

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Chapter 1: Introduction

#### Hazard Mitigation Planning

Natural and human-caused hazards have a direct impact on residents and property on Spirit Lake Reservation. While it is impossible to eliminate most hazards, it is possible to mitigate their negative effects. Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Mitigation actions may be implemented before, during or after an event; however, they are most successful when based on a long-term plan developed before a disaster occurs. Successful mitigation actions must be practical, cost-effective, politically acceptable and supported by a sound planning process.

The plan is organized into five chapters:

#### Chapter 1: Introduction

- General plan overview

#### Chapter 2: Study Area Background

- Background information about each participating jurisdiction and identification of critical facilities

#### Chapter 3: Hazard Risks and Vulnerabilities

- Hazard profiles, assessment of risks and vulnerabilities, identification of key issues and potential action items

#### Chapter 4: Mitigation Strategy

- Identification of goals and action items to mitigate risks of hazards in the community

#### Chapter 5: Plan Maintenance

- Procedures for monitoring, evaluating and updating the plan

#### Purpose

The purpose of the plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property and the environment from natural and human-caused hazards. The Federal Emergency Management Agency (FEMA) identifies the primary benefits of hazard mitigation planning as:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations and businesses.
- Increasing education and awareness of threats and hazards, as well as their risks.
- Communication priorities to state and federal officials.
- Aligning risk reduction with other community objectives.

The plan includes a risk and vulnerability assessment that residents, organizations, local governments and other interested participants can utilize when planning for hazards. The plan also includes an evaluation of mitigation projects that will assist each adopting jurisdiction in reducing risk and preventing loss from future hazard events.

Additionally, all participating jurisdictions are eligible to apply for funds through FEMA's Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program and Flood Mitigation Assistance (FMA) program to help fund the implementation of mitigation projects.

#### Authority

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides legal basis for state, local and Tribal governments to reduce risks from natural hazards through mitigation planning. All state, local and Tribal governments are required to have an approved

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Multi-Hazard Mitigation Plan to receive funding for certain types of non-emergency disaster assistance, including mitigation projects.

This plan is an update of Spirit Lake's 2011 Multi-Hazard Mitigation Plan. Hazard mitigation plans are required by FEMA to be updated every five years to maintain the jurisdiction's eligibility for grant funding.

Jurisdictions that participated in the planning process and are adopting the plan by the official

Jurisdiction	Adoption Date
Spirit Lake Tribe	

method of approval based on legal authority are listed in Table 1.1. To be eligible for future funds through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program and Flood Mitigation Assistance program, jurisdictions must either adopt the plan and participate in the planning process or be sponsored by a jurisdiction that has done so. Approval and adoption documentation can be found in Appendix A.

## Planning Process

FEMA identifies four essential steps to the hazard mitigation planning process:

- **Resource organization:** Involving interested community members, and reaching out to critical stakeholders and those with technical expertise required during the planning process.
- **Risk assessment:** Identifying hazard characteristics and potential consequences, including effects on critical facilities.
- **Development of mitigation strategies:** Determining priorities and ways to minimize effects of identified hazards.
- **Plan implementation and progress monitoring:** Implementing the plan brings it to life and periodic monitoring ensures the plan remains relevant as conditions change.

The success of the plan and implementation of action items is dependent on public participation during all four steps of the planning

process. Public involvement for the plan included Planning Team meetings, public meetings, project website, and a public survey. Local planning documents were also reviewed and incorporated into the document when applicable.

Ten meetings were held to complete the planning process. The initial meetings introduced the Planning Team to the overall planning process and focused on incidence of hazards in the Spirit Lake Nation. The consultant team then developed a draft risk assessment of each hazard. Then three district/community input meetings were held with district representatives and interested citizens to obtain input about potential hazard consequences in each district and their biggest concerns, and potential mitigation actions. A planning team meeting was held following two of the district meetings to review the input and discuss the most significant hazards. Focus at each subsequent planning team meeting was as follows:

- Review hazard profiles and past mitigation actions
- Review initial draft of plan introduction, study area background, and hazard profiles
- Review revised draft of hazard profiles and list of potential mitigation actions.
- Review and refine revised draft plan including proposed mitigation actions.
- Finalize mitigation action descriptions and confirm draft plan details.

Detailed information about the planning process can be found in Appendix B.

## Acknowledgements

Numerous elected officials, tribal staff, and members of the public participated in the planning process. The project would not have been possible without the assistance of Planning Team members (identified in Appendix B) and members of the public who participated in public meetings, completed the survey or submitted comments through the project website.

The project was primarily funded with a grant awarded through the FEMA Pre-Disaster Mitigation Program, administered by the North Dakota Department of Emergency Services (DES). Guidance from state staff was instrumental in completing the project.

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## Chapter 2: Study Area Background

### Jurisdictional Information

The Spirit Lake Reservation is located in central and northeastern North Dakota, south of Devils Lake. Its total area is approximately 405 square miles or 245,141 acres, much of which is underwater. The reservation is located in Benson, Eddy, Ramsey, and Nelson Counties. The only incorporated city completely on the reservation is Warwick while parts of Minnewaukan lie within its boundaries. Tribal government is located in Fort Totten. The reservation also has several unincorporated communities.

A general map of the reservation, including major features and neighboring jurisdictions, is shown in Figure 2.1. Major roadways include US Highway 281, and numerous State Highways. One remaining rail line cuts through the southwestern corner of the reservation near the city of Sheyenne.

Devils Lake forms the northern border of the reservation. The lake has risen in elevation significantly and inundated thousands of acres of land in recent years.

### Population and Demographics

Summarized demographic information for Spirit Lake Reservation and North Dakota is shown in Table 2.1. The reservation is generally younger than the state overall, with a median age of 23.9 and 41.6 percent of residents under 18. The reservation's population density of 11 persons per square mile is comparable to the statewide density. A majority of residents identify as American Indian. The reservation's poverty level is much higher than the state's and its median income is significantly lower than the state.

Table 2.1 - Spirit Lake Demographics

	Spirit Lake	North Dakota
Population	4,399	736,162
Persons under 5 years	11.7%	7.0%
Persons under 18 years	41.6%	22.8%
Persons 65 years and over	7.2%	14.2%
Median Age	23.9	35.2
Persons per square mile	11	10.6
White not Hispanic	18.8%	86.4%
Hispanic or Latino	3.3%	3.1%
American Indian or Alaska Native	83.3%	5.2%
Black or African American	0.0%	2.0%
Asian	0.1%	1.3%
Two or More Races	2.5%	2.4%
Foreign born	0.5%	3.3%
Language other than English spoken at home	3.7%	5.6%
High school graduates, age 25+	78.8%	92.0%
Median household income	\$31,447	\$59,114
Persons below poverty level	45.4%	11.2%
Average household size (persons)	3.77	2.33

Source: US Census Bureau, 2012-2016 American Community

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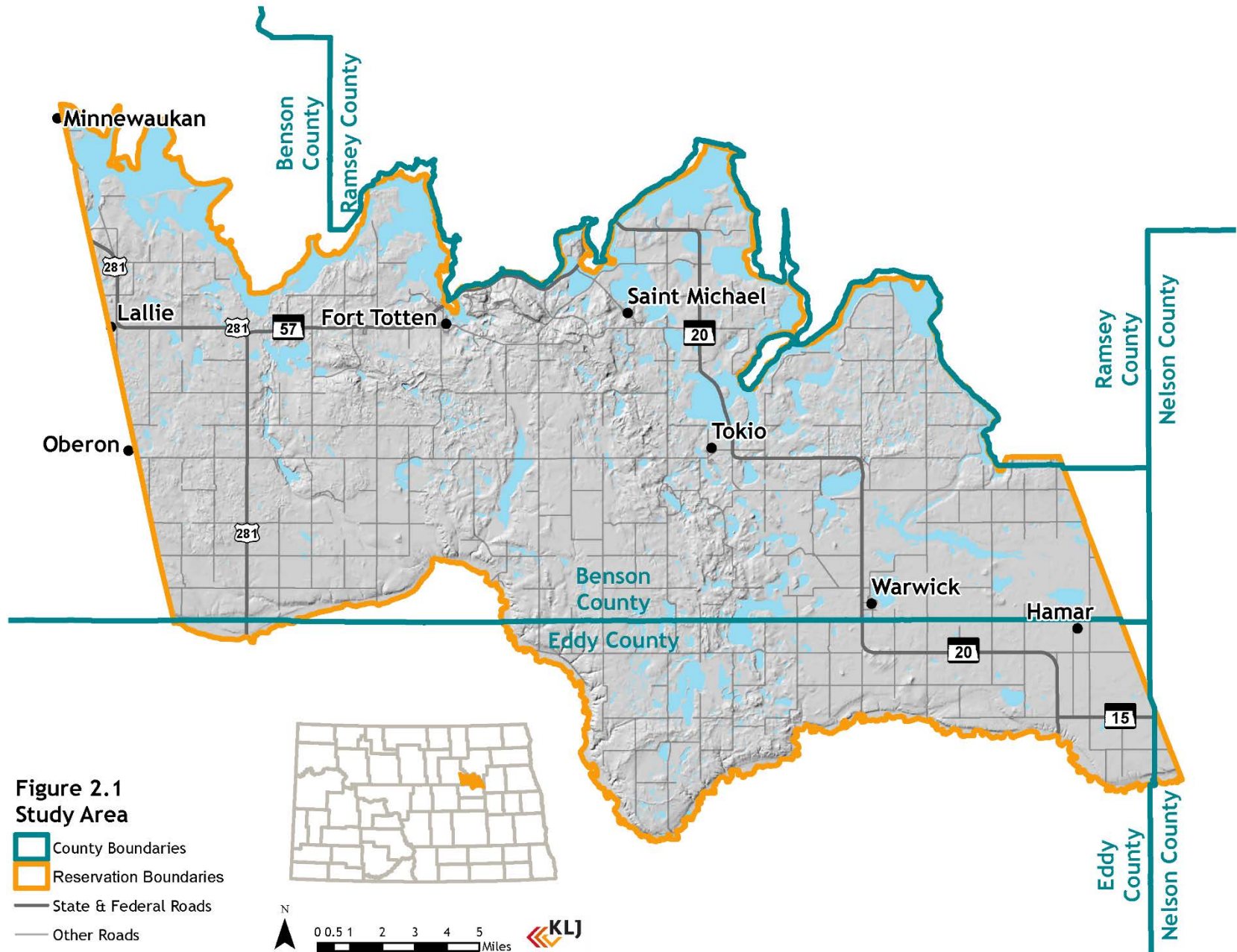
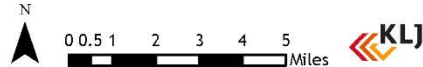


Figure 2.1  
Study Area

- County Boundaries
- Reservation Boundaries
- State & Federal Roads
- Other Roads





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Population trends for the reservation are shown in Figure 2.2. The reservation generally experienced increasing population from 1980 to 2000 and population remaining relatively stable from 2000 to the recent estimate in 2016.

Recent population trends for each district are summarized in Table 2.2. Three of the four districts experienced population growth from 2000 to 2010 with one district, Mission District (St. Michael) having a slight loss. Loss of some housing units is the most probable cause for the downturn in the Mission District population.

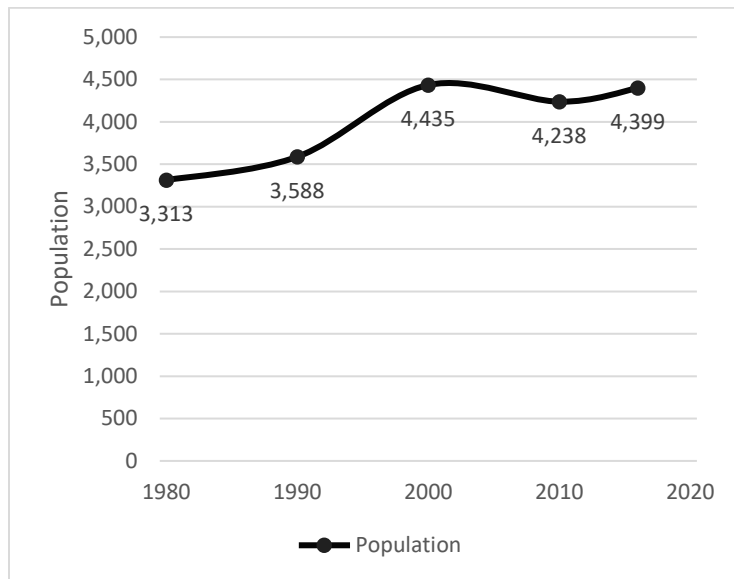
Population projections from the 2016 ND Housing Needs Assessment indicate that the reservation's population will remain steady or slightly increase through 2029.

Table 2.2 - Reservation District Population Trends					
District	2000	2010	% Change 2000-2010	2016	% Change 2000-2016
Crow Hill	465	545	17.2%	569	22.4%
Fort Totten	1,437	1,609	12.0%	1,638	14.0%
Mission (St. Michael)	1,310	1,287	-1.8%	1,333	1.8%
Wood Lake	726	797	9.8%	859	18.3%

Source: US Census Bureau, Decennial Census (2000 and 2010), Annual Estimates Program (2016)

Population density is shown in Figure 2.3. Much of the population is clustered in the north-central portion of the reservation around the Fort Totten and Mission areas.

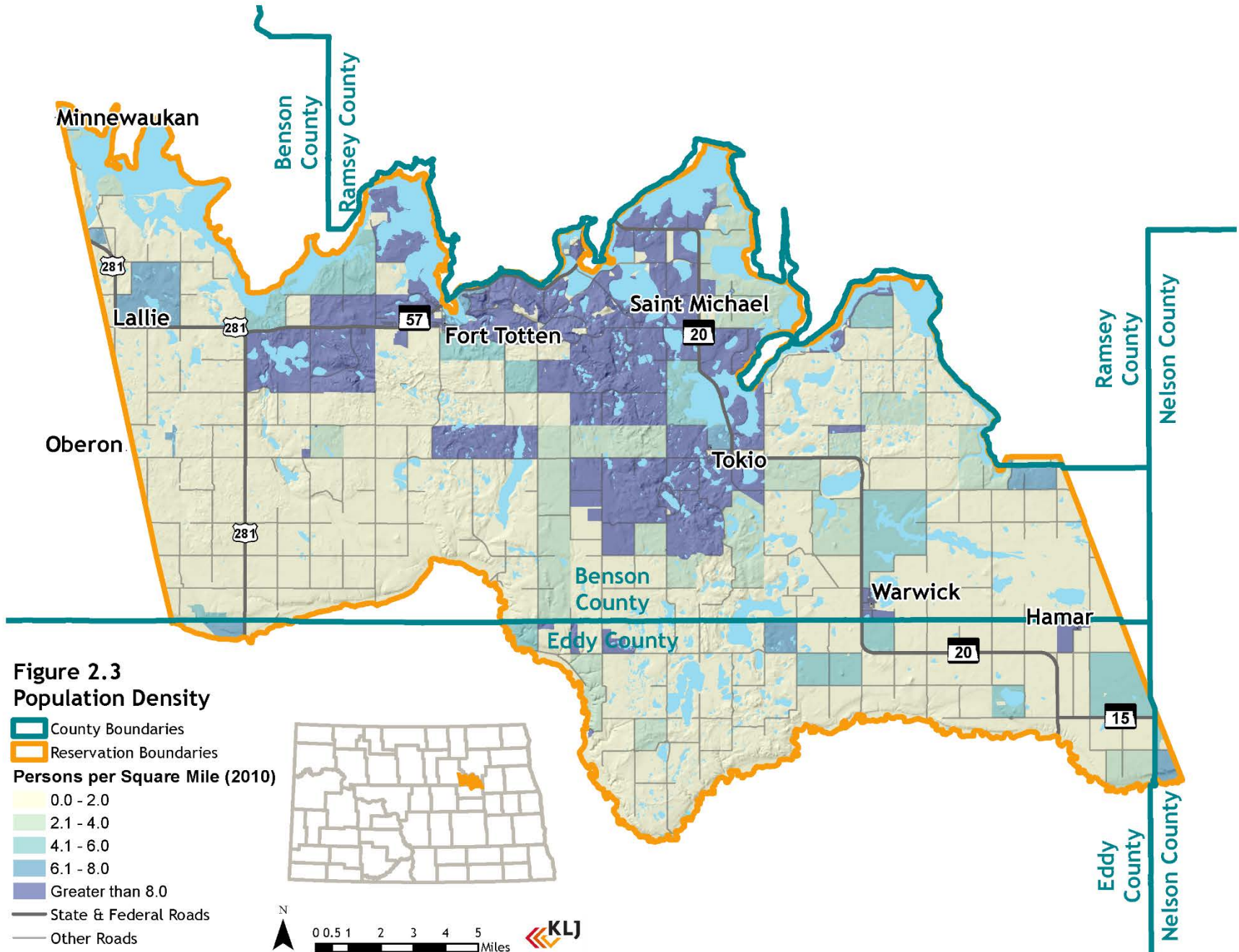
Figure 2.2 - Spirit Lake Reservation Population



Source: US Census Bureau

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### Climate and Weather

Aggregated weather statistics for the reservation are shown in Table 2.3. Weather extremes in the reservation are shown in Table 2.4. The NWS Cooperative Network Weather Station in Devils Lake, ND is used for aggregate data because it has the longest available period of record of any nearby station. Additional weather statistics can be found in Appendix C.

