

# Leech Lake Reservation 2025 Hazard Mitigation Plan



# Leech Lake Reservation Minnesota

## 2025 Hazard Mitigation Plan

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# Section 1 – Introduction

## 1.1 Hazard Mitigation Planning in Minnesota

Hazard mitigation planning refers to any sustained action to reduce or eliminate long-term risk to human life and property from natural disasters. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals, and a primary mechanism in achieving this goal is both the hazard mitigation planning process and the subsequent implementation of resulting projects, measures, and policies (FEMA, 2023b).

Since 1980, damages from natural disasters in the U.S. have exceeded \$2.72 trillion. 2023 saw a record 28 separate billion-dollar weather and climate disaster events in the United States, breaking the previous record of 22 events set in 2020. Minnesota alone has experienced 59 separate billion-dollar disasters since 1980 (NCEI, 2024). Hazard mitigation planning is an effective process to prepare communities and lessen the impact of loss of life and property from future disasters. Although mitigation efforts will not eliminate all disasters, government at all levels should strive to be as prepared as possible for a disaster for the well-being of its residents.

The Hazard Mitigation Plan (HMP) is a requirement of the Federal Disaster Mitigation Act of 2000. The development of a local government plan is required to maintain eligibility for federal hazard mitigation grant funding programs. To be eligible for future mitigation funds, communities must adopt an HMP.

Researchers at the National Institute of Building Sciences looked at the results of 23 years of federally funded mitigation grants provided by FEMA, the U.S. Economic Development Administration (EDA), and the U.S. Department of Housing and Urban Development (HUD). Their findings revealed that for every \$1 spent on hazard mitigation funding in the nation, \$6 is saved in future disaster costs (Multi-Hazard Mitigation Council, 2019).

Leech Lake Reservation is vulnerable to a variety of natural hazards that threaten the loss of life and property. Hazards such as tornadoes, flooding, wildfires, blizzards, straight-line winds, and droughts can potentially inflict vast economic loss and personal hardship.

This planning document is accompanied by a website that allows for easy stakeholder and community engagement, as well as interactive maps, dashboards, and infographics.

A broad overview of this companion website's features is as follows:

- Homepage (featuring Declared Disasters dashboard, feedback forms, links to Leech Lake Reservation Emergency Management website, etc.)
- Reservation Profile
- Risk Assessment & Natural Hazard Profiles
- Goals & Implementation
- Climate Change

[\*Leech Lake Reservation HMP Website\*](#)

The Leech Lake Reservation HMP provides assurances that the Leech Lake Band of Ojibwe (LLBO) will comply with all applicable federal statutes and regulations during the periods for which it may receive

federal grant funding to implement eligible mitigation actions, in compliance with 44 CFR 13.11(c), and will amend this Annex whenever necessary to reflect changes in tribal or federal laws and statutes as required in 44 CFR 13.11(d).

### **1.1.1 Scope**

U-Spatial, University of Minnesota, was contracted by Minnesota Homeland Security and Emergency Management using FEMA Pre-Disaster Mitigation (PDM) grant funds to work with Leech Lake Reservation Emergency Management to facilitate an update to the 2015 Leech Lake Reservation HMP. U-Spatial brings extensive geographic data analysis skills and hazard risk assessment expertise to the process. U-Spatial also employed the services of Hundrieser Consulting LLC for tribal and stakeholder outreach as well as mitigation action development related to this plan.

This HMP evaluates and prioritizes the major natural hazards affecting Leech Lake Reservation as determined by frequency of event, economic impact, deaths, and injuries. Mitigation recommendations are based on input from state and local agencies, the public, and national best practices.

This is a single-jurisdiction plan that covers Leech Lake Reservation, including the communities of Bena, Boy Lake/Kego Lake, Sugar Point, Ball Club, Inger, S. Lake, Winnie Dam, Cass Lake, Cass River/Pennington, Mission, Oak Point, Onigum, Sugar Bush/Buck Lake. The Leech Lake Reservation mitigation activities identified in this plan also incorporate the concerns and needs of Leech Lake Tribal College, the Bugonaygeshig School, and other participating entities.

Representatives of the Leech Lake Reservation and additional stakeholders actively participated in the planning process by assisting with public outreach, attending planning team meetings, providing local information, identifying mitigation actions, and reviewing the plan document (see Appendix C). The information in these forms was used to help identify mitigation actions for implementation (see also Section 2.2). The Leech Lake Reservation has adopted the plan by resolution (prior to its submittal to FEMA (see Appendix B).

Leech Lake Reservation has specified the following goals for this plan update:

- Include more recent data documenting the critical infrastructure and hazards faced by Leech Lake Reservation.
- Reformat and reorganize the plan to reflect definitions of hazards as expressed in the 2024 Minnesota State Hazard Mitigation Plan.
- Reflect current hazard mitigation priorities in Leech Lake Reservation.
- Encourage recipients and sub-recipients of hazard mitigation grants to consider climate change adaptation, resiliency, and equity in their planning efforts.

### **1.1.2 Hazard Mitigation Definition**

Hazard mitigation may be defined as any action taken to eliminate or reduce the long-term risk to human life and property from natural hazards. The benefits of hazard mitigation planning include the following:

- saving lives, protecting the health of the public, and reducing injuries
- preventing or reducing property damage
- reducing economic losses
- minimizing social dislocation and stress
- reducing agricultural losses
- maintaining critical facilities in functioning order
- protecting infrastructure from damage
- protecting mental health
- reducing legal liability of government and public officials

## 1.2 State Administration of Mitigation Grants

FEMA currently has two mitigation grant programs that the State of Minnesota administers: the Hazard Mitigation Grant Program (HMGP) and the Flood Mitigation Assistance (FMA) program. The HMGP and FMA programs are administered through the Minnesota Department of Public Safety Homeland Security Emergency Management (HSEM) Division. All applicants must have or be covered under an approved hazard mitigation plan. Eligible applicants include state and local governments, certain private non-profit organizations or institutions, and tribal communities.

# Section 2 – Public Planning Process

## 2.1 Planning Team Information

The Leech Lake Reservation HMP planning team is headed by the Leech Lake Band of Ojibwe (LLBO) emergency management director, who serves as the primary point of contact. Planning team members include representatives from public and governmental sectors. Table 1 identifies the planning team individuals and organizations that participated in virtual planning team meetings during the plan update process.

Note: Table 1 is not an exhaustive list of stakeholder participation in the Leech Lake Reservation HMP update. Additional participation by community and other agency representatives is documented in Table 3 of this section, as well as in Section 3.4, Appendix C, and Appendix G. The meeting summaries in Appendix F provide a comprehensive overview of each session. This includes a complete list of invited planning team stakeholders and information on other significant opportunities for engagement during the plan update.

*Find the planning team members on the Leech Lake Reservation HMP website*

*Table 1. Hazard Mitigation Planning (HMP) Team*

Name	Agency/Organization	Participant Title
Duane Oothoudt	LLBO Emergency Management	Emergency Management Director
Keith Karnes	LLBO Forestry	Forestry Director
Rocky Papasodora	LLBO Health & Safety Department	Health & Safety Officer
Leona Howard	LLBO Health and Safety	EMS Manager
Kaitlin Connolly	LLBO Health and Safety	Admin Assistant
Gregg Anderson	LLBO Health Division	Environmental Health Specialist
Joel Bebeau	LLBO Health Division	Clinical Engineer
Michael O'Brien	LLBO Dept. of Natural Resource Management	Fisheries Biologist
Laurie Harber	LLBO Education Dept.	Director of Education
Dan McKeon	Bug O Nay Ge Shig School	Superintendent
Paul LeClaire	Bug O Nay Ge Shig School	Safety Officer
John Robinson	Leech Lake Tribal College	Campus Security
Jason Truax	Cass Lake Indian Health Service (HIS)	Safety & Emergency Preparedness
Derek Howe	Lake Country Power	Chief Operating Officer
Ryan Ferguson	Lake Country Power	Sr. Engineer
Lee Pemberton	Beltrami Electric Cooperative	Operations Manager
Kelvin McCuskey	HSEM	Region 2 Regional Program Coordinator
Owen Fifield	American Red Cross Serving Northern and Central Minnesota	Community Disaster Program Manager

Name	Agency/Organization	Participant Title
Michael Palmer	MN Dept. of Natural Resources	Regional Firewise Specialist
Eric Alger	Cass County Sheriff’s Office	Chief Deputy
Christopher Muller	Beltrami County Sheriff’s Office	Emergency Management Director
John Linder	Itasca County Sheriff’s Office	Emergency Manager
Hope Fairchild	City of Walker, Minnesota	City Administrator/Clerk-Treasurer

## 2.2 Review of Existing Plans, Capabilities & Vulnerabilities

Leech Lake Reservation and its local communities utilized a variety of planning documents to direct plan development. These documents included a Comprehensive/Master Plan, Emergency Operations Plan, Transportation Plan, etc. (see Section 5.1.4 and Appendix D). The planning process also incorporated the existing natural hazard mitigation elements from previous planning efforts. In addition, the 2024 Minnesota All-Hazard Mitigation Plan was consulted.

In the development of the Leech Lake Reservation HMP, U-Spatial consultants reviewed and incorporated a variety of planning documents that direct community development and influence land use decisions within the reservation. In addition, U-Spatial consultants worked closely with the Leech Lake Reservation emergency management director, key tribal departmental staff, and other related stakeholders to collect feedback on local mitigation capabilities and vulnerabilities that either support or hinder the ability to mitigate against natural hazards at the local level.

Building codes offer a way to incorporate geographically relevant and best-available building science with policies and programs. Leech Lake Construction Management uses the Minnesota Building Code, but the tribe has not formally adopted the Minnesota State Building Code. School buildings are owned and regulated by the Bureau of Indian Education, which uses its own codes. Additionally, non-tribal communities located within the Leech Lake reservation also use state or local building standards and guidelines to identify structures that will require additional inspections. The City of Cass Lake (and Cass County) has adopted the Minnesota Building Code.

The following is a summary of the assessment tools used to gather information on local capabilities and vulnerabilities during the planning process:

**Capabilities Assessment (hazard-specific):** In this assessment, detailed information was collected from Leech Lake Reservation on current plans and programs in place (i.e., existing programs, plans, or policies) as well as program gaps or deficiencies that currently exist to mitigate against damages caused by each natural hazard addressed in the plan. Section 4 identifies current gaps and deficiencies for mitigation, and Section 5.3 describes the mitigation capabilities that are in place by Leech Lake Reservation to support mitigation.

**Local Mitigation Surveys:** As part of Leech Lake Reservation’s 2025 HMP update, Leech Lake Reservation Emergency Management, key tribal departments, and additional agency stakeholders were asked to fill out a Local Mitigation Survey (LMS) form. Questions in the LMS form addressed the following:

- Hazard Identification, Risk Assessment & Vulnerability Analysis
- Local Mitigation Capabilities Assessment
- Local Mitigation Projects
- Survey Participants

The purpose of the survey was to gather community-specific information needed to support the update of the plan and to help inform development of tribal mitigation actions for the next five-year planning cycle (for the full Leech Lake Reservation LMS report, see Appendix C).

## 2.3 Planning Process Timeline and Steps

To update the 2015 Leech Lake Reservation HMP, U-Spatial consultants coordinated with Leech Lake Reservation Emergency Management and members of the planning team. The updated plan includes new data documenting the types of hazards faced by Leech Lake Reservation residents and emergency planning officials as well as new thinking on how to address these hazards.

Updating the plan also included providing opportunities to the public to participate in the planning process. The Leech Lake Tribal Council, the authorized governing body of the Leech Lake Reservation, defines “public” as Leech Lake Reservation elected officials, tribal departmental and other staff, and tribal residents that are living or working on or outside of Leech Lake Reservation boundaries, as well as non-tribal neighboring jurisdictions or key agencies with a partnership role to the tribe in emergency preparedness and response.

### 2.3.1 Leech Lake Reservation Stakeholder Coordination

Two planning team meetings took place via Zoom video conference hosted by U-Spatial. Meeting participants included representatives from Leech Lake Reservation tribal government and departments, neighboring jurisdictions, and other related agencies and organizations. Appendix F provides documentation of stakeholder outreach and participation in the plan update.

*[Survey forms to acquire mitigation ideas and feedback remain available on the HMP website](#)*

To provide the opportunity for public input, Leech Lake Reservation issued two news releases announcing the plan update and inviting public review and feedback on the draft plan. The news release provided information on where to view the plan and submit comments. The Leech Lake Reservation HMP website, hosted by U-Spatial, and the feedback and mitigation action ideas survey will remain available through the five-year planning period to foster public engagement. Table 2 documents dates of Hazard Mitigation update meetings and public outreach. The public feedback period for the draft plan was open from 10/22/25 to 11/3/25, for a period of 13 days. Appendix G provides documentation of the public outreach for feedback on the draft plan by Leech Lake Reservation and jurisdictions.

*Table 2. Leech Lake Reservation hazard mitigation update meetings and public outreach*

Event	Date	Appendix
Kickoff Webinar	6/13/24	Appendix F, Planning Team Meetings
News Release #1	9/11/24	Appendix G, Public Outreach & Engagement Documentation
Planning Team Meeting #1	2/28/25	Appendix F, Planning Team Meetings
Planning Team Meeting #2	9/18/25	Appendix F, Planning Team Meetings
News Release #2	10/22/25	Appendix G, Public Outreach & Engagement Documentation

At the close of the public outreach period, the U-Spatial consultants worked with the Leech Lake Reservation Emergency Manager and planning team to incorporate public feedback into the HMP.

For more information on the planning process, see Sections 5 and 6.

### 2.3.2 Overview of Community Participation

Throughout the planning process, Leech Lake Reservation and the U-Spatial team worked to engage representatives from communities in the update of the plan. Key activities included assisting with public outreach, participating in planning team meetings, providing local-level information, and reviewing and providing feedback to the plan update.

U-Spatial and Leech Lake Reservation actively used the following methods to engage community members in the HMP plan update process:

- **Zoom Video Conferencing:** Planning team meetings were conducted via Zoom video conferencing hosted by U-Spatial. Virtual meetings proved to be a beneficial addition to the planning process, resulting in a high turnout from tribal representatives and other stakeholders, as well as providing the ability for presenters to collect, respond to, and document feedback from participants through Zoom functions such as surveys, chat, and Q&A.
- **Email Correspondence:** Email was a primary tool used to communicate with representatives from Leech Lake Reservation and other stakeholders. Emails were used to distribute news releases for public outreach, to invite participation in meetings and to share meeting summaries, as well as to request local information and final review of the draft plan. Email proved to be an effective tool that resulted in increased local participation and collection of locally specific information.
- **Surveys, forms, and polls:** Input tools such as surveys, forms, and tools were used throughout the process to efficiently collect information in a format that could directly be fed into the written hazard mitigation plan. Polls were used to elicit feedback during the planning team meetings. The Local Mitigation Survey (LMS) was used to ensure local feedback for critical input, such as building code use, NFIP adoption, and changes in vulnerabilities. Feedback forms were posted on the website for easy access during the plan review.
- **Phone Calls:** Phone calls were frequently used to conduct direct outreach or follow-up to Leech Lake Emergency Management and other tribal departments to ensure participation or to

collect information via one-on-one interviews. Phone calls proved to be an effective tool that resulted in increased participation and collection of quality information.

Table 3 provides an overview of participation in the Leech Lake Reservation HMP update planning process and a reference to supporting documentation.

*Table 3. Local participation in the planning process*

Jurisdiction (2020 Population, U.S. Decennial Census)	News Release #1	Planning Team Mtg. #1	Local Mitigation Survey	Mitigation Action Charts	Planning Team Mtg.#2	News Release #2 & Plan Review
Supporting Documentation	App. G	App. F	App. C	Sec. 5.3 App. H	App. F	App. G
Leech Lake Reservation and Off-Reservation Trust Land (11,388)	X	X	X	X	X	
<b>Neighboring Jurisdictions:</b>						
Beltrami County					X	
Cass County					X	
Hubbard County						
Itasca County		X			X	
City of Bena (Cass)						
City of Cass Lake (Cass)						
City of S Lake (Itasca)						
City of Walker (Cass)		X				

# Section 3 – Risk Assessment and Vulnerability Analysis

The goal of mitigation is to reduce or eliminate the future impacts of a hazard, including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation practices must be based on sound risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people.

The risk assessments in this plan are based on widely accepted tools and databases, consultation with hazard mitigation planning expertise at FEMA and HSEM, and technical guidance from the MN DNR State Climatology Office. Geographic Information System (GIS) tools are used throughout to demonstrate geographically based risk and vulnerabilities.

## 3.1 Natural Hazard Identification

This assessment identifies the characteristics of natural hazard events, the severity of the risk, the likelihood of these events occurring, and the vulnerability of Leech Lake Reservation’s population and assets.

*See a list of all natural hazards covered in the 2024 HMP*

The cornerstone of risk assessment is identifying the hazards that affect local communities. Listed below are the natural hazards addressed in the 2024 Minnesota State Hazard Mitigation Plan:

Flooding	Lightning	Drought
Dam/Levee Failure	Winter Storms	Extreme Heat
Wildfires	Landslides (Erosion and	Extreme Cold
Windstorms	Mudslides)	Earthquakes
Tornadoes	Land Subsidence (Sinkholes	Coastal Erosion & Flooding
Hail	and Karst)	

### 3.1.1 Hazard Prioritization

As part of the plan update process, the planning team reviewed, updated, and prioritized the hazards faced by residents of Leech Lake Reservation, updated the existing mitigation actions published in the 2015 HMP, and proposed new mitigation actions.

The team examined the hazards identified in the 2015 HMP and adjusted them to reflect the definitions of natural hazards used in the 2024 Minnesota State Hazard Mitigation Plan. While this HMP focuses on natural hazards, planning took place with the understanding that many non-natural hazards could occur due to natural disasters (e.g., disruption in electrical service due to downed powerlines from heavy snow, ice storms, or high wind events).

The prioritization of hazards for the Leech Lake Reservation HMP Update (Table 4) was based upon group review and discussion of the natural hazards that pose risk to the reservation during the HMP Planning Team Meeting #1. In the review of each hazard, the group was asked to consider if the risk of severe natural hazards had increased or decreased since the last plan, and if this affected their priority level to mitigate against that hazard. Appendix F provides the discussion notes from the meeting.

*Table 4. Prioritization of hazards for 2025 Leech Lake Reservation HMP Update*

Natural Hazards Addressed in the Last Plan	Current Priority
Winter Storms	High
Windstorms	High
Tornadoes	High
Wildfire	High
Drought	High
Flooding	Moderate
Extreme Cold	Moderate
Extreme Heat	Moderate
Hail	Low
Lightning	Low
Landslides	Low
Dam/Levee Failure	Low

### 3.1.2 FEMA- and Minnesota-Declared Disasters and Assistance

Another historical perspective is derived from FEMA-declared disasters. Between 1957 and August 2025, Leech Lake Reservation has been included in seven federal disaster declarations: 1283, 4390, 4531 (COVID), 4658, 4659, 4666, and 4797.

The Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, and the former Building Resilient Infrastructure and Communities (BRIC) program are FEMA-administered hazard mitigation assistance programs that provide funding for eligible mitigation planning and projects that reduce disaster losses and protect life and property from future disaster damages (FEMA, 2021). Leech Lake Reservation received HMGP funding in 2011 under DR-4009 to develop its hazard mitigation plan.

## 3.2 Community Vulnerability

The degree to which a person is vulnerable to the impacts of a hazard depends on how well they can react before, during, and after a hazardous event. The Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances & Disease Registry (ATSDR) defines social vulnerability as “...the resilience of communities when confronted by external stresses on human health, stresses such as natural or human-caused disasters, or disease outbreaks” (ATSDR, 2020). Exacerbating these stressors are the increasing number of extreme weather events attributed to Minnesota’s changing climate (MPCA, 2018).

The ATSDR created the CDC Social Vulnerability Index (SVI) to help identify vulnerable communities that need support in preparing for hazards or recovering from disaster. The CDC SVI is created at the census tract level using American Community Survey (ACS) five-year data.

The SVI is included in the FEMA National Risk Index (NRI) and presented on the webpage for each hazard. Additionally, summaries of at-risk populations are available on the reservation profile page. Vulnerable attributes of a population are addressed with each natural hazard.

[Explore population vulnerability on the Leech Lake Reservation HMP Website](#)

### 3.2.1 Cultural Resources

The Leech Lake Band of Ojibwe affirmed its commitment to preserve, protect, and promote tribal cultural heritage by becoming a signatory to an agreement made with the U.S. Department of the Interior and the National Park Service. This trust includes the management of prehistoric, historic, cultural, and burial sites that make up the fundamental cultural history of the Leech Lake Band on tribal lands. The Leech Lake Tribal Historic Preservation Office was included in the first group approved by the Secretary of the Interior and the National Park Service in fiscal year 1997 (Minnesota Historical Society, 1997). Leech Lake has been a member of the National Association of Tribal Historic Preservation Officers (NATHPO) since 1998 (NATHPO, 2025). According to the Leech Lake Division of Resource Management,

The Tribal Historic Preservation Officer (THPO) is a federally appointed agent who oversees cultural resources within Reservation boundaries and advises federal, state, and county agencies in the management of cultural and historic properties throughout the region. The THPO works with the Tribal Archaeologist to ensure that all cultural properties are protected and preserved under current historic preservation legislation, including federal, state, and tribal regulations and ordinances. (Leech Lake DRM, 2018b)

On December 23, 2020, the Leech Lake Band of Ojibwe Reservation Restoration Act (Public Law 116-255) was passed. With the law's passage, approximately 11,760 acres of Ojibwe ancestral lands within Cass County, managed by the Chippewa National Forest, were returned to Tribal ownership (Peters, 2024). Present-day Leech Lake Reservation overlaps approximately 90% the U.S. Forest Service's Chippewa National Forest (Gifford et al., 2024).

### 3.2.2 Natural Resources

Wild rice (*Zizania palustris*), or manoomin, is a critical cultural and economic resource in the Leech Lake Reservation. According to a 2008 wild rice study by the Minnesota DNR,

Nowhere has natural wild rice been more important, nor had a richer history, than in Minnesota. No other native Minnesota plant approaches the level of cultural, ecological, and economic values embodied by this species. Natural wild rice has been hand harvested as a source of food in the Great Lakes region for thousands of years. [...] It is thought that more than 3000 tribal members participate in wild rice harvesting, providing a statewide total (tribal and nontribal) of 4000-5000 individuals annually (MN DNR, 2008).

The Minnesota counties of Aitkin, Cass, Crow Wing, Itasca, and St. Louis contain over half of the state's inventoried natural wild rice acreage. However, various threats to wild rice exist, including loss of genetic integrity, invasive species, water quality, and climate change (MN DNR, 2025c). The MN DNR recognizes the importance of protecting natural wild rice beds from genetic modification and sees this protection as critical to the future of wild rice.

Wild rice is also of high ecological importance, as both migrating and resident wildlife rely on its seeds (one acre of natural wild rice can produce over 500 pounds of seed). Wild rice not only feeds waterfowl, but herbivores such as beaver, white-tailed deer, and moose. Fish also benefit from wild rice, as it can protect shorelines and provide fish habitat. Wild rice lakes and streams provide critical habitat for 17 bird species, including the Common Loon, Trumpeter Swan, and Bald Eagle (MN DNR, 2008).

Wild rice is also an important economic asset in Leech Lake Reservation. The price for traditionally hand-parched wild rice from is 16.00/pound (Leech Lake Band of Ojibwe, 2025). In 2024, the U.S. Department of Commerce's Economic Development Administration awarded \$3.6 million grant to the Leech Lake Band of Ojibwe to support the Tribe's wild rice production industry. The grant constructed a 6,100-square-foot rice processing facility on tribal lands, allowing LLBO to process its own rice and promote the welfare of its tribal members (EDA Public Affairs Department, 2024).

Subsistence hunting, fishing, trapping, and gathering are the foundation of Ojibwe culture, and the 1854 Treaty allows hunting, fishing, and foraging within the ceded territory (Thompson, 2020). The Leech Lake Department of Conservation Enforcement is dedicated to the protection of the water, land, forest, fish, wildlife, plants, and other resources within Leech Lake Reservation (Leech Lake DRM, 2018a).

### 3.3 Climate Change

Minnesota's climate change summary is informed primarily by the Midwest Chapter of the Fifth National Climate Assessment (NCA5) dated November 2023 and with interpretations from the MN DNR State Climatology Office (Wilson et al., 2023).

Rising global temperatures and the resulting increases in atmospheric moisture from evaporation of ocean waters have allowed Minnesota to become warmer, wetter, and more humid during the past several decades. The ten combined warmest and wettest years between 1895 and 2022 all occurred since 1998. Nights have warmed faster than days since 1970, and winter has warmed several times faster than summer. Even with the drought conditions of the early 2020s in Minnesota, heavy precipitation continues to show long-term increases, with damaging rain and snowfall events reported somewhere in the state each year of the decade through 2023. Despite no increase in the highest temperatures of summer, maximum annual heat index values (one measure of how hot it feels) have been rising across the state because of increased humidity during heat waves.

Even though periods of intense growing-season drought have defined the climate of the early 2020s in much of Minnesota, long-term increases in annual precipitation have continued because of heavy and even record-setting precipitation during the cold season. For instance, record-dry conditions during May through mid-August of 2021 led to parts of northwestern and northern Minnesota reaching "Exceptional Drought"—the worst category on the US Drought Monitor. A shift to a stormy pattern

during the following winter and spring, however, produced unprecedented precipitation between December in May in the exact same areas, with historic flooding along the Rainy River.

The observed changes in our climate have altered growing seasons, damaged forests, challenged natural resource management, limited recreational opportunities, destroyed infrastructure, and affected the conditions of lakes, rivers, wetlands, and groundwater aquifers that provide water for drinking and agriculture. Climate models project that temperature and precipitation increases will continue in Minnesota through the 21<sup>st</sup> century, with hotter summers and increased drought severity during dry periods as well.

To help the public understand how the changing climate has affected and is expected to affect the behavior of common weather hazards in Minnesota, the MN DNR State Climatology Office developed graphical summaries of the scientific confidence associated with each hazard's relationship to climate change (Table 5 and Table 6). Climate change in Minnesota has by far the strongest associations with (1) sharp declines in the frequency and severity of extreme cold outbreaks, tied to a persistent warming of winters, and (2) sharp increases in the frequency and intensity of extreme precipitation events. For instance, from 1970 through 2023, Minnesota's winters warmed at a rate of almost one degree F per decade, and approximately three-four times faster than summer. During that same period, the coldest night of the year has warmed almost twice as fast as winter as a whole—up to two degrees F per decade (or 20 degrees F per century).

Despite major losses to cold extremes, the warming climate and increased abundance of atmospheric moisture has led to an uptick in many heavy snowfall metrics across Minnesota, leading to moderately high confidence that the changing climate is increasing heavy snowfall events—even as other winter characteristics decline. The intensity and frequency of tornadoes and severe convective storms are weakly connected at best to recent climate changes, and since the 1950s, despite superior detection and verification capabilities, the number of damaging tornadoes rated at least F-2 or EF-2 in Minnesota has shown no increases. Dramatic changes in the seasonal and geographical ranges of severe convective weather have, on the other hand, already affected Minnesota. In 2021, a damaging tornado crossed the Boundary Waters into Canada, becoming the latest on record so far north in the state. Then, on December 15<sup>th</sup>, an outbreak of destructive thunderstorm winds and over 20 tornadoes struck the southeastern parts of the state, producing the latest tornadoes on record by 29 days.

The climatic picture is expected to change further beyond the 2020s and especially as Minnesota approaches the middle of the 21<sup>st</sup> century (Table 6). Dramatic losses in extreme cold and additional increases in heavy and extreme precipitation are expected to remain the state's leading climate change symptoms. Although Minnesota has not yet observed increases in the frequency, severity, or duration of summertime high temperatures or drought (through 2023), climate model projections summarized in NCA5 indicate that heat waves are all but certain to increase by mid-century. A 2018 study conducted by NOAA scientists indicates that by the 2050s, heat waves in Minnesota will be more attributable to climate change than to natural variability (Lopez et al., 2018).

**Table 5. Confidence that climate change has already impacted common Minnesota weather/climate hazards**

Confidence	Hazard	Recent & Current Observations
Highest	Extreme cold	Rapid decline in severity & frequency
	Extreme rainfall and heavy snowfall	Becoming larger and more frequent
Moderately High	Humid heat waves	Some increase in maximum dew point and Heat Index values since 1980
Moderately Low	Tornadoes, hail, thunderstorm winds	Intensity and frequency unchanged, but seasons expanding aggressively
Low	Drought and dry spells	Intense & major episodes in early 2020s but no long-term trend
Lowest	Summer high temperature extremes	Highest temperatures still well within historical ranges, and number of hot days increasing only slightly in isolated locations

SOURCE: (BLUMENFELD, K. MINNESOTA STATE CLIMATOLOGY OFFICE, PERSONAL COMMUNICATION, DECEMBER 21, 2023)

**Table 6. Confidence that climate change will impact common Minnesota weather/climate hazards through 2070**

Confidence	Hazard	Expectations through 2070
Highest	Extreme cold	Continued rapid decrease in severity and frequency
	Extreme rainfall	Unprecedented events more common
High	Heat waves	Summer high temperatures, maximum dew point and heat index values all projected to increase
Moderately High	Drought	Increased severity likely as summer heat increases; frequency and duration projections unclear
Moderately Low	Heavy snowfall	Greater extremes, but events less frequent as winter rain increases
	Tornadoes, hail, thunderstorm winds	Intensity and frequency unclear but continued seasonal expansion and larger “outbreaks” possible

SOURCE: (BLUMENFELD, K. MINNESOTA STATE CLIMATOLOGY OFFICE, PERSONAL COMMUNICATION, DECEMBER 21, 2023)

### 3.3.1 Climate Change Impacts and Resilience Planning

The NCA5 states that even if the world decarbonizes rapidly, the Nation will continue to face climate impacts and risks. Adequately and equitably addressing these risks involves longer-term inclusive planning, investments in transformative adaptation, and mitigation approaches that consider equity and justice. In the Midwest, rising temperatures, extreme precipitation, drought, and other climate-related events are impacting agriculture, ecosystems, cultural practices, health, infrastructure, and waterways. Communities, Indigenous Peoples, governments, and businesses are embracing adaptation approaches that include climate-smart agriculture, improved landscape management, innovative green infrastructure financing, and collaborative decision-making.

NCA5 includes these key messages for the Midwest region ([Chapter 24: Midwest](#)):

- Changes in precipitation extremes, timing of snowmelt, and early-spring rainfall are expected to pose greater challenges for crop and animal agriculture, including increased pest and disease transmission, muddier pastures, and further degradation of water quality. Climate-smart agriculture and other adaptation techniques provide a potential path toward environmental and economic sustainability.
- Increasing incidence of flooding and drought is expected to further alter aquatic ecosystems, while terrestrial ecosystems are being reshaped by rising temperatures and decreasing snow and ice cover. In response, communities are adapting their cultural practices and the ways they manage the landscape, preserving and protecting ecosystems and the services they provide.
- Climate change has wide-ranging effects on lives and livelihoods. Mitigation and adaptation strategies, such as expanded use of green infrastructure, heat-health early warning systems, and improved stormwater management systems, when developed in collaboration with affected communities, have the potential to improve individual and community health.
- Increases in temperatures and extreme precipitation events are already challenging aging infrastructure and are expected to impair surface transportation, water navigation, and the electrical grid. Shifts in the timing and intensity of rainfall are expected to disrupt transportation along major rivers and increase chronic flooding. Green infrastructure and public and private investments may mitigate losses, provide relief from heat, and offer other ways to adapt the built environment to a changing climate.
- Climate-related changes to water quantity and quality are increasing the risks to ecosystem health, adequate food production, surface water and groundwater uses, and recreation (high confidence). Projected increases in droughts, floods, and runoff events across the Mississippi River basin and the Great Lakes will adversely impact ecosystems through increased erosion, harmful algal blooms, and expansion of invasive species.

Key messages from the NCA5 are indicated in green throughout this document.

The 2018 [Leech Lake Band of Ojibwe Population Vulnerability Assessment and Climate Adaptation Framework](#) identifies climate risks and impacts on the population of the Leech Lake Band. The report includes a review of past and projected climate change impacts, identification of community vulnerabilities, and development of adaptation strategies (Pale Blue Dot & MPCA, 2018).

For Ojibwe people, natural resources and cultural resources are inextricably intertwined, and climate change is therefore considered a threat to Ojibwe culture, affecting “flora and fauna that are imperative to the culture, history, well-being, and life-ways of the Ojibwe people” (Stults et al., 2016).

### 3.3.2 Health Impacts of Climate Change in Minnesota

Climate change already impacts our health, and these impacts are expected to worsen in the years ahead. The risks are especially high for Minnesotans who are less able to cope due to their age, income, housing insecurity, preexisting health conditions, and more.

Heat, air pollution (including wildfire smoke and allergens like pollen), extreme precipitation, floods, droughts, and ecosystem changes are all “climate hazards” that impact our health. Some of these

climate hazards have a direct effect, like a heat-related illness from a heatwave, while some have an indirect impact, like exacerbation of asthma from mold growth in a flooded basement.

## **Heat**

Minnesotans will experience a wide range of impacts from the increased frequency and severity of extreme heat events. Higher heat, increased humidity, and longer and more frequent extreme heat events can lead to direct health impacts of dehydration and heatstroke. Untreated heat stroke can lead to death. Heat-related illness directly accounted for 75 deaths in Minnesota from 2000–2022.

Heat can also worsen existing health conditions, such as respiratory and cardiovascular diseases. The people most at risk include those who are more exposed and those who may be more susceptible due to physiological reasons. People more likely to be exposed to heat include outdoor workers in agriculture and construction, student athletes, people who live in cities (due to the heat island effect), people without air conditioning, and unhoused persons.

People at higher risk because of physiological reasons include those with underlying medical conditions, pregnant people, older adults, infants, and young children.

Just as one example of the devastating effects of heat, in the summer of 2011, Minnesota had six days when the heat index was 105 degrees F or higher—and that same summer there were 1,302 emergency department visits and 3 deaths due to heat. What makes these numbers tragic is that heat-related illnesses are preventable.

## **Air Pollution**

In general, we breathe clean air in Minnesota, according to federal standards. But on some days and in some locations, air is unhealthy due to ozone or fine particulate matter. Greenhouse gas emissions can increase air pollution, and rising temperatures can also affect the formation and release of pollutants. Unhealthy air days are expected to become more frequent, and more intense due to climate change.

Climate change is likely to increase three main air contaminants in Minnesota: ozone, particulate matter (including wildfire smoke), and allergens. These air pollutants can cause or exacerbate cardiovascular and respiratory diseases, chronic obstructive pulmonary disease (COPD), allergies, and asthma.

Pollen is intensifying with climate change, and can trigger allergies, asthma attacks, and affect other respiratory conditions. In Minnesota, asthma affects one in 16 children (6.4%) and one in 13 adults (7.4%). People with asthma need to be especially aware of pollen sources and seasons to prevent an allergy-related asthma attack.

