

Montmorency County HAZARD MITIGATION PLAN



2021

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MONTMORENCY COUNTY HAZARD MITIGATION PLAN 2021

Montmorency County, Michigan

Prepared for:

Montmorency County
and the
Jurisdictions in Montmorency County

Prepared by:

Montmorency County Emergency Management Office

and

Northeast Michigan Council of Governments
80 Livingston Boulevard, Suite U-108
P.O. Box 457
Gaylord, Michigan 49734

Adopted Insert Date

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Chapter I 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 Montmorency County, NEMCOG worked with the Emergency Manager and the Local Emergency Planning Committee (LEPC) to review and update Montmorency 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 2021 Montmorency 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, recommends feasible mitigation strategies, and documents the plan's progress towards mitigating the county's 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 updates to the chapter.

Chapter 5: Community Services and Facilities

- Reviewed and updated the county government, local government, public safety, education system, medical facilities, utilities, public facilities, Canada Creek Ranch, transportation network, and community capability sections.

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 hazard priority index and risk assessment.

Chapter 7: Goals and Objectives

- Reviewed and updated the goals and objectives. A goal and 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.

Chapter 9: Plan Maintenance

- Reviewed and made minor updates to the chapter.

Hazard Mitigation Planning Process

In 2005, Montmorency County prepared its first Hazard Mitigation Plan and updated it in 2014. In 2019, NEMCOG worked with the Emergency Manager and the LEPC to review and update the 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).

Name	Title
Jerry Stanley	Emergency Management Coordinator
Brian Rogers	Emergency Management Coordinator (resigned)
David Wagner	County Board of Commissioners
Lt. Mike de Castro	MSP/EMD District 7 Coordinator
Chad Brown	Montmorency County Sheriff Office
John VanCoillie Jr.	Montmorency County Fire Services
Donna Szlag	Montmorency Emergency Medical Services
Christi Cross	Public Information Officer
Donna Baranyia	Montmorency County 911 Director
Carrie Badgero	Montmorency/Alpena DHHS

Table 1-1 Montmorency County LEPC Membership	
Name	Title
Matt Radocy	District Health Department #4
Mike Walker	Montmorency County Road Commission
Charles Oncina	Montmorency County Emergency Radio Services
Jean Klein	Montmorency County Treasurer
Amber Woehlert	Montmorency County Equalization Director

Community Involvement

The 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 its adoption. Information was disseminated to the communities and public through public meetings, news releases, and email. Representatives from Montmorency County, Avery Township, Loud Township, the Village of Hillman, Montmorency Township, Vienna Township, Briley Township, Hillman Township, Albert Township, Rust Township, Lewiston, Vienna, and Atlanta participated in updating the critical facilities, and mitigation actions and strategies, and reviewing the draft plan (Table 1-2).

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 facilitate communication and allow for the pooling of resources.

Table 1-2 Jurisdiction Participation Status		
Jurisdiction	Representative	Participation Status
Village of Hillman	Dave Post, Manager	Continuing Participant
Albert Township	Mike Dombrowski, Supervisor	Continuing Participant
Avery Township	Thom Seymour, Supervisor	Continuing Participant
Briley Township	Bruno Wojcik, Supervisor	Continuing Participant
Hillman Township	Charles Manning, Supervisor	Continuing Participant
Loud Township	Robin Chinavare, Clerk	Continuing Participant
Montmorency Township	Garry Boldrey, Supervisor	Continuing Participant
Rust Township	Johnathan Schulze, Supervisor	Continuing Participant
Vienna Township	Cheryl Klein, Supervisor	Continuing Participant

Public Participation Survey

The Emergency Manager 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 Montmorency Board of Commissioner's Secretary Office within the Courthouse 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, Montmorency County Board of Commissioners, and the local jurisdictions' president, 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 Montmorency 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 and discussions, additional meetings were held.

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.

Kick off Meeting

On August 15, 2019, NEMCOG met with Montmorency County's LEPC to review and update the 2014 Hazard Mitigation Plan. A brief overview of the hazard mitigation planning process, current plan status, and grant match was discussed. Additionally, the committee reviewed and updated the county's hazard rankings based on their social impact, likelihood of occurrence, and administrative potential. The

committee elevated the county's risk for wildfire and reduced the county's risks for terrorism/sabotage/WMD and nuclear attack. It was determined no additional strategies needed to be added to the plan at this time. The committee also reviewed and updated the plan's goals and objectives to include a goal and its corresponding objectives regarding the County's geographic information system. Finally, the committee reviewed and updated each hazard mitigation action's priority ranking, current progress, and future status. Several action items were moved to the all-hazard mitigation action table, four hazard actions were deemed no longer relevant in the county (and will be removed from future plans), and multiple action items were determined to be ongoing projects. Attendees included Michael Walker, Dave Hornbacher, Lanny Cotner, Joe Richards, Charles Oncina II, Chad Brown, Brock Baum, Doug Baum, Chuck Herbst, Anthony Utt, Brian Rogers, 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 draft 2021 Montmorency County Hazard Mitigation Plan was made available to local governments, agencies, and the public for review and comment. A public notice was sent to *The Montmorency County Tribune* informing the residents about the draft plan and where it could be reviewed. The draft plan was posted on NEMCOG's website and a paper copy was available at the Montmorency County Board of Commissioners Office. On January 15, 2020, a link to the draft plan was also emailed to the local jurisdictions' president, supervisors, clerks, and Board of Commissioners for review and comment.

On February 18, 2020, a public hearing was held to receive comments and suggestions on the draft plan. The comments and suggestions included the following: the plan was nicely done, and the public health emergency mitigation table should be expanded. Comments and suggestions obtained in the review process were incorporated into the final plan. Attendees included Kevin Keller, Brian Rogers, and NEMCOG staff, Nico Tucker.

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

Plan Adoption

INSERT DATE the 2021 Montmorency County Hazard Mitigation Plan received “approvable pending adoption” status from the State and FEMA. **INSERT DATE** the Montmorency County LEPC approved a motion to recommend adoption of the 2021 Montmorency County Hazard Mitigation Plan by the Montmorency County Board of Commissioners and all local municipalities within Montmorency County.

A public notice was sent to the local newspaper informing residents when the County Board of Commissioners would be considering adoption of the plan. **INSERT DATE**, NEMCOG presented the 2021 Montmorency County Hazard Mitigation Plan to the Montmorency County Board of Commissioners to request adoption of the plan (**Appendix C**). After adoption by the County, the local jurisdictions were contacted and requested to 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 the 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

Montmorency County encompasses 563 square miles in Michigan's Northeastern Lower Peninsula. It is approximately 20 miles west of Lake Huron and is bordered by Alpena, Otsego, Presque Isle, Cheboygan and Oscoda Counties. The county straddles the 45th parallel and the Michigan Meridian forms its western boundary.

Montmorency County is composed of eight townships, a village, and three unincorporated places (Figure 2-1):

- Atlanta (unincorporated; county seat)
- Village of Hillman
- Lewiston (unincorporated)
- Vienna (unincorporated)
- Montmorency Township
- Vienna Township
- Briley Township
- Hillman Township
- Avery Township
- Albert Township
- Loud Township
- Rust Township

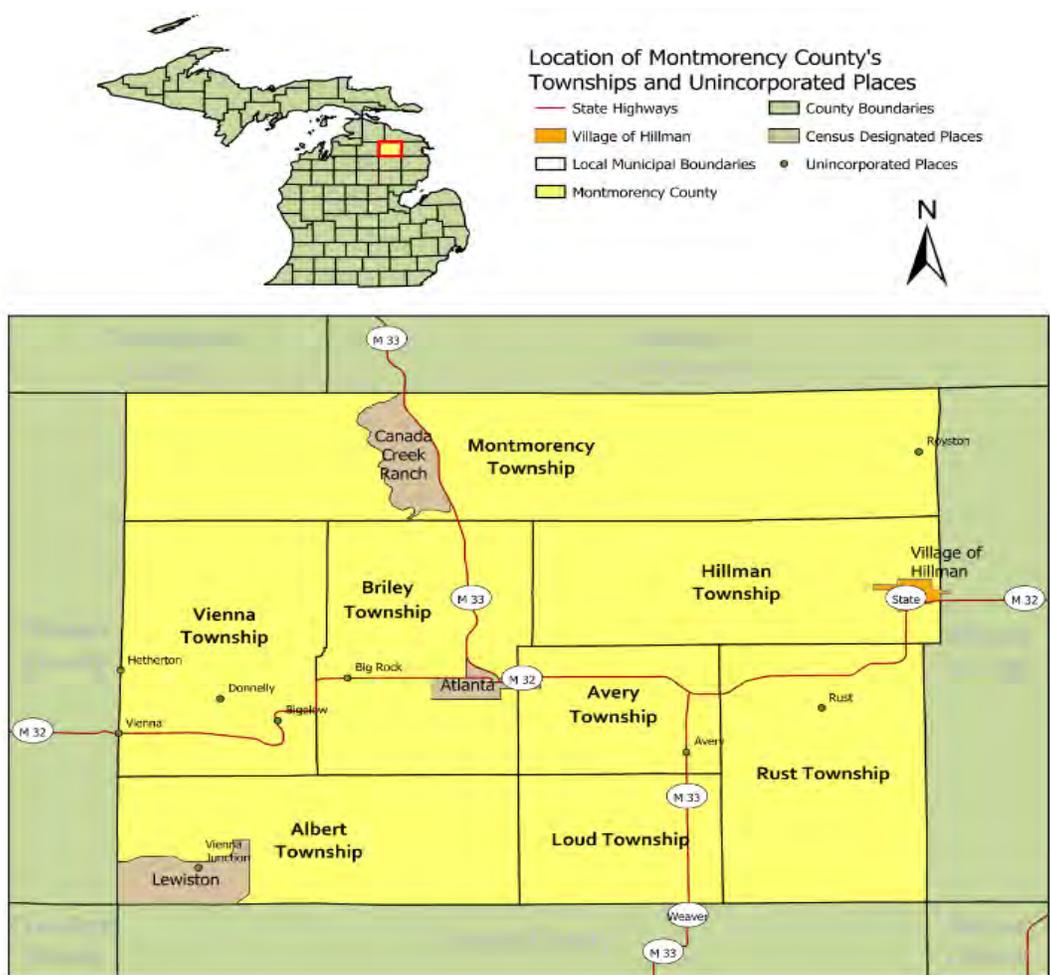


Figure 2-1 Location of Montmorency County's Townships and Unincorporated Places

Climate

Montmorency County's climate is humid continental and is not strongly influenced by the Great Lakes. The county has generally cold winters, cool springs, moderately warm summers, and cool falls. According to the USDA's *Soil Survey of Montmorency County, Michigan*, the average relative humidity is approximately 61% in the afternoon and about 83% in the morning. The average temperature for the area is 43.05 degrees Fahrenheit.

The temperature ranges between 19 degrees Fahrenheit and 67 degrees Fahrenheit in the spring and between 51 degrees Fahrenheit and 80 degrees Fahrenheit in the summer. The average annual precipitation is 24.9 inches with approximately 60% of the precipitation falling between April and September. The frost dates for Atlanta are typically June 10 and September 8.

The temperature ranges between 16 degrees Fahrenheit and 56 degrees Fahrenheit in the fall, and between 9 degrees Fahrenheit to 30 degrees Fahrenheit in the winter. The average annual snowfall is 96 inches, while the highest seasonal snowfall recorded in Atlanta was 139.2 inches during the 1996-1997 season. On average, 129 days of the year have at least one inch of snow on the ground according to the *Soil Survey of Montmorency County, Michigan*. However, the number of days varies each year.

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. Since the 2014 plan update, the county has seen an increase of 1.25 degrees Fahrenheit in the average temperature, and an increase of 26 inches in average annual snowfall.

Topography and Geology

Montmorency County's topography is classified as consisting of plains, rolling plains, and hilly lands. The retreating continental glaciers formed the rolling hills, till plains, moraines, outwash channels, sand deltas, kames, eskers, river valleys, swamps and lakes in Montmorency County (Figure 2-2). The hills are rounded and gently slope to the stream beds; however, the banks are steep where the streams pass through the plain-like areas. A rolling, hilly highland stretches from the northwest to the southeast and has elevations ranging from 900 to 1,100 feet. The dominant glacial feature in the county is the Johannesburg Moraine located in the southwest portion of the county.

Most of the upland is predominantly well-drained sand and gravel with wetlands occupying swales and valleys. Deep sand plains are located in the southwestern portion of the county with elevations ranging from 1,200 to 1,300 feet. The only till plain is in the northeast portion of the county near Royston. Outwash plains comprise the northern half of the county and a small area around East and West Twin Lakes near Lewiston. In the central and eastern parts of the county, lacustrine plains are intermixed with isolated moraines. A level or gently rolling lake plain is located in the northeastern portion of the county and contains wet swales, ponds, and higher patches of sand. Elevations in this area range from 700 to 900 feet.

Beneath the glacial landforms, Montmorency County's sedimentary bedrock consists of shale, limestone, dolomite, and economic deposits of natural gas and oil. Albert, Avery, Briley, Hillman, Loud, Rust, and Vienna Townships have many gas producing wells. Sinkholes and sinkhole lakes are found in the northwest portion of the county.

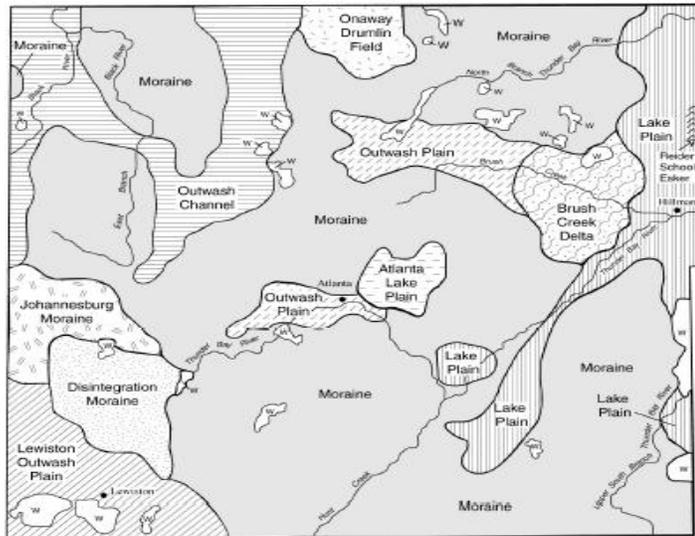


Figure 2-2 Montmorency County's Geology

Source: USDA Montmorency Soil Survey

Soils

The Natural Resource Conservation Service completed a detailed soil survey of Montmorency County and the soil survey maps were acquired from the Michigan Center for Geographic Information.

Hydric Soils and Steep Slopes

Soil types and slopes should be considered when planning for types and intensity of land uses. 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. Also, steeply sloped areas influence wildfire behavior and may make it difficult for firefighting equipment to access an area during a wildfire.

Hydric soils are located adjacent to streams and creeks and are classified as poorly drained and very poorly drained (Figure 2-3). 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 of these soils may classify them as wetlands and require a wetland permit for development.

According to the *Soil Survey of Montmorency County, Michigan*, areas with slopes 12 percent and greater are located in a wide band that runs from the southeast corner to the northwest corner of the county and are associated with the Johannesburg Moraine (Figure 2-3).

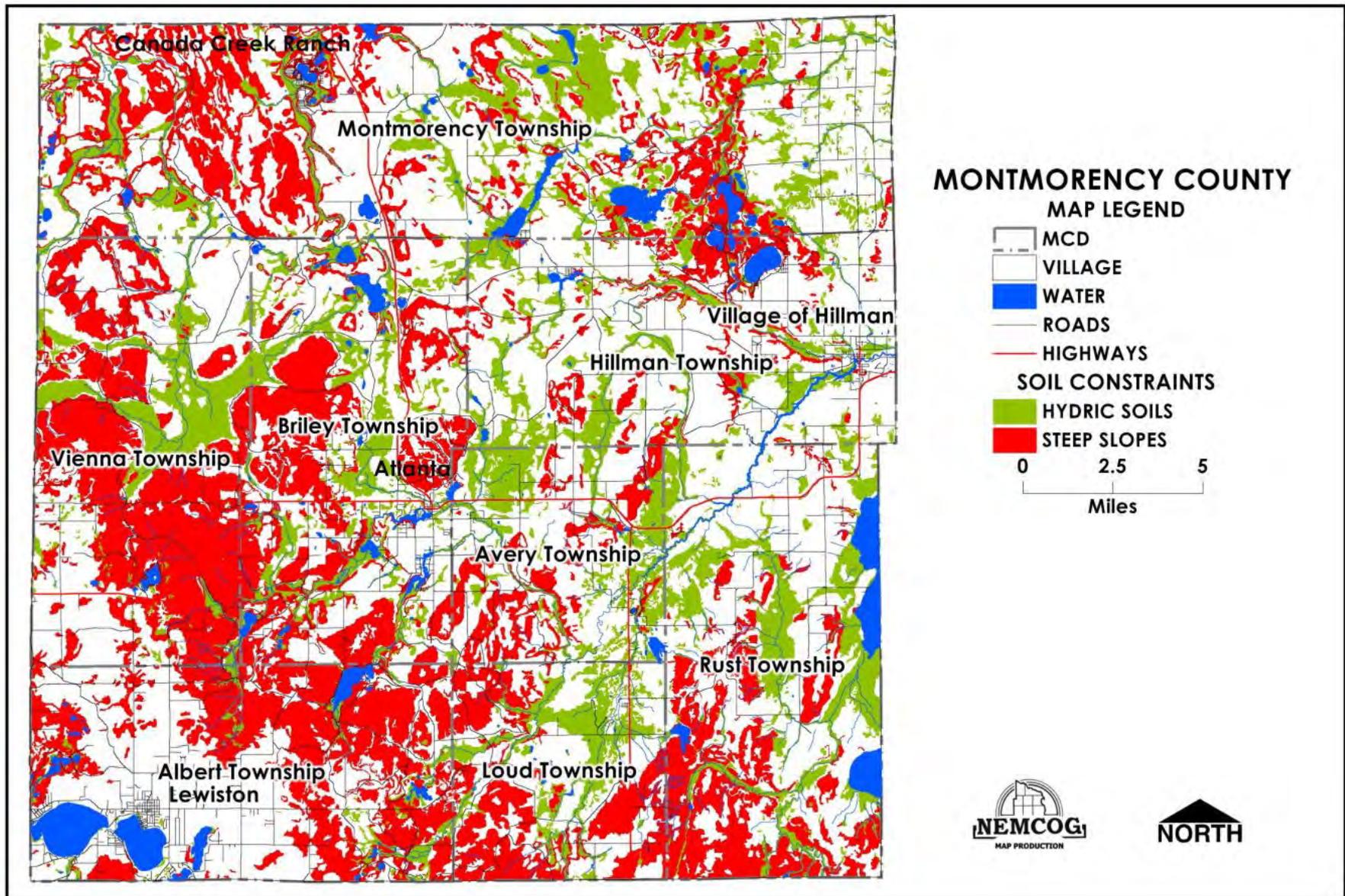


Figure 2-3 Montmorency County's Hydric Soils and Steep Slopes

Water Resources

According to the *Soil Survey of Montmorency County, Michigan*, the county has 89 lakes that cover more than 8,000 acres. Forty-five lakes are greater than 50 acres and three lakes are greater than 600 acres. The largest body of water in the county is Fletcher Pond at 8,970 acres with 3,660 acres in Montmorency County and the rest of the acreage in Alpena County. Other large lakes include East and West Twin Lakes, Grass Lake, Avalon Lake, Rush Lake, Long Lake, Avery Lake, and Clear Lake. Inland Lakes and streams cover 3.3% of the total county land area. The principal rivers are the North, South and Main branches of the Thunder Bay River, the Black River and the Au Sable River. The Thunder Bay River bisects the Village of Hillman. Flooding and high water are not issues along these rivers. The county has a few large streams and tributary streams. Gilchrist and Hunt Creeks in the southeastern portion of the county are known as premier trout streams. Smaller water bodies, such as small ponds, kettle holes and marshes, are connected to the lakes by the streams and are characterized by moderate seasonal water level fluctuations and various stages of vegetation.

Montmorency County has an abundance of high-quality fishing streams, creeks, and inland lakes. Brook, rainbow, and brown trout are established in cold water streams, while warm water fisheries have established populations of walleye, northern pike, largemouth bass, smallmouth bass and pan fish.

The county is composed of four watersheds that are part of the Lake Huron drainage basin (Figure 2-4). The northwest quarter of the county is located in the Black River Watershed, which is part of the Cheboygan River Watershed, the southwest corner is in the Au Sable River Watershed, a small portion along the northern border is in the Ocqueoc Watershed and the rest of the county is located in the Thunder Bay River Watershed.

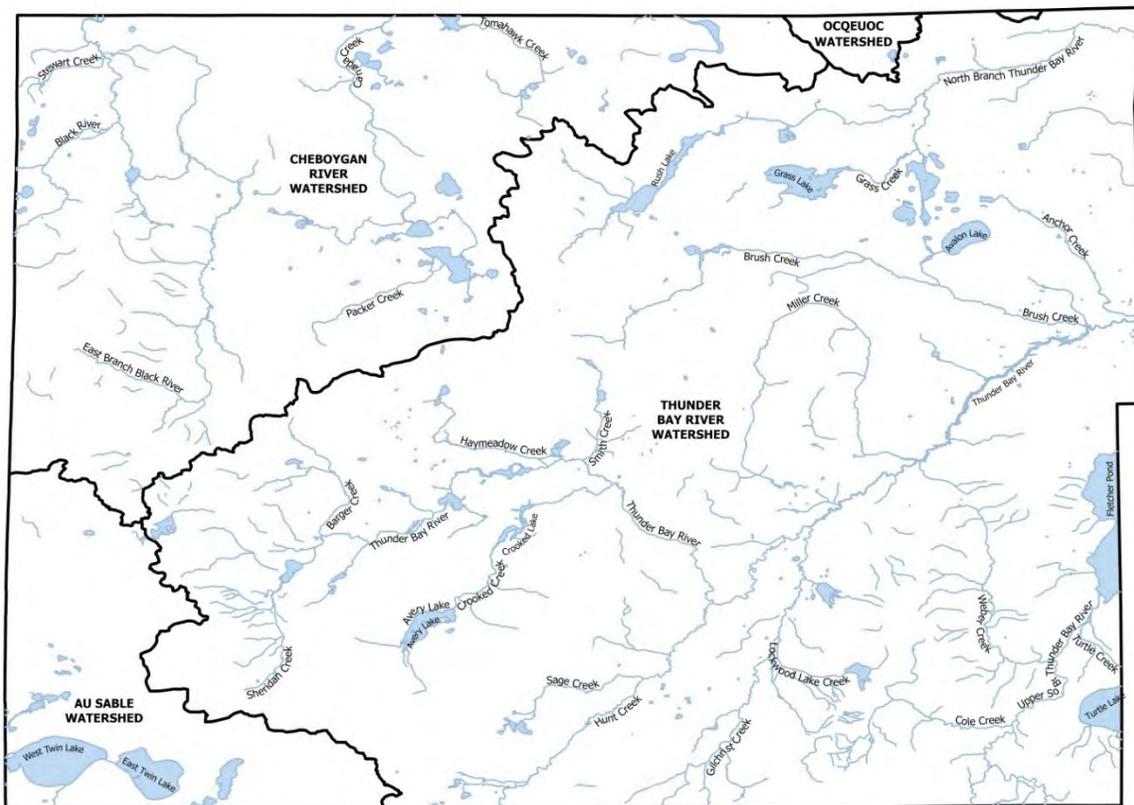


Figure 2-4 Montmorency County's Watersheds

The county has adequate quantities of groundwater available with depths ranging between 30 to 40 feet and 100 feet (e.g., in Gaylanta and Gilcrest). Four-inch wells in glacial drift will yield 10 to 15 gallons per minute, while wells in bedrock yield 10 or fewer gallons per minute. The groundwater is recharged from water discharged through septic system drainage fields after treatment, springs, streams, and lakes. The groundwater system flows towards Haymeadow Creek, Thunder Bay River, Black River, and the Au Sable River. Due to the permeable soils and landscape features in the county, the groundwater system is at risk for contamination. Atlanta has a past history of chemicals moving through the groundwater system.

Wetlands

Wetlands are located between terrestrial and aquatic systems where the water table is high for a significant portion of the year. The hydrology of these areas permits the formation of hydric soils and the growth of hydrophytic vegetation. These areas include marshes, swamps, and bogs. Wetlands serve many functions, including serving as wildlife habitat, ecological corridors, shoreline protection, discharging and recharging aquifers, and improving water quality through the filtration of pollutants, organic chemicals, and toxic heavy metals.

The most common wetland feature in the county is lowland forests/riparian forests. These areas support northern white cedar, tamarack, balsam fir, black spruce, eastern hemlock, white pine, Balsam Poplar, quaking aspen, paper birch, black ash, speckled alder and shrub willows. Northern white cedar dominates areas with lateral water movement and organic soils. Within the Johannesburg Moraine, small kettle hole depressions form isolated wetlands. Non-forested wetland types include lowland brush, marshes and bogs. Forested and non-forested wetlands are a finite resource in the county and land use planning should focus on preserving them.

Woodlands

According to the *Soil Survey of Montmorency County, Michigan*, 86% of the county is forested with various tree species due to the variance in soil types, moisture levels, and past activities (e.g., logging, fires, land clearing, etc.) (Figure 2-5). The major forest species in the county are Aspen (24%), Maple/Beech/Birch (23%), and Oak/Hickory Group (22%). Other forest species include Jack Pine (9%), Red Pine (7%) Northern White Cedar (7%), Elm/Ash/Cottonwood group, Eastern White Pine, Balsam Fir, Balsam Poplar, and Red Maple/Oak group.

A review of the county's pre-settlement vegetation shows 47% of the county was jack pine-red pine forest, white pine-red pine forest, pine barrens and pine/oak barrens (Figure 2-6). However, in the late 1800's, extensive logging and wildfires resulted in the conversion of the white pine-red pine forests to oak and aspen forests.

Fish and Wildlife Resources

Hunters are attracted to Montmorency County since its forest lands provide habitat for deer, grouse, woodcock, rabbit, bear, bobcat, elk, turkey, and coyote. The elk herd is located on large tracts of state land and private club lands in the western portion of the county. Along with Alpena, Alcona, Oscoda, and Presque Isle Counties, Montmorency County is located within the Bovine Tuberculosis outbreak area, which affects the local deer population and other wildlife populations. The Michigan Department of Natural Resources (DNR) has created a deer management unit (DMU 452) to manage and prevent the spread of the disease through the enforcement of special regulations regarding deer hunting and

feeding. The long-term effect of Bovine Tuberculosis on the area's hunting is unknown at this time.

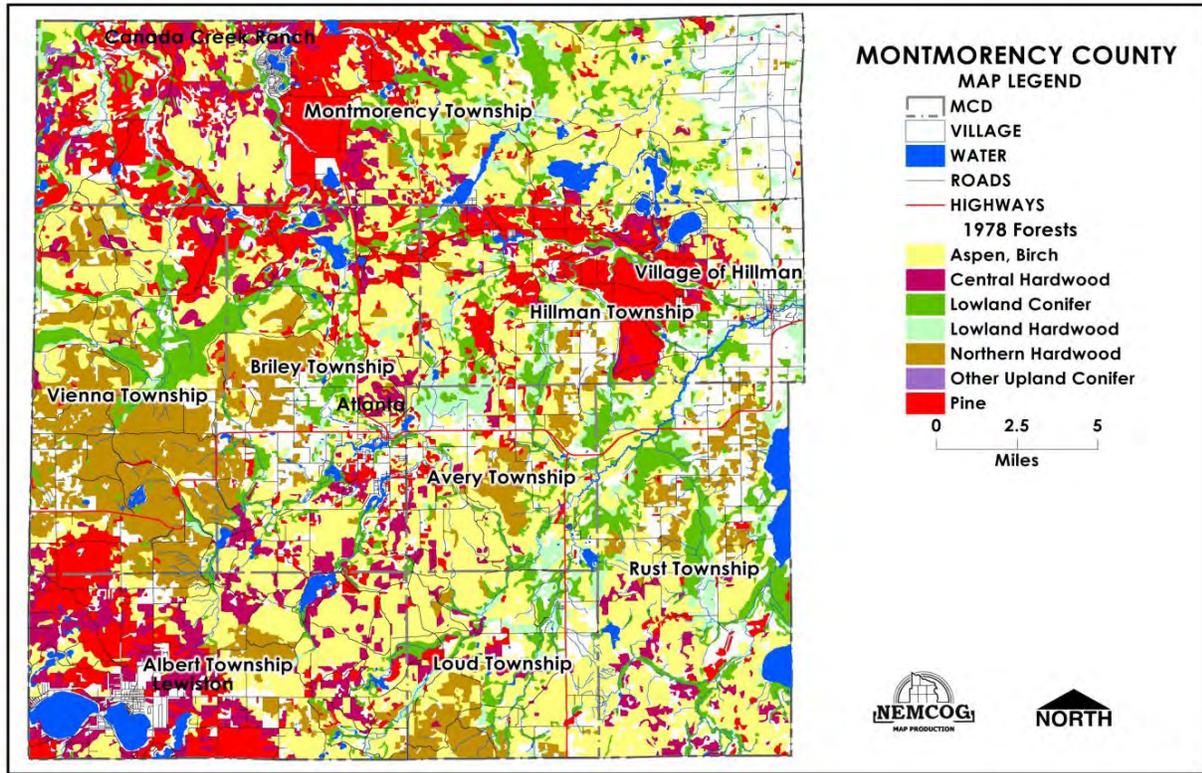


Figure 2-5 Montmorency County's Forest Cover

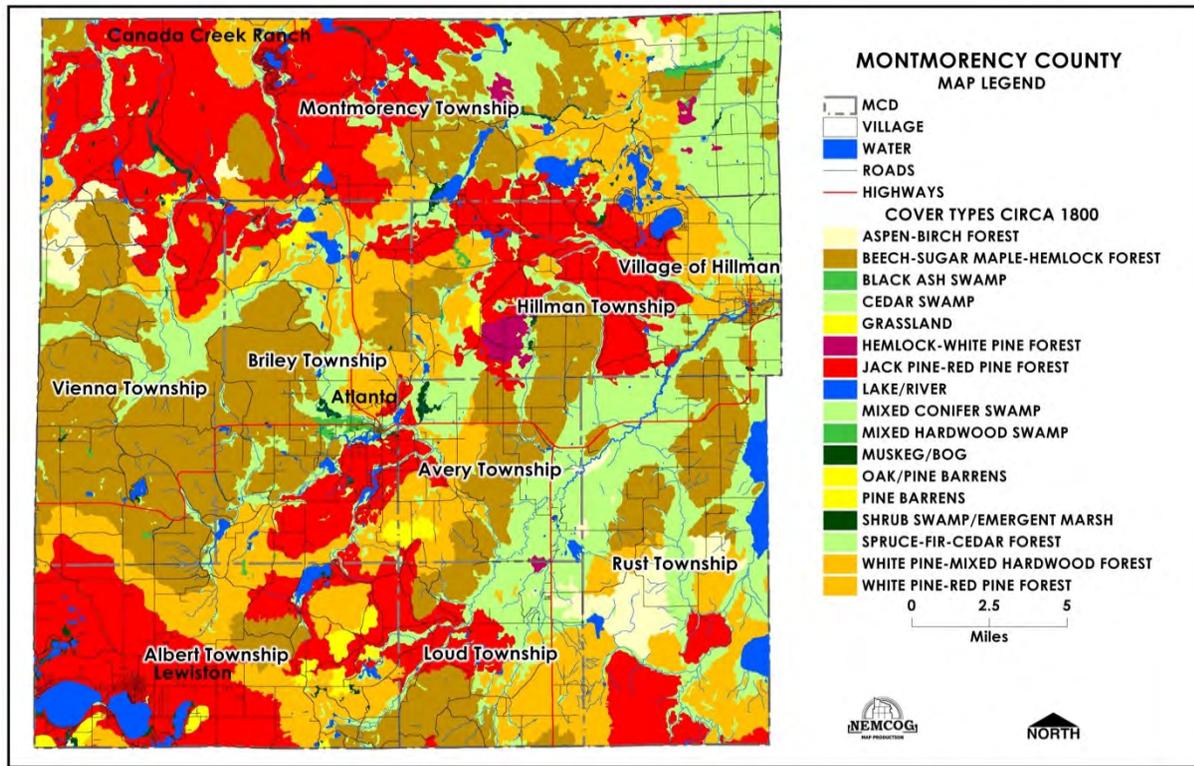


Figure 2-6 Montmorency County's Pre-settlement Vegetation

Discharge Permits

Surface Water (National Pollutant Discharge Elimination System) Permit

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. Five NPDES permits have been issued in Montmorency County (Table 2-1).

Table 2-1 National Pollutant Discharge Elimination System Permits, Montmorency County				
Site Name	Address	Site Type	Permit Number	Expiration Date
Gildner Concrete Products Inc	800 Progress Street	Industrial	MIS210065	4/1/22
Hillman Power Company	750 Progress Street	Industrial	MI0044563	10/1/20
Hillman WWSL	Third Street West	Municipal Sanitary-Public	MIG580152	4/1/19
Wayne Wire Cloth-Hillman	221 Garfield	Industrial	NEC157449	3/18/23
Wysons Gen Store GWCU	11720 M-33	Groundwater Cleanup	MIG081039	4/1/20

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

Groundwater Discharge Permit

The State of Michigan regulates the discharge of waste and wastewater 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 three groundwater discharge permits issued in Montmorency County:

- DNR-Parks and Recreation-Clear Lake
- Laundry Basket
- Lewiston Laundromat-Lewiston

Air Discharge (Renewable Operating Permit (ROP)/ Title V) Permits

The State of Michigan administers the Renewable Operating Permit (ROP) system to regulate air emissions for facilities that emit more than a certain amount of air contaminants. According to EGLE, there are two renewable operating permits issued in Montmorency County: Montmorency-Oscoda-Alpena Waste Management Authority and Hillman Power Company.

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 work 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 Assessments document the existing contamination and allows a facility to be acquired and/or operated without being held liable for the existing contamination. In Montmorency County, the facility inventory database reports the following:

- 21 sites with completed Baseline Environmental Assessments
- 23 sites listed as Sites of Environmental Contamination (Part 201)
- 27 sites listed as Leaking Underground Storage Tanks (Part 213)

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Chapter 3 Community Profile

A Brief History of Montmorency County

Montmorency County was founded on April 1, 1840 and was legally formed in 1881 with land taken from Cheboygan and Alpena Counties. The first county seat was at Brush Creek, which became known as Hillman. In 1891, the county seat moved to Atlanta.

Population

According to the U.S. Census Bureau, Montmorency County’s population is 9,290, which is a 9.9% decline since 2000 (Table 3-1). The county has a population density of 17.0 persons per square mile. Avery, Montmorency, Albert, Briley, and Rust Townships also had declining populations between 2000 and 2017, while Vienna and Loud Townships, and the Village of Hillman had increases in their populations according to the U.S. Census Bureau (Table 3-1).

Table 3-1 Population for Montmorency County and its Municipalities, 2000-2017

Municipality	2000 Population	2010 Population	2017 Population	Percent Change	Numeric Change
Montmorency County	10,315	9,765	9,290	-9.9%	-1,025
Albert Township	2,695	2,526	2,293	-14.9%	-402
Avery Township	717	646	602	-16.0%	-115
Briley Township	2,029	1,860	1,784	-12.1%	-245
Hillman Township	2,267	2,175	2,051	-9.5%	-216
Loud Township	284	293	312	9.9%	28
Montmorency Township	1,202	1,117	1,012	-15.8%	-190
Rust Township	549	561	503	-8.4%	-46
Vienna Township	572	587	733	28.1%	161
Village of Hillman*	685	701	691	0.9%	6

Source: U.S. Census Bureau- 2017 American Community Survey
 Note: Green text indicates an increase; Red text indicates decline
 *Population counts appear as part of another municipality in the county.

