Menominee Nation 2017 All Hazard Mitigation Plan

Prepared by RW Management Group, Inc. and the Menominee Nation All Hazard Mitigation Plan Project Team

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Prepared by:
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PURPOSE FOR THE PLAN

Development of a new Hazard Mitigation Plan of the Menominee Nation, Wisconsin. Work on the All Hazards Mitigation Plan began in February 2015 and was approved by the Menominee Tribal Legislature on '###____, 2017. A Project Team comprised of tribal officials and emergency management personnel guided the plan development process over a several-month timeframe with professional planning support from RW management Group, Inc. The purpose for the plan is to evaluate the tribe's potential exposure to natural hazards and to identify appropriate mitigation strategies. Consistent with the Code of Federal Regulations (44 CFR Part 201.7), the tribe decided to initially limit the scope of this planning effort to natural hazards. Based on these required components, this plan conforms to Federal All Hazards Mitigation Planning requirements. Completion of the 2017 plan will further assist Menominee Tribal emergency personnel in identifying areas of risk, assessing the magnitude of the risk, and developing strategies for reducing this risk. Through this process, the tribe can address issues related to incompatible land uses; the identification and protection of critical facilities; and the reduction of community costs associated with natural disaster relief and rescue efforts. Completion and approval of the plan will also make Menominee Indian Tribe eligible to apply for future disaster relief and mitigation project funds to implement applicable recommended mitigation strategies. The following sections discuss the Disaster Mitigation Act of 2000 which led to the requirement for All Hazards Mitigation Plans as well as the funding of this planning effort to develop the five parts of this plan.

DISASTER MITIGATION ACT OF 2000

The development of the Menominee Nation 2017 All Hazards Mitigation Plan is in response to passage of the Disaster Mitigation Act (DMA) of 2000. The act attempts to stem the losses from disasters, reduce future public and private expenditures, and speed up response and recovery from disasters. The following is a summary of the parts of the Disaster Mitigation Act of 2000 that pertain to local governments and tribal organizations.

The Act:

- Establishes a new requirement for local governments and tribal organizations to prepare an All Hazards Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program.
- Establishes a requirement that natural hazards need to be addressed in the risk assessment/vulnerability analysis part of the All Hazards Mitigation Plan. Addressing man-made/technological hazards is encouraged, but not required.
- Authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local and tribal organization All Hazards Mitigation Plans.
- Established November 1, 2004, as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Grant Program. This deadline was November 1, 2003 for the Pre-Disaster Mitigation Program. The plan is being developed in 2017 with a five year update to remain current and eligible for funding. In the past, if a plan is not prepared by November 1, 2004, local units of government would have had to agree to prepare an All Hazards Mitigation Plan within one year to be eligible for funding if a major disaster is declared. By not having an All Hazards Mitigation Plan, local governments and tribal organizations would not have been able to utilize funding through the Pre-Disaster Mitigation Grant Program.

PLANNING VISION

This plan establishes three major visions in fulfilling the requirements established through DMA 2000:

Reduce Hazard Risks and Impacts – This All Hazard Mitigation Plan assessed vulnerability of life and property to a broad range of potential natural hazards, and developed a prioritized range of corresponding mitigation strategies to reduce both risks and impacts.

Build on Existing Efforts – Many cities, villages, towns, school districts, and businesses, often lead by county personnel, have already engaged in mitigation and/or response planning. The

intent of this plan is to maximize these efforts by inventorying, coordinating, and building on these efforts when possible, and developing new strategies to fill any gaps identified among existing efforts. This plan incorporates information and strategies from existing emergency response plans and other relevant public documents.

Share Information and Raise Awareness – Public engagement methods used in the preparation of this plan sought input from a diverse range of stakeholders including the general public and various public, private, and non-profit sector representatives. One of the most commonly heard messages throughout these planning meetings and workshops is the need for clear information and ongoing communication among all stakeholders. Mitigation strategies identified in this plan address the public information and communication component in a universal manner (regardless of hazard type) and within a hazard-specific context, as applicable.

PLANNING GOAL

Historically, the Menominee Indian Tribe has not had federal disaster declarations for flooding, severe storms (including winter storms), and tornadoes. There has also never been a declared disaster that involved the Menominee Indian Tribe for flooding. More generally, Wisconsin disasters over the same period incurred millions of dollars in Federal Emergency Management Agency (FEMA) expenditures. The creation of the Menominee Nation 2017 All Hazards Mitigation Plan is designed to meet Tribal, State and Federal planning standards.

PLANNING PROCESS

Development of the Menominee Nation 2017 All Hazards Mitigation Plan was based on the planning requirements and guidance provided by the Federal Emergency Management Agency (FEMA) and the Wisconsin Department of Military Affairs, Wisconsin Emergency Management (WEM). Following these requirements and guidance, the plan meets the requirements of the Disaster Mitigation Act of 2000. Since the Wisconsin Emergency Management guidance for All Hazards Mitigation Plans recommended that planning areas “be consistent with a community’s comprehensive planning boundary,” the planning area for this Menominee Nation 2017 All Hazards Mitigation Plan includes all of the County of Menominee, Menominee Reservation is located about 45 miles northwest of Green Bay. The Reservation is unique because it shares

coterminous boundaries with the one Township of Menominee as well as the Menominee County. The Reservation borders three other counties: Langlade, Oconto, and Shawano. There are five communities within the Reservation: two main Villages of Keshena and Neopit, a smaller Village named Zoar, Middle Village and a more scattered community called South Branch.

The Menominee Indian Reservation is approximately 234,355 acres or 360 square miles and contains roughly 223,500 acres of heavily forested lands, representing the largest single tract of virgin timberland in the State of Wisconsin. The elevation of Keshena is 829 feet above sea level. There are four rivers flowing through the Menominee Reservation, the Evergreen, the Oconto, the Red, and the Wolf. The Legend Lake area of Menominee County is a spring-fed lake over six miles long, with 47.5 miles of shoreline. Legend Lake acts as a main recreational area, and is heavily developed with both seasonal and permanent residences. Thus making this a comprehensive multi-jurisdictional plan.

PLANNING APPROACH

The Menominee Tribe initiated development of this updated plan with a pre-planning meeting held in August, 2015. The Project Team was invited to a meeting on September 22, 2015 to inform them of the process and to encourage their input and participation during the plan development period. Development of the plan was structured along a four-phase planning process:

Phase I: Start-Up, Assess Community Support

Phase II: Assess Risks

Phase III: Develop a Mitigation Plan

Phase IV: Implement the Mitigation Plan

PROJECT TEAM

Menominee Tribal Emergency Management Coordinator established a Hazard Mitigation Plan Project Team to oversee the development of the plan. Committee members were selected from tribal departments involved in emergency management issues (i.e. Tribal Housing, Environmental Services, Community Development, Brownfields, Insurance, GIS, Tribal Administration, Utilities, Historic Preservation, Fire and Menominee Tribal Enterprise). Because the plan focused on the Menominee Nation, the Project Team did not include representation from adjacent counties, however draft copies of the plan were sent to the adjacent counties prior to FEMA approval and final copies were sent after approval occurred. The Project Team was responsible for providing input, guiding the planning process, reviewing and commenting on draft chapters of the plan, and advocating for approval at the legislative level. Menominee Tribe's Emergency Management Coordinator collected and distributed information for Project Team meetings in addition to handling the administrative portion of the grant. During the assessment of natural hazard conditions, the Project Team reviewed and adjusted the prioritized potential natural hazards facing the Menominee Reservation. The committee's risk assessment for natural hazards can be found in Table 3.1 of Chapter 3 of this plan. Based on the results of this exercise and analysis of past natural hazards, the Project Team prioritized and selected the natural hazards that were to be the focus of this plan: Natural disasters related to flooding, lightning storms and thunderstorms, extreme heat, winter storms, extreme cold, and fog. It was determined that man-made disasters would not be included with this plan.

The 2017 Menominee Nation Hazard Mitigation Plan Project Team held meetings, interviews or reviewed draft sections on the following dates:

- August 6, 2015
- August 28, 2015
- September 22, 2015
- September 29, 2015
- September 30, 2015
- March 11, 2016
- April 29, 2016

An update was provided to the Menominee Tribal Legislature through the emergency management coordinator and project team to keep them informed of the progress being made on the development of the Tribe's All Hazards Mitigation Plan. Once a draft of the All Hazard Plan and Mitigation Strategies was completed, the document was shared with each tribal department. A CD of the completed draft was sent to the State of Wisconsin Emergency Management, for their review and comment prior to being sent to the Federal Emergency Management Agency (FEMA). The State was asked to review the document with their appropriated committee(s) to ensure the plan addresses their specific mitigation needs and to provide feedback to the Project Team as necessary. State involvement was utilized in order to allow Wisconsin Emergency Management to provide comments, to allow the State to offer information that would increase the plan eligibility for pre and post disaster funding, and to allow the State an opportunity to adopt the plan.

RELATIONSHIP TO MENOMINEE TRIBAL EMERGENCY PLANS

The Menominee Tribe has prepared and adopted emergency plans for the reservation as part of its overall preparedness strategy. The Menominee Emergency Alert System (EAS) is to be used in conjunction with the Menominee County Disaster Plan, the County Emergency Operations Plan (EOP) and the Menominee Tribal Emergency Response Plan (ERP). This plan eliminates the need for an annual Hazard Analysis Report that identifies those hazards that have or could occur in Menominee Nation. It includes a description of each hazard, its frequency of occurrence, and actions being taken to mitigate the hazard. These hazards are the basis for the development of all emergency management plans. The purpose of the Menominee Emergency Response Plan is to help tribal government protect lives, property, and the environment from major emergencies of any nature. If assessment of an incident indicates a response beyond the capability of a single jurisdiction and routine mutual aid, the Tribe may activate the Menominee Disaster Plan. Both Emergency Response Plans will facilitate integrated operations planning by response agencies to help them adapt and respond together effectively to emergencies of unusual nature, scale, or multi-agency impact through the allocation of emergency responsibilities and authority among town, tribal and county agencies, and coordination of activities among agencies and levels of Government. The Emergency Response Plan

addresses response training and all aspects of response from occurrence forward. The purpose of the Tribal Emergency Response Plan is to: 1. Facilitate the protection of lives, property and the environment in major disasters of any nature. 2. Coordinate response to disasters, assess damages, identify mitigation opportunities and implement recovery efforts. 4. Serve as a coordinating document for supporting Internal Agency Plans (IAP) (i.e., Policy and Procedures.) 5. Reflect information collected, decisions made and procedures developed in the planning process and during response. The All Hazards Mitigation Plan is complementary to the ERP and seeks to reduce hazard risks and impacts on a pre-event basis through:

- Structural hazard control or protection measures;
- Retrofitting of facilities;
- Acquisition and relocation of repetitive loss structures;
- Development of mitigation standards, regulations, policies, and programs;
- Review, updating, and enforcement of building codes;
- Public awareness and education programs; and
- Development or improvement of warning systems.

PLAN ORGANIZATION

The 2017 Menominee Tribal All Hazards Mitigation Plan is divided into five chapters to specifically address each of FEMA's local mitigation plan requirements. The five chapters are as follows:

Chapter 1 – Introduction is the executive summary of the Menominee Tribal All Hazards Mitigation Plan. It provides the overarching vision, purpose, and regulatory context for preparing this plan. The chapter also provides a brief synopsis of the plan's main sections as outlined below.

Chapter 2 Summary –Profile of the Menominee Indian Tribe of Wisconsin, its physical, social, economic, and political characteristics comprised mainly of the following:

Historical Setting

Schools

Climate
Public Facilities Geology
Transportation
Topography and Soils
Utilities Hydrology
Population and Housing Land Cover and Land Use
Demographic Trends
Community Infrastructure
Economics and Labor
Emergency Response Resources

Chapter 3 Summary – Risk Assessment profiles a range of potential natural hazards that could pose a threat to the Menominee Tribe. As appropriate, selected events that may originate outside of the reservation have been included if they could jeopardize safety and stability within the reservation. This chapter also assesses vulnerabilities to the potential hazards based on a variety of considerations. This resulting assessment was used with other factors to identify priorities for future mitigation efforts.

Chapter 4 Summary – Mitigation Strategies are a series of goals, objectives, and action steps to mitigate the impacts of each hazard. Each strategy has a lead department(s) responsible for addressing that strategy and for setting benchmarks to measure progress toward implementation.

Chapter 5 Summary – Plan Adoption and Maintenance describes the planning process in terms of its technical, political, and public engagement components. This section also sets the course for plan implementation and updating, measuring progress, and continued engagement of persons with a stake in this plan; e.g., residents, municipal governments, county government, businesses, non-profit organizations, and schools.

CHAPTER 2: MENOMINEE NATION PROFILE

INTRODUCTION

During the early stages of the planning process, it was important to understand the physical elements and social components of the reservation and how these elements would influence the contents and scope of the plan. This chapter of the Menominee Nation All Hazards Mitigation Plan inventories and details the Menominee Nation history, general physical composition, land cover and land use, demographics, development patterns, critical infrastructure, and emergency response resources. The profile draws on data and information from the US Census Bureau; Wisconsin Department of Natural Resources; Menominee County All Hazards Mitigation Plan; the Menominee County Farmland Preservation Plan; watershed plans; FEMA regulations; infrastructure maps (sewer, water, etc.); and utility maps. Information used to prepare the maps in this chapter was drawn from the Menominee Indian Tribe of Wisconsin (MITW) GIS Office, existing MITW plan documents, and the State of Wisconsin.

HISTORICAL AND CULTURAL SETTING

The Menominee an Algonkian speaking people are the only present-day tribe in Wisconsin whose origin story indicates they have always lived in Wisconsin. The Menominee refer to themselves as Mamaceqtaw (pronounced ma-ma chay-tau), meaning “the people. Other Indians called them Menominee, derived from manomin – an Algonkian word for wild rice- because it is a major food source for the tribe. The Menominee lived around Green Bay when the French explorer Jean Nicolet arrived there in 1634. The French called the Menominee Folles Avoines; “the wild oats people.” Prior to the coming of the French, the Menominee settled in village sites at the mouth of the Menominee River. Their main village, called Menekaunee, was located near present day Marinette, Wisconsin.

After Nicolet’s visit, Indian tribes from southern Michigan fled to Wisconsin because of the encroachment of Iroquois tribes from New York. The Iroquois sought to monopolize rich Midwestern fur-bearing lands, and sent war parties as far West as the Mississippi. The Menominee did not have direct contact with the Iroquois but, along with other refugee tribes, they suffered starvation, disease, and intertribal warfare, thus reducing their population.

In 1667, the French began to trade for furs with the Menominee. This encouraged the Menominee to abandon their large villages and instead live in bands that spent spring and summer in semi-permanent villages of several hundred people. By the early 1800s, Menominee villages existed along the Fox, Wolf, and Oconto Rivers, Lake Winnebago, Green Bay, and even as far West as the Wisconsin River. In the winter months, the Menominee dispersed into small winter hunting camps to gather furs to trade for guns, knives, cloth, metal cooking utensils, and other European goods. Besides traders, the French also sent Jesuit missionaries among the Menominee. In 1669, the Jesuits established the mission of St. Francis Xavier at Green Bay and two years later moved it to nearby De Pere.

Wars of the Midwest

In the early 1700's, the Fox (or Mesquaki) Indians rose up against French authority in Wisconsin. The Menominee sided with the French against the Fox during what are known as the Fox Wars. Jesuit missionaries left the area in 1728, but French soldiers and traders remained in Wisconsin throughout the 1700's. The Menominee's retained strong ties to the French and fought alongside them during the French and Indian War. Having lost the war, the French gave up Canada and the Midwest to Great Britain in 1763. Many Great Lakes tribes did not want the British to replace the French as colonial overlords. The Ottawa Chief Pontiac at Detroit led a general uprising against the British in 1763, and sent envoys to the Menominee to ask them to join him. The Menominee refused and became allies of the British.