There are three pollen seasons in Minnesota: trees, grasses, and weeds. Trees are the first to release pollen, typically starting in early April, grasses usually ramp up pollen release in early June, and weeds typically begin releasing pollen in mid-June and continue until the first hard frost. Research shows that the growing season for ragweed pollen, which is highly allergenic, has increased by 15 to 25 days in and around Minnesota. The lengthening pollen season is strongly related to climate change characteristics, such as lengthening of the frost-free season and later timing of the first fall frost.

Indirect health effects from air pollution can include reduced visibility on a high smog day, reduced productivity at work or school due to allergies or asthma, and reduced productivity and degradation of crops and water sources, which can lead to economic burdens.

Those most at risk include:

- Children, because they have developing lungs, are outside more, and they play vigorously and inhale more air per pound of body weight compared to adults.
- Adults over 60, because their bodies are aging.
- People with chronic respiratory or cardiovascular disease because they are more susceptible to air pollution.
- Individuals living near other sources of air pollution (such as roadways, freeways, and heavy industry), because they are chronically exposed to air pollution.
- People of color, because they are more likely to be exposed to more air pollution and have a disproportionate burden of heart and lung diseases, which may increase susceptibility.

### **Extreme Precipitation, Floods, Drought**

Rain is falling more frequently in extreme, heavy, localized events, leading to some parts of our state experiencing flooding while other areas experience drought.

Increased frequency and severity of heavy rainfalls can lead to flooding, which results in both direct and indirect health impacts like:

- Injury or even death from drowning.
- Illnesses from being exposed to contaminated drinking water or recreational sources.
- Mental health stress from experiencing the trauma of the event or later from being displaced or dealing with damaged homes and business.
- Respiratory ailments from exposure to mold from flooded basements.
- Carbon monoxide poisoning from exposure to carbon monoxide when using secondary power sources, like generators.
- Flooding can also disrupt economic and social networks and put a strain on essential services.

The people most at risk are Minnesotans who are more likely to be exposed to flood waters, like those who live in a flood plain or near water bodies, or people who cannot easily evacuate or recover from flooding destruction, such as people who do not have reliable transportation, people who can't use the stairs when elevators are out of service, people in wheelchairs, people with disabilities, older adults, and lower income people.

Heavy rain events can cause standing water in backyards or basements. Many homeowners have experienced wet basements, which is mentally and financially stressful, and if mold starts to grow that can become a health problem.

Localized flash flooding can also be a problem where our infrastructure is undersized, and people get caught off guard by flooded roads. This is an important public health safety concern as almost half of flash flood fatalities occur in vehicles. It takes as little as six inches of fast-moving water to knock over and carry away an adult, and as little as 12 inches can carry away a small car.

Another public health concern with precipitation changes exacerbated by climate change is waterborne disease outbreaks. Heavy downpours can lead to a host of problems, including increased

runoff and sewage overflows, which can cause outbreaks of waterborne diseases such as E. coli and Cryptosporidium. Runoff can carry viruses and other disease-causing agents into wells and recreational waters, contaminating them and causing health problems.

### **Zoonotic Diseases**

Zoonotic diseases or zoonoses are caused by germs like viruses, bacteria, parasites, and fungi that spread between animals and people. Increases in temperatures and changes in rain patterns are changing our ecosystems, which can affect the spread of diseases carried by insects, ticks, rodents, birds, and other animals.

Diseases from ticks include Lyme disease, Anaplasmosis, and Babesiosis. As temperatures increase, disease-transmitting ticks will become active sooner and stay active longer, allowing more time to develop and feed on hosts. Ticks thrive in warm humid environments.

Additionally, there may be a decreased die off over the winter months if temperatures do not get very cold. An increase in winter temperatures can also lead to new tick species moving into and surviving in Minnesota, which can lead to the introduction of new diseases.

People more at risk for diseases carried by insects, ticks, and rodents are people who spend more time outdoors or are more exposed to these pests.

### **Harmful Algal Blooms**

An increase in water temperatures can lead to blue-green algal blooms, which contain toxins that can pose harmful health risks. People or pets who drink or swim in water with dangerous levels of harmful algal bloom (HAB) contamination may experience stomach illness, skin irritation, allergic responses, and damage to the liver and nervous system. In extreme cases, dogs and other animals have died after drinking water containing these toxins.

Harmful algal blooms in Minnesota lakes result from several factors including runoff from fertilizers, discharges from waste treatment plants, warmer waters, and higher temperatures. While HABs can occur naturally, the frequency of outbreaks is increasing in part because human activities create favorable conditions for the blooms.

Zoonotic diseases and HABs can have an indirect health effect when they threaten the livelihoods of people who work in recreation-dependent economies that revolve around camping, fishing, and hunting.

### **Mental Health**

Climate change threatens our mental health through direct exposure to a climate-related disaster (e.g., flooding); through the disruption to a major determinant of health, such as a loss of livelihood or a cultural tradition; and through awareness or uncertainty of climate change as an existential threat. These experiences may overlap and lead to compounded impacts on an individual or even an entire community, such as family farmers burdened with decadal drought who are more likely to commit suicide.

Existing research has associated several mental health conditions with climate change, such as psychological distress, grief reactions, depression, post-traumatic stress disorder, interpersonal conflicts, drug or alcohol abuse, loss of identity, and suicidal ideation.

Vulnerable populations such as children, the elderly, communities of color, and other marginalized communities are most at risk of climate change-related mental health impacts.

### 3.3.3 Climate Change Adaptation

Climate change adaptation is important for increasing the resilience of communities and the environment. The shocks caused by more extreme weather events and the stressors of longer-term changes to the climate affect all natural systems. For human communities, these impacts challenge the surroundings in which they live, the critically important ecosystem services upon which they depend, public health, local facilities and infrastructure, the safety of their residences, and the viability of their livelihoods. Development trends can further exacerbate both climate impacts and population vulnerability. Communities are only as resilient as the most vulnerable within them.

### 3.3.4 Climate Change Data and Tools in Minnesota

The University of Minnesota Extension and the University of Minnesota's Water Resources Center coordinate the Minnesota Climate Adaptation Partnership (MCAP), which brings together federal and state agencies, organizations, and individuals statewide with an interest in climate adaptation. MCAP received funding after the 2021 legislative session to develop high-resolution (2.6 mile/4km grid) dynamically downscaled climate projections utilizing the University of Minnesota's Supercomputing Institute. This data is being made publicly accessible via the new [Minnesota CliMAT—Climate Mapping and Analysis Tool](#). This interactive online tool provides highly localized climate projections for Minnesota. MN CliMAT is based on data from the latest generation of global climate models, called [CMIP6](#). With the dynamically downscaled climate projection data, users can visualize even how small cities will likely be impacted in the coming decades (Liess, S. et al., 2023).

*More resources are available on the [climate change page](#) of the Leech Lake Reservation HMP website*

## 3.4 Jurisdictional Change in Risk or Vulnerability Assessment

Areas within the Leech Lake Reservation have varying vulnerabilities and concerns about impacts to their communities. Interviews with tribal representatives, in addition to the Local Mitigation Survey, resulted in some specific concerns (see Appendix C). Participants were asked to provide feedback on how the reservation's vulnerability to natural hazards had either increased (due to changes such as development) or decreased (due to local mitigation efforts) over the past five years.

Representatives from several Leech Lake Reservation departments noted an increase in development over the last five years as a factor for an increase in vulnerability to severe weather or disaster events.

### 3.4.1 Jurisdictional Responses

As part of the Local Mitigation Survey form, Leech Lake Reservation Emergency Management was asked to provide a vulnerability assessment that described what structures, systems, populations, or other community assets were susceptible to damage and loss from specific hazard events. This information was used to help tie local vulnerability back to the exposure of people, buildings,

infrastructure, and the environment to the natural hazards listed in Table 4 and to assist the tribal government in development of related local mitigation actions to reduce risk.

The following is a compilation of common responses taken directly from tribal representatives as preserved in Appendix C: Question 2 – Local Vulnerabilities. Responses here are edited only for clarity.

### **LLBO Regulatory Division**

LLBO Gaming Facilities (Casinos) can have a population of several hundred persons (employees/customers) at any given time. Likely incidents that could affect the casinos could include events such straight-line winds/tornadoes, wildfire.

Tribal housing areas located throughout the thirteen (13) separate communities within the exterior boundaries of the Reservation, including the community center in each community, could all be affected by straight-line winds, tornado, wildfire, and/or flood waters.

### **Leech Lake Emergency Management**

*Winter Storms:* We have several issues during winter storms. Access to first responder services is threatened and we need more local supplies and equipment in the communities, including plows, first aid kits, defibrillators, emergency energy sources for heat, cooking, light, water and sewer. Fire extinguishers, more CO and smoke detectors are needed as well. Power goes out during winter storms often, buried power lines would mitigate the problem, a more immediate solution would be to clear dangerous trees that threaten to fall on powerlines.

*Windstorms:* Depending on the time of year, windstorms create immediate hazards to transportation. Winter windstorms can create dangerous white out conditions and ensuing drifting can occur and present hazardous driving conditions. During the summer, we have experienced severe wind events that take down entire areas of trees that impede roads and driveways, remove roofing, tumble trailers, and cause a lot of property damage as well as causing outages of power and communication. Summer storms with power outages also cause loss of frozen and refrigerated foods, wild game and local caught fish which are difficult to replace.

*Tornadoes:* We need to have a shelter option for the whole community or for individual homes. There are a lot of homes that are built on concrete slab, or people who live in trailer houses. Elderly and special needs populations may have difficulty walking to a community shelter, and personal transportation is another common problem. Public transportation needs to grow to suit the needs of day-to-day transport to jobs, hospitals, local businesses and be more readily available for emergency evacuation or transport.

*Wildfire:* Our types of wildfires are primarily wind-driven with topography usually not being a major factor. We have large areas of wetland vegetation, tree farms of densely packed pines, coupled with urban interface, limited dependable personal transportation, and limited access one way in communities. Mitigation for these include public transportation in the communities,

good public messaging from a variety of resources such as radio, internet, IPAWS, and door-to-door notification.

### Leech Lake Environmental Department

*Extreme Heat:* High summer water temperatures can cause kill off of native/cultural fish (whitefish and tullibee).

*Extreme Heat, Drought, Summer Storms:* Water level fluctuations affect wild rice during growing season; high water can rip out rice plants; wind events; hail events; low water levels that deter harvest; all can directly affect wild rice life cycle and gathering.

*Climate Change:* Climate change is affecting our natural resources. Invasive species such as the Emerald Ash Borer are affecting ash trees causing die off that then affects wetlands. This is changing wetland components, warming wetlands, affecting water quality and evaporation rates, and thus changing the original function of the wetland. This could affect water retention and species' habitat.

### Forestry - Leech Lake Department of Resource Management

*Windstorms, Extreme Heat:* Many populations are very rural and subject to being stranded in case of a windstorm (or wildfire). This, coupled with extreme heat that could be likely at these times and resultant power outages, poses a very high risk.

## 3.4.2 Future Development

Because Leech Lake Reservation is vulnerable to a variety of natural hazards, the tribal government—in partnership with the state government—must commit to preparing for the management of these events. Leech Lake Reservation is committed to ensuring that tribal elected officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and tribal response.

As part of the vulnerability assessment conducted for the Leech Lake Reservation HMP update, participants were asked to describe if there were any factors related to population growth, zoning, or development they felt have increased their community's vulnerability to future severe weather or disaster events. The following is a compilation of responses taken directly from departmental representatives as preserved in Appendix C: Question 4 – Increase in Vulnerability. Responses here are edited only for clarity.

### Leech Lake Emergency Management

We have seen development of several new buildings owned by the Leech Lake Band of Ojibwe. We also have a new project that involves removal of the Enbridge Line 3 pipeline from the ground.

### **Leech Lake Environmental Dept.**

There are stormwater issues with development, but we have been countering with rain gardens and stormwater retention measures.

### **Leech Lake Dept. of Resource Management**

When cutting open the footprints for new housing areas, Forestry is often told to minimize the number of trees removed. Some of these new development areas are put into aspen stands. Aspen, by its' nature, is a weaker species and can be more susceptible to wind events (especially if openings are created, which they are for new developments). There is a risk that some of these areas will, in time, result in heightened risk due to senescing trees (refer to Porcupine/Quill Lanes project where we removed very large, very over-mature aspen from the housing vicinity.)

In other areas, we need to be cognizant of wide-enough roads to properly allow for emergency vehicles to get in. This seems to be especially true in areas along lakes where residents place an even higher value on the aesthetic.

Lastly, and this is more noticeable in longer-existing resident areas, is defensible space allowance and hazardous tree work; having areas around a house that would allow for engines to come in and ward off a wildfire AND ensuring proper tree care so trees do not lean over the top of houses over time.

In the development of local mitigation actions, all planning team members were encouraged to consider hazard mitigation strategies that would reduce risk in relation to future development, such as the update of local comprehensive plans, enforcement of ordinances, and incorporation of infrastructure improvements to reduce local vulnerabilities.

The Leech Lake Reservation emergency management director will work to keep the communities covered by the HMP engaged and informed during the plan's cycle. By keeping tribal leaders involved in the monitoring, evaluation, and update of the HMP, they will be aware of the hazards that face their communities and how to mitigate those hazards through planning and project implementation.

Section 6 of this plan further outlines the process by which Leech Lake Reservation will address the maintenance of this plan, including monitoring, evaluation, and update of the plan, as well as implementation and continued public involvement.

## Section 4 – Hazards

As part of the risk assessment, each natural hazard that poses risk to the reservation was independently reviewed for its past hazard history, relationship to future trends, and vulnerability to future events. The reservation also conducted a capabilities assessment to review the plans and programs that are in place or lacking (program gaps or deficiencies) for implementing mitigation efforts, as related to each natural hazard. An assessment was also conducted for the tribe to identify the plans, policies, programs, staff, and funding they have in place to incorporate mitigation into other planning mechanisms (see Section 5.1 and Appendix C).

[Read more about natural hazard prioritization and view interactive information on all hazards](#)

The following hazard profiles address hazards that the Leech Lake Reservation HMP Planning Team deemed moderate to high risk. Hazards determined to be low risk or without substantive mitigation actions are not required to be included.

### 4.1 Flooding

Flooding is the most significant and costly natural hazard in Minnesota. Ten of the 18 federal disaster declarations in Leech Lake Reservation included flooding.

After several years of drought and exceptionally mild winter, the first half of 2024 was extremely wet with frequent, heavy precipitation causing widespread flooding throughout Minnesota, resulting in a Federal Disaster Declaration affecting 22 counties. Leech Lake Reservation was included in this declaration (FEMA, 2024c).

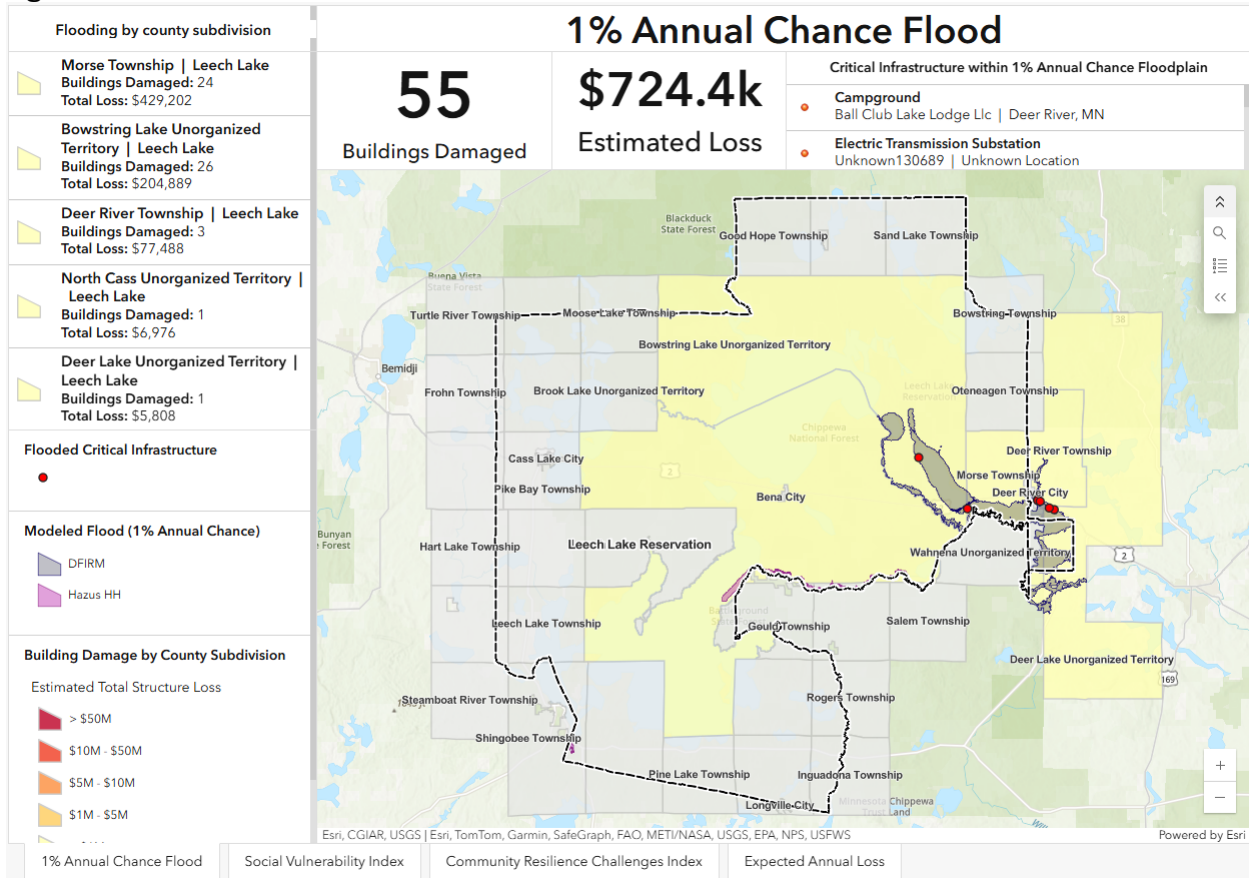
#### 4.1.1 Probability of Occurrence

From 1997 through May 2025, the NCEI Storm Events Database has recorded 57 flood and flash flood events in the four counties surrounding and including Leech Lake reservation. This area of Beltrami, Itasca, Hubbard, and Cass Counties has experienced one flash flood event every 1.5 years and one riverine flood event every 1.9 years on average during this period.

[View interactive maps and see information about flooding history, risk, and vulnerability](#)

Minnesota HSEM has encouraged a potential risk and economic loss analysis for a 1% annual chance flood using the FEMA tool, Hazus for ArcGIS. Where available, Digital Flood Insurance Rate Map (DFIRM) data was used to define the 1% annual chance flood boundary. Flood water depths within the DFIRM boundary are calculated by taking the difference between the elevation of the ground and the surface of the flood water. The method of calculating the flood water surface elevation (WSEL) varies within the DFIRM boundary by the data available. For this analysis, the water surface elevation was calculated by interpolating the WSEL values of cross section line data and shoreline elevation values (where cross section data was not available).

Figure 1. 1% Annual chance flood in Leech Lake Reservation



For communities located in areas where DFIRM data is not available, a Hydrologic and Hydraulic (H&H) model was run in Hazus to generate a flood boundary and depth grid. The resulting Hazus 1% annual chance floodplain is shown in the Flood Vulnerability dashboard on the Leech Lake Reservation HMP website (Figure 1), where it is available in an interactive form.

#### 4.1.2 Vulnerability

Potential economic loss estimates were based on reservation-specific building data. Leech Lake Reservation provided parcel tax and spatial databases that included building valuations, occupancy class, square footage, year built, and number of stories. The quality of the inventory is the limiting factor to a Hazus flood model loss estimation. Best practices were used to use local data and assumptions were made to populate missing (but required) values.

[View at-risk populations within Leech Lake Reservation](#)

Hazus reports the percent damage of each building in the floodplain, defined by the centroid of each building footprint. After formatting the tax and spatial data, 15,463 points were input to Hazus to represent buildings with a total estimated building plus contents value of \$2.9 billion. Approximately 83% of the buildings (and 69% of the building value) are associated with residential housing.

Table 7. Summary of 1% annual chance flood loss estimation by occupancy class

General Occupancy	County Total Buildings	County Building and Contents Value	Floodplain Total Buildings	Floodplain Building + Contents Value	Buildings with damage	Building + Contents Loss
Residential	12,947	\$2,061,333,782	69	\$5,871,900	51	\$711,486
Commercial	353	\$49,634,224	1	\$291,000	1	\$2,747
Other	2,163	\$856,734,014	6	\$257,800	3	\$10,130
Totals	15,463	\$2,967,702,020	76	\$6,420,700	55	\$724,363

SOURCE: (FEMA, 2024B)

The estimated loss by occupancy class for the entire reservation is shown in Table 7.

The distinction between building attributes within a parcel was not known, so the maximum percent damage to a building in that parcel was used to calculate loss estimates for the entire parcel. The sum of all the losses in each census block were aggregated to visualize the loss (see [flood risk map on the HMP website](#)). Please note: It is possible for a building location to report no loss even if it is in the flood boundary. For example, if the water depth is minimal relative to 1<sup>st</sup>-floor height, there may be 0% damage.

### Hazus Critical Infrastructure Loss Analysis

Critical facilities and infrastructure are vital to the public, and their incapacitation or destruction would have a significant negative impact on the community. These facilities and infrastructure were identified on the [HMP website](#) and verified by Leech Lake Reservation.

Buildings identified as essential facilities for the Hazus flood analysis include hospitals, police and fire stations, and schools (often used as shelters). Many essential facilities are vulnerable to structural failure, extensive water damage, and loss of facility functionality during a flood, thereby negatively impacting the communities relying on these facilities' services. Fortunately, none of Leech Lake Reservation's essential facilities included in the Hazus flood analysis are located within the 1% annual chance floodplain

Extreme precipitation resulting in flooding may overwhelm water infrastructure, disrupt transportation and cause other damage. Particularly where stormwater, sewage and water treatment infrastructure is aging or undersized for more intense rainstorms, extreme rain events may pose both health and ecological risks in addition to costly damage (USGCRP, 2018b).

It is important to identify any critical infrastructure within the 1% annual chance floodplain, given the higher risk of the facility or infrastructure being incapacitated or destroyed during a flood. In Leech Lake Reservation, one electric substation and the campground at Ball Club Lake Lodge were found to be at risk in the 1% annual chance flood. In nearby Deer River, three more electric transmission substations and two waste treatment or disposal facilities are within the 1% annual chance floodplain.

### Community Vulnerability

Potential economic losses were estimated by Census Minor Civil Division. Morse Township and Bowstring Lake Unorganized Territory would suffer significant estimated losses in the 1% annual chance flood. All jurisdictions with buildings identified in the 1% annual chance flood zone can also be viewed on the Leech Lake Reservation HMP website.

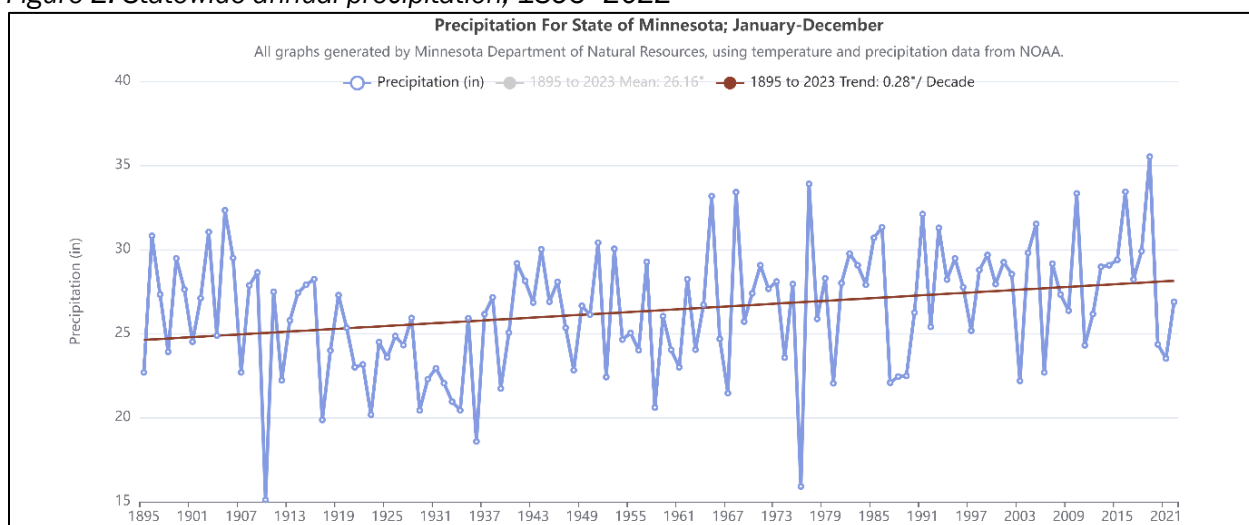
The status of jurisdictional participation in the National Flood Insurance Program and any repetitive loss properties are detailed in Section 5.1.1. National Flood Insurance Program (NFIP).

Section 3.4 provides responses to localized vulnerabilities to specific hazards.

### 4.1.3 Flooding and Climate Change

Higher temperatures globally have evaporated more surface and ocean water into the atmosphere, which, in turn, has provided more potential moisture for precipitating weather systems. In Minnesota, the result has been increased precipitation, with annual totals increasing at an average rate of just over a quarter inch per decade statewide since 1895 (see Figure 2).

Figure 2. Statewide annual precipitation, 1895–2022



SOURCE:(MN DNR, 2025B)

**Key Message #1** in the Water Chapter of the NCA5 states that climate change will continue to cause profound changes in the water cycle.

Snow cover will decrease and melt earlier and heavier rainfall is leading to increasing flooding (Payton et al., 2023). Additional increases in heavy and extreme precipitation are expected to remain the state’s leading climate change symptoms. Heavy rains are now more common in Minnesota and more intense than at any time on record. Long-term observation sites have seen dramatic increases in one-inch rains, three-inch rains, and the size of the heaviest rainfall of the year. Since 2000, Minnesota has seen a significant uptick in devastating, large-area extreme rainstorms as well. Rains that historically would have been in the 98th percentile annually (the largest 2%) have become more common (MN DNR, 2024).

This precipitation increase is found in all seasons, but spring and summer are becoming wetter at faster rates than fall and winter. Whereas temperature increases have been greatest in the northern parts of the state, precipitation increases have been well distributed geographically, and have somewhat favored southern Minnesota, which has better access to moisture from the Gulf of Mexico and is more frequently near the “low-level jet” airflow (a relatively fast-moving zone of winds in the lower atmosphere) that influences precipitation production

### 4.1.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified existing program gaps and deficiencies that make its residents more vulnerable to flooding. The following gaps and deficiencies should be addressed with new mitigation efforts to reduce that vulnerability:

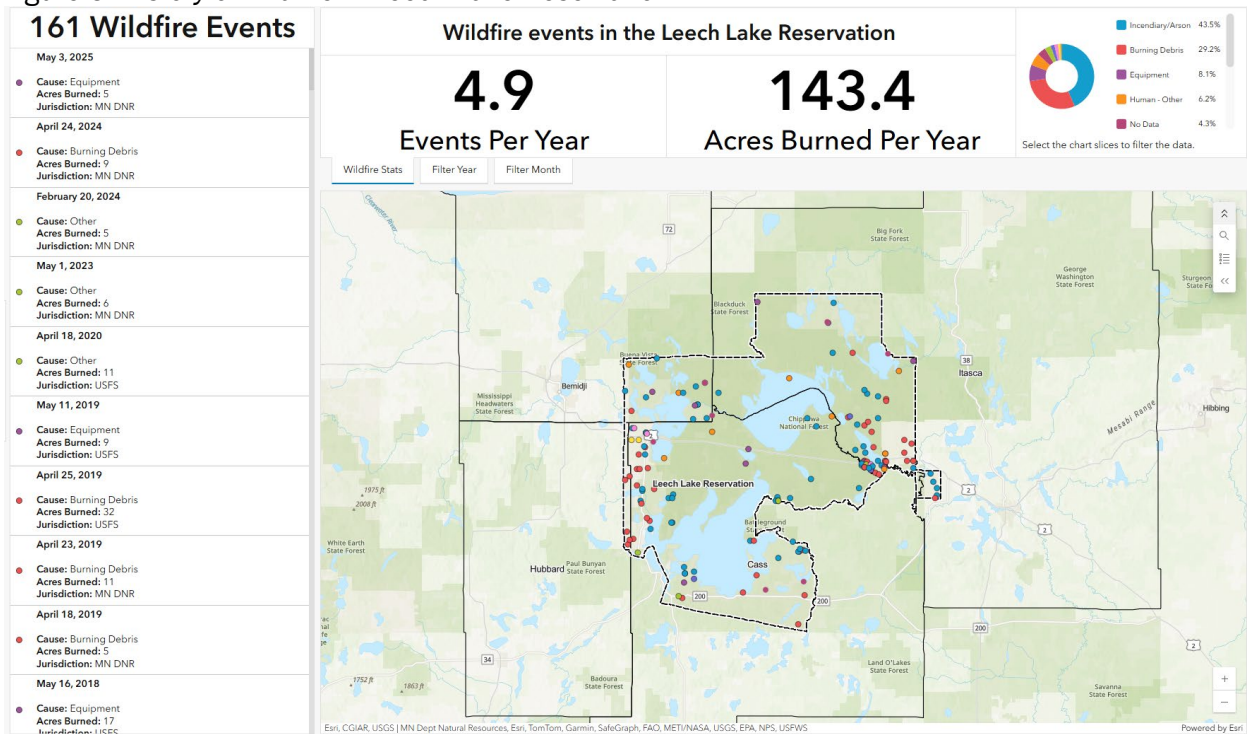
**Road Infrastructure:** Flood mitigation for tribally owned road infrastructure (e.g., culvert replacements, road repair) is an ongoing need. LLBO needs funding assistance to improve roads and culverts that experience repetitive flooding.

## 4.2 Wildfire

Wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. Minnesota experienced an average of 427.4 wildfires that burned at least five acres each year between June 1992 and July 2025 (MN DNR, 2021b). Wildfires occur throughout the spring, summer and fall; however, most wildfires in Minnesota take place in March, April and May. The history of wildfire in Leech Lake Reservation is shown in Figure 2; an interactive map is available on the Leech Lake Reservation HMP website.

[View interactive maps and see information about wildfire history, risk, and vulnerability](#)

Figure 3. History of wildfire in Leech Lake Reservation



### 4.2.1 Probability of Occurrence

To determine the probability of future wildfires, Minnesota DNR, USFS, and BIA records of previous wildfire events in Leech Lake Reservation were summed and divided by the dataset’s period of record, resulting in an annual relative frequency of wildfires during the period of record. From January 1985 to August 2025, the relative frequency of wildfire events is 4.9 per year. (MN DNR, 2025d). This relative frequency can be used to infer the probability of these events occurring in the future.

### 4.2.2 Vulnerability

Wildfires jeopardize the built environment, health, and wellbeing of individuals living near its fuel source. Some residents are more vulnerable to air quality conditions of wildfire, including children, older adults, and those with respiratory issues (AirNow, 2021).

Structures located in areas near undeveloped wildland are vulnerable to wildfires. The SILVIS Lab at University of Wisconsin–Madison created a dataset documenting the changes of the wildland–urban interface (WUI) in the United States from 1990 to 2010. Radeloff et al. (2018) define WUI as the area where structures and other human development meet or intermingle with wildland vegetation. With the increase of development in metropolitan fringes and rural areas, the WUI is growing. The expansion of the WUI in recent decades has significant implications for wildfire management and impact as it creates an environment in which fire can readily move between structural and vegetation fuels. Its expansion has increased the likelihood that wildfires will threaten structures and people (Radeloff et al., 2018).

There are two main types of WUI: intermix and interface. Intermix WUI are areas where housing and wildland vegetation intermingle; interface WUI are areas where housing are adjacent to wildland vegetation (Radeloff et al., 2018). Table 8 shows the change of total WUI (intermix and interface) in the reservation from 2000 to 2020, and the percentage of the reservation’s land, housing, and population in the WUI area.

Communities with higher proportions of WUI areas are more vulnerable to wildfires. The percentage of WUI within individual communities in Leech Lake Reservation is shown in Table 9.

*Table 8. Wildland-Urban Interface (WUI), Leech Lake Reservation, 2000–2020*

	Total WUI 2000	Total WUI 2010	Total WUI 2020	% Change (2000–2020)
Land Area	7.3%	8.7%	8%	+9.6%
Housing	79.5%	81.5%	78.8%	-0.9%

SOURCE: (RADELOFF, MOCKRIN, ET AL., 2023)

*Table 9. Percentage of land area classified as WUI per jurisdiction in Leech Lake Reservation*

Township / City	Percent WUI
Bena	94.5
Boy Lake	9.8
Cass Lake	48.2
Otter Tail Peninsula	8.5
Pike Bay	27.2

Township / City	Percent WUI
Squaw Lake	89.1
Ten Lake	29.4
Wilkinson	7.7

SOURCE: (RADELOFF, HELMERS, ET AL., 2023)

Section 3.4 provides responses to localized vulnerabilities to specific hazards.

#### 4.2.3 Wildfire and Climate Change

The changing climate poses a complex web of issues for wildfire in Minnesota. Climate change likely is affecting the frequency and intensity of Canadian wildfires, similar to its effect on wildfires in the western U.S. and Alaska (Wehner, 2017). Small particulate pollution from smoke plumes has numerous health impacts as described above, and if severe enough can result in spikes of demand for emergency services. Based even on intermediate (RCP4.5) future climate projections, many Midwest counties will experience increased exposure to wildfire smoke (Mills et al., 2018).

According to the NCA5, Key Message #3 in the Midwest Chapter, Climate Adaptation will require innovative collaborations between public health and other sectors such as emergency management (Wilson et al., 2023).

Changes in Minnesota's climate also may be influencing the frequency, severity, and areal coverage of wildfires. For example, warmer winters with inconsistent snow cover, the arrival of wet conditions prior to the growing season, plus early and more frequent thaws, all combine to prolong the exposure of susceptible vegetation to dry conditions, potentially extending the peak wildfire season.

Minnesota's changing climate also may affect fire-damaged areas. For instance, heavy rains in burned areas can lead to erosion and mudslides. Documented and projected increases in the frequency and intensity of heavy and extreme rainfall suggest that Minnesota is becoming and will become more prone to post-fire landscape hazards. Climate change also is having an impact on the pests that damage the health and composition of Minnesota forests, although the ultimate consequences for wildfire are complex and uncertain. Shorter winters are allowing two reproductive cycles of the Eastern Larch Beetle, which has now killed off at least 143,000 acres of mature tamarack forest in Minnesota since 2001 and affected about 535,000 acres to some degree during that period. The decline in severity and frequency of extreme cold may allow more rapid establishment of Emerald Ash Borer to latitudes further north than without climate change. Minnesota forests are home to an estimated 1 billion ash trees. Many of these trees are in nearly pure stands of black ash growing in wet areas. So while the deaths of these lowland species will increase fuel loading, their decreased transpiration will increase water on the ground. The ultimate contribution to wildfire will depend on the interplay between increased precipitation, warming temperatures, extreme heat, and periods of drought as our climate continues to change.