Seasonal Population

According to the U.S. Census Bureau, 53.7% of the housing units are seasonal within the county. The seasonal population estimate is approximately 11,538 people (seasonal housing units (5,151) multiplied by the average number of persons per household (2.24)). Montmorency County has a population estimate of approximately 20,828 when the seasonal population estimate, and Census Bureau population estimate are combined. However, this estimate does not include the seasonal visitors that stay in motels, campgrounds, or family homes.

Age Distribution

The majority of Montmorency County's population is 45 years old or older (63.8%) according to the U.S. Census Bureau (Table 3-2). The most populous age group in Albert, Briley, Hillman, Loud, and Vienna Townships is the 45-64 age group, while in Avery, Montmorency, and Rust Townships and the Village of Hillman, the 65 and older age group is the most populous (Table 3-2).

Between 2000 and 2017, Montmorency County's median age has increased from 47.0 years to 55.3 years, while the State of Michigan's median age increased from 35.5 years to 39.6 years (Figure 3-1, Table 3-2). Since Montmorency County is aging faster than the State of Michigan, the county may experience an increase in the need for social, emergency response, and medical services. Montmorency Township has the highest median age at 60.6 years, while Vienna Township has the lowest median age at 41.8 years (Table 3-2).

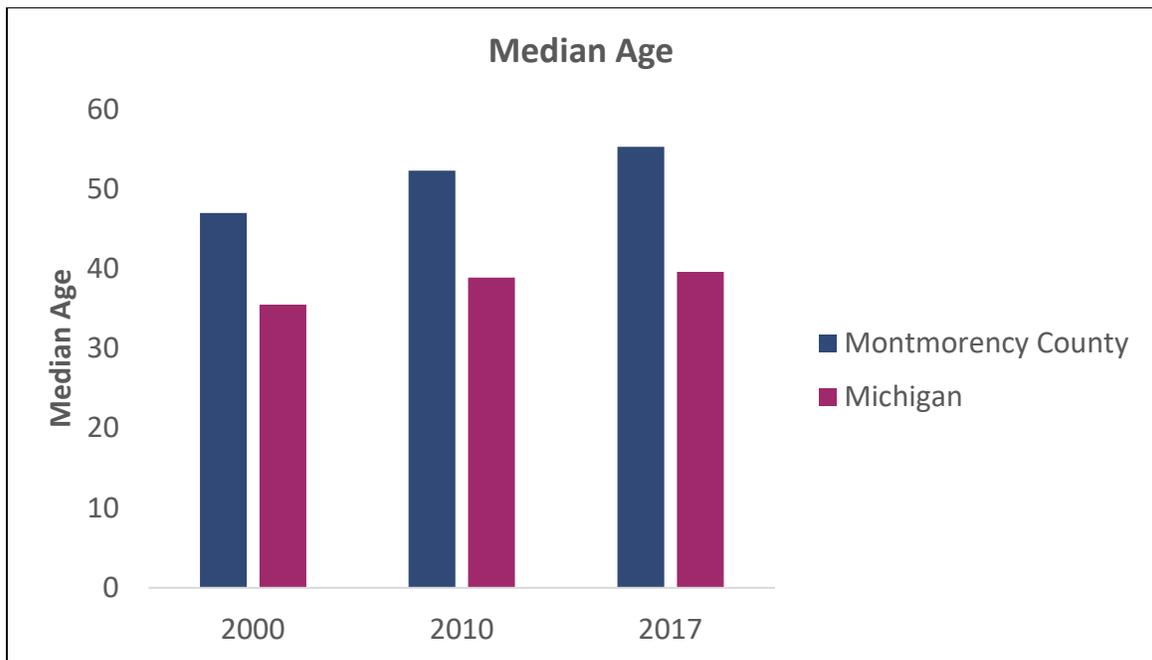


Figure 3-1 Median Age

Table 3-2 Montmorency County Age Distribution by Municipality, 2017

Municipality	Less than 5 Years	Percent*	5-19 Years	Percent*	20-24 Years	Percent*	25-44 Years	Percent*	45-64 Years	Percent*	65 Years & Older	Percent*	Median Age
Montmorency County	334	3.6%	1,220	13.2%	337	3.6%	1,473	15.8%	3,133	33.7%	2,793	30.1%	55.3
Albert Township	51	2.2%	382	16.7%	104	4.5%	296	13.0%	811	35.4%	649	28.4%	55.4
Avery Township	12	2.0%	56	9.3%	12	2.0%	106	17.7%	183	30.4%	233	38.7%	60.1
Briley Township	57	3.2%	167	9.4%	79	4.4%	284	15.9%	637	35.7%	560	31.4%	55.7
Hillman Township	101	4.9%	237	11.6%	64	3.1%	404	19.7%	650	31.7%	595	29.0%	54.1
Loud Township	20	6.4%	36	11.6%	16	5.1%	33	10.5%	116	37.2%	91	29.1%	56.9
Montmorency Township	21	2.1%	115	11.4%	9	0.9%	91	9.1%	366	36.2%	410	40.5%	60.6
Rust Township	38	7.6%	72	14.4%	20	4.0%	94	18.8%	137	27.2%	142	28.3%	53.6
Vienna Township	34	4.6%	155	21.1%	33	4.5%	165	22.6%	233	31.8%	113	15.3%	41.8
Village of Hillman	20	2.9%	81	11.7%	40	5.8%	111	16.1%	186	27.0%	253	36.6%	56.7
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 -2017 American Community Survey

Disability Status

The American Community Survey estimates disabled status data based on a sample. 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. In Montmorency County, 46.8% of the population is classified as having some type of disability (Table 3-3). There are 2,068 people between the ages of 18 and 64 years who have some type of disability with ambulatory and cognitive disabilities being the most common. The high percentage of disabilities in Northeast Michigan indicates a need for disabled services.

Table 3-3 Disability Status	
Status Type	Number of Persons
Population under 5 years with a disability	13
With a hearing difficulty	13
With a vision difficulty	0
Population 5-17 years with a disability	85
With a hearing difficulty	12
With a vision difficulty	19
With a cognitive difficulty	32
With an ambulatory difficulty	16
With a self-care difficulty	6
Population 18-64 years with a disability	2,068
With a hearing difficulty	211
With a vision difficulty	90
With a cognitive difficulty	455
With an ambulatory difficulty	654
With a self-care difficulty	247
With an independent living difficulty	411
Population 65+ years with a disability	2,186
With a hearing difficulty	528
With a vision difficulty	153
With a cognitive difficulty	255
With an ambulatory difficulty	623
With a self-care difficulty	225
With an independent living difficulty	402
Source: American Community Survey 2017	

Economic Characteristics

Unemployment Rate

Since Montmorency County’s population has been declining, the number of people in the labor force has also declined from 4,086 people in 2000 to 3,405 people in 2017. Additionally, the unemployment rate has declined from 19.8% in 2010 to 12.7% in 2017. However, the County’s unemployment rate remains higher than the rates for the State of Michigan and the United States (Figure 3-2).

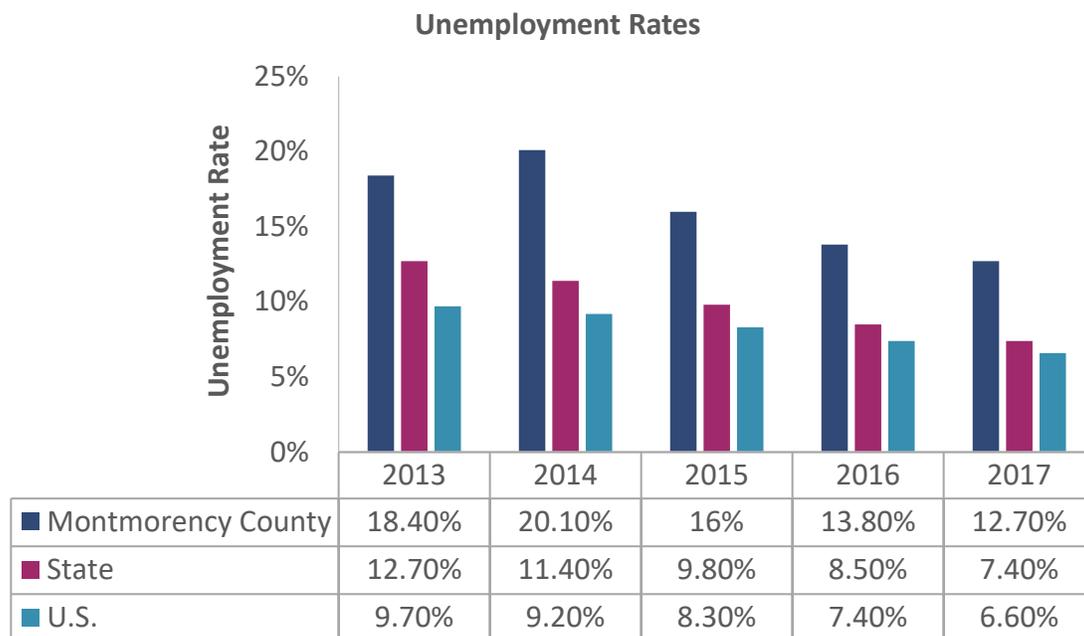


Figure 3-2 Unemployment Rates

Income

According to the U.S. Census Bureau, Montmorency County has the second lowest median household income in the northeast region at \$39,152, which is 74.3% of the State’s median income and 67.9% of the national median income (Table 3-4). In Montmorency County, 28.9% of the households have incomes with benefits that are less than \$25,000 and 43.9% of the households have incomes with benefits that are less than \$35,000 (Table 3-5).

The median household incomes in Northeast Michigan are expected to remain lower than the State of Michigan as the region has a higher proportion of older individuals than the State and the region’s economy is becoming reliant on the service and tourism industries, which tend to have seasonal employment opportunities and lower 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 decrease

Table 3-4 Median Household Incomes in Northeast Michigan	
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, American Community Survey	

in median household income and an increase in an older population.

Income	2017
Less than \$10,000	5.1%
\$10,000 - \$14,999	7.4%
\$15,000 - \$24,999	16.4%
\$25,000 - \$34,999	15.0%
\$35,000 - \$49,999	19.7%
\$50,000 - \$74,999	19.5%
\$75,000 - \$99,999	7.0%
\$100,000 +	10.0%

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

Poverty Rates

Poverty remains an issue in Montmorency County with approximately 11.5% of families in poverty (Table 3-6). The poverty rate increases to 22.0% when children are present. The poverty rate for a female householder with no husband is 27.0%; however, the rate decreases to 22.7% when children are present.

Category	Poverty Rate
Families	11.5%
All families w/related children under 18	22.0%
Married couple families	7.3%
Married couple families w/related children under 18	18.9%
Female householder, no husband present	27.0%
Female householder, no husband present w/ related children under 18	22.7%
Householder 65+ years	4.9%

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

Housing Stock

According to the U.S. Census Bureau, Montmorency County has 9,601 housing units with 4,074 occupied units and 5,527 vacant units (Table 3-8). Albert Township has the most housing units at 2,717, while the Village of Hillman (320 units) and Loud Township (384 units) have the least amount of units.

Communities with lakes, rivers, and private forestlands tend to have a higher number of seasonal housing units which presents challenges when mitigating hazards due to their geographic location. In Montmorency County, 53.7% of the total housing units are seasonal with the majority of units located in Montmorency (65.5%) and Loud Townships (63.8%).

Year Structure Built	Percent
2000 or later	7.0%
1990-1999	12.3%
1980-1989	15.4%
1960-1979	42.8%
1940-1959	18.8%
1939 or earlier	3.7%

Source: U.S. Census Bureau- American Community Survey 2017

Generally, older housing units are more likely to need renovations. In Montmorency County, the majority of the structures were built between 1960 and 1979

(Table 3-7). However, 22.5% of the structures were built prior to 1960 and 3.7% were built prior to 1940. Approximately 19.3% of the structures were built after 1990.

Table 3-8 Housing Counts and Occupancy Status, 2017						
Jurisdiction	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Percent Vacant Units*	Seasonal Units	Percent Seasonal Units*
Montmorency County	9,601	4,074	5,527	57.6	5,151	53.7
Albert Township	2,717	1,039	1,678	61.8	1,619	59.6
Avery Township	624	294	330	52.9	310	49.7
Briley Township	1,514	809	705	46.6	631	41.7
Hillman Township	1,714	885	829	48.4	730	42.6
Loud Township	384	121	263	68.5	245	63.8
Montmorency Township	1,558	483	1,075	69.0	1,020	65.5
Rust Township	490	193	297	60.6	267	54.5
Vienna Township	600	250	350	58.3	329	54.8
Village of Hillman	320	274	46	14.4	32	10.0
* Percent of total housing Source: US Census Bureau						

Agriculture

According to the USDA's 2012 Census of Agriculture County Profile for Montmorency County, the number of farms in the county has increased from 140 (21,801 acres) in 2007 to 151 (24,337 acres) in 2012 (Table 3-9). The 2012 County Profile reported the market value of products sold to be \$8,132,000 with \$4,295,000 in crop sales and \$3,837,000 in livestock sales.

Table 3-9 Agricultural Statistics	
Total farm production expenses	\$5,526,000
Organic Program certified farms	-
Cropland in transition to organic program certified farms	-
Revenue by Grains, oilseeds, dry beans, and dry peas	\$3,155,000
Revenue by milk from cows	\$2,717,000
Total livestock inventory	3,685 animals
Source: 2012 USDA Census of Agriculture	

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Chapter 4 Land Use Characteristics

Overview

Existing land use maps, future land use maps, and zoning maps can be combined with hazardous areas and land uses to develop an assessment of the existing land uses in Montmorency County. The process identifies urban land uses, such as residential and commercial, and natural land cover uses, such as farmlands, forests, and wetlands. Once assessed, the county can identify vulnerable populations and mitigate potential hazards through the use of planning and zoning techniques.

Minimal development has occurred in the county; therefore, no significant changes in development have occurred since the previous plan update.

Land Division Patterns

The county tends to have parcels that are 40 acres or larger being subdivided into two to ten smaller parcels. Since this subdivision causes a dispersed population, there are issues with the ability to provide adequate transportation, public safety, and emergency services. In the remainder of the county, land divisions range from two-acre parcels to tracts greater than 300 acres.

Private land division patterns indicate the most intensive development has occurred within the communities of Atlanta (Briley and Avery Townships), Village of Hillman, Lewiston (Albert Township) and Canada Creek Ranch (Montmorency Township). These developments include residential subdivisions, small commercial and residential tracts, and platted lot developments around lakes that are used for residential purposes.

Additionally, the majority of privately-owned, non-subdivision parcels range in size from five to ten acres. A review of the plat books from 1984, 1973 and 1962 show the majority of the land was subdivided into five- and ten-acre parcels after 1960. Prior to 1960, the majority of privately-owned parcels were 40 acres or larger. A large portion of Montmorency County is publicly owned. The State of Michigan owns approximately 37% of the land, which means the land will more than likely remain in large, publicly owned tracts (Figure 4-1).

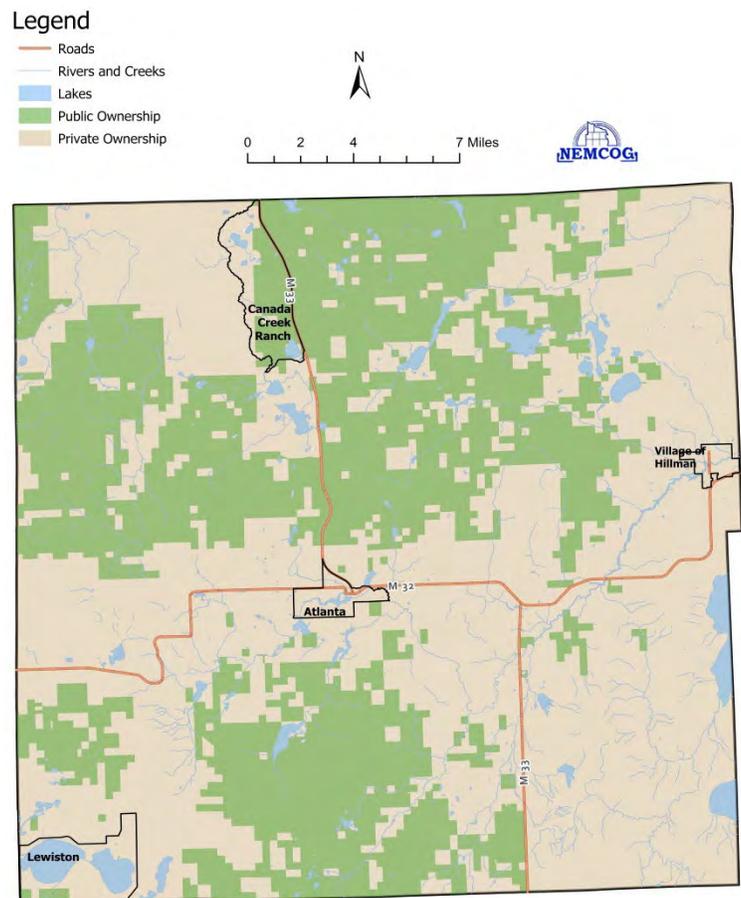


Figure 4-1 Public and Private Ownership in Montmorency County

Land Cover/Use

The Michigan Resource Information Systems (MIRIS) land cover/use data was used to determine the existing land use in the county (Figure 4-2, Table 4-1). Some of the MIRIS data was updated through aerial photographs and extensive field checking, while the remaining areas used the 1978 MIRIS data. Specifically, Hillman and Albert Townships were updated in 1996, the west half of Montmorency, Avery and Briley Townships were updated in 1997, and Vienna Township was updated in 1999.

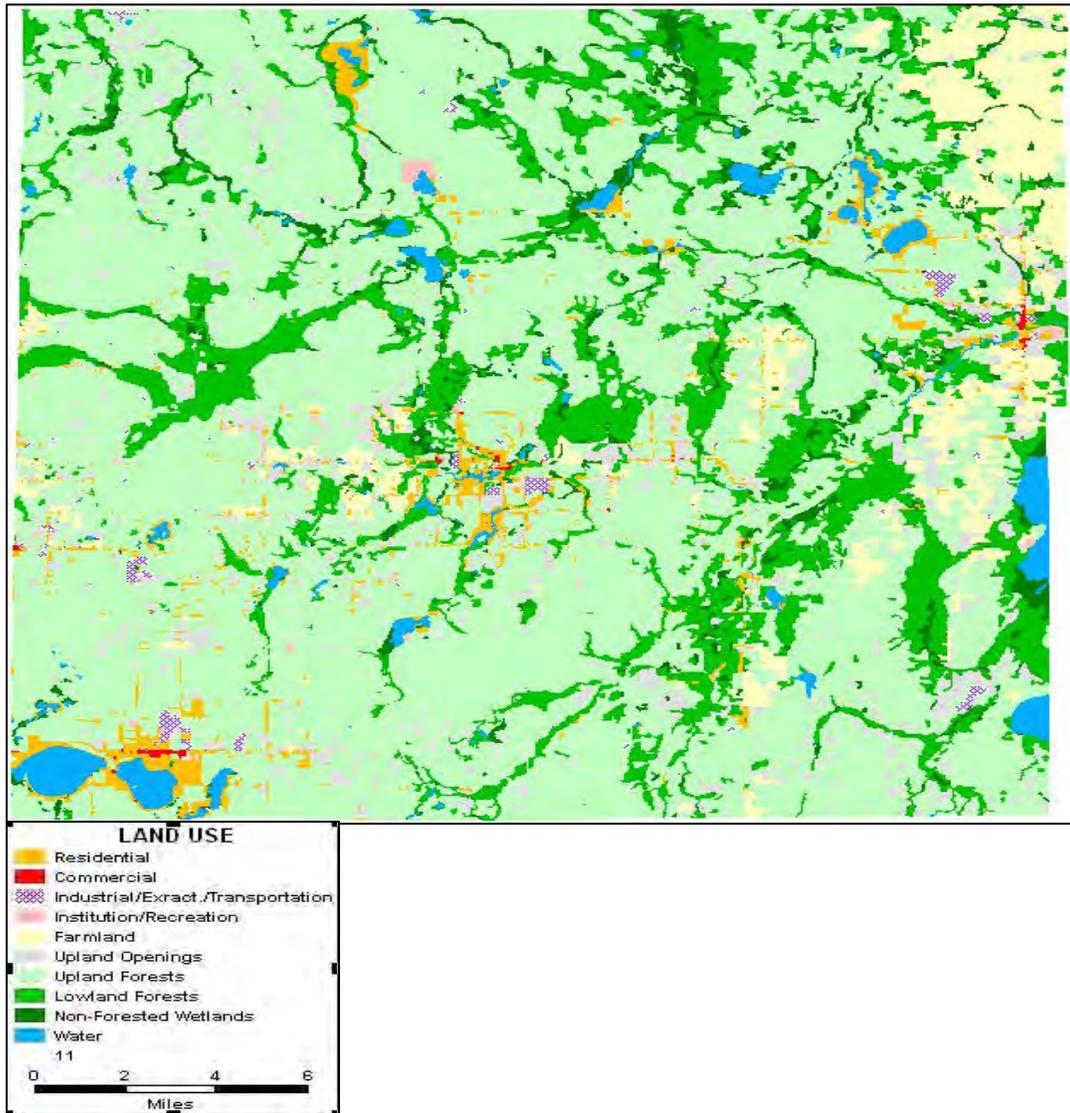


Figure 4-2 Montmorency County Existing Land Use

Table 4-1 Existing Land Use in Montmorency County		
Land Use Category	Number of Acres	Percent of Township
Residential	10,149	2.8%
Commercial	324	<0.1%
Industrial/Extractive/Transportation	1,525	0.4%
Institutional/Recreational	610	0.2%
Agricultural	20,349	5.7%
Non-forested Uplands	23,659	6.6%
Upland Forests	228,572	63.6%
Lowland Forests	53,760	15.0%
Wetlands	11,667	3.3%
Water	8,830	2.5%
TOTAL	359,445	100%

Source: Michigan Resource Inventory System and NEMCOG photo interpretation field verification and map updating.

Residential

Residential use occupies almost three percent (10,149 acres) of the County’s land. The highest concentrations of residential development are located in Atlanta, the Village of Hillman and around East and West Twin Lakes in Lewiston, Albert Township. Lake Geneva (Montmorency Township), Avalon Lake (Hillman Township), Long Lake (Hillman Township), Ess Lake (Hillman Township), Rush Lake (Montmorency Township) and Little Brush Lake (Hillman Township) also have heavy concentrations of residential development along their shores. Montmorency Township has a large concentration of residences in Canada Creek Ranch. Residential development is also scattered along M-32, M-33, and the primary county roads in the central portion of the county.

Commercial

Lands used for commercial purposes comprise less than one tenth of one percent of the county’s area. The largest concentrations of commercial uses are found in Atlanta, Hillman, and Lewiston. Most of these uses are service and retail in nature and are intended for local residents. Additionally, small pockets of commercial uses are found in several rural locations around the county and are typically convenience retail uses that serve the rural residents.

Industrial/Extractive

This category covers four tenths of one percent (1,525 acres) of the county. The majority of uses in this category are light manufacturing businesses and airports in Atlanta, Hillman, and Lewiston. Infrastructure can be found in Lewiston (Albert Township), Atlanta (Briley Township), and the Village of Hillman.

Agricultural

Agricultural lands comprise approximately 5.7% (20,349 acres) of the county. Farming activities include hay production, pastureland, and row crops. The majority of the land is located in the northeast corner of the county. Smaller concentrations of farms are located south of the Village of Hillman and west of Atlanta (Briley Township).

Institutional/Recreational

This land use includes schools, churches, cemeteries, and recreational areas. This category accounts for 0.2% (610 acres) of the land area in the county with the majority of the land composed of the parks and

campgrounds. Almost half of the land area consists of the 290 acres that make up Clear Lake State Park at the north end of Clear Lake in Montmorency and Avery Townships. Other recreational areas include Thunder Bay Golf Course in Hillman and Sheridan Valley ski hill in Albert Township. Approximately 37% of the county is publicly owned with most of the land located in the Thunder Bay River State Forest. While these lands are not classified as recreational, the land offers residents and visitors a place to participate in outdoor recreational activities, such as fishing, hunting, cross country skiing, and snowmobiling. Loud Township has a large amount of public recreation land.

Non-Forested Uplands

Non-forested uplands account for 6.6% (23,659 acres) of the county's land cover/use. This category consists of herbaceous open and shrub land and abandoned farm fields. These lands are generally scattered equally throughout the county.

Upland Forests

The upland forests are the predominant land cover and account for 63.6% (228,572 acres) of the county. The most prevalent forest type is aspen/birch. Other forest types include jack, red and white pine. Albert, Avery, Rust, Vienna, Briley, Loud, Montmorency, and Hillman Townships are covered with upland forests.

Lowland Forests/ Wetlands

The wetland category consists of non-forested types, such as lowland brush (e.g., tag alder and willow), and wet meadows. Non-forested wetlands account for 3.3% (11,667 acres) of the county. The wetlands receive surface water and subsurface water to create the streams and creeks that flow into the lakes. This interconnection shows how activities distant from major water bodies can impact water quality.

Lowland forests occupy 53,760 acres or 15% of the county and are often classified as wetlands since they are located in areas with seasonally high-water tables. These forests include lowland hardwoods and conifers (e.g., northern white cedar, black spruce, balsam fir, elm, red maple, ash and aspen species). Vienna, Rust, Loud, Hillman, and Briley Townships are covered with lowland forests

Surface Water

Open water comprises 2.5% of the area throughout the county. The county has several major rivers and over 89 lakes, ponds, and flooding areas. Some of the county's larger water bodies include East and West Twin Lakes, Fletcher Pond (Rust Township and Green Township, Alpena County), Turtle Lake (Rust Township), Avalon Lake (Hillman Township), Long Lake (Hillman Township), Grass Lake (Montmorency Township), and Rush Lake (Montmorency Township). The Thunder Bay River and its North and South branches flow through the east half of the county, while the Black River is located in the county's northwest corner.

Chapter 5 Community Services and Facilities

Overview

Community services and facilities play an important role in maintaining and improving quality of life (Figure 5-1). 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. Montmorency County is primarily a rural community with a relatively low population density, which presents challenges in providing facilities and services to county residents and mitigating hazard impacts.

County Government

The Montmorency County Board of Commissioners meets on the second and fourth Wednesday of each month, unless posted otherwise, in the Judicial Annex located at 12265 M-32 in Atlanta. The County is represented by five commissioners. There are many county departments, including the clerk, treasurer, sheriff, register of deeds, prosecuting attorney, courts, equalization, building, drain commissioner, MSU extension, housing, emergency management, and conservation district.

Local Government

Montmorency County has eight townships and one village.

Township Governments

- Albert Township is located at 4360 Hanson in Lewiston
- Avery Township is located at 11010 McMurphy Rd. in Atlanta
- Briley Township is located at 12423 Jerome Street in Atlanta
- Hillman Township is located at 24220 Veterans Memorial Hwy. in Hillman
- Loud Township is located at 3882 M-33 South in Atlanta
- Montmorency Township is located at 20841 N. County Rd. 457 in Hillman
- Rust Township is located at 23390 Cohoon Rd. in Hillman
- Vienna Township is located at 2734 M-32 in Johannesburg

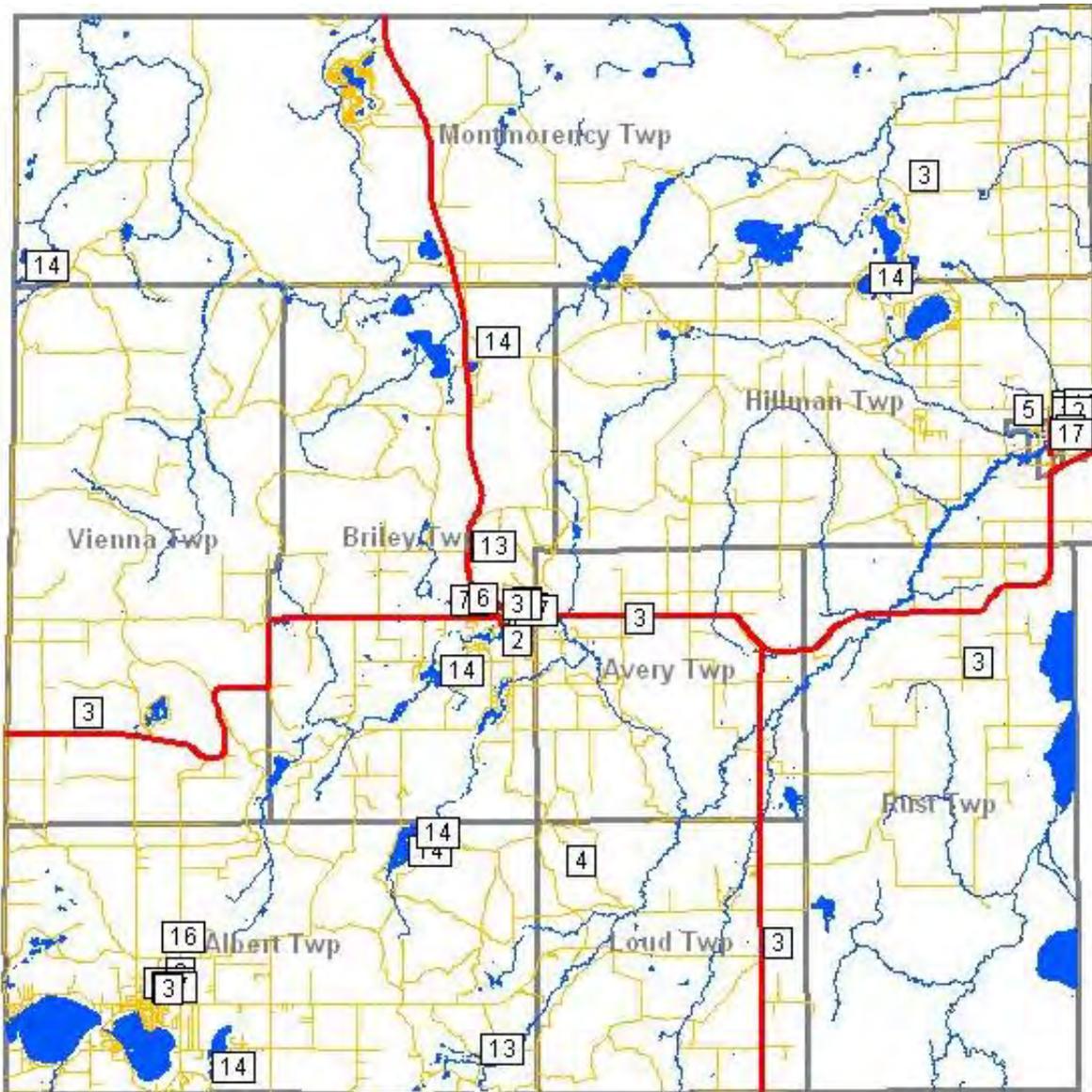
Village Government

- Village of Hillman is located at 24220 Veterans Memorial Hwy. in Hillman

Public Safety

Law Enforcement

The Montmorency County Sheriff's Office is located at 11045 M-32 in Atlanta and provides police protection for the entire county. The Sheriff's Office operates a county jail with 42 beds and a countywide 911 emergency service dispatch center. The jail employs nine full-time corrections officers (including one jail administrator), and three part-time corrections officers. In addition to the Sheriff's Office, the county is protected by the Michigan State Police, which is located on Hanson Street in Lewiston.



Fire Stations	1	Bus Stations	10
Schools	2	Ports/Harbors	11
Govt. Buildings	3	Colleges/Universities	12
Solid Waste Facilities	4	DNR Offices	13
WWTP	5	Campgrounds	14
Muni. Water Supplies	6	Traffic Counts	15
Police Stations	7	Industrial Parks	16
Medical Facilities	8	Cham. of Comm.	17
Health Dept. Buildings	9		

Figure 5-1 Public and Private Infrastructure

Fire Services

Montmorency County has five fire departments that provide fire protection (Figure 5-2).