The Menominee, like most tribes in Wisconsin, fought alongside the British during the American Revolution. The United States won the war and gained possession of the Midwest, including Wisconsin. Despite this the Menominee maintained strong ties to British and French traders in Canada. When Tenskwatawa (the Shawnee Prophet) began preaching his doctrine of resistance to American encroachment of 1805, some Menominee traveled to Ohio to hear his teachings. His brother, Tecumseh, assembled a pan-Indian military force to fight the Americans. Tomah, one of the most influential Menominee chiefs, refused to support Tecumseh, but did not stop other Menominee from joining Tecumseh and the British against the United States during

the War of 1812. This was the final war for control of the Midwest, and the United States gained undisputed sovereignty over the region.

Treaties

The Menominee were initially reluctant to make peace with the United States, but finally did so in 1817. Soon afterward the Menominee became embroiled in a disagreement with the Oneida, Stockbridge-Munsee, and Brotherton Indians. These three tribes emigrated from New York to escape settler encroachment. With the federal government's sanctions, the New York tribes negotiated two treaties with the Menominee and Ho-chunk for lands in Wisconsin. The first, in 1821, ceded a small tract along the Fox River, but the second in 1822 ceded over 6.7 million acres.

The Menominee and Ho-chunk later argued these agreements were invalid because they had not been informed of all of the treaties' provisions. Between 1831 and 1832, the federal government negotiated three new treaties, which ceded about 3.5 million acres of Menominee land. While some of this land went to three New York tribes, the United States retained a significant portion.

In two subsequent treaties, the 1836 Treaty of the Cedars and the 1848 Treaty of Lake Poygan, the Menominee sold their remaining land to the United States. In exchange, the government offered the Tribe about 600,000 acres along the Crow Wing River in Minnesota. Oshkosh, the grand chief of the Menominee, was to lead his tribe there, but he and other tribal leaders asserted they had signed the 1848 treaty under pressure. In 1852, the President allowed the Menominee to stay on a temporary reservation on the Wolf River in Northeastern Wisconsin. An 1854 treaty made this quarter-million acre reservation permanent, and in 1856 about 46,000 acres in the reservations Southwest corner were granted to the Stockbridge-Munsee.

Government Policies

The reservation era brought about new challenges and disruptions. In the 1860's epidemics of smallpox, dysentery, and other diseases introduced from Europe killed hundreds of Menominee. White-owned logging companies, known as the "Pine Ring" coveted rich reservation timber. The Pine Ring received federal permission to harvest dead and downed trees on the reservation, but illegally cut standing timber as well. By 1872, the Menominee gained temporary federal permission to harvest and sell their own timber. This soon became success, but the Pine Ring continued their efforts to purchase tribal lands. To protect Menominee forests, Congress made a permanent provision in 1890 for the Menominee to harvest their timber under government supervision. Waste, inefficiency and fraud marred the effort and the Menominee lost substantial revenues. In 1951, the tribe received $8.5 million from the federal government as compensation for these losses.

Within three years of this decision, the Menominee became one of the first tribes in the United States to undergo a new federal program called Termination, signed by President Dwight Eisenhower in June of 1954. This policy terminated the United States jurisdiction over the Menominee Tribe and ended their tribal sovereignty. The Menominee underwent termination early because the federal government felt the tribe possessed the economic resources necessary to succeed without governmental supervision. On April 30, 1961 the reservation ceased to exist and became Menominee County. All tribal property and assets were held by Menominee Enterprises, Inc.

All federal services ended with the assumption that the tribe could service itself. The reservation hospital at Keshena closed due to the lack of federal funds. Only one other tribe, the Klamath in Oregon, has been terminated by Congress, and the problems that they and the Menominee faced convinced other tribes to resist the government's policy. Termination of the Menominee Tribe led to a drastic decline in tribal employment, increased poverty and brought about devastating reductions in basic services and health care.

The Menominee's greatest fear was that without federal protection, their tribal lands would pass into the hands of non-Indians. In 1970, a few Menominees banded together and created the Determination of Rights and Unity for Menominee Shareholders (DRUMS) group, which sought to end termination and restore the Menominee status as a federally recognized tribe. Under the direction of Ada Deer, a Menominee woman, DRUMS pushed for the restoration of the Menominee federal status. On December 22, 1973, President Richard M. Nixon signed the Menominee Restoration Bill into law. In April 1975, the lands of Menominee County reverted back to reservation status, and in 1976, the Menominee approved their new tribal constitution. The new tribal legislature took over governance of the tribe in 1979.

PHYSICAL CHARACTERISTICS

Menominee Indian Reservation is located about 45 miles northwest of Green Bay. The Reservation is unique because it shares coterminous boundaries with the one Township of Menominee as well as Menominee County.

The Reservation borders three other counties: Langlade, Oconto, and Shawano. There are five communities within the Reservation: two main Villages of Keshena and Neopit, a smaller Village named Zoar, Middle Village and a more scattered community called South Branch.

The Reservation is approximately 234,355 acres or 360 square miles and contains roughly 223,500 acres of heavily forested lands, representing the largest single tract of virgin timberland in the State of Wisconsin. The elevation of Keshena is 829 feet above sea level. There are four rivers flowing through the Reservation, the Evergreen, the Oconto, the Red, and the Wolf. The Legend Lake area of Menominee County is a spring-fed lake over six miles long, with 47 1/2 miles of shoreline. Legend Lake acts as a main recreational area, and is heavily developed with both seasonal and permanent residences.

Climate

The climate of the Menominee Reservation is classified as continental. This climate type is characterized by an extreme disparity between summer and winter temperatures that range from cold, snowy winters and warm summers with periods of hot, humid conditions. According

to the U.S. Climate Data, the average annual temperature is 43.9 degrees with the coldest month being January at approximately 23.8 degrees and the warmest month July at approximately 82.4 degrees.

The annual precipitation of 31.23 inches, or 65.4 percent, falls from April through September with June traditionally being the wettest month (4.45 inches). This time period also encompasses the growing season for most crops. Overall, the varied climate is favorable for many agricultural purposes and suitable for a number of outdoor activities ranging from biking and camping to snowmobiling and skiing.

Floodplains

Floodplains are natural extensions of surface waters. They store floodwaters, reduce flood peaks and velocities, and reduce sedimentation. They also provide wildlife habitat and serve to filter out pollution from water. Like surface waters, the importance of floodplains is also recognized and is regulated by federal, state, and local governments. The State of Wisconsin mandates floodplain zoning for all communities under Wisconsin Administrative Code NR 116. These minimum standards must be implemented in order to meet eligibility requirements for federal flood insurance programs. The Federal Emergency Management Agency (FEMA) has prepared floodplain mapping for the reservation. New FEMA maps were approved by the Tribe in 1999. The community number is 550619.

Wetlands

Wetlands are defined as areas where water is at or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which have soils indicative of wet conditions. Wetlands are a significant natural resource that serves several important functions. They enhance water quality by absorbing excess nutrients into the roots, stems, and leaves of its plants and by slowing the flow of water to let suspended pollutants settle out. Wetlands help regulate storm water runoff, which minimizes floods and periods of low flow.

Demographics

In order to plan for any natural hazards that may occur within the reservation, it is important to gain an understanding of the population and housing characteristics of the reservation. The population estimates provided by the Wisconsin Department of Administration (WDOA) and U.S. Bureau of the Census provide a clearer picture of where the largest population increases are expected to occur within the planning area.

Households

A household includes all the people who occupy a housing unit as their usual place of residence and a person, or one of the people, in whose name the home is owned, being bought, or rented. If there is no such person present, any household member 15 years old and over can serve as the householder for the purposes of the census. The number of households in Menominee County in 2014 was 2,256.

Employment

Private non-farm establishments on the Reservation are 26.

Geography

Menominee Reservation is 357.61 square miles including land and water areas. There are 11.8 persons per square mile.

Land Use

Since 1854, Menominee Tribal Enterprises (MTE) has demonstrated its expert ability to manage, harvest and process timber from the world renowned Menominee Forest - an award winning sustainable forest located on the Menominee Nation Reservation in central Wisconsin.

The Menominee Forest supplies a stunning variety of native hard and soft woods. Nothing matches the natural beauty of wood grain. That's why in 2010 the Menominee Tribe started Menominee Tribal Enterprises Millwork Division, making beautiful natural wood products, including cabinets, furniture, moldings and caskets. The handcrafted, solid wood construction

and natural beauty of our products is an expression of the Native American spirit - closely connected to Mother Earth.

The MTE maintains a high standard of craftsmanship. In addition, the fact that the MTE Millwork Division uses materials from our sustainable forest creates further demand for its products.

Transportation Land

STH 55, STH 47, CTH M and CTH VV are main routes through The Menominee Nation. Opus International Consultants was retained by the College of Menominee Nation to conduct a Road Safety Audit (RSA), which was funded through a grant from the Wisconsin Department of Transportation (WisDOT) Tribal Task Force. It included both components which were operational and design.

Transportation Network

The County maintains the existing transportation network; this would include centerlines, and annotation of all named public and private roads within Menominee County.

- The right of ways for all state, town and county roads is maintained by the Menominee County Highway Department.
  - The right of ways for all BIA routes within the reservation are maintained through sub contracts with Menominee County Highway Department and Menominee Tribal Enterprise.
- The centerlines are maintained for roads within Menominee County.
- The address ranges are maintained, for the reservation, by the Tribal GIS Office.
- A site address plan was implemented throughout the entire Menominee County/Indian Reservation in 1999. The site address information can be accessed through the tax database and is a GIS layer. Addresses are maintained by the GIS/Land Information Office. Addressing standards for local government, with consideration given to FGDC and USPS have been followed in this process.
- Address point, structure and/or driveway aerial photos are used to assist with locating of driveways and buildings, these layers are maintained on a regular basis.

- Road names within Menominee Reservation are in accordance with the Menominee Tribal Addressing Code #458. The Menominee County Land Information Office also maintains a road name layer in GIS.
- Menominee County does not currently have an official recreation map showing various places of interest and/or landmarks within the county.
- Integration with the County's Master Street Address Guide (MSAG) Menominee County Land Information Office in coordination with the Menominee County Telecommunications Department recently created the MSAG in order to have an E-911 System in place for the County. Tribal GIS Office also coordinates addressing with the County MSAG.
- Ability to support emergency planning, response and mapping. The Menominee Tribal GIS/Land Information Office has the abilities to supply this type of information. Mapping was done for the Hazard Mitigation Plan for the Tribal Emergency Management Department and submitted to state and federal agencies for approval. The Menominee Tribal and Menominee County Land Information Office have also developed a Fire Number & Road Directory that is available for emergency officials as well as the public.

General Development Trends

The economy continues to improve, albeit at a less than desirable pace. U.S. Gross Domestic Product (GDP) is up 9.2 percent through sixteen quarters since the trough of June 2009. That is the slowest rate of GDP recovery of all post - WWII business cycles. Our economy is largely based on consumption. Nearly 70 percent of U.S. GDP is consumption or consumer spending. Consumption is being dampened on a number of fronts: real earnings have been flat for a decade; spending supported by home equity has dropped by about $1.3 trillion since the housing bust; revolving credit has fallen by $130 billion; interest income is down $400 billion as the Federal Reserve Bank maintains near zero interest rates; and our savings rate has turned around from nearly zero, but that has pulled another $350 billion out of the consumption contribution to economic growth. The sum total effect is an absence of $2.2 trillion of spending in a $16.9 trillion dollar economy, almost 13 percent. Add in the fact that private non –

residential investment is down about $500 billion and businesses and banks are sitting on a couple trillion dollars in cash. Also in the mix is a decline in federal, state and local spending. Between the national sequestration and state and local budget cuts, government spending has been a drag on the economy. During this recovery, government spending is down 1.7 percent. Moreover, the rate at which federal, state and local spending growth will be reestablished will be substantially below historical rates, certainly in the short – term.

CRITICAL COMMUNITY INFRASTRUCTURE ("CRITICAL FACILITIES")

A critical facility is a structure that, if destroyed, would present an immediate threat to life, public health, and safety. Menominee Reservation determined criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions. Impacts on critical facilities include impacts to schools, communication facilities, utilities, health facilities, police and fire stations, municipal and tribal government structures, clinics, jails, shelters, etc.

Critical Facilities

The Menominee Nation Target Hazards for Pre Disaster Mitigation are as follows:

College of Menominee Nation – N172 Hwy 47/55 Keshena WI
Menominee Casino Resort – N222 Hwy 47/55 Keshena WI
Menominee Casino Thunderbird Complex – W110 CTH VV Keshena WI
Menominee Fuel Station – W2794 Go Around Rd Keshena WI
MITW Community Development W2794 Go Around Rd Keshena WI
MITW Shopping mall – W2818 Warrington Rd Keshena WI
MITW Housing Dept. – W3196 Our Children's Rd Keshena WI
MITW Food Distribution – N737 Head Start Rd Keshena WI
MITW Head Start – N733 Head Start Rd Keshena WI
MITW Day Care – N774 Weso Apartment Rd Keshena WI
MITW Transit Facility –W2727 Our Children's Rd Keshena WI
MITW Utilities Dept. – N700 Go Around Rd Keshena WI
MITW Administrative Office – W2908 Tribal Office Loop Rd Keshena WI

MITW Family Investment Center – W2907 Tribal Office Loop Rd Keshena WI

Menominee Tribal Clinic – W3275 Wolf River Drive Keshena WI

Menominee Tribal Jail/Courts – W3293 Wolf River Drive Keshena WI

MITW Cultural Museum – W3426 CTH VV Keshena WI

Menominee Tribal Forestry – N1037 Hwy 47 Keshena WI

MITW Maehnowesekiyah Complex – N2150 White Cedar Middle Village WI

MITW CBRF Facility – N2222 White Cedar Middle Village WI

Menominee Tribal Enterprise office- N3522 Cottage Ave Neopit WI

Menominee Tribal Enterprise Mill – N3580 Hwy 47 Neopit WI

Menominee Tribal School – W6817 Church Street Neopit WI

Provisions for Critical Facilities

- The Menominee Tribe contracts with the Town of Menominee Fire Department to provide for fire rescue services.
- The Menominee Tribe maintains its own tribal police force. The department provides for criminal investigations, crime victim support, sex offender registry program, crime prevention program, and patrol.
- The Tribal Conservation Department provides conservation law enforcement, and assists with fish and wildlife management and environmental quality services.
- The Menominee Tribe operates a full time Emergency Medical Services Department, providing basic and advanced life support services.
- Utilities Menominee Tribal Land Information Office maintains a mapping layer for transmission substation, transmission lines, and two of the utility companies that occupy Menominee Reservation. This layer was developed with the assistance of the East Central Wisconsin Regional Planning Commission for use within our Comprehensive Plan, and will be maintained as necessary.

Transportation

The average one-way commute in Menominee Reservation, Wisconsin, takes 21 minutes. 77% of commuters drive their own car alone. 14% carpool with others. 2% take mass transit and 2% work from home.

Railroads

Menominee Reservation has no railroads serving the reservation.

Airports

There are no airports on the Menominee Reservation. The closest major airports would be located in Green Bay and Appleton, Wisconsin.

Transit

Menominee Department of Transit Services (MDOTS) manages and provides direct transportation services for the Menominee Regional Public Transit, Menominee Tribal Clinic, Menominee Aging Division, Menominee Tribal School, Menominee Indian Headstart, Menominee County Human Services, Menominee County, Menominee Casino Resort, College of Menominee Nation, Langlade County, Lac Du Flambeau, and Shawano County agencies. In addition MDOTS continues to assist Tribal departments not only with transportation needs and services but also with maintenance of their vehicles, and occasionally provide secure parking for Tribal vehicles as space permits.

Menominee Regional Public Transit was founded in 1982. Menominee Transit services more than 90 percent of the tribal population of 3,200 people and provides an astounding 80,000 annual trips. With key partnerships from the tribal medical clinic, the College of the Menominee Nation, the school district, local aging and veteran's services and Menominee County Human Services, the system will continue to prosper and grow. And the system's routes have expanded far beyond the reservation borders to include service to Appleton, Green Bay, Madison and even Milwaukee.