Table 2.3 - Spirit Lake Aggregated Weather Statistics				
Devils Lake KDLR, ND				
	Temperature (° F)		Precipitation (In.)	Snow Fall (In.)
	Avg Daily Max	Avg Daily Min	Avg Monthly	Avg Monthly
Jan	14.9	-3.5	0.50	7.5
Feb	20.3	1.6	0.42	4.8
Mar	32.4	14.1	0.74	6.8
Apr	51.2	30.2	1.11	2.7
May	65.4	42.1	2.28	0.6
Jun	74.3	52.2	3.53	0.0
Jul	80.9	57.6	2.78	0.0
Aug	79.5	54.9	2.22	0.0
Sep	68.0	44.8	1.88	0.0
Oct	54.5	33.5	1.24	1.6
Nov	34.2	17.9	0.71	5.0
Dec	20.6	3.7	0.54	8.0
<b>Ann</b>	<b>49.3</b>	<b>29.2</b>	<b>17.86</b>	<b>37.1</b>

Note: Aggregated Monthly Statistics January 1921-December 2011  
 Source: NWS Cooperative Network Weather Station, Devils Lake (High Plains Regional Climate Center)

Table 2.4 - Spirit Lake Weather Extremes		
Highest Max Temperature	112° F	7/6/1936
Lowest Min Temperature	-46° F	2/15/1936
Highest Daily Precipitation	4.49"	9/3/1941
Greatest Snowfall	17.5"	3/4/1966

Note: Aggregated Monthly Statistics January 1921-December 2011  
 Source: NWS Cooperative Network Weather Station, Devils Lake (High Plains Regional Climate Center)

### Economy

Agriculture is an important part of the Spirit Lake Tribe economy. The industry is tracked on reservations by survey every five years through the National Agricultural Statistics Service. Summarized survey information is shown in Table 2.5. Soybeans are the most common crop, accounting for about 50 percent of the reservation's harvested acreage in 2012. Cattle and calves make up almost the entirety of the reservation's livestock industry. The USDA Census of Agriculture indicates that in 2012 the total value of crops sold on the reservation was \$48,969,000 and the total value of livestock was \$6,530,000.

Table 2.5 - Spirit Lake Agriculture Summary		
Crop (2012)	Acres Harvested	Production
Soybeans	47,321	1,522,182 bu
Spring Wheat (excl Durum)	20,523	850,394 bu
Corn, Grain	16,968	1,922,013 bu
Barley	8,559	555,218 bu
Oats	1,476	92,682 bu
Sunflower	815	1,185,000 lb
Livestock (2012)	Inventory	
Cattle and Calves	19,187	
Sheep and Lambs	935	

Source: USDA 2012 Census of Agriculture - American Indian Reservations

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Tourism and recreation is another significant element of the reservation's economy. Spirit Lake Casino is the largest employer on the reservation employing some 450 people. Other large employers include tribal government, Cankdeska Cikana Community College, and Sioux Manufacturing.



Spirit Lake Casino, Imagery Source: 2018 Google

Countywide workforce data is compiled by the Job Service North Dakota Labor Market Information Center. Data for part of Benson County is used for the analysis. The reservation's largest employers are shown in Table 2.6. A majority of the top employers in 2016 were from government and education.

Rank	Employer	Industry
1	Spirit Lake Casino	Amusement, Gambling, and Recreation
2	Spirit Lake Sioux Nation	Executive, Legislative and General Government
3	Cankdeska Cikana Community College	Educational Services
4	Four Winds Elementary School	Educational Services
5	Sioux Manufacturing Corporation	Textile Mills
6	Fort Totten School District	Educational Services
7	Warwick School District	Educational Services
8	BIA	Executive, Legislative and General Government

Source: 2016 Quarterly Census of Employment and Wages, Job Service ND, Labor Market Information Center

## Critical Facilities

An important element to hazard mitigation planning is to determine critical facilities that may need special consideration during the preparation of mitigation action items and the risk assessment. Critical facilities fall into several categories:

- Facilities that are essential to the health and welfare of the entire population, and may become especially important following hazard events.
- Utility systems whose disruption would have a significant impact.
- Facilities containing a high density of population, especially those containing vulnerable populations. Examples include schools, retirement homes and large employers.
- Facilities that are a key element to the local economy, and could cause significant economic damage if their function was disrupted.
- Historic, cultural and natural resource areas that are important to the community.

Critical facilities on Spirit Lake Reservation can be found in Appendix D. The facilities listed in the appendix were verified by the Planning Team. Critical facilities are discussed in each hazard profile found in Chapter 3.



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## Chapter 3: Hazard Risks and Vulnerabilities

### Hazards Overview

Spirit Lake Reservation is subject to numerous natural and human-caused hazards. Many hazards are capable of creating significant levels of damage and having a negative effect on the local economy.

Table 3.1 lists Presidential Disaster Declarations for the primary counties comprising Spirit Lake Reservation from 1989 to 2014 (FEMA). There were 32 Presidential Disaster Declarations in North Dakota during the period, and Benson and Eddy Counties were designated for 21 and 15 disasters, respectively, while Spirit Lake Nation had 6. The most recent declared disasters were the severe storms and flooding of 2014 in Benson, Eddy, and other North Dakota counties.

The 2014 North Dakota Multi-Hazard Mitigation Plan served as the basis for selecting the hazards profiled in this chapter. Shortage or Outage of Critical Materials or Infrastructure, Structure Collapse, Transportation Accident and Windstorm are profiled as separate hazards in the statewide plan; however, in this plan the risks and impacts associated with those hazards are discussed in other applicable hazard profiles and do not receive individual recognition.

Profiled natural hazards:

- Drought
- Flood
- Geologic Hazards
- Severe Summer Weather
- Severe Winter Weather
- Wildland Fire

Profiled human-caused/technological hazards:

- Communicable Disease
- Dam Failure
- Hazardous Materials Release
- Homeland Security Incident
- Urban Fire

Table 3.1 - Presidential Disaster Declarations, 1989-2014

Year	Declaration	Hazard(s)	Areas Affected
2014	DR 4190	Severe Storms and Flooding	Benson, Eddy
2013	DR 4128	Severe Storms and Flooding	Benson, Spirit Lake
2013	DR 4118	Flooding	Benson, Spirit Lake
2011	DR 1981, 3318	Flooding	Benson, Eddy, Spirit Lake
2010	DR 1901	Sever Winter Storm	Benson
2010	DR 1907	Flooding	Benson, Eddy, Spirit Lake
2010	DR 1907, 3309	Flooding	Benson
2009	DR 1829	Severe Storms and Flooding	Benson, Eddy, Spirit Lake
2005	DR 1616	Severe Winter Storm & Record And/Or Near Record Snow	Benson
2005	DR 1597	Severe Storms, Flooding and Ground Saturation	Benson
2004	DR 1515	Severe Storms, Flooding and Ground Saturation	Benson, Eddy
2001	DR 1376	Severe Storms, Flooding and Ground Saturation	Benson, Eddy, Spirit Lake
2000	DR 1353	Severe Winter Storms and Tornadoes	Benson
2000	DR 1334	Severe Storms, Flooding and Ground Saturation	Benson, Eddy
1999	DR 1279	Severe Storms, Flooding, Snow, Ice, Ground Saturation, Landslides, Mudslides, and Tor	Benson, Eddy
1998	DR 1220	Flooding, Ground Saturation, Severe Storms	Benson
1997	DR 1157	Sever Winter Storms and Blizzard Conditions	Benson, Eddy
1997	DR 1174	Severe Flooding, Severe Winter Storms, Snowmelt, Spring Rains	Benson, Eddy
1996	DR 1118	Severe Storms, Flooding, and Ice Jams	Benson, Eddy
1995	DR 1050	Severe Storms, Flooding, and Ground Saturation	Benson, Eddy
1994	DR 1032	Severe Storms, Flooding	Benson, Eddy
1993	DR 1001	Severe Storms and Flooding	Benson, Eddy



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Natural hazards are listed first, followed by human-caused/technological hazards. Each profiled hazard includes the following information:

- *Hazard Profile*: Definition of the hazard and general overview.
- *Local Risk*: Previous occurrences and specific risk for the jurisdiction, including population, critical facilities and property.
- *Existing Capabilities*: Current actions taken by the jurisdiction to address the hazard.
- *Key Issues*: The primary issues that affect the jurisdiction and the basis for determining action items.
- *Potential Action Items*: A preliminary list of action items to address key issues. These items are refined and prioritized in Chapter 4.

The profiles include an analysis of the probability and magnitude of each event to determine overall hazard risk. Probability is the chance that the hazard event will occur within the reservation in the next year. Magnitude is the percentage of residents and property that could be significantly affected by the hazard event in a worst-case scenario. Criteria used to determine probability, magnitude and overall risk class are shown below. Historical data from previous events was utilized to determine probability and magnitude when possible. Risk class is determined for the area within the reservation boundaries and (in some cases) for each of the four districts.

### Probability

Low: less than 10 percent probability in the next year

Moderate: 10-100 percent probability in the next year

High: more than 100 percent probability in the next year

### Magnitude

Low: less than 5 percent of jurisdiction exposed

Moderate: 5-10 percent of jurisdiction exposed

High: more than 10 percent of jurisdiction exposed

		Magnitude		
		Low	Moderate	High
Probability	Low	Low	Low	Moderate
	Moderate	Low	Moderate	High
	High	Moderate	High	High

Hazard statistics for recent years are provided from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center's Storm Events Database. The Storm Events Database provides a comprehensive list of weather events along with vital information about each event. Information from the Database is provided in the corresponding hazard profiles and Appendix C. These data are available at a County level, but not specifically for the Spirit Lake reservation. Therefore, data is often reported for counties as a proxy for the reservation. The majority of the Spirit Lake Reservation is located in Benson and Eddy Counties. For these counties, the database includes information about flooding, severe summer weather and severe winter weather. Statistics for other hazards are provided by a variety of sources, as noted in each corresponding profile.

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### Drought

<b>Area Counties</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Moderate (once per decade, approximately 10 percent annual probability) <i>Magnitude:</i> Moderate (economic impact on entire area)
<b>Seasonal Pattern</b>	None, but impacts may be greater during Spring and Summer
<b>Duration</b>	Months/Years
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Economic loss Increased fire potential Loss of potable water Pest infestation

### Hazard Profile

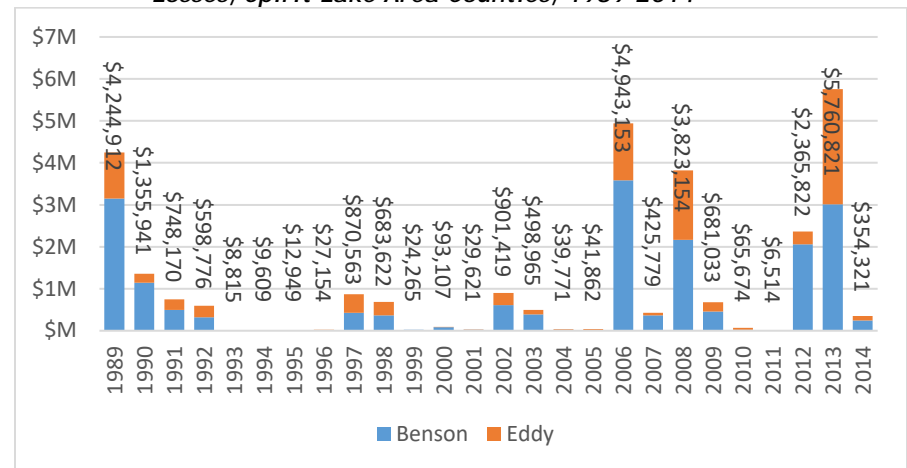
Drought is generally defined as a deficiency of precipitation over an extended period. If severe enough, this deficiency has potential to reduce soil moisture and water below the minimum necessary for sustaining plant, animal and human life systems. It is a normal, recurrent phenomenon that takes place in nearly all climate zones. Droughts appear gradually, and it is often difficult to pinpoint their beginning and end. Droughts can last multiple years, and even persist over decades. Previous droughts include the 1930s, 1950s, early 1960s, mid 1970s, early 1980s, 1988 through 1991, 2002 through 2004 and 2006 and recently in 2015 to 2017 for much of the state. However, a “wet cycle” starting in the latter half of the 1990’s was sandwiched between those drought years resulting in raised lake levels and significant flooding in the Devils Lake region. Drought conditions may vary by region within the state. Significant drought conditions have occurred within the Spirit Lake Nation as recently as 2012 and 2013.

Droughts are often measured by impacts, most notably agricultural damage and municipal water supply shortage. The impacts are highly variable based on time of year, amount of stored water in the soil, and meteorological factors such as temperature, humidity and wind. Impacts are also greatly affected by human factors such as local water demand and water management practices.

### Local Risk

- It is difficult to predict when a drought will appear. Historic trends show that wetter-than-normal periods tend to alternate with drier-than-normal periods. **The average annual precipitation on the reservation is 17.86 inches** as recorded by the National Weather Service Cooperative Network weather station in Devils Lake. The reservation’s **lowest annual precipitation is 10.08 inches**, which was recorded in 1967. It is important to note, however, that numerous factors beyond rainfall contribute to drought status, which can make it difficult to predict and classify droughts.
- Historical drought occurrences can be measured by looking at impacts. Federal indemnity programs provide financial assistance to help reduce the impact of drought-related agricultural losses. Figure 3.1 shows indemnity payments for area counties from 1989-2014. The figure shows that **2013 had the largest drought indemnity payments** during the time period. Drought losses occurred during the late 1980s and mid 2000s, and have resumed in recent years. Based on previous regional trends, a severe drought can be expected approximately once per decade.

**Figure 3.1 - Federal Indemnity Payments for Drought-Related Losses, Spirit Lake Area Counties, 1989-2014**



Source: National Drought Mitigation Center

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### Vulnerability

#### Population

- Drought has no local direct impact on human life, but it **greatly increases the risk of wildfire**, which is a potentially life-threatening hazard. Drought accompanied by high temperatures can **increase the threat of heat-related illness** for persons who spend a significant amount of time outdoors or do not have adequately-cooled homes. The **highest recorded temperature at a Devils Lake monitoring station is 112 degrees Fahrenheit recorded in July 1936**. Elderly persons are at increased risk of heat-related illness. According to recent American Community Census estimates, approximately **319 residents on the reservation are 65 years of age or older**. The estimated number of residents age 65 or older for each district are summarized below.
  - Crow Hill: 34 residents (6 percent)
  - Fort Totten: 79 residents (4.8 percent)
  - Mission: 116 residents (8.7 percent)
  - Wood Lake: 90 residents (10.5 percent)
- **Prolonged drought could potentially affect water supplies**. Most of the reservation is served by the Spirit Lake Rural Water System (SLRWS). Portions of Spirit Lake are part of the Central Plains Water District. The water source for these systems are not considered vulnerable to drought. Personal wells also provide water to parts of the reservation. Bottled water could be brought in as an emergency measure, but a lack of household water could create health and sanitation issues for residents.

#### Critical Facilities

- No critical facility in Spirit Lake Nation is physically impacted by drought.

#### Property

- Drought can have a significant economic impact on agriculture and related industries. Federal indemnity payments, previously shown in Figure 3.2, are an indicator of drought-related agricultural losses. **Since 1989, the year with the greatest payments was 2013, with \$5.8 million paid by the USDA to reduce the**

**economic impact of drought in the area**. Agriculture is a moderate economic contributor on the reservation.

- The statewide Multi-Hazard Mitigation Plan includes information about crop insurance payments from the USDA Risk Management Agency. Drought-related **crop insurance payments in Benson and Eddy counties from 2005 to 2014 totaled \$18.5 million**. Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for area counties were \$20.1 million**.
- It is difficult to measure direct economic loss for livestock producers. Cattle and calf numbers regularly fluctuate based on a wide number of factors. Impacts on livestock producers include **reduced rangeland productivity, high cost/unavailability of water for livestock, disruption of reproductive cycles and the cost of finding supplemental feed or pasture**.
- Beyond agricultural impacts, there is also a greater threat of structure damage in drought-affected areas, as **drought increases the risk of wildfire and may create water shortages** that inhibit adequate fire response. Structure vulnerability from wildfire is discussed in more detail in the Wildland Fire section of this chapter.

#### Future Development

- If significant population growth were to occur, the local water supply systems could potentially reach capacity limitations of either treatment or transmission. Public water systems are monitored by the North Dakota Department of Health, and water permit applications are maintained by the North Dakota State Water Commission and US Army Corps of Engineers. In the event that significant population growth occurs the local water supply systems could expand capacity to meet the demand.

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### Existing Capabilities

- Both the USDA Farm Service Agency and North Dakota State University Extension have field offices located in Minnewaukan, New Rockford, Devils Lake, and Lakota. Both agencies offer general education relating to drought management best practices. The USDA Farm Service Agency field office assists with the distribution of drought indemnity payments to agricultural producers.
- There are no water useage/conservation plans in place within the Spirit Lake Nation.