- **Albert Township Fire Department, 4196 Salling Ave., Lewiston**

 - Equipment: 1- Class A (Type 1) Pumper 1500 GPM, 1 - Class A (Type 1) Pumper 1250 GPM, 1 - 4000-gallon Tender, 1 - 2000-gallon Tender, 2 - Type 6 Brush Trucks, 1 - Type 4 Brush Truck, 1 - ALS Ambulance, 1 - BLS Ambulance
 - Staff: 3 full time, 10 part-time EMS, 15 paid on-call firefighters
 - Budget: \$800,000 annually from millage, special assessment and patient pay
 - Service Area: Albert Township (72 sq. miles)
 - Population Served: 2,400

- **Tri-Township Fire Department, 11700 M-32 West, Atlanta**

 - Sub Station at 3910 M-33 South, Atlanta; Equipment: 1-Class A Pumper 1000 GPM
 - Equipment: 2 - Class A Pumpers 1250 GPM, 1 - 2000 Gallon Tender, 1 - Brush Truck, 1 - Off-Road Rescue Vehicle (Kubota RTV), 1 - Mobile Light Tower/Generator
 - Staff: 24 paid on-call
 - Budget: \$129,500 annually from millage
 - Service Area: Avery, Briley & Loud Townships and part of Montmorency Township(144 Sq. miles)
 - Population Served: 2,700

- **Hillman Township Fire Department, 131 West Third Street, Hillman**

 - Equipment: 2 - Class A Pumpers 1250 GPM, 1- 2000 Gallon Tender, 1 - 3000 Gallon Tender, 1 - Brush Truck, 1 - Off Road Rescue Vehicle (Kubota RTV), and 1 - Mobile Command Trailer
 - Staff: 23 volunteers
 - Budget: \$133,000 annually from millage
 - Service Area: Montmorency, Rust and Hillman Townships (408 sq. miles)
 - Population Served: 4,500

- **Vienna Township Fire Department, 2600 E M-32, Atlanta**

 - Equipment: 1 - Class A Pumper 1250 GPM, 1 - 2000 Gallon Tender, 1 - Type 4 Brush Truck, 1 - Type 6 Brush Truck, 1 - Command Vehicle
 - Staff: 15 paid on-call
 - Budget: \$57,000 annually from millage
 - Service Area: Vienna Township (72 sq. miles)
 - Population Served: 600

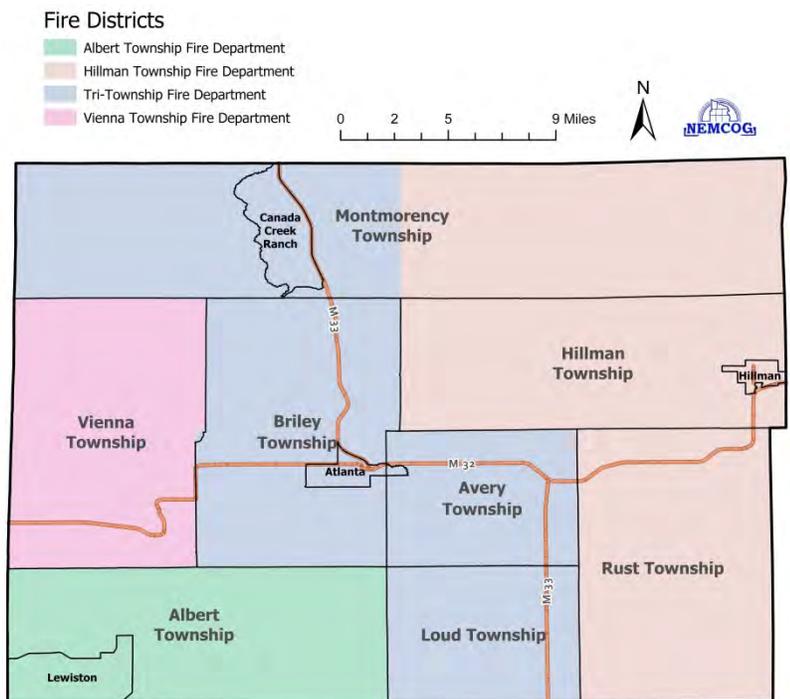


Figure 5-2 Montmorency County Fire Districts

Emergency Medical Services

- **Albert Township Fire Department (see information in Fire Services Section)**
 - Provides staffed 24-hour ALS ambulance service to its service area

- **Tri-Township Ambulance Service, 11413 Parland Street, Atlanta**
 - Equipment: 4 - ALS Ambulances, 8 - BLS Ambulances
 - Staff: 10 paid
 - Budget: \$500,000 annually from millage and patient pay
 - Service Area: Avery, Briley, Loud, Vienna and ½ of Montmorency Townships (288 sq. miles)
 - Population Served: 3,500
 - Provides staffed 24-hour ALS ambulance service to its service area
 - Provides intra-hospital transfers not reflected in the above numbers

- **Hillman Area Ambulance Service, 131 West Third Street, Hillman**
 - Equipment: 2 - ALS Ambulances, 1 - BLS Ambulance
 - Staff: 14 paid
 - Budget: \$528,000 annually from millage and patient pay
 - Service Area: Rust, Hillman, and ½ of Montmorency Townships (336 sq. miles)
 - Population Served: 4,200
 - Provides staffed 24-hour ALS ambulance service to its service area

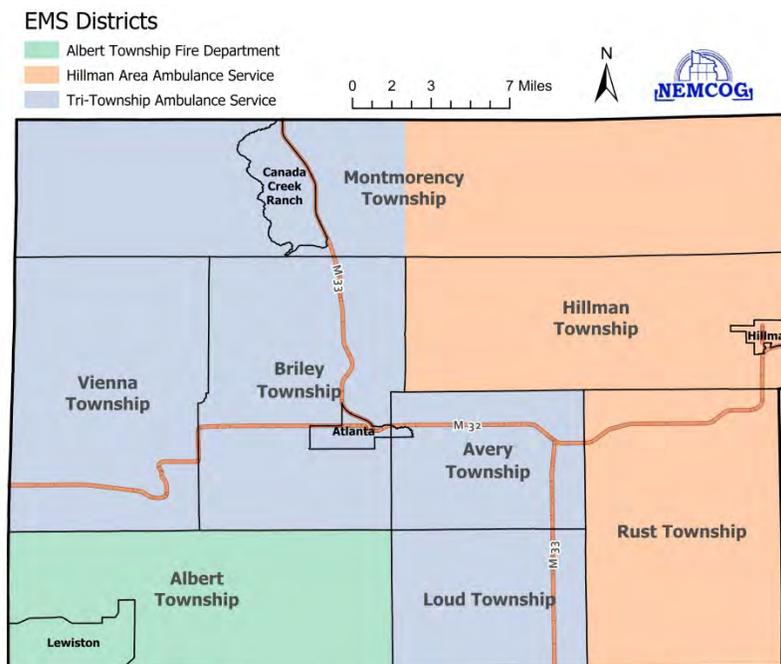


Figure 5-3 Montmorency County EMS Districts

Early Warning & Siren Systems

There is one active emergency warning siren located and operated at the Canada Creek Ranch Association Fire Brigade Building. This siren serves the nearby population. Atlanta, Lewiston, Hillman, and Vienna do not have sirens or an outdoor warning system for their populations.

The County's primary warning system for the general population is integrated into the National Weather Service's NOAA Weather Radio Alert System and the National Emergency Alert System. Signal coverage comes from Alpena County's NOAA transmitter KIG83, utilizing 162.550 MHZ. Montmorency's Specific Area Message Encoding (S.A.M.E.) code is 026119. The Emergency Alert System broadcasts over every radio, mobile phone, and television in the area. However, this coverage is compromised since many of the county's residents utilize mobile phone service that is not covered in the whole county or receive TV programming via satellite, which generally does not broadcast local information.

Medical Facilities

Montmorency County does not have a hospital and residents travel to hospitals in nearby cities to obtain specialized medical services. Pharmacies are located at the Rite Aid Pharmacy in Lewiston and the Hillman Pharmacy in Hillman. There is one dentist in Lewiston.

Thunder Bay Community Health Service, Inc. is a federally qualified health center that serves underserved populations in Northeastern Lower Michigan. Thunder Bay operates two clinics in Hillman and Atlanta that offer outpatient care, ambulatory care, family practice, and occupational medicine. The Atlanta clinic also provides a pharmacy and full dental service.

Munson Health Care Otsego Memorial Hospital operates a clinic in Lewiston. This clinic offers outpatient care, ambulatory care, ultrasounds, physical therapy, radiology, labs, and occupational therapy. It is currently staffed with four primary care physicians.

District Health Department #4 provides community health care needs for Alpena, Cheboygan, Montmorency and Presque Isle Counties. The programs offered by the department fall into two categories: environmental health services and personal health services. Home health care services include hospice and private home health care providers.

The Montmorency County Commission on Aging (MCCOA) is a non-profit agency that provides assistance to Montmorency County residents aged 60 years and over. MCCOA's purpose is to coordinate and implement public and private programs that promote and safeguard the independence, welfare, and dignity of the County's senior citizens. The agency provides services, including homemaking, personal care, respite, MiChoice Waiver Program, MDCH Home Help Program, Veteran's Home Care Assistance, Private Duty, Congregate Meals and Home Delivered Meals in Atlanta, Hillman and Lewiston. In addition, MCCOA collaborates with other agencies to provide additional services through referrals and resources. MCCOA also offers educational, informational and support groups.

The Region 7 Healthcare Coalition covers Alpena, Crawford, Montmorency, Otsego, and Presque Isle Counties. Some of the coalition's responsibilities include functioning as the regional resource for hospitals and medical control authorities, developing an 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 your 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.

Utilities

Water and Sewer

Except for more populated communities, the majority of the county is not served by either municipal water or sewer services. The Village of Hillman has both municipal water and sewer services, and parts of Briley and Albert Townships have a municipal water system.

The Village of Hillman's water and sewer systems serve most of the developed portions of the village. There are approximately 300 customers utilizing the water system and 275 utilizing the sewer system. In 1977, the treatment works were originally constructed. In 1999, the water and sewer lines were extended to serve the high school/middle school complex south of the village. In 2005, the village upgraded the lift stations, and cleaned and expanded the west sewer lagoon.

Briley Township operates a public water system on a pay per user fee system due to past groundwater contamination detected in Atlanta by District Health Department #4. The water system services portions of downtown Atlanta and extends west along M-32 to McArthur Road, east along M-32 to just past Jerome Street, north along M-33 to Depot Street, and south on Co. Rd. 487 to approximately Park Street. The township does not operate a public sewage or wastewater disposal system. Residents and businesses rely on individual septic fields or holding tanks that must be frequently pumped. Unfortunately, many septic systems in and around the downtown area have experienced failures.

Albert Township's very small public water system serves downtown Lewiston. Residents and businesses not in the downtown area have individual septic systems.

Solid Waste

Residential and commercial solid waste is collected by commercial providers or individuals transporting their own waste to transfer stations or the landfill. Private hauling companies provide residential and commercial service pick-up through private agreements with county residents. The county is served by three to four commercial waste hauling companies. The primary solid waste disposal facility is the Montmorency-Oscoda-Alpena Solid Waste Management Authority (MOA Landfill) in Loud Township. The contingency landfill is the Waste Management facility in Waters, Michigan.

Residents can recycle certain materials through the use of recycling drop-off sites in Hillman and Lewiston. Separate containers are located at the MOA Landfill for proper disposal of tires, Freon items, and metal. Periodic household hazardous waste drop-off days are held in Montmorency County and nearby areas.

Telephone, Natural Gas, and Electric Services

The majority of the county receives phone service from Frontier (formerly Verizon & GTE); however, there are other providers for both long distance and cellular services. Unfortunately, the county has areas that do not have phone coverage.

Presque Isle Electric & Gas Cooperative and DTE provide natural gas to the residents in Hillman, Atlanta, and Lewiston. In more rural areas, residents and businesses can purchase propane gas or fuel oil from local suppliers or use wood for heating purposes.

Presque Isle Electric & Gas Cooperative, Great Lakes Energy, and Alpena Power Company provide electric services to the entire county. The Hillman Power Company burns wood waste and converts it to energy. However, the power plant will be decommissioned in 2022 and local businesses will no longer have a place to safely dispose of wood waste, which has the potential to create future fire hazards in the county. Eagle Creek Renewable Energy produces about 1.4 million kilowatt-hours of clean electricity at the Hillman Dam in the Village of Hillman.

Education System

Montmorency County is served by three public school districts: Johannesburg-Lewiston Area Schools, Atlanta Community Schools, and Hillman Community Schools (Figure 5-3). The Johannesburg-Lewiston Area School District has the highest enrollment of the three districts in Montmorency County since it is composed of residents from Montmorency, Otsego and Oscoda Counties. The enrollment in the Johannesburg-Lewiston District has declined, but appears to be stabilizing, while the enrollment for the Hillman and Atlanta Districts has been slowly declining (Table 5-1).

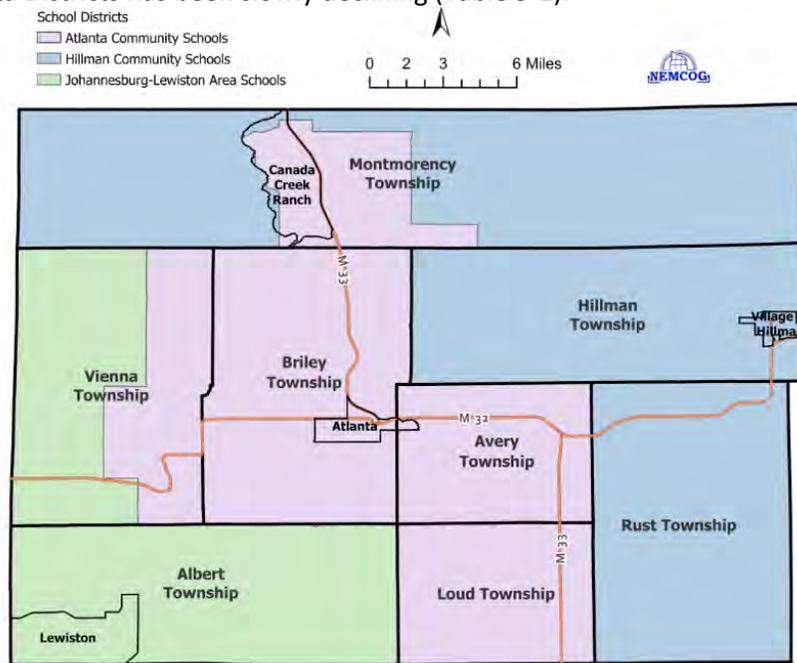


Figure 5-4 Montmorency County Area School Districts

Table 5-1 Montmorency County School System Enrollment Numbers					
Schools	2014	2015	2016	2017	2018
Hillman Schools	495	475	442	437	411
Atlanta Schools	244	245	249	258	240
Johannesburg-Lewiston Area Schools	728	723	718	694	697
Source: Montmorency County					

Montmorency County does not have any post-secondary educational institutions. The nearest colleges are Alpena Community College in Alpena, Kirtland Community College in Roscommon, and North Central Michigan College in Petoskey. These colleges offer a wide variety of associate degree programs, career and technical training, and liberal arts and transfer programs. Additionally, the University Center in Gaylord is affiliated with Kirtland Community College and several other Michigan colleges and universities. The Center offers a variety of technical training opportunities and college level courses.

Canada Creek Ranch

For over 80 years, Canada Creek Ranch has been operating as a private club on 13,500 acres. The club has three rental cabins, a 125-site campground (80 sites have full hook-up service), and a main ranch house with a dining room and 19 motel rooms. In the northeastern section of the ranch, there is a high concentration of residences. The ranch has 538 permanent houses with 185 houses considered to be permanent residences with approximately 304 permanent residents according to the 2010 U.S. Census. The ranch provides fire protection and coordinates with surrounding emergency facilities.

Public Facilities

The majority of the County's government offices, the county courthouse, Sheriff's Office, Michigan Department of Natural Resources (DNR) field office, Family Independence Agency, and Michigan Works are located in Atlanta. The offices for Hillman Township and the Village of Hillman are located in the Hillman Civic Center. Most of the township halls serve as civic centers and are available for rent by the public. The county has three senior centers located in Atlanta, Hillman, and Lewiston.

The Montmorency County Fairgrounds are located north of Atlanta on M-33. The Hunt Creek Research Station is a state-owned cold water fisheries research facility that is located in eastern Albert Township. The station is primarily used as a research facility for Lake Superior State University.

Montmorency County operates three library facilities in Lewiston, Hillman and Atlanta. The Lewiston Area Historical Society owns and operates the only museum in the county. The historical museum has been restored, including a porch, and is open to the public from Memorial Day to Labor Day.

Transportation Network

Roads

State highway M-32 is the major east-west road that connects Vienna, Atlanta, Hillman, Gaylord, and Alpena (Figure 5-4, Figure 5-5). People can travel north and south on I-75 in Gaylord or on U.S. 23 in Alpena. The county's major north-south road is M-33 that connects Onaway, Cheboygan, Fairview, and Mio.

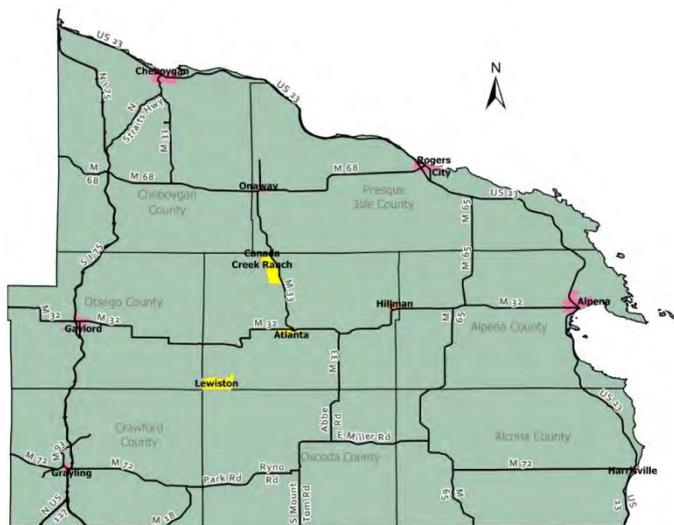


Figure 5-5 State Trunkline Network in Northeast Michigan

Legend

-  Airport
-  Unincorporated Places
-  Uncoded Roads
-  State Trunkline
-  County Primary Road
-  County Local Road
-  Village Major Roads
-  Village Minor Roads
-  Rivers and Creeks
-  Lakes
-  Village of Hillman
-  Census Designated Places
-  Townships

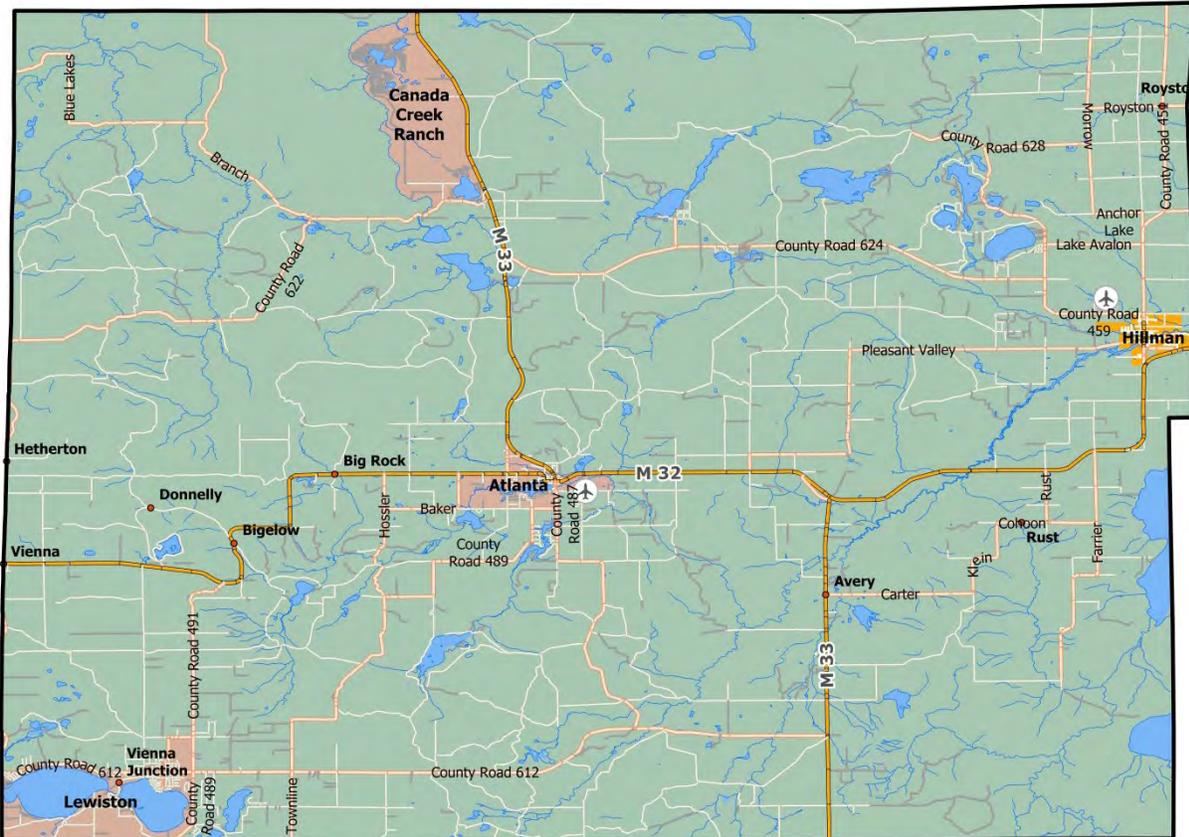
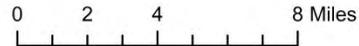


Figure 5-6 Montmorency County Transportation Network

The Montmorency County Road Commission has jurisdiction over the County’s public roads except for M-32, M-33, and the local streets in the Village of Hillman. The Michigan Department of Transportation (MDOT) oversees M-32 and M-33, while the Village of Hillman maintains its street system. MDOT operates a maintenance facility approximately one mile east of Atlanta on M-32. The County Road Commission operates a central garage approximately one mile west of Atlanta on M-32 and satellite garages near Lewiston and Hillman. The primary transportation routes through Albert Township are County Road 491 and County Road 691. The 2017 annual average daily traffic volume for M-32 in Avery Township is between 3,294 and 4,316 vehicles and for M-33 in Avery Township, it is 1,925 vehicles. The 2017 annual average daily traffic volume for M-32 in Briley Township is 4,504 vehicles and for M-33 in Briley Township, it is 1,429 vehicles. The 2017 annual average daily traffic volume for M-32 in the Village of Hillman is between 5,220 vehicles. The major roadways in Hillman Township are County Road 624 and County Road 451. The 2017 annual average daily traffic volume for M-33 in Loud Township is

1,925 vehicles. The 2017 annual average daily traffic volume for M-33 in Montmorency Township is 1,429 vehicles. The 2017 annual average daily traffic volume for M-32 in Rust Township is 4,316 vehicles. The 2017 annual average daily traffic volume for M-32 in Vienna Township is 3,305 vehicles.

Thunder Bay Transportation Authority

The Thunder Bay Transportation Authority provides transportation services to all individuals in Alpena, Alcona and Montmorency Counties as well as individuals south of M-68 in Presque Isle County. The Authority operates five days a week and by special contract other times and days. It has a fleet of 20 medium-duty busses and 4 vans, where 21 of the vehicles are equipped with lifts.

Air Transportation

The county does not have regularly scheduled airline services. However, it has two small airports in Hillman and Atlanta that can accommodate small private airplane traffic. Montmorency Township has an airstrip near Foch Lake. Rust Township has three airstrips. Commercial transport airline service is available at the Alpena County Regional Airport and the Gaylord Regional Airport. Daily passenger airline services to Detroit Metro Airport, charter airplane services, and air freight services are offered at the Alpena County Regional Airport. Pellston Regional Airport in Pellston and the Cherry Capital Airport in Traverse City also offer a wide variety of commercial flights and services.

Community Capability

Overview

Currently, the communities in Montmorency County have a limited number of staff and financial resources. For example, none of the communities have planners, foresters, floodplain managers, public works engineers, transportation engineers, or civil engineers on staff. Therefore, the communities have limited capabilities in implementing the hazard mitigation action and implementation strategies. However, all agencies, communities, and organizations 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. To fully implement the hazard mitigation plan, the communities in Montmorency County would need additional staff and funding.

Planning and Zoning

Montmorency County adopted its master plan in 2002 and all jurisdictions except Rust Township have adopted master plans. Montmorency County does not enforce zoning at the county level since all of the jurisdictions except Loud Township have adopted and administer their own zoning. These communities have a zoning administrator, planning commission and zoning board of appeals that administer their zoning. The planning commissions are responsible for overseeing the master plan, recreation plan and zoning ordinance. The Township Boards, Village Council and County Board are the governing bodies responsible for managing finances and making policy decisions. The Village of Hillman has a manager and staff to support everyday operations. None of the communities have planning staff and rely on planning commissions to oversee planning and zoning activities. Townships rely on elected officials to conduct township business since the townships do not have staff.

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 and incorporate Firewise development standards into their designs. 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.

A review of the local jurisdictions' plans found the jurisdictions have designated a majority of the county's land as natural resource and forest recreation. State lands are typically included in these areas. Residential development is envisioned, but at lower densities than areas planned specifically for residential development. Communities with active farming have designated agricultural future land use areas. However, a comparison with current zoning indicates communities intend to reduce the amount of area planned for future agricultural uses.

Zoning ordinances and zoning maps are local laws that regulate how property can be developed and are primarily 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. Within Montmorency County, the Village of Hillman and the Townships of Albert, Avery, Briley, Hillman, Loud, Montmorency, Rust and Vienna have zoning authority.

Capital improvement plans guide communities' major public expenditures for the next five years. These expenditures include creating access roads and fire breaks and reducing wildfire fuel projects. Capital improvement plans can be used to create a project timeline to implement hazard mitigation strategies.

Public Safety

Montmorency County has an Emergency Management Office and Local Emergency Planning Committee. The county operates a countywide 911 system and the Sheriff's Office operates under the County Board of Commissioners.

Local agencies and units of government have fire suppression crews. All communities provide fire and rescue service either on their own or through a cooperative arrangement. The Michigan DNR has foresters who conduct forest and fuels management on public lands. Forestry consultants and the County Conservation District provide forest management assistance on private lands.

Infrastructure

Montmorency County's drain commissioner works with communities and landowners regarding drainage and flooding issues. The County Road Commission works in conjunction with the townships to manage the local road network, while MDOT is responsible for State and Federal highways.

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Chapter 6 Hazard Identification and Assessments

Overview

Montmorency County is vulnerable to a wide range of natural, technological, and human-related hazards. Emergency management officials are challenged with managing these threats to protect life and property. In order to be effective at mitigating, preparing for, responding to, and recovering from all hazards, the types of hazards facing a county should be identified and understood. Hazard identification provides communities with a realistic base to plan for mitigation, preparedness, response, and recovery activities.

Montmorency County's risk and vulnerability assessments were determined based on the hazard identification, community profile, community input, and the weighted hazard ranking process recommended in Publication #207. However, it should be noted the assessments are not reliable predictors for the occurrence of any hazard. 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.

According to the National Oceanic and Atmospheric Administration's National Centers for Environmental Information data center (NOAA), the county has had 170 storm events with approximately \$1.2 million in estimated damages between January 1950 and April 2019.

Natural Hazards

Ice and Sleet Storms

Description

Ice and sleet storms generate sufficient quantities of ice or sleet that result in hazardous conditions and/or property damage. First, ice storms occur when cold rain freezes and coats the ground, trees, buildings, and overhead wires with ice. Often times, ice storms are accompanied by snowfall, which may cause extensive damage, treacherous conditions, and power loss. Second, sleet storms occur when small ice pellets hit the ground or other objects and bounce. It does not stick to trees or wires but can cause hazardous driving conditions. When electric lines are down due to these storms, 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 Montmorency County is at risk to the occurrence and impacts from ice and sleet storms.

Previous Occurrences and Probability of Future Occurrences

According to NOAA, Montmorency County has had three reported ice storm events between 2001 and 2019 (one in 2001, one in 2005, and one in 2008). The events did not have any deaths, injuries, or property and crop damages. Since three events have occurred in the past 19 years, approximately one event would occur every 6.3 years. Additionally, not all ice and sleet storms may have been reported based on the lack of injuries, deaths, and extensive damages. Also, ice and sleet storms may have been reported as other hazards. 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 cost of damages and the number of injuries and deaths. None of the events in Montmorency County had any injuries, deaths, or property and crop damages.

Vulnerability Assessment

Walking can cause injuries from falls that may result in fractures or broken bones. Ice accumulation can cause damage to tree limbs, and 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. These storms have the potential to shut down towns and cities since they can reduce visibility, cause property damage, loss of life, and infrastructure failure. Blizzards are the most perilous snowstorms and are characterized by low temperatures, strong winds, and enormous amounts of fine, powdery snow.

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. Due to the Great Lakes, Michigan experiences differences in snowfall over short distances with the average annual snowfall accumulation ranging 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 of northern Lower Michigan. In the northeast region of the Lower Peninsula, the average snowfall in the Gaylord area is 141 inches, while it is 96 inches in the Atlanta area.

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 Montmorency County is at risk to the occurrence and impacts from snowstorms. The county is less susceptible to winds from Lake Michigan and Lake Huron. However, the easterly winds from Lake Huron can increase the amount of snowfall in the county.

Previous Occurrences and Probability of Future Occurrences

According to NOAA, Montmorency County has experienced 60 winter storm events since 1997. These events included heavy snow, lake-effect snow, blizzards, winter weather, and winter storms. None of these events had any deaths, injuries, or crop damages. Property damages ranged between \$15,000 and \$150,000. Additionally, the county received a Presidential Emergency Declaration for a snowstorm and blizzard in January 1999. The data shows that approximately one event will occur every 0.4 years, though it should be noted that winter weather hazards fluctuate between years.

Extent

Extent can be measured by the cost of property damages. The property damage caused by snowstorms in Montmorency County has ranged between \$15,000 and \$150,000. On March 2, 2012, a heavy snow event caused \$150,000 in property damages. The weight of the snow downed trees and power lines. Widespread power outages lasted up to a week in some spots. Great Lakes Energy described it as the worst snowstorm in regard to power outages in the last 30 years. Many counties and communities opened shelters to aid those without power or heat. On December 20, 2012, a winter storm event caused \$15,000 in property damages. The sticky, wet snow downed many trees and limbs, which resulted in widespread power outages with some lasting five days. Travel was brought to a near-standstill in some areas for a couple of days due to blowing and drifting snow. Extent can also be measured based on snowfall accumulations. The average annual snowfall in Montmorency County is 96 inches with the highest seasonal snowfall recorded at 139.2 inches in Atlanta.

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.

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, sunstroke, muscle cramps, fatigue, and heat exhaustion. 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. The major threats from extreme cold are hypothermia and frostbite. According to the *2019 Michigan Hazard Mitigation Plan*, Michigan has 35 average annual extreme cold events with 1 death, 9.4 average annual injuries, and \$6.4 million in average annual property and crop damage. Extreme cold affects transportation modes, infrastructure, 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 6-1). 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 6-2 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 Montmorency County is at risk to the occurrence and impacts from extreme temperatures.

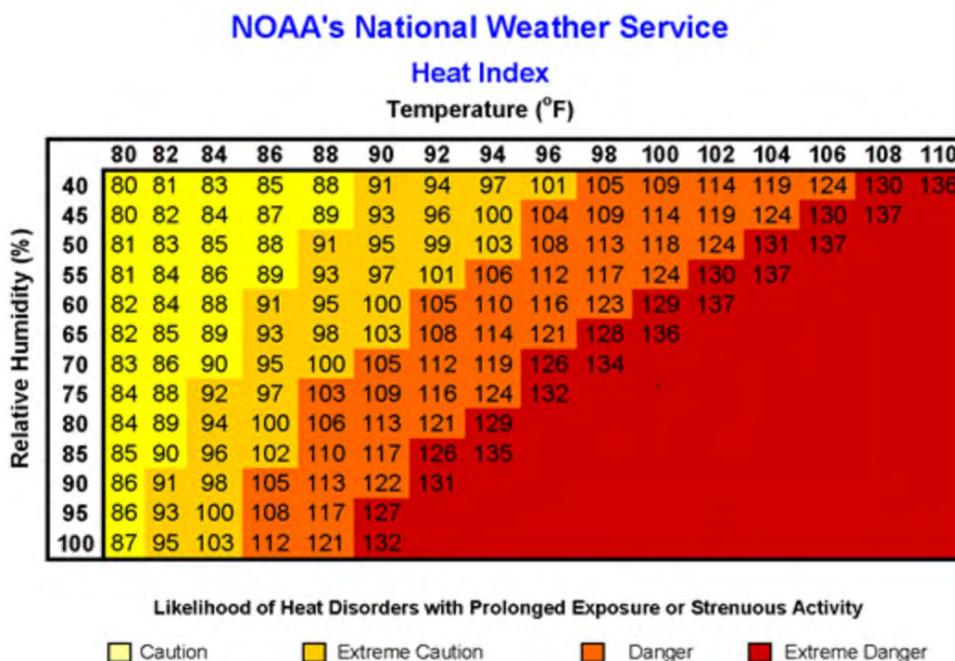


Figure 6-1 NOAA's National Weather Service Heat Index



Wind Chill Chart

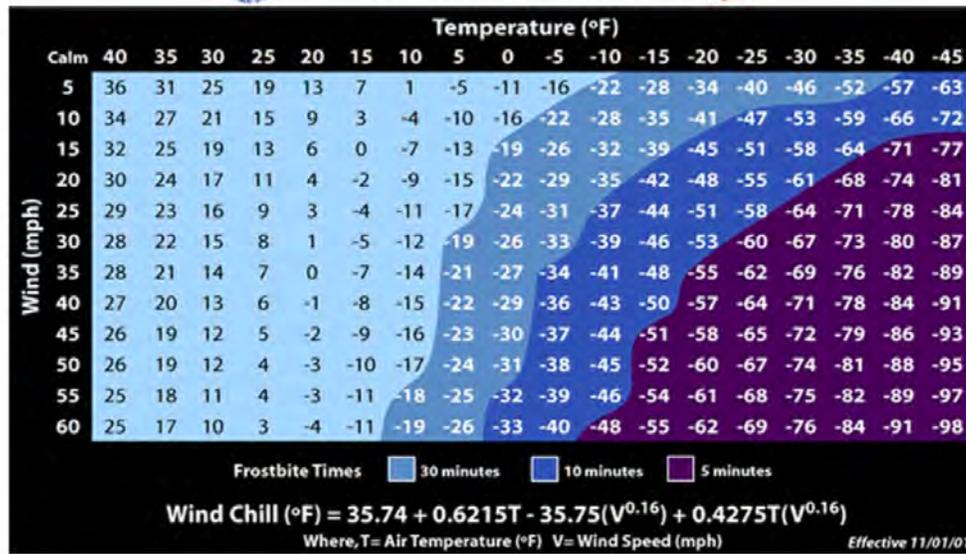


Figure 6-2 Wind Chill Chart

Previous Occurrences and Probability of Future 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 6-3 shows the average maximum temperatures and extreme maximum temperatures in Montmorency County between 1927 and 2004 from the Western Regional Climate Center, Atlanta 5 Wnw, MI Station (200343). Figure 6-4 shows the average minimum temperatures and extreme minimum temperatures in Montmorency County between 1927 and 2004 from the Western Regional Climate Center, Atlanta 5 Wnw, MI Station (200343).

Montmorency County has had two heat or excessive heat events in 2001 and 2018. The events did not have any deaths, injuries, or property/crop damages. The events consisted of hot and humid conditions that caused outdoor events to be modified and attendance at outdoor events to be lower than normal. Since there have been two extreme heat events in Montmorency County in the last 19 years, approximately one extreme heat event would occur every 9.5 years.

Between 2007 and 2015, there have been three extreme cold/windchill events reported in Montmorency County. The events did not have any deaths, injuries, or property/crop damages. The low temperatures caused schools to close and the blowing and drifting snow caused poor road conditions. However, since cold temperatures typically occur during winter months and are coupled with blustery winds and snowstorms, many events may have gone unrecorded or reported as other hazards. Since there have been three extreme cold events in Montmorency County in the last 19 years, approximately one extreme cold event would occur every 6.3 years.