Dams

Legend Lake Dams one and three are also located on the Reservation, but are privately owned by the Legend Lake Protection and Rehabilitation District. They are located near Keshena and both have a spill capacity of 20,000 acre – feet. There are written emergency action plans for both.

Neopit Dam is located on the West Branch of the Wolf River in the Village of Neopit, WI on the Reservation. The dam has a reservoir capacity of 800 acre-feet. Normal operation level of the reservoir is 1,050.6 feet above sea level or lower. There is a written emergency action plan for this dam.

Communication Facilities

There are no extensive communications infrastructures owned by the Menominee Tribe.

Power Facilities

There are no energy generating plants located on the Menominee Reservation.

EPCRA

Facilities Emergency Planning and Community Right to Know Act (EPCRA) establishes requirements for Federal, State and local governments, Indian Tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. EPCRA facilities on the Menominee Reservation are displayed on the county critical facilities map. There are no EPCRA Planning facilities on the Reservation but there are some reporting facilities.

EMERGENCY COMMUNICATIONS SERVICES

The Menominee County Dispatch Center provides county-wide communications for the public to police, fire, and emergency medical services. The Menominee Tribe has an Intergovernmental agreement to provide dispatch services to tribal emergency services.

Menominee Reservation Law Enforcement

The Menominee Indian Tribe has a Tribal Police Department. The Tribal Police Department is assisted by the Menominee County Sheriff's Department as needed. The Tribal Police Department is located in Keshena, which is a full service law enforcement agency that serves all portions of the Menominee Reservation.

Fire and Rescue Departments

The Menominee Indian Tribe receives fire and rescue services from the Town of Menominee Fire Department. This department is a volunteer department with four stations throughout the Reservation. The main station is located in Keshena, WI.

Emergency Medical Services

Emergency medical services are provided by Menominee Tribal Rescue Service
W3275 Wolf River Drive, Keshena, WI 54135, 715-799-5496. This service is licensed to provide the EMT-Intermediate Technician level.

Hospitals – Medical Clinics

The Menominee Tribal Clinic is located at W3275 Wolf River Drive in Keshena. The closest hospital is located in Shawano, Wisconsin. Theda Care Medical Center at 100 County Road B, Shawano.

Emergency Warning Systems

The Menominee Indian Tribe and Menominee County have an Emergency Alert System (EAS), along with an EAS Operational Plan, which has been approved by the federal government.

Emergency Operations Center

The Menominee Nation emergency response operations are carried out at Menominee County's designated Emergency Operations Center (EOC) in Keshena. The EOC has 24-hour per day operational capabilities. County Emergency Management provides and manages the Emergency Operations Center and it is activated through Menominee County Dispatch and Emergency Management. Menominee Tribal Emergency Management is developing a plan for a Tribal EOC as part of the Tribes Emergency Management Office.

Temporary Shelters

Temporary shelters, designed for short duration lodging, may be needed before, during, and after a hazard event to provide sheltering facilities. Menominee Tribal Emergency Management has identified several temporary emergency shelters located throughout the reservation that can provide interim housing for people evacuated from their homes. These shelters consist primarily of schools, plus facilities such as the tribal buildings and other public owned buildings.

Temporary Pet Shelters

Temporary pet shelters may also be needed before, during, and after a hazard event if people are required to evacuate their homes. It is important to provide a method to segregate the pets in the shelters. There are no temporary pet shelters on the reservation. There are three designated pet shelters within 15 miles in the City of Shawano. Keshena Animal Help & Rescue is a volunteer organization that can be called upon to assist with pet sheltering.

Long Term Pet Shelters

Humane Societies often serve as long-term pet sheltering facilities if needed after a hazard event. Shawano County Humane Society may be able to fill this role along with volunteer pet owners.

CHAPTER 3: RISK ASSESSMENT

This risk assessment has been prepared to identify the hazards believed to pose the greatest risk to the residents of the Menominee Indian Tribe; to profile the extent and severity of past reservation hazards; and to assess the vulnerability of the reservation to the risk of future hazard events. Through the risk assessment process, emergency management personnel will be able to more effectively evaluate potential hazard mitigation measures and develop useful strategies to address the risks associated with the identified hazards.

HAZARD IDENTIFICATION

Although the Menominee Nation could potentially be at risk from several distinct hazards, this plan narrows the scope of the hazards to those that pose the greatest risk to residents and facilities of the tribe. Identification of the hazards was based on a priority ranking of the many different natural and man-made/technological hazards identified in the Resource Guide to All Hazards Mitigation Planning in Wisconsin that was prepared by the Association of Wisconsin Regional Planning Commissions through funding provided by the State of Wisconsin Department of Military Affairs, Wisconsin Emergency Management, and the Federal Emergency Management Agency.

Natural Hazards Prioritization

The purpose of rating the potential risks associated with each natural hazard and reviewing past hazard event data is to address those natural hazards posing the greatest threat to residents and to property. Based on the assessment of past data, the State has identified the following updated natural hazards to be the focus of the plan assessment, goals, objectives and strategies:

- Lightning Storms and Thunderstorms
- Winter Storms (including heavy snow, ice, and blizzards involving high winds)
- Fires (Forest and Wildland)
- Tornadoes/High Winds
- Stormwater Flooding
- Flooding (including flash, riverine, and lake)

- Extreme Cold
- Extreme Heat
- Fog
- Hailstorms
- Dam Failure Flooding

Earthquakes According to the U.S. Geological Survey (USGS), there have been 20 earthquake events in Wisconsin. The closest of these to the Menominee Reservation occurred in Clintonville in March 20, 2012, being a magnitude of 1.5 on the on the Richter scale. Other notable earthquakes included northern Ozaukee County (Lake Church) in 1956, as well as in Fond du Lac County in 1922. Where readings were available, these events were relatively small, most being 3.0 to 4.2 on the Richter scale in intensity with the largest being an intensity of 5.3 (Beloit, 1909), which may be strong enough to crack some plaster but typically does not cause serious damage. Due to the lack of recent events, some geologists question whether many of these events were true earthquakes or rather were quarry collapses, blasts, etc. The nearest active earthquake fault outside of Wisconsin is the New Madrid Fault, which stretches from northeast Arkansas to southern Illinois. The Menominee Reservation falls within the lowest earthquake hazard shaking area. This represents the levels of horizontal shaking which have a 1-in-50 chance of being exceeded in a 50-year period. Similarly, the reservation falls within a 0% g-force to 1% g-force peak ground acceleration (PGA) zone as shown on the USGS PGA values map with a 10 percent chance of being exceeded over 50 years. Therefore, Menominee Reservation is considered unlikely to be substantially affected by earthquakes in the long-term future. The earthquake threat to the reservation is considered very low. If a tremor or earthquake was to occur anywhere on the reservation, damage to structures and infrastructure could be substantial due to the fact design standards do not include earthquake construction requirements or guidelines.

Landslides

The term “landslide” includes a wide range of ground movement, including rock falls, deep failure of slopes and shallow debris flows. Although gravity acting on an overly steep slope is

the primary reason for a landslide, there can be other contributing factors such as erosion by rivers, excess weight from the accumulation of rain or snow, or manmade and other structures stressing weak slopes to the point of failure. In addition, slope material that becomes saturated with water may develop a debris flow or mudflow. The U.S. Geological Survey Landslide Overview Map of the Coterminous United States identifies low landslide susceptibility risks for the Menominee Nation. The majority of the land within the Menominee Nation does not involve significantly steep slopes and does not pose a landslide risk. While there are steeper portions of the reservation, the soils involved pose more of a gradual erosion risk as opposed to the sudden, large-scale movement of ground associated with landslide hazards. Hillside erosion (minor landslides) within the reservation is very uncommon and results from man-made impacts such as the removal of vegetation. Hillside erosion has not posed substantial risk to life or property and has been largely mitigated site plan review, and erosion control plans for construction sites. There are no records of substantial damage or injury from large landslides within the Menominee Nation and these hazard threats are considered low.

Subsidence

Land subsidence is an event in which a portion of the land surface collapses or settles. Common causes of subsidence are located in an area with karst topography or location in an area where large amounts of groundwater have been withdrawn. Although this assessment will attempt to focus on the risk potential to the overall planning area, critical facilities are of particular concern. These entities provide essential products and services to the public that are necessary to preserve health, welfare, and quality of life of residents of Menominee Reservation, plus fulfill important public safety, emergency response, and/or disaster recovery functions. A profile of each natural hazard assessed in this plan is provided in each individual hazard section. For the purposes of this plan, some hazards have been grouped into logically related hazard topics in order to better organize and describe the extent of the potential risk and vulnerability. The assessment for natural hazards follows in this order: flooding (including flash, riverine, and lake); tornadoes/high winds; lightning and thunderstorms, winter storms (including heavy snow storms, ice storms, and blizzards); storm water flooding; extreme cold; extreme

heat; fog, hailstorms, dam failure flooding, forest fires, wildland fires, coastal hazards, and drought.

NATURAL HAZARDS - Flooding

A flood is a natural event for rivers and streams that occurs when excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers, and lakes that are subject to recurring floods. Most flood-related injuries and deaths occur when people are swept away by flood currents, and the majority of property damage is caused from sediment-laden floodwaters. The severity of flooding is determined by rainfall intensity (or other water source) and duration. A large amount of rainfall over a short time span can result in flash flood conditions. However, several factors beyond intensity and duration also come into play. For instance, a small amount of rain can cause flooding in areas where the soil is saturated or in areas of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. History Twelve flood events have been reported by the National Climatic Data Center as having occurred in the planning area since January 1, 1990. June 16, 1996 Heavy rainfall fell across most of central and east central Wisconsin, as well as parts of northeast Wisconsin from June 16 through 18, 1996. Amounts over the three-day period ranged from two to seven inches in most locales. Runoff from the heavy rainfall caused rivers to rise substantially, with several peaking well above flood stage. Several streets, parks, campgrounds and county roads were flooded, and a few roads were washed out. Crop damage estimates amounted to at least 56 million dollars over the entire 15 county area.

Vulnerability

Past floods are indicative of what can happen in the future, and flood studies and mitigation plans are based on the risk of future flooding. Flood studies extrapolate from historical records to determine the statistical potential that storms and floods of a certain magnitude will recur. The probability of reoccurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year. The most widely adopted design and regulatory standard for floods in the United States is the 1-percent annual chance flood and this is the

standard formally adopted by FEMA. The 1-percent annual flood, also known as the base flood, has a 1 percent chance of occurring in any particular year. It is also often referred to as the "100-year flood" since its probability of occurrence suggests it should only reoccur once every 100 years. This expression is, however, merely a simple and general way to express the statistical likelihood of a flood with actual recurrences varying from place to place. These terms are often misunderstood. Frequently, people interpret the 50-year flood definition to mean occurring "once every 50 years," which is incorrect. From a probability standpoint, a 50-year flood has a one in 50 (two percent) chance of occurring in any given year. In reality, a 50-year flood could occur two times in the same year, two years in a row, or four times over the course of 50 years. On the other hand, it is possible for 100 years to pass without having a 50-year flood event. The term "50-year flood" has caused much confusion for people not familiar with statistics. Another way of looking at it is in the context that a base flood will happen during the life of a 30-year mortgage, a 26 percent chance. The official floodplain study for insurance and regulatory purposes is the Flood Insurance Study by the Federal Emergency Management Agency (FEMA). Flood Insurance Studies have been prepared for The Menominee Reservation. FEMA uses the "base" flood as the basis for its regulatory requirements and flood insurance rate setting. This Hazards Mitigation Plan also uses the base flood for planning purposes. The base flood is the one percent chance flood, or the 100-year flood. Even these numbers do not convey the true flood risk because they focus on the larger, less frequent floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During a typical 30-year mortgage, a house may have a 26 percent chance of being hit by the 100-year flood, but the odds are 96 percent (nearly guaranteed) that a 10-year flood will occur during the 30-year mortgage period. Compare those odds to the only five percent chance that the house will catch on fire during the same 30-year mortgage period. Another term used is the "500-year flood," which has a 0.2 percent chance of occurring in any given year. While the odds of it occurring are more remote, the "500-year flood" is the national standard used for protecting critical facilities, such as hospitals and power plants.

When wastewater treatment plants are flooded, raw sewage can flow from the facility. Infiltration and lack of treatment lead to overloaded sewer lines, which back up into low lying areas and

some homes. Raw sewage can be a breeding ground for bacteria, such as E. coli and other disease causing agents. The second type of health hazard is presented after floodwaters have receded. Stagnant pools become breeding grounds for mosquitoes, and wet areas of a building that have not been thoroughly cleaned, propagate mold and mildew. A building that is not cleaned properly is especially a health hazard for small children and the elderly. Health hazards occur when heating ducts in a forced-air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and are breathed in by the occupants. If the water system loses pressure, a boil order may be issued to protect people and animals from contaminated water. The third health hazard occurs from the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and the uninsured. The resulting stress on those impacted takes its toll in the form of aggravated physical and mental health problems. In some cases, stress-induced hypertension, heart disease and certain cancers have been linked with traumatic events.

Safety

A frequent cause of flood fatalities occur from drowning, which can occur when a vehicle is swept into deep water and the occupants become trapped in the vehicle. Flood victims have frequently put themselves in harm's way by ignoring warnings about travel or by believing that a washed out bridge is still intact. People often die of heart attacks, especially from exertion, during a flood fight. Electrocution can cause flood deaths, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods can damage gas lines, floors, and stairs, creating secondary hazards such as gas leaks, unsafe structures and fires. Fires are especially damaging in areas made inaccessible to firefighting equipment by high water or flood-related road or bridge damage.

Infrastructure

Infrastructure flooding impacts include damage to roads and bridges, and sewer, water, and electrical systems. Localized infrastructure impacts include street, road, and shoulder washouts;

culvert damage; storm sewer and sanitary sewer failures; public utility damage; damage to emergency vehicles; and trail and road damage in parks. Much of this damage could lead to public service interruptions. Transportation Route Interruptions Loss of road access is a major flood ramification that affects all residents and businesses within the region, not just those who own property in the floodplain. Oftentimes, the inability to travel freely is only temporary, perhaps lasting several hours. The loss of transportation may last months after the disaster. When roads, bridges, or railroads are washed out by a flood, it can be weeks or months before they are repaired and usable. A key evacuation consideration is an evaluation of the roads that have the potential for flooding and remaining submerged for long periods. This will determine how emergency personnel will enter the area to begin rescue operations and to deliver vital goods and services to residents of the area affected. A bridge does not have to be inundated to be damaged or to cut off an evacuation route. In some cases, the bridge is above water but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous for a person utilizing a flooded road assuming passage is possible because the bridge is still intact.

Economic Business and Industry Disruptions

Flooding damage to businesses and industry is not as easy to identify as critical facilities. Even minor damage may result in businesses or industry closures. Businesses or industry damages or disruptions may also include loss of inventories, inaccessibility to customers or employees, and often employees are busy protecting or cleaning up their flooded homes and are unable to come to work.

Farming

Crop damage and loss often occurs due to flooding, which leads to large financial losses and loss of projected income to the agricultural community.

Other Public expenditures on flood fighting, sandbags, fire, and police calls, clean up, and on repairs to damaged public property affect all residents of the planning area, not just those in the floodplain. Federal assistance is not available for smaller, more localized floods, and it cannot

be counted on in the future. In addition, public agencies are required to purchase insurance on flood prone buildings. The amount of insurance that should be carried is deducted from disaster assistance payments.