### Key Issues and Potential Action Items

- *Key Issue:* Agriculture is a contributing component of the reservation's economy. A significant drought has the potential to greatly affect the industry and impact the reservation as a whole.
  - *Potential Action Item:* Collaborate with the USDA Farm Service Agency and North Dakota State University Extension to provide outreach and assistance as needed to local farmers and ranchers.
  - *Potential Action Item:* Develop emergency response plan that includes coordination with local livestock producers.
  - *Potential Action Item:* Develop water usage/conservation plans within the Spirit Lake Nation.
  - *Potential Action Item:* Establish a protocol to verify capacity for additional water treatment and transmission before approving any significant new development project
- *Key Issue:* Drought conditions lead to increased risk of wildfire which is already a significant issue on the reservation. Potential actions to address this key issue are discussed in the Wildland Fire section of this chapter.
- *Key Issue:* Extended drought conditions have a major impact on the water levels of Devils Lake. Significantly lowered water levels of Devils Lake would reduce the local recreation and tourism industry.
  - *Potential Action Item:* Participate in discussions and efforts to stabilize the lake elevation of Devils Lake.

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### Flood

<b>Benson County</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (59 reported event days 1996-2017) <i>Magnitude:</i> High (history of damages over \$60,000,000)
<b>Eddy County</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (23 reported event days 1996-2017) <i>Magnitude:</i> Moderate (history of damages over \$200,000)
<b>Fort Totten</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Moderate (4 reported event days 1996-2017) <i>Magnitude:</i> Moderate (located in identified Area of Special Consideration floodplain, temporary flooding due to heavy rain is not expected in any specific location but is possible)
<b>Mission</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (1 reported event day 1996-2017) <i>Magnitude:</i> Moderate (located in identified Area of Special Consideration floodplain, temporary flooding due to heavy rain is not expected in any specific location but is possible)
<b>Wood Lake</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (1 reported event day 1996-2017) <i>Magnitude:</i> Low (history of damages \$11,000, not located in identified floodplain, temporary flooding due to heavy rain is not expected in any specific location but is possible)
<b>Crow Hill</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (0 reported event days 1996-2017) <i>Magnitude:</i> Low (not located in identified floodplain, temporary flooding due to heavy rain is not expected in any specific location but is possible)
<b>Seasonal</b>	March - October

### Pattern

#### Primary Impacts

Agricultural loss (crops, livestock)  
Blocked roads  
Economic loss  
Human loss and injuries  
Localized evacuation  
Permanent loss of businesses  
Power loss  
Property damage or loss  
Release of hazardous materials

### Hazard Profile

Primary causes of flooding in North Dakota include heavy rain/flash flooding, rapid snowmelt/ice jams and increased seasonal moisture. Flooding can occur in riverine zones or flat areas that lack adequate drainage.

Typical insurance policies do not cover flood damages, so FEMA created the National Flood Insurance Program (NFIP) to provide flood insurance for property owners. The NFIP makes flood insurance available to residents in NFIP-participating communities that adopt and enforce floodplain management ordinances and follow other basic requirements.

A Flood Insurance Rate Map (FIRM) is created to determine flood insurance rates for each participating community. The FIRM identifies Special Flood Hazard Areas (SFHA) that have a one percent annual chance of flooding, commonly referred to as the 100-year floodplain. Areas outside the SFHA are considered to be in the Non-Special Flood Hazard Area (NSFHA). Structures in the NSFHA may still be at risk from flooding; according to FEMA, one in every four floods occurs in an NSFHA. Flood insurance is required for all property owners who acquire a loan from a federally regulated, supervised or insured financial institution for the acquisition or improvement of land, facilities or structures located within an SFHA.

### Local Risk

- NFIP participation is summarized in Table 3.3. The Spirit Lake Tribe has a floodplain administrator and is actively enforcing its



# Spirit Lake

## Multi-Hazard Mitigation Plan

floodplain management ordinance. Action items to strengthen the NFIP compliance are included in Chapter 4.

Table 3.3 - NFIP Participation in Spirit Lake

Jurisdiction	Total Participating Properties	Insured Value of Participating Properties	Claims Since 1978	Total Paid Since 1978
Spirit Lake Tribe	5	\$717,800	63	\$1,679,505

Note: Policy and claim information as of 1/31/2015

- Benson and Eddy counties were included in 23 flood-related Presidential Disaster Declarations from 1966 through 2017.
- The most significant flooding issue on the reservation is the persistent threat from Devils Lake. With outlets constructed in recent years to mitigate lake rising, the lake level has fluctuated, but the risk of overtopping levees has been reduced.
- Recent flood events in Benson and Eddy counties are summarized in Table 3.4. **Limited local area flooding (not classified as a flood event) that does not damage property typically occurs every year.** Flood event classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.4 - Flood Events in Area Counties, 1996-2017

Flood Events	Event Days*	Annual Probability	Event Days per Year
Benson County			
Flood	43	195%	2
Flash Flood	20	91%	0.9
<i>Total Discrete Events</i>	<i>59</i>		<i>2.7</i>
Eddy County			
Flood	10	45%	0.5
Flash Flood	15	68%	0.7
<i>Total Discrete Events</i>	<i>23</i>		<i>1</i>

\*Number of days with a reported event Source: National Climatic Data Center

- The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent flood events within Benson and Eddy counties are summarized below.
  - *July 23, 1997.* Devils Lake rose to 1442.8 ft. High water closed portions of state highways 57 and 20. 200,000 trees were estimated to have been inundated and killed in the last two years. Some homes had to be moved.
  - *September 1, 1999.* Devils Lake rose another two feet from its 1998 level to hover around 1447.0 ft.
  - *June 1, 2000.* Problems with high water continue at Spirit Lake where several homes had high levels of mold, students at the head start facility had to be relocated, and erosion continued around the casino.
  - *August 1, 2001.* Devils Lake rose again to 1448.1 ft. Basements were flooded on the reservation and at Warwick. Black Tiger Bay park was damaged.
  - *May 31, 2004.* Significant rainfall occurred on already saturated ground, causing basement flooding and other concerns.
  - *July 1, 2004.* Devils Lake rose to 1449.0 ft. Damages to State Highways 19, 20, and 57 and US 281.
  - *August 1, 2004.* Devils Lake fell slightly. Continued damage to several roads on the reservation as well as the Wood-Rutten Road.
  - *April 1, 2005.* Devils Lake thawed and rose to 1448.4 ft. Water began to seep into ND Highway 20 near Mission.
  - *June 12, 2005.* Heavy rain fell on saturated soils in a five-county area. Some overland flooding was reported 1 mile west of Warwick.
  - *September 22, 2008.* Heavy rain fell in a band including the Mission area.
  - *May 1, 2009.* Heavy late-season snow caused flood concerns across much of eastern North Dakota. Devils Lake rose to 1450.4 ft.
  - *May 1, 2010.* Devils Lake rose to 1451.7 ft.
  - *April 10, 2011.* Above-average snowfall, particularly in the Devils Lake basin resulted in the lake rising to 1453.6 ft. Overland flooding caused several road closures.
  - *June 1, 2011.* Devils Lake rose to 1454.3 ft.
  - *August 10, 2016.* A bow-shaped string of thunderstorms caused flash flooding in southern Rock Township.

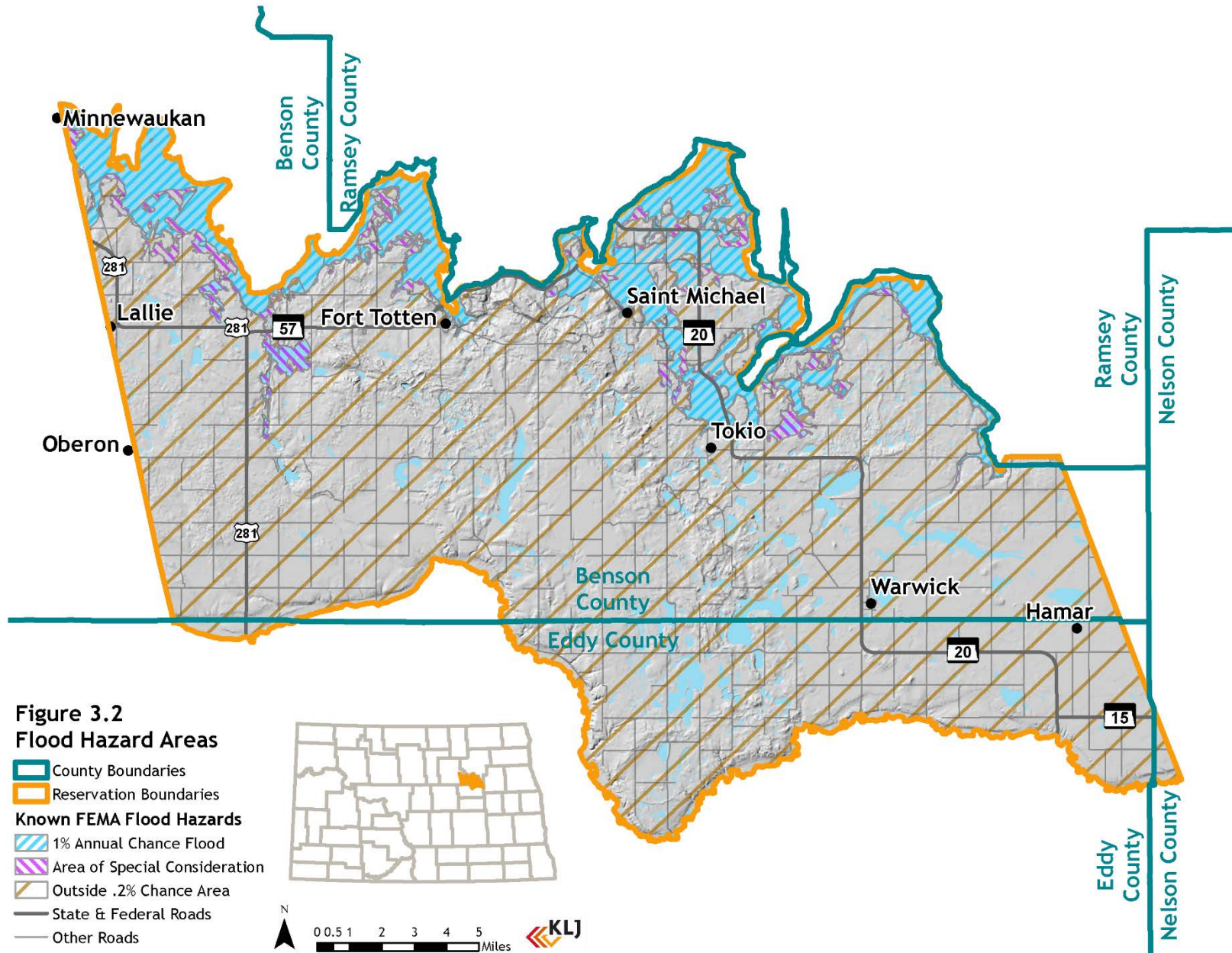
# Spirit Lake

## Multi-Hazard Mitigation Plan

- The National Climatic Data Center Storm Events Database categorizes storm events by location. **From 1996 through 2016 there were five flood event days in Hamar, four in Fort Totten, three in Warwick, one in Mission, and one in Tokio (the Wood Lake district).**
- **The largest flooding issue in Spirit Lake has been inundated roads, fields and threats to homes and other structures due to rising lake levels.** Flooding issues for rural roads are exacerbated during periods of heavy rain. Some roads have been abandoned due to year-round water issues, others have been rerouted or raised.
- **The most common impact on structures in Spirit Lake is flooded basements due to saturated soil.** Rising water levels have increased the amount of saturated soil in the reservation and increased the number of flooded basements.
- The US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) maintains river gauges at one point on the reservation on the Sheyenne River near Warwick to track ice jams. **CRREL has recorded 3 ice jams in the since 1959.**
- FEMA Digital Flood Insurance Rate Maps (DFIRMs) were completed for Spirit Lake Tribe in 2009. The DFIRMs for the reservation are shown in Figures 3.3, 3.4, 3.5, 3.6, 3.7, 3.8 and 3.9. The DFIRMs identify areas of enhanced flooding risk. Zone A (also known as a 100-year floodplain or Special Flood Hazard Area) presents a one percent annual chance of flooding. This equates to approximately a one in four chance of flooding during a 30-year mortgage. Many areas on the reservation fall into a sub-category of Zone X called Areas of Special Consideration (ASC). ASC corresponds to areas outside the Special Flood Hazard Area (SFHA) between elevations of 1450.7 and 1461.2 ft. The ASC includes the 1-percent and 0.2-percent-annual-chance floodplains and accounts for continuous fluctuations in the water-surface elevation of Devils Lake due to the closed basin lake phenomenon. Areas excluded from the ASC are those that are landward of certified levees.

# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

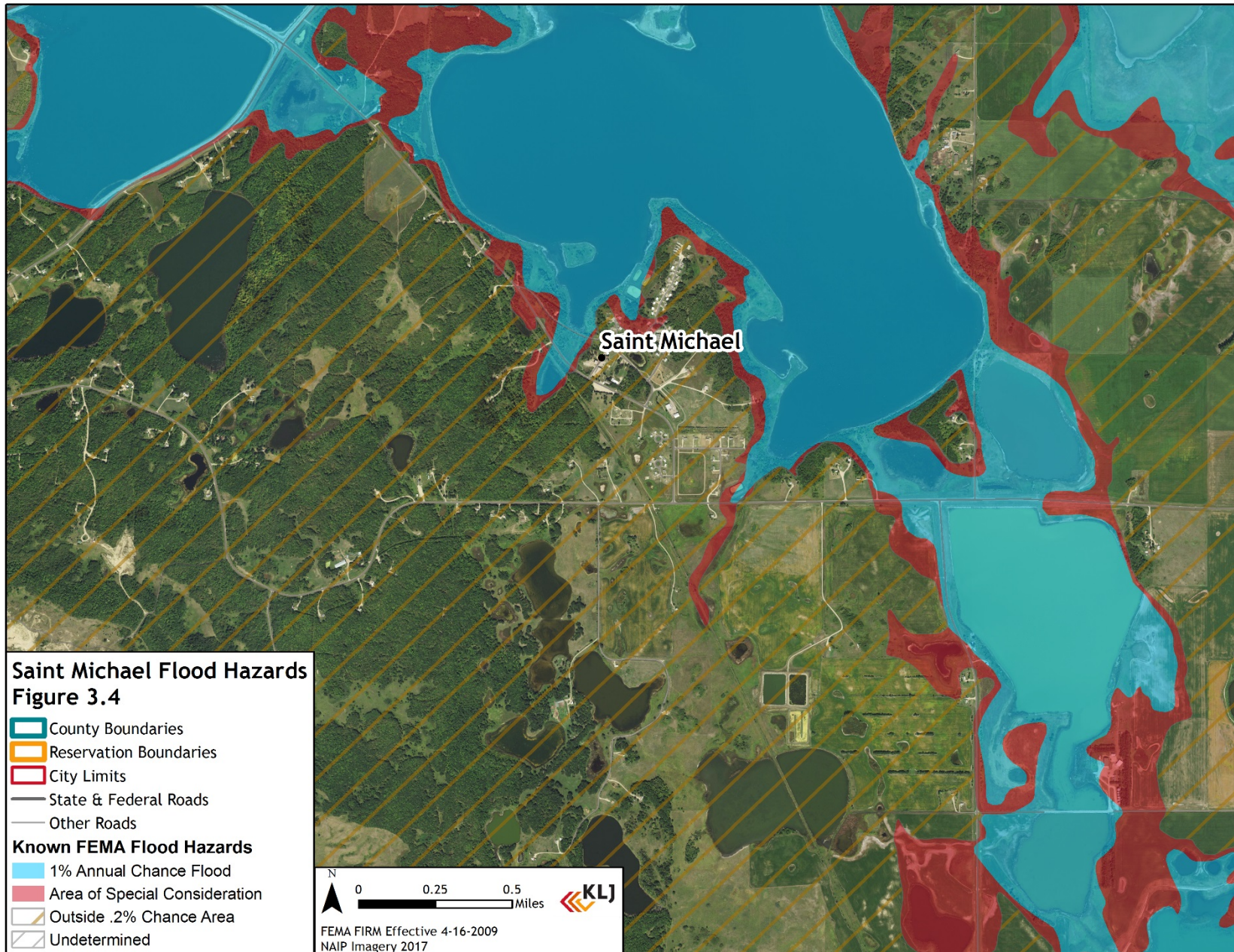
Multi-Hazard Mitigation Plan





# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

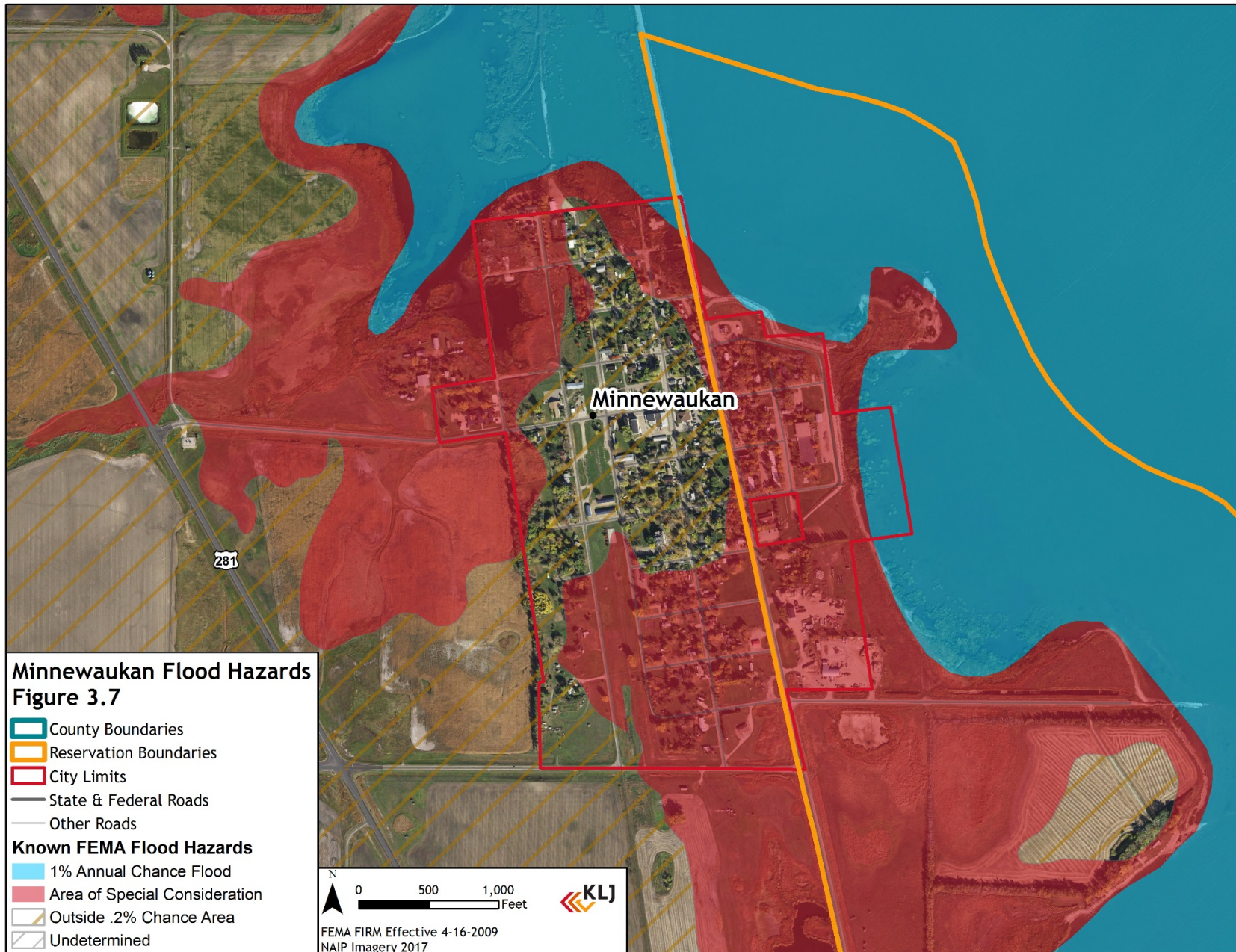
Multi-Hazard Mitigation Plan





# Spirit Lake

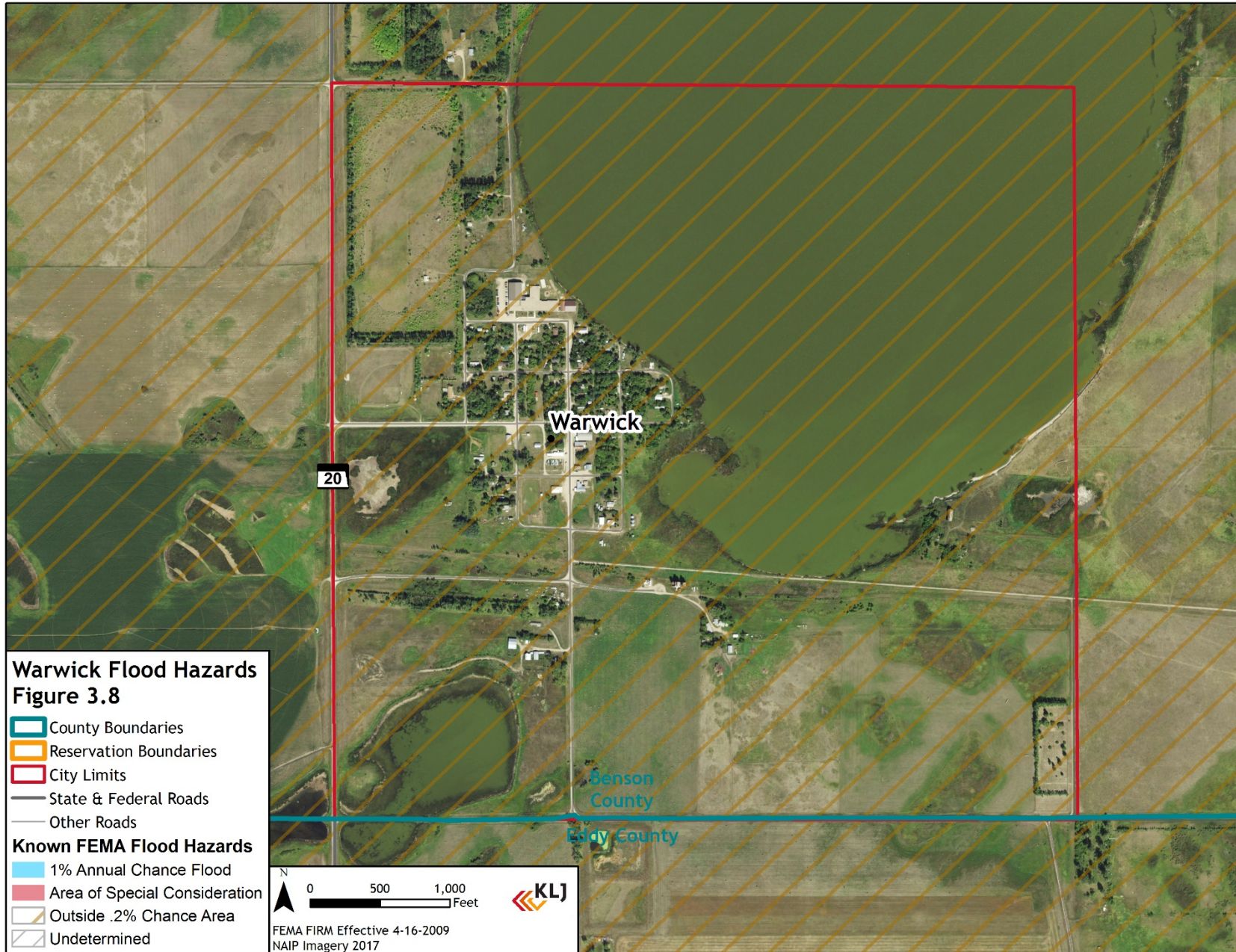
Multi-Hazard Mitigation Plan





# Spirit Lake

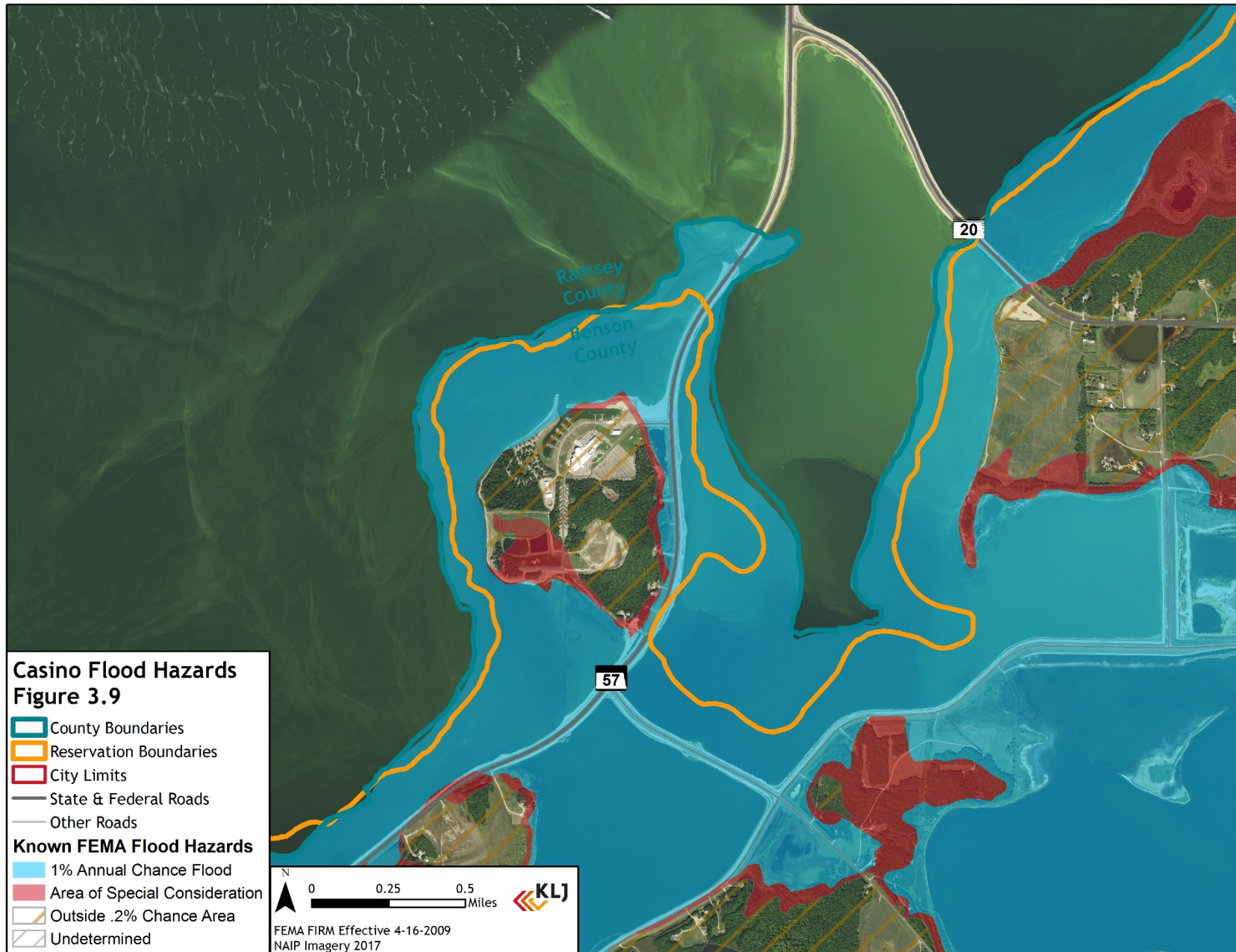
Multi-Hazard Mitigation Plan





# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

## Multi-Hazard Mitigation Plan

### Vulnerability

#### Population

- Aerial photography shows that there are several residences located within a designated floodplain, either zone A or the ASC.
- Flash flooding events can be potentially dangerous, particularly if people try to travel during an event. There is no history of injuries or fatalities associated with flash flooding on the reservation.

#### Critical Facilities

- The Casino wastewater treatment lagoons are located within a designated floodplain; however, the lagoons are elevated and have no history of flooding damages. They are however susceptible to damage from erosion, and have required ongoing erosion control measures.
- No critical facilities have a history of flood-related impacts.

#### Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop insurance payments from the USDA Risk Management Agency. **Flood-related crop insurance payments in Benson County from 2003 to 2012 totaled \$68 million and in Eddy County \$19 million.** Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for the area were \$76.4 million.** Over a ten-year period this results in an annualized loss of \$7.6 million.
- The most significant flooding event in terms of recorded damages has been the rise of Devils Lake, causing thousands of acres to be inundated and many structures and roads to be lost.
- Repetitive loss properties are tracked for communities that participate in the NFIP. **There are three repetitive loss properties in the Mission district.** Repetitive loss properties are addressed in the mitigation strategy found in Chapter 4.
- Several structures in the Spirit Lake Nation are located within a designated floodplain or ASC.

### Future Development

- Phase II of the Roads Acting as Dams (RAADs) project will provide necessary long-term stability.

### Existing Capabilities

- Spirit Lake Tribe has a floodplain administrator and floodplain regulations.

### Key Issues and Potential Action Items

- *Key Issue:* Spirit Lake Tribe experiences some level of flooding every year. Flood events in the reservation are primarily related to rising lake levels, heavy rainfall, and snowmelt runoff.
  - *Potential Action Item:* Conduct NFIP workshop to educate public about benefits of flood insurance.
  - *Potential Action Item:* Place riprap to prevent erosion.
  - *Potential Action Item:* Improve municipal drainage.
  - *Potential Action Item:* Acquire and remove high risk properties in the floodplain.
  - *Potential Action Item:* Consider joining the NFIP Community Rating System (CRS) program.
  - *Potential Action Item:* Install sewer backflow prevention valves on select facilities.
- *Key Issue:* Many roads and bridges on the Spirit Lake Nation are commonly washed-out or inundated during flooding events.
  - *Potential Action Item:* Adopt policy for minimum culvert size to help prevent washouts.
  - *Potential Action Item:* Elevate commonly-impacted roads, culverts or bridges.
- *Key Issue:* The threat of RAADs failure or overtopping remains.
  - *Potential Action Item:* Implement Phase II of RAADs to provide equal protection with the City of Devils Lake where the level of protection is higher.
  - *Potential Action Item:* Improved monitoring and communication of potential risks related to RAADs.

# Spirit Lake

Multi-Hazard Mitigation Plan

## Geologic Hazards

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (the reservation is in a low probability area for a significant earthquake and landslides) <i>Magnitude:</i> Low (no history of recorded damages)
<b>Seasonal Pattern</b>	May - October
<b>Duration</b>	a few minutes to 6 hours
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Economic loss Human loss and injuries Increased stress on medical services Permanent loss of businesses Power loss Property damage or loss Release of hazardous materials

## Hazard Profile

Geologic hazards include landslide, earthquake, and mining.

The US Geological Survey (USGS) defines a landslide as a movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction. The primary causes of landslides are slope saturation by water from intense rainfall, snowmelt, or changes in groundwater levels on primarily steep slopes, earthen dams, and the banks of lakes, reservoirs, canals and rivers.

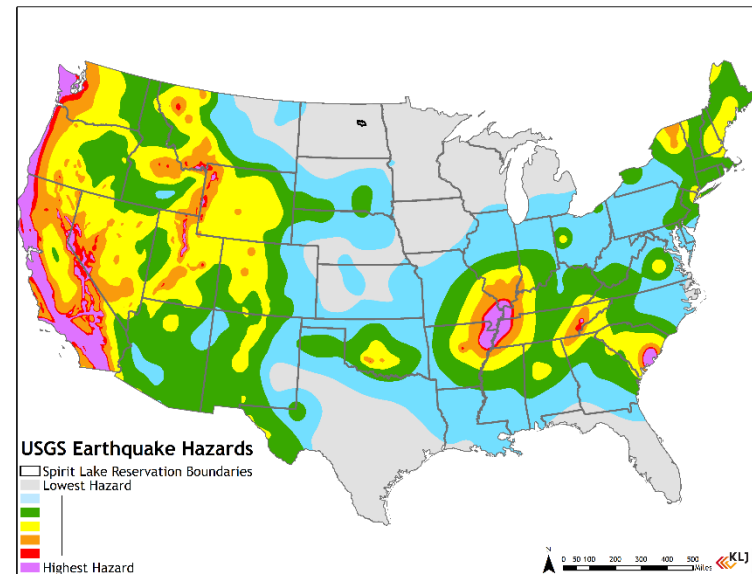
An earthquake is defined by USGS as a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. North Dakota is not an area known for earthquake activity; however, many small earthquakes may occur throughout the state.

Mining hazards are related to mining, drilling and energy production disasters. The mining hazard in North Dakota is focused primarily in the Bakken region in the western part of the state.

## Local Risk

- Figure 3.10 shows potential earthquake hazard areas in the contiguous United States. Spirit Lake Reservation straddles the line between a two-percent probability and zero-percent probability of exceeding a peak ground acceleration of 0.02 to 0.04 in the next 50 years. According to the Pacific Northwest Seismic Network, a ground acceleration of 0.014 to 0.039 can result in a light perceived shaking and no damages. There is no significant earthquake history in the area.

Figure 3.10 - Earthquake Hazard Areas in the Continental United States



- The reservation is not in a landslide area according to the USGS. It is important to note that these areas are delineated at a national scale and not intended for precise analysis.
- Small landslides could potentially occur in parts of the reservation where steep slopes are combined with saturated ground conditions.

# Spirit Lake

## Multi-Hazard Mitigation Plan

- There are no known mining sites which might cause a related hazard.