Temperatures are predicted to rise in the state, which could lead to more extreme heat events and associated wildfire risks. As Minnesota's climate changes, weather fluctuations between drought and extreme rain events and increasing temperatures will result in changes to forest composition and/or

distribution. These fluctuations can lead to dry conditions that may cause increased fire risk in both grassland and forest environments.

The varied impacts of climate change are complicated by how these changes also interact with and reinforce one another. Drought and heat may both contribute to wildfires, which may in turn lead to changes in plant and animal populations and other ecological shifts. Increasing events of extreme heat and drought can increase the number of wildfires (Blumenfeld, K. Minnesota State Climatology Office, personal communication, January 9, 2019).

#### 4.2.4 Program Gaps and Deficiencies

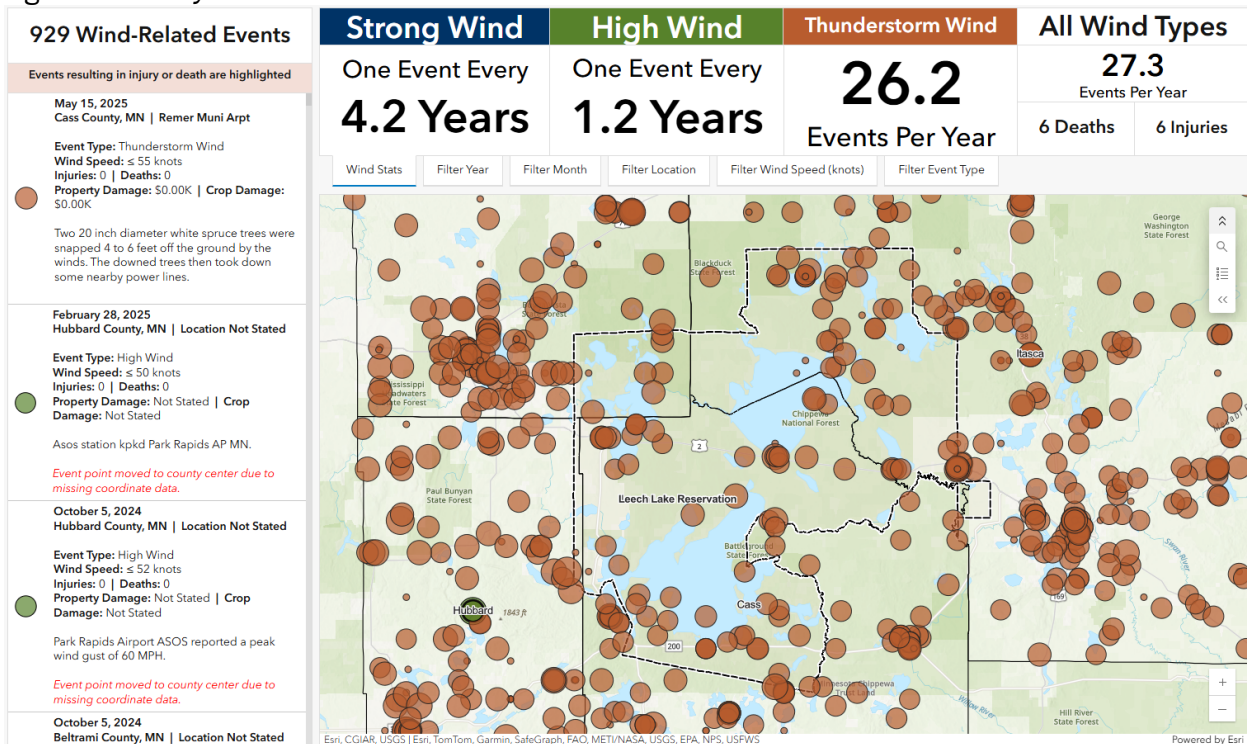
Leech Lake Reservation Management identified existing program gaps and deficiencies that make its residents more vulnerable to wildfire. These gaps should be addressed with new mitigation efforts to reduce vulnerability, outlined as follows:

*Community Wildfire Protection Plan:* Leech Lake Reservation is in the process of updating our community wildfire protection plan. An updated plan is necessary to plan for areas of highest risk and determine needed mitigation measures.

### 4.3 Windstorms

A windstorm is a wind strong enough to cause damage to trees and buildings and typically exceeding 34 mph (Pielke, 2012). Windstorm events encompass a variety of types of damaging wind. The history of windstorms in Leech Lake Reservation is shown in Figure 4; an interactive version of this map can be found on the Leech Lake Reservation HMP website.

Figure 4. History of windstorms in Leech Lake Reservation



[View interactive maps and see information about windstorm history, risk, and vulnerability](#)

#### 4.3.1 Probability of Occurrence

To determine the probability of future wind-related events in Leech Lake Reservation, records from January 1996 to May 2025 of previous wind-related events (strong wind, high wind, and thunderstorm wind) were examined in the four counties surrounding and including Leech Lake Reservation. This area of Beltrami, Itasca, Hubbard, and Cass Counties has experienced an average of 27.3 wind events per year. These relative frequencies can be used to infer the probability of these events occurring in the future.

#### 4.3.2 Vulnerability

The likelihood of a windstorm event does not vary geographically within the reservation, but the vulnerability of its residents is not constant. Vulnerability to injury from all kinds of windstorms decreases with adequate warnings, warning time, and sheltering in a reinforced structure. Therefore, residents living in rural areas, living alone or with limited mobility, or living in a manufactured home may be more vulnerable. Also at a higher risk to windstorms are those who work outdoors or do not have permanent housing.

Structural vulnerability depends in part upon the construction of a building and its infrastructure. Residents of mobile homes are more vulnerable to fatality or injury from windstorms because mobile homes are not able to withstand high winds as well as other structural dwellings, with 50 mph (43.4 knots) being the lower limit of wind speeds capable of damaging mobile homes (AMS, 2004). Steps to mitigate these vulnerabilities have been taken by the state, requiring all mobile home parks to provide an evacuation plan, and parks with at least 10 homes licensed after March 1, 1988 to provide a storm shelter (MDH, 2020). However, mobile home parks often do not provide the required storm shelters (Sepic, 2017). Building codes have also changed to improve the strength of new mobile home construction but there are still many older mobile homes in use that do not meet these new standards.

Section 3.4 provides responses to localized vulnerabilities to specific hazards.

#### 4.3.3 Windstorms and Climate Change

Lack of high-quality long-term data sets makes assessment of changes in wind speeds very difficult (Kunkel et al., 2013). In general, one analysis found no evidence of significant changes in wind speed distribution. Other trends in severe storms, including the number of hurricanes and the intensity and frequency of tornadoes, hail, and damaging thunderstorm winds, are uncertain. Since the impact of more frequent or intense storms can be larger than the impact of average temperature, climate scientists are actively researching the connections between climate change and severe storms (USGCRP, 2018a).

According to the NCA5 Key Message #5 in the Climate Trends chapter, extreme events are becoming more frequent.

### 4.3.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified program gaps and deficiencies that make its residents more vulnerable to summer storms, including windstorms, that should be addressed with new mitigation efforts to reduce vulnerability. These include:

**Above-Ground Power Lines:** Most power lines throughout Leech Lake Reservation are above ground, exposing them to potential damage from high wind events. Converting overhead power lines to underground would help to reduce risk of power failure.

**Public Education:** Ongoing public education is needed during tornado season to inform the public on what a tornado watch/warning is and what to do when outdoor warning sirens are activated. Ongoing outreach is also needed to encourage residents to be aware of and ready for severe storm events that can lead to long-term power outages.

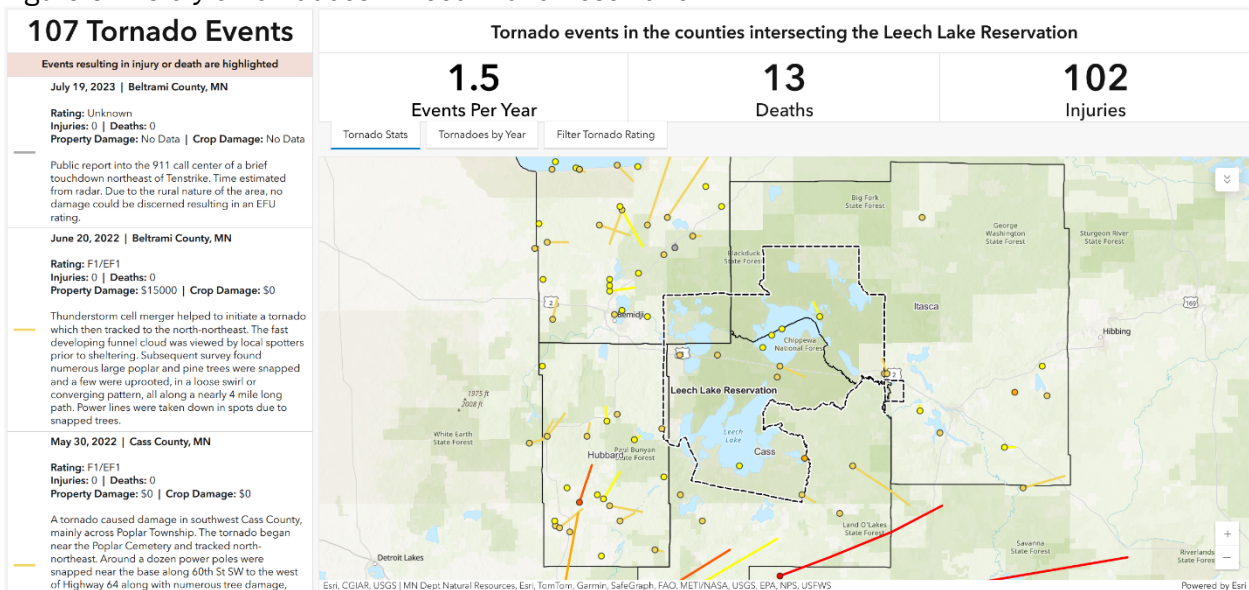
**Storm Shelters and Tornado Safe Rooms:** We need to have a shelter option for the whole community or for individual homes. There are a lot of homes on the reservation that are built on concrete slab, or people who live in trailer houses. Elderly and special needs populations may have difficulty walking to a community shelter, and personal transportation is another common problem.

**New Housing in Aspen Forested Areas:** LLBO Forestry notes that when cutting open the footprints for new housing areas, there is a heightened risk of aspen trees being more susceptible to coming down during severe wind events since they are by nature a weaker species.

## 4.4 Tornadoes

With wind speeds reaching up to 300 mph, tornadoes are one of nature’s most violent storms (Hogeback, 2020). The history of tornadoes in Leech Lake Reservation is shown in Figure 5; an interactive version of this map can be found on the Leech Lake Reservation HMP website.

Figure 5. History of tornadoes in Leech Lake Reservation



[View interactive maps and see information about tornado history, risk, and vulnerability](#)

#### 4.4.1 Probability of Occurrence

Estimating the probability of future tornadoes in Leech Lake Reservation was done using two methods. The first method summed the total number of tornadoes that either touched down in or traveled through the reservation. This sum was divided by the number of years tornado data was recorded, resulting in the annual relative frequency of tornado occurrences in the reservation. Based on records in the NCEI Storm Events Database through May 2025, there have been 1.5 tornadoes every year in the counties (Beltrami, Itasca, Hubbard, and Cass) intersecting Leech Lake Reservation. These 107 tornadic events occurred in 40 of the 72 years on record.

Because tornadoes often cross geographical boundaries, and tornadic frequency may be better understood using events from a larger area, a second method was used to describe the frequency of tornadic events within a 50-mile radius of any location within the reservation. A grid of 900 square-meter cells was used to cover Minnesota and 50 miles beyond its border. From the center of each cell, the number of tornadoes that intersected a 50-mile radius was counted. Each cell was assigned a total tornado line count, which was then divided by the tornado dataset's period of record, resulting in the annual relative frequency of tornadoes occurring within 50 miles of the respective cell.

For any location in Leech Lake Reservation, there was an annual frequency of <1–2 tornadoes within a 50-mile radius. The historical frequency was only slightly higher in the southwest than in the northeast. These relative frequencies can be used to infer the probability of these events occurring in the future.

#### 4.4.2 Vulnerability

The likelihood of a tornado does not vary significantly across geography within Leech Lake Reservation; however, certain populations may be more vulnerable and less resilient to the impacts of a tornado. In general, tornado casualties decrease when people receive adequate warnings with sufficient time to seek shelter in a reinforced structure. Because communication is critical before a tornadic event, certain residents may be more negatively impacted by a tornado, including those living in rural areas, individuals with limited mobility, people who do not live near an outdoor warning siren, or those who do not use social media. Section 3.4 provides responses to localized vulnerabilities to specific hazards.

[View at-risk populations in Leech Lake Reservation](#)

People living in mobile homes are particularly vulnerable to tornadoes because they cannot withstand the strong winds produced by a tornado. An analysis by the Associated Press of NOAA storm data found that since 1996, 53% of tornado fatalities in the United States were people who remained within or attempted to flee from mobile homes (Borestein et al., 2023). While Minnesota law requires most mobile home parks to have storm shelters, many do not (Raiche, 2022).

### 4.4.3 Tornadoes and Climate Change

Minnesota's climate is undergoing distinct changes, but as reported by the MN DNR State Climatology Office, these changes are only weakly connected to increases in tornadoes or severe convective storms. Minnesota, like all parts of the U.S., has seen increases in the weakest class of tornadoes (rated F-0 or EF-0), but these increases are known to be linked to improved spotting, detection, and verification procedures within the National Weather Service.

When examining tornadoes that cause significant structural damage and are rated EF-2 or above, Minnesota has seen no recent trends towards increasing frequencies—whether measured as raw counts, or as days with one or more of these tornadoes (MN DNR, 2019).

The tornado trends in Minnesota match those found nationally. NCA5 states that while the average annual number of tornadoes appears to have remained relatively constant, there is evidence that tornado outbreaks have become more frequent, tornado seasons are extending into later in the fall, and that tornado strength has increased (Marvel et al., 2023). An October 10, 2021 tornado in the Boundary Waters Canoe Area Wilderness became the latest on record so far north in the state. Then, on December 15, 2021, an outbreak of destructive thunderstorm winds and over 20 tornadoes struck the southeastern parts of the state, producing the latest tornadoes on record by 29 days (Blumenfeld, K. Minnesota State Climatology Office, personal communication, December 21, 2023).

According to the NCA5 Key Message #5 in the Climate Trends chapter, extreme events are becoming more frequent.

However, climate scientists are unclear about whether the recent statistical behavior of these severe convective storm events has any relationship with the changing climate. This uncertainty results from the fact that tornadoes and their parent thunderstorms operate on smaller scales and more localized processes than the global climate. There has been some indication that, on a national basis, tornadoes are being clustered into fewer days, suggesting a greater tendency towards outbreaks. Scientific modelling studies indicate that the meteorological conditions supportive of severe thunderstorms should increase in the future, but it is unclear whether the specific conditions required for the formation of tornadoes, and particularly significant tornadoes, will increase (Kossin, 2017). Until more studies are completed, the Minnesota State Climatology Office recommends assuming that tornadoes will remain an important and dangerous part of Minnesota's climate, even if they do not increase in frequency or severity in response to changing climatic conditions.

### 4.4.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified program gaps and deficiencies that make its residents more vulnerable to summer storms, including tornadoes, that should be addressed with new mitigation efforts to reduce vulnerability. These include:

*Above-Ground Power Lines:* Most power lines throughout Leech Lake Reservation are above ground, exposing them to potential damage from high wind events. Converting overhead power lines to underground would help to reduce risk of power failure.

**Public Education:** Ongoing public education is needed during tornado season to inform the public on what a tornado watch/warning is and what to do when outdoor warning sirens are activated. Ongoing outreach is also needed to encourage residents to be aware of and ready for severe storm events that can lead to long-term power outages.

**Storm Shelters and Tornado Safe Rooms:** We need to have a shelter option for the whole community or for individual homes. There are a lot of homes on the reservation that are built on concrete slab, or people who live in trailer houses. Elderly and special needs populations may have difficulty walking to a community shelter, and personal transportation is another common problem.

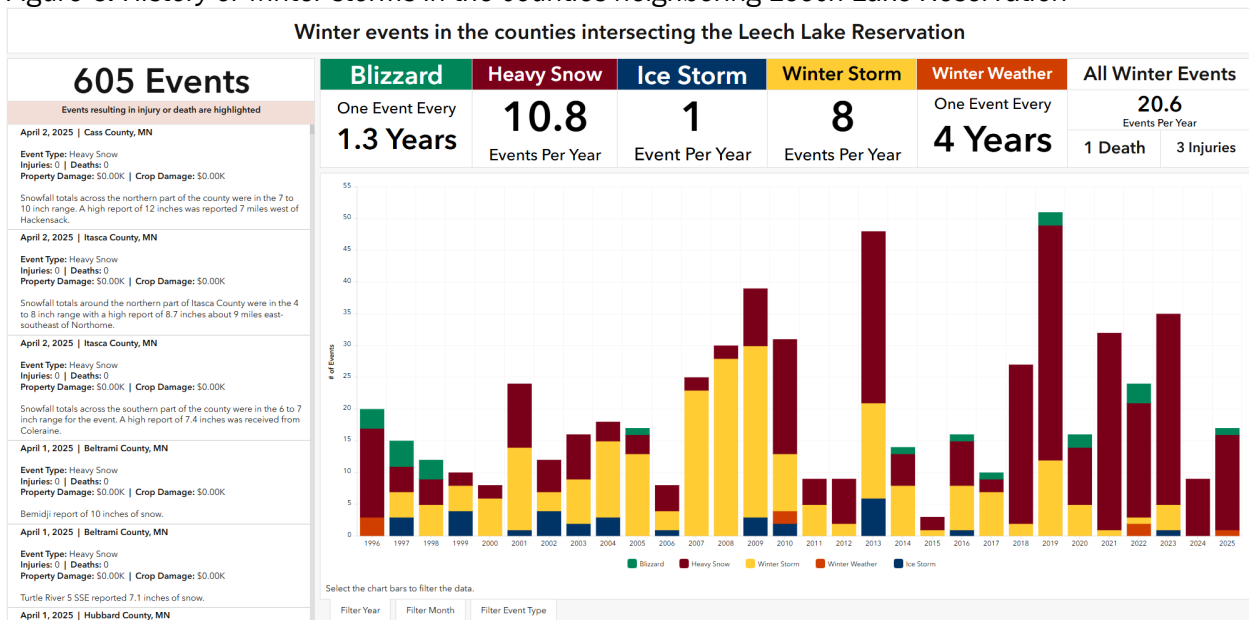
**New Housing in Aspen Forested Areas:** LLBO Forestry notes that when cutting open the footprints for new housing areas, there is a heightened risk of aspen trees being more susceptible to coming down during severe wind events since they are by nature a weaker species.

### 4.5 Winter Storms

Winter storms encompass a number of winter weather events which the National Weather Service (NWS) organizes into the following categories: blizzard, heavy snow, ice storm, winter storm, and winter weather. Winter weather events are common in Minnesota and can be costly. According to the Spatial Hazard Events and Losses Database (SHELDUS), winter weather events in Minnesota have cost more than \$1.02 billion in damages since 1960 (CEMHS, 2023). The history of winter storms in Leech Lake Reservation is shown in Figure 6; an interactive version of this map can be found on the Leech Lake Reservation HMP website.

[View interactive maps and see information about winter storm history, risk, and vulnerability](#)

Figure 6. History of winter storms in the counties neighboring Leech Lake Reservation



#### 4.5.1 Probability of Occurrence

To determine the probability of future winter-related storm events in Leech Lake Reservation, records of previous events (blizzards, heavy snows, ice storms, winter storms, and winter weather) were summed and divided by the dataset's period of record, resulting in the annual relative frequency of winter-related storms. Based on records in the NCEI Storm Events Database through May 2025, the relative frequency of winter-related storm events reported in or near Leech Lake Reservation is 20.6 per year. Please note, a single event may have been recorded in more than one county and may result in overcounting. This relative frequency can infer the probability of these events occurring in the future.

#### 4.5.2 Vulnerability

Transportation systems, electrical distribution systems, and structures are vulnerable to winter storms throughout the reservation. These events do not vary geographically within the reservation; all areas are equally vulnerable. While it is highly likely these events will continue occurring annually, the amount of snow and ice and number of winter-related storm events to occur each year are unpredictable. Residents living in climates such as these must always be prepared for situations that put their lives or property at risk. It is important that extra consideration be given to the vulnerable populations discussed in Section 3.2. Section 3.4 provides responses to localized vulnerabilities to specific hazards.

#### 4.5.3 Winter Storms and Climate Change

Historically, winter storms have had a large impact on public safety in Minnesota. If the frequency of snowstorms and annual total snowfalls increase, as anticipated effects of climate change, the effects on public safety will also increase. Pressures on energy use, reduced reliability of services, potential outages, and potential rise in household energy costs are major climate change risks to public health that can occur from winter weather.

Table 6 in Section 3.3 discusses confidence that climate change will impact common Minnesota weather/climate hazards beyond 2025, there is some weak evidence that warming winters may make heavy snowfall events less frequent as winter warms.

#### 4.5.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified several program gaps and deficiencies that make its residents more vulnerable to severe winter storms. The following gaps and deficiencies should be addressed with new mitigation efforts to reduce that vulnerability:

*Above-Ground Power Lines:* Most power lines throughout Leech Lake Reservation are above ground, exposing them to impacts/damage from winter high wind and ice events, potentially leading to localized or extensive power outages.

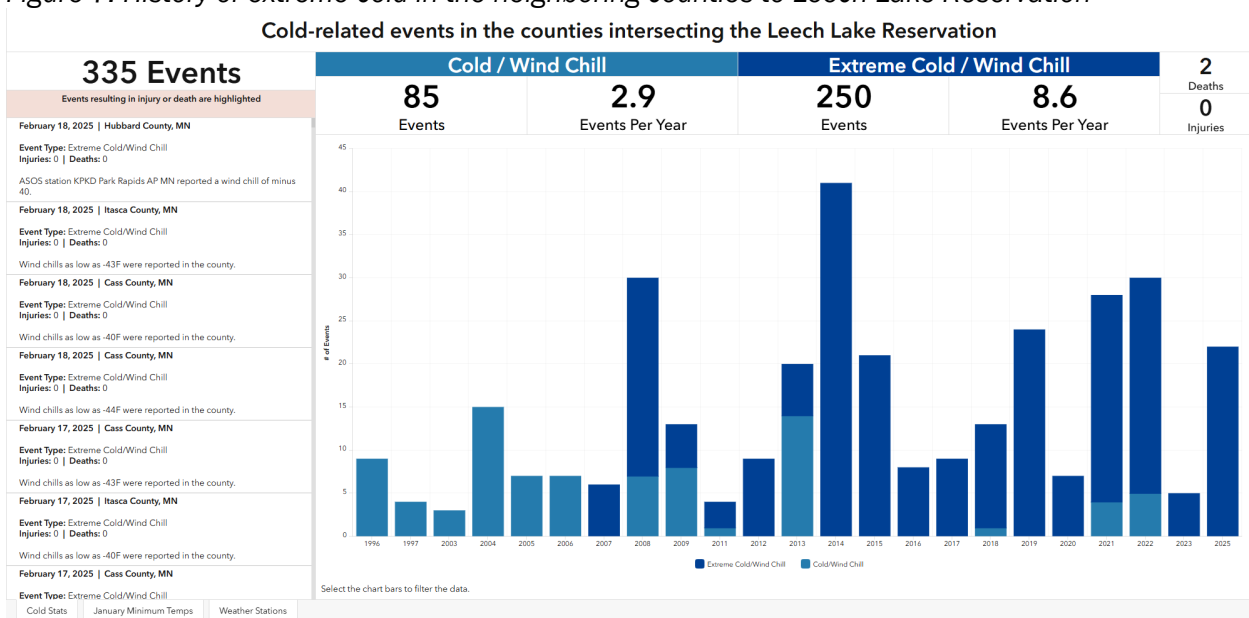
*Public Education:* Ongoing public education is needed to encourage residents to be ready for long-term power outages or to be snowed in during dangerous winter events such as ice storms and blizzards.

## 4.6 Extreme Cold

Due to Minnesota’s position in the middle of the continent and subsequent climate, the state may experience extremely frigid temperatures in winter. Winter in Leech Lake Reservation can be especially dangerous when low temperatures and wind create arctic-like wind chills. The history of extreme cold in the neighboring counties (Beltrami, Itasca, Hubbard, and Cass) to Leech Lake Reservation is shown in Figure 7; an interactive version of this dashboard can be found on the Leech Lake Reservation HMP website.

[View interactive maps and see information about extreme cold history, risk, and vulnerability](#)

Figure 7. History of extreme cold in the neighboring counties to Leech Lake Reservation



### 4.6.1 Probability of Occurrence

To determine the probability of future cold-related events in Leech Lake Reservation, records of previous cold/wind chill and extreme cold/wind chill events were summed and divided by the dataset’s period of record, resulting in the annual relative frequency. Based on records in the NCEI Storm Events Database through May 2025, the relative frequency of extreme cold/wind chill events in and near Leech Lake Reservation is 8.6 per year. (NCEI, 2025). Please note, a single event may have been recorded in more than one county and may result in overcounting. This relative frequency can be used to infer the probability of these events occurring in the future.

### 4.6.2 Vulnerability

The risk of extreme cold does not vary geographically within the reservation. Citizens living in climates such as these must always be prepared for situations that put their lives or property at risk. The youngest and more elderly residents, homeless persons, individuals with chronic medical conditions, and those who are working or recreating outdoors are most at risk for frostbite and hypothermia (MDH, 2021).

### [View at-risk populations in Leech Lake Reservation](#)

It is not always the depth of the cold that poses a threat but rather unpreparedness for the cold, such as an individual with a vehicle breakdown who lacks a personal winter safety kit in the vehicle. The cost of propane can make rural residents more vulnerable to issues with extreme cold. A propane shortage and resulting crisis, such as that which occurred in 2014, may increase the cost of heating homes and farms to a prohibitive amount (Eaton, 2014). The Minnesota Department of Commerce presents options and suggestions for homeowners who use propane [on their website](#).

The CDC publication “Extreme Cold: A Prevention Guide to Promote Your Personal Health and Safety” outlines preparation measures that individuals can take to reduce their vulnerability to extreme cold. Highlights in this document include advice about travel preparations, securing your home water supply, and safety during recreation (CDC, 2021).

Section 3.4 provides responses to localized vulnerabilities to extreme cold.

#### 4.6.3 Extreme Cold and Climate Change

Although climate research indicates that Minnesota’s average winter lows are rising rapidly, and our coldest days of winter are now warmer than we have ever recorded, cold temperatures have always been a part of Minnesota’s climate, and extreme cold events will continue.

As the climate changes, an increase in extreme precipitation or storm events could lead to a higher risk of residents being exposed to cold temperatures during power outages or other storm-related hazards. Extreme and changing temperatures are already challenging aging infrastructure and are expected to impair surface transportation and the electrical grid.

Key Message #4 in NCA5 in the Midwest Chapter states that green infrastructure and public and private investments may mitigate losses, provide relief from heat, and offer other ways to adapt the built environment to a changing climate.

#### 4.6.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified several program gaps and deficiencies that make its residents more vulnerable to extreme cold. The following gaps and deficiencies should be addressed with new mitigation efforts to reduce that vulnerability:

*Generators for Backup Power to Critical Facilities & Shelters:* Not all healthcare and other critical facilities utilized for the care of residents & visitors, including designated severe weather/emergency shelters (schools, churches, etc.) have backup power to run heating systems in the event of a power outage.

*Public Education:* Ongoing public education is needed to encourage residents to be prepared for extreme weather, including power outages during periods of extreme cold.

## 4.7 Extreme Heat

Extreme heat describes weather that is much hotter and/or humid than typical for a place and time of year. In the United States, extreme heat is the deadliest weather-related hazard and causes more deaths than flooding, tornadoes, and hurricanes combined. While heat waves are infrequent in a northern state like Minnesota, they can have severe consequences for residents who are not acclimatized to their effects (Runkle et al., 2022).

The National Weather Service (NWS) issues heat advisories and extreme heat warnings based on the heat index, which is a combination of air temperature and relative humidity that determines how hot it feels. The heat index threshold differs based on locality, since people in colder climates are less prepared for heat events than people who live in warmer climates (NWS, 2025b).

More recently, the NWS has developed the HeatRisk tool to issue a forecast of heat-related impacts to occur over a 24-hour period. It is intended to provide risk guidance to decision-makers and heat-sensitive populations. Historical data from the HeatRisk tool, available back to 2015, provide a more comprehensive look at extreme heat events beyond those reported as Extreme Heat Events in the Storm Events Database. The HeatRisk tool takes into consideration:

- How unusual the heat is for the time of year
- The duration of the heat, including both daytime and nighttime temperatures
- If those temperatures pose an elevated risk of heat-related impacts based on data from the Centers for Disease Control and Prevention (NWS, 2025a).

Impacts of extreme heat are far-reaching and can be severe. Some impacts include infrastructure failures, such as roads buckling and power outages; strain on essential services, such as increased demand for emergency medical services and law enforcement (Guo, 2017; Williams et al., 2020); and disruptions to important social and economic networks, such as school and event cancellations, which reduce access to education, physical activity, and community support.

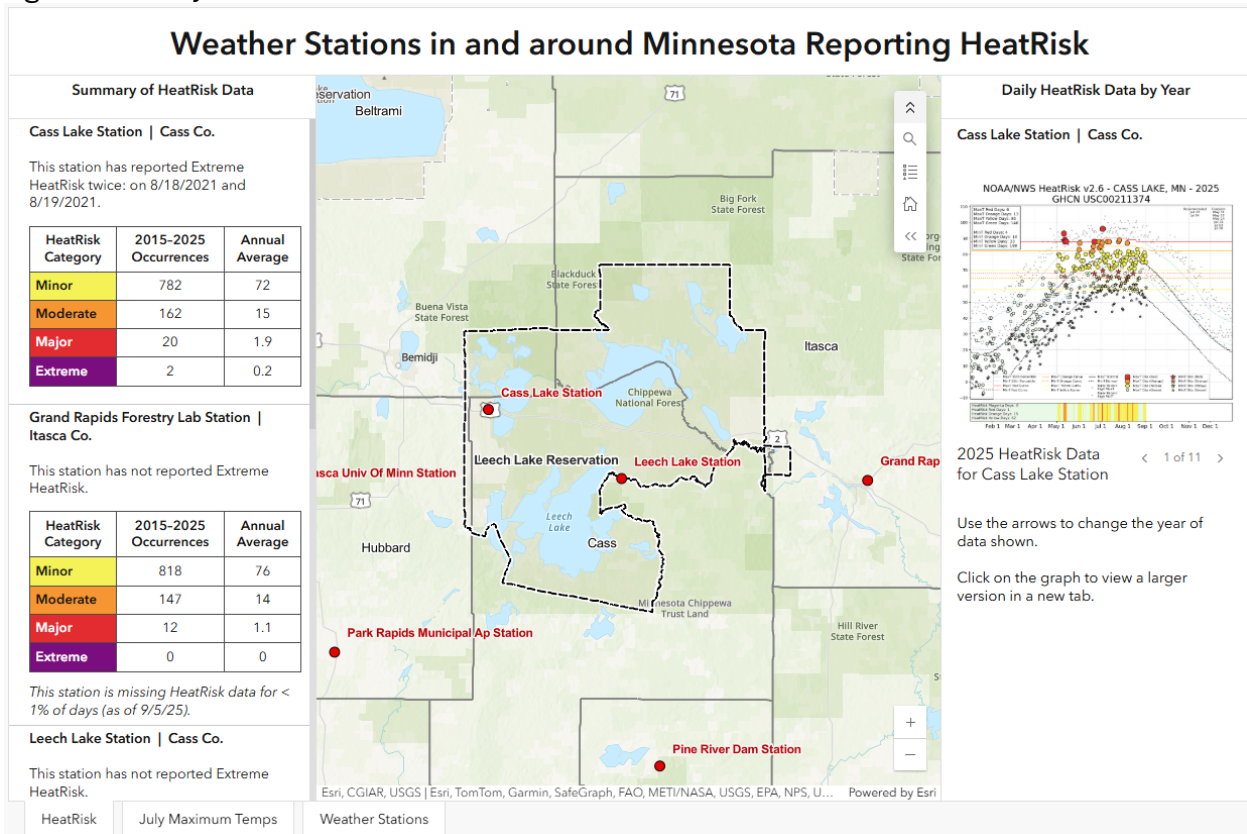
[\*View interactive maps and see information about extreme heat history, risk, and vulnerability\*](#)

Leech Lake Reservation's agricultural lands and structures are vulnerable to heat damage and its residents to injury, exacerbation of pre-existing chronic conditions, and even death (Moss, 2017). In the United States, heat is estimated to result in \$100 billion in economic losses annually, primarily due to lost productivity, and it accounts for \$1 billion in direct healthcare costs each year (American Public Health Association, 2025). In 2022, extreme heat led to 682 emergency department visits, 63 hospitalizations, and two deaths in Minnesota (MDH, 2025).

Extreme heat exacerbates poor air quality conditions because the stagnant air during a heat wave increases ozone and particulate pollution (Center for Science Education, 2025). Air pollution is particularly harmful for people over the age of 65, children under the age of five, outdoor workers, and people with respiratory or cardiovascular conditions. The [Minnesota Extreme Heat Toolkit](#) further details the health effects of poor air quality.

The history of extreme heat in Leech Lake Reservation is shown in Figure 8; an interactive version of this chart can be found on the Leech Lake Reservation HMP website. This dashboard summarizes the occurrences of days when each HeatRisk category threshold was met for each year from 2015–2024. For the purposes of hazard mitigation planning, we have considered days in the Major (Red) Category (a level of heat affects anyone without effective cooling and/or adequate hydration. Impacts are likely in some health systems, heat-sensitive industries, and infrastructure) and the Extreme (Magenta) Category (level of rare and/or long-duration extreme heat with little to no overnight relief affects anyone without effective cooling and/or adequate hydration. Impacts are likely in most health systems, heat-sensitive industries, and infrastructure) as extreme heat-related events.

Figure 8. History of extreme heat in Leech Lake Reservation



#### 4.7.1 Probability of Occurrence

To determine the probability of future heat-related events in Leech Lake Reservation, the average number of days exceeding the major or extreme HeatRisk categories is used to reflect heat events at the two weather stations within the reservation. The Cass Lake Station experiences major or extreme HeatRisk days an average of 2.1 days per year, and the Leech Lake Station experiences these events an average of 1.2 days per year based on the 11 years of record. This relative frequency can infer the probability of these events occurring in the future.