Areas at Greatest Risk

The area inundated by the base flood is the “base floodplain.” FEMA maps (called Flood Insurance Rate Maps or FIRMs) also call this the Special Flood Hazard Area, or “A Zone.” Areas affected by flood hazards in the planning area include areas adjacent to various rivers, creeks, lakes and other bodies of water on the Menominee Reservation. The Reservation has 53 lakes totaling 2,756 acres of surface, or 12% of the Reservation, 187 streams or rivers totaling 1,314 acres or .6% of the reservation. These bodies of water include Legend Lake, Upper Bass Lake, Honky Springs, Noseum Lake, North Springs, Lake Neconish, Kemmitz Springs, Lake Elma, Deadman Springs, Neopit Mill Pond, Waupoose Springs, Frechette Lake, Nawahquaw Springs, Perote Lake, Askenette Springs, Crystal Springs, Keso Springs, Marsh Lake, Beauprey Lake, and Beaupre Spring.

The central part of the floodplain is referred to as the “floodway.” The floodway is the channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. The remainder of the floodplain is called the “fringe,” where water may be shallower and slower. Floodplains (including floodways and flood fringes) are subject to special development regulations, as explained at the end of this section.

Relationships to Other Hazards Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Fire

Fire can occur due to infrastructure compromise of electrical and natural gas systems. In addition, fire trucks are unable to pump water if floodwaters are deep enough to reach the tailpipe of the truck.

Hazardous Materials

Hazardous material releases can occur due to improper storage of materials in floodplains.

Infectious Disease

Infectious disease outbreaks are possible during prolonged flood events in areas sensitive to disease vectors.

Wastewater Treatment Plant Failure

Wastewater treatment plant failure can occur if facilities are not adequately protected from flooding, excessive Clearwater inflow and infiltration into the system, or protection is weakened.

Transportation Disruption

Disruptions of transportation routes via roads, bridges, railroads, and water can be disrupted due to inundation and/or substantial flow velocities.

Power Outages

Power outages can occur if portions of the electrical grid are damaged by floodwaters.

Plans and Programs

Emergency Response Plan

The Menominee Tribal Emergency Response Plan outlines procedures for the Tribe in response to a variety of hazards. During the course of a flood event on the Menominee Reservation, the Emergency Management Coordinator works with local officials to ensure public health and safety and maintain transportation routes.

National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program in response to the rising costs of taxpayer funded disaster relief. The Federal Emergency Management Agency (FEMA), Mitigation Division manages the NFIP, and oversees the floodplain management components of the program, with state coordination through the Wisconsin DNR, National Weather Service.

The National Weather Service in Green Bay provides weather, hydrologic, and climate forecasts and warnings for northeastern Wisconsin.

Sewer Service Area Review

Development in floodplains, wetlands, and other environmentally sensitive areas has been kept to a minimum in recent years through such mechanisms as the sewer service extension review process and floodplain overlay zoning. Floodplain Ordinance. The Menominee Tribe regulates development within the floodplain through its Floodplain Ordinance. This ordinance can be a useful tool in keeping inappropriate development out of many flood hazard zones in the planning area. Floodplain overlay zoning ordinances (where they exist in local jurisdictions within the planning area) can also help to deter development in flood hazard zones.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Provisions of Plans and Policies that Regulate Development

The Menominee Tribe has a comprehensive plan that addresses regulation of development in floodplains, watersheds, and natural resource areas in various ways.

TORNADOES/HIGH WINDS

The tornado is a rapidly rotating column of air spawned by a cumulonimbus cloud. When a tornado funnel drops to the ground, it can create significant damage and loss of life. A tornado is a relatively short-lived storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour, but some tornadoes may have winds in excess of 300 miles per hour. A tornado path averages four miles, but may reach up to 300

miles in length. Widths average 300 to 400 yards, but severe tornadoes have cut swaths a mile or more in width, or have formed groups of two or three funnels traveling together. On average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 miles per hour have been recorded. Tornadoes rarely last more than a couple of minutes in a single location or more than 15 to 20 minutes in a ten-mile area, but their short periods of existence do not limit their devastation of an area. The current rating scale has related to how most structures are designed. The wind speeds on the original scale were deemed by meteorologists as being too large and engineering studies have shown that slower winds can cause the same damage as that of winds of 300 mph. The new scale lists an EF-5 as a tornado with winds at or above 200 mph (324 km/h) – which corresponds to the wind speeds of F3 or F4 in the original Fujita scale. None of the tornadoes recorded before January 31, 2007 will be re-categorized. Essentially, there is no functional difference in how tornadoes are rated. The old ratings and new ratings are cleanly connected with a linear formula. The only differences are adjusted wind speeds, measurements of which were not used in previous ratings, and refined damage descriptors. The destructive power of the tornado results primarily from its high wind velocities and sudden changes in pressure. Wind and pressure differentials probably account for 90 percent of the damage caused by tornadoes. Since tornadoes are generally associated with severe storm systems, they are usually accompanied by hail, torrential rain, and intense lightning. Depending on their intensity, tornadoes can uproot trees, down power lines and destroy buildings. Flying debris can cause serious injury and death.

National Weather Service Based on 40 years of tornado history and more than 100 years of hurricane history, the United States has been divided into four zones that geographically reflect the number and strength of extreme windstorms. FEMA Wind Zone IV, which includes most of the southern two-thirds of Wisconsin, has experienced the most and the strongest tornado activity that has affected the entire U.S., with wind speeds of up to 250 miles per hour being recorded at some point. This zone includes the entire reservation.

Vulnerability

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornados, an area better known as "tornado alley." According to the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center this area extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Generally, the southern and western portions of the state have been subject to a higher frequency of tornados; however, every county has experienced a tornado at some time and is susceptible to a tornado related disaster. In considering other tornado-like occurrences, which includes waterspouts, funnel clouds, and high winds, on average. Menominee Reservation had two tornados since 1950. One occurred on April 27, 1984, at 3:20 p.m. and lasted 8 minutes. There were no reported injuries or death resulting from the tornado and it was listed as an F3. The latest tornado occurred June 7, 2007, at 4:31 p.m. It was on the ground for 40 miles and was rated as an EF3. There were no injuries or deaths reported but this tornado leveled over 3000 acres of Menominee Forest. Over 20 million board feet of logs and 40,000 cords of pulpwood were harvested due to the tornado.

Infrastructure damage is usually limited to above ground utilities, such as power lines. Damage to utility lines can usually be repaired or replaced relatively quickly. Damage to roads and to railroads is also localized; if these facilities cannot be repaired promptly, alternate transportation routes are usually available. Public expenditures include police and fire department calls, search and rescue, shelters, and emergency protection measures. The largest public expenses are for repairs to public facilities and clean up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury is likely to be small. Clean up and disposal can be a larger problem, especially if there is limited landfill capacity near the damage site. The agricultural sector can experience economic losses as winds in excess of 39 miles per hour can damage crops during the growing season. Other Clean up and disposal can be a larger problem, especially if there is limited landfill capacity near the damage site. Clean up may also include the disposal of hazardous wastes as much of the damaged structures and their contents are considered hazardous materials.

Areas at Greatest Risk

Tornadoes have no defined hazard area within the Reservation and events are relatively uniform throughout the reservation. However, mobile homes are at greatest risk during tornadoes and high winds. An F1 tornado might cause minor damage to a site-built house; but could do significant damage to a manufactured home, especially an older model or one that is not properly secured. RV Parks, campgrounds, and marinas are also at significant risk from tornadoes and high winds.

Relationship to Other Hazards Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding.

Heavy rain and thunderstorms can cause flooding that can disrupt emergency response, transportation, and communication before, during, or after a tornado. Flooding can further exacerbate the aftereffects of a tornado that has caused property damage, loss of life, and personal injury. Flooding can disrupted transportation, communication, and emergency services, and threaten public health and safety. Essential public infrastructure and services such as power, water supply systems and sanitary systems can be compromised as well.

Plans and Programs

Emergency Response Plan

The Menominee Nation All-Hazard Mitigation Plan and the Emergency Response Plan outlines procedures for the Tribe in response to a variety of hazards. During the course of a flood event on the Reservation, the Emergency Management Coordinator works with local officials to ensure public health and safety and maintain transportation routes.

Severe Storm Spotters Network

This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar

reports. The Tribe has trained severe weather spotters, many of whom report directly to their respective public safety answering points when severe weather is observed.

Tornado Warning System

Most of the communities on the Reservation have emergency sirens to warn residents in the event of a tornado. There are a total of 3 tornado sirens on the reservation. The Menominee County Dispatch Center is responsible for testing and activating the systems.

Shelter Opening Plan

The Menominee Nation ERP Support Function #6 addresses the procedures for opening shelters.

Gaps and Deficiencies

A significant number of homes on the reservation lack basements that would provide shelter in the event of a tornado or damaging winds from a severe thunderstorm. Moreover, in many of the nursing homes, residents are moved to an interior hall away from windows in the event of a violent storm. Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations. A majority of the power lines on the Reservation are above ground and subject to damage from wind and falling tree limbs.

LIGHTNING AND THUNDERSTORMS

Lightning

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the channel causes a shock wave that produces thunder. The death toll from lightning strikes is relatively low; however, a sizeable percentage of fires are the result of a lightening striking structures, woodlands, grassy areas, or even industrial sites containing highly combustible substances.

Thunderstorms

Thunderstorms are most likely to happen in the spring and summer months and during the afternoon and evening hours, but can occur throughout the year and at all hours. The biggest threats from thunderstorms are flash flooding and lightning. In most cases, flash flooding occurs in small drainage areas where water quickly accumulates before it drains to the floodplains. When taken together, these local drainage problems can be as great a problem as flooding in the mapped floodplains. Other threats from thunderstorms include downburst winds, high winds, hail, and tornadoes. The National Weather Service classifies a thunderstorm as severe if its winds reach or exceed 58 miles per hour, produces a tornado, or drops surface hail at least 0.75 inch in diameter. Compared with other atmospheric hazards (such as tropical cyclones and winter low-pressure systems), individual thunderstorms affect relatively small geographic areas. The average thunderstorm system is approximately 15 miles in diameter, covers 75 square miles, and lasts less than 30 minutes at a single location. However, weather monitoring reports indicate that coherent thunderstorm systems can travel intact for distances in excess of 600 miles.

Vulnerability

Approximately 3 - 4 severe lightning and/or thunderstorm wind events occur on the reservation each year.

Impacts

The following describes the various impacts that lightning and thunderstorms have on the county. Critical Facilities Hospitals can see increases in patient load with sufficiently severe lightning and thunderstorms. Schools can sustain damage, and if they do not sustain damage, they often function as temporary shelters in the aftermath of severe thunderstorms. Police and fire departments often see an increased workload during and after lightning storms and/or severe thunderstorms. Emergency operations can be disrupted as lightning storms and thunderstorms affect radio communications, taking into consideration that antennas are a prime target for lightning.

Public Health

No special health problems are attributable to lightning and thunderstorms, other than the potential for tetanus and other diseases that arise from injuries and damaged property. In the case of lightning storms, when lightning strikes a person, serious burns or death are common outcomes. For every person killed by lightning, three persons are injured. For those who survive, their injuries can lead to permanent disabilities. About 70 percent of lightning strike survivors suffer serious, long-term effects, including memory loss, sleep disorders, depression and fatigue.

Safety

Lightning and thunderstorms rarely cause loss of life, but can cause injuries. From 1959 through 2012, lightning has killed 50 people and injured 239 people in Wisconsin. High winds can also kill and injure people in thunderstorms. For example, in 1998, thunderstorm winds were responsible for one death and 59 injuries in Wisconsin. In 2013 high winds in a thunderstorm killed a Menominee woman, when the wind blew part of a tree on her car. Most lightning and thunderstorm deaths can be prevented through safe practices. A considerable amount of information has been developed over the past two decades concerning lightning safety. Education efforts based on this information are leading to a reduction in the number of lightning-related deaths over time. Infrastructure Street signs often face disrepair after severe thunderstorms, and debris often litter streets and highways following a severe thunderstorm, requiring clean up. Downed trees caused by lightning and thunderstorms can be problematic for transportation. Buildings and Mobile homes are at a high risk to damage from thunderstorms. Garages are also frequently damaged by thunderstorms. Wind and water damage can result when windows are broken by flying debris or hail. Lightning can cause direct damage to structures (especially those without lightning protection systems), and can set off fires that may lead to further damage. Downed trees and limbs cause frequent damage to structures during lightning and thunderstorms.

Economic

Lightning and thunderstorms may damage or destroy crops. In the agricultural sector, buildings and livestock can also be negatively impacted from lightning and thunderstorms. Impacts to businesses from lightning and thunderstorms can include damage to signs, windows, and siding. In addition, billboards, or other advertising can be damaged from such storms. Thunderstorms can affect utilities. Power lines, transformers, and the poles supporting power lines can be knocked out by lightning or knocked down by wind and debris. Telephone lines can be disabled in a similar manner. Radio communications can be disabled because of thunderstorms. Lightning can cause power surges that damage appliances, electronic equipment and computers. Finally, thunderstorms can affect transportation. Airplanes have crashed when hit by downbursts of lightning. As stated previously, street signs often face disrepair after severe thunderstorms, and debris often litter streets and highways following a severe thunderstorm, requiring clean up.

Areas at Greatest Risk

Based on review of the historic patterns of lightning and thunderstorms, there are no specific jurisdictions that have unusual risks (meaning higher than average for the entire Reservation). The events are relatively uniform throughout the Reservation.

Estimation of Potential Losses

No estimation of potential losses can be derived as there is no defined hazard area. Lightning and thunderstorms can occur anywhere on the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding

Thunderstorms can cause flooding that can disrupt emergency response, transportation and communication. Lightning and thunderstorms can cause property damage, loss of life, and personal injury, disrupt transportation, communication, and emergency services, and threaten

public health and safety, as well as pose significant threat to essential public infrastructure and services such as power, water supply systems and sanitary systems.

Hailstorms

Lightning and thunderstorms are often accompanied by hailstorms.

Plans and Programs

Severe Storm Spotters Network.

This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar reports.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Redundancy is needed on communications towers. Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations. A majority of the power lines in the Reservation are above ground and subject to damage from wind and falling tree limbs. There are community requirements to manage trees near power lines.

WINTER STORMS

Winter storms in Wisconsin are caused by Canadian and Arctic cold fronts that push snow and ice deep into the interior of the United States. These storms can vary in size and strength, and can include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result

in wind chills that cause bodily injury such as frostbite, hypothermia, and death. Winter storms can occur as a single event or in combination, making an event more severe. For example, a moderate snowfall could create severe conditions if it were followed by a freezing rain and subsequent extremely cold temperatures. The aftermath of a winter storm can impact a community or region for weeks, and even months. A variety of weather phenomena and conditions can occur during winter storms. For purposes of classification, the following are National Weather Service approved descriptions of winter storm elements: Heavy Snowfall – the accumulation of six or more inches of snow in a 12-hour period, or eight or more inches in a 24-hour period. Winter Storm – the occurrence of heavy snowfall accompanied by significant blowing snow, low wind chills, sleet or freezing rain. Blizzard – the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.

Ice Storm – an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground. Freezing drizzle/freezing rain – the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below. Sleet – solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces.

Wind chill – an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin. Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls (producing at least eight to ten inches of accumulation) happen on the average only five times per season. True blizzards are rare in Wisconsin, and are more likely to occur in northwestern Wisconsin than in northeastern portions of the state, even though heavy snowfalls are more frequent in southeastern Wisconsin. However, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause the severe blowing and drifting of snow. Both ice and sleet storms can occur at any time throughout the winter season from October into April. Early- and late-season ice and sleet storms are generally restricted to northern Wisconsin. Otherwise, the majority of these storms

occur in southern Wisconsin. In a typical winter season, there are three to five freezing rain events, and a major ice storm occurs on a frequency of about once every other year. If a half inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the effects of the added weight of the ice. There are also between three and five instances of glazing (less than one quarter inch of ice) throughout Wisconsin during a normal winter. Winter storms present a serious threat to the health and safety of affected citizens, and can result in significant damage to property. This can occur when the heavy snow or accumulated ice causes structural collapse of buildings, downs power lines, severely affects electrical power distribution, or cuts off people from assistance or services. Difficult and dangerous driving conditions caused by the adverse conditions associated with winter storms often result in large numbers of traffic injuries, deaths, and even high costs associated with damage to personal and public property. These winter storm deaths are not accounted for in the statistics maintained by the National Climatic Data Center. The Reservation has typically experienced about two to three significant winter storm events per year. Winter storms tend to be a regional phenomenon affecting much of the northeastern portion of Wisconsin including the Reservation.

