alpena. City has ordinance in place.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a low priority.

8. Develop real estate disclosure laws that identify a home's location within a dam's hydraulic shadow.

Priority Level: Low

Responsible Agencies: County Emergency Management Office, Local Governments, Real Estate Companies

Financial and Technical Resources: Local Businesses

Progress/Status: Removed for the entire county. Unable to be implemented.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a low priority.

9. Meet with local industries from surrounding counties to determine the type of products that are transported over county highways and provide the information to the local HAZ/MAT team and fire agencies.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Local Governments, Local Fire Departments, Police, State, Federal Government, Medical

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Unable to be implemented.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

10. Provide a training exercise about a 60-person accident involving a passenger bus.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments, Police, National Weather Service, Schools

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Not relevant to the county.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

11. Program load type into Hazard Mitigation software and develop pre-evacuation plans by material type.

Priority Level: Low

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Police

Financial and Technical Resources: Federal Government

Progress/Status: Removed for the entire county. Completed.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a low priority.

12. Review and develop programs to raise community awareness on proper installation and maintenance of heating systems.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Local Governments

Financial and Technical Resources: Federal Government, Local Fire Departments

Progress/Status: Removed for the entire county. Countywide inspection of rental properties in place. Annual public awareness at Public Safety Day Events.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

13. Communicate information to the public about handy household items that can be used as fire tools.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Local Fire Departments

Financial and Technical Resources: Civic and Church Groups, County, Insurance Companies, Local Governments

Progress/Status: Removed for the entire county. Countywide inspection of rental properties in place. Annual public awareness at Public Safety Day Events.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

14. Identify communities or neighborhoods to develop “Firewise” demonstration projects.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Local Governments, Local Fire Departments, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, State

Progress/Status: Removed for the entire county. Firewise program did not take off in the county.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

15. Develop and implement a strategy to introduce “Firewise” program in at-risk communities.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Local Governments, Local Fire Departments, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, State

Progress/Status: Removed for Ossineke, Maple Ridge, and Wilson Townships. Firewise program did not take off in the county.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

16. Develop a program to inspect campsites in public forest areas to ensure safe open fires, where allowed.

Priority Level: Medium

Responsible Agencies: Local Governments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: State, Local Fire Departments, Local Governments, County

Progress/Status: Removed throughout the entire county. Program in place.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

17. Organize neighborhood wildfire safety coalitions to determine how to work together and prevent wildfires.

Priority Level: Low

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments

Financial and Technical Resources: County Emergency Management Office, County, Local Governments

Progress/Status: Removed from Ossineke, Maple Ridge, and Wilson Townships.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a low priority.

18. Study and support pre-arranged shelters for stranded motorists, travelers, and others.

Priority Level: Medium

Responsible Agencies: County Emergency Management Office, Civic and Church Groups, American Red Cross

Financial and Technical Resources: County Emergency Management Office, County, Local Governments

Progress/Status: Removed from the entire county.

Previous Plans: This item had been retained from the 2005 and 2014 plans, in which it was classified as a medium priority.

Chapter 9 Plan Maintenance

Implementation, Monitoring, and Evaluation

The Alpena County Board of Commissioners (BOC) and the Alpena County Emergency Management Office (EM) are the primary entities responsible for implementing the Alpena County Hazard Mitigation Plan. The BOC will need to evaluate funding and staffing required to implement the hazard mitigation plan since the current resources, both staff and financial, may not accommodate the expanded role of the EM and the Alpena County Local Planning Team (LPT). GIS data sets and maps will be updated and maintained by the local governments for future use in the implementation and monitoring of hazard mitigation activities.

The LPT meets on a regular basis to carry out its duties and has expanded its role to function as the Hazard Mitigation Committee (HMC). The HMC and the Emergency Services Coordinator/911 Director will be responsible for monitoring and overseeing the implementation of the hazard mitigation plan. Staff support will be provided by the EM and will coordinate with the BOC. Once projects are supported and approved by the BOC, the EM will seek funding. The Emergency Services Coordinator/911 Director will provide program administration and project oversight. Additional emergency management staff time will be required to assist the HMC in completing its duties.