Based on records in the Midwestern Regional Climate Center (MRCC) that date back to 1991, the average daily maximum temperature for July in Leech Lake Reservation has historically been in

the 78–79 °F range (MRCC, 2021), which is below the 90 °F for 2–3 days criteria for “extreme” heat events (FEMA, 2024a). However, the Cass Lake Weather Station reported daily maximum temperatures above 90 °F an average of four days per year. This historical average can be used to infer future events, although climate change projections show an increase in the number of days that exceed 90 °F by mid-century (see Section 4.7.3).

#### 4.7.2 Vulnerability

The Minnesota Department of Health updated the Minnesota Extreme Heat Toolkit in 2025 to help local governments prepare for extreme heat events. In their toolkit, they note extreme heat events are often dubbed “silent killers” because deaths and illnesses from these events are often misunderstood and underreported. In fact, extreme heat kills more people in the United States than all extreme weather events combined (Adams-Fuller, 2023). Minnesota does not have a mandated reporting system to report deaths and illnesses linked to extreme heat (MDH, 2025), but is important to not underestimate the danger of extreme heat events within the state.

Rural areas have higher rates of heat-related emergency department visits compared with urban areas (MDH, 2024), and Americans living in rural areas are twice as likely as those in urban areas to have pre-existing health conditions that make them more vulnerable to extreme heat (Pohl, 2025). Rural agricultural regions can have higher rates of humidity due to moisture-producing crops like corn (Minnesota Supercomputing Institute, 2016), which produces evapotranspiration, or “corn sweat,” that can add as much as 5–10 °F to the dew point temperature (Steil, 2016).

**Key Message #3** in the Midwest Chapter of the NCA5 lists strategies, such as expanded use of green infrastructure and heat-health early warning systems, have the potential to improve both individual and community health (Wilson et al., 2023).

Everyone is susceptible to extreme heat, but certain individuals are at a higher risk of developing heat-related illnesses. According to the Centers for Disease Control and Prevention (CDC), population groups more vulnerable to extreme heat include:

- Older adults (≥65 years old). The elderly cannot easily adjust to sudden changes in temperature and are more likely to have a chronic medical condition or take medication affecting their body’s ability to control its temperature.
- Infants and children. Young children and infants have limited control of their surroundings and rely on others to keep them cool and hydrated.
- Individuals with chronic health conditions. These individuals are less likely to respond to changes in temperature, may be taking a medication that exacerbates the effects of extreme heat, or have a condition that is a risk factor for heat-related illness (e.g., heart disease, mental illness, poor blood circulation, and obesity).
- People with low income. These individuals may not be able to afford to properly cool their home and may face transportation challenges when trying to access cooling shelters.
- Athletes and people working outdoors. Both groups are likely to exert energy while being exposed to the heat (CDC, 2020).

Table 10 shows characteristics that MDH has determined make individuals more at risk to adverse health effects from extreme heat, including how that vulnerability ranks among Minnesota counties. The indicator’s percentile rank within Minnesota determines the vulnerability level of Cass County for that indicator (e.g., the 1<sup>st</sup> –25<sup>th</sup> percentile is associated with the highest vulnerability compared to other Minnesota counties). The population of Cass County is the county with the highest population of Leech Lake Reservation residents, so it is used as a representative population for the table. For more information on what makes individuals and communities more vulnerable, see the [Minnesota Extreme Heat Toolkit](#).

*Table 10. Populations vulnerable to extreme heat in Cass County*

Vulnerability Indicator	Percentage of Population	Percentile Rank within Minnesota	Vulnerability Level
Adults with COPD	8.1%	84th	Highest
Adults with a self-care disability	4.2%	88th	Highest
Adults with coronary heart disease	9.5%	93rd	Highest
Adults with diabetes	13.6%	97th	Highest
Families at less than 200% of poverty level	24.7%	91st	Highest
Households where a person age 65 or over lives alone	14.9%	64th	High
Households with no computing device	6.7%	43rd	Moderate
Households with no vehicle available	4.5%	29th	Low
Households with rent over 50% of income	2.2%	9th	Lowest
Medicare beneficiaries who are electricity-dependent	4.5%	62nd	High
Medicare–Medicaid-enrolled beneficiaries	3.7%	76th	High
People age 5 or over with limited English	0.7%	14th	Lowest
People age 65 or over	26.8%	94th	Highest
People over age 16 who work outdoors	7.2%	33rd	Low
People under age 5	4.8%	8th	Lowest
People who are experiencing homelessness	0.1%	70th	High
People who are uninsured	7.1%	91st	Highest
People who do not identify as “White alone, not Hispanic or Latino”	18.9%	84th	Highest

[View interactive information about at-risk populations in Leech Lake Reservation](#)

Facilities where vulnerable populations may be concentrated, such as prisons, group homes, and childcare centers, are considered to be at higher risk during heat events.

Warming temperatures will continue to increase the risk of extreme heat, especially among these already vulnerable populations. Section 3.4 provides responses to localized vulnerabilities to extreme heat.

### 4.7.3 Extreme Heat and Climate Change

Minnesota’s annual average temperature has increased more than 3 °F since record-keeping began in 1895, and nine of Minnesota’s hottest 16 years on record have occurred since the year 2000 (MCAP, 2024). In Leech Lake Reservation, the average temperature from July to September has increased 0.18 degrees Fahrenheit per decade since 1895.

Nights are warming at a much higher rate than days in Minnesota. In Leech Lake Reservation, nighttime minimum temperatures from July to September have increased at a rate of 0.78 degrees Fahrenheit per decade (MN DNR, 2025b). While 94% of Minnesota households have some form of air conditioning (including central air, room units, dehumidifiers, and ceiling fans), only 68% have the central air conditioning that can provide reliable whole-house cooling (U.S. Energy Information Administration, 2023). Furthermore, homes with air conditioning equipment may not use it; for example, low-income homes might not turn on their units due to the associated costs, and homes in areas with higher crime rates may be reluctant to use window units for security reasons (EPA, 2006).

*The average number of days per year with temperatures over 90 °F under a high carbon emissions (SSP 585), mid-century (2040–2059) scenario is illustrated in the [Climate Dashboard](#) on the Plan website.*

Climate models project that temperature and precipitation increases will continue in Minnesota through the 21<sup>st</sup> century, with hotter summers and increased drought severity during dry periods as well. Already, the maximum annual heat index values have been rising across the state, because increased humidity during heat waves (Blumenfeld, K. Minnesota State Climatology Office, personal communication, December 21, 2023).

Table 11 compares historical temperature averages to projections under a high emissions (SSP 585) scenario, demonstrating how many more days will reach above 90 °F and nights where the minimum does not go below 75.2 °F. The data in the table is taken from [Minnesota CliMAT](#), an interactive online tool that provides highly localized climate projections for Minnesota and visualize how even specific towns will likely be impacted in the coming decades (Liess, S. et al., 2023). While models differ on how many degrees of warming will be caused by climate change, all models agree that temperatures will continue to rise.

Greenhouse gas concentrations will continue rising through the century, and the air’s ability to trap heat from the Earth’s surface will increase accordingly. Warming of the atmosphere will evaporate even more water into the air, further limiting the amount of cooling Minnesota will be able to achieve at night and during the winter. As warmer winters and warmer baseline conditions transition into summer, it will be much easier to attain extreme heat (MN DNR, 2025a).

*Table 11. Historical vs projected number of days reaching temp. thresholds in Leech Lake Reservation*

	Historical (1995–2014)	Projected (2040–2059)	Change
Days Above 90	3.34	12.80	+9.47
Nighttime Minimum > 75.2	1.75	1.91	+0.16

### 4.7.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management identified several program gaps and deficiencies that make its residents more vulnerable to extreme heat. The following gaps and deficiencies should be addressed with new mitigation efforts to reduce that vulnerability:

*Generators for Backup Power to Critical Facilities & Shelters:* Not all healthcare and other critical facilities utilized for the care of residents & visitors, including designated severe weather/emergency shelters have backup power to run cooling systems in the event of a power outage.

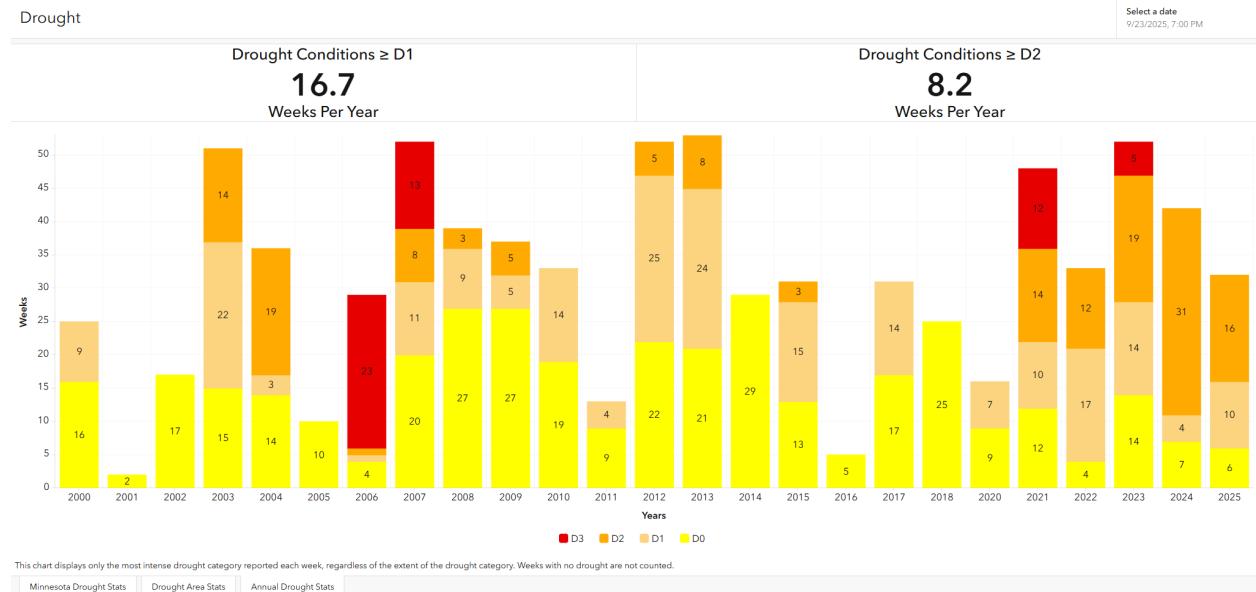
*Public Education:* Ongoing public education is needed to encourage residents to be prepared for extreme weather, including power outages during periods of extreme heat.

### 4.8 Drought

There are numerous approaches to assessing drought conditions. The current gold standard for accurate drought conditions in the United States is the United States Drought Monitor (USDM). Annual drought statistics since 2000 can be seen in Figure 9; an interactive version of this dashboard can be found on the Leech Lake Reservation HMP website.

[See interactive information about drought, including history and the USDM Dashboard, on the Leech Lake Reservation HMP website](#)

Figure 9. Annual drought statistics in Leech Lake Reservation since 2000



### 4.8.1 Probability of Occurrence

To determine the probability of future droughts in Leech Lake Reservation, records of previous droughts were summed and divided by the dataset's period of record, resulting in the annual relative frequency of droughts. The USDM database was examined from January 2000–August, 2025 for any occurrence of drought  $\geq$  D1 in Leech Lake Reservation, regardless of the duration of the drought. According to the weekly reported data, the relative frequency of the reservation experiencing drought conditions  $\geq$  D1 is 16.7 weeks per year, and the relative frequency of drought conditions  $\geq$  D2 is 8.2 weeks per year (NDMC, 2025b). The relative frequency of past droughts can be used to infer the probability of similar droughts occurring in the future.

### 4.8.2 Vulnerability

One way to identify reservation assets vulnerable to drought is by examining the impacts of previous droughts. Overseen by the National Drought Mitigation Center (NDMC), the Drought Impact Reporter (DIR) is a comprehensive database that gathers drought-related reports from a variety of sources and identifies the sector(s) impacted by each drought. The NDMC (NDMC, 2025b) defines a drought impact as “[a]n observable loss or change that occurred at a specific place and time because of drought.” A drought meeting this definition is categorized based on the sector(s) the drought impacts; therefore, a single drought affecting multiple sectors will be counted once for each respective sector it impacted.

DIR records show 2 reported drought incidents covering all four neighboring counties to Leech Lake Reservation between 2000 and 2025. These incidents were related to burning restrictions in the counties. (NDMC, 2025a). Since droughts are regional in nature, communities within Leech Lake Reservation do not vary in their vulnerability to drought; however, the impact from droughts may not be equal.

Drought conditions may impact soil moisture reserves, groundwater supplies, lake levels, and stream flows. Water-dependent industries that experience the greatest impacts include: agriculture, public utilities, forestry, and tourism (MN DNR, 2021a). In addition, droughts may negatively affect an individual's health by contributing to poor air quality caused by wildfire smoke and particulate matter, or a dusty environment. The 2021 drought resulted in elevated fire danger in roughly the northern two-thirds of the state, and record high particulate readings across Minnesota due to the Canadian wildfires (Huttner, 2021). [Populations vulnerable to these conditions](#) include children, older adults, and those with respiratory issues.

Section 3.4 provides responses to localized vulnerabilities to specific hazards.

### 4.8.3 Drought and Climate Change

Droughts have been happening throughout Minnesota's history. While the degree at which climate change will impact future droughts is not certain, an increase in efforts and resources are being devoted to project these impacts. In 2023, the NCA5 was completed by the U.S. Global Change Research Program. It provided a comprehensive scientific review of how climate change is impacting the U.S. as well as providing climate change projections.

According to the report, a warming climate is contributing to oscillations between extreme droughts and floods, threatening the agriculture and livestock in the Midwest which produces more than 30%

of the world's corn and soybeans (Wilson et al., 2023). Climate change is attributed to an estimated \$31.9 billion (2022 USD adjusted) of US crop indemnity payments over the last 30 years, with the largest portion of payments going to farmers affected by drought (Wilson et al., 2023). In Minnesota, drought alone represents 25% of the total crop indemnity payments made in the state (CEMHS, 2023).

Climate projections indicate an increase in annual precipitation of 0.2%–0.5% in the western Midwest and the increase in cumulative runoff is expected to continue through the midcentury (Wilson et al., 2023).

Key Message #5 in the Midwest Chapter of the NCA5 states that managing extremes is necessary to minimize impacts on water quality and quantity. The extreme variability between wet and dry periods is expected to negatively impact the water quality and quantity of the Mississippi River System and adversely affect dependent ecosystems and commerce (Wilson et al., 2023).

#### 4.8.4 Program Gaps and Deficiencies

Leech Lake Reservation Emergency Management did not identify any program gaps or deficiencies that make its citizens more vulnerable to drought.

#### 4.9 Dam Failure

The MN DNR Dam Safety Program has the mission of protecting the life and safety of people by ensuring that dams are safe. Minnesota's Dam Safety Program sets minimum standards for dams and regulates the design, construction, operation, repair, and removal of both privately and publicly (non-federal) owned dams (MN DNR, 2020). The federal government is responsible for regulating and maintaining dam safety of federally owned dams. No single agency regulates all federally owned dams. 42% of federal dams are owned and managed by the U.S. Army Corp of Engineers (USACE) and the Bureau of Reclamation. The remaining federal dams are owned and managed by other federal agencies, including the Fish and Wildlife Service, Forest Service, the Department of Defense, and the Bureau of Indian Affairs, among others (Normand, 2019). The Federal Energy Regulatory Commission (FERC) Dam Safety Program is the largest dam safety program in the U.S. The Commission works with federal and state agencies to ensure and promote dam safety of over 3,000 dams across the U.S. The Commission inspects projects on an unscheduled basis to investigate potential dam safety problems; complaints about constructing and operating a project; safety concerns related to natural disasters; and issues concerning compliance with the term and conditions of a license (FERC, 2020).

**Dam Inventory:** The National Dam Inventory reports that there are 15 dams in Leech Lake Reservation. An interactive map of Minnesota dams is available on the [MN State 2024 HMP website](#). Leech Lake Reservation had zero dams classified as High Hazard Dams, four dams classified as Significant Hazard Dams, and 11 dams classified as Low Hazard Dams. All of these dams are owned by USACE and USDA. An additional dam, Mud-Goose Lake, is owned by MN DNR and located within Leech Lake's Off-Reservation Trust Land. It is classified as a Low Hazard Dam.

The Minnesota Dam Safety Program office was consulted to identify dam incidents and concerns. None were raised for dams within Leech Lake Reservation.

### 4.9.1 Probability of Occurrence

Extreme precipitation is only one factor contributing to dam failure, and the possibility of failure is dam-specific, relating to both environmental and structural conditions. There have been no known dam incidents in Leech Lake Reservation. Dam failures are extremely unlikely if the dam is maintained in compliance with Minnesota’s Dam Safety Program. The likelihood of failure in Leech Lake Reservation is low.

### 4.9.2 Vulnerability

Although dam regulatory authorities differ between various federal and state agencies, all authorities attempt to classify dams according to the potential impacts from a dam failure or mis-operation. In response to the numerous classification systems, FEMA’s Interagency Committee on Dam Safety created a downstream hazard potential classification system that is adaptable to any agency’s current system. Table 12 provides an overview of the main criteria agencies consider when determining a dam’s downstream hazard potential. This classification system does not imply that the dam is unsafe, but rather categorizes dams based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests (FEMA, 2004).

Table 12. Downstream hazard potential classification criteria

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Class III (Low)	None expected	Low and generally limited to owner
Class II (Significant)	None expected	Yes
Class I (High)	Probable - one or more expected.	Yes (but not necessary for this classification)

SOURCE: (USACE, 2008)

Dams for which a hazard potential has not been designated, or is not provided, are classified as “Undetermined.”

An Emergency Action Plan (EAP) is a document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed during a dam failure to minimize property damage or loss of life. An EAP is required for Class I dams and strongly recommended for Class II dams (MN DNR, 2020).

### 4.9.3 Dam Failure and Climate Change

Dams are designed based on assumptions about a river’s annual flow behavior that will determine the volume of water behind the dam and flowing through the dam at any one time. Changes in weather patterns due to climate change may change the hydrograph or expected flow pattern. Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events are mechanisms that also result in increased discharges downstream. It is conceivable that bigger rainfalls at earlier times in the year could threaten a dam’s designed margin of safety, causing dam operators to release greater volumes of water earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

Climate change may increase the probability of design failures. Some spillways may not be large enough to convey the increased flow pattern. An undersized spillway could lead to dam overtopping and failure.

The partial failure of the Rapidan Dam in Blue Earth County in June of 2024 highlighted the growing threat climate change poses to the country's aging infrastructure as extreme weather becomes more common and severe. The Rapidan Dam is a Significant Hazard Dam in "poor" condition. About 20% of Minnesota's Significant and High Hazard Potential Dams are in "fair" or "poor" condition, with a few in "undefined" condition, and about 70% of these dams were built before 1970 (USACE, 2024). These older dams are growing increasingly taxed by extreme weather, especially in the Midwest (Harrison, 2024). Climate change is adding a new level of uncertainty that needs to be considered with respect to assumptions made during the dam construction.

While the Rapidan Dam partial failure did not result in mass inundation, it sent an estimated 11.6 million cubic yards of sediment downstream. The sediment was high in phosphorus and nitrogen because of nearby agricultural runoff. The impacts to the fish habitat and ecology of the stream may not be known for years (MPR News, 2024). The sediment loading behind older dams adds another compounding threat of dam failure to the stream and structures below.

#### **4.9.4 Program Gaps and Deficiencies**

Leech Lake Reservation Emergency Management did not identify any program gaps or deficiencies that make its citizens more vulnerable to dam failure.

# Section 5 – Mitigation Strategy

The goal of mitigation is to protect lives and reduce the impacts of future hazard events, including property damage, disruption to local and regional economies, the amount of public and private funds spent on recovery, and to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment as provided in Section 3 of this plan and on the HMP website. Mitigation should be an ongoing process, adapting over time to accommodate a community's needs.

## 5.1 Community Capability Assessments

The capability assessment identifies current activities and existing planning tools used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to reducing disaster damages. The assessment also evaluates these capabilities to determine whether the activities can be improved to more effectively reduce the impact of future hazard events. The following sections identify existing plans and mitigation capabilities within all of the communities:

- Appendix D: Lists the plans and programs in place in Leech Lake Reservation as related to hazard mitigation.
- Appendix C: As part of the Leech Lake Reservation HMP update, the tribal government was asked to participate in filling out a “Local Mitigation Survey” (LMS) form to report on their current mitigation capabilities and program gaps. Appendix C provides the LMS reports gathered for Leech Lake Reservation.

Information from the capability assessments was used to support development of local mitigation actions for implementation over the next five years (see column *Comments on Implementation & Integration*).

### 5.1.1 National Flood Insurance Program (NFIP)

The NFIP is a federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the federal government that states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the federal government will make flood insurance available within the community as financial protection against flood losses.

Leech Lake Reservation is not participating in the NFIP.

### 5.1.2 Repetitive Loss Properties

Repetitive loss properties are defined as properties with two or more flood insurance claims of \$1,000 or more in any rolling 10-year period. Property owners are asked to consider mitigation activities such as acquisition, relocation, or elevation, among other options. FEMA's Repetitive Loss (RL) properties strategy is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties. Property owners are notified of their status by FEMA.

A Severe Repetitive Loss (SRL) property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- c) For both (a) and (b) above, at least two of the referenced claims must have occurred within any 10-year period and must be greater than 10 days apart.

Repetitive Loss properties are not inventoried for Leech Lake Reservation.

### 5.1.3 Previous Integration of Hazard Mitigation into Planning Mechanisms

The Leech Lake Band of Ojibwe (LLBO) is encouraged to integrate relevant information from this mitigation plan into their other planning mechanisms. This demonstrates local progress in mitigation efforts for the Leech Lake Reservation and strengthens the overall mitigation planning process. As part of this plan update, Leech Lake Reservation representatives were asked to report whether and how information from the 2015 plan was incorporated into other tribal planning mechanisms (e.g., plans, policies, programs, partnerships, or other documents). The following provides an overview of responses.

- The Leech Lake Tribal Emergency Response Committee (TERC) is led by the LLBO Emergency Manager. The EM incorporated discussion of progress on mitigation efforts included in our 2015 hazard plan or any new needs in response to severe storm events during our regular TERC meetings.
- Leech Lake Emergency Management and Leech Lake Public Health incorporated the 2015 plan into our joint planning for vulnerable elders on the Reservation. Together we compiled a list of their locations. This information supports both Leech Lake Emergency Management and Leech Lake Public Health conduct more direct outreach to this group and plan for emergency evacuation for this distributed population.
- On August 31<sup>st</sup>, 2017 the Leech Lake Tribal Council made a resolution that endorsed Ordinance No. 2018-01 that outlines and clarifies the roles, authorities, and relationship between Public Health and Emergency Management. This ordinance was successfully implemented during the COVID-19 response period.

- Leech Lake Emergency Management worked with other tribal departments to purchase emergency response equipment (towable Baldor Trailer 150KW generator and chainsaws) identified as necessary to support response to severe storm events.
- Leech Lake Emergency Management incorporated goals of the past plan to improve emergency notifications and outreach to our community. We purchased CodeRED software and completed a new MOU for LLBO to participate in the IPAWS (Integrated Public Alert and Warning System) program. We further have worked to better utilize our tribal radio station to share information with our residents before, during, and following severe storm events.
- Leech Lake Environmental Department incorporated mitigation actions in our past plan into the department's wetland restoration and maintenance projects.
- The Leech Lake Environmental Department incorporated climate change considerations from our last plan into development of a Climate Adaptation Plan that is underway for the Leech Lake Reservation.
- The last plan identified we needed to increase warning siren coverage on the reservation. Since 2015 LLBO has purchased and installed 2 new outdoor warning sirens in areas where they were needed on the reservation. We also worked to prepare evacuation plans for the Bug School and Gaming locations.
- The Leech Lake Pow Wow committee worked with Emergency Management to create an emergency plan that included sheltering and evacuation that was implemented during the June 20<sup>th</sup>, 2025 Wind Storm that occurred while several hundred pow wow participants were camping in tents- they were evacuated to the identified shelter which resulted in no injuries or loss of life. Afterwards, 8 tents and one camper were observed to have been crushed and destroyed by large trees that were blown down by up to 105 MPH winds.
- The Leech Lake Department of Resource Management – Forestry Division incorporated education and awareness mitigations into public outreach and assistance efforts. The Leech Lake Forestry Division has a Fire Prevention Technician who conducts in-school education and conducts on-site assessments with tribal property owners to review their properties and how to create defensible space. LLBO Forestry has also continued to work in partnership with the Chippewa National Forest staff to reduce blowdown risk to buffer areas that are vulnerable to strong wind events. This was noted by FEMA Region 5 officials during the PDA from the June 20<sup>th</sup> 2025 storm, defensible space around our housing saved us from infrastructure and housing damage. Leech Lake Forestry has also been working to update our Community Wildfire Protection Plan.
- The Leech Lake Environmental Dept. and Leech Lake Dept. of Resource Management have incorporated the past plan into our programmatic efforts to monitor how the natural hazards of flooding, drought, and extreme heat are affecting our natural resources. This includes monitoring high water temps that kill of native/cultural fish species, monitoring water fluctuations that affect the health of our Wild Rice harvest, and monitoring invasive species such as the Emerald Ash Borer that are causing die off to Ash trees. The Leech Lake Environmental department has also continued to partner with the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) to monitor water levels and provide us with data.

#### 5.1.4 Plans and Programs in Place to Address Natural Hazards

Leech Lake Reservation has numerous plans and programs in place to address natural hazards. Some of these programs are specific to a hazard and others address impacts and human safety for many types of events (“All Hazards”). To group related natural hazards, “Summer Storms” encompasses Tornadoes, Windstorms, Lightning, and Hail. The plans and programs in place by Leech Lake Reservation to support mitigation for the hazards addressed in this plan are described as follows:

##### All Hazards

*All Hazards Emergency Operations Plan:* Leech Lake Reservation Emergency Management maintains an all-hazards Emergency Operations Plan (EOP) which lays out concepts and operating guidelines for all incident management and support functions that may be needed to ensure life safety, incident stabilization, and property preservation during an incident and the transition to recovery.

*Emergency Notification System:* Leech Lake Reservation maintains the CodeRED Emergency Notification System which allows residents and visitors to sign up (“opt-in”) to receive severe weather alerts targeted to their location, along with other local emergency alerts. A link to sign up for the system is located on the Leech Lake Reservation Emergency Management website page. Leech Lake Reservation also has a Sovereign Nation IPAWS MOU with FEMA, one of only 14 tribes nationwide to do so.

*Preparedness Outreach & Education:* Leech Lake Reservation Emergency Management utilizes the Leech Lake Reservation Emergency Management website page and Leech Lake News (social media/email messages) to communicate with reservation members on severe weather awareness and emergency preparedness throughout the year. The tribe also receives all products/statements issued by the National Weather Service, and in turn shares or incorporates these into its community outreach and public education. Promotion of the use of NOAA weather radios occurs during the NWS Severe Weather Awareness Week as well as throughout the year.

*Mass Care Sheltering:* LLBO has entered into an MOU with the American Red Cross to increase the number of trained volunteers in the area and to respond to regularly occurring incidents such as housefires. We also work closely with Cass County under a MOU between the tribe and the county that states that we will communicate and work together for everything that impacts our shared communities.

*Backup Power:* Leech Lake Reservation works to ensure the continuity of operations of tribal government services and critical infrastructure in the event of an extended power outage. Reservation residents are encouraged to assess where backup power is needed and to obtain emergency generators.

*Schools Support:* Leech Lake Reservation Emergency Management coordinates with the Bug-O-Nay-Ge-Shig School on emergency planning and preparedness, including support for specific

trainings, exercises, equipment, and relay of emergency notifications. The school has its own policies, decision-making protocols, and communications plans in place to determine the need to close school and to relay notifications in the event of severe weather, extreme temperatures, or other events that pose risk to students and staff.

*Regional Collaboration:* Leech Lake Reservation Emergency Management works closely with the neighboring emergency managers in MN HSEM Region 2 on a range of planning, training, and exercises to support all-hazards preparedness, mitigation, response, and recovery capabilities. Leech Lake Reservation Emergency Management also works closely with our regional National Weather Service (NWS) office, having access to all live and on-demand briefings, announcements, and educational opportunities, and contact information for direct collaboration as needed.

## Severe Winter Storms

*Winter Weather Statements (Watch, Advisory, Warning, etc.):* Leech Lake Reservation Emergency Management works to relay winter weather statements received from the NWS to help alert residents and visitors to hazardous conditions.

*Winter Hazard Awareness Week:* Leech Lake Reservation participates in the Winter Hazard Awareness Week campaign sponsored by MN HSEM and the National Weather Service each November. The week-long effort provides specific information each day covering the topics of winter weather, outdoor winter safety, indoor winter safety, and winter driving safety. Leech Lake Reservation Emergency Management promotes and shares information during the week via social media and area news media.

*Snow Removal & Ice Control:* The Leech Lake Reservation Tribal Roads Construction and Surveying Department conducts winter road maintenance on 117 miles of BIA roads on the Leech Lake Reservation.

## Severe Summer Storms

*Severe Weather Statements (Watch, Advisory, Warning, etc.):* Leech Lake Reservation works to relay severe spring and summer weather statements (such as for thunderstorms, windstorms, or tornadoes) received from the NWS to help alert residents and visitors to hazardous conditions.

*Outdoor Warning Sirens:* Leech Lake Emergency Management oversees repairing and testing our LLBO owned Emergency Alert Sirens. There are 12 located in: Tract 33, Veterans Grounds, Mission Community Center, Pennington Community Center, Prescott, Northern Lights, Onigum, Boy River, Sugar Point, Bena, Ball Club, Inger and more recently added S. Lake and Oak Point.

*Skywarn® Program:* Leech Lake Reservation Emergency Management works with the National Weather Service to offer Storm Spotter training on an annual basis to tribal law enforcement and firefighters, as well as area residents that wish to be trained as spotters. SkyWarn Storm

Spotters help to keep their local communities safe by providing timely and accurate reports of severe weather to their local NWS office.

*Severe Weather Awareness Week:* Leech Lake Reservation participates in the Severe Weather Awareness Week campaign sponsored by MN HSEM and the NWS each April. The week-long effort provides specific information each day covering the topics of severe weather alerts and warnings, lightning, hail, floods, tornadoes (with statewide drills), and extreme heat. Each topic covered includes factsheets, checklists, data, and other resources. Leech Lake Reservation Emergency Management promotes and shares information during the week via social media with communities, schools, churches or other civic programs are encouraged to share locally.

*Vegetation Management:* The Leech Lake Reservation Roads Department conducts vegetation management along tribally-owned roads to reduce the risk of downed trees or branches resulting from severe spring and summer storm events. Electric utility providers also work to manage vegetation near power lines to reduce the risk of downed lines and power outages. Leech Lake also monitors for invasive species such as Emerald Ash Borer that can cause die off of Ash trees.

## Extreme Cold

*Emergency Notifications:* Extreme cold temperature warnings are issued by the National Weather Service. Leech Lake Reservation Emergency Management works to relay extreme cold temperature warnings from the NWS to help alert residents and visitors to hazardous conditions. The Leech Lake Reservation Emergency Management Office also encourages residents to follow local news or NWS weather applications to receive severe weather and extreme temperature notifications.

*Extreme Cold Safety Awareness:* Leech Lake Reservation Emergency Management and Leech Lake Reservation Public Health promote public awareness of personal safety measures to take during periods of extreme cold, such as sharing information via Facebook posts.

*Emergency Sheltering:* In the event of an extended power outage coupled with a period of extreme cold, Leech Lake Reservation Emergency Management will work with Leech Lake Reservation Public Health to assist vulnerable residents such as the elderly who may need temporary sheltering.

## Extreme Heat

*Emergency Notifications:* Extreme heat temperature warnings are issued by the National Weather Service. Leech Lake Reservation Emergency Management works to relay extreme heat temperature warnings from the NWS to help alert residents and visitors to hazardous conditions. The Leech Lake Reservation Emergency Management Office also encourages residents to follow local news or NWS weather applications to receive severe weather and extreme temperature notifications.

*Public Education and Awareness:* Leech Lake Reservation Emergency Management and Leech Lake Reservation Public Health to promote public awareness of personal safety measures to take during periods of extreme heat, such as sharing information via Facebook posts.

*Emergency Sheltering:* In the event of an extended power outage coupled with a period of extreme heat, Leech Lake Reservation Emergency Management will work with Leech Lake Reservation Public Health to assist vulnerable residents such as the elderly who may need temporary sheltering.

*Water Temperature Monitoring (Fisheries and Wild Rice):* The Leech Lake Environmental Dept. and Leech Lake Dept. of Resource Management continue to monitor how extreme heat affects our natural resources. This includes monitoring high water temps that kill of native/cultural fish species.

## Drought

*Public Awareness & Outreach:* In the event of extreme drought conditions, Leech Lake Reservation works in concert with the NWS, MN DNR, and neighboring county emergency managers to raise public awareness of drought conditions and recommended water use restrictions as per MN DNR guidance.

*Wild Rice Monitoring:* The Leech Lake Environmental Dept. and Leech Lake Dept. of Resource Management continue to monitor how drought and water level fluctuations affect our lakes that sustain Wild Rice. The Leech Lake Environmental Department continues to monitor water levels through the Great Lakes Indian Fish & Wildlife Commission (GLIFWC).

## Wildfire

*Public Awareness & Emergency Notifications:* In event of wildfire, Leech Lake Reservation Emergency Management works with local law enforcement, local fire departments, the NWS, and the MN DNR to get the word out on the risk of the level of fire danger and any burning restrictions to help keep the public informed and protected.

*Wildland Fire Program:* LLBO Forestry leads efforts for wildfire prevention and working with homeowners to conduct Home Assessments for defensible space.

*Wildland Fuels Reduction:* LLBO Forestry has promoted conversations with Chippewa National Forest staff to perform some work along roadsides to reduce blowdown risk; historically, they leave an entire buffer strip which results in weaker trees that are more open to wind events.

*Burning Restrictions/Permits:* Burning restrictions are set by the MN DNR. Burning permits within Leech Lake Reservation are obtained through the LLBO Forestry Division.

*Wildland Fire Fighting:* LLBO Forestry responds to woodland or grassland fires within reservation boundaries and works in coordination with other fire departments as needed via mutual aid agreements.

## Flooding

*Stormwater Management:* LLBO Environmental Department is working to address stormwater issues with development by countering with rain gardens and stormwater retention measures.

*Wetland Remediation, Climate Plan:* LLBO Environmental Department is working on a remediation plan to return wetlands to functioning bodies as well as development of a Climate Adaptation Plan.

*Shoreland Ordinance:* Leech Lake Land Use Ordinance-Article XVIII Management of Shoreland Areas establishes allowable uses and development standards in shoreland areas designated within the Leech Lake Reservation.