Impacts

The following describes the various impacts that winter storms have on the Reservation. Town and county road crews have an increased burden of snow removal (and salting in the case of ice storms) during and after winter storms. In some cases, winter storms can be so severe that these crews have to be called off the roads for a while. Hospitals and clinics can treat additional patients for frostbite, pedestrian, and vehicular accident injuries, and conditions resulting from the shoveling of heavy snow during and following winter storms. As is the case for any business, hospital and clinic employees may have difficulty getting to work because of the storm, which increases the workload for the staff who is already there (double shifts, etc.). More accidents occur in which the Sheriff and Police departments must respond. Utility and telephone companies have to respond to downed electrical and telephone lines, especially in the case of ice storms. Rescue services can receive more calls because of accidents or health related circumstances. Schools may need to have early dismissal or cancel classes altogether.

Public Health

Most injuries caused by winter storms result from vehicle accidents. Frostbite and hypothermia occur frequently when these storms combine with extreme cold (these health concerns are discussed more under the extreme cold hazard). Heart attacks and back injuries from shoveling snow are also a public health concern.

Safety

Winter storms can produce weather related hazards, including hazardous driving and walking conditions and injuries from shoveling snow. In some winter storm events, extreme cold from low temperatures, wind chill, and loss of heat due to power outages can create safety concerns.

Infrastructure

The major impacts of winter storms on infrastructure are to utilities and roads. Power lines and tree limbs can be coated with heavy ice in some winter storms, resulting in disrupted power and telephone service, often for days. Cable and satellite television services can also be negatively impacted in certain winter storm events. In the case of transportation, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Buildings

Occasionally, heavy snow or accumulated ice will cause structural collapse of buildings (particularly roofs), but most buildings are now constructed with low temperatures, snow loads and ice storms in mind. In addition, with the modern focus on energy conservation, buildings are much better insulated than they were in the past. Therefore, for the most part, winter storms do not have a major impact on buildings on the Reservation.

Economic

Loss of power often means that businesses and manufacturing concerns must close down. Loss of access due to snow or ice covered roads can have a similar effect, especially when trucks cannot travel on major thoroughfares to make “just in time” deliveries to businesses and

industries on the Reservation. The effects are particularly difficult when the storm is widespread. Agriculture can be negatively impacted by these storms if they occur over a long period.

Areas at Greatest Risk

Winter storms have no defined hazard area within the Reservation. The events are relatively uniform throughout the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Extreme Cold

Extreme cold and wind chill effects can greatly exacerbate any winter storm event.

Flooding

Heavy snows and snowmelt can cause flooding that can disrupt emergency response, transportation, and communication.

Plans and Programs

Wind Chill Warnings

The local radio and TV media in concert with the National Weather Service issues a wind chill warning when temperatures are -40º F or lower for a period longer than three hours. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor.

School Closings

The Reservation's school district have a policy of closing schools when the National Weather Service issues a wind chill warning or when snow accumulations become greater than 5" and travel conditions are determined to be unsafe. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am. Some school districts have an automated phone system that contacts the homes of students by 6:00 am.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations. A majority of the power lines on the Reservation are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines.

STORM WATER FLOODING

The waterways and storm water drainage systems provide essential flood protection. Storm water drainage systems cope well with most storms. However, occasionally storms, such as flash floods can occur of such intensity that not all the storm water can get into the drains at once and flooding occurs. Flash floods happen when a large amount of rain falls in a localized area over a very short period. These localized storms are generally beyond the capacity of any drain, and it would not be economically feasible to design drains to cater for these very large, but infrequent storms. In addition, localized storm water flooding can occur if drains in the area are blocked. It is important to keep the drainage system clear of litter and debris to avoid blocked drains. This is also necessary to protect and improve the health of the Reservation's waterways. Today, new developments and redevelopments incorporate storm water management measures such as storm water detention and retention basins that provide greater flood protection. Detention basins slow the flow of storm water being carried in the drainage system by storing it for a time, while retention basins (i.e. ponds) hold water during most of the year. Detention basins often double as parks and playing fields. Storm water flooding is relatively uncommon on the Reservation and occurrences are localized.

History

One National Climatic Data Center record exists for “urban/small stream flooding” in the planning area since January 1, 1990. However, there are numerous occurrences of minimal storm water flooding events that occur on the Reservation every year. July 8, 2000 A nearly stationary front across Wisconsin combined with upper air support and abundant moisture to produce a prolonged period of thunderstorms. A few of the storms contained high winds and hail but flooding from heavy rainfall caused the majority of the problems. Flooding of roads and/or basements was reported on the Reservation. Small streams and creeks overflowed their banks and rural areas suffered some crop damage.

Vulnerability

There are several areas throughout the Reservation susceptible to recurrent storm water flooding. Street and ditch flooding after heavy rains have historically caused little damage or traffic disruption in the past.

Impacts

The following describes the various impacts that storm water flooding has on the Reservation.

Critical Facilities

Interior water damage can occur to critical facilities, just as it does for any building when storm drains back up.

Public Health

There is not much of a public health risk as the situation is usually alleviated quickly and any cases prolonged standing water would be rare.

Safety

Electrocution could occur from a building experiencing storm drain backup flooding and electrical wires or appliances short out and carry current through standing water.
Fire injuries could occur due to water damage to heating systems.

Infrastructure Erosion damage to roads can occur from storm water flooding, especially if the storm water facilities in the area are defective.

Economic

Clean up and replacement of damaged items can be costly after a building has experienced storm drain backup flooding. Maintenance of roads and parking lots after storm water flooding damage can be costly.

Areas at Greatest Risk

The areas at greatest risk for storm water flooding are bridges and roads as they often do not have infrastructure to manage storm water.

Estimation of Potential Losses

No estimation of potential losses can be derived as the hazard area is vaguely defined.

Relationship to Other Hazards – Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Fire

Electrical system can malfunction due to storm water flooding and cause fires.

Transportation Disruption.

Transportation routes can be disrupted due to standing water in roadways.

Plans and Programs

Repair and Maintenance

Repair and maintenance is routinely performed by Tribal Maintenance Department and Community Development Department and Menominee County on areas with storm water flooding damage.

Storm Drain Cleaning Program

Many if not all of the communities on the Reservation have some type of storm drain cleaning program that involves utilizing a vacuum to remove debris from storm drains in the fall of each year.

WisDOT Flood Damage Aids Program

Wisconsin Department of Transportation assists local governments with replacing or improving roads and roadway structures that have had major damage caused by flooding, by providing help to defray the costs of repairing any public highway, street, alley, or bridge not located on the State Trunk Highway system.

Gaps and Deficiencies

There is a need to correct defective storm water facilities to prevent infrastructure damage. The Reservation permitting agency is Menominee Tribal Environmental Services Department.

EXTREME COLD

Dangerously cold conditions can be the result of extremely cold temperatures, or the combination of cold temperatures and high winds. The combination of cold temperatures and wind creates a perceived temperature known as “wind chill.” Wind chill is the apparent temperature that describes the combined effect of wind and air temperatures on exposed skin. When wind blows across the skin, it removes the insulating layer of warm air adjacent to the skin. When all factors are the same, the faster the wind blows the greater the heat loss, which results in a colder feeling. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Extreme cold events are most likely during the months of January and February.

February 10, 1995 an "arctic blast" brought the coldest weather of the winter to the northern half of the state. Brisk winds occasionally gusting to 30 to 40 mph combined with sub-zero temperatures created wind chill readings of 50 to 70 below zero. During the cold spell numerous schools were closed, numerous outdoor "fest" events were cancelled. Some frozen water pipes

were reported. Snow blew and drifted, reducing visibility in open areas, and many roads iced over, resulting in numerous vehicle accidents. December 5, 1995 Bitter cold arctic air swept into Wisconsin on northwest winds of 20 to 40 mph. Temperatures dropped as much as 15 degrees F in 15 minutes as the strong front moved through. Wind chill values ranged from 25 below to 50 below zero. Many schools canceled evening activities, and there were some frozen water pipes, which resulted in flooded rooms or basements. January 30, 1996 Bitter cold arctic air settled in across central and northeast Wisconsin. Record low temperatures were set in a few locations. February 1, 1996 At least 20 record low temperatures were set across central and northeast Wisconsin during the early part of February, as a frigid arctic air mass remained entrenched across the area. Temperatures dropped to colder than 40 degrees below zero in parts of north central Wisconsin. Temperatures remained below zero for 137 hours straight. The cold weather was responsible for numerous school closures, stalled vehicles, frozen pipes, and broken water lines. Electrical and telephone outages occurred due to snapped wires and lines. Extreme cold temperatures combined with west winds of 10 to 15 mph to produce wind chill readings in the 50 to 70 degree below zero range on February 2, 1996. October 4, 1999 the low temperature at Austin Straubel International Airport in Green Bay was 25 degrees. This tied the record low that was set in 1989. February 17, 2006 a bitter cold air mass settled over the Western Great Lakes region on the February 17 and 18, 2006. On the morning of the 18th, temperatures dropped into the 15 below to 20 below zero range across east central Wisconsin, 18 below to 24 below zero across central Wisconsin, and 22 below to 27 below zero across northern Wisconsin. The cold temperatures combined with west winds of 5 to 15 mph to produce extremely cold wind chill readings. Green Bay recorded a wind chill of -41.
January 30, 2008 after an arctic front passed through the area, air temperatures fell into the 10 below to 20 below zero range and west winds increased to speeds of 20 to near 40 mph. The combination of cold temperatures and strong winds produced wind chills of 40 below to near 50 below zero across most of the area. Some of the coldest official wind chills included 49 below zero at Rhinelander (Oneida Co.), 47 below zero at Wausau (Marathon Co.) and 40 below zero at Green Bay (Brown Co.). February 10, 2008 Strong northwest winds behind a departing low pressure system brought cold air into Wisconsin. Temperatures fell into the 10 below zero to 20 below zero range at most locations overnight and combined with 15 to 30 mph winds, with gusts

as high as 40 mph, to produce bitter cold wind chills. Some of the coldest wind chills included -47 at Antigo (Langlade Co.), -45 at Rhinelander (Oneida Co.), -43 at Wausau (Marathon Co.) and -40 at Appleton (Outagamie Co.), Eagle River (Vilas Co.) and Kewaunee (Kewaunee Co.). January 24, 2009 Northwest winds between a departing cold front and an approaching high pressure system brought much colder air into the area. Low temperatures ranged from the single digits below zero from the Fox Valley east to Lake Michigan, to the teens below zero in north-central and parts of central Wisconsin. Wind chills across the area were mostly in the 20 below zero to 30 below zero range.

Vulnerability

Typically an extreme cold episode affects the Menominee Reservation once every two to three years based on past observations. Extreme cold episodes tend to be a regional phenomenon in that the episode affects much of the northeastern region of Wisconsin on nearly all of the occasions in which the episodes affected the Reservation.

Impacts

The following describes the various impacts that extreme cold events have on the Reservation.

Critical Facilities

All buildings involving critical facilities will have greater heating expenses during an extreme cold event. Increased demand will also affect local natural gas energy utilities serving the planning area. Hospitals and clinics may be asked to treat patients exposed to the extreme cold conditions. Emergency shelters may take in additional individuals during the extreme cold event. Area schools may cancel classes or call for early dismissal in extreme cold events. Water utilities may need to repair damaged water mains caused by the extreme cold. Local fire departments and rescue services may also deal with direct or indirect consequences of the extreme cold event.

Public Health

Exposure to cold temperatures can cause serious or life threatening health problems. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life threatening. When exposed to cold temperatures or low wind chills, one's body begins to lose heat faster than it can be produced. The result is hypothermia, or abnormally low body temperature. Hypothermia is "clinically significant" when the body temperature is below 95 degrees. Severe hypothermia occurs when the body's temperature drops below 85 degrees, resulting in unconsciousness. When body temperatures drop too low, the brain may be affected, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and will not be able to do anything about it. Hypothermia occurs most commonly at very cold temperatures, but can occur even at cool temperatures (above 40 degrees) if a person becomes chilled from rain, sweat or submersion in cold water. Victims of hypothermia are most often elderly people with inadequate food, clothing or heating; babies sleeping in cold bedrooms; children left unattended; adults under the influence of alcohol; mentally ill persons; and people who remain outdoors for long periods (such as the homeless). In cases of hypothermia, if help does not come, death follows. Great care is needed to properly re-warm victims with even mild cases of hypothermia. Frostbite is an injury to the body that is caused by freezing; it is damage to tissue caused by the effects of ice crystals in frozen tissue. Frostbite causes a loss of feeling and color in affected areas. It most often affects the nose, ears, cheeks, chin, fingers or toes, all of which are extremities with more circulation difficulties. Frostbite can permanently damage the body, and severe cases can lead to amputation.

Safety

In addition to the health risks directly related to exposure to cold temperatures, residents are also susceptible to other risks associated with extremely cold temperatures. For example, many homes will become too cold either due to a power failure or because the heating system is not adequate for the weather. The risks of household fires and carbon monoxide poisoning increase when people begin to use space heaters and fireplaces to stay warm. Infrastructure Public domain water pipes can burst in extreme cold conditions, which can also ruin the street above the water pipes. In addition, damage to fiber optic cables can occur during extreme cold

episodes, which can negatively affect commerce and hospitals in the planning area. It is possible that extreme cold conditions combined with low lake levels might have led to the freezing of the water intake pipe in Lake Michigan in early 2004.

Buildings

Extreme cold conditions can result in burst water pipes. In addition, it is more expensive to heat homes and other buildings during extreme cold events. Sometimes, residents of the planning area might consider use of space heaters during an extreme cold event. However, use of space heaters comes with its own risks, including a higher probability of fire to a structure if used improperly.

Economic

Economic impacts of extreme cold events can include lack of motivation to participate in the local economy unless necessary during the event. Utility bills following the event will also be higher, which will give the consumer less ability to purchase discretionary goods about a month after the event (unless that consumer is on a monthly even payment plan with the local utility). If area school districts need to call off school early on extremely cold days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. The private sector incurs economic losses and production decreases during an extreme cold event.

Areas at Greatest Risk

Extreme cold events have no defined hazard area within the planning area. The events are relatively uniform throughout the Reservation.

Estimation of Potential Losses

No estimation of potential losses can be derived as there is no defined hazard area. Extreme cold events can occur anywhere on the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Winter Storms

Winter storm events will exacerbate extreme cold conditions.

Plans and Programs

Heating Moratorium

A Wisconsin rule, adopted in 1984, prohibits utilities from disconnecting natural gas and electric service during the winter months, between November 1 and April 15. School Closings. The Reservation's school district has a policy of closing schools when the National Weather Service issues a wind chill warning or when snow accumulations become greater than 5" and travel conditions are determined to be unsafe. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am. Some school districts have an automated phone system that contacts the homes of students by 6:00 am.

Wind Chill Warnings.

The local radio and TV media in concert with the National Weather Service issues a wind chill warning when temperatures are 30º F or lower. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Not all school districts have a transportation manager providing information on current weather and road conditions. Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations. A majority of the power lines on the Reservation are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines. Residents that have had their heat disconnected prior to the heating moratorium beginning on November 1 must make arrangements with their local utility to pay outstanding bills in order to have their service restored. If a consumer has not made arrangements to pay an outstanding bill, the utility is not required to provide heat until an agreed-upon payment schedule has been reached. Residents could be without needed heating during any out-of-season cold spells that occur between April 16 and October 31.