AVERAGE AND EXTREME MAXIMUM TEMPERATURES IN MONTMORENCY COUNTY

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

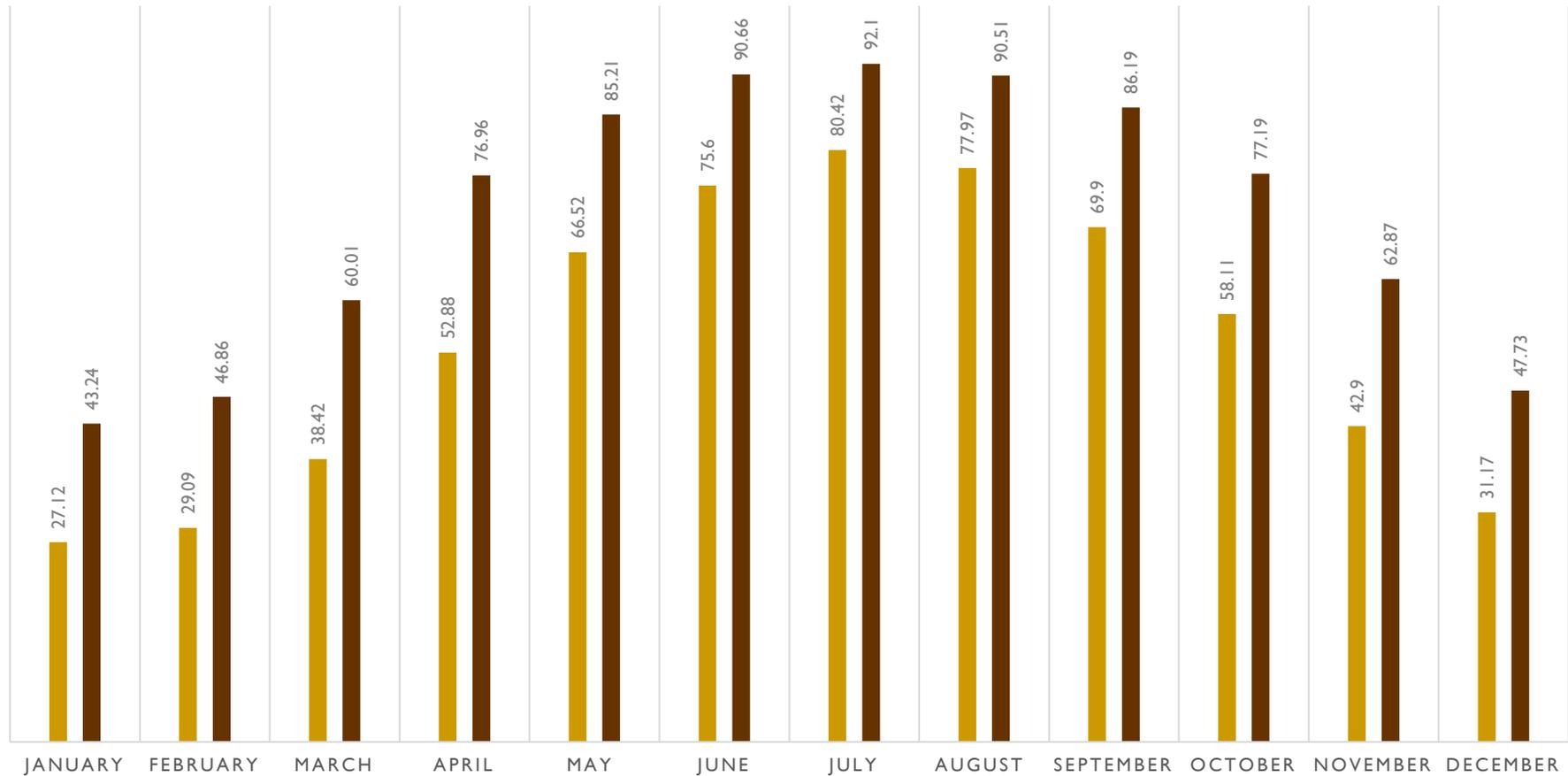


Figure 6-3 Average and Extreme Maximum Temperatures in Montmorency County

AVERAGE AND EXTREME MINIMUM TEMPERATURES IN MONTMORENCY COUNTY

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

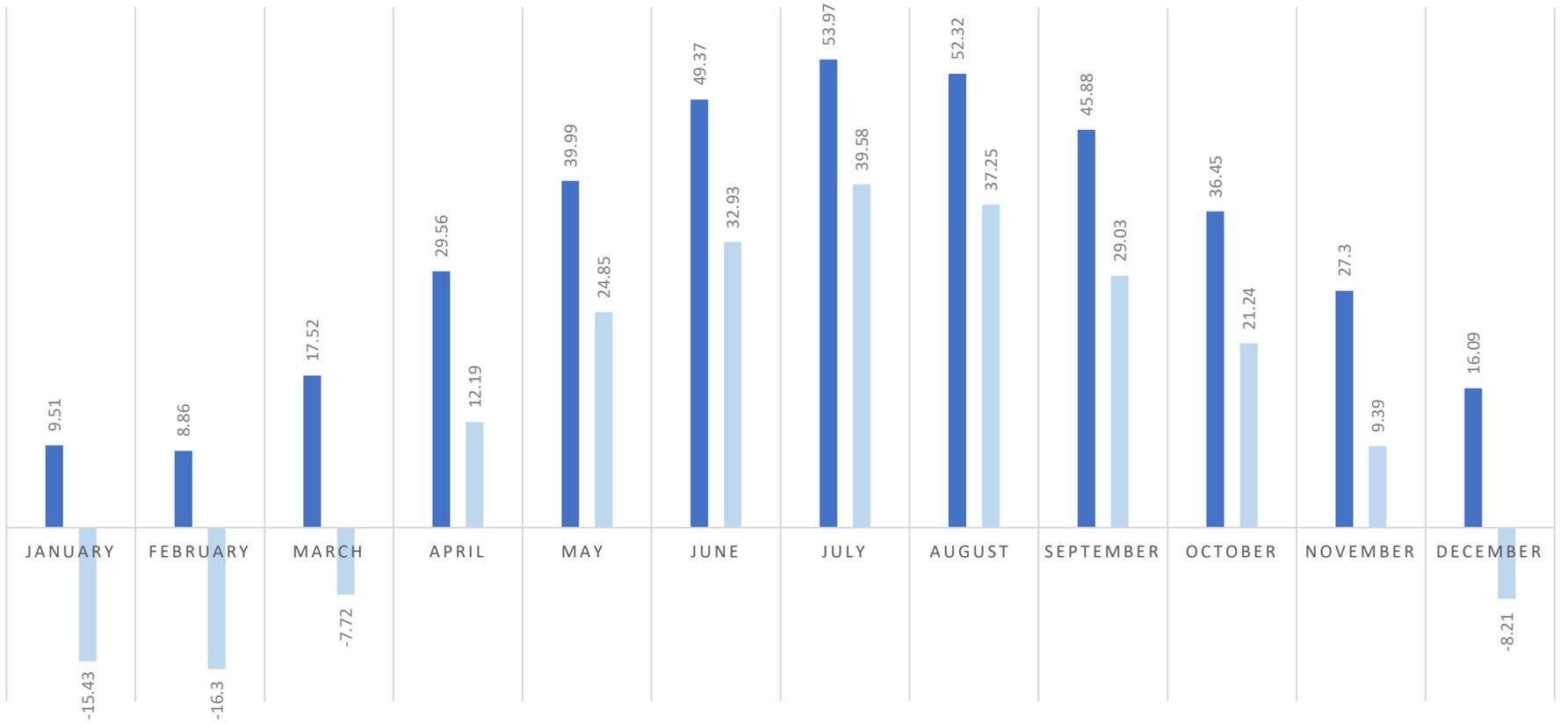


Figure 6-4 Average and Extreme Minimum Temperatures in Montmorency County

Extent

Extreme heat temperatures can be defined by record highs and the National Weather Service Heat Index. Alpena County Regional Airport is currently the closest station to Montmorency County. This station reported the highest recorded temperature at 106 degrees Fahrenheit on July 13, 1936. This temperature correlates to danger and extreme danger of having a heat disorder from prolonged exposure or strenuous activity (Figure 6-1). However, it should be noted that hotter events are possible. Montmorency County does not have any areas that would produce a heat island effect.

Extreme cold temperatures can be defined by record lows and the National Weather Service Wind Chill Index. Alpena County Regional Airport is currently the closest station to Montmorency County. This station reported the lowest recorded temperature at -37 degrees Fahrenheit on February 17, 1979. This temperature correlates to frostbite exposure of 5-30 minutes (Figure 6-2). However, it should be noted that colder events are possible.

Vulnerability Assessment

All of Montmorency 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 windstorm that is associated with fast-moving severe thunderstorms, and primarily occurs during the spring and summer. According to The National Severe Storms Laboratory, winds in excess of 58 miles per hour are considered to be a derecho. Severe windstorms can cause damage to

homes and businesses, power lines, trees and agricultural crops, and may require temporary sheltering of individuals who have lost power for extended periods.

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 throughout Michigan, although they occur most often along the lakeshores 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 mph when in conjunction with a storm front according to the Michigan State Police's *Local Hazard Mitigation Planning Workbook*.

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 with strong winds that damaged or destroyed homes, businesses and public facilities, and downed trees and power lines. In Otsego County, the storm had wind speeds ranging between 80-100 miles per hour and golf-ball sized hail. There were approximately 818 homes that were damaged or destroyed, 11 persons who were injured, 12,000 people who lost power and thousands of trees that were snapped in the county and a Governor's Disaster Declaration was granted to Otsego County to provide state assistance with debris cleanup.

On April 30, 1984, a windstorm struck the entire Lower Peninsula and had 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 one death, several injuries, and over 500,000 customers without power.

Another storm event moved across Michigan on November 10-11, 1998. This storm was the strongest storm ever recorded in the Great Lakes with wind gusts between 50-80 mph and a peak gust of 95 mph was 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 to one-half of the bay bed. As the wind died down, the Bay's water level rose to its normal level.

Measuring Severe Winds

The Beaufort Wind Scale is used to describe wind strength through observation. Table 6-1 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 Montmorency County is at risk to the occurrence and impacts from severe winds.

Table 6-1 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 and Probability of Future Occurrences

According to the USDA’s *Soil Survey of Montmorency County, Michigan*, thunderstorms occur about 35 days each year. Since 1973, there have been 55 high wind and thunderstorm wind events reported in the county with the majority of the events occurring during the summer. None of the events had any deaths. Property damages for the county’s windstorms range between \$2,000 and \$500,000. The most severe and costliest windstorm occurred on April 24, 1993 with wind speeds up to 90 mph. The event did not have any deaths, injuries, or crop damage, but had \$500,000 in property damages. There were two events that had one injury each. On August 3, 1988, a thunderstorm wind event caused one injury, and no deaths or property and crop damages. Information is unavailable about what type of injury was incurred or the magnitude for the winds. The second thunderstorm wind event that had an injury occurred on June 5, 2005 when a falling tree fell on a truck and injured the driver. The event had 55 mph winds, and caused \$40,000 in property damages, and no deaths or crop damages. Two garages in Lewiston were damaged by falling trees and shingles were torn off of some roofs. On June 8, 2011, a thunderstorm wind event with 60 mph winds caused \$22,000 in property damages and \$5,000 in crop damages. The event caused downed trees in the Avalon Lake area, damaged/downed apple trees, and deroofed a barn in Hillman. Since there have been 55 high wind and thunderstorm wind events in the last 47 years, the data shows approximately one event would occur every 0.7 years.

Extent

Winds are measured by wind speed and the amount of damage. The most severe and costliest windstorm occurred on April 24, 1993 with wind speeds up to 90 mph. The event did not have any deaths, injuries, or crop damage. However, it did have \$500,000 in property damages. The county has also had two events that caused injuries and one event that caused \$5,000 in crop damages. Property damages have ranged between \$2,000 and \$500,000. It should be noted that stronger winds and higher damage estimates are possible.

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 crop and timber damage that would result in a loss of crop and

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.

Wildfires

Description

A wildfire is an unplanned, uncontrolled fire in grassland, brushland, or forested areas. They 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 burning outdoor debris. Wildfires cause destruction to property and timber resources, injure or cause 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 the 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 annually with the majority of fires occurring in April, May and June. The Michigan DNR is primarily responsible for wildfire suppression and prevention; however, the U.S. Forest Service and local fire departments assist them. In 2018, the Michigan DNR reported there were 301 fires and as of June 2019, 168 fires were reported. In northeastern Michigan, the large number of permanent and seasonal homes and the increase in tourists during the driest (most vulnerable) times of year greatly increases wildfire risks.

Location

The County's most prevalent forest types are Aspen, Maple/Beech/Birch, and Oak/Hickory (Figure 6-5). Approximately 31% of the County's forested land is a combination of jack pine and oak/hickory forests that were historically perpetuated by wildfires. A review of the pre-settlement vegetation for Montmorency County shows wildfire prone areas are located on state-owned property, on large club acreages, in Albert and Hillman Townships, and along the western portion of the county (Figure 6-6). These vulnerable areas include Lewiston, the Village of Hillman, and Canada Creek Ranch. About 6,164 persons (about 60% of Montmorency County's total population), and 5,656 housing units (about 50% are seasonal dwellings) are located in these areas.

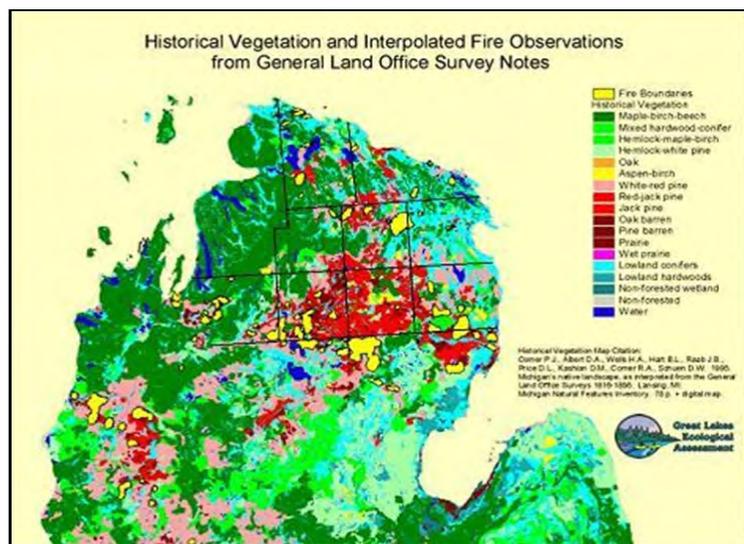


Figure 6-5 Historic Vegetation and Fire Observations

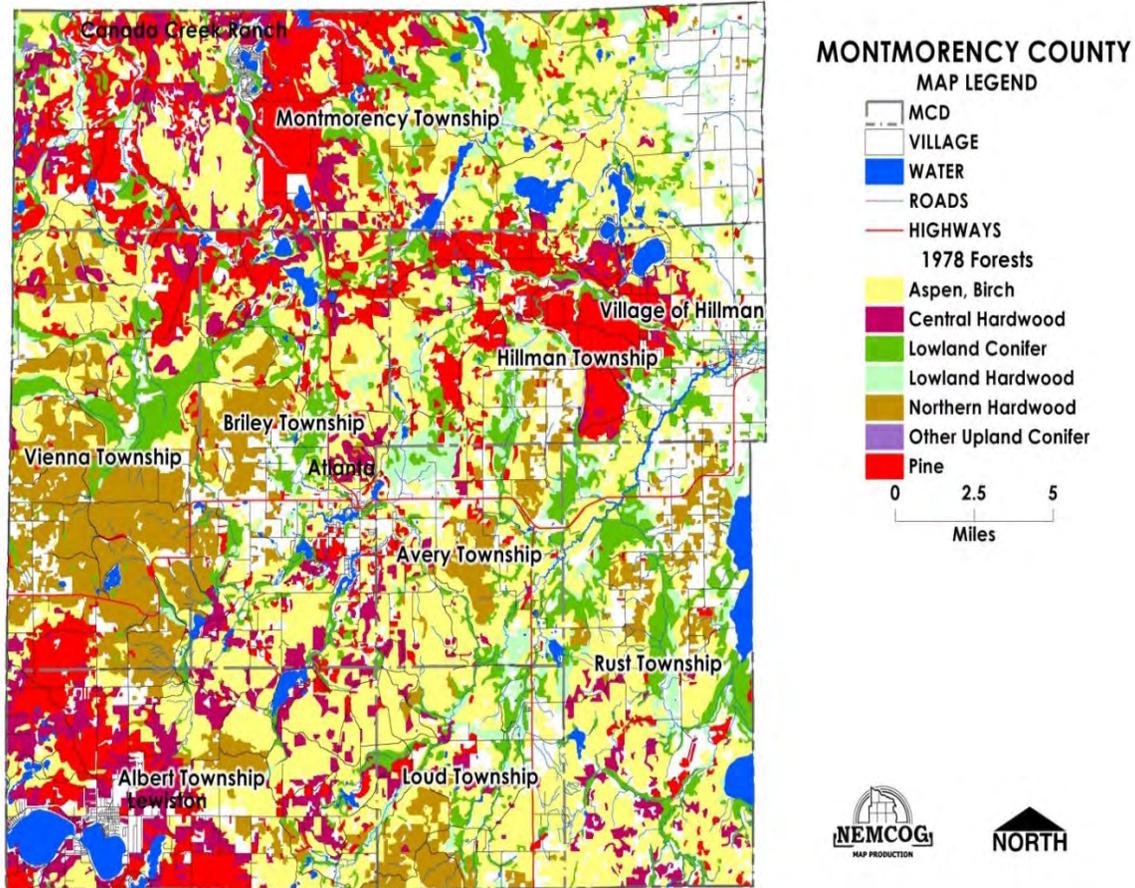


Figure 6-6 Montmorency County's Forest Cover and Wildfire Susceptibility

Previous Occurrences and Probability of Future Occurrences

According to the Montmorency MSU Extension Office, Montmorency County has not had any large wildfires recently, but it does continue to have numerous small grass and brush wildfires that have destroyed a number of buildings in the county. A brush fire burned 26.2 acres in Albert Township at the intersection of Wolf Lake and Townline roads around 2:23 p.m. Albert, Greenwood, and Tri-Township fire crews responded, along with tanker support from Hillman, and law enforcement from Montmorency and Oscoda Counties' Sheriff Offices. DNR fire crews from Grayling, Gaylord, and Mio also provided support, including backhoes for digging fire lines. The fire caused Townline and Big Wolf Roads to be closed and homes to be evacuated. The fire was under control by 4:40 p.m. and fire crews spent the weekend for mop up work. Fire crews saved four homes. A garage on the property where the fire began was lost.

In Montmorency County, the Michigan DNR reported there were 110 wildfires that burned 416 acres between 2001 and 2012 (not including wildfires suppressed by the U.S. Forest Service or local fire departments). Between 2013 and 2018, Montmorency County has had 64 wildland fire incidents that burned 66.2 acres according to the Michigan DNR Wildland Fire Interactive Map. Since Montmorency County has had 174 wildfires in the past 18 years, the data shows approximately one event will occur every 0.1 years.

Extent

Extent can be measured by the number of acres burned and the cost of property damage. In Montmorency County, wildfires tend to be caused by debris burns, although there have been fires caused by power lines, campfires, equipment, and miscellaneous causes. These fires range from 0.1 to 2 acres burned. However, it should be noted the State ignites prescribed burns in the county to reduce hazardous fuel loads and manage landscapes.

Vulnerability Assessment

All of the county's existing and future buildings and populations are at-risk to wildfires. Additionally, neighboring counties are also at-risk since wildfires can spread across political boundaries. About 31% of the county is composed of jack pine (pyrophytic plants) and oak/hickory forest types. 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. Wildfires also have the ability to cause secondary hazards (e.g., fixed site hazardous material accident, oil and gas accident, etc.).

Lightning

Description

Lightning is a discharge of electricity between the clouds, air, or ground to equalize the charged regions in the atmosphere. It is still being debated about 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 wildfires.

In the United States, approximately 100,000 thunderstorms occur annually according to the *2019 Michigan Hazard Analysis*. The National Weather Service Storm Data reports that in the last ten years (2009-2018), the U.S. has had on average 27 lightning fatalities and 243 injuries. On average, the *2019 Michigan Hazard Analysis* reports lightning 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 following statistics were compiled from NOAA and the National Lightning Safety Institute (NLSI) for the period between 1959 and 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 effects, such as memory and attention deficits, sleep disturbance, fatigue, dizziness, and numbness. Additionally, the NLSI estimated the annual lightning damage to property exceeds \$4-5 billion in the United States.

Michigan’s lightning-related deaths and injuries are fairly consistent with the national trends in terms of location of deadly or injury-causing strikes (Table 6-2, Table 6-3). According to the National Weather Service’s 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.

Table 6-2 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 6-3 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

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 Montmorency County is at risk to the occurrence and impacts from lightning.

Previous Occurrences and Probability of Future Occurrences

According to NOAA, Montmorency County has not had any lightning events. Based on this data, the county would not have any future lightning strikes. 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 are higher. For example, a lightning event was reported in *The Montmorency County Tribune* on July 23, 2019. The lightning strike impacted Albert Township’s well and phone system.

Extent

One method to measure lightning extent is by flash density even though not all flashes result in a lightning strike. In Montmorency 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 property damage and the number of deaths and injuries. Unfortunately, Montmorency County has not had any reported lightning events.

Vulnerability Assessment

All existing and future buildings, exposed infrastructure, tall trees, 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, 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., the Southern half of the Lower Peninsula) are also most prone to large and damaging hail. The majority of the 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 that moved across northern Lower Michigan produced hail up to 2" in diameter, destroyed an estimated 30,000-35,000 bushels of apples at area farms, and damaged 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 Montmorency County is at risk to the occurrence and impacts from hailstorms. According to the National Weather Service, Montmorency County is in an area of the United States that has on average one day of hailstorm events per year.

Previous Occurrences and Probability of Future Occurrences

Between March 1983 and April 2019, Montmorency County has had 40 hailstorms reported to NOAA. None of the events had any deaths, injuries, or property damages. The largest sized hail reported in Montmorency County was 2.5 inches on August 27, 1990. The event did not have any deaths, injuries, or property/crop damages. The costliest hailstorm occurred on July 8, 2016 when a hailstorm with 1.5-inch hail caused \$50,000 in crop damages (soybeans and wheat). The event did not have any deaths, injuries,

or property damages. Since there have been 40 events in the past 37 years, approximately one event will occur every 0.9 years. It should be noted that hailstorm events and damages may not have been reported to NOAA, which means the number of events and damages may be higher.

Extent

The greatest extent of hail reported in Montmorency County was 2.5 inches, which correlates to H7 (Destructive) on the TORRO Hailstorm Intensity Scale. According to the scale, hailstones of this size are equivalent to a tennis ball and can cause severe roof damage and serious injuries.

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.

Riverine, Flash, and Urban Flooding

Description

Riverine flooding occurs when rivers, streams, and lakes 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 throughout the year. Flooding caused by severe thunderstorms has a greater impact on watercourses with small drainage areas.

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

Urban flooding occurs when water flows into low-lying areas because it does not have a place to go. 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 the water. 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 Plan 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 has not developed flood insurance maps for Montmorency County. Riverine and urban flooding events have not been documented in Montmorency County. Figure 6-10 shows the location of the county's water resources and wetlands. Generally, the wetlands show where the floodplains are located and the wetlands function to prevent flooding by storing water. County soil maps show small areas of flood prone soils within the county with the most vulnerable areas located along the Thunder Bay River near Genre and Avery Drives (Figure 2-3).

Previous Occurrences and Probability of Future Occurrences

According to NOAA, Montmorency County has had one flash flood event reported. The event occurred on April 11, 2001 when water covered many secondary roads from several small lines of thunderstorms. The event did not have any deaths, injuries, property damages, or crop damages. However, the *2019 Michigan Hazard Analysis* reports that Montmorency County has had two flood events with \$200,000 in property damages. Based on NOAA's data, approximately one event would occur every 19 years. The probability for a future event cannot be determined based on the *2019 Michigan Hazard Analysis* since the date of the events are not included in the document. It should be noted that there may be a lack of reporting on 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

Flood extent can be measured by the amount of property damage. The *2019 Michigan Hazard Analysis* reports two events in the county with \$200,000 in property damages. Unfortunately, specific information is unavailable (date, description of event, etc.). 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 lack of flood events in the county may also be attributable to the county's wetlands assisting in flood prevention through the collection and storage of stormwater and floodwaters.

Flooding and high water are not issues along the North, South, and Main branches of the Thunder Bay River, the Black River, and the Au Sable River. Instead, the Thunder Bay River and its tributaries, the county's lakes, and ponds have the potential for shoreline erosion. *The Thunder Bay River Watershed Initiative* identified sedimentation from steep slopes, short culverts, and runoff at road-stream crossings as top priorities for the Thunder Bay River. The Road Commission has collaborated with agencies, businesses, and organizations to implement a program that evaluates and improves road crossings on the streams and rivers in the county. The program has extended culverts and relocated and constructed bridges. Program completion depends on available funding.

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. These buildings 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 provide affordable insurance to reduce the impact of flooding on private and public structures. 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, residents and business owners can receive reduced flood insurance premiums.

When NFIP was created, it included discounted policies that paid at rates that do 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 set limits on the amount 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 FEMA's Community Status Book Report for Michigan, Montmorency County and its jurisdictions do not participate in the National Flood Insurance Program and floodplain maps have not been developed for the county. Therefore, the county does not have any FEMA repetitive loss structures.

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 it, and assess when and where it will occur.

Some of the severe impacts 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 the 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, the central and eastern portions of the United States, including 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. 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 consecutively.

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 either 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 counties in Michigan. 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. The closest station to Montmorency County is at the Alpena County Regional Airport, which maintains PDSI information. The station shows that Montmorency County's inland areas are currently experiencing a moderate wet period (Figure 6-7).

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 Montmorency County is at risk to drought occurrence and impacts. Agricultural lands are primarily found in the northeast corner of the county with smaller concentrations of farms located south of the Village of Hillman and west of Atlanta (Briley Township).

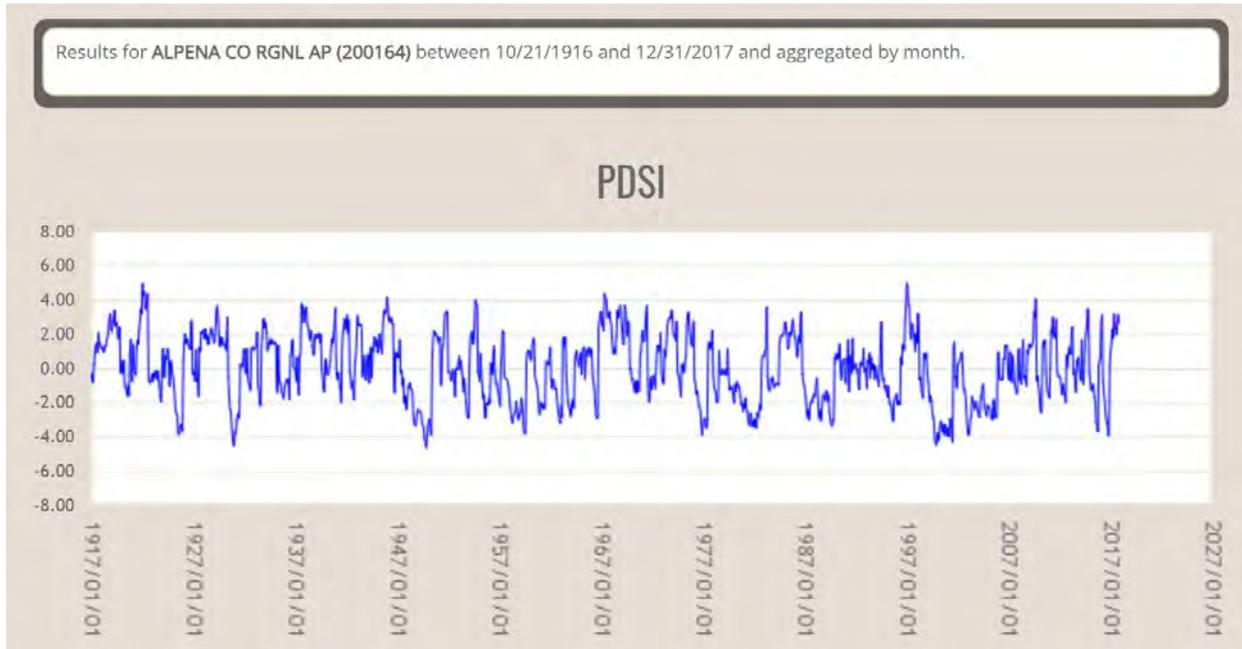


Figure 6-7 Palmer Drought Severity Index for the Alpena County Regional Airport

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

Previous Occurrences and Probability of Future Occurrences

The amount of precipitation received each year has the potential to inform the impact drought may have on the county. Montmorency County's average annual precipitation is 24.9 inches, and its average annual snowfall is 96 inches.

In Michigan, droughts are monitored and analyzed through its ten climate divisions. According to the *2019 Michigan Hazard Analysis*, Montmorency County is part of Climate Division 4, along with Alcona, Alpena, Cheboygan, Crawford, Iosco, 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 6-8). 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, Montmorency 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 Great Lakes levels in Michigan.

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, Montmorency 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, and some water deficits.

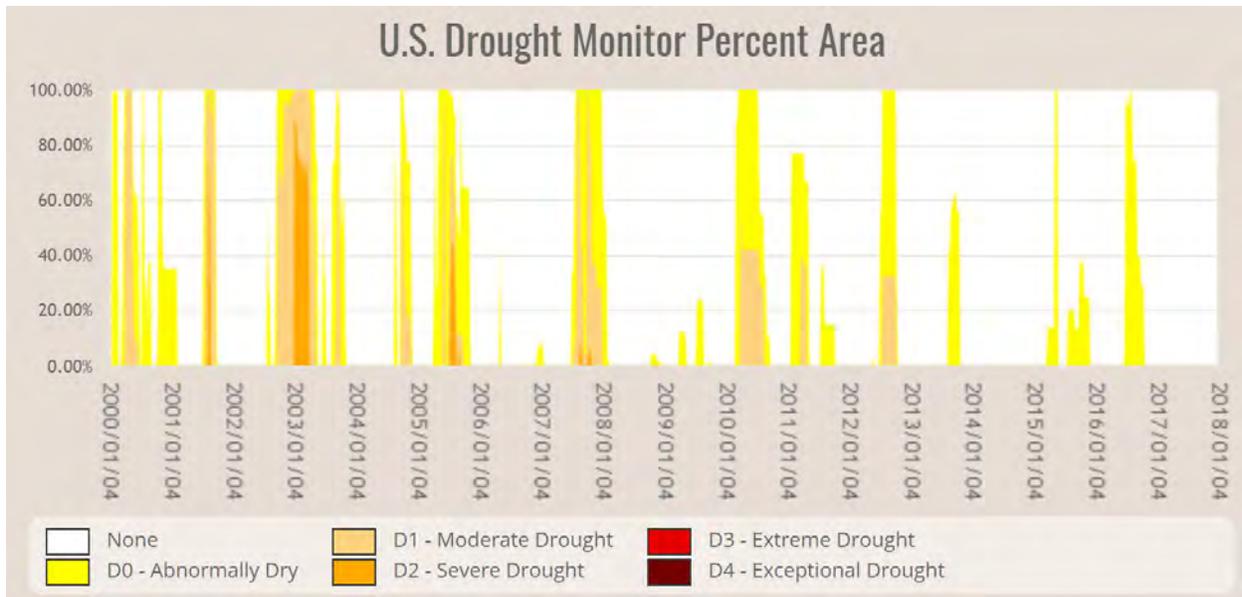


Figure 6-8 U.S. Drought Monitor Percent Area for Climate Division 4
Source: The National Drought Mitigation Center's Drought Risk Atlas

Extent

Generally, the county experiences abnormally dry conditions that fall into the drought watch category of the U.S. Drought Monitor. Severe droughts occurred in 2001, 2003, 2005, and 2007. Despite not experiencing exceptional droughts, the county has 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 weather-related factors. In Montmorency County, impacts from droughts include an increase in wildfires, a reduction in farm products, a reduction in timber production, a reduction in crop and livestock production, a decrease in watercraft access to large inland lakes, and the loss of tourism. With an increase in wildfires, there would be an increase in warning and/or evacuating residents. 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 activities (hay production, pastureland, and row crops) occur on about 5.7% of the county's land. Farms may see an increase in production expenses.

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 mph 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. Generally, tornado path widths are less than one-quarter mile wide. These storms 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, tornadoes are most likely 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 6-4). It uses 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 6-4).

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

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 Montmorency 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.

Previous Occurrences and Probability of Future Occurrences

Between 1957 and 2004, Montmorency County has had six reported tornadoes, which caused \$240,000 in property damage (Table 6-5). No deaths, injuries, or crop damage occurred as a result of these tornadoes. The most destructive tornado touched down in Rust Township on June 13, 2004 and caused \$150,000 in property damages. Damage was sporadic, which suggest the tornado was on the ground intermittently. There was occasional tree damage, a billboard on M-32 was destroyed at the Alpena/Montmorency County line, roofs were damaged, windows were broken, and a barn, silo, and 80-year-old farmhouse were destroyed. Homes were damaged two miles south of Hillman with shingles blown off and one home struck by a falling tree. Since six events have occurred in the past 63 years, approximately one event will occur every 10.5 years. It should be noted the majority of the events occurred in the 1980’s and 1990’s. Historical data shows Albert Township is at greater risk for a tornado (Table 6-5). The tornado that touched down in Albert Township on July 3, 1999 continued into Oscoda County where the tornado became stronger, damaged park facilities in Comins (Oscoda County), and destroyed a Parsonage, Mennonite Church, Township Hall, Fire Department, and Post Office in Comins (Oscoda County).

Table 6-5 Tornado Storm Events January 1957-April 2019							
Date	Time	Location	F-Scale	Number of Deaths	Number of Injuries	Property Damage	Crop Damage
6/14/1957	1730 CST	Vienna Township	F1	0	0	\$25,000	\$0
7/17/1982	1035 CST	Albert Township	F0	0	0	\$2,500	\$0
7/17/1982	1035 CST	Albert Township	F0	0	0	\$2,500	\$0
5/19/1998	1605 EST	Avery Township	F0	0	0	\$0	\$0
7/3/1999	1821 EST	Albert Township	F1	0	0	\$60,000	\$0
6/13/2004	1730 EST	Rust Township	F1	0	0	\$150,000	\$0

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

Extent

Based on the Fujita Scale, Montmorency County’s most intense tornadoes occurred in Vienna Township, Albert Township, and Rust Township with winds ranging from 73-112 mph. The tornado in Vienna Township did not have any deaths, injuries, or crop damages, but had \$25,000 in property damages. The tornado in Albert Township did not have any deaths, injuries, or crop damages, but had \$60,000 in property damages (three homes were damaged, several mobile homes were damaged). The tornado in Rust Township did not have any deaths, injuries, or crop damages, but had \$150,000 in property damages. Montmorency County has not had any tornadoes since the United States began using the Enhanced Fujita Scale to measure tornadoes. Future tornadoes may have greater wind speeds.

Vulnerability Assessment

All of Montmorency County’s existing and future buildings, population, and infrastructure are at-risk 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 (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.

Earthquakes

Description

An earthquake usually occurs without warning when the earth suddenly starts shaking from the breaking and shifting of underground rock. Earthquakes range in intensity from slight tremors to great shocks and can last a few seconds to several days. As of yet, scientists are unable to predict exactly when or where an earthquake will occur. However, earthquakes generally occur along faults. Casualties usually result from falling objects and debris. Earthquakes have the potential to contaminate water supplies, damage transportation systems, disrupt communication systems, electric lines, gas lines, and sewer and water mains, and can cause other hazards, such as fires and hazardous material spills.

According to the USGS, Michigan has felt several mildly damaging earthquakes from the New Madrid Seismic Zone and upstate New York since the late 1700s. Unfortunately, the exact number is difficult to determine due to varying scientific opinion. Based on scientific studies, portions of southern Michigan could receive minor damage, such as damage to natural gas and petroleum pipelines, if an earthquake occurred in the New Madrid Seismic Zone. If the earthquake occurs in the winter, many areas of the state could be severely impacted by fuel shortages. Damage would probably be negligible in well-designed and constructed buildings. However, poorly designed and constructed buildings could suffer considerable damage under the right circumstances. Montmorency County is located in an area with less than 2%g (peak acceleration) and has a relatively low seismic risk.

Measuring Earthquakes

Earthquakes are measured by their magnitude (size of the earthquake) and intensity (effect of an earthquake on the Earth's surface). The U.S. Geological Survey (USGS) no longer uses the Richter Scale to measure the magnitude of an earthquake. Instead, the USGS uses the Moment Magnitude Scale since it provides more accurate estimates for a wider range of earthquakes than the Richter Scale. In the United States, the Modified Mercalli Intensity Scale is used to determine the intensity of an earthquake, which ranks observed effects on a scale ranging from I (not felt) to X (extreme).

Location

Michigan is not located in an area subject to major earthquake activity and has not had a severely destructive earthquake documented. Although there are fault lines in the bedrock in Michigan, such as the one running through Otsego County into Montmorency County and the one running through Otsego County into Crawford County, the fault lines are considered to be inactive. Unfortunately, these fault lines are poorly mapped according to the U.S. Geological Survey (USGS).

Previous Occurrences and Probability of Future Occurrences

In 2014, the USGS linked hydraulic gas fracturing with an increase in earthquakes in areas that did not previously have them. According to EGLE, there are over 12,000 wells that do hydraulic fracturing in Michigan, with the majority located in Otsego, Montmorency, Alpena, and Alcona Counties. Since the injections for wastewater drilling impact the risk of an earthquake, EGLE has procedures to locate

injection wells away from faults. Since Montmorency County has not had a previous occurrence of an earthquake, no further analysis will occur at this time.

Extent

Montmorency County has not had previous occurrences of an earthquake. However, there is a potential of an earthquake due to hydraulic gas fracturing. To prevent these type of earthquakes, EGLE has established procedures to locate injection wells away from fault lines.

Vulnerability Assessment

If an earthquake occurs in the winter, many areas in the state could be severely impacted by fuel shortages. Damage would probably be negligible in well-designed and constructed buildings. However, poorly designed and constructed buildings could suffer considerable damage under the right circumstances.