*Transportation Plan:* The Leech Lake Tribal Engineering Department, also Tribal Roads Construction & Surveying Dept. develop and implement plans to address transportation projects as needed for tribally-owned roads.

*Wild Rice Monitoring:* The Leech Lake Environmental Dept. and Leech Lake Dept. of Resource Management continue to monitor how high rain events and water level fluctuations affect our lakes that sustain Wild Rice. The Leech Lake Environmental Department continues to monitor water levels through the Great Lakes Indian Fish & Wildlife Commission (GLIFWC).

## Dam/Levee Failure

The Leech Lake Band of Ojibwe does not have any plans in place in regards to dam or levee failure.

## 5.2 Mitigation Goals

The goals and strategies for natural hazards in the 2024 Minnesota State Hazard Mitigation Plan were adopted for use in the Leech Lake Reservation Plan. This framework, as outlined below, will allow for integration of the mitigation actions that are listed by Leech Lake Reservation and its communities into the state plan. The state will then be able to develop a statewide strategy that will benefit all of Minnesota.

*Flooding Goal:* Reduce deaths, injuries, property loss and economic disruption due to all types of flooding (riverine, flash, coastal, dam/levee failure).

*Wildfire Goal:* Reduce deaths, injuries, property loss, natural resource and economic disruption due to wildfires (forest, prairie, grass, and peat bogs).

*Windstorms Goal:* Reduce deaths, injuries, property loss, and economic disruption due to windstorms.

*Hail Goal:* Reduce deaths, injuries, property damage, and economic disruption due to hailstorms.

*Winter Storms Goal:* Reduce deaths, injuries, property loss, and economic disruption due to winter storms (blizzard, ice, and ice storm).

*Lightning Goal:* Reduce deaths, injuries, property losses, loss of services, and economic disruption due to lightning.

*Tornado Goal:* Reduce deaths, injuries, property loss, and economic disruption due to tornadoes.

*Drought Goal:* Reduce economic loss and environmental impacts due to drought.

*Extreme Heat Goal:* Reduce deaths, injuries, and economic disruption due to extreme heat.

*Extreme Cold Goal:* Reduce deaths, injuries, and economic disruption due to extreme cold.

*Dam/Levee Failure Goal:* Reduce deaths, injuries, property loss, natural resource and economic disruption due to dam/levee failure.

*Erosion/Landslide/Mudslide Goal:* Reduce deaths, injuries, property loss, and economic disruption due to hillside, coastal, bluff: caused primarily by oversaturation of soil.

### 5.3 Mitigation Action and Project Strategies

The mitigation actions in this plan are summarized into four main strategy types, as described in the FEMA publications *Local Mitigation Planning Handbook* (2013) and *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* (2013). Minnesota HSEM determined a fifth strategy type for use within the state: Mitigation Preparedness and Response. The strategies and example actions are listed in Table 13.

Table 13. Mitigation strategies and action types

Mitigation Strategy	Description	Example Mitigation Actions
Local Plans and Regulations	These actions include government authorities, policies, or codes, that influence the way land and buildings are developed and built.	<ul style="list-style-type: none"> <li>• Comprehensive plans</li> <li>• Land use ordinances</li> <li>• Planning and zoning</li> <li>• Building codes and enforcement</li> <li>• Floodplain ordinances</li> <li>• NFIP Community Rating System</li> <li>• Capital improvement programs</li> <li>• Open space preservation</li> <li>• Shoreline codes</li> <li>• Stormwater management regulations and master plans</li> </ul>
Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private	<ul style="list-style-type: none"> <li>• Acquisitions and elevations of structures in flood-prone areas</li> <li>• Utility undergrounding</li> <li>• Structural retrofits</li> </ul>

Mitigation Strategy	Description	Example Mitigation Actions
	structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program.	<ul style="list-style-type: none"> <li>• Floodwalls and retaining walls</li> <li>• Detention and retention structures</li> <li>• Culverts</li> <li>• Safe rooms</li> </ul>
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	<ul style="list-style-type: none"> <li>• Sediment and erosion control</li> <li>• Stream corridor restoration</li> <li>• Forest management</li> <li>• Conservation easements</li> <li>• Wetland restoration and preservation</li> </ul>
Education and Awareness Programs	These are actions to inform and educate residents, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	<ul style="list-style-type: none"> <li>• Radio or television spots</li> <li>• Websites with maps and information</li> <li>• Real estate disclosure</li> <li>• Presentations to school groups or neighborhood organizations</li> <li>• Mailings to residents in hazard-prone areas.</li> <li>• StormReady Certification</li> <li>• Firewise Communities</li> </ul>
Mitigation Preparedness and Response	This is a State of Minnesota mitigation strategy with the intent of covering preparation and actions that protect life and property during a natural disaster.	<ul style="list-style-type: none"> <li>• Emergency operations plan</li> <li>• Flood fight plans and preparedness</li> <li>• Dam emergency action plans</li> <li>• Warning</li> <li>• Backup power</li> <li>• Emergency capabilities</li> </ul>

HMP Planning Team members work together with the Leech Lake Reservation emergency management director to assure that the hazards and mitigation actions included in this plan are accurate and address the needs of the reservation. Development of mitigation actions for the reservation was informed by a community’s hazard and risk assessment; identification of local vulnerabilities, and review of capabilities in place to address mitigation. Leech Lake Emergency Management, tribal elected officials, tribal departmental staff, and other HMP planning team members actively participated in the development and review of the Leech Lake Reservation mitigation action chart for implementation through participation in planning team meetings (see Appendix F) and development of the Leech Lake Reservation Local Mitigation Survey (see Appendix C). Additional public feedback was incorporated following news releases inviting public input to the planning process (see Appendix G).

The Leech Lake Reservation risks and mitigation activities identified also incorporate the role of other entities participating in this plan.

*See Mitigation Actions and provide ongoing feedback on the HMP website*

The following is an overview of the mitigation action charts and a description of each element of the chart.

### **Number (#)**

Each mitigation action is identified by a number.

### **Hazard**

Each mitigation action is identified by the natural hazard it relates to. Actions that fall under “All Hazards” relate to both natural and non-natural hazards. “Severe Winter Storms” includes blizzards, heavy snow, ice storms, winter storms, and winter weather. “Severe Summer Storms” includes windstorms, tornadoes, lightning, and hail.

### **Mitigation Strategy**

Each mitigation action is identified by one of the following five mitigation strategies.

- Local Planning and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs
- Mitigation Preparedness and Response Support

See Table 13 for a description of each mitigation strategy and related types of actions.

### **Mitigation Action**

Each mitigation action provides a concise, action-oriented description of the action or project to be undertaken that will help to reduce or eliminate future risk, including in areas with existing or new development.

### **Status**

The status of each mitigation action is indicated by one of the following categories:

- New – New actions that have been identified since the last plan.
- Existing – Actions that are carried over from the last plan or have been updated.
- In Progress – Actions from the last plan that are currently being acted upon.

Mitigation actions that have been completed or deleted from the 2015 Leech Lake Reservation Hazard Mitigation Plan are identified and reported on in Table 15. Completed and deleted mitigation actions are not carried over into the updated mitigation action chart.

### **Priority**

In the review and discussion of selected mitigation strategies and actions, the planning team ranked

mitigation actions by priority for implementation. Table 14 provides criteria that were taken into consideration in the process.

**Table 14. Criteria for Mitigation Action Priority Ranking**

Ranking	Criteria
High Priority	<ul style="list-style-type: none"> <li>• Methods for reducing risk from the hazard are technically reliable.</li> <li>• The jurisdiction has experience in implementing mitigation measures.</li> <li>• Mitigation measures are eligible under federal grant programs.</li> <li>• There are multiple mitigation measures for the hazard.</li> <li>• The mitigation measure(s) are known to be cost-effective.</li> <li>• The mitigation measures protect lives and property for a long period or are permanent risk reduction solutions.</li> </ul>
Moderate Priority	<ul style="list-style-type: none"> <li>• Mitigation methods are established.</li> <li>• The jurisdiction has limited experience with the types of measures that may be appropriate to mitigate the hazard.</li> <li>• Some mitigation measures are eligible for federal grants.</li> <li>• There is a limited range of effective mitigation measures for the hazard.</li> <li>• Mitigation measures are cost-effective only in limited circumstances.</li> <li>• Mitigation measures are effective for a reasonable period.</li> </ul>
Low Priority	<ul style="list-style-type: none"> <li>• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental.</li> <li>• The jurisdiction has little or no experience in implementing mitigation measures, and/or no technical knowledge of them.</li> <li>• Mitigation measures are ineligible under federal grant programs.</li> <li>• There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative.</li> <li>• The mitigation measure(s) have not been proven cost-effective and are likely to be very expensive compared to the magnitude of the hazard.</li> <li>• The long-term effectiveness of the measure is not known or is known to be relatively poor.</li> </ul>

**Time frame**

Each mitigation action identifies the anticipated timeframe for implementation within the next five-year planning cycle. If a mitigation action is considered an ongoing effort, the next five-year period in which the activity would occur is listed. If a mitigation activity has a defined period for implementation (i.e., a specific year), it will be noted.

**Responsibility**

Each mitigation action identifies what personnel, department, or agency will serve as lead for the administration or implementation of the action.

**Comments on Implementation & Integration**

Each mitigation action provides a description of how the jurisdiction will work to implement the mitigation action and incorporate the activity into other existing planning mechanisms. This can

include description of methods for public outreach, enforcement of policies, development of plans, and coordination of key staff and partnership efforts.

### **Possible Funding**

Each mitigation action identifies potential funding sources to support implementation of the mitigation activity, such as existing tribal, state, or federal funding. Projects that may be eligible for future FEMA Hazard Mitigation Assistance grant funding are noted.

#### **5.3.1 Tribal Funding Capabilities**

This section discusses the capabilities of Leech Lake Reservation to implement hazard mitigation projects through current and potential sources of tribal, federal, or private funding.

### **Current Mitigation Funding**

Current hazard mitigation activities on Leech Lake Reservation are primarily funded through internal tribal program funding as directed by the Reservation Business Committee (RBC).

The Leech Lake Emergency Management Program is funded by the Leech Lake Tribal Police Department, which provides for the staffing of a full-time Leech Lake Emergency Manager. The Emergency Manager's responsibilities related to hazard mitigation for the Reservation include planning, project coordination with other tribal departments, public education, and coordination with neighboring county and city emergency managers.

The Leech Lake Department of Resource Management – Forestry Division has utilized the 638 Contracting Authority with the U.S. Department of Agriculture (USDA) to receive Fire Dependent Forest Restoration and Wildland Fire Program Capacity Building Funds. This is allowing us to update our Community Wildfire Protection Plan CWPP and ramp up our Wildland Fire/Fuels Program.

The Leech Lake Environmental Department has utilized funding from both State and Federal sources in the past. State sources have included Department of Commerce, Minnesota Pollution Control Agency, and MN Board of Water and Soil Resources. Federal sources have included Environmental Protection Agency, Department of Energy, Bureau of Indian Affairs, and the Department of the Interior. Non-governmental related funding has come from The Nature Conservancy and local foundations.

Additional mitigation efforts by Leech Lake are under the direction of specific departments and funded through tribal program funding, including working to reduce the vulnerability of natural resources (e.g., Wild Rice habitat) and critical facilities (e.g., casinos, tribal government buildings) to hazards such as high winds and flooding.

### **Potential Mitigation Funding**

The Leech Lake Reservation five-year Mitigation Action Chart (Table 15) identifies possible funding sources for each of the mitigation actions listed, which would be investigated further in the process of project development. Potential sources of funding identified during the planning process include:

- Leech Lake Tribal Departmental budgets (Tribal Police Department/Emergency Management, Reservation Services, Dept. of Resource Management, Public Health, Environmental Department, and Tribal Roads Construction & Surveying Department).
- National Weather Service
- FEMA Hazard Mitigation Grant Program (HMGP) Funding: The Leech Lake Band will be eligible to apply for FEMA HMA mitigation funds either directly to FEMA or as a sub-grantee through the State of Minnesota upon final approval by FEMA that the plan meets requirements 44CFR 201.7.
- Utility Company Providers (Beltrami Electric Coop, Lake County Electric Coop, Lake Country Power, Otter Tail Power, and Minnesota Power)
- Great Lakes Indian Fish & Wildlife Commission
- Community Wildfire Defense Grant (CDWG)
- MN Department of Natural Resource (MN DNR) Firewise Program
- Bureau of Indian Affairs (Roads Program, Wildland Fuels Reduction)

### 5.3.2 Leech Lake Reservation Mitigation Action Chart

The Leech Lake Reservation Mitigation Action Chart is provided below in Table 15 on the HMP website.

[See Mitigation Actions and provide feedback on the HMP website](#)

Table 15. Leech Lake Reservation Mitigation Action Chart, 2026–2031

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
1	All-Hazards	Education & Awareness Programs	Utilize effective methods to share information with the community about severe weather, extreme temperatures, and personal preparedness.	Existing High 2026-2031	Leech Lake Emergency Management (LLEM)	LL Emergency Management utilizes the Leech Lake Reservation Emergency Management website page and Leech Lake News (social media/email messages) to communicate with reservation members on severe weather awareness and emergency preparedness throughout the year. The tribe also participates in the annual Severe Weather Awareness Weeks held by the NWS and HSEM every April and November. SkyWarn trainings are held annually in coordination with the NWS.	Internal: LL Tribal Police Dept./EM
2	All-Hazards	Education & Awareness Programs	Encourage reservation residents to opt-in for the tribal’s emergency notification system and utilize effective outreach during emergencies.	Existing High 2026-2031	LLEM	The LLBO website homepage features a large banner with the CodeRED signup link. We have also identified a list of all the elders on our reservations and where they live order to support doing in-person notifications to more vulnerable tribal members. The LL Public Relation Department has connections to several news and media outlets, and we have our own radio station that is implementing its own public information and warning.	Internal: LL Tribal Police Dept./EM
3	All-Hazards	Local Planning & Regulations	Enforce tribal regulations governing new construction to prevent damage to buildings and infrastructure from severe weather events.	Existing Moderate 2026-2031	LL Facilities Management	LLBO requires a building permit to build on newly developed property, but this is mainly to ensure the building meets our environmental and historic preservation ordinances. The LL Facilities Management Division Director serves as our Building Official. The Tribe also conducts	Internal: LL Res. Services

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						Environmental and Public, Health and Safety walkthroughs of LLBO owned buildings which must follow set EPHS standards. The tribe does not adopt the MN State Building Code but construction projects are encouraged to follow those standards.	
4	All-Hazards	Local Planning & Regulations	Implement existing tribal plans and policies in place that help to mitigate against the impacts of flooding and other natural hazards to future development.	Existing High 2026-2031	LLDRM	LLBO Forestry - When new developments occur, we are pushing to ensure trees are not immediately adjacent to reduce the risk of downed trees on structures resulting from severe wind events. The Leech Lake Land Use Ordinance-Article XVIII Management of Shoreland Areas establishes allowable uses and development standards in shoreland areas designated within the Leech Lake Reservation. LLBO Dept. of Resource Management is updating the tribe's Land Use Ordinance in 2025.	Internal: LL Dept. of Resource Mgmt.
5	All-Hazards	Local Planning & Regulations	Utilize departmental staff and elected officials to work together to accomplish identified mitigation efforts.	Existing High 2026-2031	LLEM in coord with LL TERC and other tribal departments	The LL Tribal Emergency Response Commission (TERC) includes tribal departments that are responsible for supporting hazard mitigation and emergency response during an incident. These include the LLBO Department of Public Safety, Department of Public Works, Division of Resource Management, and the Leech Lake Housing Authority. LLEM also works in close coordination with LL Public Health on emergency preparedness & response planning.	Internal: LL Tribal Police Dept./EM, LL Public Health

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
6	All-Hazards	Local Planning & Regulations	Develop and sustain partnerships with outside agencies, organizations, businesses, and neighboring jurisdictions to accomplish mitigation efforts.	Existing High 2026-2031	LLEM, LL Forestry	LL Emergency Management works closely with neighboring county emergency managers and is a member of the Arrowhead Regional Emergency Managers Association (AREMA). LL Forestry also works with neighboring city volunteer fire departments other land management agencies on issues across the Leech Lake Reservation (Chippewa National Forest, MNDNR, tribal governments). All DRM depts work with other agencies in partnership for planning and regulation.	Internal: LL Tribal Police Dept./EM
7	All-Hazards	Mitigation Preparedness & Response Support	Ensure the Leech Lake Emergency Operations Plan (EOP) is updated and addresses policies & procedures needed to support EM functions prior to, during, and following a disaster.	Existing High 2026-2031	LLEM	LL Emergency Management maintains an all-hazards Emergency Operations Plan (EOP) which lays out concepts and operating guidelines for all incident management and support functions that may be needed to ensure life safety, incident stabilization, and property preservation during an incident and the transition to recovery.	Internal: LL Tribal Police Dept./EM
8	All-Hazards	Mitigation Preparedness & Response Support	Obtain backup generators for critical infrastructure or facilities that need them.	Existing High 2026-2031	LLEM in coord with other tribal depts.	LLEM has purchased a towable Baldor Trailer 150KW generator. LLBO Health Division also has a mobile solar array. Newer buildings have backup. We are working to ensure there are stand-generators that can be made available to outlying LL rural communities.	Internal: LL Tribal Police Dept./EM
9	All-Hazards	Mitigation Preparedness & Response Support	Ensure that plans, procedures, and designated facilities are in place to provide temporary sheltering due to a severe weather or other disaster event.	Existing High 2026-2031	LLEM, Public Health	LLBO and Cass County have and MOU that states we will communicate and work together for everything that impacts our shared communities. LLBO has	Internal: LL Tribal Police Dept./EM

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						also entered into an MOU with the American Red Cross to increase the number of trained volunteers in the area and to respond to regularly occurring incidents such as housefires.	
10	All-Hazards	Local Planning & Regulations	Identify and work to secure internal tribal as well as external funding (grant or loan sources) to help accomplish mitigation activities.	Existing Moderate 2026-2031	LLEM, Other Tribal depts as related	The LL Dept. of Resource Management has utilized 638 Contracting Authority with USDA to receive Fire Dependent Forest Restoration and Wildland Fire Program Capacity Building Funds. This is allowing us to update our CWPP and ramp up our Wildland Fire/Fuels Program. The LL Environmental Dept. utilizes State funding (Dept. of Commerce, MPCA, BWSR), Federal (EPA, DOE, BIA, Dept. of the Interior), as well as NGO's (TNC and local foundations). LL Emergency Management is funded under internal tribal funding and also works to obtain FEMA grant funding as necessary for mitigation projects.	Internal: LL DRM  <b>External:</b> State, Federal, NGO - See detailed comments section.
11	Flooding	Local Planning & Regulations	Address stormwater issues management in areas of new development on the LL Reservation.	Existing Moderate 2026-2031	LL Envr. Dept.	The LL Environmental Department is working to implement rain gardens and stormwater retention measures to address stormwater issues resulting from new development.	Internal: LL Envr. Dept.
12	Flooding	Local Planning & Regulations	Conduct wetland restoration and maintenance projects on the LL Reservation to naturally reduce the impacts of high rain events.	Existing Moderate 2026-2031	LL Envr. Dept.	The LL Environmental Department is working on a remediation plan to return wetlands to functioning bodies as well as development of a Climate Adaptation Plan.	Internal: LL Envr. Dept.
13	Flooding	Local Planning & Regulations / Structure & Infrastructure Projects	Address flood mitigation for tribally-owned road infrastructure.	Existing High 2026-2031	LL Tribal Roads Construction and Surveying Dept.	The Leech Lake Tribal Engineering Department, also Tribal Roads Construction & Surveying Dept. develop and implement plans to address	Internal: LL Tribal Roads Construction

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						transportation projects as needed for tribally-owned roads.	& Surveying Department
						Flood mitigation for tribally-owned road infrastructure (i.e., culvert replacements, road repair) is an ongoing need. LLBO needs funding assistance to improve roads and culverts that experience repetitive flooding.	External: BIA Roads Program
14	Severe Winter Storms	Local Planning & Regulations	Implement snow removal and ice control to ensure the safety of tribal roads impacted by winter storms.	Existing High 2026-2031	LL Tribal Roads Construction & Surveying Dept	The LL Tribal Roads Construction & Surveying Department conducts winter road maintenance on 117 miles of BIA roads on the Leech Lake Reservation.	Internal: LL Tribal Roads Construction & Surveying Department
15	Severe Winter Storms	Education & Awareness Programs	Conduct public outreach efforts to reservation residents on winter home heating safety and installation of smoke & carbon monoxide alarms.	Existing High 2026-2031	LLEM in coord with American Red Cross	This is an ongoing effort of LL Emergency Management. We include information on the LL Reservation on the dangers of using alternate heating sources indoors in winter, such as generators. LLEM works with the American Red Cross to go door to door to provide smoke and carbon monoxide alarms to reservation residents who need them.	Internal: LL Tribal Police Dept./EM External: American Red Cross
16	Severe Summer Storms	Education & Awareness Programs	Ensure there are trained SkyWarn spotters for the Leech Lake Reservation.	Existing High 2026-2031	LLEM in coord with NWS	LLEM works with the National Weather Service to offer annual SkyWarn training. The training is funded by the NWS.	External: National Weather Service
17	Severe Summer Storms	Mitigation Preparedness & Response Support	Repair and relocate a damaged existing warning located to a new location near the Northern Lights Casino.	Existing High 2026-2031	LLEM	During 2023-2024 LL Emergency Management worked extensively on developing and advancing this project, with a completed scope of work and project cost established with a vendor (Frontline Warning Systems). The project has undergone environmental review and approval by the LLBO Land Use	Internal: LL Tribal Police Dept./EM External: FEMA HMGP Grant

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						Dept. as well as review and approval by the tribe's Tribal Historic Preservation officer. The siren will be self-supplied with solar power. It has been determined that the LLBO needs to seek external grant funding for this critical project. LL Emergency Management intends to advance a Notice of Interest to MN HSEM in order to apply for a FEMA HMGP grant, which is contingent upon completion and FEMA approval of the tribes' 2025 HMP update.	
18	Severe Summer Storms	Mitigation Preparedness & Response Support	Ensure emergency plans are in place for annual Powwow events.	In-Progress High 2026-2031	LLEM in coord with Pow Wow Committee	LL Emergency Management in coordination with the Powwow Committee is working to update our emergency plans for severe summer storms that may occur during the annual Leech Lake Days Powwow and Onigum Powwow event. Evacuation and sheltering plans are being updated.	Internal: LL Tribal Police Dept./EM
19	Severe Summer Storms	Structure & Infrastructure Projects	Address the need for the construction of storm shelters or tornado safe rooms in areas where tribal residents or visitors are vulnerable to high wind events	Existing High 2026-2031	LLEM	LL Emergency Management is leading efforts to evaluate current emergency shelter needs and potential locations for new development or existing facilities. The Pow Wow grounds are an area of high vulnerability during public events. Many homes are also built on slab with no basements. FEMA grant funding may be available for tornado safe rooms from HMGP funding,	Internal: LL Tribal Police Dept./EM,  <b>External:</b> Possible FEMA HMGP grant
20	Severe Winter & Summer Storms	Structure & Infrastructure Projects	Work to convert overhead power lines to underground to avoid power outages from high wind events and storms.	Existing High 2026-2031	LLEM in coord with electric utility providers	LLBO has worked with our electric utility providers on burying powerlines and will continue to do. Our utility providers include	<b>External:</b> Utility Providers, Possible

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						Beltrami Electric Coop, Lake County Electric Coop, Lake Country Power, Otter Tail Power, and Minnesota Power) as needed. FEMA HMGP grant funding may be a source for powerline infrastructure retrofits that the tribe or rural electric coops may apply for.	FEMA HMGP grant
21	Severe Winter & Summer Storms	Natural Systems Protection	Manage trees and other vegetation along tribal roads from severe storm events to reduce risk to powerlines and passing motorists.	Existing Moderate 2026-2031	LL Tribal Roads Construction & Surveying Dept	The LL Reservation Roads Department conducts vegetation management along tribally-owned roads to reduce the risk of downed trees or branches resulting from severe spring and summer storm events. Electric utility providers also work to address dead or dying trees in the right of way to reduce the risk of power outages.	Internal: LL Tribal Roads Construction & Surveying Department,  External: Utility Providers
22	Extreme Cold/Heat Temps	Education & Awareness Programs	Provide outreach and education to the public on personal safety measures to take during periods of extreme cold or extreme heat.	In-Progress High 2026-2031	LLEM & Public Health	LLEM works to share information received from the National Weather Service when periods of extreme cold or heat are forecast and occurring. LLBO uses our website, tribal radio station, and in-person outreach to share information with tribal residents. The Leech Lake - Bugonaygeshig School has policies in place for delaying or closing school to protect students from extreme temps.	Internal: LL Tribal Police Dept./EM, Bug. School
23	Extreme Cold/Heat Temps	Mitigation Preparedness & Response Support	Plan for the activation of warming or cooling facilities and promote their use for those that are vulnerable to extremely heat or cold temperatures.	Existing High 2026-2031	LLEM in coord with PH and local govt's	In the event of an extended power outage coupled with a period of extreme cold or heat, LLEM will work with LL Public Health to assist vulnerable residents such as the homeless and elders who may need temporary sheltering. We also have an MOU in place with the American Red Cross and	Internal: LL Tribal Police Dept./EM  External: American Red Cross

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
						Cass County to provide assistance as needed.	
24	Flooding / Drought / Extreme Temperatures	Natural Systems Protection / Local Planning & Regulations	Monitor and plan for the impacts of flooding, drought, and extreme heat to our lakes that sustain fish populations and Wild Rice.	Existing High 2026-2031	LL Envr. Dept., LL DRM	The LLBO Environmental Dept. and LL Dept. of Resource Management continue to monitor how flooding, drought, and extreme heat affect our natural resources. This includes monitoring high water temps that kill of native/cultural fish species, monitoring water fluctuations that affect Wild Rice, and monitoring invasive species such as the EAB that are causing die off to Ash trees. The LL Envr. Dept. continues to monitor water levels through the Great Lakes Indian Fish & Wildlife Commission (GLIFWC).	Internal: LL Env. Dept., LL DRM  External: GLIFWC
25	Wildfire	Local Planning & Regulations	Update the Leech Lake Reservation Community Wildfire Protection Plan (CWPP).	In-Progress High 2026-2031	LL Forestry	LL Forestry is in the process of updating our CWPP. An updated plan is necessary to plan for areas of highest risk and determine needed mitigation measures.	Internal: LL DRM Forestry  External: Community Wildfire Defense Grant (CWDG)
26	Wildfire	Education & Awareness Programs	Conduct public outreach and education on wildfire risk.	Existing High 2026-2031	LL Forestry	LL Forestry has a Fire Prevention technician who promotes public awareness about fire safety through Smokey Bear appearances and visiting schools, performs Home Assessments to note any fuels risk evident at houses.	Internal: LL DRM Forestry  External: CWDG grant funding, MN DNR Firewise
27	Wildfire	Education & Awareness Programs	Work with tribal property owners to assess their properties and make recommendations for fuels reduction around the home.	Existing High 2026-2031	LL Forestry	The LL Forestry Fire Prevention Technician works with homeowners to conduct Home Assessments for defensible space.	Internal: LL DRM Forestry  External:

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
							CWDG grant funding, MN DNR Firewise
28	Wildfire	Natural Systems Protection	Work in coordination with natural resource agency partners to address wildland fuels risk and reduction.	Existing High 2026-2031	LL Forestry	LLBO Forestry continues to work with the Chippewa National Forest staff to reduce blowdown risk to buffer areas that are vulnerable to strong wind events. LL Forestry may also add more prescribed burning to prevent uncontrolled wildfire events.	Internal: LL DRM Forestry External: CWDG grant funding, MN DNR Firewise, BIA Wildland Fuels Reduction
29	Wildfire	Mitigation Preparedness & Response Support	Ensure mutual aid agreements with neighboring jurisdictions are in place for wildland wildfire response.	Existing High 2026-2031	LL Forestry/ Chippewa National Forest	The Chipp has primary wildland fire response and the LLBO Forestry also responds to woodland or grassland fires within reservation boundaries and works in coordination with other fire departments from neighboring jurisdictions as under mutual aid agreements.	Internal: LL DRM Forestry
30	Wildfire	Structure & Infrastructure Projects	Investigate grant funding opportunities to support implementation of programs to install metal roofing and external wildfire sprinkler systems for homes located in high-risk wildfire areas on the Leech Lake Reservation.	New High 2026-2031	LLEM in coord with LL Forestry and MN DNR Firewise	Leech Lake Emergency Management and Leech Lake Forestry will look into grant funding opportunities through FEMA HMGP and Community Wildfire Defense Grant funding to develop and implement projects for metal roofing and external wildfire sprinkler systems where needed on the reservation. We will work to engage with our MN DNR Firewise Specialist for guidance on these projects.	Internal: LLEM, LL DRM Forestry External: FEMA HMGP, CWDG funding
31	Drought / Wildfire	Local Planning & Regulations	Work with the MN DNR to enforce burning restrictions during periods of high risk for wildfire, and to improve	Existing High 2026-2031	LL Forestry	Burning restrictions are set by the MN DNR. Burning permits within Leech Lake Reservation are obtained through the LLBO	Internal: LL DRM Forestry

#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
			communication to the LLDRM when burn restrictions are in place.			Forestry Division. The LLDRM will request the MNDNR improve communication to us when burning restrictions are in place.	
32	Drought / Wildfire	Local Planning & Regulations	Conduct public outreach on limiting water use during periods of extreme drought and the heightened risk of wildfire	New Moderate 2026-2031	LL EM, LL DRM Forestry	We use the LL website, radio station, and in-person outreach to provide information to residents on water conservation and wildfire risk / burning restrictions during periods of extreme drought.	Internal: LL Tribal Police Dept./EM, LL DRM Forestry

# Section 6 – Plan Maintenance

## 6.1 Monitoring, Evaluation, and Updating the Plan

The Leech Lake Reservation Hazard Mitigation Plan (HMP) should be considered a living document. The plan should be updated and approved by FEMA at least every five years. The guidance in this section will function as the primary tool when reviewing progress on the implementation of the Leech Lake Reservation HMP.

The Leech Lake Reservation emergency management director (EMD) is the individual responsible for leading all efforts to monitor, evaluate, and update the HMP within the five-year window. Throughout the five-year planning cycle, the Leech Lake Reservation EMD will work with a tribal emergency preparedness group to help monitor, review, evaluate, and update the HMP. The group will include tribal government and departmental representatives from the Leech Lake Reservation. Representatives from agencies or organizations that are involved with related mitigation work in Leech Lake Reservation as well as those that work with underserved communities or socially vulnerable populations may also be invited to participate in the group. The Leech Lake Reservation EMD will conduct quarterly outreach to and communicate with the group on emergency management matters regarding severe weather awareness, local preparedness, mitigation, and response & recovery as needed. Additional stakeholders will be added based on need or in response to severe weather events.

If necessary, the Leech Lake Reservation EMD will convene the group to meet more regularly to monitor plan implementation progress and reassess needs and opportunities. This could be done in response to funding cycles of programs that provide resources for hazard mitigation activities. If there is a need for a special meeting due to new developments or a declared disaster occurring in Leech Lake Reservation, the group will meet to update pertinent mitigation strategies. Depending on Leech Lake Reservation opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

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

Updates or modifications to the HMP during the five-year planning process will require a public notice and a meeting prior to submitting revisions to FEMA for approval. The plan will be updated via written changes, submissions as the group deems appropriate and necessary, and as approved by Tribal Council.

During the five-year plan period, the EMD will require all relevant tribal departments to report on the status of their mitigation actions using the worksheets provided in Appendix H. This information will be used to track progress for the next plan update. Additionally, the EMD will establish and implement

an HMP maintenance schedule. Forms for these purposes are drawn from FEMA's 2023 Local Mitigation Planning Handbook and can be found in Appendix H (FEMA, 2023a).

The EMD will also solicit feedback from the emergency managers group using the following prompts (also found in Appendix H):

- Are there any new representatives from the reservation, neighboring jurisdictions and related agencies, or organizations that you feel should be included in our stakeholder outreach?
- Do you feel your community has any new vulnerabilities that may be impacted by hazard events? (critical infrastructure, systems, or populations)
- Has your community identified any new mitigation activities that would help reduce risk to future hazard events?
- Are there any funding opportunities or other resources that may be available to help implement local mitigation activities?
- How is your community integrating information from the mitigation plan into other planning mechanisms (such as plans, policies, or partnerships)?

## 6.2 Implementation

Leech Lake Reservation and its partner stakeholders share a common HMP and work together closely to develop, revise, and implement it. This HMP provides a comprehensive chart of mitigation actions for Leech Lake Reservation (see Section 5.3). Leech Lake Reservation identified the specific mitigation strategies that tribal government and departments would seek to implement across the Leech Lake Reservation tribal communities during the five-year planning cycle. These mitigation actions are provided in Table 15.

Over the five-year planning cycle, mitigation measures and project closeouts will be monitored by the Leech Lake Reservation Emergency Manager in coordination with other tribal departments as needed. In cases where projects are incorporated into existing Leech Lake Reservation programs and implemented using local tribal funds (e.g., Forestry Division fuel reduction practices), the respective division director or designated staff will be responsible for tracking and reporting on project status, closeout, and costs as per Leech Lake Reservation policy. For mitigation projects implemented with outside grant funding (such as BIA, USDA, or FEMA), the Leech Lake Reservation Emergency Manager or other tribal department staff will follow the monitoring and reporting requirements of the respective grant program. Commonly applied grant management processes and procedures include submission of quarterly reports that detail project progress, documentation of local match (cash or in-kind), maintaining records of costs incurred, spending plans, and reporting updates to the Reservation Business Committee.

Several implementation tools are available to address hazards. The strategies to use will be part of an ongoing discussion as Leech Lake Reservation looks for opportunities for plan implementation. The following tools will be considered:

**Education:** In many cases, education of residents has been identified as one of the most effective mitigation strategies.

**Capital Investments:** Capital investments such as fire and ambulance equipment, sprinkler systems, and dry hydrants are tools that can limit risks and impacts of natural and manmade hazards.

**Data Collection and Needs Assessments:** Data collection and needs assessments can aid in gaining a better understanding of threats and allow planning for mitigation strategies accordingly. As resources are limited for this part of the planning process, additional data collection is likely to be an ongoing activity as resources become available.

**Coordination:** Responsibilities for mitigation strategies run across various tribal departments, in coordination with neighboring local fire and ambulance departments, city and township governments, and a host of state and federal agencies. Ongoing coordination is an important tool to ensure resources are used efficiently. Coordination can also avoid duplication of efforts or prevent gaps that are created because of unclear roles and responsibilities. The mitigation plan review process can function as a tool to have an ongoing discussion of roles, responsibilities, and opportunities for coordination.