### Vulnerability

#### Population

- No earthquake event on the reservation has resulted in injuries or fatalities, and according to the USGS the probability of a significant earthquake in the area is very low or non-existent. In the event of a significant earthquake, residents in very old structures may be the most vulnerable. According to the most recent American Community Survey estimates, approximately 115 housing units on the reservation (7.6 percent of total) were built before 1940. Applying the reservation's average household size of 3.77 persons, **there are approximately 433 persons on the reservation with an enhanced vulnerability to earthquakes.** Note that this analysis does not include structure information for workplaces, which would have a large impact on potential vulnerability for an earthquake during daytime hours. The estimated number of structures built before 1940 and vulnerable residents for each district is summarized below.
  - Crow Hill: 24 housing units (90 residents, 12 percent)
  - Fort Totten: 16 housing units (60 residents, 3.6 percent)
  - Mission: 12 housing units (45 residents, 2.4 percent)
  - Wood Lake: 63 housing units (237 residents, 16 percent)

#### Critical Facilities

- According to the USGS Earthquake Hazard Area map shown in Figure 3.10, a potential earthquake on the Spirit Lake Reservation would most likely only result in a light perceived shaking and no damages. The oldest facilities would be most likely to experience some damages. There is no history of earthquakes on the reservation causing structure damage. No critical facilities are anticipated to be impacted by a geologic hazard.

#### Property

- According to the USGS Earthquake Hazard Area map shown in Figure 3.10, a potential earthquake on the reservation would most likely only result in a light perceived shaking and no damages. If damages were to occur, it is likely that only the reservation's

oldest structures would be impacted. According to recent American Community Survey estimates, there are approximately 115 housing units in the reservation that were built before 1940. Age information is not available for other types of structures in the reservation.

#### Future Development

- The North Dakota state building code has been adopted for all construction projects on the Spirit Lake Nation. The state building code consists of the 2012 International Building Code, International Residential Code, International Mechanical Code and International Fuel Gas Code published by the International Code Council. The code includes provisions that prohibit construction on areas with steep slopes and provides general standards that contribute to earthquake resiliency.

#### Existing Capabilities

- The North Dakota state building code has been adopted for all construction projects on the Spirit Lake Nation. State building code prohibits construction on steep slopes and provides general standards that contribute to earthquake resiliency.
- Most major construction projects involve federal funds and include standards for construction as a condition of funding.

#### Key Issues and Potential Action Items

- *Key Issue:* The reservation is in an area of minimal hazard for earthquakes.
  - *Potential Action Item:* None identified.
- *Key Issue:* The reservation is in an area of minimal hazard for landslides.
  - *Potential Action Item:* None identified.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Severe Summer Weather

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (Approximately ten event days per year) <i>Magnitude:</i> High (Potential for damages totaling millions of dollars and many fatalities)
<b>Seasonal Pattern</b>	May - October
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Economic loss Human loss and injuries Increased stress on medical services Permanent loss of businesses Power loss Property damage or loss Release of hazardous materials

### Hazard Profile

The elements of severe summer weather include tornadoes, wind, hail and lightning. All areas of the reservation are at equal risk.

Tornadoes are the most destructive weather phenomenon on earth. They can produce winds ranging from 65 MPH to more than 300 MPH, and pose severe danger to life and property. Peak tornado season is from June to August, and most occur during evening hours. Tornadoes typically travel from southwest to northeast at a speed between 30 and 70 MPH, and are generally on the ground for less than 10 minutes; however, tornado characteristics are highly unpredictable and can change rapidly.

Tornado severity is recorded with the Enhanced Fujita (EF) Scale, which replaced the Fujita (F) Scale in 2007. Wind speed estimates are determined by the damage created by a tornado. The EF Scale includes ratings from zero (65 to 85 MPH wind speeds) to five (wind speeds over 200 MPH).

Straight-line winds are a common element of severe summer storms, and typically responsible for most damage associated with the storms.

Strong winds often form on the leading edge of severe storms, and gusts more than 100 MPH are possible.

Hail presents a hazard for property, crops, livestock and occasionally human life. Hail events range from an area of a few acres up to hundreds of square miles, although small events are most common. Hailstones can fall to the surface at more than 100 MPH, and reach more than seven inches in diameter; however, most hailstones do not exceed two inches in diameter.

Lightning strikes pose multiple threats to life and property. A lightning strike can electrocute humans and animals, vaporize materials, cause fire and cause an electrical surge that may damage equipment. Human deaths from lightning strikes are somewhat uncommon. According to the National Oceanic and Atmospheric Administration, there were 12 recorded lightning fatalities in North Dakota from 1959-2013. Florida led the nation during that time period with 471 lightning fatalities. Livestock deaths and property damage are the most common lightning-related threats in North Dakota.

### Local Risk

- Spirit Lake Reservation was included in two summer storm-related Presidential Disaster Declarations between 1989 and 2014 while Benson County was included in 11 and Eddy County in 8.
- Severe summer weather events in Benson and Eddy counties are summarized in Table 3.5. **On average, a severe summer weather event occurs on the reservation approximately ten days per year.** Summer weather classification criteria and a detailed listing of events can be found in Appendix C.

# Spirit Lake

## Multi-Hazard Mitigation Plan

Table 3.5 – Severe Summer Weather Events in area Counties, 1996-2014

Summer Storm Events	Event Days*	Annual Probability	Event Days per Year
Benson			
Hail	103	542.1%	5.4
High/Thunderstorm Wind	68	357.9%	3.6
Tornado/Funnel Cloud	19	100.0%	1.0
Lightning	0	0%	0
Excessive Heat	1	5.3%	0.1
Total	191		10.1
Eddy			
Hail	70	368.4%	3.7
High/Thunderstorm Wind	59	310.5%	3.1
Tornado/Funnel Cloud	13	68.4%	0.7
Lightning	0	0%	0
Excessive Heat	2	10.5%	0.1
Total	144		7.6

\*Number of days with a reported event

Source: National Climatic Data Center Storm Events Database

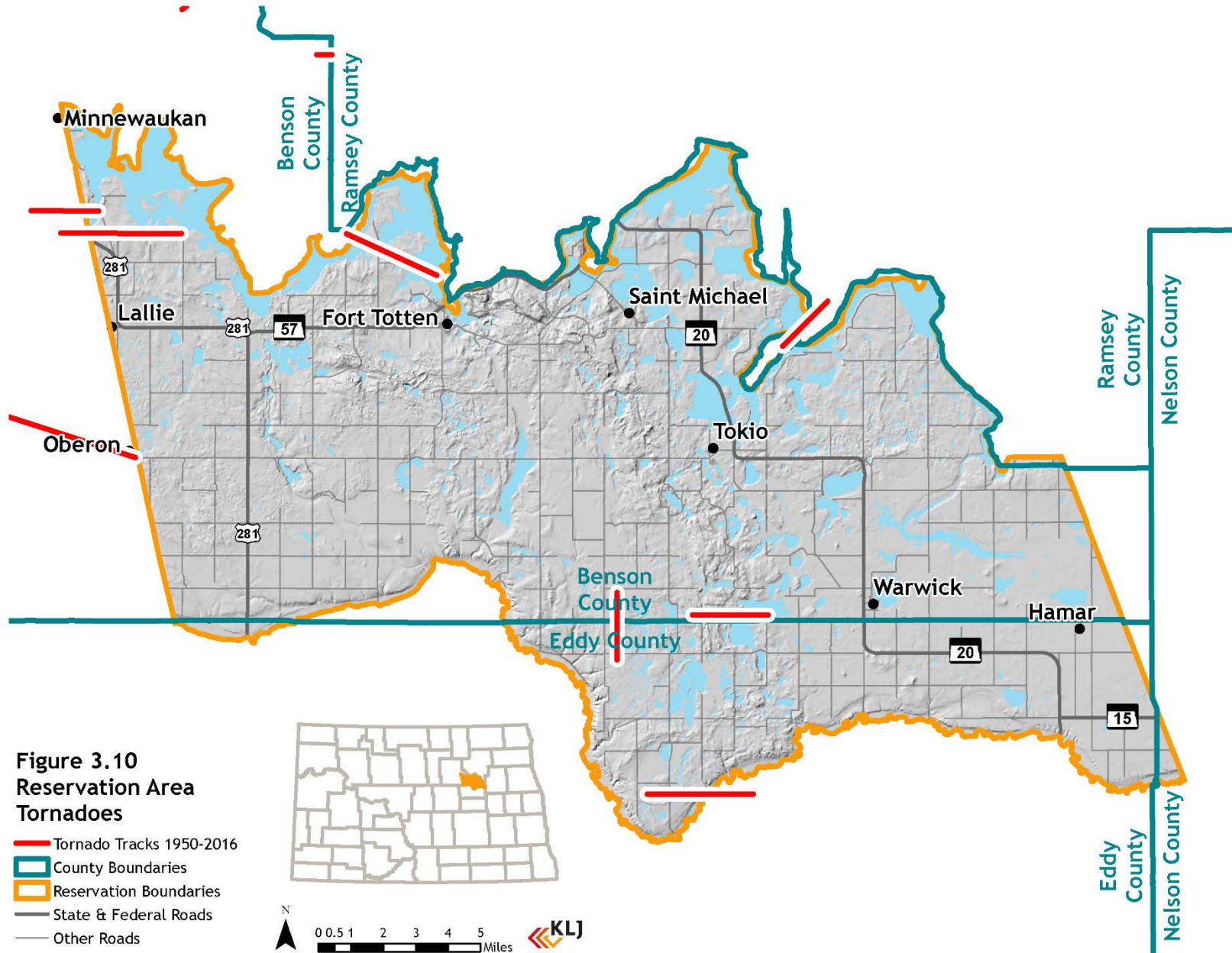
- A severe hail event is defined as a storm producing hailstones greater than 0.75 inches in diameter. According to the National Climatic Data Center, **the largest hailstone recorded on the reservation from 1950 to 2017 is 4.5 inches in diameter**, which occurred in August 1994. Common impacts from hail include broken windows, damaged shingles, dented or broken gutters, and damaged vehicles. Heavy hail events can also injure livestock and destroy crops.
- A severe wind event is defined as gusts of at least 50 kts or 58 MPH. According to the National Climatic Data Center **the greatest straight-line wind gust recorded in the area from 1950 to 2017 is 103 kts (118 MPH)**, which occurred in June 2017. Common impacts from severe winds include broken trees and limbs, damaged agricultural structures, and damaged power poles.

- Historical tornadoes in the reservation are shown in Figure 3.10. There were 28 tornadoes/funnel clouds reported in Benson County and 13 in Eddy County between 1996 and 2014, a majority of which were rated at EF0 or EF1. These tornadoes generally resulted in minimal damage, but the impact would be devastating if a large tornado were to directly strike a city or populated area.
- The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent summer storm events within area counties are summarized below.
  - *November 1, 1999.* Severe winds swept through eastern North Dakota; eight-foot waves were reported on Devils Lake.
  - *August 11, 2000.* Severe winds damaged several new housing structures in Fort Totten. Damage was also reported to Spirit Lake Casino. \$1 million in property damages was reported.
  - *May 21, 2005.* High winds struck northeast North Dakota. High waves on Devils Lake destroyed rip rap and temporarily closed Highway 57. Damages were \$25,000.
  - *June 23, 2005.* Large hail fell on Tokio and Warwick.
  - *July 28, 2008.* A thunderstorm with high winds struck Black Tiger Bay, uprooting several trees. Trees fell on vehicles and campers. Property damage of \$100,000 was reported.
  - *August 2, 2008.* Large hail fell on Tokio causing \$15,000 in damages.
  - *August 1, 2011.* Strong winds felled trees in Fort Totten.



# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

## Multi-Hazard Mitigation Plan

### Vulnerability

#### Population

- The entire population is vulnerable to a severe summer storm event. Residents living in homes without a basement or permanent foundations are particularly vulnerable to tornado and wind events. There are approximately 326 mobile homes on Spirit Lake Reservation according to the most recent American Community Survey Estimates. Applying the reservation's average household size of 3.77 persons, **there are approximately 1,229 persons on the reservation with an enhanced vulnerability to severe summer weather.** The estimated number of mobile homes and vulnerable residents for each district is summarized below.
  - Crow Hill: 34 mobile homes (128 residents, 17.1 percent)
  - Fort Totten: 77 mobile homes (290 residents, 17.5 percent)
  - Mission: 144 mobile homes (543 residents, 29.1 percent)
  - Wood Lake: 71 mobile homes (268 residents, 18.2 percent)
- Major recreation areas in the reservation include Devils Lake, Black Tiger Bay, Sully's High National Game Preserve, Wood Lake, marinas, and campsites. **The reservation has many campsites and RV sites, many of which are not located near adequate shelter in the event of severe summer weather.**

#### Critical Facilities

- All critical facilities are vulnerable to a severe summer storm event. Facilities with an increased vulnerability include schools, special care centers, tall buildings, electrical infrastructure and event facilities.

#### Property

- The 2014 statewide Multi-Hazard Mitigation Plan documents claims paid to cover damages on local government facilities and property insured by the state. From 1989 to 2013, claims were paid for the following hazards in Benson and Eddy counties.
  - Hail: \$21,903 (Benson), \$49,281 (Eddy)
  - Lightning: \$1,859 (Benson), \$1,369 (Eddy)
  - Wind: \$48,723 (Benson), \$5,598 (Eddy)
- The 2014 statewide Multi-Hazard Mitigation Plan also documents damage claims for public school facilities. From 1989 to 2013,

claims were paid for the following hazards in Benson and Eddy counties.

- Hail: \$9,196 (Benson), \$20,947 (Eddy)
- Lightning: \$7,264 (Benson)
- Wind: \$43,214 (Benson), \$241 (Eddy)

- The most damaging summer storm event recorded by the National Climatic Data Center since 1996 is a wind event in August 2000 that caused an estimated \$1 million in damages in Fort Totten.

#### Future Development

- The North Dakota state building code has been adopted for all construction projects on the Spirit Lake Nation. The North Dakota State Building Code consists of the 2012 International Building Code, International Residential Code, International Mechanical Code and International Fuel Gas Code published by the International Code Council. The code includes a provision that buildings must be constructed to withstand a wind load of 75 MPH constant velocity and three-second gusts of 90 MPH.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Existing Capabilities

- Each district has a designated emergency shelter.
- Warning sirens have been installed but are not yet operational in each district.
- The North Dakota State Building Code is required to be followed for all construction projects on the Spirit Lake Nation.

### Key Issues and Potential Action Items

- *Key Issue:* Spirit Lake Reservation averages approximately ten days per year with a summer storm event. Severe wind and hail are the most common summer storm events on the reservation, and tornadoes are also a possibility in the region.
  - *Potential Action Item:* Cover windows in select critical facilities with shatter-resistant film.
  - *Potential Action Item:* Offer information about weather-resistant building best practices.
  - *Potential Action Item:* Install and maintain surge protection on critical equipment.
- *Key Issue:* Spirit Lake Reservation has a large number of mobile homes used as residences. Tornadoes pose a major threat to the inhabitants.
  - *Potential Action Item:* Develop an action plan to provide emergency shelter for mobile home residents that is within two minutes walking distance of all mobile homes.
  - *Potential Action Item:* Work with Tribal Real Estate Office to develop a strategy for moving households out of mobile homes and into safer dwellings.
  - *Potential Action Item:* Complete the process of making warning sirens operational so that 100% of residences can be warned of severe weather risks.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Severe Winter Weather

<b>Spirit Lake Tribe</b>	<p><i>Overall Risk:</i> High</p> <p><i>Probability:</i> High (Approximately six event days per year)</p> <p><i>Magnitude:</i> High (Potential for damages totaling millions of dollars with fatalities)</p>
<b>Seasonal Pattern</b>	October - April
<b>Primary Impacts</b>	<p>Agricultural loss (crops, livestock)</p> <p>Blocked roads</p> <p>Economic loss</p> <p>Exposure risks to people, pets, livestock and wildlife</p> <p>Freezing pipes</p> <p>Human loss and injuries</p> <p>Increased stress on medical services</p> <p>Power loss</p> <p>School closure</p> <p>Vehicle accidents</p>

### Hazard Profile

Elements of severe winter weather include blizzards, heavy snow, ice storms and extreme cold. These elements can produce life-threatening situations and are equally a threat to all areas of the reservation.

A blizzard is defined by the National Weather Service as a storm producing winds of 35 mph or more, with snow and/or blowing snow reducing visibility to less than 0.25 miles for at least three hours. A closely related weather event known as a surface blizzard occurs when heavy winds blow snow that has already fallen. Both traditional and surface blizzards can reduce visibility, disrupting transportation and communication systems in the area.

Heavy snow is defined as six or more inches of snow in 12 hours, or eight or more inches of snow in 24 hours. Heavy snow can damage property and make roads impassable for extended periods.

An ice storm produces heavy and damaging accumulations of ice due to a combination of rain and below freezing surface temperatures.

Accumulated ice can bring down trees and power lines and poses a threat to motorists, pedestrians and livestock.

Extreme cold is a common occurrence in North Dakota during the winter months. Cold temperatures are amplified when combined with wind, creating dangerous wind chills. Exposure to extreme cold temperatures and wind chill can damage tissue (frostbite) and lower the body's core temperature (hypothermia), presenting a risk to both humans and livestock.