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. The populations that are most at risk from this hazard would be located in industrial areas, residential areas that have been constructed overactive or abandoned mines that have underground cavities near the surface, and areas where extensive amounts of groundwater have been withdrawn.

In Montmorency County, the most prevalent subsidence features are the Karst sinkholes on state-owned land in the northwestern portion of the county. 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. It takes several decades for new sinkholes to appear on the surface. Due to the moist terrain within the bedrock and the partially subterranean shaded location, the sinkholes host plant communities that are not found in the surrounding surface areas.

Location

Karst sinkhole lakes are found in Montmorency and Albert Townships.

Previous Occurrences and Probability of Future Occurrences

Walled Lake and Lost Lake are karst sinkhole lakes in Montmorency Township. Walled Lake is a 44-acre, spring fed lake. North Twin Lake and South Twin Lake are karst sinkhole lakes in Albert Township. 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, 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 Montmorency County, the karst sinkhole lakes are located on State-owned property. The lakes are open to the public for fishing and other recreation activities under strict regulations to prevent damage to the lakes. Camping within 600 feet of a sinkhole lake is prohibited, and the type of boats that are permitted on the lakes is regulated (some lakes prohibit all boats, while other lakes allow the use of

non-motorized watercraft or boats with an electric motor). The extent can also be measured by the amount of damage caused by the collapse of ground. Unfortunately, data is not available to quantify damages.

Vulnerability Assessment

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. 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 have 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 the 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.

Technological Hazards

Transportation Accident (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 the 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 during take-off or landing according to the NTSB and airline industry. When responding to these accidents, it may be difficult to suppress 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 include communities near airports, communities with railroad tracks, 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 with the water accidents strictly occurring on all waterways (rivers, streams, lakes, etc.). The air transportation accidents have a greater chance of occurring at the airports in Atlanta, Lewiston, and Hillman. Land transportation accidents have a greater chance of occurring on M-32 and M-33 since they experience high traffic volumes.

Previous Occurrences and Probability of Future Occurrences

Montmorency County does not have any major air and land transportation accidents reported. However, smaller accidents have likely occurred. Air accidents would primarily occur around the airports. Land transportation accidents would primarily occur along the roadways and trail systems. Water transportation accidents would primarily occur on the Thunder Bay River, the Au Sable River, the Black River, East and West Twin Lakes (Lewiston, Albert Township), Fletcher Pond (Rust Township and Green Township in Alpena County), Turtle Lake (Rust Township), Avalon Lake (Hillman Township), Long Lake (Hillman Township), Grass Lake (Montmorency Township), Avery Lake (Albert Township), Clear Lake (Montmorency Township), and Rush Lake (Montmorency Township).

Extent

All of Montmorency County is at-risk for an air, land, or water transportation accident. 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*, Montmorency County has had one fatal traffic crash, 12 with serious injuries, and property damage only for 320 out of 384 traffic crashes. The average cost of a traffic crash casualty was \$50,067 with the total traffic crash cost for all 384 accidents equaling \$20,761,839. The county also experiences several snowmobile-related deaths each year. However, compiled data is unavailable to quantify the extent. Additionally, data is also unavailable to quantify the extent of air and water transportation accidents. The 2017 annual average daily traffic volume for M-32 in Avery Township is between 3,294 and 4,316 vehicles and for M-33 in Avery Township, it is 1,925 vehicles. The 2017 annual average daily traffic volume for M-32 in Briley Township is 4,504 vehicles and for M-33 in Briley Township, it is 1,429 vehicles. The 2017 annual average daily traffic volume for M-32 in the Village of Hillman is between 5,220 vehicles, 4,316 vehicles in Rust Township, and 3,305 vehicles in Vienna Township. The 2017 annual average daily traffic volume for M-33 in Loud Township is 1,925 vehicles and 1,429 vehicles in Montmorency Township.

Vulnerability Assessment

Montmorency County does not have passenger rail service, commercial marine passenger service, intercity bus service or commercial airports. However, it does have school bus and specialized public transit services that could result in loss of life and injuries if an accident occurred. An air transportation accident has the potential to cause deaths, injuries, and large amount of property damage if a plane hits the county's existing and future buildings, infrastructure, or population. Land transportation accidents have the potential to cause damage to other vehicles, injuries, death, and a transportation hazardous material accident. The primary and secondary roadways in the county experience heavy truck traffic from the timber and gas production industries, and the county experiences an increase in traffic from seasonal tourists. Dependent on the severity of the accident, it can cause road or trail closures, and may contaminate the county's water system. The road closures would impact the county's traffic flow patterns and could reduce emergency response times. The Sheriff's Office has a marine division that monitors boating traffic on the county's large lakes.

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 National Fire Incident Reporting System (NFIRS) reported that Michigan had 3.7 deaths and 15.6 injuries per 1,000 fires.

Location

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

Previous Occurrences and Probability of Future Occurrences

In 2003, there were 64 fires reported in Montmorency County with \$276,400 in total property damage. In 2018, Montmorency County received 62 fire calls with 31 structural fire calls, 5 vehicle fire calls, and 26 other fire calls according to NFIRS. The fire service had two fire-related civilian deaths and a total fire loss amount of \$551,000. Dependent on age of housing stock, infrastructure, and distance between structures, all of the existing and future structures are at-risk for a structural fire. It is difficult to predict the future occurrence of a structural fire.

Extent

All existing and future structures in the county are at-risk for a structural fire with the total fire loss amounting to \$551,000 in 2018.

Vulnerability Assessment

All of the existing and future buildings, populations, and infrastructure in Montmorency County are at-risk to 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 and cause secondary hazard events.

Montmorency County relies on a network of partially paid and volunteer fire departments, which means there is a lack of full-time professional firefighters who are available to conduct fire inspections, take part in trainings, and take other preventive measures to lessen the threat of structural fires. Therefore, efforts in Montmorency County are directed at fire suppression and make it challenging to maintain sustainable fire prevention and inspection programs.

Transportation Hazardous Material Accident

Description

A transportation hazardous material incident is an uncontrolled release of hazardous materials during transport that pose risks to health, safety, property, and the environment. All modes of transportation (e.g., highway, railroad, seaway, airway, and pipeline) carry thousands of hazardous material shipments on a daily basis through local communities. A transportation accident involving any of these shipments could create an 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 transportation hazardous material incidents; however, southern Michigan is more vulnerable due to its highly concentrated population. The State has experienced small scale incidents that local fire departments and hazardous material teams have responded to. Fortunately, the State has not experienced large scale incidents.

Location

The Village of Hillman, Atlanta, Canada Creek Ranch, and Montmorency, Hillman, Briley, Vienna, Avery, Loud, and Rust Townships are vulnerable to transportation hazardous material accidents (Figure 2-1). M-32 runs through Atlanta, the Village of Hillman, and Vienna, Briley, Avery, Rust, and Hillman Townships. M-33 runs through Canada Creek Ranch, Atlanta, and Montmorency, Briley, Avery, and Loud Townships.

Previous Occurrences and Probability of Future Occurrences

Montmorency County has not had any significant accidents reported but has had minor accidents. There is the potential for a future accident to occur on M-32 and M-33 since these routes are heavily travelled. Areas at greater risk for accidents along M-32 occur along the sharp curves, at dead man's hill and at the junction of M-32 and M-33.

Extent

The extent of a transportation hazardous material accident can be measured by the amount and cost of property damages. However, data is unavailable to quantify the cost of past accidents. Another way extent can be measured is based on location of an accident. M-32 and M-33 are the most vulnerable to a transportation hazardous material accident since these are the major thoroughfares through the county.

Vulnerability Assessment

Existing and future buildings, infrastructure, and populations located near M-32 and M-33 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 (e.g., Thunder Bay River Watershed), 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.

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 respond to an incident. However, releases can occur despite precautions taken to ensure careful handling during the manufacture, transport, storage, use, and disposal.

Location

According to the Tier II Manager, there is one SARA Title III Site in Montmorency County: Hillman Power Company at 750 Progress Street in Hillman. The plant is located northeast of the Village of Hillman and near an elementary school. However, the plant is set to be decommissioned by May 2022.

Previous Occurrences and Probability of Future Occurrences

Montmorency County does not have any recorded fixed site hazardous material accidents. However, there is the potential for an accident. Emergency Plans are on file with the Montmorency County Emergency Management Office, fire department, and at the power plant.

Extent

The extent can be measured by the amount of damage incurred from a fixed site hazardous material accident. However, the county has not had an accident in the past fifteen years and the emergency plans are annually reviewed and updated, if necessary.

Vulnerability Assessment

The county's infrastructure, existing and future buildings, and populations near the fixed sites are at-risk for a fixed site hazardous material accident. An accident could impact air quality. 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 area to be evacuated and require a need for emergency 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 drinking and natural water systems as well as causing communication and utility infrastructure to fail. However, the Hillman Power Company is set to be decommissioned by May 2022.

Oil and Gas Accident (well and pipeline)

Description

An oil and gas accident occurs when there is an uncontrolled release of oil, natural gas, or hydrogen sulfide from production wells or from a pipeline that causes property damage, environmental contamination, injuries, or 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 wells, and leak into soils and the water system.

In addition, oil and gas 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 when responding to sour gas wells.

Location

Oil and gas wells and pipelines are located throughout Montmorency County (Figure 6-9).

Previous Occurrences and Probability of Future Occurrences

Montmorency County has not had any major accidents reported. Even though the county has not had any significant accidents, the possibility for an oil and gas well and pipeline accident does exist.

Extent

According to EGLE, Montmorency County had 2,812 oil and gas wells with 93 active, 201 plugging approved, 2,508 producing and 10 temporarily abandoned in 2017. Buried pipelines connect the wells to the processing facilities in the county.

Vulnerability Assessment

The existing and future buildings and populations near the oil and gas wells 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. Additionally, oil and gas wells and pipelines located in high-risk wildfire areas are at greater risk for an accident. In Montmorency County, the greater risk wells are located in Albert, Hillman, and Vienna Townships.

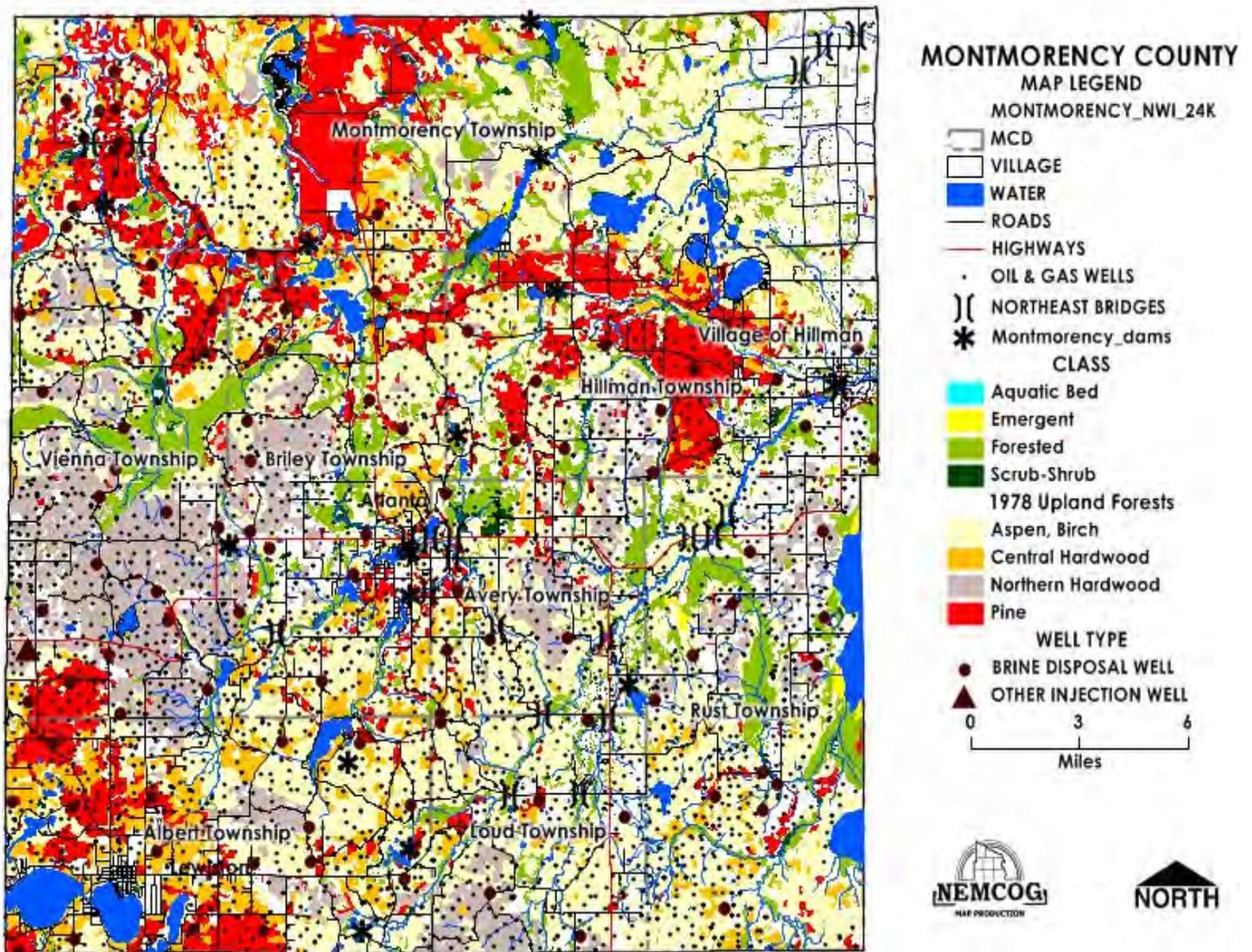


Figure 6-9 Oil and gas wells in relation to wildfire risk

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. They 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 these failures. For example, people unable to afford generators or who do not have access to fireplaces will have greater difficulty getting through a power failure during the colder months.

Since infrastructure is becoming more complex and interdependent, these failures can be large in scope and magnitude. For example, a power outage during extreme temperature events has the potential to cause a person to die in their home, which creates a public safety emergency; while, potentially causing water or wastewater treatment systems to become inoperable, resulting in a public health emergency. Additionally, northern Michigan has fewer infrastructure networks than urban areas; however, a failure affects a larger geographical area since the 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, Michigan established the Michigan Infrastructure Council to develop a 30 year statewide strategic framework to address the need for infrastructure improvements in Michigan. For more information, see the following website: <https://www.michigan.gov/mic>.

Location

The entire county is susceptible to infrastructure failures since the population and businesses are spread out. Even though the county has a large number of forested areas, infrastructure does traverse these areas. Additionally, 84.3% of the county's population is in Albert, Hillman, Briley, and Montmorency Townships, and the Village of Hillman (24.7%, 22.1%, 19.2%, 10.9%, and 7.4%, respectively). Areas with high population densities, such as Canada Creek Ranch, Atlanta, and Lewiston are in Montmorency, Briley, and Albert Townships, respectively. According to the U.S. Census Bureau, people are moving into the Village of Hillman, and Loud and Vienna Townships (18.5% of the county's population).

Previous Occurrences and Probability of Future Occurrences

Montmorency County has not had a major infrastructure failure reported. However, the possibility for an event to occur exists depending on the age of the county's infrastructure and the availability of maintenance funding.

Extent

Since Montmorency County is classified as rural, its infrastructure is spread over a large geographic area. If there is an infrastructure failure, a large area would be impacted. Additionally, if a failure occurred in Albert, Hillman, Briley, and Montmorency Townships, and the Village of Hillman, 84.3% of the population would be affected.

Vulnerability Assessment

In Montmorency County, the electrical system consists of above ground power transmission lines that traverse forested areas. Damage to these lines would cause a power outage over a large area since the county is rural in nature. A power outage would impact the population based on the time of year (winter would require heating stations to be set up and summer would require cooling stations to be set up), and if the population has any medical issues that require machines or refrigerated medicine. A water and sewer infrastructure failure would impact the businesses and residents in the Village of Hillman. Parts of Briley and Albert Townships would be impacted by a water infrastructure failure. A failure may cause health issues (e.g., gastrointestinal illnesses and cancer) if contaminated water is ingested. Also, some areas in the county are not covered by cell phone service due to topography and lack of infrastructure. Businesses, residents, and visitors would not be able to reach out to 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.

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. The Rubber Manufacturers Association reports a fire can convert a standard passenger vehicle tire into about two gallons of oily residue. 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 tire fires 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, and the environmental consequences are significant.

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 Montmorency County. There are no known tire collection sites in Montmorency County.

Previous Occurrences and Probability of Future Occurrences

According to EGLE, Englehart and Son had a collection site application that lapsed in 1994. There are no recorded occurrences of scrap tire fires in Montmorency County. Based on this data, Montmorency County will not have scrap tire fires in the future. However, there may be scrap tire collection sites in the county that few people know about. Therefore, there is a possibility for a scrap tire fire in the county.

Extent

Extent can be measured by the number of acres burned and the cost of property damages. Since Montmorency County has not had a reported scrap tire fire, data is unavailable to determine the number of acres burned, property damage costs, and the costs to fight the fire. However, there is a potential for an event to occur 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 infrastructure, 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, infrastructure failure, and an oil and gas accident (well and pipeline). 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 and agricultural revenue from the fire damaging timber supplies and agricultural products and killing livestock. 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.

Dam Failures

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 and results in flash flooding downstream or water pouring over the top of the dam. This failure may occur from poor operation, lack of maintenance, or vandalism. 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 depending 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 and 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

There are eighteen dams in Montmorency County with sixteen low hazard potential dams in Montmorency, Hillman, Briley, Avery, and Rust Townships, Atlanta, and the Village of Hillman. The Upper Hiawatha Dam/Hiawatha Dam (Hillman Township) and Robert Slivensky Dam/Limberlost Lake Dam (Avery Township) have significant hazard potentials in the county.

Previous Occurrences and Probability of Future Occurrences

Montmorency County has not had any previous reported dam failures. According to the National Inventory of Dams, Montmorency County has eighteen dams with an average age of 67 years (Table 6-6, Figure 6-10). Based on the aging infrastructure, there is a potential for a dam failure. Proper dam maintenance may predict and prevent the possibility of a future event.

Further analysis will only focus on the Upper Hiawatha Dam/Hiawatha Dam and Robert Slivensky Dam/Limberlost Lake Dam since they are the only dams in the county with a significant hazard potential. The other dams in the county have a low hazard potential and are not required to have an emergency action plan. Therefore, the low hazard potential dams will not be further analyzed at this time.

Extent

The extent of a dam failure can be measured by the amount of damage that occurs and the number of deaths and injuries. The Upper Hiawatha Dam/Hiawatha Dam is located in Hillman Township, while the Robert Slivensky Dam/Limberlost Lake Dam is located in Avery Township near Avery. The Upper Hiawatha Dam/Hiawatha Dam is 73 years old and the Robert Slivensky Dam/Limberlost Lake Dam is 48 years old. Despite a previous dam failure not occurring, the age of the dams increases the risk that the dams have the potential to fail.

Vulnerability Assessment

The Upper Hiawatha Dam/Hiawatha Dam and Robert Slivensky Dam/Limberlost Lake Dam have significant hazard potentials. This means that there will be no loss of life, but there may be economic loss, environmental damage from the release of sediments behind the dam, and disruption of lifeline facilities. The Upper Hiawatha Dam/Hiawatha Dam is owned by Twin Dams Owners Association and has an emergency action plan. The Robert Slivensky/Limberlost Lake Dam is privately owned and has an emergency action plan.

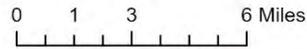
A flood event due to a dam failure would prevent access to buildings, cause businesses to lose their businesses and inventories, and cause residents to lose their houses and belongings. Buildings would be damaged, destroyed, or compromised, and would develop mold, rot, and foundation damage from floodwaters. The presence of mold would increase health risks 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 closed for long periods of time, which would impact traffic flow and emergency response times. 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 Montmorency County Dams

	Name	Height (ft)	Storage (acre-feet)	Location	Regulatory Agency	Dam Type	Year Completed	Dam Purpose	Hazard Potential
1	Rainy River Dam	11	1,755	West Branch Upper Rainy River	State	State	1960	Recreation	Low
2	Grass Lake Level Control Structure/Grass Lake	16	3,360	Grass Creek	State	Private	1937	Recreation	Low
3	Rush Lake Level Control Structure	19	5,205	North Branch of the Thunder Bay River	State	Private	1956	Other	Low
4	Muskellunge Lake Level Control Structure/ Muskellunge Lake Dam	7	1,000	Canada Creek	State	Private	1957	Recreation	Low
5	Atlanta Sportsmen Dam	13	52	Smith Creek	State	State	1980	Recreation	Low
6	Upper Hiawatha Dam/Hiawatha Dam	9	72	Brush Creek	State	Private	1947	Recreation	Significant
7	Brush Creek Dam/Cooks Dam	12.8	350	Brush Creek	State	Local Government	1930	Other	Low
8	Hillman Dam	16	500	Thunder Bay	Federal (FERC)	Public Utility	1895	Hydroelectric	Low
9	Turtle Lake Fish Slats Dam	7	3,392	South Branch of Thunder Bay River	State	Private	-	Recreation	Low
10	Robert Slivensky Dam/Limberlost Lake Dam	20	1,140	Tributary to Gilchrist Creek	State	Private	1972	Recreation	Significant
11	East Fish Lake Dam	9	58	Fuller Creek	State	State	1962	Recreation	Low
12	Fuller Creek Pond Dam	8	54	Fuller Creek	State	State	1949	Recreation	Low
13	Sage Lake Dam	8.5	384	Sage Creek	State	State	1960	Recreation	Low
14	Avery Lake Dam	15	2,420	Crooked Creek	State	Private	1970	Recreation	Low
15	Crooked Lake Level Control Structure/Crooked Lake Dam	18	800	Crooked Creek	State	Private	1949	Recreation	Low
16	Atlanta Dam/Thunder Bay River Dam	15	965	Thunder Bay River	State	Private	1920	Recreation	Low
17	Lake Inez Dam	15	285	Barger Creek	State	Private	1974	Recreation	Low
18	Foch Lake Dam	13	440	Tributary to East Branch of the Black River	State	State	1948	Recreation	Low

Source: National Inventory of Dams, Retrieved July 2019

Dams, Wetlands, and Water Resources Locations Montmorency County



Legend

- Significant Hazard Dam
- Low Hazard Potential Dam
- Roads
- Rivers
- Lakes
- Wetlands

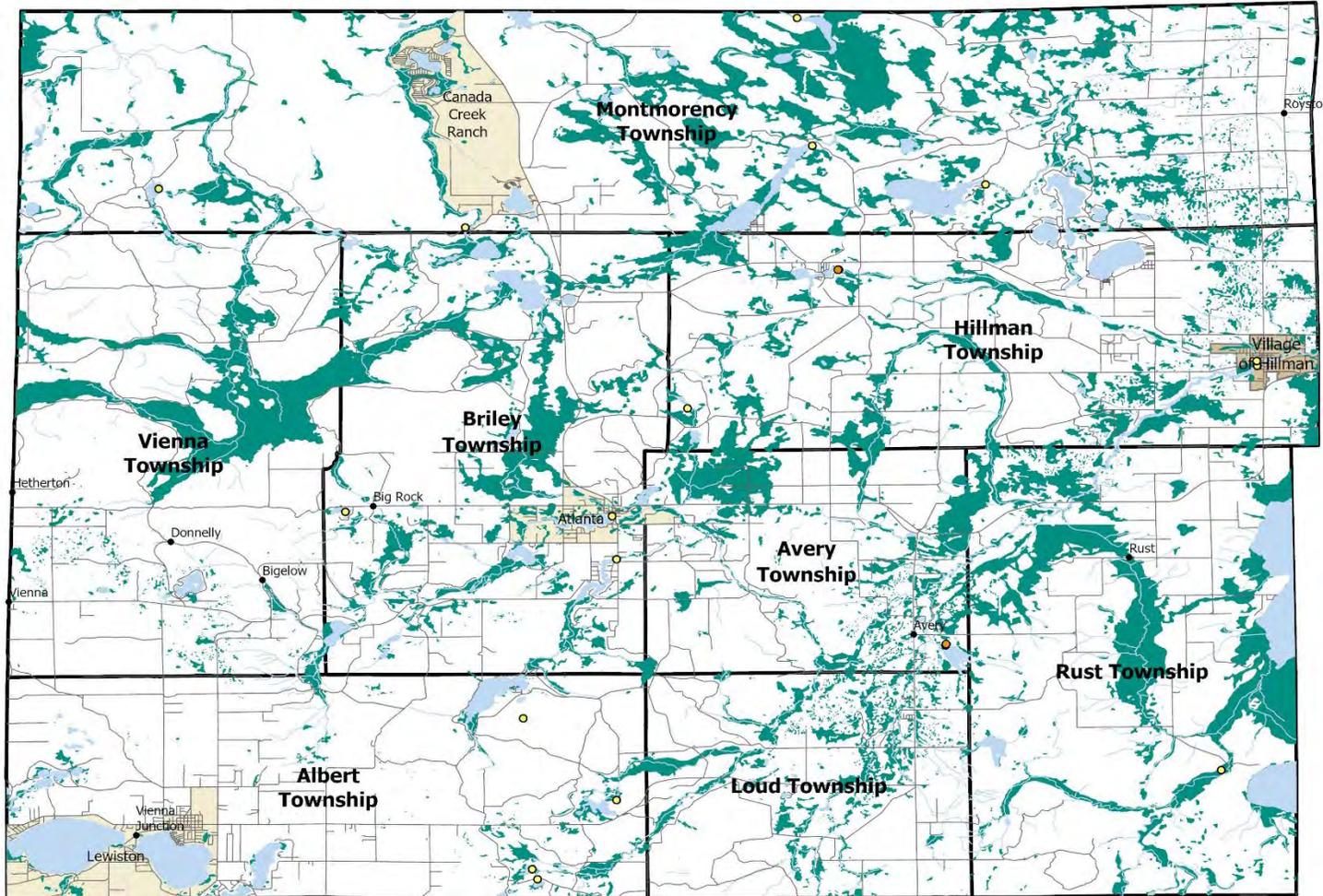


Figure 6-10 Dams, Wetlands, Water Resources Locations

Human-Related Hazards

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 (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.

Additionally, Bovine Tuberculosis has impacted the personal, social, and economic health of the residents and visitors of Montmorency County. Government regulations and enforcement actions have affected the County's agriculture and tourism (e.g., hunting) industries.

Location

Public health emergencies do not have geographic or political boundaries and affect all of Montmorency County.

Previous Occurrences and Probability of Future Occurrences

As of January 5, 2021, there have been 504,410 confirmed cases and 12,867 deaths in Michigan, and 277 confirmed cases and nine deaths in Montmorency County. 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 are high population concentrations and during colder 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 Montmorency 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 January 4, 2021, Montmorency County administered 4,439 diagnostic tests for COVID-19 with 312 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.

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 population centers in Montmorency County are at risk for a sabotage/terrorism/nuclear attack. However, the population centers are small and will not create high profile media coverage.

Previous Occurrences and the Probability of Future Occurrences

In the last 15 years, Montmorency County has not had any recorded incidents of sabotage/terrorism/nuclear attack. Based on this information, Montmorency County would not have any sabotage/terrorism/nuclear attacks in the future. 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 sabotage/terrorism/nuclear attack event 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 Assessment

A sabotage/terrorism/nuclear attack will have minimal impacts and financial burdens on residents and businesses since the county does not have high profile targets, such as military installations, Federal and State government offices, large population centers, etc. Therefore, terrorism/sabotage/nuclear attack will not be further analyzed at this time.

Civil Disturbances

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 involves 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

Albert, Hillman, Briley, and Montmorency Townships, the Village of Hillman would be at risk for civil disturbances since the majority of the county’s population lives in these jurisdictions (24.7%, 22.1%, 19.2%, 10.9%, and 7.4%, respectively). Areas with high population densities, such as Canada Creek Ranch, Atlanta, and Lewiston are located in Montmorency, Briley, and Albert Townships, respectively. However, it should be noted an event may occur at community events in any of the county’s jurisdictions.

Previous Occurrences and Probability of Future Occurrences

Montmorency County has not had any recorded incidents of civil disturbances. Based on this information, the county would not have any civil disturbances in the future. However, an event has the possibility of occurring depend on 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 civil disturbance 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 Assessment

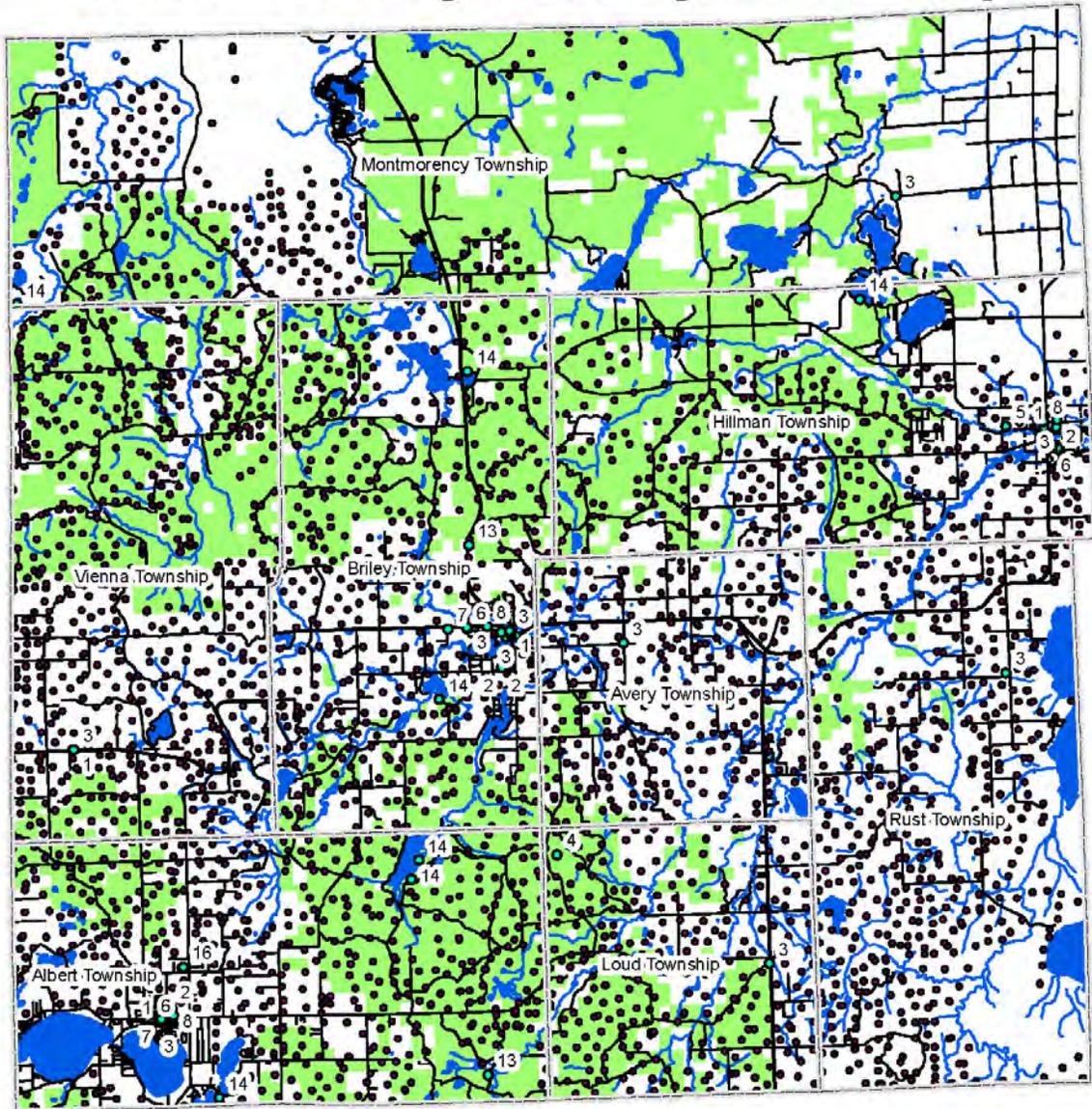
Civil disturbance events will have minimal impacts and financial burdens on residents and businesses since the county is not an area that provides high profile media coverage. However, during community events, large crowds may be attracted to county. Dependent on the severity of the civil disturbance event, businesses may be damaged or looted, and injuries and deaths may occur.

Montmorency County and its Jurisdictions

The Montmorency County base map shows the county’s infrastructure, oil and gas wells, water resources, state lands, and facilities, while the hazards map shows infrastructure, oil and gas wells, areas of high wildfire risk in red (pine forests) and yellow (oak-pine forests and aspen-birch forests), and the waterways that have a high potential for springtime flooding in dark green (Figure 6-11 to Figure 6-12). The local jurisdictions also have base and hazard maps. The base maps show the community’s infrastructure, facilities, state lands, and oil and gas wells, while the hazard maps show infrastructure, oil and gas wells, areas of high wildfire risk in red (pine forests) and yellow (oak-pine forests and aspen-birch forests), and waterways that have a high potential for springtime flooding in dark green (Figure 6-13 to Figure 6-30). The community infrastructure legend corresponds to the numbers on the following base maps.