**Regional Cooperation:** Neighboring county and city jurisdictions and public safety services providers throughout the region often share similar challenges and concerns. In some cases, a regional approach may be warranted as a mitigation strategy in order to save resources. Mutual aid agreements are a tool already in use for a number of services. Needs assessments for fire and ambulance services and development of assistance for volunteer recruiting, training, and retention could benefit from a regional approach. Cooperation between Leech Lake Reservation and neighboring counties could also help in lobbying for certain funding priorities that address concerns relating to challenges in service delivery in rural tribal areas. Organizations such as FEMA Region 5 and the Minnesota Division of Homeland Security and Emergency Management (HSEM) through the Regional Program Coordinator can offer tools and resources to assist in these cooperative efforts.

**Regulation:** Regulation is an important mitigation tool for Leech Lake Reservation. Regulation plays a vital role in land use, access to structures, and the protection of water resources and public health.

### 6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the Hazard Mitigation Plan. The Leech Lake Emergency Management Director and the emergency managers group will continue to engage new public stakeholders in planning discussions and project implementation during the five-year cycle of this plan.

*The Leech Lake Reservation HMP website provides opportunities for continued public involvement and feedback*

To seek continued public participation after the plan has been approved and during the five-year window of implementation for this plan, Leech Lake Reservation will take the following measures:

- The Leech Lake Reservation HMP website link will be posted on the Leech Lake Reservation Emergency Management website. The website provides a PDF of the plan for download and

an interactive experience for the public to understand the planning process, where reservation-specific vulnerabilities lie, national best practices, as well as a chance to submit feedback. Collected feedback will be reviewed during the five-year plan cycle and will be noted for future update of the plan or addressed as necessary.

- Following any major storms or natural disasters, Leech Lake Reservation Emergency Management will seek to gather concerns and new ideas for mitigation from local residents to include in the next update of the plan. This may be done through public meetings, outreach via social media, or news releases via local media.
- Tribal representatives participating in the plan will be responsible to report on the status of mitigation actions to the Leech Lake Reservation EMD. (see Section 5.3 or the Leech Lake Reservation HMP website).
- Leech Lake Reservation will use numerous means of public outreach to engage new public stakeholders in providing input on mitigation concerns, including those from underserved communities or socially vulnerable populations within the Leech Lake Reservation. Outreach methods may include presentations at community meetings, sharing information at special events, working with tribal schools and partner organizations, and posting information in areas that are used to communicate with the public (tribal newsletter, bulletin boards, websites, and social media). As mitigation projects are implemented, Leech Lake Reservation will work to keep the public updated and engaged in those local efforts.
- To ensure an equitable outreach strategy continues after the plan is adopted, the planning team will continue to seek to engage with underserved and vulnerable populations during the next five years. Methods of engagement will include those listed above, as well as working with partner agencies, local organizations, facilities, or neighboring jurisdictions to conduct more targeted outreach or presentations to share information on hazard mitigation and solicit feedback on concerns and ideas.

# Appendices

**Appendix A – References**

**Appendix B – Adopting Resolutions**

**Appendix C – Local Mitigation Survey Report**

**Appendix D – Plans & Programs in Place**

**Appendix E – Past Mitigation Action Review Status Report**

**Appendix F – Planning Team Meetings**

**Appendix G – Public Outreach & Engagement Documentation**

**Appendix H – Plan Maintenance & Monitoring Worksheets**

## **Appendix A – References**

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## **Appendix B – Adopting Resolutions**

# **Appendix C – Local Mitigation Survey Report**

# Leech Lake Reservation

## LOCAL MITIGATION SURVEY

As part of the Leech Lake Reservation 2025 Hazard Mitigation Plan update, the **Local Mitigation Survey (LMS)** Form is used to gather jurisdictionally-specific information that is used to meet FEMA requirements and to support development of local mitigation actions.

### Jurisdictions to Complete LMS:

This form is to be completed by representatives from **Leech Lake Reservation Emergency Management, Tribal Government, and related tribal department heads and staff.**

**Additional stakeholders on the Leech Lake HMP contact list are also invited to provide feedback to this form in the designated areas.** (See “Other Stakeholders” section with each question).

### LMS - Main Point of Contact (Name, Work Title, and Email)

<b>Leech Lake Reservation</b>	Duane Oothoudt, Leech Lake Emergency Management Director <a href="mailto:Duane.Oothoudt@llpolice.org">Duane.Oothoudt@llpolice.org</a>
<b>OTHER STAKEHOLDERS</b>	Bugonaygeshig School - Paul LeClaire, Safety Officer <a href="mailto:paul.leclaire@bugschool.k12.mn.us">paul.leclaire@bugschool.k12.mn.us</a>

### Review: Prioritization of Hazards

During the Leech Lake Reservation HMP Planning Team Meeting #1, participants determined the following natural hazards below to be of high, moderate, or low priority as they relate at a reservation-wide level. Hazards noted as high or moderate priority are considered to be of greatest risk and concern, reflecting the frequency of past events, the probability of future events, and the severity of impacts that can occur. Hazards listed as a low priority are considered to be of lower risk and concern, reflecting an infrequency of past events and/or occurring without significant impacts to local vulnerabilities.

### Prioritization of Hazards for 2025 Leech Lake Reservation Update

Natural Hazards	Current Priority
Winter Storms	High
Windstorms	High
Tornadoes	High
Wildfire	High
Drought	High
Flooding	Moderate
Extreme Cold	Moderate
Extreme Heat	Moderate
Hail	Low
Lightning	Low
Landslides	Low
Dam/Levee Failure	Low

## SURVEY QUESTIONS (1-15)

<b>#1 - HAZARD IDENTIFICATION</b>	
<b>Does the priority level listed for any of the hazards in the table above differ for your jurisdiction? If so, please describe how.</b>	
<b>LL Emergency Management</b>	No changes. These are the hazard priorities we discussed at our planning team meeting.
<b>LL Environmental Dept.</b>	Elevate drought from moderate to high. A repeated lack of winter precipitation begins the season with a deficiency and changes the ability to adsorb precipitation, especially with high rain flash events.
<b>Forestry LLDRM</b>	I agree with Environmental on their recommendation that drought get elevated from moderate to high.

<b>#2 - LOCAL VULNERABILITIES</b>	
<b>Describe any <u>specific</u> community assets (infrastructure, systems, or populations) that are susceptible to damage or loss from natural hazard events in your jurisdiction. Consider how recent severe storms or other natural hazard events have caused damages or threatened life safety to people in your community. Please list the natural hazards and related local vulnerabilities separately.</b>	
<b>LLBO Regulatory Division</b>	<p>LLBO Gaming Facilities (Casinos) can have a population of several hundred persons (employees/customers) at any given time. Likely incidents that could affect the casinos could include events such straight-line winds/tornadoes, wildfire.</p> <p>Tribal housing areas located throughout the thirteen (13) separate communities within the exterior boundaries of the Reservation, including the community center in each community, could all be affected by straight line winds, tornado, wildfire, and/or flood waters.</p>
<b>Leech Lake Emergency Management</b>	<p>Winter Storms: We have several issues during winter storms. Access to first responder services is threatened and we need more local supplies and equipment in the communities, including plows, first aid kits, defibrillators, emergency energy sources for heat, cooking, light, water, and sewer. Fire extinguishers, more CO and smoke detectors are needed as well. Power goes out during winter storms often, buried power lines would mitigate the problem, a more immediate solution would be to clear dangerous trees that threaten to fall on powerlines.</p> <p>Wind storms: Depending on the time of year, windstorms create immediate hazards to transportation. Winter wind storms can create dangerous white out conditions and ensuing drifting can occur and present hazardous driving conditions. During the summer, we have experienced severe wind events that take down entire areas of trees that impede roads and driveways, remove roofing, tumble trailers, and cause a lot of property damage as well as causing outages of power and communication. Summer storms with power outages also cause loss of frozen and refrigerated foods, wild game and local caught fish which are difficult to replace.</p>

	<p>Tornadoes: We need to have a shelter option for the whole community or for individual homes. There are a lot of homes that are built on concrete slab, or people who live in trailer houses. Elderly and special needs populations may have difficulty walking to a community shelter, and personal transportation is another common problem. Public transportation needs to grow to suit the needs of day-to-day transport to jobs, hospitals, local businesses and be more readily available for emergency evacuation or transport.</p> <p>Wildfire: Our types of wildfires are primarily wind driven with topography usually not being a major factor. We have large areas of wetland vegetation, tree farms of densely packed pines, coupled with urban interface, limited dependable personal transportation, and limited access one way in communities. Mitigation for these include public transportation in the communities, good public messaging from a variety of resources such as radio, internet, IPAWS, and door to door notification.</p>
<b>Environmental</b>	<p>High summer water temperatures can cause kill off native/cultural fish (whitefish and tullibee).</p> <p>Wild Rice: Water level fluctuations affect wild rice during growing season; high water can rip out rice plants; wind events; hail events; low water levels that deter harvest; all can directly affect wild rice life cycle and gathering.</p> <p>Climate Change: Climate change is also affecting our natural resources. Invasive species such as the Emerald Ash Borer, are affecting ash trees causing die off that then affects wetlands. This is changing wetland components, warming wetlands, affecting water quality and evaporation rates and thus changing the original function of the wetland. This could affect water retention and species habitat.</p>
<b>Forestry LLDRM</b>	<p>Windstorms, Extreme Heat: Many populations are very rural and subject to being stranded in case of a windstorm (or wildfire). This, coupled with extreme heat that could be likely at these times and resultant power outages, poses a very high risk.</p>

<b>#3 - REDUCTION IN VULNERABILITY</b>	
<b>In the last 5 years, has your jurisdiction taken any actions to <u>reduce</u> vulnerability against future severe weather or disaster events? Please describe.</b>	
<b>Leech Lake Reservation</b>	<p>Over the past several years stemming from 2005 which continues to include the last five years, the LLBO signed onto a "<u>Cooperative Law Enforcement Agreement</u>" that includes the four counties that lie within the Reservation (Itasca, Cass, Hubbard &amp; Beltrami) to include the State of Minnesota that defines amongst other purposes to; "Establish a process by which the Band, Counties and State will work together cooperatively to <u>enhance public safety efforts on the Leech Lake Reservation</u>" which could include life safety measures during a situation stemming from the priorities of hazards listed for 2025.</p>

<b>LLBO Regulatory Division</b>	<p>Our casino buildings may be used for a temporary storm shelter from severe weather. These buildings also have a communication tower system located on their property for important communication processes. These buildings have first aid equipment to include AED's and EMS personnel. These buildings have food/water and cooking equipment on premises that will last for an extended period of time backed up by a high voltage generator.</p>
<b>LL Emergency Management</b>	<p>We have set up an MOU to access the integrated public alert warning system to increase our capability to communicate. We utilize CodeRED to access IPAWS.</p> <p>We entered into an MOU with the American Red Cross to increase the number of trained volunteers in the area and to respond to regularly occurring incidents such as housefires.</p> <p>We also work closely with Cass County under a MOU between the tribe and the county that states that we will communicate and work together for everything that impacts our shared communities.</p> <p>We have a local HAM radio operators group that we can tap into if needed during an incident that negatively impacts cellular, POTS, and public safety communications.</p> <p>Purchased chainsaws to ensure that police can obtain access to calls that occur during and after an event that causes trees to shut off roads.</p> <p>Purchased drones to assist with damage assessment, victim location and recovery, access difficult terrain to get eyes on a possible hazmat release. Entered into an agreement with a local bottling company to provide bottled water, they agreed to provide 2 pallets of water at no charge annually if needed.</p> <p>MOU with Enbridge to provide training, exercise, equipment, and supplies to local first response agencies that may have a part in responding to a hazmat incident or a crude oil release over land or in the water.</p> <p>Leech Lake Emergency Management participates with planning, hosting, and assists with funding ongoing training and exercises that focus on different aspects of emergency response to a wide variety of threats to the environment, our communities, and our infrastructure. Last June, we hosted a large grant-funded exercise that focused communications during a railway hazmat release into one of our waterways. In another exercise, in June in 2021 we hosted an exercise that brought in the FBI, Army North, Army Civil Support team, as well as a myriad of other agencies. The focus of the exercise was another hazmat incident that focused on the law enforcement response and coordination.</p>
<b>LL Environmental Dept.</b>	<p>Drafted a Population Vulnerability and Risk Assessment.</p>

	<p>Working on a Climate Adaptation Plan.</p> <p>Culvert study and remediation to return wetlands to functioning bodies.</p> <p>Solar PV installations for clean energy to offset EGU emissions.</p> <p>EV charging infrastructure installations to offset vehicle emissions.</p> <p>Water quality analysis to assess water quality and habitat health for species of concern. Provides data for mitigation opportunities within the water body or shoreline.</p> <p>Air quality analysis for GHG inventory and assessment - current project.</p>
<b>Forestry LLDRM</b>	<p>We are in the midst of renewing our Community Wildfire Protection Plan (CWPP). We have also promoted conversations with Chippewa National Forest staff to perform some work along roadsides to reduce blowdown risk; historically, they leave an entire strip (buffer strip) which results in weaker trees that are more open to wind events.</p>

**#4 – INCREASE IN VULNERABILITY**  
**In the last 5 years, has your jurisdiction experienced an increase in new development? Has this new development created new vulnerabilities to natural hazards in your community? Please describe.**

<b>LL Emergency Management</b>	<p>We have seen development of several new buildings owned by the Leech Lake Band of Ojibwe. We also have a new project that involves removal of the Enbridge Line 3 pipeline from the ground.</p>
<b>LL Environmental Dept.</b>	<p>There are stormwater issues with development, but we have been countering with rain gardens and stormwater retention measures.</p>
<b>Forestry LLDRM</b>	<p>When cutting open the footprints for new housing areas, Forestry is often told to minimize the number of trees removed. Some of these new development areas are put into aspen stands. Aspen, by its' nature, is a weaker species and can be more susceptible to wind events (especially if openings are created, which they are for new developments). We fear some of these areas will, in time, result in heightened risk due to senescing trees (refer to Porcupine/Quill Lanes project where we removed very large, very over-mature aspen from the housing vicinity.)</p> <p>In other areas, we need to be cognizant of wide-enough roads to properly allow for emergency vehicles to get in. This seems to be especially true in areas along lakes where residents place an even higher value on the aesthetic.</p> <p>Lastly, and this is more noticeable in longer-existing resident areas, is defensible space allowance and hazardous tree work; having areas around a house that would allow for engines to come in and ward off a wildfire AND ensuring proper tree care so trees do not lean over the top of houses over time.</p>

<b>#5 - PUBLIC OUTREACH</b>	
<b>How does your jurisdiction share information with community members about severe weather events and personal preparedness? If this is not something that is currently done, how could it be done in the future?</b>	
<b>Leech Lake Reservation</b>	Based on upcoming weather-related hazardous situations, LLBO News (social media/email messages) has shared the closing of worksites/Tribal school to prevent stranded motorist/accidents and/or school age children from exposure to extreme cold events and suffering from freeze-related injuries/accidents.
<b>Bugonaygeshig School</b>	We do have our "Robo Caller" in place (and working), to notify our families of weather-related school closings. It can be used for other emergency situations as needed. There is also the school website and Facebook as well.
<b>Forestry LLDRM</b>	We have a Fire Prevention technician who, in addition to promoting public awareness about fire safety through Smokey Bear appearances and visiting schools, performs Home Assessments to note any fuels risk evident at houses.
<b>Leech Lake Tribal Police Department</b>	<p>The Leech Lake Tribal Police communicates through several available social media outlets, CodeRED, and adjoining counties.</p> <p>The MN Bureau Of Criminal Apprehension also makes their public address available to LLTPD and IPAWS.</p> <p>Our Public Relation Department has connections to several news and media outlets, and we have our own radio station that is implementing its own public information and warning.</p> <p>We host trainings and exercises, and promote American Red Cross fire prevention events in the community.</p>

<b>#6 - EMERGENCY NOTIFICATIONS</b>	
<b>Does your jurisdiction encourage residents to sign up for the county's emergency notification system and/or a local emergency alert system? If yes, how? If this not something that is currently done, how could it be done in the future?</b>	
<b>Bugonaygeshig School</b>	We do not currently do this. We could send out a flier yearly or possibly use the Robo Caller to encourage enrollment.
<b>Forestry LLDRM</b>	We have a "Fire Risk Rating" system that mirrors all other agencies in the vicinity, but is on the LLBO website and LLBO DRM website. This rating notes how high of a risk the area is in for wildfires.
<b>LL Emergency Management</b>	We have our own website that has a banner with the CodeRED signup link on the first page on top.

<b>#7 - BUILDING CODES</b>	
<b>Has your jurisdiction adopted the Minnesota State Building Code? Please clearly answer yes or no and provide supporting detail. IF YES, please describe how it is enforced. IF NO,</b>	

please describe if there are other building codes or permitting processes in place to reduce the risk to future development.	
<b>Leech Lake Reservation</b>	<p>LLBO Gaming Ordinance (Casino) - Chapter 9 "<b>Gaming Facilities</b>" has adopted "<i>Ongoing Compliance with Environmental and Public, Health and Safety</i>" (EPHS) standards that are strictly enforced by the LLBO Regulatory Division by conducting scheduled walk-throughs identifying any deficiencies that <b>MUST</b> be corrected within 30 days that pertains to Reservation-owned casinos and non-owned establishments located on the Reservation who are licensed by the Tribe to conduct class II gaming.</p> <p>The Tribe also conducts Environmental and Public, Health and Safety walkthroughs of LLBO owned buildings who must follow set EPHS standards.</p>
<b>Bugonaygeshig School</b>	To the best of my knowledge, our school buildings are owned/regulated by the Bureau of Indian Education, and fall under their building codes.
<b>Leech Lake Emergency Management</b>	Leech Lake Facilities Management Division Director serves as our Building Official.
<b>LLDRM</b>	There is a building permit required to build on newly developed property but this is mainly to ensure the building meets our environmental and historic preservation ordinances
<b>TERO (Tribal Employment Rights Ordinance or Office)</b>	Tero requirements must be followed <a href="https://www.llojibwe.org/td/tero.html">https://www.llojibwe.org/td/tero.html</a>
<b>LL Construction Management</b>	Ensures project MN building code must be followed but they are not officially adopted. Certain projects we have a building inspector and electrical inspectors make sure the general contractor and the subs are adequately meeting the code with a memorandum of understanding established. The tribe has not adopted the MN State Building Code

<b>#8 - OTHER PLANS AND POLICIES</b>	
<b>What other plans or policies does your jurisdiction have in place to help mitigate against the impacts of flooding and other natural hazards to future development? Please describe.</b>	
<b>LL Environmental Dept.</b>	<p>Updating Land Use Ordinance in 2025 at DRM</p> <p>Climate Adaptation Plan in works/planning stage</p> <p>Population Vulnerability and Risk Assessment</p> <p>Solar Master Plan</p>
<b>LL Forestry</b>	<p>We are in the midst of renewing our Community Wildfire Protection Plan (CWPP).</p> <p>When new developments occur, we are pushing to ensure trees are not immediately adjacent (they should be backed off the building a distance to decrease risk of damaging windfall).</p>

<b>#9 - ORGANIZATIONAL CAPACITY</b>	
<b>What departmental staff or elected officials in your jurisdictional help to accomplish hazard mitigation in your community? Please describe.</b>	
<b>Leech Lake Reservation</b>	The LLBO has a Regulatory Division that includes a Compliance Director, Director of Investigations and a Health & Safety Department, the H&S Department includes A Director, Emergency Medical Services (EMS) Manager and a Health & Safety Officer who conducts building inspections, follow-up inquiries on any accident, injuries/damages occurring on Reservation owned properties for documentation purposes for (medicals, damage, equipment and insurance purposes) and to resolve safety issues to prevent the same type of injury/damage from reoccurring.
<b>Bugonaygeshig School</b>	We have a Safety/Compliance Officer position (myself) to ensure we comply with the BIE standards for safety and environmental management on site. The school groundskeeper (O & M) works to clear outside safety hazards and keep the culverts open as needed.
<b>Forestry LLDRM</b>	There are a number of positions at DRM as well that work in this regard. From Forestry and Wildland Fire Programs with their mitigations to Environmental Program with their mitigations.
<b>LL Emergency Management</b>	There are divisions in the Tribal Emergency Response Commission that are responsible for supporting hazard mitigation and emergency response during an incident these include: the Department of Public Safety, Department of Public Works, Division of Resource Management, and dthe Leech Lake Housing Authority.

<b>#10 – PARTNERSHIPS</b>	
<b>Are there any agencies, organizations, or businesses that your jurisdiction has worked with to address mitigation efforts in your community? Please describe.</b>	
<b>Leech Lake Reservation</b>	LLBO Regulatory Division (H&S) works directly with Casino General Managers (Mechanical Maintenance) Mangers, Reservation Facility Maintenance (Department of Public Works) to repair all equipment disruptions caused by heavy snowfall, underground water flow deterioration to prevent future mishaps.
<b>LL Environmental Dept.</b>	Multiple LLBO Departments and Divisions...state/local counties/feds
<b>Forestry LLDRM</b>	CWPP includes all local VFDs as well as any state/federal wildland firefighters. We work with other land management agencies on issues across the Leech Lake Reservation (Chippewa National Forest, MNDNR, county governments).
<b>Leech Lake Emergency Management</b>	LL Emergency Management works closely with neighboring county emergency managers.

<b>#11 - PROGRAMS IN PLACE</b>	
<b>What sort of programs does your jurisdiction participate in to help raise awareness and reduce risk from natural hazards in your community?</b>	
<b>Leech Lake Reservation</b>	LLBO has a Temporary Employment Program (TEP) who hires tribal members who travel throughout the Reservation mowing lawn and rakes

	excess leaves for Tribal elders thus preventing areas next to homes that could fall victim to local wildfires caused by lightning strikes, railway fires (trains) ETC.
<b>Bugonaygeshig School</b>	We recently participated in the MN statewide tornado drill on 4/10/25.
<b>Environmental</b>	Climate Change/Adaptation work/projects Sustainability Program work Redevelopment and Revitalization of Cass Lake ie stormwater runoff
<b>Forestry LLDRM</b>	Wildland Fire Program-Fire Prevention, performing Home Assessments for individual's residences.
<b>Leech Lake Emergency Management</b>	Leech Lake Emergency Management participates in the annual Severe Weather Awareness Weeks held by the NWS and HSEM every April and November. We also work with the NWS on holding SkyWarn trainings.

### #12 - FUNDING & OTHER RESOURCES

**What funding sources are available to help your jurisdiction to accomplish implementation of mitigation activities? Please describe. Include internal local government funding as well as external funding sources (grant or loan sources from local, state, or federal agencies).**

<b>LL Environmental Dept.</b>	State: Department of Commerce, MPCA, BWSR,  Federal: EPA, DOE, BIA, Dept of Interior,  NGOs: TNC, local foundations  Cost recovery or fines to implement mitigation of those activities or other effects to the environment.  Funds are competitive and can be difficult proposals to submit. Funding opportunities are limited and specific to criteria per funding source and may not fit the Tribe's needs or priorities/objectives.
<b>Forestry LLDRM</b>	We have utilized 638 Contracting Authority with USDA to receive Fire Dependent Forest Restoration and Wildland Fire Program Capacity Building Funds. This is allowing us to update our CWPP and ramp up our Wildland Fire/Fuels Program; these individuals are who we would lean on to open roads with chainsaws etc.

### #13 - LOCAL MITIGATION PROJECTS

**Please describe what mitigation actions would help to reduce risk to your community from future natural hazard events. Please include mitigation activities that address local vulnerabilities that were identified in Question #2. Please be as specific as possible in your responses. The mitigation actions you identify will be used to develop your local mitigation action charts. If you have any mitigation projects you are aware that your jurisdiction will be seeking to apply for FEMA HMA Grant Program funding for, please make note of that.**

<b>LL Environmental Dept.</b>	Climate adaptation planning would be key in identifying these plans/projects for this mitigation and progress. Currently in the initial stages. Wildfire, maybe add more prescribed burning to prevent uncontrolled wildfire events.
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<b>Leech Lake Emergency Management</b>	Mitigation for severe storms with power outages could include having trained community members who can operate a chainsaw safely, set up and run a cooling shelter, and provide basic first aid. We could have large walk-in coolers and freezers and a generator for each community center to salvage food supplies. Each community should have access to a radio transceiver to establish communication with the local authorities if regular routes of communication are unavailable. Public safety and the tribal government need to have COOP plans to provide services in an alternate location if the primary building is no longer usable.
<b>Forestry LLDRM</b>	LLBO's movement to bury power lines, coupled with the push to tend to trees along roadsides (buffer areas) to ensure improved wind-firmness should help with Tribal residents living in very rural areas. Also, the current project to improved internet connectivity should also benefit in this arena.

#### #14 - GAPS OR DEFICIENCIES

Please describe any specific gaps or deficiencies that are a barrier to implementing local mitigation measures.

<b>LL Environmental Dept.</b>	Capacity and lack of funding to monitor, assess and implement projects. Organizational support (capacity) and engagement with other Tribal programs such as Emergency Response (ie 1 staff for whole Reservation). Emergency Manager was unable to take on new projects such as drone training due to a 3-day commitment that conflicted with other necessary duties.
<b>Forestry LLDRM</b>	Having some items on stand-by such as generators for outlying communities. Agree with Environmental, we may need to increase capacity for the Emergency Response Program.

#### #15 - SURVEY PARTICIPANTS

Please list the names & titles of all persons that contributed information to this survey. Participant information is important to ensure good jurisdictional participation, and each person's time will count towards the 25% in-kind match requirement for the HMP update.

<b>Leech Lake Reservation</b>	Duane Oothoudt, LL Emergency Management Director Rocky Papasodora, LLBO Regulatory Division, Health & Safety Officer
<b>Bugonaygeshig School</b>	Paul LeClaire, Safety Officer Aaron Carlson, LLPD (SRO)
<b>LL Environmental Dept.</b>	Brandy Toft, Environmental Director Craig Tangren, Environmental Deputy Director Jason Helgeson, Brownfield Coordinator Eugene Strowbridge, Sustainability Coordinator
<b>Forestry LLDRM</b>	Keith Karnes, Forestry Director B.J. Gotchie, Fire Management Officer
<b>LL Construction Management</b>	Jonathan Barcenas, Project Specialist

## **Appendix D – Plans & Programs in Place**

# Leech Lake Reservation

## HMP Plans & Programs in Place Form

EMERGENCY PLANNING CAPABILITIES	Yes/No	Comments
Emergency Notification System (please specify, i.e., CodeRED, Smart911, Everbridge, etc)	Yes	Code Red and recently enacted IPAWS MOU with FEMA, only 14 other tribes have Sovereign Nation IPAWS MOUs nationwide.
Outdoor Warning Sirens (please note locations and # per jurisdiction)	Yes	1 Cass Lake 1 Mission 1 Cass River 1 Prescott 1 Breezy Point 1 Oak Point 1 S. Lake 1 Inger 1 Ball Club 1 Battle Point 1 Boy Lake 1 Onigum 1 Bena
Emergency Operations Plan (EOP)	Yes	EOP is updated annually
Mass Care Sheltering Plan / List of Shelter Facilities	Yes	Addressed in EOP and in coordination with local jurisdictions
Tornado Safe Rooms / Storm Shelters (please list any existing specific locations)	No	Addressed in coordination with schools & local jurisdictions with local vulnerabilities
NWS Weather Ready Nation / StormReady Certification	Yes	Annual training hosted by LLBO
Coordination with Schools	Yes	Tornado Drills, other trainings
Coordination with Neighboring Jurisdictions	Yes	Annual regional planning and training; statewide AMEM conference
Coordination with Local and Regional Agencies involved in mitigation	Yes	SWCD, MN DNR, MnDOT, Rural and Municipal Electric

		Cooperatives, Watershed Districts
Coordination with organizations or agencies addressing disaster related issues and vulnerable populations, emergency preparedness, access and functional needs populations (List as applicable)	Yes	Public Health, American Red Cross, Salvation Army
Past storm hazard data and information	Yes	Damage information is kept on file from past storm events and disaster declarations
<i>Other (please describe)</i>	No	

<b>PLANNING &amp; REGULATORY CAPABILITIES</b>	<b>Yes/No</b>	<b>Comments</b>
Comprehensive/Land Use Plan	Yes	Interim plan in place, is in update process now.
Capital Improvements Plan	Yes	Est. 2023
Economic Development Plan	Yes	CEDS 2024-2029
Climate Adaptation Plan	No	In draft form update process in 2025 possibly.
Continuity of Operations Plan (COOP)	Yes	In draft adopted and implemented during COVID by LLBO.
Transportation Plan	No	In general plans to be completed.
Stormwater Management Plan / Drainage Plan	No	
Burning Permits/Restrictions (i.e., identify if issued through Sheriff's Office or MN DNR)	Yes	LL 2006
Comprehensive Local Water Management Plan	No	
Watershed Plan (One Watershed, One Plan)	Yes	Mississippi Headwaters and Leech Lake River both have 1W1P's in place. The planning for the Big Fork River 1W1P is just starting, LLBO Water Program plans to be involved in the planning process.
Wellhead Protection Plan	No	MDH handles wellhead protection for the state of MN. LLBO does not have any wellhead protection plans in place. We do have stringent standards that protect drinking

		water from contaminants in our Water Quality Standards.
Forest Management Plan	Yes	
Community Wildfire Protection Plan (CWPP)	Yes	In the process of being updated now.
Participation in MN DNR Firewise Program	Yes	This is a part of our CWPP.
Database of Dry Hydrants/Well Access	No	There are no dry hydrants we are aware of, local FD's would have that information.
<i>Other (please describe)</i>	No	

<b>LOCAL POLICY / PROGRAM CAPABILITIES</b>	<b>Yes/No</b>	<b>Comments</b>
Land Use, Planning, & Zoning Ordinance	Yes	Under interim plan and new in 2025
Subdivision Ordinance	No	We have no subdivisions.
MN State Building Code Enforcement	No	
Participation in the National Flood Insurance Program (NFIP)	No	
Adoption of Digital Flood Insurance Rate Maps	No	
Floodplain Ordinance	No	Only a small portion in Itasca County has been mapped.
Shoreland Ordinance	Yes	Leech Lake Land Use Ordinance-Article XVIII Management of Shoreland Areas.
Minnesota Buffer Law / Soil Erosion Ordinance	No	Minnesota Buffer law only applies on privately-held (non-tribally owned) lands within the Reservation Boundaries.
Home Buyouts for flood or erosion mitigation	No	
Other natural hazard specific ordinances (i.e., stormwater, steep slope, wildfire)	No	
Maintenance programs to reduce risk	Yes	We maintain 128 Miles of roads, over 88 buildings and several housing developments along with our businesses.

<i>Other (please describe)</i>	No	
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<b>ADMINISTRATIVE/TECHNICAL CAPABILITIES</b>	<b>Yes/No</b>	<b>Comments</b>
Emergency Management Director	Yes	Full time EMD
Sheriff/Police Department	Yes	Leech Lake Tribal PD
Floodplain Management Administrator	No	
Chief Building Official	Yes	Facilities Management Division Director
Highway Engineer	Yes	LL Tribal Engineering Department, also Tribal Roads Construction & Surveying Dept.
Mapping Specialist (GIS)	Yes	Department of Resource Management GIS program
Public Health Coordinator/Department	Yes	LL Health Division
Planning Commission	No	We do have a planning ordinance.
Coordination with Soil and Water Conservation District	No	
Coordination with Minnesota Department of Natural Resources	Yes	Dept of Resource Management is the tribal equivalent to the MN DNR on the reservation. We do work together.
Mitigation Planning Committee	Yes	2025 HMP Update Planning Team of Stakeholders
Mutual Aid Agreements in place	Yes	Regional; MAA's also existing between local fire departments
<i>Other (please describe)</i>	No	

<b>EDUCATION &amp; OUTREACH CAPABILITIES</b>	<b>Yes/No</b>	<b>Comments</b>
SKYWARN Program Training with NWS (annual training)	Yes	Held in coordination with the NWS
National Weather Service – Severe Weather Awareness Weeks	Yes	Leech Lake Emergency Management in coordination with HSEM and NWS each November and April

Promotion of NOAA Weather Radios	Yes	During NWS Severe Weather Weeks and Ongoing
<i>Other (please describe)</i>	No	

# **Appendix E – Past Mitigation Action Review Status Report**

# Leech Lake Reservation

## Past Mitigation Action Review Status Report

Following is a report on the status of mitigation actions related to natural hazards included in the Leech Lake Reservation **2015** Hazard Mitigation Plan. This report covers the mitigation actions that were listed for implementation by Leech Lake Reservation and by city jurisdictions or partner agencies, as applicable. The status of mitigation actions is defined as the following:

**Completed** – The action was a defined activity or project completed since the last plan update.

**Ongoing** – The action is continually being implemented and moving forward. Ongoing mitigation actions will be reviewed and revised as necessary for inclusion in the plan update.

**Deleted** – The action is deemed as not relevant and is not considered for inclusion in the plan update.

#	Hazard	Mitigation Action	2025 Status	Comments
1	Flooding	Create MOU with surrounding counties regarding use of culverts and rainwater management.	Deleted	This has not been an ongoing problem.
2	Flooding	Obtain backup generators for the water tower and sewage lift station in Cass Lake.	Completed	Purchased a towable Baldor Trailer 150KW generator.
3	Wildfire	Increase education about wildfire.	Completed	Firewise, new prevention coordinator. New CMPG.
4	Wildfire	Review methods to address fuel loading across the reservation.	Completed	Yes, we cut out the fuels around our communities.
5	Wildfire	Review fire restriction policies.	Ongoing	Yes we just did that last Fall due to the current drought conditions. We reserve the option to restrict.
6	Wildfire	Develop a communication protocol when wildfire danger is high to alert LLBO employees.	Ongoing	Not right now but we are working on it to put up wildfire prevention signs.
7	Wildfire, Summer Storms	Establish protocol for who is in charge of cutting trees around power lines.	Completed	We avoid the powerlines. Once we know it is not energized we will go ahead and cut.
8	Summer Storms	Continue efforts to distribute NOAA weather radios.	Completed	We no longer have radios to give out. Completed.
9	Summer Storms	Continue SKYWARN trainings.	Ongoing	Annual training on the reservation hosted every year.
10	Summer Storms	Inventory existing storm shelters.	Completed	Added inventory of shelters on the state database. Complete
11	Summer Storms	Train personnel in shelter management.	Completed	MOU with American Red Cross and they train shelter management volunteers, two have since deployed.