### Local Risk

- A summary of the severe winter weather events in Benson and Eddy Counties is shown in Table 3.6. **On average, a severe winter weather event occurs approximately eight days per year.** Generally classified "winter storm" and extreme cold/wind chill events are most common. Winter weather classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.6 - Severe Winter Weather Events in area Counties, 1996-2014			
Winter Storm Events	Event Days*	Annual Probability	Event Days per Year
Benson County			
Winter Storm	46	242.1%	2.4
Blizzard	45	236.8%	2.4
Extreme Cold/Wind Chill	36	189.5%	1.9
Heavy Snow	13	68.4%	0.7
High Wind	25	131.6%	1.3
<b>Total</b>	<b>157</b>	<b>826.3%</b>	<b>8.3</b>
Eddy County			
Winter Storm	37	194.7%	1.9
Blizzard	43	226.3%	2.3
Extreme Cold/Wind Chill	36	189.5%	1.9
Heavy Snow	13	68.4%	0.7
High Wind	26	136.8%	1.4
<b>Total</b>	<b>155</b>	<b>815.8%</b>	<b>8.2</b>

\*Number of days with a reported event

Source: National Climatic Data Center

# Spirit Lake

## Multi-Hazard Mitigation Plan

- Blowing snow resulting in road hazards was a commonly identified impact during planning committee meetings. Wind is particularly strong coming off Devils Lake.
- Power loss happens occasionally throughout the reservation during severe winter storms.
- Benson and Eddy Counties were included in three winter storm-related Presidential Disaster Declarations between 1989 and 2014.

### Vulnerability

#### Population

- Residents living in mobile homes, recreational vehicles, or poorly insulated homes may find it difficult to adequately heat their homes during cold temperature events. There are approximately 326 mobile homes on Spirit Lake Reservation according to the recent American Community Survey Estimates. Applying the reservations's average household size of 3.77 persons, there are approximately 1,229 persons in the reservation with an enhanced vulnerability to severe winter weather. The estimated number of mobile homes and vulnerable residents for each district is summarized below.
  - Crow Hill: 34 mobile homes (128 residents, 17.1 percent)
  - Fort Totten: 77 mobile homes (290 residents, 17.5 percent)
  - Mission: 144 mobile homes (543 residents, 29.1 percent)
  - Wood Lake: 71 mobile homes (268 residents, 18.2 percent)
- Wind, ice, heavy snow and cold temperatures can combine to create hazardous conditions and "trap" residents in their homes without heat or electricity. Elderly residents may be especially vulnerable to this hazard as they are more likely to have limited mobility, especially in the event of hazardous road conditions. Approximately 319 residents on the reservation are 65 years of age or older. The estimated number of residents age 65 or older for each district are summarized below.
  - Crow Hill: 34 residents (6 percent)
  - Fort Totten: 79 residents (4.8 percent)
  - Mission: 116 residents (8.7 percent)
  - Wood Lake: 90 residents (10.5 percent)

- People required to travel on a daily basis face increased road hazards. According to the recent American Community Survey data, the labor force on Spirit Lake is approximately 2,714 people (47.8 percent of the total population).
- Stranded motorists are another vulnerable population. Closed roads and whiteout conditions force them to stop driving and look for temporary shelter.

#### Critical Facilities

- A winter storm event that "traps" fire and ambulance responders within the facility would severely limit the emergency response capability of the reservation.
- A severe winter storm event would most likely require closure of schools. A winter storm event that begins mid-day could present issues for students leaving school.
- Power outages and loss of heating could impact the elderly and populations that require assistance for daily living who are located in special care facilities.

#### Property

- It is difficult to estimate the impact of winter storms on property on the reservation. The most likely damages involve roof collapse due to heavy snow loads and vehicle accidents. Roof collapse is most likely for older structures. According to the most recent American Community Survey estimates, there are approximately 115 housing units on the reservation that were built before 1940. Age information is not available for other types of structures in the county.
- A winter storm can also result in an increased risk of structure fire due to use of portable heaters and fireplaces during events that involve extremely cold temperatures.
- A severe winter storm can cause significant livestock fatalities. According to the 2012 Census of Agriculture, the market value of livestock on the reservation was \$6.5 million. Losses vary based on storm severity and duration, but losses to unprotected livestock

# Spirit Lake

## Multi-Hazard Mitigation Plan

can be significant following a major storm event. Winter storms in the spring season have the potential to affect calving operations.

- *Potential Action Item:* Obtain and install emergency generators for critical facilities.

### Future Development

- The potential vulnerability to winter weather on the reservation is not expected to change in the foreseeable future.

### Existing Capabilities

- Facilities with backup generators include Cankdeska Cikana Community College (limited), Tribal Health Clinic, Tribal Police Department, and DTI.
- Snow removal on reservation roads is generally timely and effective. Tribal, County and BIA agencies each are responsible for removal on some roads.

### Key Issues and Potential Action Items

- *Key Issue:* Spirit Lake Reservation averages approximately eight days per year with a winter storm event. Severe winter weather events in the county include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm.
  - *Potential Action Item:* Coordinate with landowners to identify strategic locations for constructing snow fences.
  - *Potential Action Item:* Continue educating residents about winter storm safety.
- *Key Issue:* A winter storm event that causes a power outage may make it difficult for residents to heat their homes. It may also impede emergency response activities. Elderly residents and residents in mobile homes are the most vulnerable to extreme cold temperatures. Approximately 1,229 residents live in a mobile home and 319 are elderly.
  - *Potential Action Item:* Identify emergency warming shelter(s) and acquire back-up generator(s) to heat shelters and provide electricity during a winter storm event. Promote shelters so residents are aware of their availability.
  - *Potential Action Item:* Encourage utility provider to bury electric power lines when undergoing upgrades or repair.



# Spirit Lake

## Multi-Hazard Mitigation Plan

### Wildland Fire

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (18 reported fires greater than 100 acres from 1995-2015) <i>Magnitude:</i> High (a large wildfire could potentially cause damages totaling millions of dollars and put human lives at risk; however, the largest wildfire reported from 1995-2015 was 1,900 acres)
<b>Crow Hill</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (17 reported fires in district 1995-2015) <i>Magnitude:</i> High (Fires occur throughout district)
<b>Fort Totten</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (15 reported fires in district 1995-2015) <i>Magnitude:</i> High (Fires occur throughout district)
<b>Mission</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (6 reported fires in district 1995-2015) <i>Magnitude:</i> High (Fires occur throughout district)
<b>Wood Lake</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (6 reported fires in district 1995-2015) <i>Magnitude:</i> High (Fires occur throughout district)
<b>Seasonal Pattern</b>	March - November
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Blocked roads Economic loss Explosion Hazardous materials release Human loss and injuries Increased stress on medical services Localized evacuation Property damage or loss Reduced air quality

### Hazard Profile

A wildfire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires either human-caused or natural in origin. Many of the fires occurred in or near developed areas.

Wildfires pose increasing threats to people and their property as communities develop in the wildland-urban interface. The wildland-urban interface refers to areas where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The threat exists anywhere that structures are located close to natural vegetation and where fire can spread from vegetation to structures, or from structures to vegetation.

The three major factors that affect the occurrence and severity of wildfires are the fuels supporting the fire, the weather conditions during a fire event and the topography in which the fire is burning. These factors affect and increase the likelihood of a fire starting, the speed and direction in which a fire will travel, the intensity at which it burns, and the ability to control and extinguish it. At the landscape level, both topography and weather are beyond our control. Fuel is the only factor influencing fire behavior that humans have the ability to manage.

### Local Risk

- Figure 3.11 shows fuel types on Spirit Lake Reservation. Predominate fuel types are classified using the 13 standard fuel models for fire behavior by Anderson. **Significant portions of the reservation is agricultural land, which the Anderson models do not consider to be a significant fuel;** however, in times of drought or during harvest season agricultural fields may present a wildfire risk. **The most prevalent fuels on the reservation are of the grass and brush groups.** These fuels generally burn with a low intensity but can spread quickly. Grass and shrub fuels are found throughout the reservation. Timber fuels are clustered along Devils Lake in the Sully's Hill area.

# Spirit Lake

## Multi-Hazard Mitigation Plan

- Figure 3.11 also shows incidence of wildfires over 100 acres. The information is from the Interagency Fire Program Analysis fire-occurrence database, compiled by Karen C. Short of the USDA Forest Service, Rocky Mountain Research Station. The database is sourced from multiple reporting agencies; however, due to reporting limitations, it should not be considered an all-inclusive list. According to the database, **Spirit Lake Reservation had 18 wildfires over 100 acres between 1995 and 2015 with an average fire size of 320 acres. The largest wildfire reported during the time period was 1,900 acres.**
  - There were **three wildfires greater than 1,000 acres** on Spirit Lake reported to the National Interagency Fire Center between 1995 and 2015.
  - Local Fire department leaders estimate there are between 300 and 400 wildland fires each year. They report that the majority of these fires are caused by arson and are typically set near population centers on the reservation.
  - In 2010 the North Dakota Forest Service developed a wildfire risk assessment for every county in the state based on wildfire occurrence, fire department response capabilities and weather. The assessment ranked Benson County as having a low risk for wildfire but Eddy County as having a high risk.
  - The wildland-urban interface identifies risk areas where fire can spread from vegetation to structures, or from structures to vegetation. **Any areas where structures are located within or adjacent to wildland environments can be included within the wildland-urban interface.** This includes all rural structures on Spirit Lake Reservation and structures along the edges of each community.
- majority of the population is at increased vulnerability to wildfire as well.
- Although many of the reservation's key facilities are within developed areas, which are considered defensible space for wildfire, **several critical facilities are located along the edges of communities near the wildland-urban interface or in rural areas.** Facilities within 100 yards of the edge of town, or within non-urbanized rural areas are especially vulnerable.

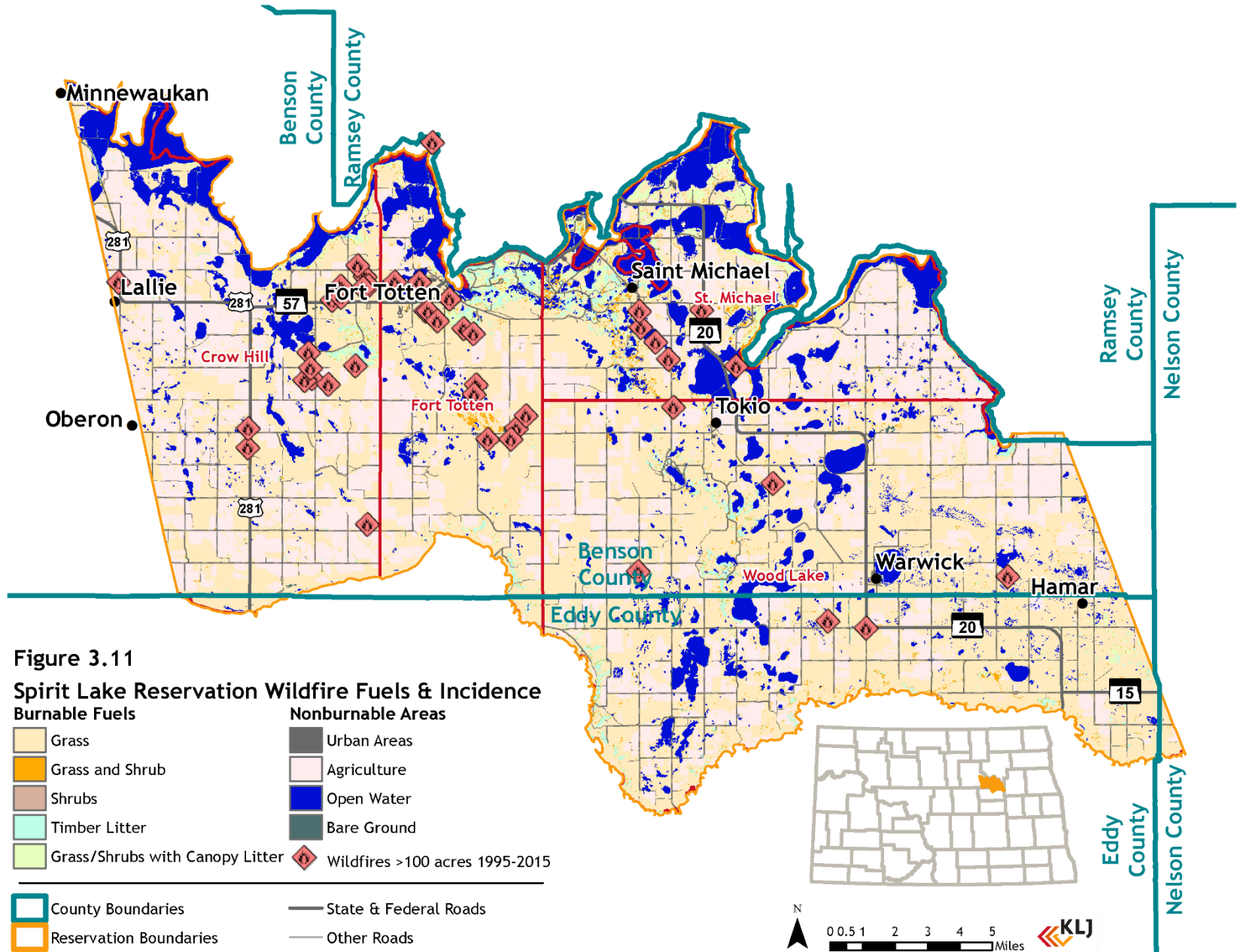
### Vulnerability

#### Population

- Residents in the wildland-urban interface are generally at a higher risk of wildfire. According to 2016 Census Bureau estimates, there are approximately 4,399 residents on the reservation; many residents live in rural areas and are at increased vulnerability to wildfire. Because the communities are small and spread out, the

# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

## Multi-Hazard Mitigation Plan

### Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop indemnity payments from the USDA Risk Management Agency. There were \$3,732 of wildfire-related crop indemnity payments in Benson County and \$6,528 in Eddy County between 2003 and 2012.
- There is no history of widespread property loss on the Spirit Lake Reservation due to wildfire. Affected areas for each city include an estimated wildland-urban interface area along the edges of the community's urban area. Smaller communities have a larger proportion of their properties along the wildland-urban interface because they have a smaller centralized urban area. Note that this analysis does not include infrastructure damage or the cost of suppression.

### Future Development

- New development proposals should be reviewed by the relevant fire protection district.

### Existing Capabilities

- Wildfire response in the reservation is coordinated by several fire districts. District boundaries are shown in Figure 3.12.
  - Spirit Lake Fire Department
  - Warwick Fire Protection District
  - Devils Lake Rural Fire Department
  - Tolna Fire Protection District
  - Sheyenne Rural Fire Department
  - Minnewaukan Fire Protection District
  - A small portion falls under the New Rockford Rural Fire district
- Arson prevention programs are ongoing, but have not resulted in significant decrease in arson initiated wildland fires.

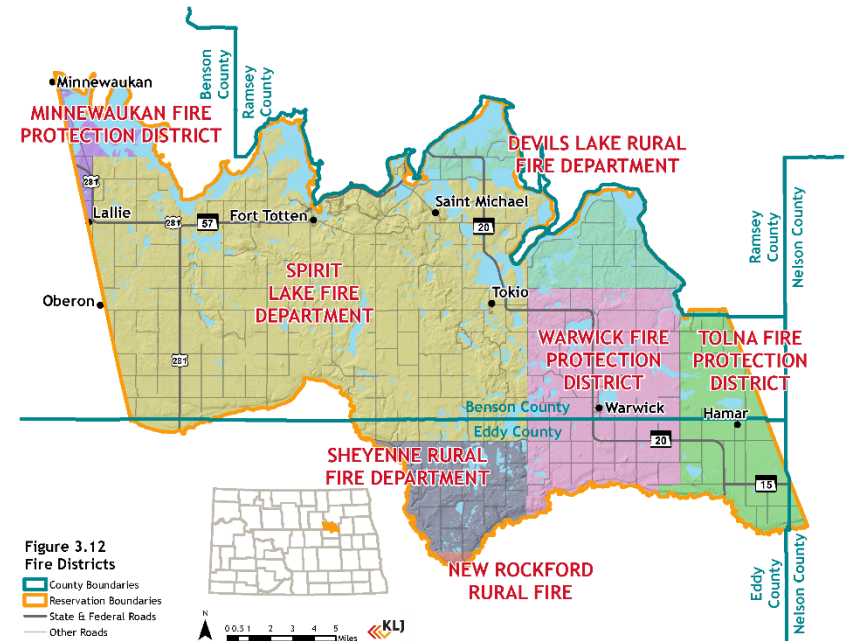


Figure 3.12  
Fire Districts

County Boundaries  
Reservation Boundaries  
State & Federal Roads  
Other Roads

### Key Issues and Potential Action Items

- **Key Issue:** Spirit Lake Reservation experiences a wildfire greater than 100 acres approximately once per year.
  - *Potential Action Item:* Perform fuel reduction activities in high-risk rural areas.
  - *Potential Action Item:* Educate residents about defensible space best practices.
  - *Potential Action Item:* Encourage the use of non-combustible materials (stone, brick, stucco, etc.) for new construction in wildfire hazard areas.
  - *Potential Action Item:* Incorporate wildland-urban interface guidelines into the local development regulations.
  - Explore innovative public education opportunities to discourage arson initiated wildland fires

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Communicable Disease

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (No incidence of major disease outbreak in recent decades) <i>Magnitude:</i> Moderate (Approximately 37 percent of population is under 18 or over 65 years of age, fatality rates for most modern diseases in North Dakota are significantly lower than one percent, agricultural losses could total millions of dollars)
<b>Seasonal Pattern</b>	None
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Economic loss Human loss and injuries Increased stress on medical services Localized evacuation School closure

### Hazard Profile

Communicable disease is an illness caused by an infectious agent such as bacteria, virus, fungi, parasites or toxin. Communicable diseases of particular concern are those that can lead to the loss of human life or widespread loss of crops and livestock. A severe communicable disease incident has potential for catastrophic effects on human populations and the economy.