EXTREME HEAT

Extreme heat and humidity associated with heat waves directly kill over 688 people a year in the US, making heat the number one weather killer in this country. This number is based on information from the Centers of Disease Control and Prevention (CDC) for the period of 1999 to 2003. Extended periods of warm, humid weather can create significant risks for people, particularly the elderly who may lack air conditioning or proper insulation or ventilation in their homes. Animals are also at risk during extended periods of heat and humidity. The National Weather Service issues a Heat Advisory when the Heat Index ranges from 105 to 114 degrees during the day and remains at or above 80 degrees at night, during a 24-hour period. The following Heat Index Chart displays the National Weather Service Heat Index chart. The heat index combines the effects of heat and humidity to reflect the risk of warm weather to animals and people. When heat and humidity combine to reduce the amount of evaporation of sweat from the body, outdoor activity becomes dangerous even for those in good shape. The index measures the apparent temperature in the shade. People exposed to the sun would experience an even higher apparent temperature. A heat index of 105 is considered dangerous and prolonged exposure can result in heat stroke, heat exhaustion, and heat cramps. People are

reminded to use extreme caution when the heat index is between 95 and 105. A heat index of 95 occurs when the temperature is 90 degrees and the relative humidity is 50 percent.

Heat Index Chart:
Source: Accuracyproject.org, 2012

On average, at least five people die in Wisconsin each year due directly to heat (National Weather Service). In addition, evidence suggests that a similar number of people die each year in Wisconsin from heat as an indirect or secondary cause. Over one week of hot and very humid conditions across northeast Wisconsin resulted in numerous heat related illnesses and three deaths due to excessive heat. The heat caused concrete on many roads to buckle.

Vulnerability

Based on past observations, it is likely that one to two extreme heat episodes will affect the Menominee Reservation in any given year. Extreme heat episodes tend to be a regional phenomenon in that they affect much of the northeastern part of Wisconsin on nearly all of the occasions in which they affected the Reservation.

Impacts

The following describes the various impacts that extreme heat events have on the Reservation.

Critical Facilities

Utilities may see peak demand for electricity during extreme heat episodes. There have been fears that an extreme heat episode could cause the power grid to collapse in a manner similar to what was experienced in the northeastern United States and in eastern Canada in the summer of 2003. Hospitals and clinics will likely experience increased demand due to heat related illnesses during an extreme heat episode. In some cases, rescue services will experience an increased demand due to these same heat related illnesses. If school is in session during the extreme heat episode, area school districts may dismiss classes early in the day, at least in older schools without air conditioning. Emergency shelters will experience higher demand during the extreme heat episode, with some emergency shelters being set up

specifically in response to the episode. Finally, there is likely to be increased water demand during the episode, both for human consumption as well as for lawn watering in the event that the extreme heat episode includes a drought.

Public Health

Large numbers of persons can experience serious illnesses and ailments during an extreme heat episode. The most common of these illnesses include heat cramps, heat exhaustion and heat (sun) stroke. Sunburn can also occur during many extreme heat episodes. Symptoms of heat cramps include painful spasms usually occurring in the leg and abdominal muscles, along with heavy sweating. Symptoms of heat exhaustion include heavy sweating, weakness, having cold and pale skin, having a weak pulse, fainting and vomiting, although a normal body temperature is still possible. Symptoms of heat/sun stroke include high body temperatures (106 degrees Fahrenheit or higher), hot and dry skin, a rapid and strong pulse, possible unconsciousness, and no sweating. Heat stroke is a medical emergency, while heat exhaustion requires medical attention if persistent. Symptoms of sunburn include skin redness and pain, possible swelling, blisters, fever and headaches. In addition to these typical extreme heat related illnesses, if meteorological conditions are right, the Menominee Reservation may experience levels of ground-level ozone (smog) which exceed the federal standard. Ozone can irritate lung airways and cause inflammation much like sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people who are active outdoors can be affected when ozone levels are high. Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors in the summer is at risk, particularly children and other people who are active outdoors. Even at very low levels, ground-level ozone triggers a variety of health problems, including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Safety

The safety impacts of extreme heat episodes are generally similar to the health impacts of those episodes. In some communities, extreme heat has led to shorter tempers, which can lead to violence that might normally not be seen under more typical weather conditions.

Infrastructure

There are few impacts of extreme heat on publicly owned infrastructure. One impact that extreme heat can have on publicly owned infrastructure involves the buckling of certain streets and highways, which need to be repaired immediately. There may be higher demand for water recreation in city parks as well, including beaches along Lake Michigan and other swimming venues (pools, inland lakes, etc.). Buildings while there are no direct impacts on buildings; periods of excessive heat can affect the ability of buildings to be comfortable and safe for human habitation. Periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages and black outs.

Economic

Economic impacts of an extreme heat episode which can affect private businesses and consumers include higher electrical consumption and increased demands for medical treatment. Local governments may need to incur expenses when repairing streets and highways in the planning area that have been damaged due to buckling. If area school districts need to call off school early on extreme heat days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. Water utilities will incur the expenses involved with additional demand for water during extreme heat episodes, and these expenses will be passed on to consumers. One less tangible economic impact of extreme heat involves lower productivity from persons who must work outside or in less than ideal conditions. In addition, people will be less motivated to shop at local businesses and may defer non-essential activities until the heat episode is over, negatively impacting the local economy. Extreme heat can negatively impact agriculture in the surrounding area when combined with

drought. Areas at Greatest Risk Extreme heat usually occurs throughout the entire planning area.

Estimation of Potential Losses

No estimation of potential losses can be derived as there is no defined hazard area. Extreme heat events can occur anywhere on the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Drought.

Extended high temperature extremes can phase into drought.

Wildfire.

Dry, hot condition can increase to risk of wildfires.

Plans and Programs

Heat Advisories

The local radio and TV media in concert with the National Weather Service issues a heat advisory when the combination of temperature and humidity create risks for people and animals. A heat index of 105 to 114 warrants a heat advisory. This occurs when air temperature reaches 95 and the relative humidity is 50 percent. An excessive heat warning is issued when the heat index reaches 115. This occurs with an air temperature of 95 degrees and relative humidity of 60 percent. An index of 115 or higher creates severe risk for both humans and animals.

School Closings

The Reservation's school district has a policy of closing summer schools when the National Weather Service issues a heat index warning. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am.

Cooling Shelter.

The Reservation has a cooling shelter plan that becomes active when the heat index exceeds 115 ºF.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Not all school districts have a transportation manager providing information on current weather conditions. Although Wisconsin requires utilities to provide residents heating between November 1 and April 15, there is no guarantee that residents will have access to cooling during times of extreme heat. Cooling systems are lacking in many elderly housing developments.

FOG

Fog is a hazard mainly for one very important reason: reduced visibility. Airport delays, automobile accidents, shipwrecks, plane crashes, and many other problems are frequently caused by fog. When air pollution (such as smoke) combines with fog, visibility decreases even more. Acid fog, resulting from the combination of air pollutants (such as nitrogen and sulfur oxides) with water droplets can create health problems, especially for people who have respiratory conditions. Fog is responsible for an average of over $1,000,000 in property damage, dozens of injuries, and several deaths every year throughout the nation. The financial cost of transportation delays caused by fog has not been calculated, but is substantial. Fog can occur almost anywhere and during any season. Certain seasons are more likely to have foggy days and nights in certain locations based on several factors, including topography and the process responsible for forming the fog. Fog is classified based on how it forms, which is often related to where it forms. The following are the four most common types of fog:

- Advection fog occurs when warm, moist air is blown over a cold surface, and that surface can lower the temperature of the air to its dew point. Advection fog is common in harbors and bays in the summer. In the winter, warm and humid air from the subtropical oceans can also be blown over the cooler surface of the land, causing extensive fog.
- Evaporation fog is the result of water evaporating from streams, lakes and oceans. When cold air blows over warm water, the moisture that is evaporating from the surface will increase the amount of moisture in the air, possibly to the point that the air can no longer hold all of the water it contains. In this type of fog, the temperature of the air does not decrease to dew point. Instead, the moisture content of the air increases, resulting in the dew point being reached for this amount of moisture. Steam rising from lakes is a common type of evaporation fog.
- Radiation (Ground) fog is common on clear nights with little or no wind, and forms from the rapid cooling of the Earth's surface in the absence of clouds. Since the temperature of air near the surface is mostly influenced by the surface itself, the air temperature can easily drop to its dew point on calm, clear nights. This type of fog is common in valleys where cool air tends to accumulate. Often, radiation fog is called "valley fog" when it persists in valleys during the daytime hours and is fairly thick.
- Upslope fog can form from the cooling of rising air. If air is blown over high hills or mountains, it may cool enough to reach its dew point. This can result in extensive fog in mid-slope areas, such as the portion of the Great Plains adjacent to the Rocky Mountains. The National Weather Service forecasts fog and issues dense fog advisories when visibility is decreased to less than one quarter of a mile. These advisories alert travelers to potentially dangerous conditions. Traveling in fog requires reduced speed and careful navigation. At night, traveling in fog is especially dangerous because darkness combines with fog to reduce visibility even more. In addition, light from automobile headlights and other navigational lights is scattered off the water droplets of the fog, limiting sight to only a short distance. In response to this problem, automobiles are often equipped with specially designed lights that illuminate a usually dry (and therefore clear) area just above the roadway surface.

History

According to National Climatic Data Center, The reservation experiences about 1-2 fog events each year. March 18, 1996 dense fog reduced visibilities to one-quarter mile or less across a large portion of northeast and east central Wisconsin. May 9, 1996 dense fog reduced visibilities to one-quarter mile or less across most of central and east central Wisconsin. June 10, 1996 dense fog affected parts of northeast and east central Wisconsin, especially near the Bay of Green Bay and Lake Michigan. The Fox Valley was also affected by the thick fog, which reduced visibilities to one-quarter mile or less at times. September 6, 1996 dense fog affected most of northeast and east central Wisconsin, reducing visibilities to one-quarter mile or less. September 21, 1996 dense fog dropped visibilities to one-quarter mile or less across east central Wisconsin. October 16, 1996 dense fog developed across most of central, northeast, and east central Wisconsin, reducing visibilities to one-quarter mile or less. October 21, 1996 dense fog reduced visibilities to one-quarter mile or less across most of northeast and east central Wisconsin. January 2, 1997 dense fog reduced visibilities to one-quarter mile or less across much of northeast, central, and east central Wisconsin. A warm air advection over the top of snow-covered ground led to the fog development. March 1, 1997 dense fog enshrouded much of central and northeast Wisconsin, reducing visibilities to one-quarter mile or less. December 12, 1999 dense fog reduced visibilities to near zero over much of north central, northeast, central, and east central Wisconsin. Moisture, trapped near the surface by weak high pressure, combined with cool temperatures and light winds to form widespread dense fog. January 9, 2000 a warm front moving north through Wisconsin brought warm and moist air to central and east central Wisconsin. The snow-covered ground cooled the moist air, resulting in widespread dense fog that first developed in the Fox Valley early in the morning of the January 9, 2000 and then overspread most of central and east central Wisconsin by evening. The fog began to dissipate a bit shortly after midnight on the 10th. February 24, 2000 Moisture from rainfall and melting snow combined with light winds to produce widespread dense fog across most of northeast Wisconsin.

Vulnerability

Twelve fog events occurred between 1990 and 2012, which covers a 22-year period. This means that on average one fog event occurs on the Reservation every other year. It is probable that at least one fog episode will affect Menominee Reservation in any given year.

Impacts

The following describes the various impacts that fog events have on the Reservation.

Critical Facilities

Law enforcement will be asked to respond to an increased number of accidents during many fog events. Hospitals and clinics may be asked to treat individuals injured in accidents that likely would have not occurred in the absence of the fog event. Rescue services may be called to respond to accidents that resulted from the fog event. The starting time for schools may be delayed by the fog event for the safety of students and all involved. Courtrooms may see increased adjudication of traffic law violations resulting from accidents occurring during fog events. Municipal public works and county highway departments may need to perform emergency repairs to streets and highways in worst-case scenario accidents resulting from the fog event. In winter fog events, utility companies may need to repair their lines in circumstances where the fog combines with icing on electrical lines.

Public Health

Most injuries caused by fog events result from vehicle accidents. Few other public health impacts occur during fog events.

Safety

Fog events can produce weather related hazards, including hazardous driving conditions during most fog events, as well as hazardous walking conditions during winter fog events in which ice is produced on pavement surfaces. Although rare, ship wrecks and plane crashes could occur during a fog event.

Infrastructure

The main impact on infrastructure from a fog event is when accidents occur on the street and highway network. This can result in rescue services helping injured drivers and passengers; clean-up of the affected portions of the street and highway network; and temporary rerouting of motorists after some incidents. In addition, motorists often must travel at slower speeds when fog is in the area, which adds travel time and can lead to vehicular congestion in cases where it would normally not occur. In fog events during the winter, icing can sometimes be a problem. Power lines and tree limbs can be coated with heavy ice in some winter fog events, resulting in disrupted power and telephone service. In addition, in fog events during the winter, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Buildings

There are no direct impacts to buildings from a fog event, except under certain winter circumstances, when freezing of power lines can occasionally lead to disruptions in power to buildings.

Economic

There are economic costs in the accidents caused by fog events. Vehicular accidents usually involve property damage, and some vehicular accidents during fog events involve injuries and/or fatalities. All of these consequences to vehicular accidents have costs both to the individual involved and to society. Fog events can also cost businesses in lost time involving late workers and/or late shipments. If area school districts need to delay school during a fog event, there may be expenses involved with delayed busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Airline delays due to fog have economic impacts for travelers as well as for commerce. There are additional economic impacts if the fog event occurs in conjunction with the icing of power lines in cases where the power lines are damaged and residents lose power.

Areas at Greatest Risk

Areas of the Reservation situated in river valleys and other low lying areas can be at greater risk for fog under certain meteorological conditions. However, no portion of the planning area is free of the possibility of experiencing fog at least occasionally.

Estimation of Potential Losses

No estimation of potential losses can be derived as there is no defined hazard area. Fog events can occur anywhere on the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Winter Storms

Winter storm conditions with freezing rain and icy roads can mix with fog to create deadly roadway conditions.

Plans and Programs

Fog Warning Signs. Flashing fog warning signs can be placed in areas of known fog prone areas on major roads on the Reservation.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Local radio and television stations provide warnings but are effective only if tuned to one of the local stations. Fog warning signs may be ineffective if drivers are traveling at an unsafe speed for the weather conditions.

HAILSTORMS

Hailstorms are often produced by severe thunderstorms. Hailstones are ice crystals that form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop sufficient weight and fall as precipitation. The size of hailstones is a direct function of the severity and size of the storm. Significant damage usually does not result until the hailstones reach 1.5 inches in diameter, which occurs in less than half of all hailstorms. Hail in Wisconsin ranges from pea-sized to golf ball sized. Area coverage of individual hailstorms is highly variable and spotty because of the unstable nature of cumulonimbus clouds.

History

According to National Climatic Data Center, the Menominee Reservation has experienced 7 hailstorms in or near the Reservation since January 1, 2006.

Source: NOAA National Climatic Data Center; March, 2012

HAIL REPORTS FOR MENOMINEE COUNTY, WISCONSIN

Date	Size	City	County	State
05/06/2009 4:52 P	0.88 inches	White Lake	Langlade	WI
at the wild wolf camp ground				
06/28/2008 1:50 P	0.75 inches	Keshena	Menominee	WI
06/20/2007 8:45 P	1.00 inches	Neopit	Menominee	WI
06/07/2007 4:50 P	3.00 inches	Elton	Langlade	WI
one to three inch dia. hail				
06/07/2007 5:22 P	0.75 inches	Gresham	Shawano	WI
03/25/2007 7:55 P	1.50 inches	White lake	Langlade	WI
time approx.				
10/03/2006 7:50 P	1.00 inches	Keshena	Menominee	WI

Vulnerability

Forty-one hail events occurred between 1990 and 2012 in Northeast and Northcentral Wisconsin. This means that on average approximately 1.9 hail events occurs in or near the Reservation each year.

Impacts

The following describes the various impacts that hail events have on the Reservation.