Legend for Community Infrastructure on Base Maps			
Fire Stations	1	Bus Station	10
Schools	2	Port/Harbor	11
Gov’nt Buildings	3	College/University	12
Solid Waste Facil.	4	DNR Office	13
Waste Water Treat.	5	Campgrounds	14
Municip Water Supply	6	Traffic Counts	15
Police Station	7	Industrial Parks	16
Medical Facilities	8	Chamber of Commerce	17
Health Dept. Buildings	9		

Montmorency County Base Map



- | | | |
|----------------------|----------------|--------------|
| ● Infrastructure | ▭ Hillman | — Rivers |
| • Oil & Gas Wells | — County Roads | Public Lands |
| ▭ Montmorency County | — M 32 | ■ State |
| ▭ Townships | — M 33 | ■ Water |

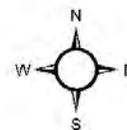
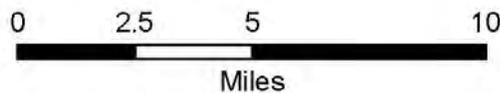
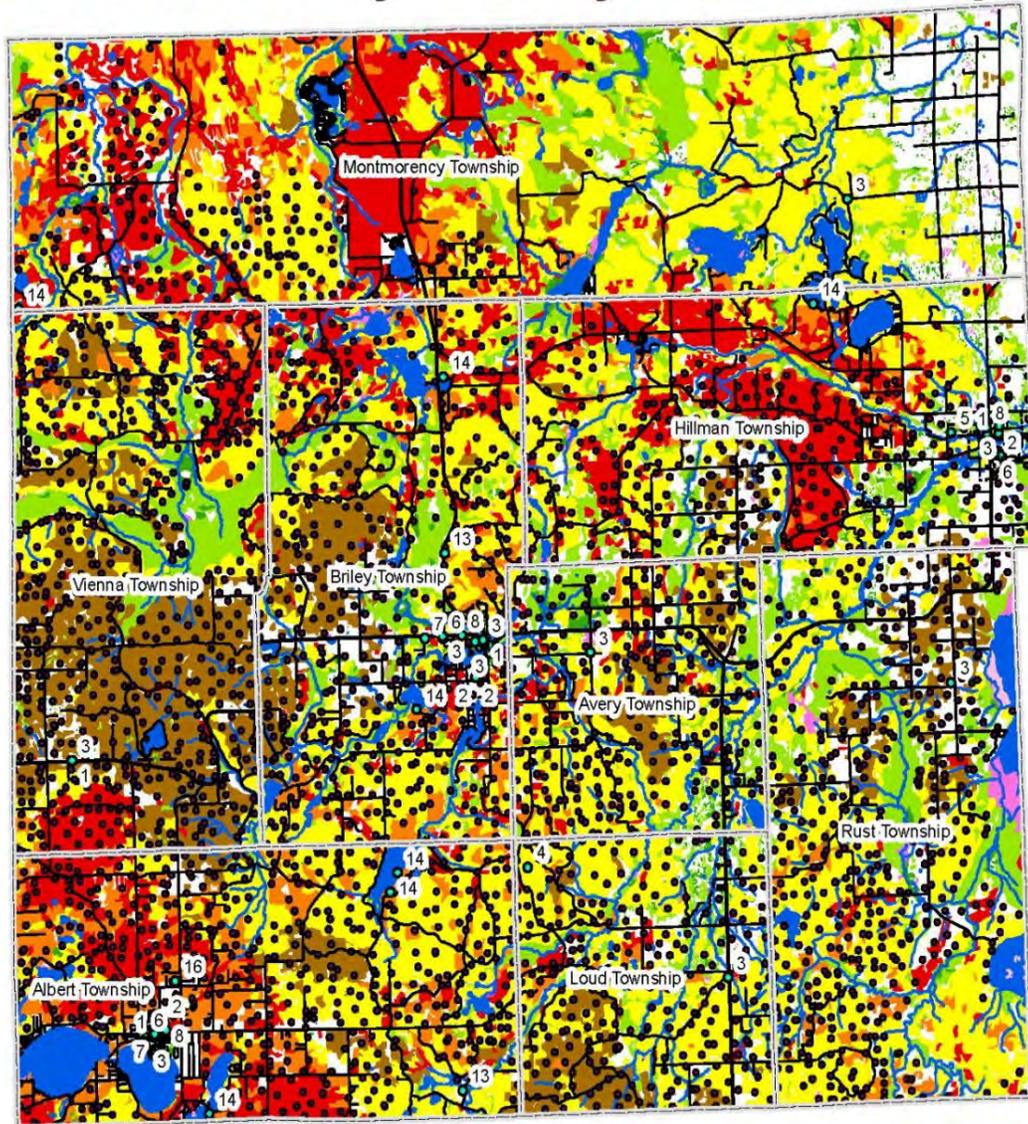


Figure 6-11 Montmorency County Base Map

Montmorency County Hazards Map



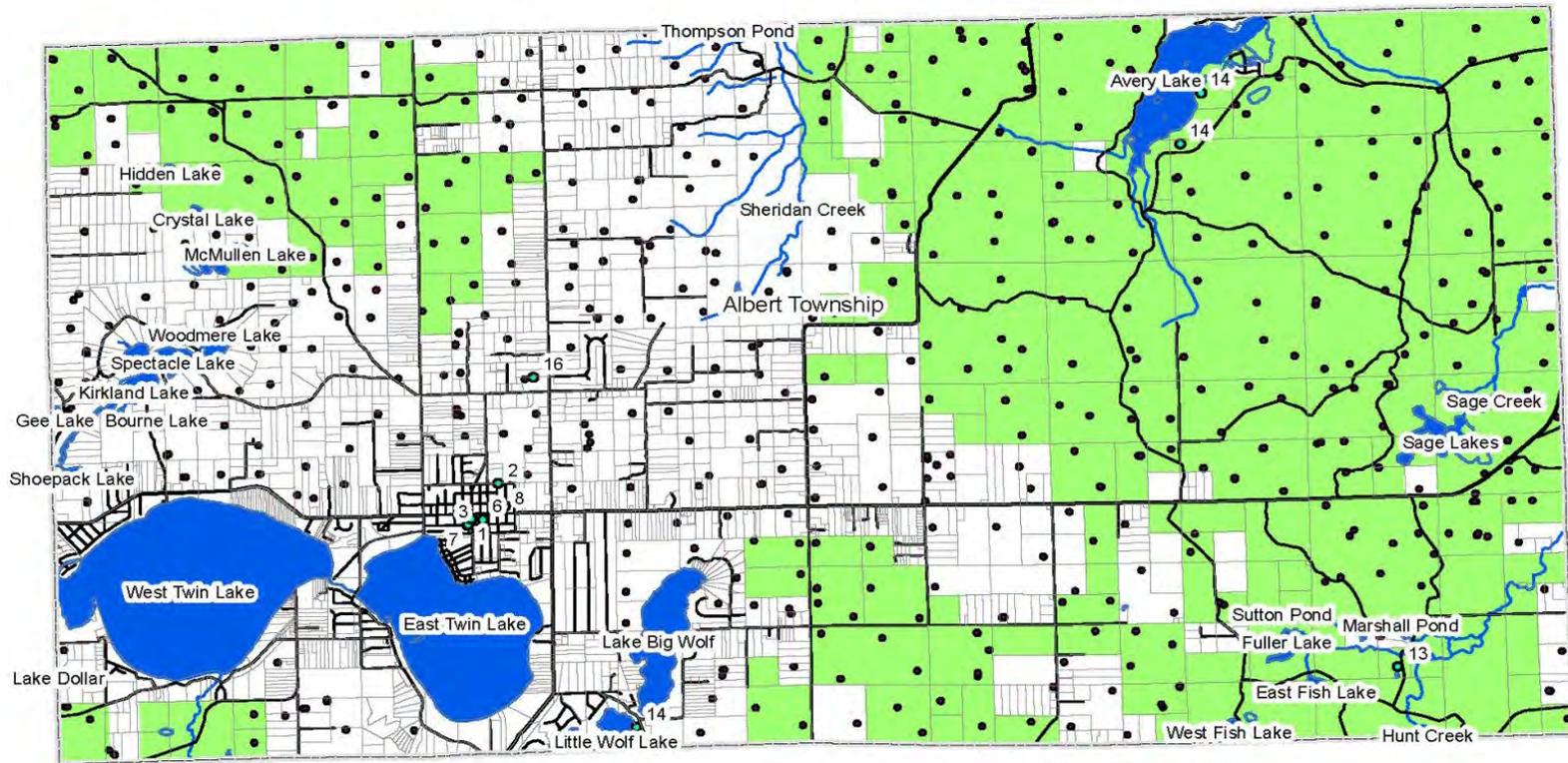
● Infrastructure	— County Roads	Forest Types	Wetland Types
● Oil & Gas Wells	— M 32	■ Northern Hardwoods	■ Aquatic Bed
□ Montmorency County	— M 33	■ Aspen-Birch	■ Emergent
□ Townships	— Rivers	■ Oak	■ Forested
□ Hillman		■ Other Upland Conifers	■ Open Water
		■ Pine	■ Scrub-Shrub

0 2.5 5 10

Miles

Figure 6-12 Montmorency County Hazards Map

Albert Township Base Map



- | | | |
|-----------------|-----------------|---------------------|
| Albert Township | County Roads | Public Lands |
| Parcels | County Road 489 | State |
| Infrastructure | County Road 612 | Water |
| Oil & Gas Wells | Rivers | |

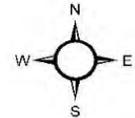
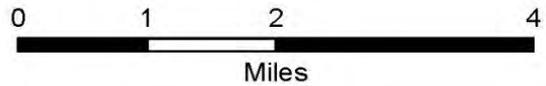


Figure 6-13 Albert Township Base Map

Albert Township Hazards Map

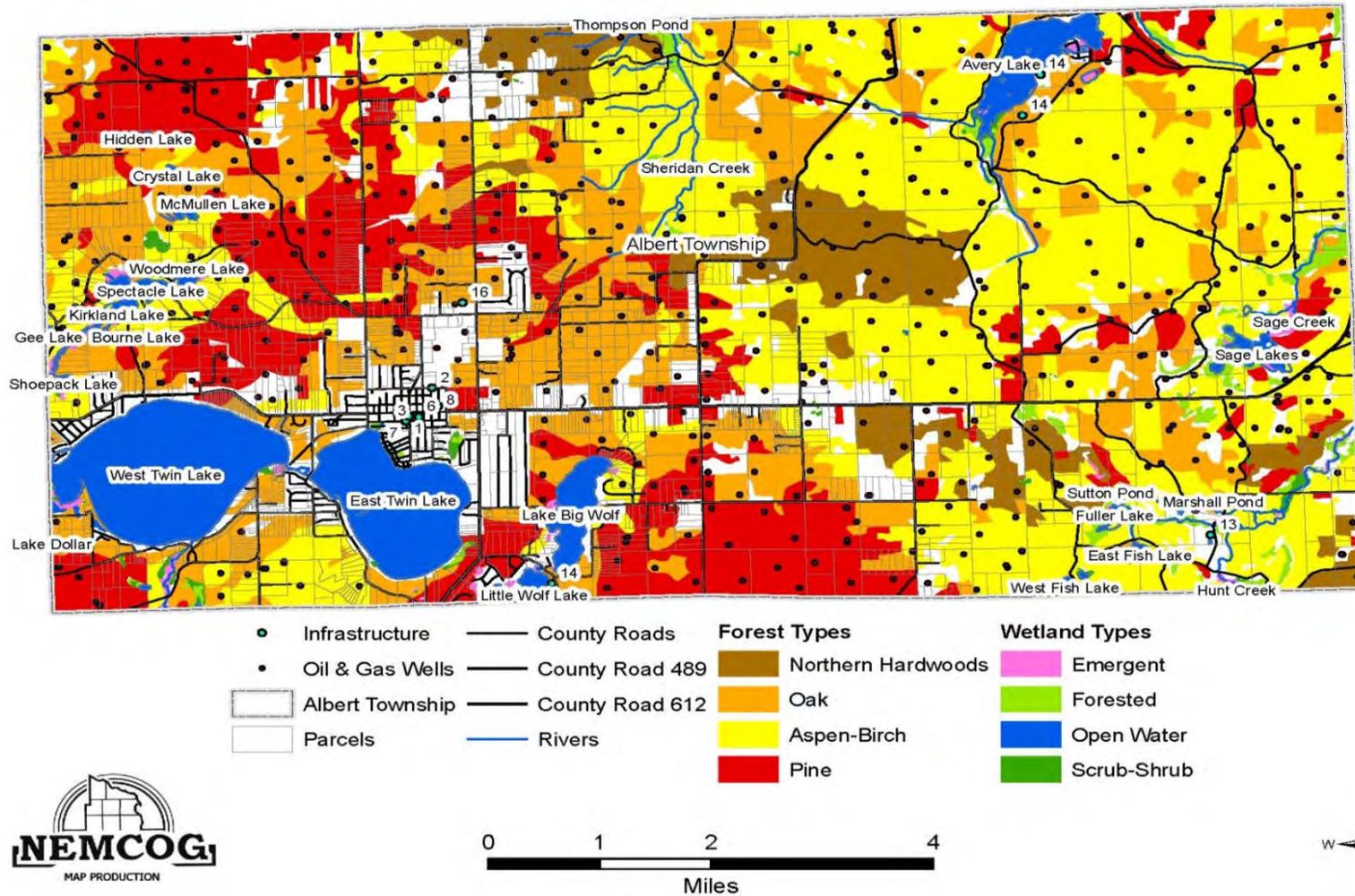
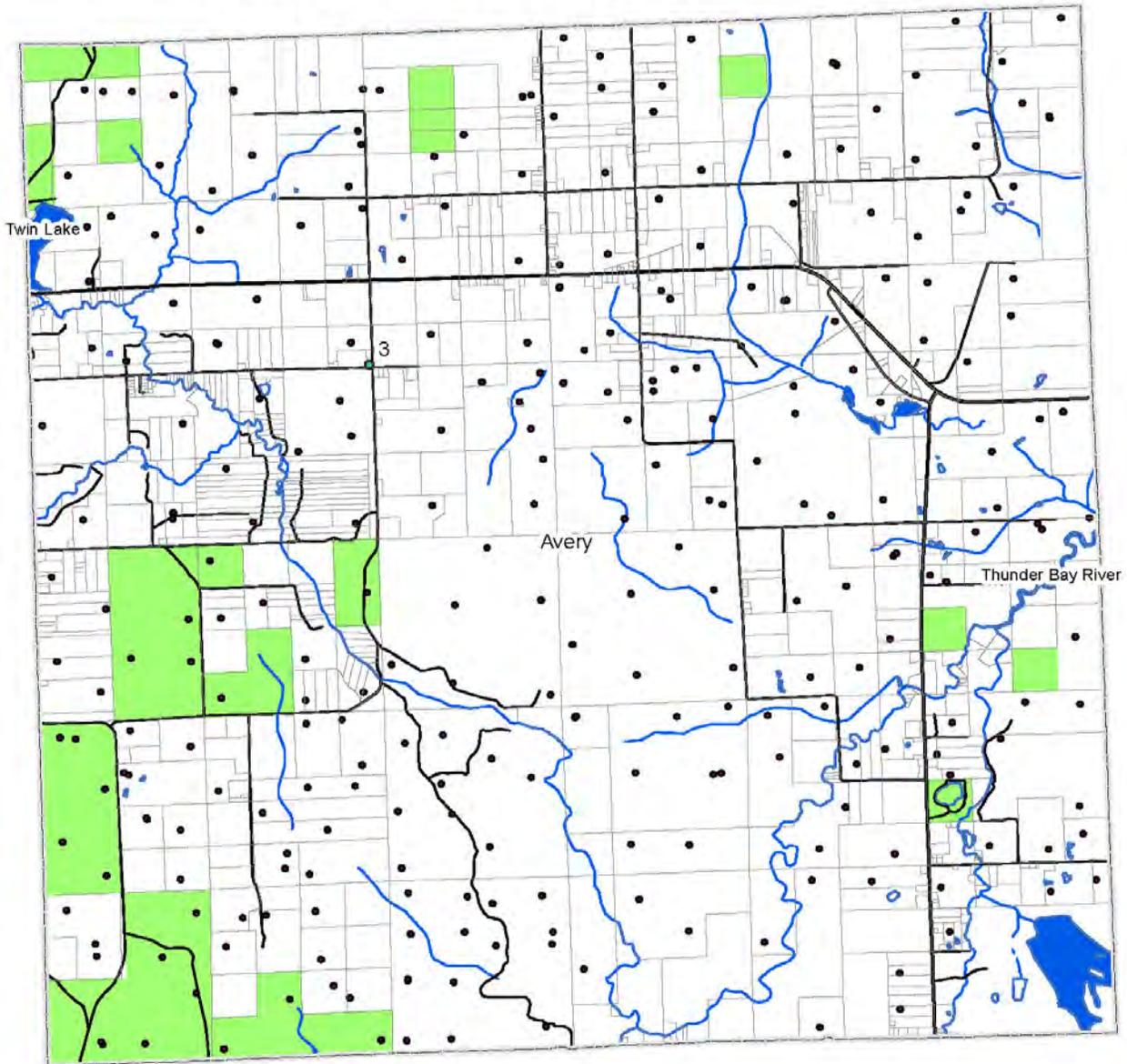


Figure 6-14 Albert Township Hazards Map

Avery Township Base Map



- Infrastructure — County Roads Public Lands
- Oil & Gas Wells — M 32 State
- Avery Township — M 33 Water
- Parcels — Rivers

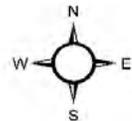
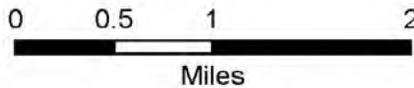


Figure 6-15 Avery Township Base Map

Avery Township Hazards Map

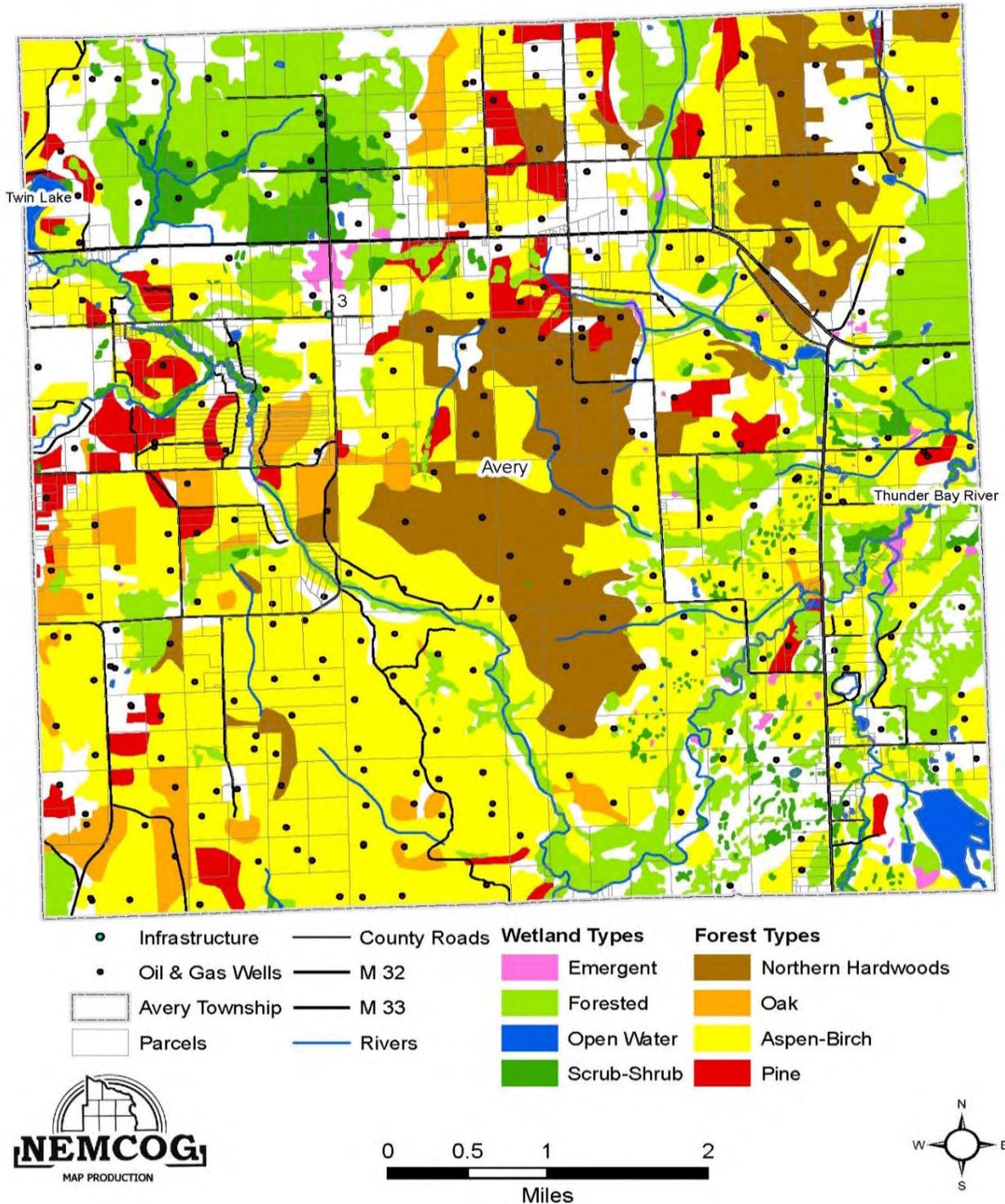


Figure 6-16 Avery Township Hazards Map

Briley Township Base Map

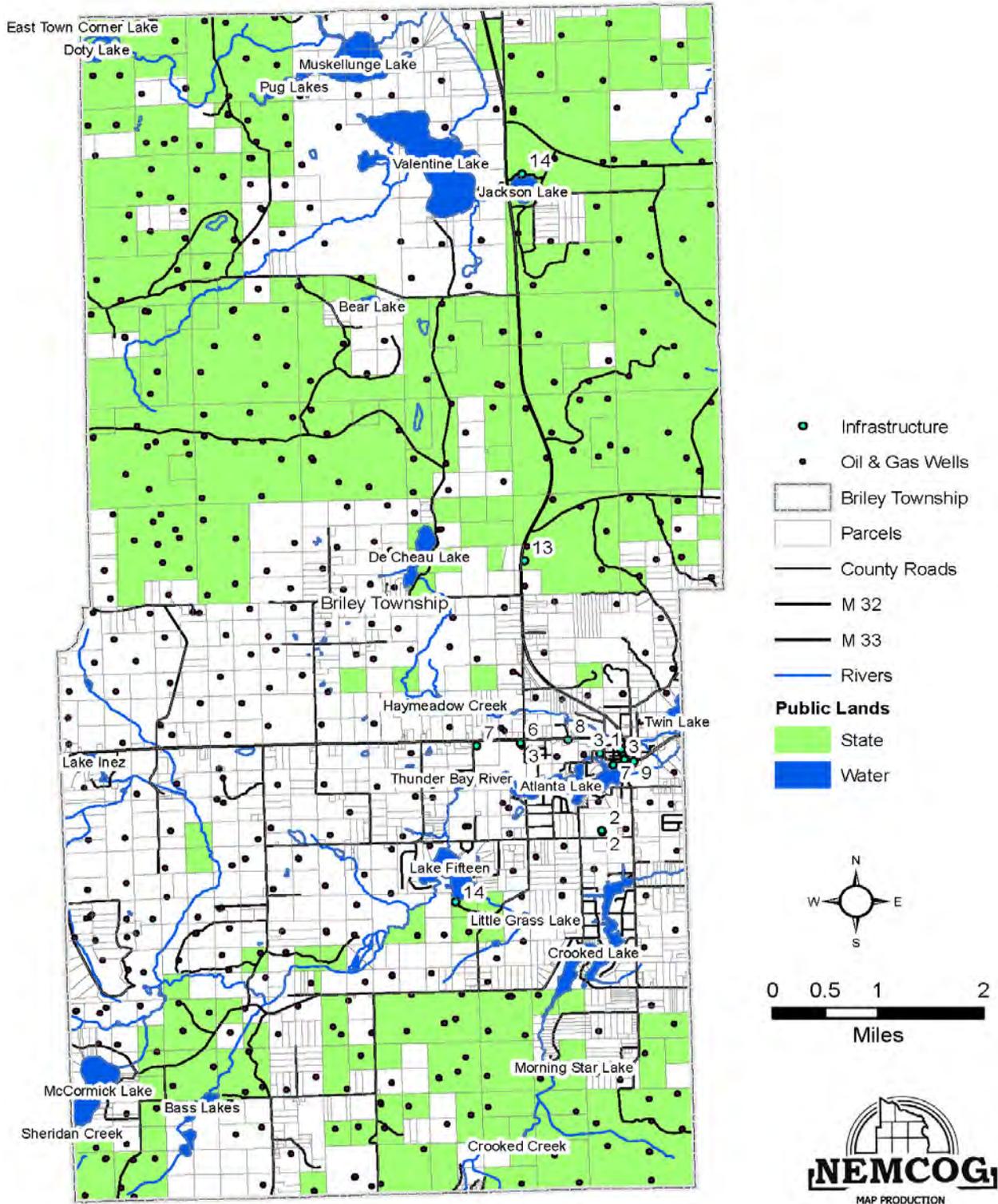


Figure 6-17 Briley Township Base Map

Briley Township Hazards Map

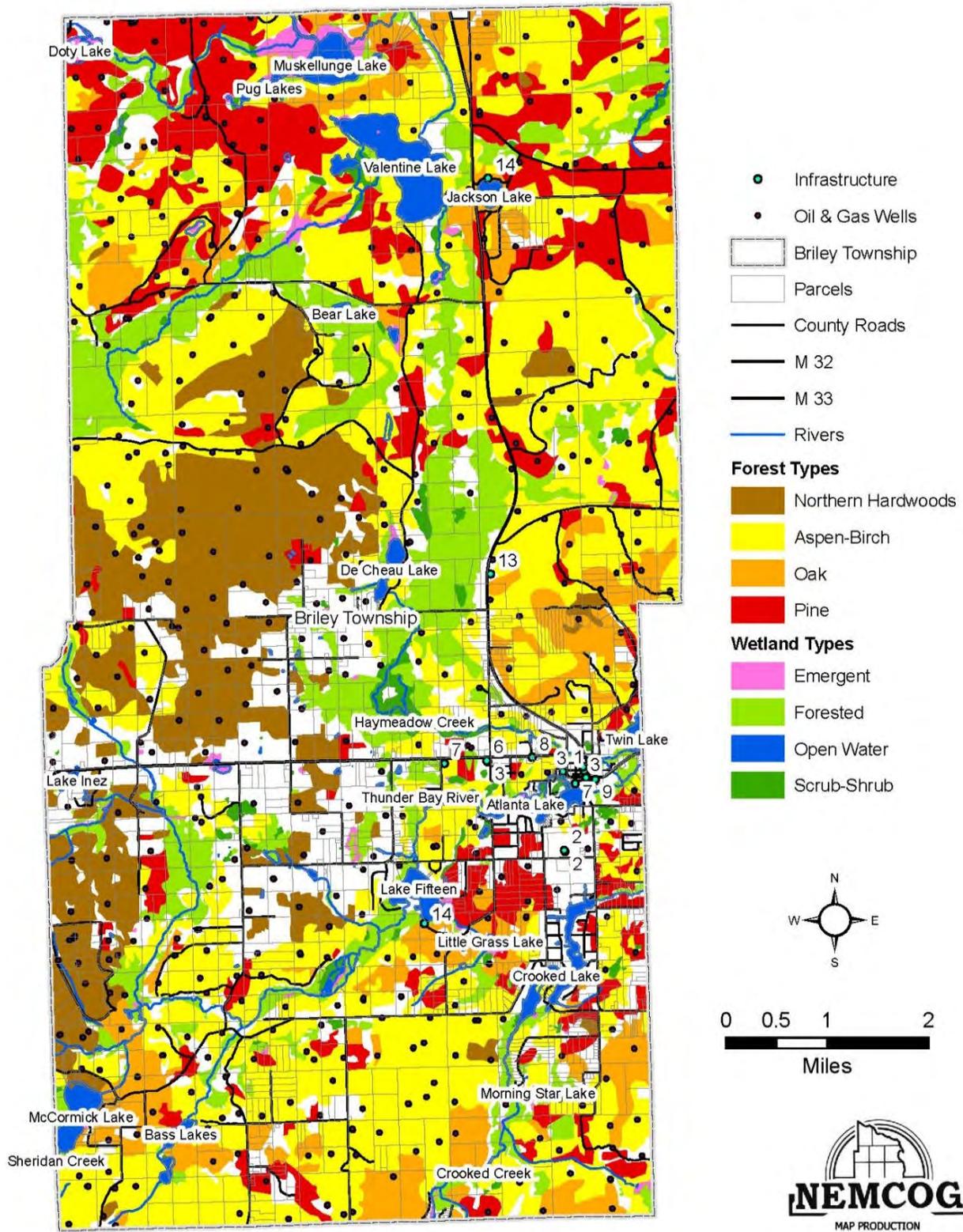


Figure 6-18 Briley Township Hazards Map

Village of Hillman Base Map

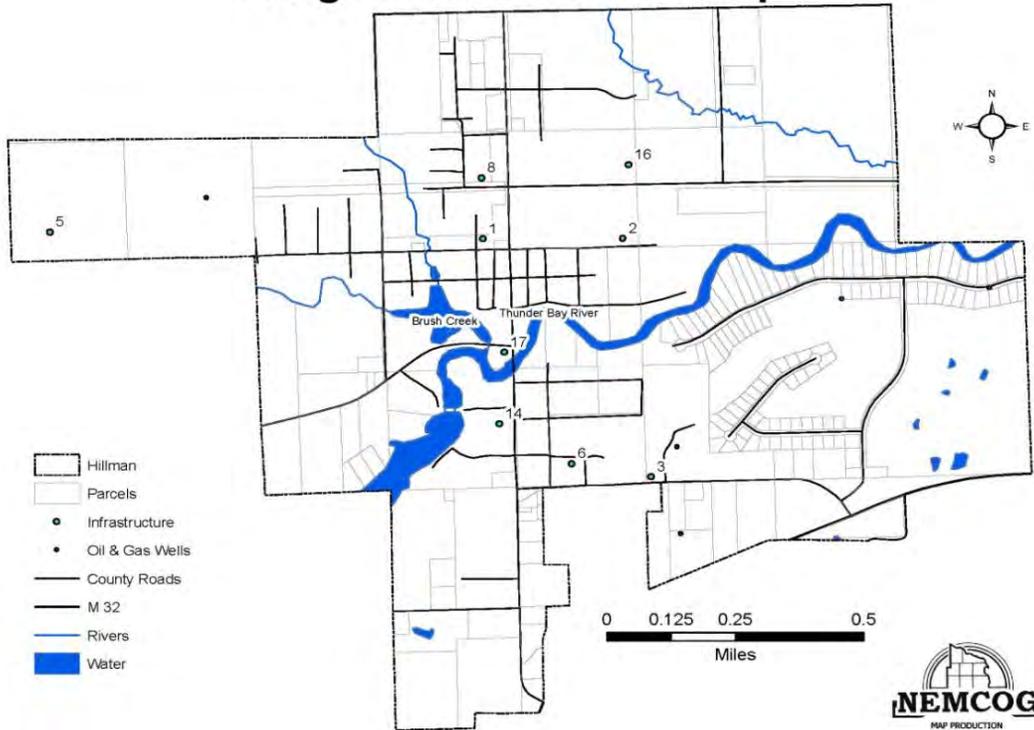


Figure 6-19 Village of Hillman Base Map

Village of Hillman Hazards Map

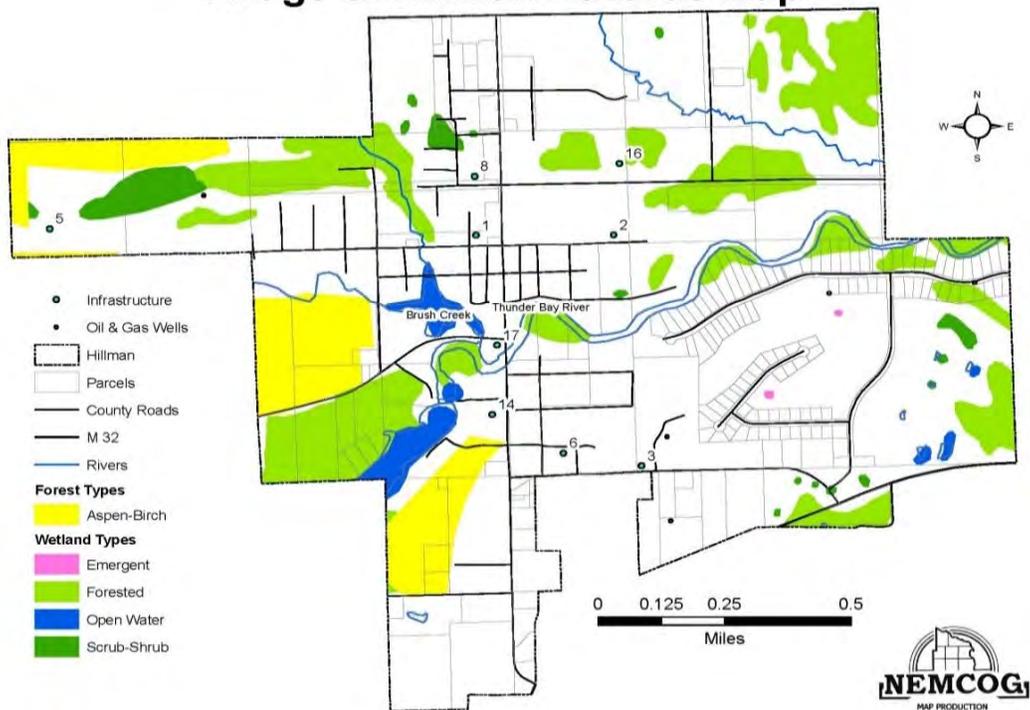
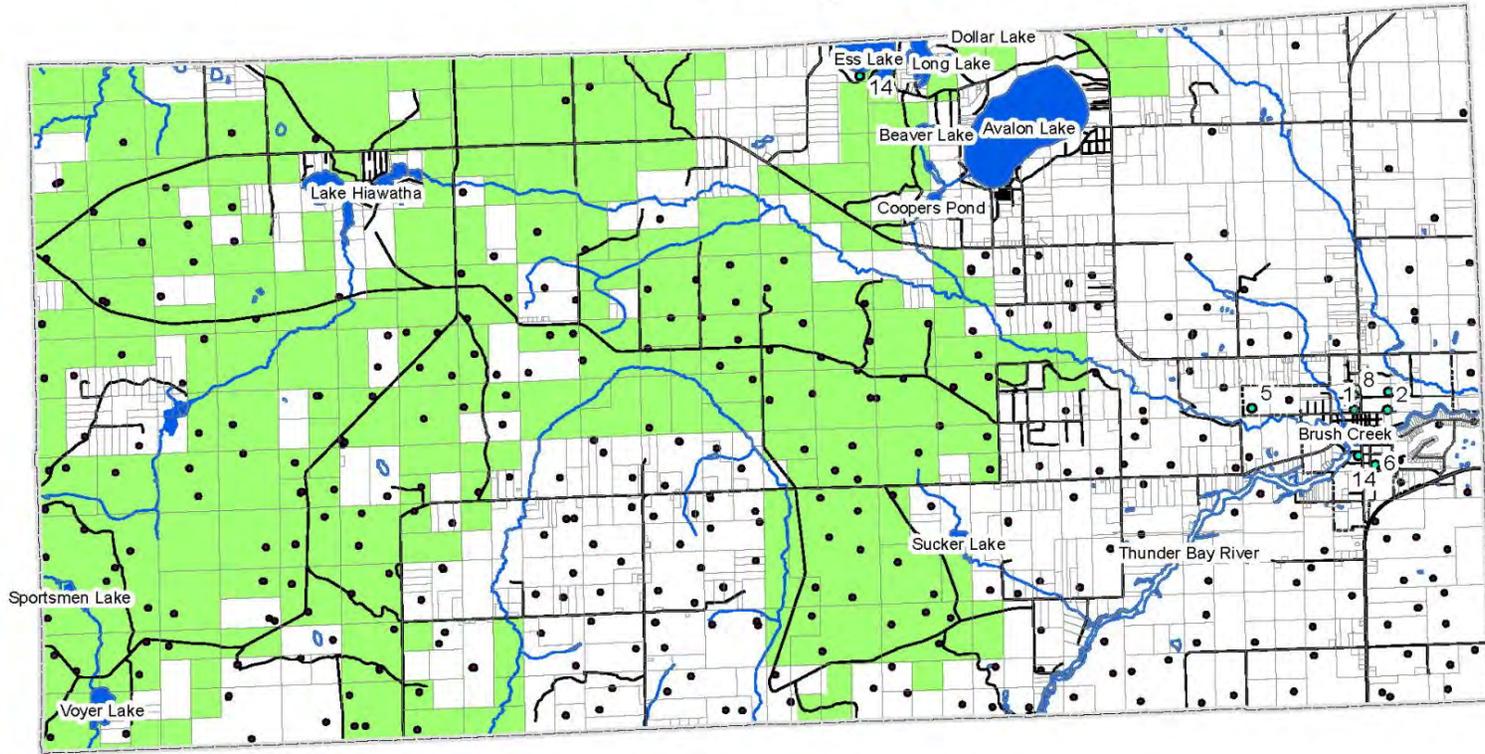


Figure 6-20 Village of Hillman Hazards Map

Hillman Township Base Map



- Infrastructure
- Oil & Gas Wells
- ▭ Hillman Township
- ▭ Hillman
- ▭ Parcels
- County Roads
- M 32
- Rivers
- Public Lands**
- State
- Water