#	Hazard	Mitigation Action	2025 Status	Comments
12	All Hazards	Research creating a community shelter that will provide food, water, and heat for all manner of natural hazards.	Completed	We have completed research and designated and assessed our shelters.
13	Summer Storms	Research new locations for safe rooms.	Ongoing	Bug School new gymnasium is a safe room.
14	Summer Storms	Create shelter plan for large public events.	Ongoing	We have a pow wow evacuation plan, Bug School Evacuation Plan, and Gaming Evacuation Plans.
15	Summer Storms	Research possible site for taking debris following severe storms and falling trees.	Ongoing	We have not completed this task.
16	Extreme Cold	Educate the public on available heating assistance programs.	Ongoing	We have programs for assistance however it appears they do not have adequate public information. Our website is also dated.
17	Drought	Continue monitoring water levels through the Great Lakes Indian Fish & Wildlife Commission (GLIFWC).	Ongoing	Drought is of particular concern for Leech Lake Reservation due to its impacts on wild rice. For productive yields, wild rice needs the high-water low-water flux
18	All Hazards	Purchase backup generators for elder housing in Cass Lake.	Ongoing	
19	All Hazards	Implement texting services for notifications.	Completed	We have purchased Code Red and utilized in emergency.
20	All Hazards	Research the option of using the CodeRED Emergency Communications Network.	Completed	We have CodeRed and this past year we got our MOU to participate in the IPAWS program.
21	All Hazards	Identify areas out of siren range and look to better reach those areas.	Completed	We have since put in two additional sirens in our communities.
22	All Hazards	Create backup food and water supplies to have on hand during power outages.	Completed	We implemented contracts with local farmers, identified needy elders and delivered food and supplies.
23	All Hazards	Increase public awareness for how best to deal with severe weather.	Ongoing	We continue to host NOAA Skywarn classes and have our own radio station that informs the public.
24	All Hazards	Research improving resources available for dealing with the effects of hazards, such as chainsaws.	Completed	We purchased 10 chainsaws and PPE, 5 at the police department and 5 at facilities management.
25	All Hazards	Utilize the local radio station to educate residents about emergency management and preparedness.	Ongoing	EM has put out several PSA messages on the radio to address this project.
26	All Hazards	Create public education campaign about evacuations and checking on elders.	Ongoing	We identified a list of all the elders on our reservations and where they live.

#	Hazard	Mitigation Action	2025 Status	Comments
27	All Hazards	Compile a list of vulnerable elders on the Reservation to ensure that this population is provided for during periods of inclement weather.	Completed	Completed.
28	All Hazards	Create an emergency management handbook.	Ongoing	We have not completed this task.
29	All Hazards	Utilize monthly Local Indian Council meetings and quarterly assembly meetings for people to discuss natural hazard issues.	Ongoing	Have attended these meetings and discussed natural hazards, conduct surveys, answer questions.
30	All Hazards	Improve communication between TERC and Local Indian Councils (LICs).	Ongoing	There has been improvement but the LICs are numerous and contacts are constantly changing. Rely on the district office for this information.
31	All Hazards	Improve communication between the radio station and Incident Command.	Ongoing	We developed a plan to improve direct communication during incidents.
32	All Hazards	Purchase generators for community centers.	Ongoing	Purchased a towable Baldor Trailer 150KW generator. Newer buildings have backup.

## **Appendix F – Planning Team Meetings**

# Leech Lake Reservation HMP Planning Team Meeting #1

## 2/19/25 Meeting Summary & Documentation

**Synopsis:** On February 19, 2025 Leech Lake Reservation Emergency Management convened key county, city, and township representatives, as well as neighboring jurisdictions and other stakeholders to participate in the 1<sup>st</sup> Planning Team Meeting for the update of the Leech Lake Reservation Hazard Mitigation Plan (HMP). The meeting was held via Zoom webinar video conference and was facilitated by Stacey Stark and Bonnie Hundrieser of the U-Spatial@UMD project team.

The purpose of the meeting was to present on the update of the Leech Lake Reservation HMP update and gather stakeholder feedback on several key discussion items, including:

- 1) Prioritization of the natural hazards to be profiled in the plan,
- 2) Identification of local vulnerabilities (i.e., infrastructure and populations),
- 3) Ideas for local mitigation actions for implementation, and
- 4) Review of FEMA Hazard Mitigation Assistance grant funding opportunities.

**Stakeholder Invitations:** Leech Lake Reservation Emergency Management invited all stakeholders included on the county's HMP Update Jurisdictional Contact List, which includes the key County Contacts, City Contacts, Township Contacts, Other Stakeholder Contacts, and Neighboring Jurisdiction Contacts identified to be invited to participate in the plan update process. Contacts were encouraged to engage additional staff or to send someone in their stead if they could not attend.

**Presentation Overview:** The Power Point presentation covered the following items:

- Welcome & Introductions
- Meeting Purpose & Agenda
- Overview of HMP Key Points
- Overview of Plan Content (Hazard Identification, Risk Assessment, Vulnerability Analysis, Update of Hazard Prioritization)
- Overview of Mitigation Actions and FEMA Grants
- Overview of Mitigation Strategies for the development of mitigation actions
- Discussion of ideas for local mitigation ideas
- Overview of Next Steps following Planning Team Meeting #1

**Materials:** The following meeting summary includes documentation of the stakeholders that participated in the meeting, poll results, questions or comments provided during the meeting, and information on the FEMA Hazard Mitigation Assistance Grant Program. A list of stakeholders invited to participate is also included. A copy of the meeting invitation and a handout of the Power Point presentation slides accompany this meeting summary.

**To submit comments or questions regarding this meeting summary, please contact:**

Duane Oothoudt, Leech Lake Reservation Emergency Management Director

[Duane.Oothoudt@llpolice.org](mailto:Duane.Oothoudt@llpolice.org)

## Meeting Participants

Following is a list of representatives that participated in Planning Team Meeting #1. These individuals will be considered as part the formal planning team recorded in Table 1. Hazard Mitigation (HMP) Team of the Leech Lake Reservation HMP Update.

	Name	Organization	Job Title
1	Duane Oothoudt	Leech Lake Emergency Management	Emergency Management Director
2	Derek Howe	Lake Country Power	Chief Operating Officer
3	Jason Truax	Cass Lake Indian Health Service (HIS)	Safety & Emergency Preparedness
4	Lee Pemberton	Beltrami Electric Cooperative	Operations Manager
5	Keith Karnes	Leech Lake Band of Ojibwe	Forestry Director
6	Kelvin McCuskey	HSEM	Regional Program Coordinator
7	Hope Fairchild	City of Walker, Minnesota	City Administrator/Clerk-Treasurer
8	Owen Fifield	American Red Cross Serving Northern and Central Minnesota	Community Disaster Program Manager
9	Rocky Papasodora	LLBO Health & Safety Department	Health & Safety Officer
10	Michael Palmer	MN DNR	Regional Firewise Specialist
11	Leona Howard	LL Health and Safety	EMS Manager
12	Dan McKeon	Bug O Nay Ge Shig School	Superintendent
13	Kaitlin Connolly	Leech Lake Health and Safety	Admin Assistant
14	John Linder	Itasca County Sheriff's Office	Emergency Manager
15	Gregg Anderson	LLBO Health Division	Environmental Health Specialist
16	Joel Bebeau	LLBO Health Division	Clinical Engineer

## Discussion Polls

The presentation included several polling questions to generate discussion and gather specific feedback from participants that would be used to support public outreach, identify local vulnerabilities, and determine the updated prioritization of hazards for inclusion in the plan. Following are the polling questions and participant responses.

### POLL #1 (Slide 9, Who Participates)

**Question 1 - How can you expand participation by the county residents, including vulnerable populations, in the planning process?**

Kelvin McCuskey	Local Newspaper and/or Social Media releases
Kaitlin Connolly	I believe that more resources towards senior housing
Owen Fifield	Hosting planning meetings in a location with a facilitator that does not require personal access to the internet--possibly advertised on the radio or physical flyers in public places
Keith Karnes	Visit Local Indian Councils and provide supper

Michael Palmer	Go to community meeting spots and hold an information "meeting". Using plain language, and just letting them know the importance of these types of plans.
Derek Howe	Important to reach out early so people can make time and it may require multiple meetings

**Question 2 - Is there someone (or an organization) missing from this planning team who you think should be involved with the Hazard Mitigation Plan Development?**

Kelvin McCuskey	DNR, National Weather Service, Local Fire Departments
Owen Fifield	I am not aware of any.
Kaitlin Connolly	Aging infrastructure, unhoused populations
Keith Karnes	Homelessness, recent drought (3 yrs), aging infrastructure
Michael Palmer	Drought, frequency of extreme weather events, and increased population in the Wildland Urban Interface are all factors in the increased risks to wildfire. Statewide.
Kaitlin Connolly	We have older infrastructure and other assets that could be at risk
Keith Karnes	Wildfires are projected to increase, as well as drought and derecho severity. Many individuals live in older housing or are homeless.
Derek Howe	Dealing with dead and dying trees in the right of way. Implementing a comprehensive management policy is necessary to reduce the risk of wildfires and power outages as well as public safety.

**POLL #2, Slide 13 (Plan Content – Vulnerability Analysis)**

**Question 1 - Are there any factors in your community that may have increased the community's vulnerability? (please identify community)**

Kaitlin Connolly	Aging infrastructure, unhoused populations	Leech Lake Reservation
Keith Karnes	Homelessness, recent drought (3 yrs), aging infrastructure	Leech Lake Reservation
Michael Palmer	Drought, frequency of extreme weather events, and increased population in the Wildland Urban Interface are all factors in the increased risks to wildfire.	Statewide

**Question 2 - Are there specific areas of concern in your community that you would consider to be more highly vulnerable to damages or danger resulting from future natural hazard events? (please identify community)**

Kaitlin Connolly	We have older infrastructures and other assets that could be at risk	Leech Lake Reservation
Keith Karnes	Wildfires are projected to increase, as well as drought and derecho severity. Many individuals live in older housing or are homeless.	Leech Lake Reservation
Derek Howe	Dealing with dead and dying trees in the right of way. Implementing a comprehensive	Statewide

	management policy is necessary to reduce the risk of wildfires and power outages as well as public safety.	
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**POLL #3 (Slide 17) Leech Lake Reservation 2025 Update of Hazard Prioritization**

Meeting participants ranked each of the natural hazards listed below as what they felt was a high, moderate, or low hazard priority to include in the plan update.

**Which of the following hazards would you consider HIGH priority in the reservation communities?**

Winter Storms	5
Windstorms	5
Wildfire	5
Tornadoes	4
Drought	3
Flood	2
Extreme Cold	2
Extreme Heat	2
Hail Storms	0
Lightning	0
Landslides	0
Land Subsidence	0
Dam/Levee Failure	0

**Would you consider any of the hazards below to be low risk, low priority, or not applicable in the reservation communities?**

Flood	1
Winter Storms	1
Windstorms	1
Tornadoes	0
Hail Storms	0
Lightning	3
Extreme Cold	1
Extreme Heat	1
Drought	2
Wildfire	0
Landslides	4
Land Subsidence	4
Dam/Levee Failure	1

**2025 Leech Lake Reservation Prioritization of Hazards**

The chart below reflects the planning team’s updated prioritization of hazards that will be included in the Leech Lake Reservation 2025 HMP Update.

HAZARD	Leech Lake Reservation 2025
Winter Storms	High
Windstorms	High
Tornadoes	High
Wildfire	High
Flooding	Moderate
Extreme Cold	Moderate
Extreme Heat	Moderate
Drought	Moderate
Hail	Low
Lightning	Low
Landslides	Low
Dam/Levee Failure	Low

**Other Comments or Questions**

Following are additional comments or questions addressed during the planning team meeting and responses from meeting presenters:

Derek Howe - Noted that in order for Lake Country Power needs to underground power lines they must cut back 20’ of trees in the right of way. They have a comprehensive land management plan that includes the use of herbicides in order to mitigate against the regrowth of trees after cutting and planning of more management, habitat-friendly vegetation in the ROW. But there are restrictions to the use of herbicides on the Leech Lake Reservation that do not allow Lake Country Power to use them. Duane Oothoudt confirmed this is correct and mentioned that he can discuss this further with Derek to answer any questions.

Keith Karnes: Items not classified by me as high or low are somewhere in the middle (in my opinion).

Michael Palmer: I am not local, so the low risks are not something I am up to speed on.

**FEMA HMA Grant Funding:**

As part of the planning team meeting, participants were informed that having a FEMA-approved Hazard Mitigation Plan in place is a requirement in order to apply for FEMA Hazard Mitigation Assistance Grant Programs. Examples of eligible projects were reviewed for participants to consider for potential inclusion in their local mitigation action charts, as applicable. It was noted that representatives from the county, local governments, and other stakeholder agencies/organizations must have documented participation in the planning process in order to formally adopt the plan and be eligible to apply for future FEMA HMA grants.

To learn more about FEMA’s HMA grant programs, please review the following:

[FEMA Mitigation Assistance Program and Policy Guide, Effective July 30, 2024](#)

*At a glance info:* See Table 4, Eligible Activities by Program (page 43)

**LEECH LAKE RESERVATION HMP JURISDICTIONAL CONTACT LIST**

Following is a list of the stakeholders that received an invitation to participate in Planning Team Mtg. #1 and will receive the meeting summary.

To submit suggested additions to this contact list, please contact Leech Lake Reservation Emergency Management and provide the name of the jurisdiction, agency, or organization along with the person's full name, work title, and email address.

REPRESENTATION	NAME	TITLE
LLBO Emergency Management	Duane Oothoudt	Emergency Management Director
LLBO Division of Resource Mgmt.	Kenneth Fox	DRM Director
LLBO Environmental Dept.	Brandy Toft	Environmental Director
LLBO Forestry Dept.	Keith Karnes	Forester
LLBO Fish, Wildlife	Tanya Roerick	Program Coordinator
LLBO Cultural Resources Heritage Sites	Colleen Wells	Heritage sites coordinator
LLBO Facilities Management	Leonard Howard	Progam Coordinator
LLBO Health Division	Doris Jones	Division Director
LLBO Education Division	Laurie Harper	Division Director
LLBO Tribal Development Division	Michael Reyes	Planner
LLBO Health and Safety Division	Ernest Robinson	Health and Safety Director
LLBO Transit	Donna Wittner	Transportation Manager
LLBO Public Safety Division	Kenneth Washington	Police Chief
LLBO - TERC	Michael Roybal	BugOhNayGeyShig School
LLBO - TERC	Reuben St. Cyr	Housing Director
LLBO - TERC	Leona Howard	EMS Health and Safety
LLBO - TERC	Helen Montgomery	Leech Lake Tribal College President
LLBO - TERC	Jackie Wright	Tribal Court
LLBO - TERC	Chris Bedeau	KOJB Radio Director
LLBO - TERC	John Robinson	Leech Lake Tribal College
LLBO - TERC	Gordon Fineday	Executive Director LLBO
LLBO - TERC	Michael Michaud	Gaming Director
LLBO Administration	Gordon Fineday	Executive Director
LLBO Government	Faron Jackson Sr.	Chairman
LLBO Government	Leonard Fineday	Secretary/Treasurer
LLBO Government	Kyle Fairbanks	District I Representative
District 1 Admin	Amanda Youngrunningcrane	Admin D1
LLBO Government	Steve White	District II Representative
District 2 Admin	Michelle Johnson	Admin D2
LLBO Government	Leon Staples Jr	District III Representative
District 3 Admin	Toni Pemberton	Admin D3
LLBO Twin Cities Office	Christine Roy	LIC Office Representative
LLBO Duluth Office	Laura Van Guilder	LIC Office Representative
LOCAL & REGIONAL AGENCIES INVOLVED IN HAZARD MITIGATION		

MN HSEM	Kelvin McCuskey	Region 2 Regional Program Coordinator
MN DNR Firewise	Mike Palmer	Central Region Firewise Specialist
U.S.F.S. Chippewa National Forest	Michael Stansberry	Forest Supervisor
National Weather Service - Duluth Office	Joseph Moore	Meteorologist
NWS Northland Skywarn	Brian Howell	Meteorologist
<b>BUSINESSES, ACADEMIA, AND OTHER PRIVATE ORGS.</b>		
Leech Lake - Bugonaygeshig School	Dan Mckeon	Superintendent
Leech Lake Tribal College	Helen Zaikina-Montgomery	President
Leech Lake Gaming (Casinos, Gas Stations & Grocery)	Breanna Miettinen	Gaming Division Director
Cass Lake Indian Health Services (Hospital)	Jason Truax	Safety and Emergency Preparedness
Beltrami Electric Cooperative	Lee Pemberton	Operations Manager
Lake County Electric Cooperative	Bill Bussey	Safety Coordinator
Lake Country Power	Derek Howe	Chief Operating Officer
Minnesota Power/Allete	David Baker	Emergency Management Coordinator
Otter Tail Power Company		
<b>NONPROFIT ORGS/COMMUNITY-BASED ORGS THAT WORK WITH UNDERSERVED COMMUNITIES AND SOCIALLY VULNERABLE POPULATIONS</b>		
American Red Cross	Owen Fifield	Disaster Services Manager
Salvation Army Northern Division (MN/ND)	Major Michelle Heaver	Area Contact
<b>NEIGHBORING JURISDICTIONS</b>		
Cass County Emergency Management	Chad Emery	Emergency Management Coordinator
Itasca County Emergency Management	John Linder	Emergency Management Director
Beltrami County Emergency Management	Chris Muller	Emergency Management Director
Hubbard County Emergency Management	Nik Opsal	Emergency Management Director
City of Bena (Cass County)	Pat Rooney	Mayor
City of Cass Lake (Cass County)	Herschel Ogema	Mayor
City of Walker (Cass County)	Jerecho Worth	Mayor
City of Walker (Cass County)	Hope Fairchild	City Administrator/Clerk-Treasurer
City of Walker (Cass County)	Peter Anderley	Police Chief
City of S Lake (Itasca County)	Tanya Seibert	Clerk/treasurer

-----Original Appointment-----

**From:** Duane Oothoudt

**Sent:** Tuesday, December 10, 2024 3:03 PM

**To:** Duane Oothoudt; [kenneth.fox@llojibwe.net](mailto:kenneth.fox@llojibwe.net); [Brandy.toft@llojibwe.net](mailto:Brandy.toft@llojibwe.net); [Keith.Karnes@llojibwe.net](mailto:Keith.Karnes@llojibwe.net); [tanya.roerick@llojibwe.net](mailto:tanya.roerick@llojibwe.net); [colleen.wells@llojibwe.net](mailto:colleen.wells@llojibwe.net); [leonard.howard@llojibwe.net](mailto:leonard.howard@llojibwe.net); [doris.jones@llojibwe.net](mailto:doris.jones@llojibwe.net); [laurie.harper@llojibwe.net](mailto:laurie.harper@llojibwe.net); [Mike.Reyes@llojibwe.net](mailto:Mike.Reyes@llojibwe.net); [healthandsafety@leechlakegaming.com](mailto:healthandsafety@leechlakegaming.com); [donna.wittner@llojibwe.net](mailto:donna.wittner@llojibwe.net); Kenneth Washington; [mike.roybal@bugschool.k12.mn.us](mailto:mike.roybal@bugschool.k12.mn.us); [harry.e@llha.net](mailto:harry.e@llha.net); [Leona.howard@leechlakegaming.com](mailto:Leona.howard@leechlakegaming.com); [helen.montgomery@lltc.edu](mailto:helen.montgomery@lltc.edu); [jackie.wright@llojibwe.net](mailto:jackie.wright@llojibwe.net); [chris.bedeau@llojibwe.net](mailto:chris.bedeau@llojibwe.net); [john.robinson@lltc.edu](mailto:john.robinson@lltc.edu); [gordon.fineday@llojibwe.net](mailto:gordon.fineday@llojibwe.net); [faron.jackson@llojibwe.net](mailto:faron.jackson@llojibwe.net); [leonard.fineday@llojibwe.net](mailto:leonard.fineday@llojibwe.net); [kyle.fairbanks@llojibwe.net](mailto:kyle.fairbanks@llojibwe.net); [amanda.yrc@llojibwe.net](mailto:amanda.yrc@llojibwe.net); [steve.white@llojibwe.net](mailto:steve.white@llojibwe.net); [michelle.johnson@llojibwe.net](mailto:michelle.johnson@llojibwe.net); [leon.staples@llojibwe.net](mailto:leon.staples@llojibwe.net); [toni.pemberton@llojibwe.net](mailto:toni.pemberton@llojibwe.net); [christine.roy@llojibwe.net](mailto:christine.roy@llojibwe.net); [laura.vanguilder@llojibwe.net](mailto:laura.vanguilder@llojibwe.net); [Kelvin.Mccuskey@state.mn.us](mailto:Kelvin.Mccuskey@state.mn.us); [michael.a.palmer@state.mn.us](mailto:michael.a.palmer@state.mn.us); [michael.stansberry@usda.gov](mailto:michael.stansberry@usda.gov); [joseph.moore@noaa.gov](mailto:joseph.moore@noaa.gov); [bryan.howell@noaa.gov](mailto:bryan.howell@noaa.gov); [Dan.mckee@bugschool.k12.mn.us](mailto:Dan.mckee@bugschool.k12.mn.us); [breanna.miettinen@leechlakegaming.com](mailto:breanna.miettinen@leechlakegaming.com); [Jason.Truxax@ihs.gov](mailto:Jason.Truxax@ihs.gov); [lpemberton@beltramiellectric.com](mailto:lpemberton@beltramiellectric.com); [bbussey@lcp.coop](mailto:bbussey@lcp.coop); [dhowe@lcp.coop](mailto:dhowe@lcp.coop); [drbaker@allete.com](mailto:drbaker@allete.com); [Owen.fifield@redcross.org](mailto:Owen.fifield@redcross.org); [Michele.heaver@usc.salvationarmy.org](mailto:Michele.heaver@usc.salvationarmy.org); [chad.emery@casscountymn.gov](mailto:chad.emery@casscountymn.gov); [john.linder@co.itasca.mn.us](mailto:john.linder@co.itasca.mn.us); [cris.muller@co.beltrami.mn.us](mailto:cris.muller@co.beltrami.mn.us); [Nikolas.opsal@co.hubbard.mn.us](mailto:Nikolas.opsal@co.hubbard.mn.us); [Dennysrort@aol.com](mailto:Dennysrort@aol.com); [caslake@midconetwork.com](mailto:caslake@midconetwork.com); [jworth@ci.walker.mn.us](mailto:jworth@ci.walker.mn.us); [cityofsquawlakemn@outlook.com](mailto:cityofsquawlakemn@outlook.com)

**Cc:** Ernest Robinson

**Subject:** Kickoff Meeting Hazard Mitigation Plan

**When:** Wednesday, February 19, 2025 1:00 PM-2:30 PM (UTC-06:00) Central Time (US & Canada).

**Where:** Online Zoom

## LEECH LAKE BAND OF OJIBWE

### HAZARD MITIGATION PLAN UPDATE – MEETING INVITATION

Greetings,

Your presence is requested at a Planning Team Meeting for the update of the **Leech Lake Reservation Hazard Mitigation Plan**. You are requested to participate in this meeting because you have a position of administrative or departmental responsibility within the Leech Lake Reservation or are a key stakeholder related to the planning process. Emergency Managers from neighboring jurisdictions are also encouraged to attend so we may strengthen our shared mitigation efforts.

We will be holding the meeting virtually using Zoom conferencing:

**Date:** Wednesday, February 19, 2025

**Time:** 1:00-2:30 PM

**RSVP:** [https://umn-private.zoom.us/webinar/register/WN\\_KCIPTpdgQG6nCrQwTikowA](https://umn-private.zoom.us/webinar/register/WN_KCIPTpdgQG6nCrQwTikowA)

**(Ctrl+Click to follow link)** When you register, you will be placed on an RSVP list and will be sent an email confirmation. If you are not able to attend, please seek to send another representative in your stead.

### About the Hazard Mitigation Plan

In order to maintain eligibility for FEMA Hazard Mitigation Assistance (HMA) Grant Program funding, the tribe's hazard mitigation plan must be updated every 5 years. Our last plan is due for an update and our planning is currently underway. The plan addresses the natural hazards that face the Leech Lake Reservation and will result in the identification of mitigation actions that will help to reduce or eliminate the impact of future hazard events.

### **Meeting Information**

This meeting will be facilitated by personnel from U-Spatial at the University of MN Duluth who are working closely with us on this project. The purpose of this meeting is to present on the update of the Leech Lake Reservation HMP update and gather stakeholder feedback on several key discussion items, including:

- 1) Prioritization of the natural hazards to be profiled in the plan,
- 2) Identification of local vulnerabilities (i.e., infrastructure and populations),
- 3) Ideas for local mitigation actions for implementation, and
- 4) Review of FEMA Hazard Mitigation Assistance grant funding opportunities.

### **About FEMA HMA Grant Funding:**

To learn more about FEMA's HMA grant programs, please review the following:

[FEMA Mitigation Assistance Program and Policy Guide, Effective July 30, 2024](#)

*At a glance info:* See Table 4, Eligible Activities by Program (page 43)

Please note that representatives from the Leech Lake Reservation and other stakeholder agencies/organizations **must** have documented participation in the planning process in order to formally adopt the plan and be eligible to apply for future FEMA HMA grants.

We look forward to you joining us for this important meeting.

Thank you,  
Duane Oothoudt  
Leech Lake Emergency Management  
PO Box 187/200 Sailstar Drive NW  
Cass Lake, MN 56633  
218-766-0280

# Leech Lake Reservation Tribal Hazard Mitigation Plan Update 2025 Planning Team Meeting #1

FEBRUARY 28, 2025



**U-SPATIAL**  
UNIVERSITY OF MINNESOTA DULUTH  
Driven to Discover

## Welcome & Introductions

U-Spatial@UMD Project Leads



**Zach Vavra**  
GIS Specialist  
U-Spatial@UMD



**Bonnie Hundrieser**  
HM Planning Specialist  
Hundrieser Consulting LLC

Leech Lake Reservation Project Lead

- Duane Oothoudt, Emergency Management Director



Please type your name and representation in the CHAT – so others know who is here

PRESENTER: ZACH VAVRA

## Meeting Participation

To make a comment or ask a question, please use the chat or raise your hand to speak.

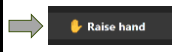
PLEASE REMAIN MUTED AND VIDEO OFF SO EVERYONE CAN HAVE THE BEST EXPERIENCE.

**USE CHAT:**

- To send a message to everyone
- To send a message to individuals or the presenters
- To send a message to host to ask for help or ask a question that isn't for the whole group. The host is Zach Vavra.



**ASK TO SPEAK:**



PRESENTER: ZACH VAVRA

## Meeting Purpose & Agenda



The purpose of this meeting is to formally convene the Leech Lake Reservation HMP Planning Team for a presentation on the plan update and to discuss key items required for the plan update.

### Agenda

- Overview of HMP Key Points
- Review of Past Plan Hazard Risk Priorities, Hazard Profiles, and Current Hazard Prioritization
- Overview of Mitigation Strategies
- Overview of FEMA HMA grant program
- Discuss local mitigation ideas
- Overview of Next Steps

PRESENTER: ZACH VAVRA

## Overview of HMP Key Points

LEECH LAKE RESERVATION 2025 HMP UPDATE

PRESENTER: BONNIE HUNDRIESER

## Plan Requirement



The Hazard Mitigation Plan (HMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000).

- The development of a local government plan is required to maintain eligibility for FEMA HMA grant programs.
- Plans must be updated every 5 years.
- Must provide an opportunity for neighboring communities, tribal, and regional agencies to be involved
- Must be approved by FEMA for meeting all federal requirements.

### Leech Lake Reservation HMP Update 2025

- Last plan was adopted in 2015.
- The updated plan will cover a 5-year window for implementation and grant program eligibility (2026-2031)
- Tribal government must formally adopt the final plan by resolution.

PRESENTER: BONNIE HUNDRIESER

## Plan Purpose



The purpose of the HMP is to:

- **Conduct risk assessment** (history, future probability, impacts of natural hazards)
- **Conduct vulnerability assessment** (at-risk critical infrastructure and populations)
- **Conduct capabilities assessment** (plans, programs, policies, partnerships, funding, etc in place or that are lacking)
- **Develop plan of action** (strategies and mitigation actions for implementation).

PRESENTER: BONNIE HUNDRIESER

## Who the Plan Covers

This is a **tribal hazard mitigation plan** that covers all of the Leech Lake Reservation.



*The plan also takes into consideration the concerns of other partner stakeholders invited to participate who are involved in hazard mitigation (e.g. rural electric utility providers, watershed districts) or that provide services to vulnerable populations within the tribal planning area.*

PRESENTER: BONNIE HUNDRIESER

## Who Participates



### Key Stakeholders

Tribal government as well as related non-governmental agencies & organizations must participate.

- 2 planning team meetings
- Public outreach
- Provision of local information (LMS forms, other data)
- Mitigation Action Charts
- Final plan review

### The Public

The public must have an opportunity to learn about and provide input to the plan update.

- Use of news releases, social media, local bulletin boards, and public meetings or events.
- Must document local-level concerns and mitigation ideas
- The plan must describe how the tribal government defined "public".

POLL #1

PRESENTER: BONNIE HUNDRIESER

## Overview of Plan Content

LEECH LAKE RESERVATION 2025 HMP UPDATE

PRESENTER: ZACH VAVRA

## Plan Content

### Hazard Identification

- The HMP addresses the **natural hazards** that can affect the tribal planning area.
- Manmade hazards are not required to be addressed (per the DMA 2000).
- Hazards that are deemed to be of low risk may be omitted from the plan.
- Hazards deemed moderate to high priority will be addressed.

Flooding	Hail	Drought
Dam/Levee Failure	Lightning	Extreme Heat
Wildfire	Winter Storms	Extreme Cold
Windstorms	Landslides	Earthquakes
Tornadoes	Sinkholes & Karst	Coastal Erosion

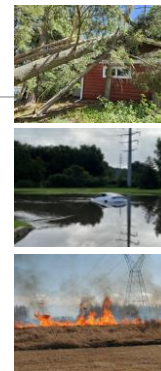
Natural hazard categories as per the State Hazard Mitigation Plan

PRESENTER: ZACH VAVRA

## Plan Content

### Risk Assessment

- History of events
- Probability of occurrence
- Severity
- Climate Change
- Identify if and how risk priorities have changed since the last plan. (Increased / Decreased)



PRESENTER: ZACH VAVRA

## Plan Content *Vulnerability Analysis*

- Inventory of critical infrastructure
- Identify specific, local-level impacts and vulnerabilities (can include natural resources, cultural, or sacred sites)
- Includes local-level capabilities assessment that supports mitigation or identifies gaps
- Identify any factors (e.g. new development) that may increase the community's vulnerability.
- Review social vulnerability factors.



POLL #2

PRESENTER: ZACH VAVRA

## Timeframe for development & Plan Format

### Timeframe:

The planning process generally occurs over the course of 14-18 months from start to finish.

- The Leech Lake Reservation Plan will be completed in **2025**.

### Format:

- PDF document (paper version)
- Interactive website companion
- Developed and hosted by U-Spatial at UMD



Example HMP website

PRESENTER: ZACH VAVRA

## Hazard Prioritization

REVIEW OF THE HAZARD RISK PRIORITIES FOR  
LEECH LAKE RESERVATION

## Leech Lake Reservation Past Prioritization of Hazards

HAZARD	Leech Lake 2015
Flooding	Moderate
Winter Storms	High
Windstorms	High
Tornadoes	High
Hail	Low
Lightning	Low
Extreme Cold	High
Extreme Heat	High
Drought	Moderate
Wildfire	High
Landslides	Low
Land Subsidence	n/a
Dam/Levee Failure	Low

POLL #3

PRESENTER: ZACH VAVRA

PRESENTER: ZACH VAVRA

## Leech Lake Reservation 2025 Update of Hazard Prioritization

### Considerations:

- Increase/Decrease of events
- Local vulnerabilities (impacts)
- New development/population growth

HAZARD	Leech Lake 2025
Flooding	
Winter Storms	
Windstorms	
Tornadoes	
Hail	
Lightning	
Extreme Cold	
Extreme Heat	
Drought	
Wildfire	
Landslides	
Land Subsidence	
Dam/Levee Failure	

PRESENTER: ZACH VAVRA

## Hazard Prioritization Poll results and discussion

Are there any hazards that differ geographically across the tribal planning area?

PRESENTER: ZACH VAVRA

## Comments or Questions?

# Overview of Mitigation Actions & FEMA grants

DEVELOPMENT OF MITIGATION ACTIONS AND ACTIVITIES ELIGIBLE FOR FEMA HAZARD MITIGATION ASSISTANCE GRANT FUNDING

PRESENTER: ZACH VAVRA

PRESENTER: BONNIE HUNDRESER

## Mitigation Action Charts



The end resulting mitigation action chart will reflect the tribal government's plan of action to reduce the impacts of future natural hazard events.

- **Must** address hazards of moderate to high priority.
- **Must** address identified local vulnerabilities.
- **Must** identify priority, status, timeframe, responsibility, how incorporation/implementation will occur, and possible funding.
- ★ Eligible FEMA HMA grant activities **must** be identified in the risk assessment and plan of action.