Critical Facilities

Hail can inflict severe damage to roofs, windows and siding, depending on hailstone size and winds.

Public Health

Hail is unlikely to cause any public health concerns.

Safety

Hail rarely causes loss of life, but can cause injuries.

Infrastructure Buildings

Hail can inflict severe damage to roofs, windows and siding, depending on hailstone size and winds.

Economic

Hail can damage or destroy crops. Taller crops, such as corn are particularly vulnerable to hail. Costly damage can occur to roofs, windows, and siding, as well as automobiles, RVs, and boats (including the body, paint and windshields and other windows).

Areas at Greatest Risk

Based on review of the historic hailstorm patterns, there are no specific areas with higher than average risks on the Reservation. The events occur relatively uniformly throughout the area.

Estimation of Potential Losses

No estimation of potential losses can be derived as there is no defined hazard area. Hailstorms can occur anywhere on the Reservation.

Relationship to Other Hazards - Cumulative

Effects Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Lightning and Thunderstorms.

Lightning and thunderstorms often accompany hailstorms, increasing the damage potential to the planning area.

Plans and Programs

Severe Storm Spotters Network.

This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar reports.

NOAA Weather Radio Program

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations. A majority of the power lines on the Reservation are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines.

DAM FAILURE FLOODING

The WDNR regulates the permitting of Legend Lake dam construction, repairs, reconstruction, ownership transfers, water levels, and abandonment. The Bureau of Indian Affairs, Division of Water and Power regulate the Neopit Dam for permitting, construction, repairs, reconstruction, ownership transfers, water levels, and abandonment. A dam with a structural height of over 6 feet and impounding 50 acre-feet or more, or having a structural height of 25 feet or more and impounding more than 15 acre-feet is classified as a large dam. Dams are classified as Low, Significant, or High Hazard. A dam is assigned a rating of High Hazard when its failure would put lives at risk. The hazard rating is not based on the physical attributes, quality or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail. This dam is rated as high hazard potential.

History

There is no significant hazard history for the Legend Lake Dams or the Neopit Dam.

Vulnerability

The areas vulnerable to dam failure flooding include those locations within the hydraulic shadow of the dam. The hydraulic shadow of the dam is the area of land downstream from a dam that would be inundated by water upon failure of the dam during the regional flood. The BIA Emergency Action Plan does not list the risk based on land use as high or low hazard.

Critical Facilities

There are no critical facilities vulnerable to flooding if any Reservation Dam were to fail.

Public Health

Three types of health concerns could accompany dam failure flooding. The first hazard comes from the water itself in the form of illnesses resulting from contaminants carried in the water. The second type of health hazard comes after the water is gone and stagnant pools creating habitat for vectors and damp areas produce mold spores. The third health hazard is the long-term psychological impact of having experienced the destruction of a flood due to dam failure.

Safety

Cars floating in moving water can be swept downstream into deeper waters, which can lead to deaths for people trapped in vehicles. Electrocution can cause flood deaths, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods can damage gas lines, floors and stairs, creating secondary hazards such as gas leaks, unsafe structures and fires.

Infrastructure

Infrastructure impacts of flooding include impacts to roads, bridges, and sewer, water, and electrical systems.

Economic

Floods cause problems for businesses and industry. Businesses disrupted by floods may have to be closed. Other Public expenditures on flood fighting, sandbags, fire department calls, clean up, and on repairs to damaged public property affect all residents of the planning area, not just those in the shadow of the dam.

Areas at Greatest Risk

The areas of greatest risk from dam failure are those areas within the hydraulic shadow of the dams.

Relationship to Other Hazards - Cumulative

Effects Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flood

Inundation of floodplain areas or a larger area would occur if the dam or levee structures are compromised.

Fire

Fire can occur due to infrastructure compromise of electrical and natural gas systems.

Hazardous Materials

Hazardous material releases can occur due to improper storage of materials in floodplains.

Infectious Disease

Infectious disease outbreaks are possible during prolonged flood events where floodwaters compromise areas sensitive to disease vectors.

Transportation Disruption

Disruptions of transportation routes along roads, bridges, railroads, and by river navigation can be disrupted due to inundation and/or substantial flow velocities.

Power Outages

Power outages can occur if portions of the electrical grid are compromised by floodwaters.

Plans and Programs

Regulation of Dams and Bridges

Chapter 31 of the Wisconsin Statutes, created in 1917 under the Water Power Law, was developed to ensure that dams are safely built, operated and maintained. NR 333 of the Administrative Code provides design and construction standards for large dams, and NR 335 (Wis. Admin. Code) covers the administration of the Municipal Dam Repair Grant Program (not currently funded) and the Dam Removal Grant Program. Wisconsin DNR is responsible for administration of these regulations. Chapter 31 covers dam construction, permitting, safety, operation and maintenance. It also covers alteration or repair of dams, dam transfer and removal, and water level and flow control. Warning Center and Hotline. Wisconsin Warning Center has a toll free number (1-800-943-0003) for reporting dam failures and other emergencies. Dam Removal Grant Program. The Wisconsin Department of Natural Resources

provides some assistance in the form of grants to dam owners. Section 31.385 (Wis. Stats.) authorizes the dam removal program.

NOAA Weather Radio Program.

The Menominee Tribe is developing a NOAA Weather Radio purchasing program that encourages and assists residents in acquiring weather radios. However, with newer and better technology developed over the past several years, including advances with wireless devices, weather radios have become less desired.

Gaps and Deficiencies

Many of the dams in Wisconsin were built in the late 1800s and early 1900s. Over time, water pressure and weathering will slowly break down a dam. Dams need constant maintenance and repairs. If dams are allowed to naturally degrade, they have a greater risk for problems such as sudden breaks during flood conditions.

FIRES (FOREST AND WILDLAND)

A wildland fire is any instance of uncontrolled burning in brush, marshes, grasslands, or field lands. Typical causes of these fires are lightning, human carelessness, or arson. Wildland fires can occur at any time of the year and during any time of the day. The primary factors that generally contribute to the start of a wildland fire are land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation. Generally, fires are more likely to occur when vegetation is dry from a winter with little snow or a spring and summer with sparse rainfall. In recent times, development of homes and other structures in areas of highly flammable vegetation have caused an increase in wildfire danger. This condition is known as the wildland-urban interface (WUI). If not promptly controlled, wildland fires can develop into an emergency or even a disaster. Fires threaten lives, resources, and property. In addition, fires can affect livestock and other domesticated pets. History The Wisconsin Department of Natural Resources no longer maintains data on wildland fires. According to the Steering Committee members, wildland fires are a frequent occurrence throughout the Reservation, primarily in the spring of the year when the snow has melted and

the vegetation is dry and yet to begin growing. Other times of the year can show an increase in wildland fires due to drought conditions or through human actions such as the burning of refuse or yard waste. Fire departments serving the Reservation have been upgrading equipment to better combat these types of fires. Over the past 10 years, there has been one major incidence of wildland fires on the Reservation. The major fire occurred in spring of 2015. Small fires have claimed some structures but primarily have impacted vegetation and wildlife habitat.

Vulnerability

The Reservation is extensively forested and does contain the hazards and risks necessary to warrant intensive fire protection. Therefore, there is one Wisconsin DNR ranger station and suppression resources combined with Menominee Tribal Enterprise Wildland fire protection. According to the U.S. Forest Service Wildland Fire Assessment System, The Reservation regularly falls within a low to moderate fire danger class. A low rating indicates that fuels do not ignite readily from small firebrands, while a moderate rating means that fires will likely start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Overall, the probability of a naturally occurring wildland fire is low for the entire Reservation. However, the probability that at least one wildland fire will occur on the Reservation remains high because people continue to burn on their own property.

Impacts

The following describes the various impacts that wildland fires have on the Reservation.

Critical Facilities

Police, fire, and emergency response departments are greatly affected by wildland fires suffering increased workloads during and after events. Hospitals can see increases in patient load resulting from burn related injuries and individuals suffering from the effects of smoke inhalation. Schools, if not affected by a fire, could potentially be used as temporary shelter for individuals that cannot return to their homes. All critical facilities located in the path of a wildland fire can be affected structurally and functionally if evacuation is deemed necessary.

Public Health

Wildland fires can lead to various injuries and even fatalities. Most individuals affected by wildland fires suffer from injuries related to burns and smoke inhalation.

Safety

Wildland fires present a major threat to public safety. Residential areas and other locations that may be at risk of experiencing wildland fires are typically evacuated to ensure the safety of the public. It is important that individuals continue to be educated on how they can reduce the risk of fire in order to safeguard the community.

Infrastructure

Traffic lights and other street signage made from plastic or glass materials could face destruction from wildland fires. Telephone poles, carrying electrical wires, and power generating structures, such as transformers, could also be damaged causing electrical outages and further fire risk. Fires also have a significant impact on the environmental health of areas where they occur. Exposed soils erode quickly and boost siltation of rivers and streams resulting in increased flood potential, potential loss or damage of aquatic life, and degradation of water quality. Lands stripped of vegetation are also subject to increased landslide hazards. Buildings Homes and other structures located in the WUI are at high risk to damage from wildland fires. This risk increases when buildings are surrounded by fuel sources such as tall grass, unraked leaves, flammable vegetation, and dead branches. Structures constructed from materials that may melt or ignite when exposed to a fire present a high risk. In general, the potential for property damage from wildland fires increases as more development occurs on wooded lands and usage of recreational properties increases. Residential housing is typically the most dominant type of structure found within the WUI. Though many parts of a home can be affected by wildfire damage, the roof is the most exposed portion of the building and is more at risk from flying embers. Attics may also be affected by airborne embers that enter through open eaves and vents. Structures attached to homes, such as decks, garages, and fences, can carry a fire into a home.

Economic

Fires can have an extensive impact on the economy of an affected area by causing thousands of dollars in damages to citizens through loss of private property and damaged forest products. Major direct costs associated with forest fires or wildfires are incurred by the salvage and removal of downed timber and debris and restoration of the burned area. Wildland fires can also have a significant impact on local agriculture. Fires will strip the land of vegetation as well as harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life.

Areas at Greatest Risk

The Reservation contains approximately 220,000 acres of natural areas, including forests, wetlands, and floodplains. Of these, many contain timbers that are very susceptible to burning. Therefore, lands covered in grass fuels pose the highest risk for the planning area. Furthermore, grasslands that abut heavy residential development present an even greater danger, especially when residents practice unapproved outdoor burning of leaves, garbage and other items of which they wish to dispose of by incineration. The potential exists that any wildland fire on the Reservation could be catastrophic, as most susceptible areas have enough acreage to allow for continuous burning.

Estimation of Potential Losses

Although a “worst case scenario” would involve the total destruction of all 220,000 acres of natural areas or most of the Reservation.

Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding and Erosion

Major wildfires can destroy ground cover, which can cause heavy erosion and loss of all vegetation. If heavy rains follow a major fire, flash floods, landslides and mudflows can occur, since vegetation is essential in deterring flooding during heavy rainfalls or spring runoff.

Hazardous Materials

Major wildfires that reach storage or transportation facilities can cause explosion or rupture of storage structures with hazmat releases.

Plans and Programs

Fire Departments

The Reservation is served by local fire departments. Each department is responsible for wildfires within their department boundaries, along with Menominee Tribal Enterprises and WDNR. However, they often work together on larger fires, including a wildfire if it were to occur.

Fire Department Wildland Training

Menominee Tribal Enterprise and Wisconsin DNR - Division of Forestry provide free wildland fire training to fire departments in cooperative fire protection areas of Wisconsin. The reservation is within a cooperative fire protection area.

Zoning

The Menominee Tribal Community Development Department, which includes building inspectors, regulates zoning and the development of new housing. The department is in charge of enforcing safety restrictions including setbacks, lot coverage, depth, and structure height. In addition, the Unified Building Code sets standards for roofing. The building inspector is responsible for inspecting residential and commercial structures, while the Town fire inspector inspects commercial structures for potential fire hazards. Chapter 625 of the Menominee Tribal Codes is the zoning ordinance.

Fire Mutual Aid Agreements.

There are formal mutual aid agreements between all fire departments in Menominee County. The county has become a Mutual Aid Box Alarm System (MABAS) organization (Division 133). As a MABAS agency, Menominee County fire departments will agree to standards of operation, incident command, minimal equipment staffing, safety, and on-scene terminology. MABAS agencies, regardless of their geopolitical origin, are able to work together seamlessly on any

emergency scene. All MABAS agencies operate on a common radio frequency, Interagency Fire Emergency Radio Network (IFERN) and are activated for response through protocols developed to meet local risk needs. MABAS also provides mutual aid station coverage to a stricken community when their Fire/EMS resources are committed to an incident for an extended period.

DROUGHT

A drought is an extended period of little measurable precipitation that results in serious hydrologic imbalance in groundwater and surface water. Droughts are associated with crop failure and wildfires. The Menominee Reservation has not experienced prolonged periods (lasting more than 2 months) without rainfall in the last 25 years. To date, no other activities, areas, or infrastructure, including public water supply, have been affected by drought on the Reservation.

CHAPTER 4: MITIGATION STRATEGIES

INTRODUCTION

As defined by the Disaster Mitigation Act of 2000, mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." Mitigation planning is the systematic process of learning about the hazards that can affect the county, setting clear goals, identifying appropriate actions and following through with an effective mitigation strategy. Mitigation encourages long-term reduction of hazard vulnerability and can reduce the enormous cost of disasters to property owners and all levels of government. Mitigation can also protect critical community facilities, reduce exposure to liability, and minimize community disruption. This chapter outlines the general goals to be achieved through the implementation of this all hazard mitigation plan. The natural hazards discussed in this chapter are listed in the order of priority as determined by the All Hazard Plan Project Team. For each natural hazard, there is list of mitigation strategies (actions and projects), noted with implementation status, along with potential stakeholders and a timetable for implementation.

CURRENT MITIGATION EFFORTS

In the preparation of this all hazard mitigation plan for the Menominee Indian Tribe of Wisconsin, it is important to understand the many mitigation activities are already underway or in place. The Tribe, local communities, the County, and schools have been very proactive in attempting to mitigate the impacts of natural hazards by adopting and using their own individual emergency response plans. The following list highlights some of the mitigation activities currently being undertaken throughout the reservation by all entities.

- Floodplain mapping and zoning completed and enforced
- Stormwater management and detention activities instituted
- Monitoring, warning, and evacuation procedures maintained and communicated
- Building codes established and enforced
- Land use controls adopted and enforced
- Capital improvement plans prepared and referenced
- Incident response exercises scheduled and assessed
- Intergovernmental cooperation partnerships established and maintained

- Education pieces prepared and distributed
- Disaster plans prepared, distributed, and followed

OVERARCHING MITIGATION GOALS

The following mitigation goals are intended to be used by public officials and emergency response personnel as general guidelines to address the needs identified during the natural hazard risk assessment process contained in Chapter 3. These goals are broad-based in order to apply to all of the natural hazards addressed in the plan.

Goal #1

Implement policies and programs designed to reduce or eliminate the impacts of natural hazards on people and property.

Goal #2

Collect and utilize data needed to improve policymaking and the identification of appropriate mitigation projects.

Goal #3

Build and support local capacity and commitment to continuously lessen the impacts of natural hazards on people and property.

Goal #4

Continue enforcement measures to reduce the impacts of natural hazards on people and property.

Goal #5

Promote the use of natural resource protection measures as a means to reduce the impacts of natural hazards on people and property.

Goal #6

Maximize available resources to reduce the impact of natural hazards on people and property.

Goal #7

Enhance training, education and outreach efforts that describe potential effects of natural hazards and ways to reduce their impact.

Goal #8

Promote intergovernmental coordination and cooperation in the planning for and implementation of hazard mitigation activities.

Goal #9

Establish a fully operational interoperability communication system to connect emergency services, utility companies, hospitals, and state and federal departments (DNR, Emergency Management, MTE, DOT, and FEMA) during natural disaster events.