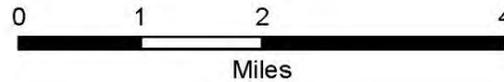
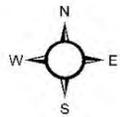
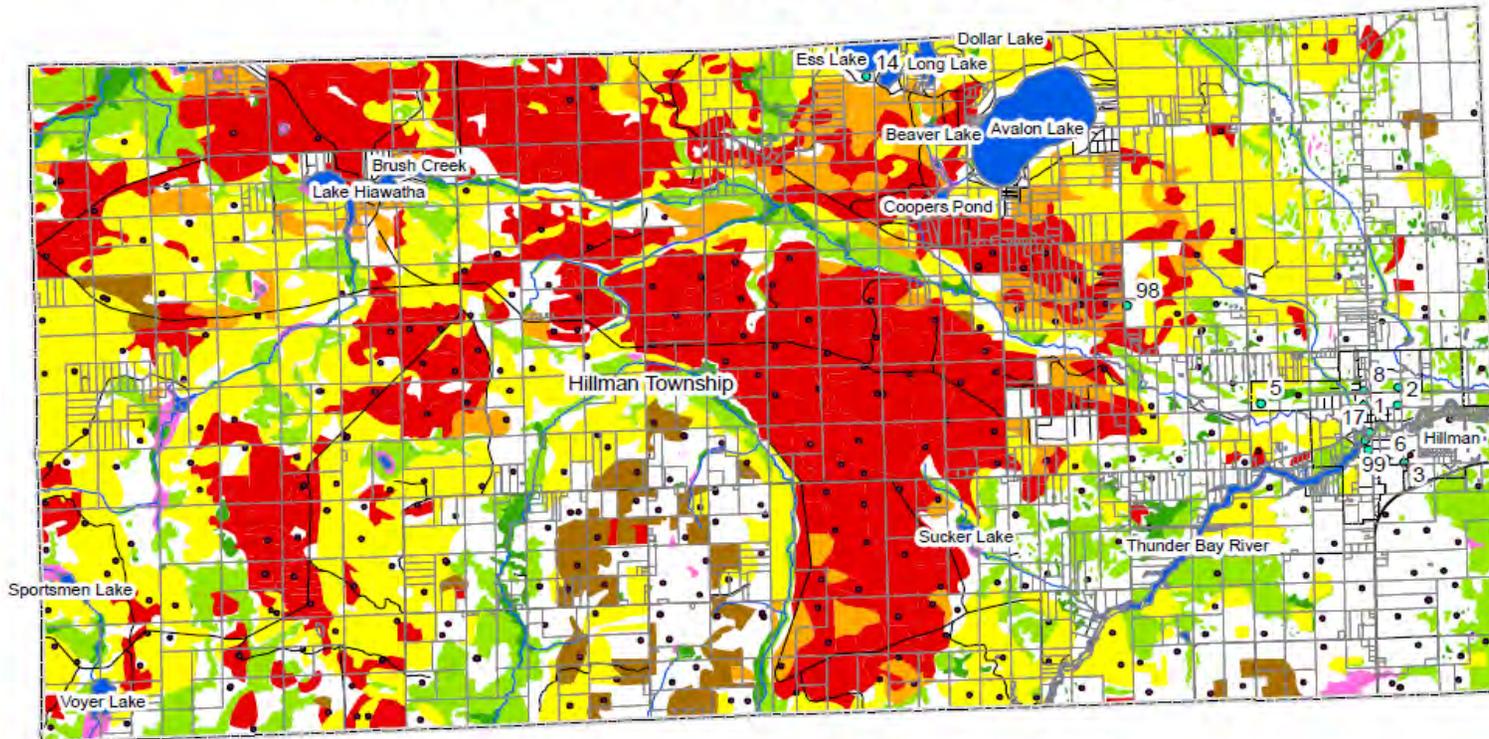


Figure 6-21 Hillman Township Base Map

Hillman Township Hazards Map



- | | | | |
|--------------------|----------------|----------------------|----------------------|
| • Infrastructure | ▭ Parcels | Forest Types | Wetland Types |
| • Oil & Gas Wells | — County Roads | ▭ Northern Hardwoods | ▭ Emergent |
| ▭ Hillman Township | — M 32 | ▭ Aspen-Birch | ▭ Forested |
| ▭ Hillman | — Rivers | ▭ Oak | ▭ Open Water |
| | | ▭ Pine | ▭ Scrub-Shrub |

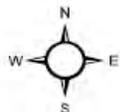


Figure 6-22 Hillman Township Hazards Map



Loud Township Base Map

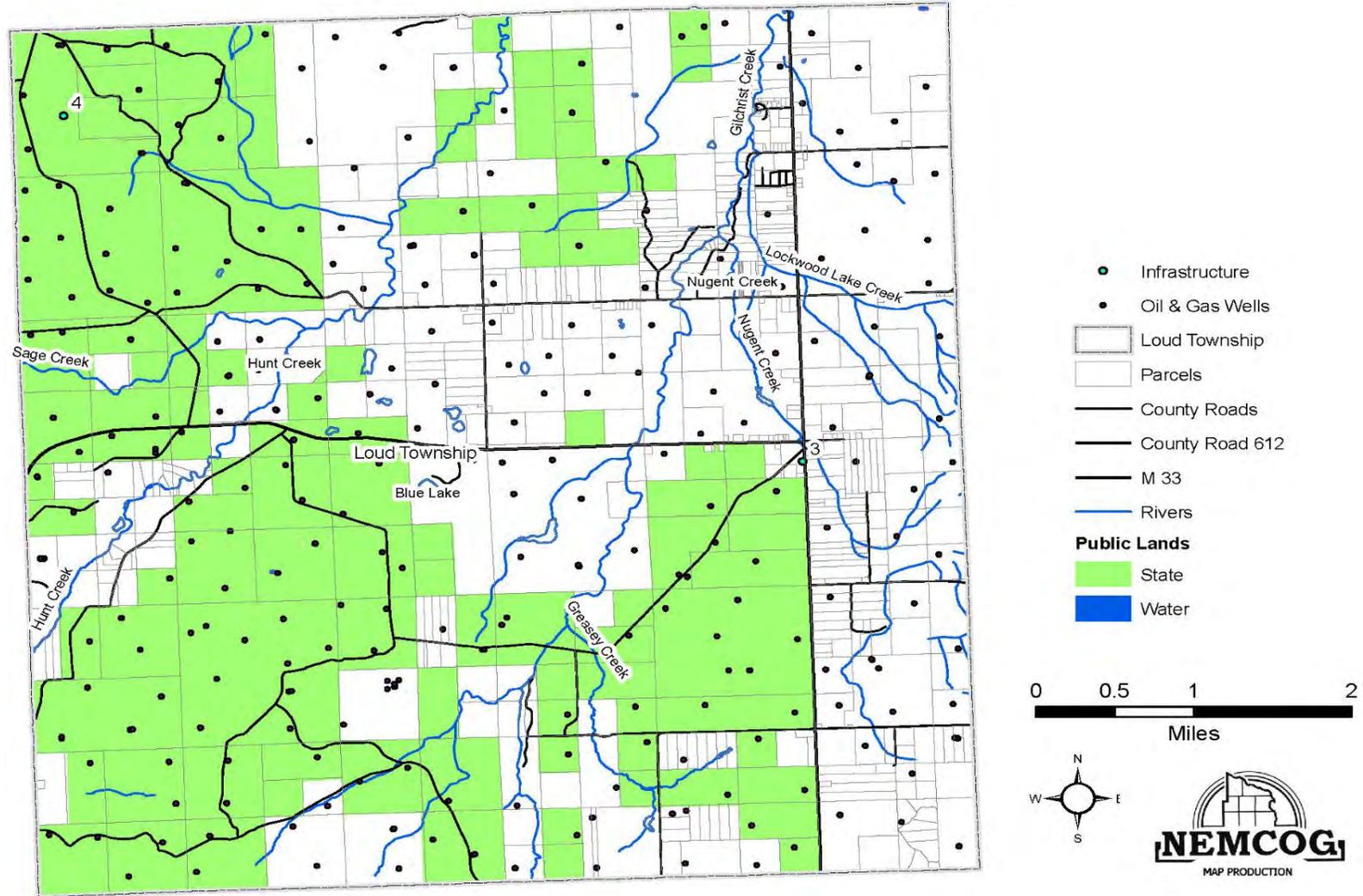


Figure 6-23 Loud Township Base Map

Loud Township Hazards Map

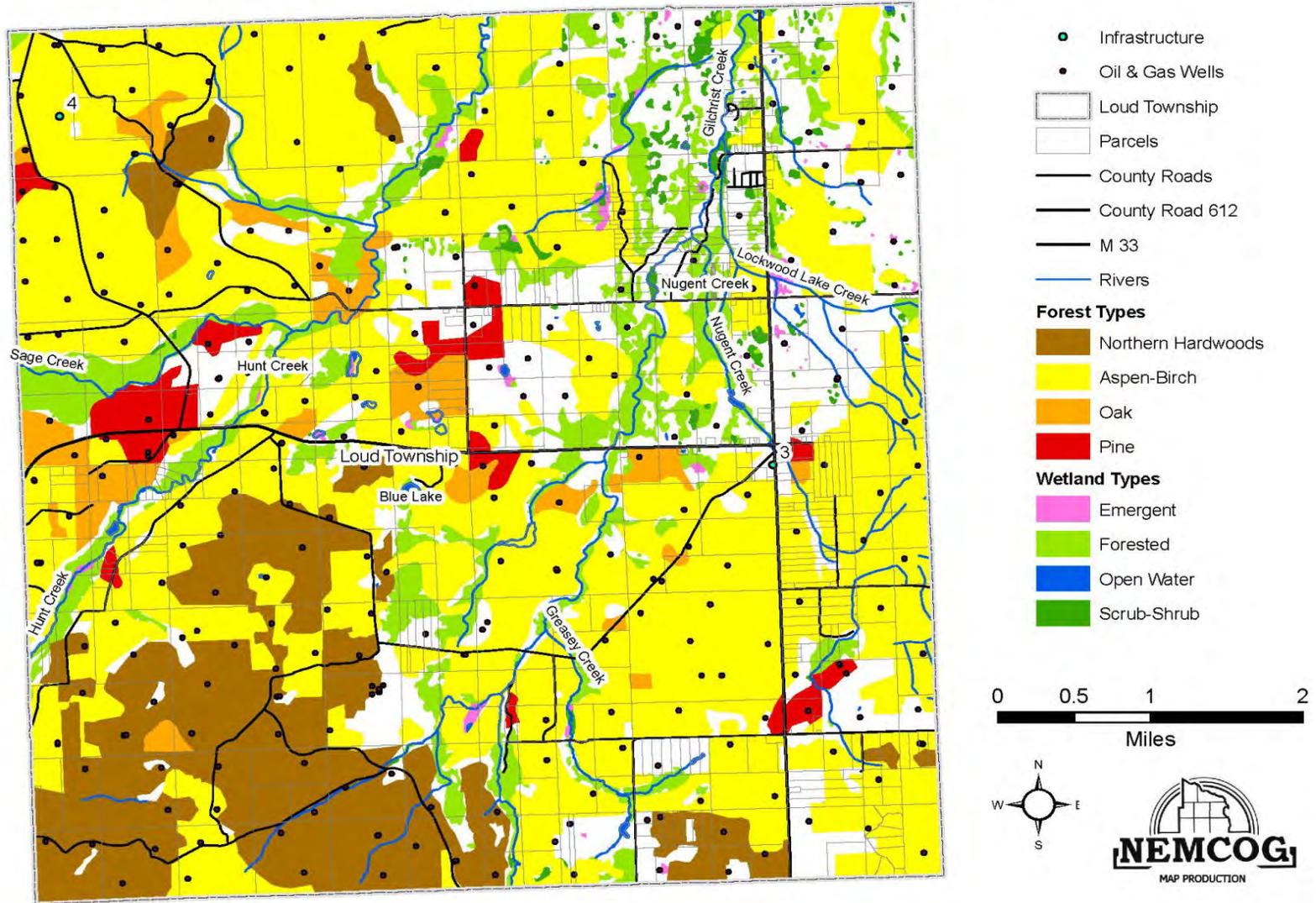


Figure 6-24 Loud Township Hazards Map

Montmorency Township Base Map

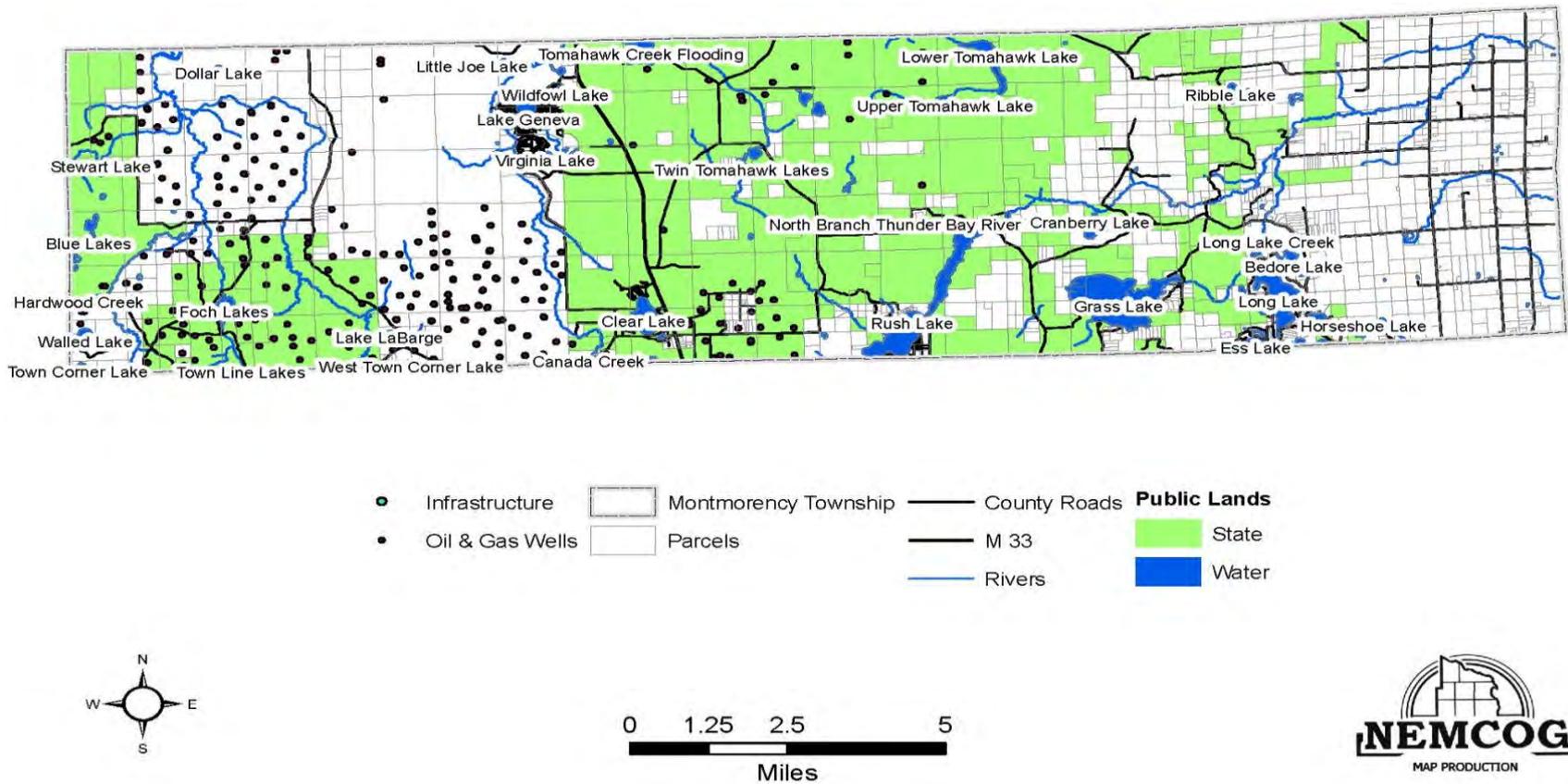


Figure 6-25 Montmorency Township Base Map

Montmorency Township Hazards Map

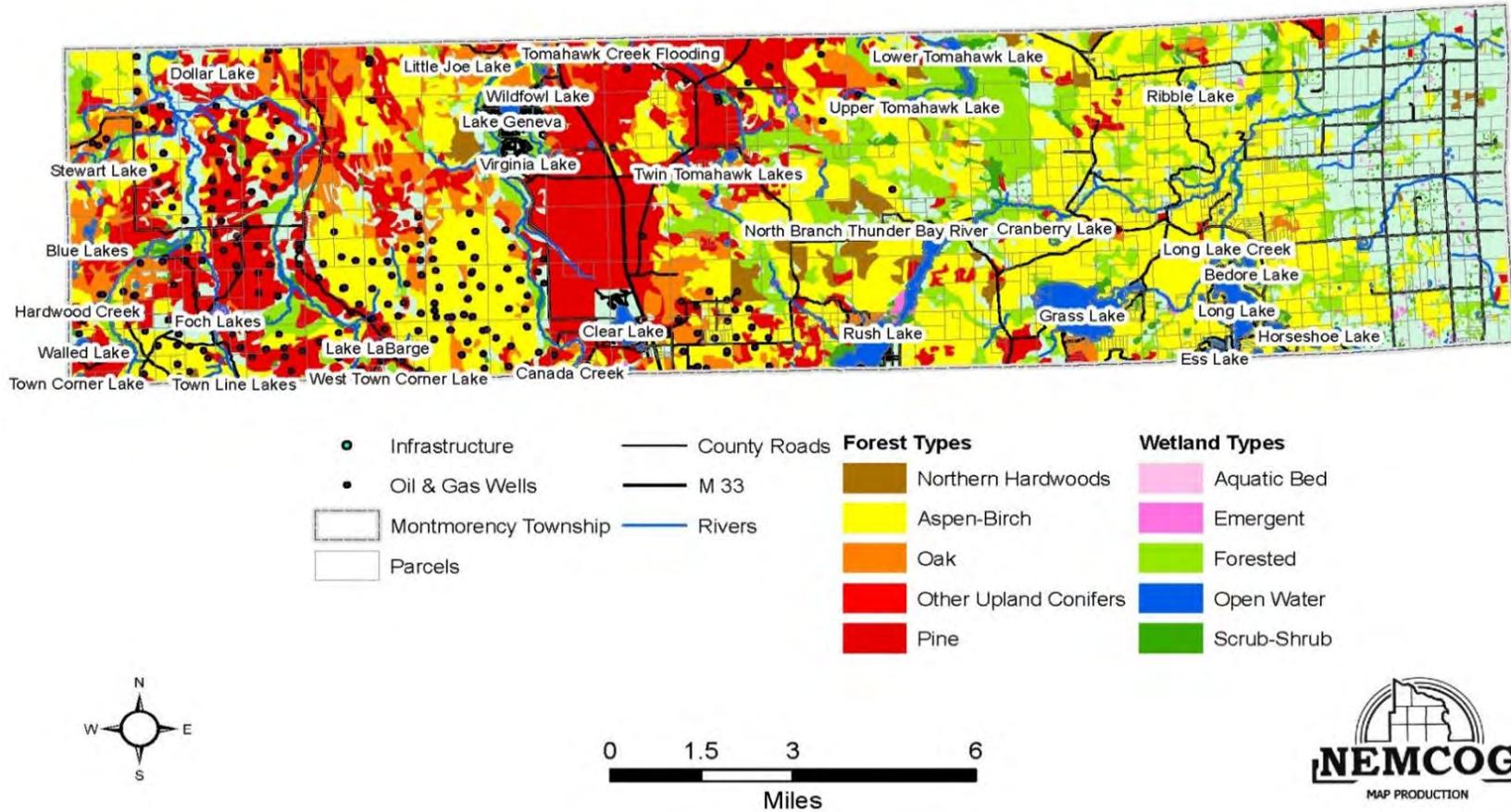


Figure 6-26 Montmorency Township Hazards Map

Rust Township Base Map

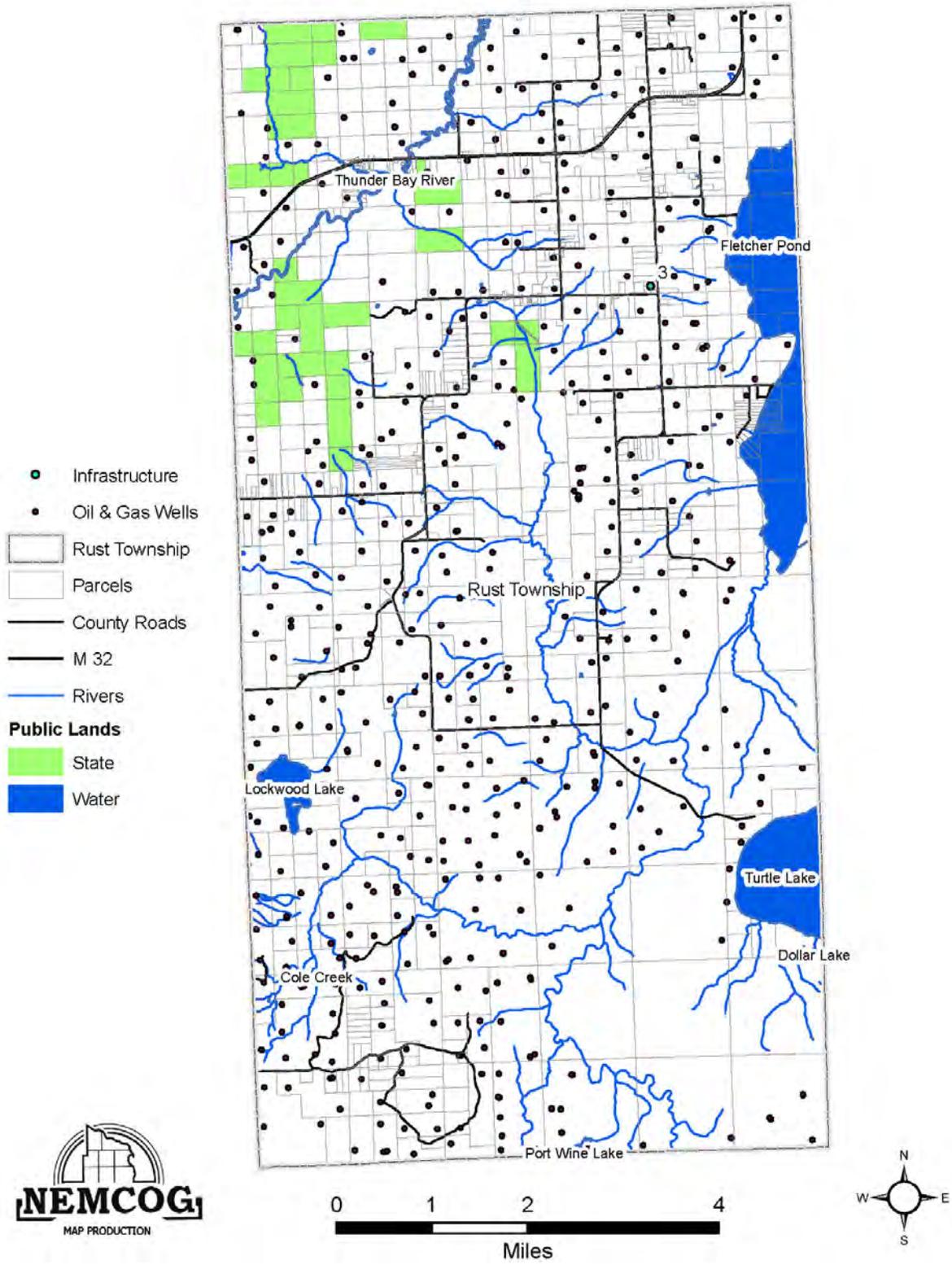


Figure 6-27 Rust Township Base Map

Rust Township Hazards Map

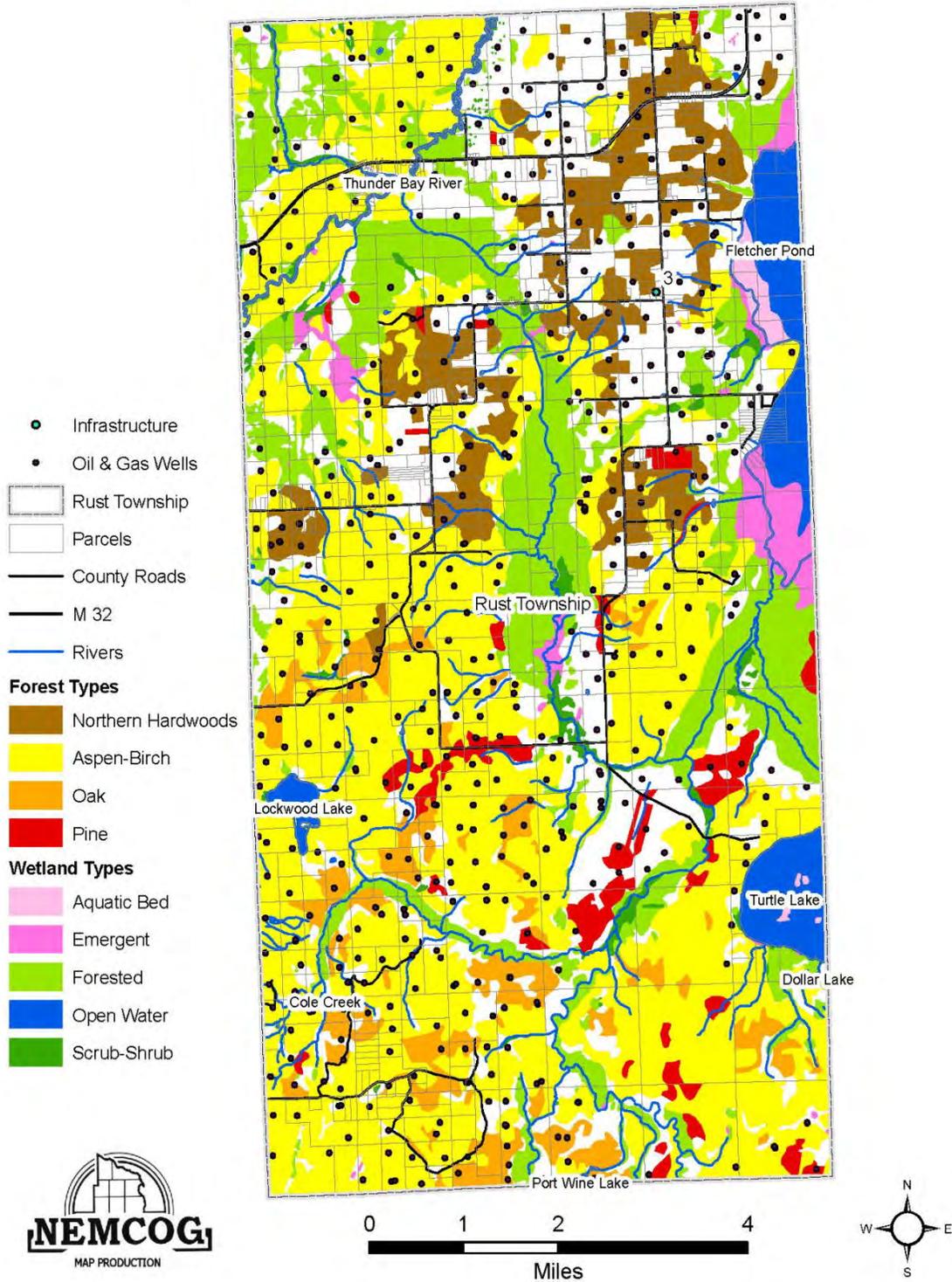


Figure 6-28 Rust Township Hazards Map

Vienna Township Base Map

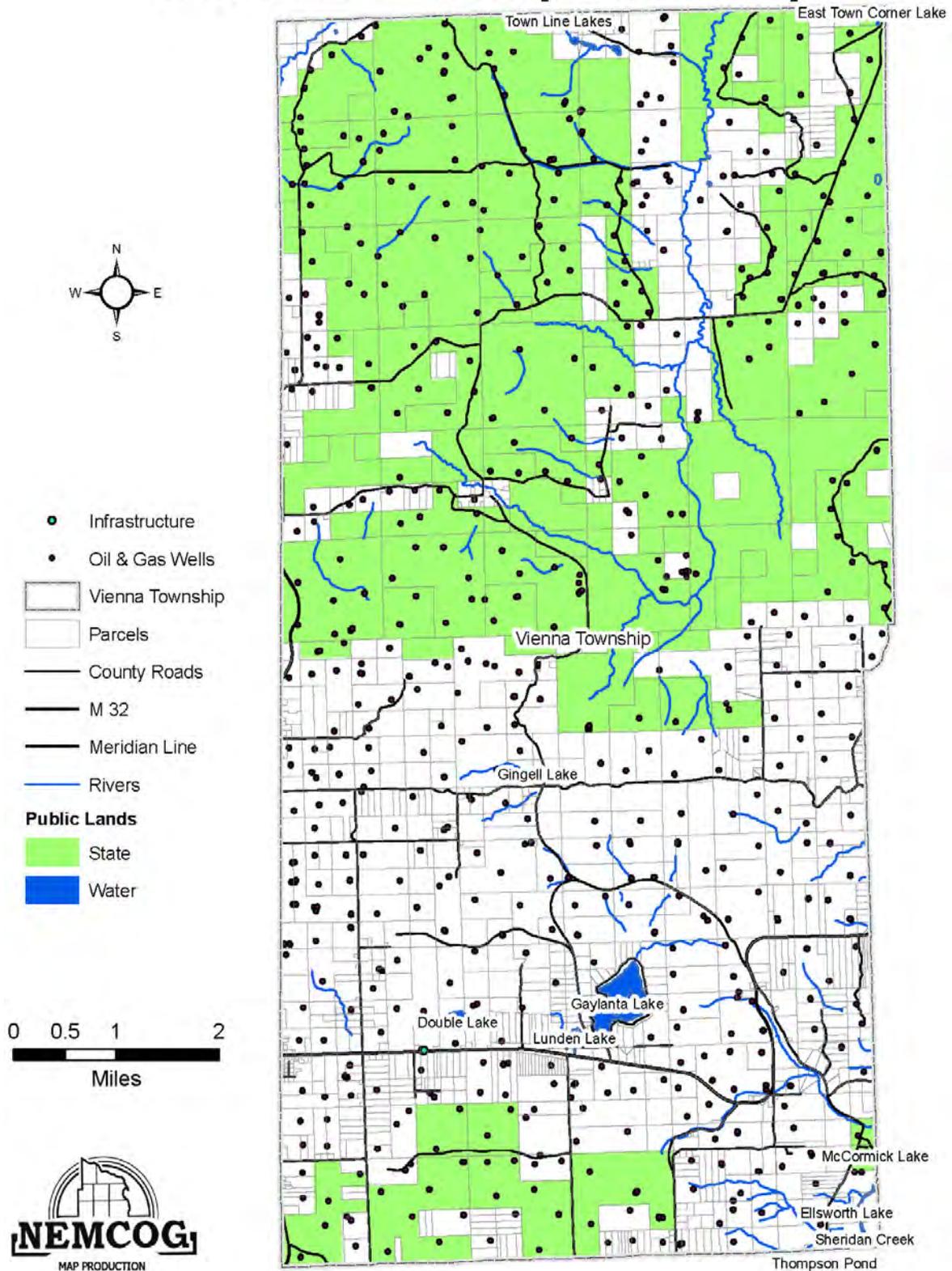


Figure 6-29 Vienna Township Base Map

Vienna Township Hazards Map

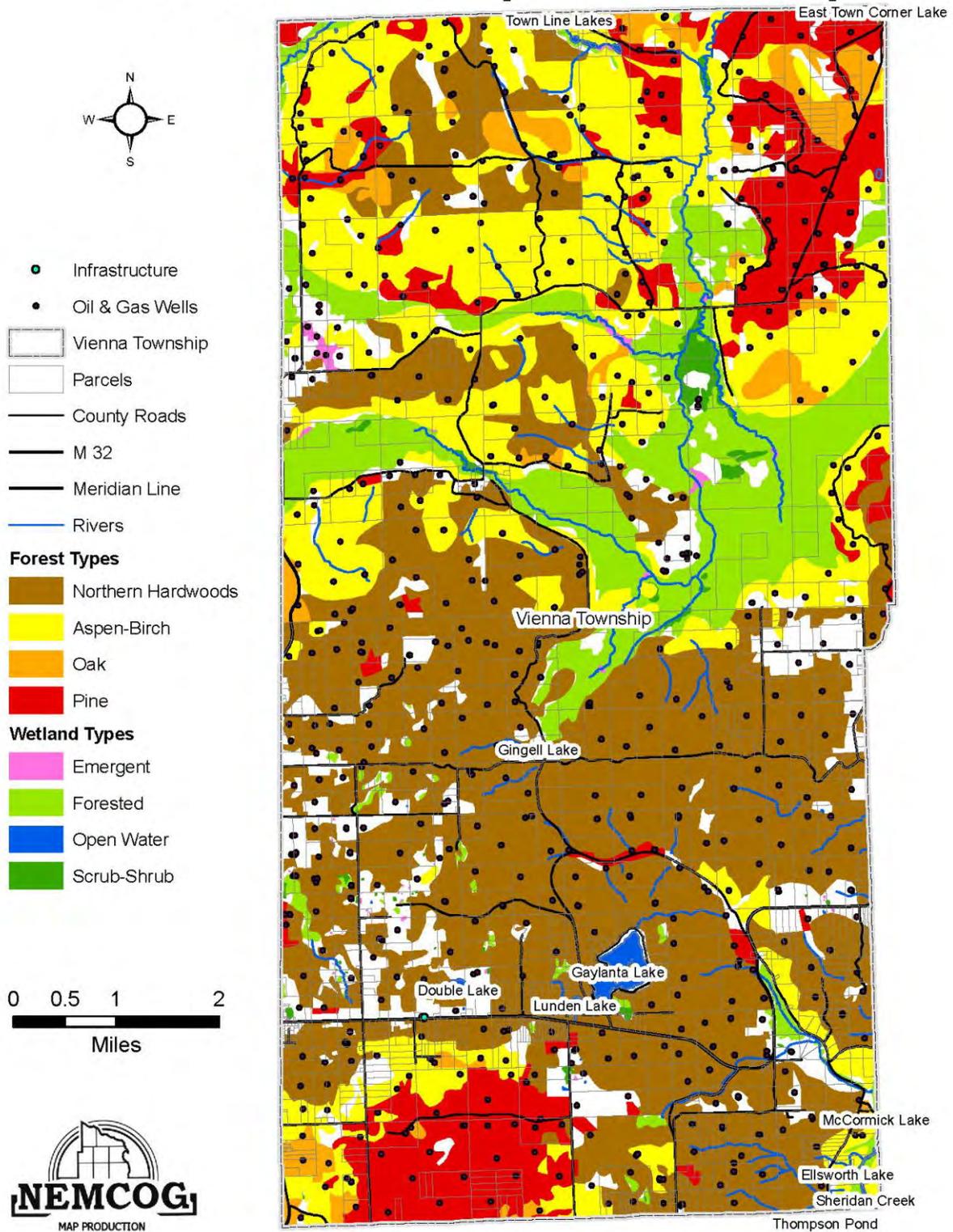


Figure 6-30 Vienna Township Hazards Map

Risk and Vulnerability Assessments

After identifying which hazards pose a risk in Montmorency 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 events are displayed as winter weather hazard in the Priority Risk Index

To begin the hazard ranking process, the 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, size of affected area, speed of onset, population impact, economic impacts, duration of threat, seasonal risk pattern, predictability of hazard, collateral damage, availability of warning systems, ability to mitigate, environmental impact, damage capacity, and public awareness. The LEPC rated likelihood of occurrence, size of affected area, population impact, economic impacts, collateral damage, and ability to mitigate as “always very important.” The LEPC rated predictability of hazard, availability of warning systems, environmental impact, and damage capacity as “usually important.” The LEPC rated speed of onset, seasonal risk pattern, and public awareness as “sometimes important” and the LEPC rated duration of threat as “rarely of importance.” After the rating process for the evaluation criteria, the LEPC selected the following seven 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.
- **Size of Affected Area:** The size of a geographic area 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.
- **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.
- **Collateral Damage:** The potential for a hazard event to cause secondary damage and impacts. The more collateral damage a hazard event causes, the greater the hazard’s threat potential is to the community. For example, blizzards and ice storms can cause power outages, which lead to the loss of heat and the potential for persons to get hypothermia, become injured, or die.
- **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 event, the less likely the hazard event will pose a threat (e.g., loss of life and property damage) to the community in the future.