The roles related to the HMC may be defined/re-defined by the committee. The HMC will develop a five year project list from the mitigation strategies identified in the Alpena County Hazard Mitigation Plan, and will perform an annual review of the hazard mitigation plan to determine what projects have been accomplished and to add new projects to the five year action list. The HMC will recommend projects to the full membership of the LPT and the Emergency Services Coordinator/911 Director will submit HMC projects to the BOC for approval and support. The HMC may also assist other agencies in accomplishing projects, such as determining overall costs and funding sources, identifying the staff and agencies required to complete the project, and determining timelines. The HMC may also establish an annual work plan, support grant writing to seek funding to complete projects, address specific issues and circumstances arising from an event that caused a disaster declaration, evaluate the need for new projects and amend the hazard mitigation plan, review reports from agencies involved in implementing mitigation projects, prepare an annual mitigation activity report for the BOC, and function as a clearinghouse for mitigation grant applications. During the hazard mitigation plan update process, the HMC will advertise and facilitate two public meetings to obtain input from the general public, businesses, townships, and agencies. A notice will be posted to advertise any meeting of the HMC where the committee will be reviewing and/or updating the mitigation plan.

Additionally, the HMC and the EM will be responsible for evaluating the effectiveness of the plan during the five-year update or more often, if necessary. The evaluation will keep the hazard mitigation plan current and will include an assessment about whether the goals and objectives address current and expected conditions, and whether the risks have changed in nature, magnitude, or type. The evaluation will also address the current available resources for plan implementation, implementation issues, favorable outcomes, and the participation levels from other agencies and stakeholders.

Local governments, county departments, and local, state and federal agencies will have the ability to propose projects and sponsor projects identified in the hazard mitigation plan. Partnerships with the following agencies and organizations will strengthen the county’s hazard mitigation program to efficiently leverage available resources:

- Alpena County Departments
- Ossineke Township
- Sanborn Township
- Green Township
- Maple Ridge Township
- Alpena Township
- Long Rapids Township
- Wellington Township
- Wilson Township
- The City of Alpena
- City and Township Fire Departments
- Alpena-Montmorency Conservation District
- Alpena County Road Commission
- Northeast Michigan Council of Governments
- Michigan Department of Natural Resources
- Michigan Department of Environment, Great Lakes, and Energy
- U.S. Forest Service
- Michigan State University Extension
- Michigan Department of Agriculture and Rural Development
- Natural Resource Conservation Service
- District Health Department
- American Red Cross
- Insurance Companies
- Real Estate Companies
- Local Businesses
- Civic Groups and Churches

Integration

Alpena County, the City of Alpena, all townships in Alpena County, and local and state agencies will consider integrating information from the hazard mitigation plan into their comprehensive and operations plans. When the county updates its master plan, it will consider incorporating appropriate hazard mitigation information into the plan. The City of Alpena and all townships except Wellington Township administer planning and zoning, which has the potential to minimize hazard effects. As part of the education and outreach portion of the hazard mitigation effort, Wellington Township will be encouraged to adopt zoning regulations.

Five Year Plan Review and Update

The Stafford Act, as amended by the Disaster Mitigation Act of 2000, requires the Alpena County Hazard Mitigation Plan to be updated, adopted, and re-submitted for Federal Emergency Management Agency (FEMA) approval every five years. The plan will be reviewed by the Hazard Mitigation Committee every five years in alignment with federal regulations. The update will include determining changes in the county, such as changes in development, an increase in exposure to hazards, an increase or decrease in the communities’ capability to address hazards, addition and/or removal of mitigation actions and strategies, reviewing goals and objectives, and changes in federal or state legislation. Upon plan review and update completion, the plan will be sent to the State Hazard Mitigation Officer at the Michigan State Police for final review and approval in coordination with FEMA. When the plan has received an “approved pending adoption” status from FEMA, the County Board of Commissioners and local jurisdictions can review, approve, and adopt the plan. In order to properly update the plan, Alpena County will need to seek funding from appropriate state and federal agencies.

Continued Public Involvement

Alpena County is committed to keeping the public involved in the implementation and update of the hazard mitigation plan. Copies of the plan will be available at the county libraries, county clerk's office, and all township offices. It will also be posted on the community websites and/or regional planning agency website. The Emergency Management Office will be responsible for keeping a record of public comments on the plan.

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