MITIGATION MEASURES

To establish a framework for the development of mitigation strategies to address the goals listed above, a clear understanding of what techniques should be considered during the planning process was necessary. The following six broad mitigation categories served as that basis in the formulation of mitigation strategies for each of the natural hazards addressed in this plan.

Prevention

Prevention activities are intended to keep hazard-related problems from getting worse. They are particularly effective in limiting the Reservation's and each community's future vulnerability, especially in areas where development has not occurred or capital improvements has not been substantial. Examples of prevention activities include:

- Planning and Zoning;
    - Suggest municipalities adopt Menominee Nation All-Hazard Mitigation Plan into local municipality plans or ordinances when no local plan exists.

  - Ensure that there are adequate groundwater wellhead protection plans in place that are utilized.
- Hazard mapping;
  - Develop a mapping system with data that maps hazardous materials (open air and/or closed storage). These materials could have adverse impacts to the community and natural environment during a natural disaster or emergency.
  - Develop a database and map to identify and track all hazardous material located within the region.
- Building codes;
  - Tribal Emergency Management will work with Community Development to review and update Chapter 625 of the Menominee Tribal Codes.
- Open space preservation;
  - Preserve and maintain open spaces within the floodplain.
- Floodplain regulations;
  - Review and update of Menominee Tribal flood plain regulations with Community Development.
- Storm water management;
  - Some area of the reservation flood after heavy rain events causing damage to infrastructure and property. Develop a mapping system and database that identifies areas where flooding occurs on a more frequent basis. This process would help place drainage ways into a future Capital Improvement Plan (CIP).
- Drainage system maintenance;
  - Address aging storm water infrastructure that needs maintenance to protect the natural waterways. Develop a plan to identify priority maintenance and replace areas.
- Capital improvements programming;
  - Acquire additional equipment to properly control forest fires and grass fires.

Property Protection

Property protection measures are intended to enable structures to better withstand hazard events, remove structures from hazardous locations, or provide insurance to cover potential losses. Examples include:

- Acquisition, Relocation, Building Elevation, Hardening, Retrofitting, Insurance, and Safe Room Construction
    - Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.
    - Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

Natural Resource Protection

Natural resource protection activities reduce the impact of hazards by preserving or restoring the function of environmental systems. In some cases, natural systems may include high hazard areas such as floodplains, steep sloped areas or barrier islands. Thus, natural resource protection measures can serve the dual purpose of protecting lives and property while enhancing environmental goals such as improved water quality or recreational opportunities.

Parks, recreation or conservation agencies and organizations often implement natural resource protection measures. Examples include:

- Floodplain protection;
- Riparian buffers;
- Fire resistant landscaping;

Encourage the use of landscaping that is fire proof and fire resistant for residential and commercial properties that develop in area to prevent fast spread of future fires.

- Best management practices;

Create an educational campaign to inform the public on best management practices on their private property.

- Fuel breaks;
- Erosion and sediment control;

Create a reservation-wide system where there is equal environmentally sensitive area protection for all natural resources. Identify potential funding sources to enforce regional erosion and sediment control measures.

- Wetland and habitat preservation and restoration;

Coordinate with Environmental Services for wetland and habitat preservation and restoration projects.

Develop protections for woodlands that may be vulnerable to fire.

- Slope stabilization.

Development of structures near steep slope may lead to erosion and structural collapse. Strongly enforce required environmentally sensitive area setbacks and encourage use of vegetation that stabilizes soil and slopes.

Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by physically modifying the environment. They are usually designed by engineers and managed or maintained by Public Works/Community Development staff. Examples include:

- Reservoirs;
- Levees / dikes / floodwalls;
- Diversions / Detention / Retention;
- Channel modification;
- Storm sewer construction;

Some areas flood periodically due to undersized storm water pipes under the street. Propose the improvement of properly sized storm water pipes and crossings to allow sufficient water flow to prevent flooding during heavy rain and snow melt events.

Emergency Services

Although not typically considered a "mitigation technique," emergency services can significantly reduce injuries and loss of life associated with hazards. These actions are typically taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems;
    - Improve safety during a severe weather event by continuing to install tornado siren systems throughout the reservation.
- Search and rescue, evacuation planning and management, flood "fighting" techniques
- Continue the planning and training in cooperation with Law Enforcement and Emergency Services.

Public Information and Awareness

Public Information and Awareness activities are used to advise residents, business owners, potential property buyers, visitors and tribal officials about hazards, hazardous areas and mitigation techniques they can use to protect themselves and their property. Measures used to educate and inform the public include:

- Outreach and education;
- Speaker series, demonstration events;
- Informing the public of emergency situations using social media and text messages;
- Training.

MITIGATION STRATEGIES (ACTIONS AND PROJECTS)

Top hazard concerns were identified for the entire reservation from a broader range of possible incidents, including natural hazards. Nearly every participating community identified severe weather incidents as their top hazard concern. Vulnerability also was assessed on a reservation-wide basis using the following parameters to determine an overall priority rating that

was based on past events to include costs, frequency of occurrence, warning time, geographic extent, likely adverse impact, and future occurrences. The designation of high, medium, or low priority was determined based on whether or not that activity was already being done, the need to expand an activity, cost to implement, the time period to implement, whether or not the strategy is connected to another natural hazard, and the level of impact if implemented. The natural hazards addressed in this plan are listed below in order of priority as further determined by the All Hazards Mitigation Plan Project Team. From highest to lowest priority, they are thunderstorms/lightning, winter storms (including heavy snow, ice, and blizzards), tornado/high winds, storm water flooding, flooding (flash, riverine, lake), extreme temperatures, fog, hail storms, dam failure flooding, forest/wildland fires, coastal hazards, and drought.

Storms

Thunderstorms and Lightning Severe wind can be as destructive as tornadoes. Damage and life safety risk may not be entirely preventable, but it can be minimized.

High Priority

1. Continue to utilize public awareness methods such as the Menominee Nation news, and local radio and television stations.
2. Continue to prepare and distribute educational materials and offer presentations to the public on severe weather safety procedures.
3. Promote the use of NOAA Weather Radios.
4. Continue to make severe weather radios available through local communities and the Menominee Tribal Emergency Management Office.
5. Informing the public of emergency situations using social media and text messages.

Medium Priority

6. Investigate the feasibility of providing safe shelters at local community parks and recreation areas.

Low Priority

7. Installation of lightning protection devices and methods such as lightning rods and grounding on each community's communications infrastructure and other critical facilities.
8. Encourage the use of fire and wind resistant materials when constructing buildings.

Winter Storms and Heavy Snow

Blizzards, Ice Winter storms on the Reservation can contain many individual characteristics. Heavy snow with an accumulation of six or more inches in a 12-hour period, or eight or more inches in a 24-hour period are not uncommon in late winter or early spring. The occurrence of heavy snowfall is often accompanied with significant blowing snow, low wind chills, and sleet or freezing rain. Proper preparation can decrease the risks of injury that can occur during cold weather and snowstorms in particular.

High Priority

1. Establish and maintain communication lines between county and town public works and emergency services.
2. Provide for coordination of public safety, support agencies (such as the American Red Cross) and resource acquisition during emergencies through the implementation of the Menominee Tribal Emergency Response Plan.
3. Continue to prepare and distribute winter safety information to the media and public through the Menominee Tribal Emergency Management Office.
4. Continue to disseminate emergency information via the Emergency Alert System and social media.

Medium Priority

5. Produce and distribute family and traveler emergency preparedness information relating to severe winter weather hazards.

Low Priority

6. Inclusion of driver safety strategies for severe weather events in driver education classes and materials.
7. Encourage utility companies to bury service lines when upgrades are made to existing services.
8. Develop and/or enforce restrictions on planting large or rapidly growing trees near overhead power lines.
9. Utilization of snow fences or “living snow fences” (rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.

Storms: Tornadoes and High Winds

Tornadoes and storm events with dangerous high winds can strike anywhere and cause extensive damage. Damage and life safety risk may not be entirely preventable, but it can be minimized.

High Priority

1. Maintain and enhance an effective early warning system as the single most important source to alert the public to a tornado hazard.
2. Distribute media information packets to re-emphasize and alert the public to tornado warning procedures.
3. Research grant opportunities to provide funding for Safe Room construction projects at or near areas of Mobile Home parks.
4. Promote tornado safety public information as well as other summer severe weather public awareness/educational efforts through continued partnerships with the National Weather Service and Severe Weather Spotters.
5. Investigate the feasibility of increasing the number of sirens located throughout the reservation.
6. Informing the public of emergency situations using social media and text messages.

Medium Priority

7. Assist personnel in schools and businesses, public facility managers, and individuals in determining “best available” tornado safety areas.
8. Develop and maintain a comprehensive safety plan for each tribally owned building.
9. Encourage all new residential structures without basements to have a safe shelter incorporated into the design of the home or provide for common shelters.
10. Continue efforts to improve mobile home safety in windstorms and tornadoes through public education efforts and assistance in locating safe shelter sites, the requirement of tie-downs in mobile home parks, and the installation of outdoor warning sirens.
11. Promote the use of weather radios in all schools and in all homes by making them available for sale at locations throughout the reservation.
12. Maintain intergovernmental cooperation agreements with neighboring communities and private vendors to acquire any necessary additional equipment needed for storm clean-up.
13. Establish agreements with surrounding municipalities and private entities on the collection and disposal of large volumes of solid waste such as building materials.

Low Priority

14. Encourage utility companies to bury service lines when upgrades are made to existing services.
15. Develop and/or enforce restrictions on planting large or rapidly growing trees near overhead power lines.

Flooding

Riverine and Storm Water/Flash Flooding (both riverine and storm water/flash) is the only natural hazard with definable hazard areas within the Reservation.

High Priority

1. Dissemination of storm preparation measures and evacuation instructions to the public through conventional and social media.
2. Continue to monitor the National Weather Service flood forecasts.

3. Construction of an Earth Berm at the Keshena Creek Outlet along the Wolf River to provide for quick response during Frazil Ice events.

Medium Priority

4. Maintain a process for the preparation of the opening and operation of receiving/sheltering facilities.
5. Prepare and maintain an evacuation plan for people and property.
6. Maintain protective measures such as sandbagging, protection of buildings and other structures, and emergency electricity cut-off procedures.
7. Prepare, adopt, and maintain proper land use planning methods through the local floodplain zoning, comprehensive plans, and stated implementation tools such as land use regulations (codes and ordinances), and storm water management plans.
8. Enforce environmentally sensitive area regulations that preserve natural resources adjacent to and in defined floodplains.
9. Inventory and assess areas throughout the reservation that have repeated flash flooding problems and identify activities to remediate or rectify those locations.
10. Develop a storm water management plan that includes such remediation techniques as surface detention basins and in-street detention units.
11. Incorporate changes to the floodplain maps to better determine areas and facilities susceptible to recurring flooding.

Low Priority

12. Implement a rural drainage improvement program that would include ditch, bridge, and culvert maintenance and improvements.
13. Promote the sale of flood insurance to residents with flood prone properties throughout the reservation.
14. Implement flood proofing techniques such as elevation, relocation, barrier construction, and wet flood proofing for residents, businesses, and critical facilities.

Extreme Temperatures

When temperatures reach the extremes, caution should be taken to limit exposure for long periods of time. Those most vulnerable are those individuals working outside, special needs and elderly populations, and animals.

High Priority

1. Encourage the reservation's social service entities and energy provides to continue to expand programs to assist at risk populations with payment of their utility bills and acquire appliances to mitigate at risk populations to extreme weather conditions.

Medium Priority

2. Identify and map locations where a large percentage of the population most susceptible to extreme temperature conditions reside in the reservation.
3. Establish centers with proper amenities, heat, AC and backup power, near those at risk population centers.

Fog

Fog is a weather condition that can develop in moments and last for extended periods of time. Spring and fall seasons usually create the largest number of fog events due to the wide temperature differences in land and air temperatures.

High Priority

1. Encourage area news media to broadcast emergency information concerning fog that addresses safety precautions during a fog event, including the need to avoid certain corridors with heavy fog or to slow down while traveling during a fog event.

Medium Priority

2. Install fog warning devices where feasible at intersections in low-lying areas most susceptible to fog occurrences.

3. Work with Tribal Community Development, WisDOT and Menominee County Highway Department to install and maintain pavement reflectors and reflective stripping along heavily traveled roads most susceptible to fog.

Low Priority

4. Include driver safety strategies for severe weather events in driver education classes and materials.

Storms: Hail

Hail often accompanies thunderstorms where clashing weather fronts of defining temperatures create high winds and heavy rain. The size of the hail is determined by the strength of the storm that is fueled by weather fronts carried along by the jet stream.

Medium Priority

1. Distribution of information through the College of Menominee Nation and the UW-Extension office on hail insurance options such as the Federal Crop Insurance Corporation (FCIC).
2. Documentation of hail damage will be the responsibility of the Menominee Emergency Management.

Low Priority

3. Continued delivery of federal emergency assistance in the form of low interest loans when a Presidential Disaster is declared or when FEMA declares the reservation eligible for aid.

Dam Failures

There are three dams located throughout the Reservation.

High Priority

1. Ensure each dam is maintained and functioning properly as stated in the Emergency Action Plan for each structure.

Medium Priority

2. Ensure the residents located within the flood zone have information on emergency procedures if the dam is compromised.

Low Priority

3. Continue to monitor water levels and communicate those conditions as necessary.

Fires: Forest and Wildland

A wildland fire is any instance of uncontrolled burning in brush, marshes, grasslands or field lands. Generally, fires are more likely to occur when vegetation is dry from a winter with little snow or a spring and summer with sparse rainfall.

High Priority

1. Coordinate with the Menominee Tribal Enterprises and Wisconsin Department of Natural Resources to disseminate information to the public on preventing fires.
2. Coordinate with the Menominee Tribal Enterprises and Wisconsin Department of Natural Resources on notifying media outlets on burning restrictions being issued.

Medium Priority

3. Enforce burning permit ordinances.
4. Ensure there are mutual aid fire protection agreements in place and they include provisions for wildfires.
5. Prevent or alleviate wildfires through proper maintenance and separation of power lines as well as efficient response to fallen power lines.
6. Work with Community Development to upgrade and maintain tribal roads and driveways to allow for access by emergency vehicles and fire equipment.

Low Priority

7. Identify and map areas on the reservation most susceptible to wildland fires.
8. Continue participation in the Wisconsin Fire Control Program.

9. Continue participation in the Rural Community Fire Protection Program.

Drought

A drought is an extended period of little measurable precipitation that results in serious hydrologic imbalance in groundwater and surface water. Droughts are associated with crop failure and wildfires.

High Priority

1. Implement and enforce water usage regulations/ordinances for both urban and rural water users.

Medium Priority

2. Utilize such entities as Tribal Environmental Services, UW extension, county land conservation, etc. to obtain information on irrigation methods and ground water movement.
3. Establish a process to obtain emergency food and water supplies for agriculture use.
4. Ensure there are adequate wellhead protection plans are in place and utilized.

Low Priority

5. Review existing groundwater monitoring and modeling programs to determine the need for any additional groundwater monitoring.

CHAPTER 5: PLAN ADOPTION AND MAINTENANCE

Development of the Menominee Nation All Hazards Mitigation Plan was based on the planning requirements and guidance provided by the Federal Emergency Management Agency (FEMA) and the Wisconsin Department of Military Affairs, Wisconsin Emergency Management (WEM). Following these requirements and guidance, the plan meets the requirements of the Disaster Mitigation Act of 2000.

Prepared by RW Management Group, Inc. and the Menominee Nation All Hazard Mitigation Plan Project Team

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The Menominee Nation Emergency Management Coordinator will provide the final internal review of this document, including any future changes. The Emergency Management Coordinator will the send the document to Wisconsin Emergency Management for review. When the State has completed their review the Plan will then be submitted to the Legislature for their approval and finally to the Federal Emergency Management Agency for approval.

This plan will be maintained by the Menominee Nation Emergency Management Coordinator and will be reviewed and revised at least every five years.