PRESENTER: BONNIE HUNDRESER

FOND DU LAC RESERVATION				Mitigation Action Chart			
#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integrations	Possible Funding
6	Severe Summer Storms	Structure & Infrastructure Projects	Identify locations where warning sirens should be located to effectively cover the FDL Reservation and obtain funding for installation of sirens.	New High TRD	FDL EMD in coordination with St. Louis County and Carlton County EMDs	FDL Emergency Management will work with St. Louis & Carlton County emergency managers on this effort. Supporting grant funding may be sought from the USDA Community Facilities Grant Program which funds sirens.	FDL, USDA CF Grant Program
7	Wildfire	Structure & Infrastructure Projects	Continue to address installation of water reservoirs through dry hydrants or in-ground water tanks to support wildland fire fighting.	Existing Moderate Ongoing	FDL EMD in coordination with FDL Forestry Division	The new filling station near Brookston is complete and FDL EMD will continue to monitor the progress of the proposed water facility.	FDL, Other (TRD)
8	Wildfire	Natural Systems Protection	Continue to address fuel reduction measures in high-risk areas of the Reservation.	Existing Moderate Ongoing	FDL Forestry	FDL Forestry works to regularly employ fuel reduction measures in areas adjacent to residential homes and other building structures in high-risk areas.	FDL
9	Flooding	Structure & Infrastructure Projects	Address risk of flood damage to existing roads that have experienced flood damage or may be at future risk by implementing mitigation measures to reduce or avoid flood damage.	Existing Moderate Ongoing	FDL Operations Division in coordination with St. Louis County and Carlton County Hwy. Dept.	The Fond du Lac Road Highway Department works in collaboration with Carlton and St. Louis County transportation departments to address problem areas on these roads and will continue to do so.	FDL / County
10	Flooding	Natural Systems Protection	Monitor and manage water levels on the lakes that produce Wild Rice for the FDL Reservation, applying measures to mitigate against the loss of wild rice harvest in the event of a flood event.	Existing Moderate Ongoing	FDL Resource Management Division	This is an ongoing part of FDL Resource Management Division's program for the management of Wild Rice.	FDL
11	Flooding	Local Planning & Regulations	Maintain annual dam inspection programs for the four dams under FDL direction to ensure dams are structurally sound, maintained, and functioning properly.	Existing Low Ongoing	FDL Resource Management Division	This is an ongoing part of FDL Resource Management Division's program for the management of dams under FDL direction.	FDL

WHITE EARTH RESERVATION				Mitigation Action Chart			
#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integrations	Possible Funding
15	Severe Summer Storms	Structure & Infrastructure Projects	Install new warning sirens where needed on the White Earth Reservation.	New High TRD	WE Emergency Management	Warning sirens acquisition is needed for the areas near the City of Mahanota. The area where the upgrade is needed is associated with the White Earth Tribal and Community College and Revisited Apartments which are associated with the WE EMD. Action items that needs an upgrade is in the Rice Lake area. Funding will be purchased and installed as WE funding allows. Outside grant funding may be sought from the USDA Community Facilities Grant Program.	WEER, USDA CF Program
16	Severe Summer Storms	Structure & Infrastructure Projects	Construct storm shelters or tornado safe rooms for emergency or tribal facilities as needed.	Existing High Ongoing	WE Emergency Management	A storm shelter or safe room is needed at Little Elbow Lake Park, which is located in south Kesteven Indian Reservation. The construction costs on the White Earth Indian Reservation. The emergency shelter and safe room will be an official storm shelter or tornado safe room. Child care facilities also need a safe place for storm evacuation. The Revisited Apartments and WECC should also be evaluated for construction projects. WEER will work obtain funding to construct a storm shelter or tornado safe room for the park and child care facilities. Mahanota County has a CVPPP in place, but updated in 2021. The CVPPP covers portions of the White Earth Reservation. WE EMD will work with the MN DNR Firewise Coordinator for WE EMD to proceed with a plan update to identify necessary wildfire mitigation activities. The plan is fully revised and fully will be applied to update the plan.	WEER, FEMA HMA, Other (TRD)
17	Wildfire	Local Planning & Regulations	Work with the MN DNR Firewise Program to address updates of the White Earth Reservation Community Wildfire Protection Plan (CWPP).	New Moderate 2025	WE Emergency Management in coordination with WE Forestry and MN DNR	Emergency Management Director (EMD) is also the EMD for Mahanota County as both the county & tribe will be engaged in this effort.	County, MN DNR, Firewise Grant

PRESENTER: BONNIE HUNDRESER

## FEMA HMA Grant Funding



Example eligible grant activities:

- All applicants **must** be covered by an approved HMP and have formally adopted the plan.
- Projects **must** be addressed in the risk assessment and be identified in the plan of action.
- Several different grant programs
- State Hazard Mitigation Officer is the main POC for questions
- Property Acquisition
- Tornado Safe Rooms
- Burying Powerlines
- Wildfire Mitigation
- Soil Stabilization
- Minor Localized Flood Reduction
- Green Infrastructure
- "5% Initiative" (e.g. warning systems, generators, public awareness/education campaigns)

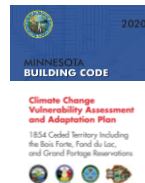
# Overview of Mitigation Strategies

THE FOLLOWING STRATEGIES ARE RECOMMENDED GUIDANCE IN THE DEVELOPMENT OF LOCAL MITIGATION ACTIONS

## LOCAL PLANNING & REGULATIONS

These actions include policies or codes that influence the way land is developed and structures are built, and also incorporate mitigation into other plans.

- Limit or restrict development in floodplain areas
- Adopt and enforce building codes
- Improve stormwater management planning
- Incorporate mitigation into climate adaptation planning
- Enforce watering / burning restrictions during periods of drought



PRESENTER: BONNIE HUNDRIESER

## STRUCTURE & INFRASTRUCTURE PROJECTS

These actions protect structures and infrastructure by changing them or removing them from danger.

- Construction of tornado safe rooms.
- Burying powerlines
- Property acquisition for properties at risk to repetitive flooding or failure to landslides
- Infrastructure retrofit (upsizing culverts, other road & bridge projects)
- Protection of vulnerable critical infrastructure such as lift stations and Fire Halls



PRESENTER: BONNIE HUNDRIESER

## NATURAL SYSTEMS PROTECTION

These actions use a natural systems approach to minimize damage and losses from natural hazard events.

- Tree management near roads & powerlines
- Floodplain and stream restoration
- Soil stabilization on at-risk slopes
- Wildfire fuels reduction & defensible space
- Living snow fences to reduce drifting
- Rain gardens to slow impacts of rain events



PRESENTER: BONNIE HUNDRIESER

## EDUCATION & AWARENESS PROGRAMS



These actions inform and educate the community to raise awareness of hazards and ways to mitigate risk.

- Promoting sign up for CodeRED etc.
- Sharing information on severe weather awareness
- Promoting personal preparedness
- Tornado season education
- Outreach to vulnerable populations
- Wildfire safety (creation of defensible space, burning restrictions)

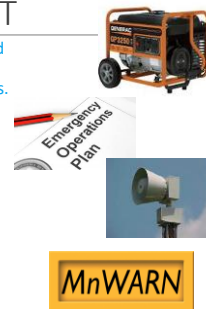


PRESENTER: BONNIE HUNDRIESER

## MITIGATION PREPAREDNESS & RESPONSE SUPPORT

These actions are typically not considered mitigation, but support reduction of the effects of damaging natural hazard events.

- Flood fight plans and equipment
- Installing generator backup power
- Development of EOPs
- Shelter planning and training
- Working with facilities that care for vulnerable populations (e.g. schools, nursing homes)
- Installation of outdoor warning sirens.
- Joining MnWARN for utility disaster mutual aid



PRESENTER: BONNIE HUNDRIESER

## Comments or Questions?

Do you have any ideas for specific mitigation activities for implementation?

PRESENTER: BONNIE HUNDRIESER



## Following Planning Team Meeting #1

### COMPLETION OF TRIBAL LOCAL MITIGATION SURVEY FORM

Representatives from Leech Lake Reservation emergency management, tribal government, and departmental staff will help to participate in filling out a Local Mitigation Survey form. This form includes:

- Local hazard identification & risk prioritization.
- Local vulnerabilities (critical infrastructure, populations or assets)
- Local-level capabilities (programs, polices, staff, funding)
- Review past mitigation actions/identify new mitigation projects.

PRESENTER: BONNIE HUNDRIESER

## Questions?

What questions do you have for U-Spatial@UMD about development of the HMP or next steps?

PRESENTER: ZACH VAVRA

## Contact Information

Zach Vavra, MS, GISP

**U-Spatial@UMD**

[slstark@d.umn.edu](mailto:slstark@d.umn.edu)

218-726-7438

Bonnie Hundrieser, HM Planner

**Hundrieser Consulting LLC**

[hundrieserconsulting@outlook.com](mailto:hundrieserconsulting@outlook.com)

218-343-3468



PRESENTER: ZACH VAVRA

## **Leech Lake Reservation HMP Planning Team Meeting #2 9/18/25 Meeting Summary & Documentation**

**Summary:** On September 18, 2025, Leech Lake Reservation Emergency Management convened tribal governmental and departmental representatives, as well as neighboring jurisdictions and other stakeholders to participate in the 2<sup>nd</sup> and final Planning Team Meeting for the update of the Leech Lake Reservation Hazard Mitigation Plan (HMP). The purpose of the meeting was to formally convene the Leech Lake Reservation HMP Planning Team for a presentation on the draft plan and discussion of key items prior to public review and submission of the plan to HSEM and FEMA. The meeting was held via Zoom webinar video conference and was facilitated by Stacey Stark and Bonnie Hundrieser of the U-Spatial@UMD project team.

**Stakeholder Invitations:** Leech Lake Reservation Emergency Management invited all stakeholders included on the tribe's HMP Update Jurisdictional Contact List (JCL), which includes Leech Lake Tribal Government and departmental contacts, along with other related agencies, organizations, and neighboring Jurisdictions invited to participate in the plan update process. Contacts were encouraged to engage additional staff or to send someone in their stead if they could not attend. A copy of the Leech Lake HMP Jurisdictional Contact List is included with this meeting summary.

**Meeting Participants:** A total of **12** people attended the meeting. Representation included tribal elected officials and departmental staff from Leech Lake Reservation and other stakeholders, including neighboring jurisdictions. A participant list is provided below:

- 1 Duane Oothoudt, Leech Lake Tribal Police Department, Emergency Management Director
- 2 Jason Truax, Cass Lake Indian Health Service, Safety and Emergency Preparedness
- 3 Michael O'Brien, LLBO Department of Resource Management, Fisheries Biologist
- 4 Paul LeClaire, Leech Lake Band of Ojibwe, Safety Officer-Bugonaygeshig School
- 5 John Robinson, Leech Lake Tribal College, Campus Security
- 6 Laurie Harper, Leech Lake Band of Ojibwe, Director of Education
- 7 Michael Palmer, Minnesota DNR, Regional Firewise Specialist
- 8 Lee Pemberton, Beltrami Electric Cooperative Inc., Operations Manager
- 9 Ryan Ferguson, Lake Country Power, Sr. Engineer
- 10 Eric Alger, Cass County Sheriff's Office, Chief Deputy
- 11 Christopher Muller, Beltrami County, Emergency Management Director
- 12 John Linder, Itasca County, Emergency Manager

**Presentation Overview:** The PowerPoint presentation covered the following items about the process and content of the plan update. A PDF of the presentation slides is included with this meeting summary.

- Meeting Purpose and Agenda
- About the Project Team
- Overview of Plan Update
- Who the Plan Covers
- Who Needs to Participate
- Overview of the Structure of the HMP (Website and PDF)

- Prioritization of Natural Hazards
- Review of Risk Assessment Factors and Hazard Profiles
- Overview of Mitigation Action Charts and FEMA HMA Grant Funding
- Review of Mitigation Strategies and Actions
- Open Discussion (Comments and Questions)
- Discussion of Next Steps & answer your questions

The opening PowerPoint presentation covered a re-cap of key points about the plan update, a review of the Risk Assessment & Vulnerability Analysis, an overview of FEMA Hazard Mitigation Assistance (HMA) grant funding; an overview of how mitigation actions are developed and an overview of the jurisdictional Mitigation Action Charts (MACs). Following the presentation, participants were provided with an opportunity to review and discuss the Leech Lake tribal Mitigation Action Chart. This discussion period offered a facilitated opportunity for participants to consider any changes or new additions of mitigation actions prior to completion of the draft plan for public review.

## LEECH LAKE RESERVATION HMP PLANNING TEAM MEETING #2 DISCUSSION NOTES

- Jason Truax – I have heard of mapping of community members who are vulnerable who are on Medicaid etc. Do you know anything about that?
- Stacey Stark – Yes, we recently completed a project with MDH in which we did look at some of that data. Stacey showed the extreme heat dashboard for the Leech Lake Reservation HMP website and demonstrated how to you select the reservation and zoom in. On the Health page it includes several variables to look at, including people who are electricity-dependent medicare beneficiaries. The map shows the level of vulnerability for the Leech Lake Reservation across different variable. Stacey noted that this is all aggregated information, we don't have information more specific than that.
- Stacey encouraged all to explore the Leech Lake Reservation extreme heat risk dashboard. It will be embedded in the Leech Lake website when that is ready. It contains health variables that MDH has determined make individuals more at risk to heat events.  
<https://www.arcgis.com/apps/dashboards/567eb4f650e74e38a1bcbc93b96a5a4c>
- Jason Truax – I'm based out of a hospital here. This information is very helpful in order to plan for emergency response capabilities. Jason also asked if once the Leech Lake Reservation HMP website is fully developed if a tutorial would be available on how to use it. Stacey Stark confirmed that yes, we will be providing an optional tutorial for people to join to learn more about all the facets of the HMP website and how to use it. We will make an announcement on that after FEMA approves the plan.
- Duane Oothoudt – Regarding the deadline of the plan to be turned in to FEMA. Our hard date is Nov. 20 in order to be considered for a Presidential Disaster Declaration. We get 90 days from our declaration request. Stacey Stark responded that we anticipate having your plan turned in to HSEM and FEMA by the end of October. They are awaiting receipt of your plan for review as they understand the sensitive timing.
- Duane also shared that an ongoing mitigation action on the LL Reservation related to Education & Outreach Programs is doing door-to-door visits with homeowners to provide smoke detectors and carbon monoxide alarms. This is done in partnership with the American Red Cross. It would

be a good item to include in the Leech Lake Mitigation Action Chart as an ongoing action related to winter weather, and our education efforts not to use devices such as generators indoors in winter for heating.

**Meeting Conclusion:** The meeting concluded with an overview and timeline of the upcoming next steps for public review and submission of the draft plan to HSEM and FEMA for final review and approval.

**Included with this meeting summary are the following:**

- Leech Lake Reservation HMP Jurisdictional Contact List
- Meeting Invitation to Stakeholders
- PowerPoint Presentation Slides

*Meeting Summary Prepared By: Bonnie Hundrieser, U-Spatial@UMD Project Team*

## LEECH LAKE RESERVATION HMP JURISDICTIONAL CONTACT LIST

Following is a list of the stakeholders that received an invitation to participate in Planning Team Mtg. #2 and will receive the meeting summary:

REPRESENTATION	NAME	TITLE
LLBO Emergency Management	Duane Oothoudt	Emergency Management Director
LLBO Division of Resource Mgmt.	Kenneth Fox	DRM Director
LLBO Environmental Dept.	Brandy Toft	Environmental Director
LLBO Forestry Dept.	Keith Karnes	Forester
LLBO Fish, Wildlife	Tanya Roerick	Program Coordinator
LLBO Cultural Resources Heritage Sites	Colleen Wells	Heritage sites coordinator
LLBO Facilities Management	Leonard Howard	Progam Coordinator
LLBO Health Division	Doris Jones	Division Director
LLBO Education Division	Laurie Harper	Division Director
LLBO Tribal Development Division	Michael Reyes	Planner
LLBO Health and Safety Division	Ernest Robinson	Health and Safety Director
LLBO Transit	Donna Wittner	Transportation Manager
LLBO Public Safety Division	Kenneth Washington	Police Chief
LLBO Tribal Emergency Response Committee	Paul LeClaire	BugOhNayGeyShig School
LLBO Tribal Emergency Response Committee	Reuben St. Cyr	Housing Director
LLBO Tribal Emergency Response Committee	Leona Howard	EMS Health and Safety
LLBO Tribal Emergency Response Committee	Helen Montgomery	Leech Lake Tribal College President
LLBO Tribal Emergency Response Committee	Jackie Wright	Tribal Court
LLBO Tribal Emergency Response Committee	Chris Bedeau	KOJB Radio Director
LLBO Tribal Emergency Response Committee	John Robinson	Leech Lake Tribal College
LLBO Tribal Emergency Response Committee	Gordon Fineday	Executive Director LLBO
LLBO Tribal Emergency Response Committee	Michael Michaud	Gaming Director
LLBO Administration	Gordon Fineday	Executive Director
LLBO Government	Faron Jackson Sr.	Chairman
LLBO Government	Leonard Fineday	Secretary/Treasurer
LLBO Government	Kyle Fairbanks	District I Representative
District 1 Admin	Amanda Youngrunningcrane	Admin D1
LLBO Government	Steve White	District II Representative
District 2 Admin	Michelle Johnson	Admin D2
LLBO Government	Leon Staples Jr	District III Representative
District 3 Admin	Toni Pemberton	Admin D3
LLBO Twin Cities Office	Christine Roy	LIC Office Representative

LLBO Duluth Office	Laura Van Guilder	LIC Office Representative
Tribal Historic Preservation Office	Gina Lemon	THPO
<b>LOCAL &amp; REGIONAL AGENCIES INVOLVED IN HAZARD MITIGATION</b>		
MN HSEM	Kelvin McCuskey	Region 2 Regional Program Coordinator
MN DNR Firewise	Mike Palmer	Central Region Firewise Specialist
U.S.F.S. Chippewa National Forest	Michael Stansberry	Forest Supervisor
National Weather Service - Duluth Office	Joseph Moore	Meteorologist
NWS Northland Skywarn	Brian Howell	Meteorologist
<b>BUSINESSES, ACADEMIA, AND OTHER PRIVATE ORGS.</b>		
Leech Lake - Bugonaygeshig School	Dan Mckeon	Superintendent
Leech Lake Tribal College	Stacie Lyon	President
Leech Lake Gaming (Casinos, Gas Stations & Grocery)	Breanna Miettinen	Gaming Division Director
Cass Lake Indian Health Services (Hospital)	Jason Truax	Safety and Emergency Preparedness
Beltrami Electric Cooperative	Lee Pemberton	Operations Manager
Lake County Electric Cooperative	Bill Bussey	Safety Coordinator
Lake Country Power	Derek Howe	Chief Operating Officer
Minnesota Power/Allete	David Baker	Emergency Management Coordinator
Otter Tail Power Company		
<b>NONPROFIT ORGS/COMMUNITY-BASED ORGS THAT WORK WITH UNDERSERVED COMMUNITIES AND SOCIALLY VULNERABLE POPULATIONS</b>		
American Red Cross	Owen Fifield	Disaster Services Manager
Salvation Army Northern Division (MN/ND)	Major Michelle Heaver	Area Contact
<b>NEIGHBORING JURISDICTIONS</b>		
Cass County Emergency Management	Chad Emery	Emergency Management Coordinator
Itasca County Emergency Management	John Linder	Emergency Management Director
Beltrami County Emergency Management	Chris Muller	Emergency Management Director
Hubbard County Emergency Management	Nik Opsal	Emergency Management Director
City of Bena (Cass County)	Pat Rooney	Mayor
City of Cass Lake (Cass County)	Herschel Ogema	Mayor
City of Walker (Cass County)	Jerecho Worth	Mayor
City of Walker (Cass County)	Hope Fairchild	City Administrator/Clerk-Treasurer
City of Walker (Cass County)	Peter Anderley	Police Chief
City of S Lake (Itasca County)	Tanya Seibert	Clerk/treasurer

**From:** [Duane Oothoudt](#)  
**To:** [Duane Oothoudt](#); [kenneth.fox@llojibwe.net](#); [Brandy.toft@llojibwe.net](#); [Keith.Karnes@llojibwe.net](#); [tanya.roerick@llojibwe.net](#); [colleen.wells@llojibwe.net](#); [leonard.howard@llojibwe.net](#); [doris.jones@llojibwe.net](#); [laurie.harper@llojibwe.net](#); [Mike.Reyes@llojibwe.net](#); [healthandsafety@leechlakegaming.com](#); [donna.wittner@llojibwe.net](#); [Michael Robinson JR](#); [mike.roybal@bugschool.k12.mn.us](#); [reuben.s@llha.net](#); [Leona.howard@leechlakegaming.com](#); [helen.montgomery@lltc.edu](#); [jackie.wright@llojibwe.net](#); [chris.bedeau@llojibwe.net](#); [john.robinson@lltc.edu](#); [gordon.fineday@llojibwe.net](#); [harry.e@llha.net](#); [gordon.fineday@llojibwe.net](#); [faron.jackson@llojibwe.net](#); [leonard.fineday@llojibwe.net](#); [kyle.fairbanks@llojibwe.net](#); [amanda.yrc@llojibwe.net](#); [steve.white@llojibwe.net](#); [michelle.johnson@llojibwe.net](#); [leon.staples@llojibwe.net](#); [toni.pemberton@llojibwe.net](#); [christine.roy@llojibwe.net](#); [laura.vanguilder@llojibwe.net](#); [gina.lemon@llojibwe.net](#); [Kelvin.Mccuskey@state.mn.us](#); [michael.a.palmer@state.mn.us](#); [michael.stansberry@usda.gov](#); [joseph.moore@noaa.gov](#); [bryan.howell@noaa.gov](#); [Dan.mckeeon@bugschool.k12.mn.us](#); [helen.montgomery@lltc.edu](#); [breanna.miettinen@leechlakegaming.com](#); [Jason.Truxax@ihs.gov](#); [lpemberton@beltramielctric.com](#); [bbussey@lcp.coop](#); [dhowe@lcp.coop](#); [drbaker@allete.com](#); [Owen.fifield@redcross.org](#); [Michele.heaver@usc.salvationarmy.org](#); [chad.emery@casscountymn.gov](#); [john.linder@co.itasca.mn.us](#); [cris.muller@co.beltrami.mn.us](#); [Nikolas.opsal@co.hubbard.mn.us](#); [Dennysrtr@aol.com](#); [casslake@midconetwork.com](#); [jworth@ci.walker.mn.us](#); [hfairchild@ci.walker.mn.us](#); [panderley@ci.walker.mn.us](#); [cityofsquawlakemn@outlook.com](#); [Donovan Staples](#)  
**Cc:** [Bonnie K Hundrieser](#)  
**Subject:** LEECH LAKE RESERVATION Hazard Mitigation Plan Update Meeting Invitation  
**Date:** Tuesday, August 12, 2025 3:58:18 PM

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## LEECH LAKE RESERVATION HAZARD MITIGATION PLAN UPDATE – MEETING INVITATION

Greetings,

Your presence is requested at the **2nd Planning Team Meeting** for the update of the **Leech Lake Reservation Hazard Mitigation Plan (HMP)**. You are requested to participate in this vital meeting because you have a position of administrative or departmental responsibility within the Leech Lake Reservation or are a key stakeholder related to the planning process. Emergency Managers from neighboring jurisdictions are also encouraged to attend so we may strengthen our shared mitigation efforts. This meeting will be the final planning meeting for the HMP update process.

**We will be holding the meeting virtually using Zoom webinar:**

**Date:** Thursday, September 18, 2025  
**Time:** 9:00 a.m. – 10:30 a.m.  
**Register:** [Control+Click here to follow to link to register for the meeting](#)

The purpose of this meeting is to provide an overview of the plan and interactive website, including a review of the updated risk assessment for natural hazards that affect the reservation. We will also discuss the Mitigation Action Chart that will be specific to the Leech Lake Reservation, as well as funding opportunities available under the FEMA Hazard Mitigation Assistance grant programs.

Your participation in this meeting and feedback on the draft plan is important to us. The draft Leech Lake Reservation HMP is nearing completion and will be ready for review by planning team members and the public in the coming weeks.

**When you register, you will automatically be placed on an RSVP list.** If you are not able to attend, please consider sending another representative in your stead.

Thank you,  
Duane Oothoudt  
Leech Lake Emergency Management  
PO Box 187/ 200 Sail Star Drive NW  
Cass Lake, MN 56633  
218-766-0280

# Leech Lake Reservation Hazard Mitigation Plan Update 2025 Planning Team Meeting #2

September 18, 2025



**U-SPATIAL**  
UNIVERSITY OF MINNESOTA DULUTH  
Driven to Discover

## Welcome & Introductions

U-Spatial@UMD Project Leads



**Stacey Stark**  
Project Manager  
U-Spatial@UMD

Leech Lake Reservation Project Lead

- Duane Oothoudt, Emergency Management Director



**Bonnie Hundrieser**  
HM Planning Specialist  
Hundrieser Consulting LLC



Please type your name and representation in the CHAT – so others know who is here

PRESENTER: STACEY STARK

## Zoom Logistics

PLEASE REMAIN MUTED AND VIDEO OFF SO EVERYONE CAN HAVE THE BEST EXPERIENCE.

### USE CHAT:

- > Send a message to everyone
- > Send a message to individuals or
- > Send a message to host to ask for help or ask a question that isn't for the whole group. The host is Stacey Stark



### ASK TO SPEAK:



PRESENTER: STACEY STARK

## Meeting Purpose & Agenda



This meeting formally convenes the **Leech Lake Reservation HMP Planning Team** for a presentation on the draft plan and discussion of the key items prior to public review and submission of the plan to HSEM and FEMA.

### Agenda

- > Recap of Key HMP Points
- > Preview of Deliverables
- > Review of Risk Assessment & Vulnerability Analysis in Website
- > Overview of FEMA HMA Funding and Mitigation Action Chart
- > Review & Feedback
- > Next Steps

PRESENTER: STACEY STARK

## Overview of Plan Update

Leech Lake Reservation is updating its **Hazard Mitigation Plan (HMP)** to fulfill a state & federal requirement. The plan must be updated every 5 years. The last plan was adopted in 2015.

The purpose of the plan is to identify & assess natural hazards that pose risk to the Leech Lake Reservation and **develop long-term strategies and mitigation actions** that will help to reduce or eliminate the impact of future hazard or disaster events.



**Hazard Mitigation** is any action taken to reduce or eliminate long term risk to people and property from natural disasters.

PRESENTER: BONNIE HUNDRIESER

## Who the Plan Covers

This is a **tribal hazard mitigation plan** that covers all of the Leech Lake Reservation.

*The plan also takes into consideration the concerns of other stakeholders invited to participate who are involved in hazard mitigation (i.e., rural electric providers, NWS, MN DNR, neighboring jurisdictions) or that provide services to vulnerable populations within the tribal planning area.*



PRESENTER: BONNIE HUNDRIESER

## Stakeholder Involvement



### Planning Team

- LL Reservation tribal government and departments, as well as related agencies, organizations, and neighboring jurisdictions.
- Participation in planning team meetings, public outreach, local mitigation survey, provision of spatial or other data, and review of draft plan.

### The Public

- Opportunity to learn about the plan and provide feedback on local-level concerns, mitigation ideas, and review of draft plan.

PRESENTER: BONNIE HUNDRIESER

### PDF document:

- All FEMA required elements
- Limited figures & images
- Integrated links to website
- Local mitigation surveys
- Plans & programs in place
- Past mitigation action review
- Planning team meetings
- Outreach & engagement documentation



- Risk and vulnerability of each hazard
- Mitigation actions!

Both formats

## Deliverables



### Website companion:

- Links to PDF components
- **Interactive maps** and context
- Critical infrastructure and assets
- Simple, concise explanations
- Public input form on site

PRESENTER: STACEY STARK

## Prioritization of Hazards for Leech Lake Reservation



- Probability and Severity of natural hazard events (risk)
- Observed increase or decrease in risk since last plan
- Consider vulnerabilities: (critical infrastructure, cultural, and natural resources; vulnerable populations, or changes in development)

Natural Hazards	Current Priority
Winter Storms	High
Windstorms	High
Tornadoes	High
Wildfire	High
Drought	High
Flooding	Moderate
Extreme Cold	Moderate
Extreme Heat	Moderate
Hail	Low
Lightning	Low
Landslides	Low
Dam/Levee Failure	Low

PRESENTER: STACEY STARK

## Hazards Risk Assessment

- Validates the prioritization of hazards
- Provides probability and severity of future events as possible
- Identifies vulnerable populations, critical infrastructure, and tribal natural and cultural structures at risk
- Considers variable geographic vulnerability
- Informs Mitigation Actions in the HMP



PRESENTER: STACEY STARK

## Website Demo

Example:  
[z.umn.edu/GrantHMP](https://z.umn.edu/GrantHMP)

## Comments and Questions?

## Overview of Mitigation Action Charts



Mitigation Action Charts are the end product of the HMP.

They demonstrate a community's 5-year plan to:

- Reduce future risk to natural hazard events.
- Address local vulnerabilities through targeted activities.
- Utilize local capabilities to implement actions.

★ Eligible FEMA HMA grant activities must be identified in the plan of action.

PRESENTER: BONNIE HUNDRIESER

LEECH LAKE RESERVATION					Mitigation Action Chart		
#	Hazard	Mitigation Strategy	Mitigation Action	Status Priority Timeframe	Responsibility	Comments on Implementation & Integration	Possible Funding
18	Severe Summer Storms	Structure & Infrastructure Projects	STORM SHELTERS / TORNADO SAFE ROOMS Address the need for the construction of storm shelters or tornado safe rooms in areas where tribal residents or visitors are vulnerable to high wind events	Existing High 2008-2021	LEEM	LL Emergency Management is leading efforts to evaluate current emergency shelter needs and potential locations for new development or existing facilities. The Pow Wow grounds are an area of high vulnerability during public events. Many homes are also built on hills with an increased FEMA grant funding may be available for tornado safe rooms from HMGCP funding. LEEM has worked with the electric utility providers on having powerlines and will continue to do. Our utility providers include Eastern Electric Coop, Lake County Electric Coop, Lake County Power, Otter Tail Power, and Minnesota Power as needed. FEMA HMGCP grant funding may be a source for powerline infrastructure retrofits that the tribe or local electric coop may apply for.	Internal: LL Tribal Dept., T&A, External: Possible FEMA HMGCP grant
19	Severe Winter & Summer Storms	Structure & Infrastructure Projects	POWERLINE RETROFITS Work to inspect overhead power lines to underground to avoid power outages from high wind events and storms.	Existing High 2008-2023	LEEM in coord with electric utility providers	The LL Reservation Roads Department conducts vegetation management along tribal roads to reduce the risk of downed trees or branches resulting from severe spring and summer storm events. Electric utility providers also work to address dead or dying trees in the right of way to reduce the risk of power outages.	External: Utility Providers, Possible FEMA HMGCP grant
20	Severe Winter & Summer Storms	Natural Systems Protection	VEGETATION MANAGEMENT Manage trees and other vegetation along tribal roads from severe storm events to reduce risk to powerlines and paving materials.	Existing Moderate 2008-2023	LL Tribal Roads Construction & Surveying Dept		Internal: LL Tribal Roads Construction & Surveying Department, External: Utility Providers



## FEMA Mitigation Grant Funding



### Section 406

Available **after** a disaster occurs.

Focuses on mitigation measures for facilities that have actually been damaged in a particular disaster.

### \*Section 404\*

Requires an approved & adopted HMP. Funds mitigation projects for both damaged and non-damaged facilities. Several different grant programs.

### Example Section 404 activities:

- Property Acquisition
- Tornado Safe Rooms
- Bury Overhead Powerlines
- Wildfire Mitigation
- Soil Stabilization
- Flood Risk Reduction
- Green Infrastructure
- Other projects difficult to conduct a standard BCA (i.e., tornado warning sirens, generators for critical facilities)

PRESENTER: BONNIE HUNDRIESER

## Strategy #1 - Local Planning & Regulations

### Leech Lake Reservation Examples:

- Building permits to ensure new development follows environmental & historic preservation ordinances
- Update of Leech Lake Reservation Community Wildfire Protection Plan (CWPP)
- Wild Rice Monitoring
- Flood mitigation for reservation roads
- Wetland Remediation and Climate Change Planning (LL Environmental Dept.)



PRESENTER: BONNIE HUNDRIESER

## Strategy #2 - Structure & Infrastructure Projects

### Leech Lake Reservation Examples:

- Repair & relocation of an outdoor warning siren
- Construction of tornado safe rooms – Pow Wow grounds, homes w/o basements
- Power line retrofit projects
- Stormwater management improvements (culvert replacements), Road & Bridge projects
- Other examples: Wildfire Mitigation – Metal Roofing, Installation of External Wildfire Sprinkler Systems



PRESENTER: BONNIE HUNDRIESER

## Strategy #3 - Natural Systems Protection

### Leech Lake Reservation Examples:

- LL Tribal Roads Construction & Surveying Department + Utility Providers – Trimming trees and branches near power lines and roads
- LL Forestry – Prescribed burns, cutting fire breaks, removal of dead and dying trees

Other examples:

- Planting Living Snow Fences to reduce snow drifting
- Installing Rain Gardens to reduce impacts of high rain events



PRESENTER: BONNIE HUNDRIESER

## Strategy #4 - Education & Awareness Programs

### Leech Lake Reservation Examples:

- Promoting sign-up for the tribe's emergency notification system.
- Encouraging residents to be aware of and prepared for severe weather events, extreme temperatures, wildfire risk, and extended power outages.
- Promoting Firewise and creation of defensible space
- Sharing information across platforms – Leech Lake Tribal Website, Community Bulletin Boards, Leech Lake Newspaper, Pow Wow, or other in-person events.



PRESENTER: BONNIE HUNDRIESER

## Strategy #5 - Mitigation Preparedness & Response Support

### Leech Lake Reservation Examples:

- Obtaining generators for backup power
- Planning for Sheltering / Warming & Cooling Centers
- Severe Weather Plans with the Bugonaygeshig School
- Testing of outdoor warning sirens
- Participation in regional EM planning, training, and exercising



PRESENTER: BONNIE HUNDRIESER

## Comments and Questions?



## October, 2025

### Review of Draft Plan and Public Review & Comment Period

#### Following Planning Team Mtg. #2

- Tribal review of draft plan + Mitigation Action Chart
- Description of "Previous Integration of Past HMP"
- Public review & comment period (News Release #2) – documentation of local postings



PRESENTER: BONNIE HUNDRIESER



## Nov-Dec, 2025

### Draft Plan Submission to HSEM & FEMA, Plan Approval, and Collection of Adopting Resolutions

- **Leech Lake Tribal Council Adopting Resolution**
- Draft plan will be submitted first to HSEM and then to FEMA for approval for meeting all Federal requirements.
- Review period typically 1-2 months.
- Final approval letter

PRESENTER: BONNIE HUNDRIESER

## Questions?

What questions do you have for U-Spatial@UMD about the draft HMP or next steps ?

PRESENTER: STACEY STARK

## Contact Information

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Stacey Stark, MS, GISP

**U-Spatial@UMD**

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218-726-7438

Bonnie Hundrieser, HM Planner

**Hundrieser Consulting LLC**

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218-343-3468



PRESENTER: STACEY STARK

# **Appendix G – Public Outreach & Engagement Documentation**

## **Appendix H – Plan Maintenance & Monitoring Worksheets**

During the five-year plan period, the Emergency Management Director (EMD) will require all relevant departments and jurisdictions to report on the status of their mitigation actions. This information will be used to track progress for the next plan update. Participating jurisdictions will use these worksheets to report on the mitigation activities listed in Appendix H.

Mitigation Action Tracking	
Name of Jurisdiction	
Reporting Period	
Describe the action or project.	
Who is responsible for the action?	
Project status:	<input type="checkbox"/> Complete <input type="checkbox"/> In progress, anticipated completion date: _____ <input type="checkbox"/> Not started <input type="checkbox"/> Canceled
Progress Report	
Has there been any progress with this project so far?	
Are there any obstacles or challenges with this action so far?	
What steps do you need to take to complete this project?	
Other comments:	

Hazard Mitigation Plan Maintenance Schedule			
Plan Maintenance Step	When	How	Who
Monitoring	Twice per year.	Get status updates on jurisdictional mitigation actions, compile progress reports and identify any opportunities for improvement.	Emergency Management Director
Evaluating	Once a year or after a disaster event.	Use a standard form to review how the plan has been carried out so far and record lessons learned.	Emergency Management Director, Lead Jurisdiction Planning Department Manager
Updating	Every 5 years, or after a disaster event.	Review the plan and document necessary updates as necessary for the next plan update.	Emergency Management Director, Lead Jurisdiction Planning Department Manager

The EMD will also seek feedback from the Emergency Managers group on the following:

- Are there any new representatives from jurisdictions, agencies, or organizations that you feel should be included in our stakeholder outreach?
- Do you feel your community has any new vulnerabilities that may be impacted by hazard events? (critical infrastructure, systems, or populations)
- Has your community identified any new mitigation activities that would help reduce risk to future hazard events?
- Are there any funding opportunities or other resources that may be available to help implement local mitigation activities?
- How is your community integrating information from the mitigation plan into other planning mechanisms (such as plans, policies, or partnerships)?