There are numerous ways for communicable disease to spread among humans: physical contact with an infected person, contact with contaminated object, bites from animals or insects carrying the disease, or air travel. A widespread occurrence of infection in a community is called an epidemic. Epidemics may lead to quarantines, school and business closures, and stress on medical facilities. A widespread epidemic (often countrywide or worldwide in scope) is referred to as a pandemic. Perhaps the most notable pandemic in the modern era was the Spanish Influenza in 1918. The disease killed an estimated 20 to 40 million people worldwide, including 675,000 Americans. In North Dakota, about 2,700 people died and 6,000 were infected.

Animal and plant diseases can harm the economy through the loss of livestock and crops. Widespread plant and animal diseases can lead to food shortages. Some animal diseases may cause sickness in humans if proper precautions are not taken with infected animals. Diseases that are a threat to cattle include tuberculosis and anthrax. According to the North Dakota Department of Health, there has been one report of tuberculosis in cattle in recent years. Anthrax is much more common, with 185 cases between 1989 and 2010; a majority of those cases occurred in 2005 when there were 109 reports. Plant diseases in North Dakota include karnal bunt disease, black stem rust race Ug99, and emerald ash borer.

### Local Risk

- Populations throughout the world are susceptible to epidemics and national pandemics, and Spirit Lake residents are no exception, although the generally low population density of the area makes rapid transmission of communicable disease less likely.
- There is no recent history of major crop, animal or human epidemic disease or contamination on the reservation.

### Vulnerability

#### Population

- Elderly and young persons are most at risk for communicable disease. The estimated number of residents age 65 or older are summarized below for each district.
  - Overall: 319 residents (7.3 percent)
  - Crow Hill: 34 residents (6 percent)
  - Fort Totten: 79 residents (4.8 percent)
  - Mission: 116 residents (8.7 percent)
  - Wood Lake: 90 residents (10.5 percent)
- The estimated number of residents under age five are summarized below for each district.
  - Overall: 516 residents (11.7 percent)
  - Crow Hill: 90 residents (15.8 percent)
  - Fort Totten: 201 residents (12.3 percent)

# Spirit Lake

## Multi-Hazard Mitigation Plan

- Mission: 121 residents (9.1 percent)
- Wood Lake: 104 residents (12.1 percent)
- According to the North Dakota Department of Health, the death rate for foodborne illnesses in the state was 31.7 per 100,000 population in 2011. Since 2005, the lowest death rate was 55 and the highest was 78. **The death rate of 78 per 100,000 equates to approximately three foodborne illness deaths on Spirit Lake over a one-year period.**
- According to the North Dakota Department of Health, the death rate for influenza in the state was 55 per 100,000 population in 2011. Since 2005 the lowest death rate was 27.1 and the highest was 61.7. **The death rate of 61.7 per 100,000 equates to approximately three influenza deaths on Spirit lake over a one-year period.**
- The Centers for Disease Control and Prevention (CDC) estimates that a medium level influenza pandemic would result in 30 percent ill, 0.8 percent of ill requiring hospitalization and 0.2 percent of ill dying from the disease. On Spirit Lake Reservation this would equate to **1,320 ill, 10 requiring hospitalization and 3 deaths from a medium level influenza pandemic.**

### Critical Facilities

- Elderly care facilities, medical facilities and schools have an increased vulnerability to communicable disease due to the high density and demographics of occupants. These facilities are summarized below.
- Cankdeska Cikana Community College
- Four Winds Community School
- Tate Topa Elementary & Middle School
- Tribal Health Department (in the Blue Building)
- Head Start Facility

### Property

- The statewide Multi-Hazard Mitigation Plan estimated that communicable disease could impact 20 percent of crop and livestock values. According to the 2012 Census of Agriculture the market value of crops on Spirit Lake Reservation was \$49 million and the market value of livestock was \$6.5 million. **Estimating 20**

**percent loss for each sector results in \$9.8 million in communicable disease-related crop loss and \$1.3 million livestock loss.**

### Future Development

- Any minor future development that may occur is not expected to affect the reservations's physical vulnerability to communicable disease. Potential future development is expected to primarily be low density single-family housing.

### Existing Capabilities

- Both the USDA Farm Service Agency and North Dakota State University Extension have field offices located in Minnewaukan, New Rockford, Devils Lake, and Lakota. Both agencies offer technical assistance to farmers and ranchers for the prevention and treatment of agricultural diseases.

### Key Issues and Potential Action Items

- *Key Issue:* Human and agricultural disease have the potential to greatly impact the health and economy of the reservation.
  - *Potential Action Item:* Continue supporting the efforts of the USDA Farm Service Agency and NDSU Extension.
- *Key Issue:* Some areas of the reservation have large amounts of standing water during the spring and summer months, which can attract potentially disease-carrying insects.
  - *Potential Action Item:* Develop insect control system during periods of standing water.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Dam Failure

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (no history of significant failure) <i>Magnitude:</i> Moderate
<b>Crow Hill</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low <i>Magnitude:</i> Low (One weir dam on Sheyenne River, 3 other dams listed as intact but submerged)
<b>Fort Totten</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low <i>Magnitude:</i> Low (One weir dam on Sheyenne River, impacts minimal)
<b>Mission</b>	<i>Overall Risk:</i> High <i>Probability:</i> High (Several dams holding back Devils Lake. Lake levels and wave action threaten dams and RAADs.) <i>Magnitude:</i> High (Several homes, structures, and roads in inundation area)
<b>Wood Lake</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (not within inundation area) <i>Magnitude:</i> Low (Three low-risk dams)
<b>Seasonal Pattern</b>	None
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Blocked roads Economic loss Human loss and injuries Increased stress on medical services Localized evacuation Loss of power Release of hazardous materials Shortage of critical materials

### Hazard Profile

A dam is defined as an artificial barrier across a watercourse or natural drainage area that may impound or divert water. Dams have many potential uses, including hydro-electric power generation, irrigation, flood control, water supply and recreation. Dam structures can be earthen or from manmade materials. Dam failure is a sudden, uncontrolled release of impounded water, and can have a devastating effect on people and property downstream.

The Association of State Dam Officials identifies five primary causes of dam failure, which are often interrelated:

- Overtopping of a dam occurs when water from the reservoir spills over the top of the dam, creating instability in the structure. This can occur during a major flood event if the spillways are not adequately designed or if there is blockage in the spillway. Approximately 34 percent of all dam failures in the United States are due to overtopping.
- Foundation defects, including settlement and slope instability, cause about 30 percent of all dam failures.
- Piping is a term used to describe the process that occurs as seepage pathways create eroded pipes through a structure. Seepage often occurs around hydraulic structures and earthen features, and if left unchecked can gradually reduce the dam structure's stability. About 20 percent of all dam failures in the United States are caused by piping.
- Structural failure of materials used to construct the dam.
- Inadequate maintenance.

The Association of State Dam Officials and the US Army Corps of Engineers utilize a rating system to determine potential hazard to property or life if a dam were to suddenly fail.

- *Low:* Dams located in rural or agricultural areas where there is little possibility of future development. Failure of low hazard dams may result in damage to agricultural land, township and county roads and farm buildings other than residences. No loss of life is expected if the dam fails.
- *Significant:* Dams located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways, railroads or cause interruption of minor public utilities. Potential for the loss of life may be expected if the dam fails.



# Spirit Lake

## Multi-Hazard Mitigation Plan

- *High:* Dams located upstream of developed and urban areas where failure may cause serious damage to homes, industrial and commercial buildings and major public utilities. Potential for loss of life if the dam fails. High hazard dam reservoirs must be at least 50 acre-feet.

According to the statewide Multi-Hazard Mitigation Plan, no North Dakota dams rated as a high or significant hazard failed between 2009 and 2013; however, some dams did sustain significant damage from major flood events during the time period.

The North Dakota Century Code requires that all dams with greater than 1,000 acre-feet of storage have emergency procedures and safety plans. Safety plans must include a map of the evacuation area, notification directory, name of the dam owner or responsible entity, availability of materials for emergency repairs, and a list of contractors that could provide emergency assistance.

### Local Risk

- The North Dakota State Water Commission maintains a database of all dams in the state. There are 21 dams on Spirit Lake Nation; 10 are classified as high hazard. High hazard dams present the greatest risk for people and property in the event of failure. High hazard dams are summarized in Table 3.8. Dams on the reservation are shown in Figure 3.13. Most of these dams are a part of the levee and roads system holding back the high waters of Devils Lake. More details of these levees and their risk are discussed in Appendix C.

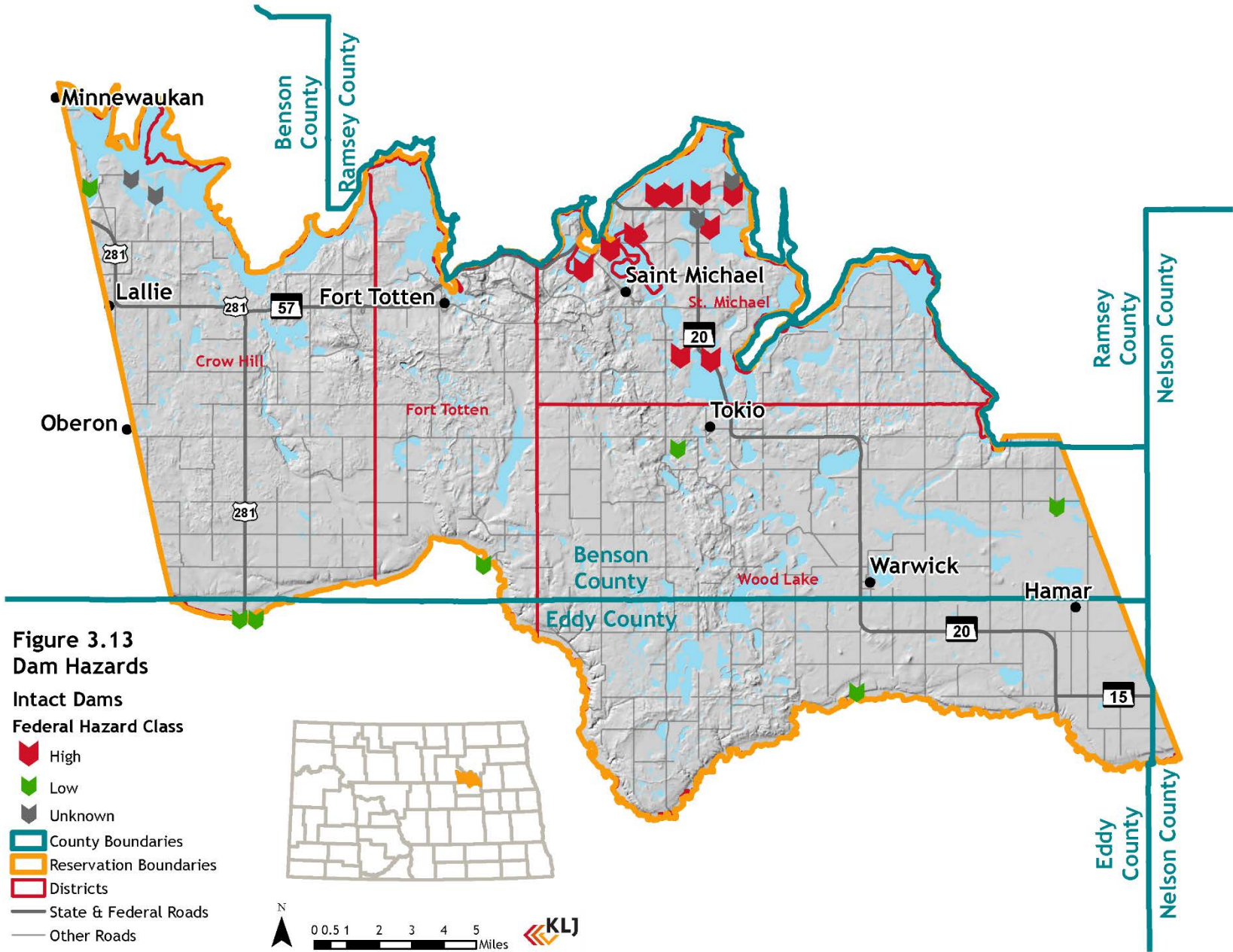
Table 3.8 - Spirit Lake High and Significant Hazard Dams

Dam Name	Action Plan	Owner	Type	Year Built	Max Storage (acre-feet)
Spirit Lake BIA 4 North	Yes	BIA	Flood Control	2012	NA
Spirit Lake BIA 4 South	Yes	BIA	Flood Control	2012	NA
Spirit Lake BIA 5	Yes	BIA	Flood Control	2012	NA
Spirit Lake Jetty 1	Yes	BIA	Flood Control	2012	NA
Spirit Lake Jetty 2	Yes	BIA	Flood Control	2012	NA
Spirit Lake Kurtz Dam	Yes	BIA	Flood Control	2012	NA
Spirit Lake Spring Lake	Yes	BIA	Flood Control	2012	NA
Spirit Lake Mission 1	Yes	BIA	Flood Control	2012	NA
Spirit Lake Mission 2	Yes	BIA	Flood Control	2012	NA
Spirit Lake Mission 3	Yes	BIA	Flood Control	2012	NA

Source: ND State Water Commission

# Spirit Lake

Multi-Hazard Mitigation Plan



# Spirit Lake

## Multi-Hazard Mitigation Plan

### Vulnerability

#### Population

- Approximately 15 percent of Mission district (200 residents) are located within the RAADs inundation area in the event of total failure. It would take less than 30 minutes hours for floodwaters to cover the inundation area. It appears that no other rural residences are within the dam failure inundation area.
- Other dams on the Spirit Lake Nation do not have any emergency action plan or known level of impact. This limits vulnerability analysis. Based on analysis of aerial imagery, there is one residential property located approximately 4,000 feet downstream of the dams and may be vulnerable in the event of failure.

#### Critical Facilities

- Critical facilities in St Michaels district located within the RAADs failure inundation area include:
  - group quarters housing

#### Property

- Approximately 15 percent of Mission district is located within the RAADs inundation area in the event of total failure. It would take less than 30 minutes hours for floodwaters to cover the inundation area. It appears that no other rural structures are within the dam failure inundation area.
- Other dams on the Spirit Lake Nation do not have any emergency action plan or known level of impact. This limits vulnerability analysis. Based on analysis of aerial imagery, there is one residential property located approximately 4,000 feet downstream of the dams and may be vulnerable in the event of failure.

#### Future Development

- Floodplain regulations limit development within the 100-year floodplain on the Spirit Lake Nation.

### Existing Capabilities

- An emergency action plan is available RAADs failure.

### Key Issues and Potential Action Items

- *Key Issue:* RAADs would have a large impact in the event of failure. A significant part of the Spirit Lake population would be affected by loss of homes and property, by loss of transportation routes, and possible loss of critical facilities.
  - *Potential Action Item:* Restrict future development in the dam failure inundation area identified in the RAADs emergency action plan.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Hazardous Materials Release

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Low (three reported incidents over 20-year period reservation-wide) <i>Magnitude:</i> High (approximately 1/3 of the reservation within potential hazard area, a large event could have a significant impact)
<b>Crow Hill</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Low (three reported incidents over 20-year period reservation-wide) <i>Magnitude:</i> High (majority of district in hazard area)
<b>Fort Totten</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Low (three reported incidents over 20-year period reservation-wide) <i>Magnitude:</i> High (high populated area in hazard area)
<b>Mission</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Low (three reported incidents over 20-year period reservation-wide) <i>Magnitude:</i> High (high populated area in hazard area)
<b>Wood Lake</b>	<i>Overall Risk:</i> Moderate <i>Probability:</i> Low (three reported incidents over 20-year period reservation-wide) <i>Magnitude:</i> High (high populated area in hazard area)
<b>Seasonal Pattern</b>	None
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Blocked roads Economic loss Human loss and injuries Increased stress on medical services Localized evacuation Loss of power Permanent loss of business Shortage of critical materials

### Hazard Profile

A hazardous material is any substance that has the potential to cause harm to humans, animals or the environment, either by itself or through interaction with other factors.

Hazardous materials incidents can occur at a fixed facility or while a material is transported. Common hazardous materials incidents at fixed sites include the improper storage, treatment and disposal of hazardous waste at manufacturing and processing facilities. Transportation-related hazardous materials incidents generally occur along major transportation routes such as highways, interstates, pipelines and railroads.