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%. 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 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

Size of 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

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

Collateral Damage

High possibility to cause a secondary hazard	10 pts
Medium possibility to cause a secondary hazard	7 pts
Small possibility to cause a secondary hazard	4 pts
No possibility to cause a secondary hazard	1pt
Unable to be determined	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

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, size of affected area, collateral damage, 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 and the economic impact. 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 6-7 Montmorency County Priority Risk Index								
Rank	Hazard	Evaluation Criteria						Score
		Likelihood of Occurrence (30%)	Size of Affected Area (15%)	Population Impact (15%)	Economic Impacts (5%)	Collateral Damage (5%)	Ability to Mitigate (30%)	
1	Wildfires	10	7	7	10	10	7	8.2
2	Public Health Emergency	7	10	10	10	1	7	7.8
3	Severe Winds (Derecho)	10	10	1	7	10	7	7.6
4	Winter Weather Hazards (ice and sleet storms, and snowstorms)	10	10	1	4	10	7	7.5
4	Structural Fires	10	1	10	10	4	7	7.5
6	Infrastructure Failures	4	10	10	10	10	7	7.3
7	Transportation Accident (air/land/water)	10	10	1	1	4	7	7.0
8	Transportation Hazardous Material Accident	10	4	4	4	7	7	6.9
8	Hailstorms	10	10	1	1	1	7	6.9
10	Drought	10	10	1	7	7	4	6.6
11	Oil and Gas Accident (well and pipeline)	1	10	10	10	7	7	6.3
12	Fixed Site Hazardous Material Accident	1	1	4	10	4	10	4.8
13	Scrap Tire Fires	1	1	1	10	10	10	4.6
14	Extreme Temperatures (Extreme Heat and Extreme Cold)	4	10	1	1	4	4	4.3
14	Riverine, Flash, and Urban Flooding	4	4	1	1	4	7	4.3
16	Tornadoes	1	1	7	10	10	4	3.7
16	Dam Failures	1	4	1	7	4	7	3.7
18	Civil Disturbances	0	1	1	1	0	7	2.5
19	Lightning	1	1	1	1	10	4	2.4
20	Karst Sinkholes (subsidence)	1	1	1	1	1	1	1.0

Table 6-8 Montmorency County's Risk and Vulnerability Assessment Summaries			
Rank	Hazard	Risk Assessment	Vulnerability Assessment
1	Wildfires	High Probability/High Impact	Severe
2	Public Health Emergency	Low Probability/High Impact	Severe
3	Severe Winds (Derecho)	High Probability/High Impact	Noticeable
4	Winter Weather Hazards (ice and sleet storms, and snowstorms)	High Probability/Low Impact	Noticeable
4	Structural Fires	Low Probability/High Impact	Noticeable
6	Infrastructure Failures	Low Probability/High Impact	Severe
7	Transportation Accident (air/land/water)	High Probability/Low Impact	Noticeable
8	Transportation Hazardous Material Accident	Low Probability/High Impact	Noticeable
8	Hailstorms	High Probability/Low Impact	Minor
10	Drought	High Probability/Low Impact	Noticeable
11	Oil and Gas Accident (well and pipeline)	Low Probability/High Impact	Noticeable
12	Fixed Site Hazardous Material Accident	Low Probability/High Impact	Noticeable
13	Scrap Tire Fires	Low Probability/High Impact	Severe
14	Extreme Temperatures (Extreme Heat and Extreme Cold)	Low Probability/Low Impact	Minor
14	Riverine, Flash, and Urban Flooding	High Probability/Low Impact	Noticeable
16	Tornadoes	Low Probability/High Impact	Severe
16	Dam Failures	Low Probability/High Impact	Severe
18	Civil Disturbances	Low Probability/Low Impact	Minor
19	Lightning	Low Probability/Low Impact	Minor
20	Karst Sinkholes (subsidence)	Low Probability/Low Impact	Minor

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Chapter 7 Goals and Objectives

Overview

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

Goals and Objectives

The following goals and objectives will be used to guide the hazard mitigation efforts within Montmorency 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.
- 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

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

GOAL 3: Maintain Essential Services

Objectives

- Inspect, maintain and upgrade 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 during a hazard event.

GOAL 4: Guide Growth/Development

Objectives

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

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 Montmorency 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, if necessary.

Chapter 8 Mitigation Strategies and Priorities

Overview

After determining Montmorency County's goals and objectives, hazard mitigation action and implementation strategies 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 Montmorency County LEPC, county, and local governments considered their budgets, available technical resources, and current visions to assess each action item's priority, and current and future progress. Utilizing all the considerations above, each strategy was assigned a priority level of High, Medium, or Low.

High Priority Projects: Projects may address many goals and objectives or mitigate multiple hazards, benefits exceed cost, funding is likely under existing programs or grant sources, technical resources to complete the action are available, and there is strong local commitment to the strategy.

Medium Priority: Projects may address several goals and objectives or mitigate multiple hazards, benefits exceed costs, funding may be available through existing programs or grants sources, technical resources may be available but are not secured, and there is a moderate amount of local commitment to the strategy.

Low Priority: Projects may address fewer goals and objectives and mitigate multiple hazards, benefits exceed costs, funding is not available and grant eligibility is unknown, technical resources to complete the action are not available or have not been determined, and there is little local commitment to the strategy.

Mitigation Action and Implementation Strategy Tables

In the previous hazard mitigation plan, the mitigation action and implementation strategies were categorized based on the hazard(s) they addressed (Appendix D). When the LEPC reviewed the strategies, they moved many action items to the all-hazard mitigation table, four 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. Encourage the continuation of the house numbering program.

Priority Level: High

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. The 911 Advisory Board is currently pursuing universal house numbers.

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 will be continually implemented.

2. Develop a Regional EMS response plan to supplement the county's mass casualty plan.

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, EMS

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 high priority. The priority has not changed since the strategy will be continually implemented.

3. Develop strategies to ensure redundancies in the utility and communication systems.

Priority Level: High

Hazards Addressed: Infrastructure Failures, Extreme Temperatures (Extreme Heat and Extreme Cold)

Responsible Agencies: State, Utility Companies

Financial and Technical Resources: State, Utility Companies

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

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

4. Compile and maintain a list of homes and facilities with vulnerable residents (e.g., elderly, infirm, and disabled individuals).

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Civic Groups and Churches

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County

Progress/Status: Ongoing/Long term throughout the entire county. Council on Aging has developed plans and outreach procedures.

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

5. Enforce compliance with the oil and gas industry's safety regulations and standards.

Priority Level: High

Hazards Addressed: Oil and Gas Accident (well and pipeline)

Responsible Agencies: County, Businesses, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, U.S. Forest Service, Michigan Department of Natural Resources, State

Financial and Technical Resources: Federal Government, Businesses

Progress/Status: Ongoing/Long term throughout the entire county. Gas and oil companies must meet standards set forth by industry regulations.

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 will be implemented.

6. Develop contingency plans for oil and gas industry employees and the public in the emergency plan that includes rescue and evacuation procedures.

Priority Level: Medium

Hazards Addressed: Oil and Gas Accident (well and pipeline)

Responsible Agencies: County Emergency Management Office, U.S. Forest Service, Michigan Department of Natural Resources, State, Local Businesses, Local Fire Departments

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

Progress/Status: Ongoing/Long term throughout the entire county. Emergency plans contain response procedures.

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 will be implemented.

7. Develop and implement a procedure to improve and enforce well site signage (e.g., larger signs, moving signs to gate sites, etc.).

Priority Level: Medium

Hazards Addressed: Oil and Gas Accident (well and pipeline)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Departments, Local Businesses

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Most gas and oil sites meet this requirement.

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 will be implemented.

8. Review emergency plans for schools and the bus system.

Priority Level: Medium

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: County Emergency Management Office, Schools

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

Progress/Status: Ongoing/Long term throughout the entire county. Minor Progress. School bus extrication training occurs 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 will be continually implemented.

9. Identify evacuation routes and emergency routes. Develop and implement a program to instruct residents on proper evacuation procedures.

Priority Level: Medium

Hazards Addressed: Wildfires, Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Riverine, Flash, and Urban Flooding, Dam Failures

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County Road Commission, Local Fire Departments, Civic Groups and Churches, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County Emergency Management Office, County Road Commission, Federal Government, State, Local Fire Department

Progress/Status: Ongoing/Long term throughout the entire county. Routes have been identified. Procedures in places for snow plowing priorities. Public awareness plans are in place.

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 reviewed and implemented.

10. Build the capabilities of the county GIS program through the creation and/or update of datasets (e.g., parcels, parcel ownership, location of all structures, driveways with ingress/egress conditions, roads, forest types, land ownership types, floodplains, utilities (power lines, gas lines, and water lines), wetlands, water features, bridges and culverts, and SARA Title III sites).

Priority Level: Medium

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County, U.S. Forest Service, Michigan Department of Natural Resources, County Road Commission, NEMCOG

Financial and Technical Resources: Federal Government, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County Emergency Management Office, State

Progress/Status: Ongoing/Long term throughout the entire county. New software has been recently purchased.

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 reviewed and updated.

11. Identify optimal staffing levels for county and community needs. Seek funding.

Priority Level: Medium

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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 will be continually reviewed.

12. Determine staging and storage areas for debris.

Priority Level: Medium

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Scrap Tire Fires, Tornadoes, Dam Failures

Responsible Agencies: County Emergency Management Office, County Road Commission

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Debris staging and storage areas have been identified in the Emergency Action Guide.

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 reviewed and updated.

13. Identify the location of water supplies and areas lacking adequate water supplies for firefighting. Develop a strategy to construct dry hydrants.

Priority Level: Medium

Hazards Addressed: Wildfires, Scrap Tire Fires, Structural Fires

Responsible Agencies: County, Local Fire Departments, Landowners

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Water sources have been identified; several dry hydrants have been installed.

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 reviewed and updated.

14. Ensure Zoning Ordinances allow for proper separation and buffering between industrial areas and other land uses that include schools, nursing homes, hospitals, and other special facilities.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Material Accident, Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Landowners

Financial and Technical Resources: Federal Government, NEMCOG, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Progress/Status: Ongoing/mid-term throughout the entire county. Moderate 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 will be implemented.

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

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, State, Federal Government

Financial and Technical Resources: Federal Government, District Health Department, State, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

Previous Plans: This item has been added to the 2021 hazard mitigation plan.

16. Maintain a public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, State, Medical, Federal Government

Financial and Technical Resources: Federal Government, District Health Department

Progress/Status: Ongoing/mid-term throughout the entire county. Ongoing, Health Department has system in place.

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

17. Individual communities should prepare master plans and capital improvement plans to address their current and future hazard mitigation needs.

Priority Level: Low

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Federal Government, NEMCOG

Progress/Status: Ongoing/Long term throughout the entire county. Minimal 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 will be continually implemented.

18. Review and update procedures, if necessary, to regularly check and maintain critical equipment.

Priority Level: Low

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Lightning

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County Road Commission, Local Fire Department

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Departments, County Road Commission

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 will be continually reviewed and updated.

19. Develop plans to identify and inform persons of "Safe Areas" during festivals and events (signs and directions to shelters).

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Hailstorms, Extreme Temperatures (Extreme Heat and Extreme Cold), Lightning

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Departments, Civic groups and churches, American Red Cross, Salvation Army

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Salvation Army, Civic groups and churches

Progress/Status: Ongoing/Long term throughout the entire county. Planning before events and holding after event reviews.

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 will be continually implemented.

20. Develop a medical airlift plan.

Priority Level: Low

Hazards Addressed: Wildfires, Public Health Emergency, Infrastructure Failures, Transportation Accident (air/land/water), Oil and Gas Accident (well and pipeline), Scrap Tire Fires, Dam Failures

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Medical, Police

Financial and Technical Resources: Federal Government

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

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.

21. Develop and enact housing and landlord ordinances to enforce heating requirements.

Priority Level: Low

Hazards Addressed: Public Health Emergency, Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Extreme Temperatures (Extreme Heat and Extreme Cold)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

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 will be implemented.

22. Develop and enact landlord-tenant ordinances.

Priority Level: Low

Hazards Addressed: Public Health Emergency, Structural Fires, Infrastructure Failures

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

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 will be implemented.

23. Develop and implement a Wildfire Safety Coalition to create and coordinate neighborhood watch programs that provide wildfire information about escape routes, sprinkler systems, power lines, etc.

Priority Level: Low

Hazards Addressed: Wildfires, Scrap Tire Fires

Responsible Agencies: County Emergency Management Office, Civic Groups and Churches, Local Fire Departments, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal government, County Emergency Management Office, Local Fire Departments

Progress/Status: Ongoing/mid-term 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 will be implemented.

24. Review compliance with and enforcement of U.S. Department of Transportation and Michigan Department of Transportation regulations regarding hazardous materials transport.

Priority Level: Low

Hazards Addressed: Transportation Hazardous Material Accident

Responsible Agencies: State, County Road Commission

Financial and Technical Resources: County Road Commission, State

Progress/Status: Ongoing/mid-term throughout the entire county. Minor Progress.

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

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. Create disaster-resistant public rights-of-way through tree trimming and maintenance efforts to safeguard utility lines from limb breakage.

Priority Level: High

Hazards Addressed: Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Hailstorms

Responsible Agencies: Utility Company, Landowners, Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources, Insurance Companies

Financial and Technical Resources: Federal Government, State

Progress/Status: Ongoing/mid-term throughout the entire county. Power lines are trimmed on a five-year cycle.

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 will be continually implemented.

2. Promote and implement the creation of defensible space around structures in fire-prone areas, including but not limited to the thinning of flammable vegetation, the creation of fuel breaks, and the use of fire-retardant materials and vegetation.

Priority Level: High

Hazards Addressed: Wildfires, Scrap Tire Fires

Responsible Agencies: County, Albert Township, Briley Township, Hillman Township, Montmorency Township, and Vienna Township, Civic Groups and Churches, Local Fire Departments, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term through Albert, Briley, Hillman, Montmorency, and Vienna Townships. Addressed through the Firewise program.

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 will be implemented.

3. 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: Public Health Emergency, Infrastructure Failures

Responsible Agencies: District Health Department, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term throughout the entire county. Ongoing.

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

4. Research and improve the 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: Public Health Emergency, Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Extreme Temperatures (Extreme Heat and Extreme Cold)

Responsible Agencies: Village of Hillman, Albert Township, Briley Township, Utility Company

Financial and Technical Resources: State, Federal Government, Village of Hillman, Albert Township, Briley Township, NEMCOG, MSU Extension

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

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 will be implemented.

5. Review regulations and implement necessary changes to ensure manufactured homes and exterior structures are properly anchored.

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Hailstorms, Tornadoes

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Insurance Companies

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. County regulates building regulations.

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 will be implemented if there are State code changes.

6. Encourage wind-resistant building designs. Incorporate wind-resistant construction techniques into existing public and private structure designs.

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Hailstorms, Tornadoes

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, State

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, State

Progress/Status: Ongoing/mid-term throughout the entire county. Minor Progress.

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 will be implemented.

7. Review and improve mutual aid assistance for utility and communication system failures.

Priority Level: Low

Hazards Addressed: Infrastructure Failures, Extreme Temperatures (Extreme Heat and Extreme Cold), Tornadoes, Dam Failures

Responsible Agencies: County Emergency Management Office, County, Utility Company

Financial and Technical Resources: Federal Government

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

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 will be continually monitored.

8. Identify electrical systems that will fail due to overload and develop a “Rolling Blackout” strategy.

Priority Level: Low

Hazards Addressed: Infrastructure Failures

Responsible Agencies: State, Utility Companies

Financial and Technical Resources: State, Utility Companies

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

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 will be implemented.

9. Review and enforce proper pipeline design, construction, maintenance, and inspection. Develop a program to increase public awareness about pipeline locations.

Priority Level: Low

Hazards Addressed: Oil and Gas Accident (well and pipeline)

Responsible Agencies: Federal Government, State, County Emergency Management Office, Local Fire Departments, Insurance Companies

Financial and Technical Resources: Federal Government, State

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

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 will be implemented.

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 and distribute public education and emergency preparedness information relating to all hazards that affect the county, including the implement of an all-hazards education and awareness program in schools and driver education programs and at workshops. Encourage the development of a Family Disaster Plan and the preparation of a Disaster Supplies Kit.

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Department, U.S. Forest Service, Michigan Department of Natural Resources, Schools, State

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Federal Government, State, Police, Civic Groups and churches, American Red Cross

Progress/Status: Ongoing/Long term throughout the entire county. Materials are distributed throughout the year at various venues. Currently developing public education information. All hazard education and awareness classroom presentations are taught with fire prevention education and awareness. Workshops are annually conducted at various locations.

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 will be continually implemented.

2. Develop public education programs regarding the proper installation and maintenance of smoke detectors, CO detectors, fireplaces and chimneys, and heating systems, and the proper use of stoves, electric and space heaters, fireworks, fire extinguishers, matches/lighters, etc., and the household items that can be used as fire tools.

Priority Level: High

Hazards Addressed: Structural Fire

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Schools, Civic Groups, Landowners, State, County, MSU Extension

Financial and Technical Resources: Federal Government, Local Fire Department, State, County

Progress/Status: Ongoing/Long term throughout the entire county. Fire safety programs are presented annually at all schools. CO and smoke detectors are available to families at the fire or health departments. Information about household items that can be used as fire tools is distributed.

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 will be continually implemented.

3. Establish an outreach program to assist residents during and after hazard events.

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme

Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Civic Groups and Churches, National Weather Service

Financial and Technical Resources: Federal Government, American Red Cross, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County

Progress/Status: Ongoing/Long term throughout the entire county. Plan in place to assist high risk populations during severe weather events.

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 will be continually implemented.

4. Introduce the “Firewise” program in at-risk communities. Distribute wildfire education materials to homeowners and businesses. Consider reducing insurance premiums if homes meet “Firewise” criteria.

Priority Level: Medium

Hazards Addressed: Wildfires

Responsible Agencies: Civic Groups and Churches, Local Fire Departments, Landowners, U.S. Forest Service, Michigan Department of Natural Resources, Insurance Companies, State, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

Progress/Status: Ongoing/mid-term throughout the county. The Firewise Program is promoted at annual events.

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 implemented.

5. Promote media broadcasts of fire weather and warnings.

Priority Level: Medium

Hazards Addressed: Wildfires

Responsible Agencies: County Emergency Management Office, Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources, insurance companies

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term throughout the county. Michigan DNR addresses this action strategy.

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 implemented.

6. Provide information to the public about sheltering in place, how to identify and assist in eliminating clandestine neighborhood drug labs, and the danger of radon and how to prevent radon concentrations in homes and buildings.

Priority Level: Medium

Hazards Addressed: Fixed Site Hazardous Material Accident, Transportation Hazardous Material Accident, Public Health Emergency

Responsible Agencies: County Emergency Management Office, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Civic Groups and Churches, Police, District Health Department

Financial and Technical Resources: Federal Government, Police, District Health Department
Progress/Status: Ongoing/Long term throughout the entire county. Sheltering in place has been promoted to area residents and businesses. The media provides information about how to identify and assist in eliminating clandestine neighborhood drug labs. Health Department has a system in place to provide information about radon.

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 will be continually implemented.

7. Increase public awareness about the causes, symptoms, and preventative measures for disease outbreaks and other public health emergencies. Encourage residents to receive immunizations against communicable diseases.

Priority Level: Medium

Hazards Addressed: Public Health Emergency

Responsible Agencies: District Health Department, Medical, Schools, Civic Groups and Churches, County Emergency Management Office

Financial and Technical Resources: Federal Government, District Health Department

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

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

8. Promote and implement solutions to keep roads and driveways accessible for fire equipment.

Priority Level: Medium

Hazards Addressed: Wildfires, Scrap Tire Fires, Structural Fires

Responsible Agencies: County Road Commission, Landowners

Financial and Technical Resources: Federal Government, State, Landowners

Progress/Status: Ongoing/Long term throughout the entire county. Moderate 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 will be continually implemented.

9. Provide information to the public about pollution control, enforcement, cleanup, and the proper disposal of chemicals and scrap materials. Encourage residents to take advantage of local recycling opportunities (chemicals, tires, electronics, etc.).

Priority Level: Low

Hazards Addressed: Public Health Emergency

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, State, Schools, Federal Government

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Minor Progress made. Health Department has a system in place to encourage residents to recycle.

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 will be implemented depending on funding.

10. Encourage securing loose items and moving yard and patio items to areas where the winds cannot blow them about.

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Hailstorms, Tornadoes

Responsible Agencies: County Emergency Management Office, Insurance Companies, Landowners

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term throughout the entire county. Minor Progress.

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 will be implemented.

11. Acquire portable signs to provide information to motorists.

Priority Level: Low

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures

Responsible Agencies: County Road Commission

Financial and Technical Resources: County Road Commission

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

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 will be 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. Review, update, and enforce open burning regulations.

Priority Level: High

Hazards Addressed: Wildfires

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Landowners, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, State, Local Fire Department

Progress/Status: Ongoing/mid-term throughout the entire county. Burning restrictions are strictly enforced.

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 the strategy will be continually implemented.

2. Seek support and funding to clean up environmental contamination sites.

Priority Level: Medium

Hazards Addressed: Public Health Emergency, Fixed Site Hazardous Material Accident, Scrap Tire Fires

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, State, Medical, Federal Government

Financial and Technical Resources: Federal Government, State

Progress/Status: Ongoing/mid-term throughout the entire county. EGLE issue; ongoing.

Previous Plans: This item has been retained from the 2014 plans, in which it was classified as a low priority. The priority has changed since the State has active programs.

3. Inspect campsites in public forests to ensure safe open fires, where allowed.

Priority Level: Medium

Hazards Addressed: Wildfires

Responsible Agencies: Local Fire Departments, State

Financial and Technical Resources: Local Fire Departments, State

Progress/Status: Ongoing/mid-term throughout the county. Michigan DNR patrols areas.

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.

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. Ensure the county, local jurisdictions, police, firefighters, EMS, and central dispatch have adequate equipment, staff, and training to respond to hazards.

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Federal Government, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Progress/Status: Ongoing/Long term throughout the entire county. Equipment has been purchased through HSGP grants.

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 will be continually implemented.

2. Ensure key gasoline stations have the capacity to pump gasoline during power outages.

Priority Level: High

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Scrap Tire Fires, Tornadoes, Dam Failures, Lightning

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Stations have been identified.

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 will be continually reviewed.

3. Conduct wildfire planning meetings with the Michigan Department of Natural Resources, U.S. Forest Service, and local fire departments.

Priority Level: High

Hazards Addressed: Wildfires

Responsible Agencies: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Departments, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term throughout the county. Annual meetings between the DNR and local fire departments.

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 will be implemented.

4. Inventory backup generators. Identify critical facilities and provide generators to maintain community infrastructure at acceptable operating levels during power failures.

Priority Level: High

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Lightning

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Schools, Local Businesses, Utility Companies

Financial and Technical Resources: Federal Government, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Progress/Status: Ongoing/Long term throughout the entire county. Additional generators have been procured through grants, when available. Generators are installed at critical sites as funding permits.

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 will be continually reviewed.

5. Provide more training, planning, and preparedness for firefighters, police, first responders, and local hazardous material emergency response teams.

Priority Level: High

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Fixed Site Hazardous Material Accident, Oil and Gas Accident (well and pipeline)

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Local Businesses, Police, EMS, Central Dispatch, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, State

Financial and Technical Resources: Federal Government, State, County, County Emergency Management Office, Local Fire Department, Village of Hillman, Albert Township, Avery Township, Briley

Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Progress/Status: Ongoing/Long term throughout the entire county. Several mass casualty exercises have been completed. Mutual aid agreements in place with neighboring hazardous material teams.

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 will be continually implemented.

6. Continue upgrade protocols for Central Dispatch.

Priority Level: High

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

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

Financial and Technical Resources: Federal Government

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

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 will be continually implemented.

7. Enforce highway speeds.

Priority Level: High

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: Police

Financial and Technical Resources: Police

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 changed since the strategy will be continually implemented.

8. Establish shelters and heating/cooling centers and shelters for vulnerable populations.

Priority Level: High

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, American Red Cross, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Federal Government, County Emergency Management Office, American Red Cross

Progress/Status: Ongoing/Long term throughout the entire county. Operational plans have been developed for vulnerable populations during severe weather events.

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 will be continually reviewed, updated, and implemented.

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

Priority Level: High

Hazards Addressed: Public Health Emergency

Responsible Agencies: County Emergency Management Office, County, District Health Department, Medical, Schools, Police, Federal Government, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Federal Government, District Health Department

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

Previous Plans: This item has been added to the 2021 hazard mitigation plan.

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

Priority Level: High

Hazards Addressed: Public Health Emergency

Responsible Agencies: County Emergency Management Office, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, Police, Fire Department

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

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

Previous Plans: This item has been added to the 2021 hazard mitigation plan.

11. Provide hazardous material training regarding on-site products and how to handle them, and compliance with all safety procedures and systems.

Priority Level: High

Hazards Addressed: Fixed Site Hazardous Material Accident, Transportation Hazardous Material Accident

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

Financial and Technical Resources: Federal Government, State

Progress/Status: Ongoing/Long term throughout the entire county. Area fire departments train annually with the Hillman Power Plant (302 site). Compliance with all safety procedures and systems is a requirement of the Michigan Firefighters Training Council.

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 will be continually implemented.

12. 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

Responsible Agencies: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, District Health Department, State

Financial and Technical Resources: Federal Government, District Health Department, State Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

Previous Plans: This item has been added to the 2021 hazard mitigation plan.

13. Enhance the public early warning system and network through the determination of sites to locate sirens. Seek funding for installation.

Priority Level: Medium

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, County, Local Fire Departments, National Weather Service, State

Financial and Technical Resources: Federal Government, NEMCOG, County Emergency Management Office, State, Local Fire Departments

Progress/Status: Ongoing/Long term throughout the entire county. Currently working on having emergency alerts sent to phones. Gas and oil companies must meet standards set forth by industry regulations.

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 is a current focus.

14. Meet with local industries and fire departments to determine the type of hazardous materials that are transported over county highways.

Priority Level: Medium

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Local Businesses, Police

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/mid-term throughout the entire county. Moderate 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 will be continually reviewed and implemented.

15. Inventory the heavy equipment, wreckers, and jaws units within the county and near the county's borders.

Priority Level: Medium

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Transportation Accident (air/land/water), Transportation Hazardous Material

Accident, Oil and Gas Accident (well and pipeline), Scrap Tire Fires, Tornadoes, Dam Failures, Karst Sinkholes (subsidence)

Responsible Agencies: County Emergency Management Office, County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Department

Financial and Technical Resources: County, County Emergency Management Office, Local Fire Department, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Progress/Status: Ongoing/Long term throughout the entire county. Mutual aid agreements with surrounding counties.

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.

16. Increase volunteer firefighter recruitment and research offering paid training.

Priority Level: Medium

Hazards Addressed: Wildfires, Public Health Emergency, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Structural Fires, Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Hailstorms, Drought, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Dam Failures, Civil Disturbances, Lightning, Karst Sinkholes (subsidence)

Responsible Agencies: Local Fire Department

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. No cost training is available throughout the region.

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 will be continually implemented.

17. Standardize all fire equipment so all county firefighters can operate any piece of equipment.

Priority Level: Medium

Hazards Addressed: Wildfires, Structural Fires, Scrap Tire Fires

Responsible Agencies: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, Local Fire Department, U.S. Forest Service, Michigan Department of Natural Resources

Financial and Technical Resources: Federal Government, State

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 medium priority. The priority has not changed since the strategy will be continually implemented.

18. Use CAMEO to develop pre-evacuation plans by material and load type.

Priority Level: Low

Hazards Addressed: Transportation Hazardous Material Accident, Fixed Site Hazardous Material Accident

Responsible Agencies: County Emergency Management Office

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Minor Progress, progress determined by available funding.

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 changed since the strategy will be continually implemented depending on funding.

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

Priority Level: Low

Hazards Addressed: Winter Weather Hazards (ice and sleet storms, and snowstorms)

Responsible Agencies: County Emergency Management Office, National Weather Service

Financial and Technical Resources: County Emergency Management Office, National Weather Service

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

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 will be continually implemented.

20. Encourage the use of intelligent transportation system (ITS) technology.

Priority Level: Low

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: State

Financial and Technical Resources: State

Progress/Status: Ongoing/mid-term throughout the entire county. Minor Progress.

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

21. Annually meet with the trucking industry and fire and law enforcement agencies.

Priority Level: Low

Hazards Addressed: Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: County Emergency Management Office, Local Fire Departments, Local Businesses

Financial and Technical Resources: Federal Government

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

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 will be 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. Develop an integrated year-round water supply system using multi-tankers and well-located water supplies.

Priority Level: High

Hazards Addressed: Wildfires, Scrap Tire Fires, Structural Fires

Responsible Agencies: County Emergency Management Office, Local Fire Department

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

Progress/Status: Ongoing/Long term throughout the entire county. Mutual aid agreements are in place.

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

2. Identify problem roadways and road/stream crossings. Obtain support and improve the roadways and road/stream crossings through re-design and the installation of snow fences and vegetation.

Priority Level: Medium

Hazards Addressed: Wildfires, Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident, Oil and Gas Accident (well and pipeline), Fixed Site Hazardous Material Accident, Scrap Tire Fires, Extreme Temperatures (Extreme Heat and Extreme Cold), Riverine, Flash, and Urban Flooding, Tornadoes, Karst Sinkholes (subsidence)

Responsible Agencies: County Road Commission, State, Landowners

Financial and Technical Resources: State, Federal Government, County Road Commission, Huron Pines

Progress/Status: Ongoing/Long term throughout the entire county. Several critical crossings have had improvements completed in the last 5 years.

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 will be implemented.

3. Promote the installation of NOAA weather radios in new residential constructions.

Priority Level: Low

Hazards Addressed: Severe Winds (derecho), Winter Weather Hazards (ice and sleet storms, and snowstorms), Hailstorms, Drought, Extreme Temperatures (Extreme Heat and Extreme Cold), Lightning

Responsible Agencies: County, Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township, National Weather Service, State

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. No 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 will be continually reviewed and implemented.

4. Encourage long-term planning to create more connector roads that reduce congestion on arterial roads.

Priority Level: Low

Hazards Addressed: Infrastructure Failures, Transportation Accident (air/land/water), Transportation Hazardous Material Accident

Responsible Agencies: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

Financial and Technical Resources: Village of Hillman, Albert Township, Avery Township, Briley Township, Hillman Township, Loud Township, Montmorency Township, Rust Township, Vienna Township

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

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 will be continually implemented.

Removed Mitigation Action and Implementation Strategies from the 2021 Plan

1. Increase the usage of NOAA Weather Radios by subsidizing the purchase and distribution of radios to county residents, organizations, and businesses. Use the NOAA radios as a community emergency alert system to distribute information on hazard events.

Priority Level: High

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments, National Weather Service

Financial and Technical Resources: Federal Government

Progress/Status: Ongoing/Long term throughout the entire county. Weather radios have been purchased for most public gathering places per available funding.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a high priority. It was removed since radios have been purchased.

2. Promote the re-installation and install the siren system across the county.

Priority Level: Low

Responsible Agencies: County Emergency Management Office, County, Local Governments, Local Fire Departments

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

Progress/Status: Ongoing/Long term throughout the entire county. No high-density population centers in the county.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. This item has been removed since the county does not have high density population centers.

3. Participate in a training exercise involving a 60-person accident involving a bus and logging truck.

Priority Level: Medium

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

Financial and Technical Resources: Federal Government

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

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a medium priority. This item has been removed since it has been completed.

4. Develop and implement a program to provide a chipper for the disposal of woody debris in conjunction with composting programs and spring clean-up days.

Priority Level: Low

Responsible Agencies: Local Governments

Financial and Technical Resources: Local Governments

Progress/Status: Ongoing/Long term throughout the entire county. Not cost effective.

Previous Plans: This item has been retained from the 2005 and 2014 plans, in which it was classified as a low priority. This item has been removed since it is not cost effective.

5. Expand community support for free or reduced-expense clinics and school health services.

Priority Level: Medium

Responsible Agencies: District Health Department

Financial and Technical Resources: District Health Department

Progress/Status: Ongoing/Long term throughout the entire county. There are two reduced expense clinics in the county.

Previous Plans: This item has been retained from the 2014 plans, in which it was classified as a medium priority. This item has been removed since the strategy has been completed.

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Chapter 9 Plan Maintenance

Implementation, Monitoring, and Evaluation

The Montmorency County Board of Commissioners and the Montmorency County Emergency Management Office (EM) are the primary entities responsible for implementing the hazard mitigation plan. The Board of Commissioners will need to evaluate funding and staffing required to implement the plan since the current resources, both staff and financial, may not accommodate the expanded role of the EM and the LEPC. 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 LEPC is organized under the Michigan SARA Title III Program and meets on a regular basis to carry out its duties. A Hazard Mitigation Committee (HMC) was formed from the members of the LEPC and will be the local group responsible for overseeing the implementation of the hazard mitigation plan. Since the HMC is a sub-committee of the LEPC, it will function under the Board of Commissioners. Staff support will be provided by the EM and will coordinate with the Board of Commissioners. The Emergency Manager will provide program administration and project oversight on an ad-hoc basis. Involvement in the HMC will be determined by the available emergency management staff time and resources.

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 Montmorency County Hazard Mitigation Plan and will perform an annual review of the hazard mitigation plan to determine which projects have been accomplished and which projects should be added to the five-year action list. 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 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 amendments to the hazard mitigation plan, review reports from agencies involved in implementing mitigation projects, prepare an annual mitigation activity report for the Board of Commissioners, 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 implementation issues, favorable outcomes, and the participation levels from other agencies and stakeholders.

Local governments, county departments, and local, state and federal agencies have the opportunity to propose new projects and/or sponsor projects identified in the plan.

Partnerships with the following agencies and organizations will strengthen the County’s hazard mitigation program to efficiently leverage available resources:

- Montmorency County Departments
- Village of Hillman
- Albert Township
- Avery Township
- Briley Township
- Hillman Township
- Loud Township
- Montmorency Township
- Rust Township
- Vienna Township
- Township Fire Departments
- Alpena-Montmorency Conservation District
- Montmorency 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

Montmorency County, the Village of Hillman, all townships in Montmorency 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. All communities in the county are encouraged to adopt zoning regulations to minimize the effect of hazards.

Five Year Plan Review and Update

The Stafford Act, as amended by the Disaster Mitigation Act of 2000, requires the Montmorency County Hazard Mitigation Plan to be updated, adopted, and re-submitted for FEMA approval every five years. The plan will be reviewed and updated by the HMC 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, the addition and/or removal of mitigation actions and strategies, reviewing goals and objectives, and changes in federal or state legislation. Upon completion of the plan review and update, 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 can review, approve, and adopt the plan. Then, all local jurisdictions can review, approve, and adopt the plan.

In order to properly update the plan, Montmorency County will need to seek funding from appropriate state and federal agencies.

Continued Public Involvement

Montmorency 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 community websites and/or the regional planning agency website. The Emergency Manager will be responsible for keeping a record of public comments regarding the plan.

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