Common hazardous materials found in North Dakota include natural gas, anhydrous ammonia and crude oil.

Natural gas is commonly used in North Dakota, often in its refined form of propane or butane. Propane and butane are generally transported as a liquid, but will vaporize in the event of an unintended release (butane only vaporizes at temperatures above 32 degrees Fahrenheit). In their gaseous form they are both heavier than air, and generally remain close to the ground. Propane and butane are both highly flammable and present the risk of explosion. Exposure to propane and butane can also be a health hazard. Acute exposure can cause asphyxiation, respiratory irritation and physiological damage; however, these effects are most likely to occur in enclosed spaces or areas with poor ventilation.

Anhydrous ammonia is used in manufacturing, refrigeration and fertilizer. It is often stored and transported as a pressurized liquid, but it will vaporize under normal pressure. Anhydrous ammonia has explosive potential, but it requires extremely high temperatures to ignite. It generally only produces a significant health hazard when released in poorly ventilated areas, but when exposed to moisture it can cause a low-lying ammonia fog. Effects of acute anhydrous ammonia exposure include severe irritation to the eyes, respiratory tract, gastrointestinal tract and skin; severe repetitive exposure can cause permanent damage to these tissues. Anhydrous ammonia is not known to be carcinogenic.



# Spirit Lake

## Multi-Hazard Mitigation Plan

Crude oil poses a significant risk due to its high flammability. It may release flammable vapors that increase the risk of explosion. Crude oil also poses several health risks. Exposure to crude oil can come from direct contact, inhalation or ingestion. Acute exposure to crude oil can cause direct effects such as skin irritation, breathing difficulty, headaches and nausea. Acute exposure may also lead to long-term complications such as lung, liver or kidney damage, and increased cancer risk.

### Local Risk

- **Transportation routes present a risk for a hazardous materials release on Spirit Lake Reservation.** Highways and railroads are the primary transportation routes through the reservation. ND Highway 281, 57 and 20 are major routes that experience large traffic volumes, including trucks carrying hazardous materials. Other roadways on the reservation also experience truck traffic. Materials transported on truck through the reservation include fuel and anhydrous ammonia. There is only one railroad on the reservation, the Red River Valley and Western which passes through a small southwest portion of the reservation.
- The Emergency Planning and Community Right-to-Know Act (EPCRA) requires that operators of facilities containing hazardous materials and chemicals must identify themselves to appropriate state and local agencies. North Dakota requires that all hazardous materials operators submit Tier II Chemical Inventory Reports to the Department of Emergency Services on an annual basis. Typical Tier II facilities include bulk fuel plants, anhydrous ammonia plants, propane plants, agricultural processing plants and energy producing sites.
- The National Response Center is an interagency effort managed by the US Coast Guard that catalogs all reported hazardous materials incidents in the United States. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is part of the US Department of Transportation and monitors all transportation-related hazardous materials incidents in the United States. Table 3.9 summarizes reported hazardous materials incidents on Spirit Lake Reservation reported to the National Response Center and PHMSA between 2003 and 2017. **There were 3 reported incidents during the time period. All three of the incidents occurred at**

**fixed facilities.** The releases were minor and resulted in minimal impacts.

Material	# of Incidents
Isopropyl Alcohol	1
Other Incidents	2
<i>Total</i>	<i>3</i>

Source: National Response Center, PHMSA Incident Reports Database

There is one transmission pipeline in the reservation according to the PHMSA - a natural gas pipeline running north to south near Fort Totten. There were no pipeline incidents reported to the PHMSA between 2003 and 2017.

- Figure 3.14 shows major transportation corridors on the reservation, with evacuation areas of 1/2 mile and 1 mile. Tier II facilities and pipelines are not shown on the map due to security concerns, although their hazard areas are utilized to calculate risks and vulnerabilities. Hazard areas are from the 2012 Emergency Response Guidebook. Recommendations for initial evacuation in the case of fire for common hazardous materials are shown below:
  - Crude oil, petroleum and diesel fuel: 1/2 mile evacuation
  - Propane, natural gas: 1 mile evacuation
  - Anhydrous ammonia: 1 mile evacuation
  - Chlorine: 1/2 mile evacuation
  - Ammonium nitrate fertilizers: 1/2 mile evacuation

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Vulnerability

#### Population

- Vulnerable population can be estimated by identifying the intersection of 2010 US Census Blocks and the identified hazard areas in Figure 3.14. Census blocks in rural areas are generally large, which makes detailed estimates difficult. For purposes of this analysis, only census blocks that have their centroid within the hazard area are included; however, it is important to note that this analysis does not consider the exact location of residential structures within each census block.
  - Approximately 1,261 residents (29 percent of all residents) are within 1/2 mile of a major highway or railroad
  - Approximately 2,237 residents (51 percent of all residents) are within 1 mile of a major highway or railroad

#### Critical Facilities

- Nearly all critical facilities on the reservation are within the 1/2 mile and 1 mile hazard areas.

#### Property

- The greatest reported property damages for a hazardous materials incident on the reservation since 2003 was a chemical spill that resulted in \$3,700 in damages.

#### Future Development

- The reservation's vulnerability to hazardous materials is not expected to change in the foreseeable future.

### Existing Capabilities

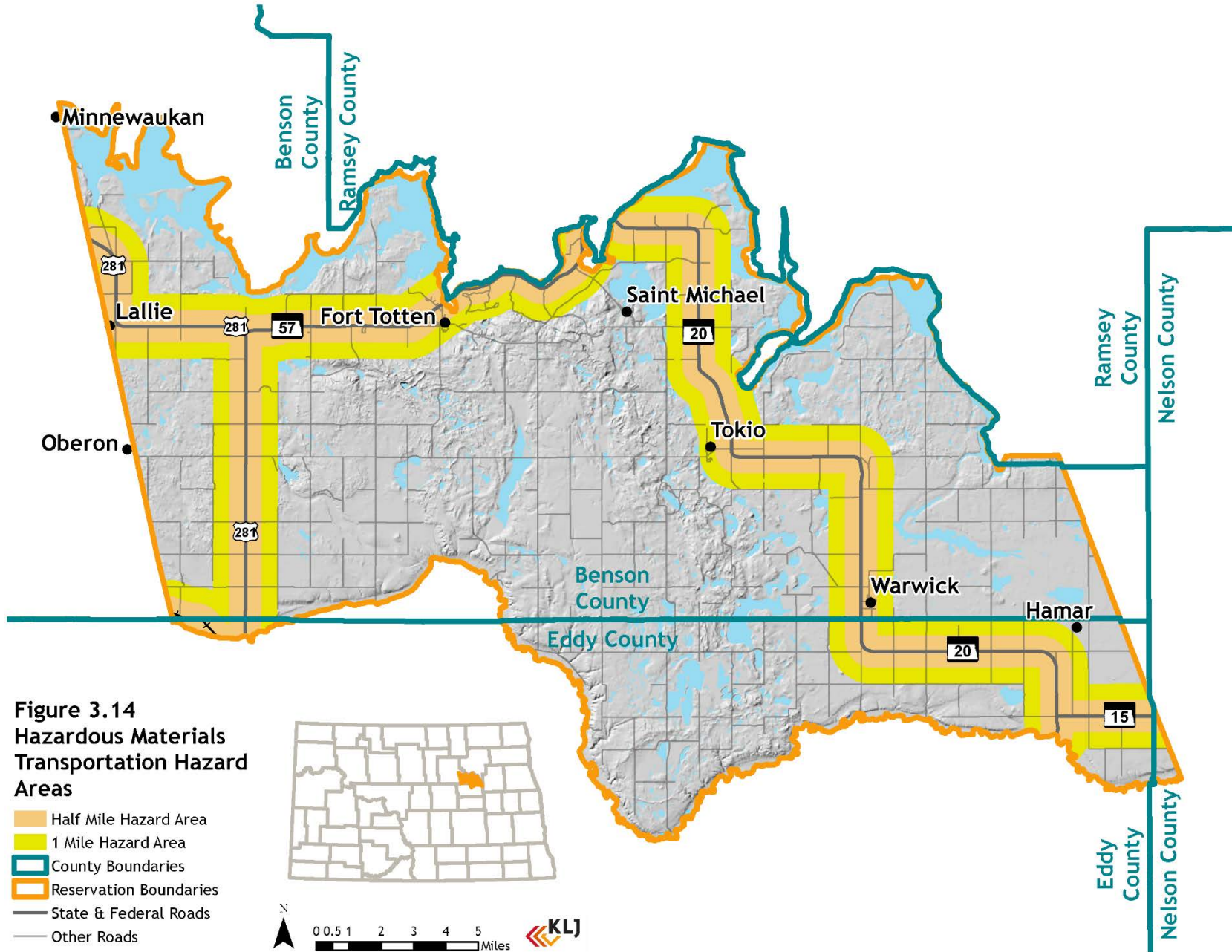
- Hazardous materials operators are responsible for clean-up and reclamation of incident sites.

### Key Issues and Potential Action Items

- *Key Issue:* Many residents on the reservation live in a potential hazard area for a hazardous materials incident. There were 3 reported hazardous materials incidents on the reservation between 2003 and 2017.
  - *Potential Action Item:* Survey the number and types of hazardous materials passing through the reservation.
  - *Potential Action Item:* Educate first responders, relevant facility operators, and residents about hazardous materials safety.
  - *Potential Action Item:* Designate evacuation shelter facility for each community located a safe distance from potential sources of a hazardous materials incident.
  - *Potential Action Item:* Explore the possibility of bypasses around populated areas when possible.

# Spirit Lake

Multi-Hazard Mitigation Plan





# Spirit Lake

## Multi-Hazard Mitigation Plan

### Homeland Security Incident

<b>Spirit Lake Tribe</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (no history of major incidents) <i>Magnitude:</i> Moderate (magnitude could vary widely)
<b>Seasonal Pattern</b>	None
<b>Primary Impacts</b>	Agricultural loss (crops, livestock) Economic loss Human loss and injuries Increased stress on medical services Localized evacuation Property damage or loss Release of hazardous materials Structure collapse

### Hazard Profile

A homeland security incident is any intentional adversarial human-caused incident, domestic or intentional, that causes mass casualties, large economic losses or widespread panic. Terrorism is an example of an intentional adversarial human-caused incident. Terrorism is defined by the Code of Federal Regulations as “the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.” Terrorist attacks are generally premeditated and motivated by a political or social objective.

### Local Threat

- The North Dakota Critical Infrastructure Program (CIP) collects data on critical infrastructure and key resources (CIKR) that exist in the state. CIKR facilities are divided into seven sectors. Each sector and their presence in Spirit Lake is summarized in Table 3.10.
- Potential terrorist targets identified for the reservation are shown in Appendix C. High profile facilities include Cankdeska Cikana

Community College, Tribal Administration and Program Building, the Casino, and Four Winds Community School.

Table 3.10 - Critical Infrastructure and Key Resources on Spirit Lake Reservation

CIKR Resource	Description	# in Spirit Lake Nation
Food/Agriculture	Major food distribution centers	0
Energy	Power generation and chemical facilities	0
Public Health	Hospitals and public health offices	1
Transportation	Bridges and major highways	3
Emergency Services	Police, fire and dispatch centers	2
Communications	Major communications towers	1
Water	Treatment facilities	1

Source: North Dakota Critical Infrastructure Program, 2014 North Dakota Multi-Hazard Mitigation Plan; Tribal communications

### Vulnerability

#### Population

- The number of residents vulnerable to a terrorist attack is highly variable based on time of day and extent of the attack. A large-scale incident, such as an attack on a municipal water supply, would have the potential for hundreds of injuries or fatalities.
- High density populations are generally more vulnerable to large-scale terrorism events. Figure 2.4 shows population density throughout the reservation. The largest concentration of high density populations can be found in the Fort Totten area.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Critical Facilities

- Facilities identified as potential terrorist targets are listed in Appendix C.

### Property

- The North Dakota Tornado and Fire Fund compensates for losses related to vandalism and theft at various essential facilities which are owned by local governments that are subdivisions of the State of North Dakota. However, because tribal facilities and local school facilities are not owned by subdivisions of the State of North Dakota, losses related to vandalism and theft at these various facilities are not available.

### Future Development

- The reservation's overall vulnerability to homeland security incidents is not expected to change in the foreseeable future.

### Existing Capabilities

- The Casino has 24 hour security
- CankDeska Cikana Community College has security from 8:00 a.m. to 5:30 p.m. and 24 hour surveillance coverage of the property
- The Tribal Administration and Program Building has security from 8:00 a.m. to 5:30 p.m.
- Four Winds Community School has 24 hour surveillance coverage of the property

### Key Issues and Potential Action Items

- *Key Issue:* Terrorism and violence are an ongoing concern, but it is very unlikely a large-scale event will occur on the reservation.
  - *Potential Action Item:* Continue general surveillance of suspicious persons or activities within the reservation.
  - *Potential Action Item:* Review evacuation plans that could be utilized in the event of a terrorist attack.

- *Potential Action Item:* Continue education and review of school response procedures for all schools on the reservation.
- *Potential Action Item:* Enhance security measures at critical facilities.

# Spirit Lake

## Multi-Hazard Mitigation Plan

### Urban Fire

<b>Spirit Lake Reservation</b>	<i>Overall Risk:</i> Low <i>Probability:</i> Low (no history of major incidents) <i>Magnitude:</i> Moderate (magnitude could vary widely)
<b>Seasonal Pattern</b>	None
<b>Primary Impacts</b>	Economic loss Human loss and injuries Increased stress on medical services Localized evacuation Property damage or loss Release of hazardous materials

### Hazard Profile

Urban fire is a threat to all Spirit Lake communities. A small flame can begin inside a structure and rapidly turn into a major fire, creating a costly and deadly situation. The National Fire Protection Association (NFPA) reports that fires in the United States caused 3,005 civilian deaths and 17,500 civilian injuries in 2011. Eighty-four percent of civilian fire deaths were due to home structure fires. According to the National Fire Incident Reporting System (NFIRS) there are about 2,500 urban fire events each year in North Dakota.

Fires may begin intentionally (arson) or by accident. Common motives for arson are insurance fraud, vandalism and murder. Common causes of accidental fires are cooking equipment, heating equipment, electrical distribution and lighting equipment, cigarettes, clothes dryer or washer, candles, and spontaneous combustion. According to the NFPA, unattended cooking is the leading cause of structure fires, with frying as the leading type of cooking activity. Heating equipment is the second leading cause of structure fire.

### Local Risk

- Most structure fires are individual disasters and not community-wide, but the potential exists for widespread urban fires that displace several businesses or residences. One multi-structure fire event occurred in the Mission District in 2015.

### Vulnerability

#### Population

- All residents in developed areas of the reservation are vulnerable to an urban fire event. The communities of Fort Totten, Mission, and Tokio (in the Wood Lake district) are considered developed areas for the purposes of this analysis.

#### Critical Facilities

- Development with zero setback lines have a greater vulnerability to fire. However, no critical facilities have this situation. Other large facilities, such as grain elevators, electric substations and manufacturing facilities, may also be vulnerable to fire.

#### Property

- Property value data for individual structures is not available, but it is assumed that a large multi-structure fire could cause damages over \$1 million.

#### Future Development

- The North Dakota State Building Code has been adopted for all construction projects on the Spirit Lake Nation.

#### Existing Capabilities

- All areas of the reservation are within the service area of a volunteer fire department. Additional fire-fighting resources are available through formal or informal mutual aid agreements.

#### Key Issues and Potential Action Items

- *Key Issue:* There is no history of large-scale urban fire on the reservation, but it is an ongoing concern.
  - *Potential Action Item:* Provide education about fire prevention best practices for local business owners and residents.
  - *Potential Action Item:* Continue response preparation with local fire districts.
  - *Potential Action Item:* Remove abandoned properties that could be a target for arson.



# Spirit Lake

## Multi-Hazard Mitigation Plan

### Summary

There are 11 priority hazards identified for Spirit Lake Reservation. The key issues for each hazard are summarized below. Hazards are summarized for the reservation overall and listed alphabetically within priority class. Hazard risk for each district/community is summarized in Table 3.11.

Hazard	Reservation Overall	Districts				Other Communities <sup>1</sup>			
		Crow Hill	Fort Totten	Mission	Wood Lake	Fort Totten	Mission	Tokio	Warwick
Drought*	M	M	M	M	M				
Flood*	H	NA				M	L	L	L
Geologic Hazards	L	L	L	L	L				
Severe Summer Weather*	H	H	H	H	H				
Severe Winter Weather*	H	H	H	H	H				
Wildland Fire	H	H	H	H	H				
Communicable Disease	L	L	L	L	L				
Dam Failure	L	L	L	H	L				
Hazardous Materials Release	M	M	M	M	M				
Homeland Security Incident	L	L	L	L	L				
Urban Fire	L	L	L	L	L				

\*Using Area County Data

<sup>1</sup>For Flood Analysis Only

Note: H = High, M = Moderate, L = Low

### Drought

- Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole.
- Recent population growth has resulted in an increased demand for potable water. There is sufficient capacity for foreseeable growth. Maintaining an adequate water supply may become difficult if growth occurs at higher than anticipated rates, particularly during times of drought.

### Flood

- Spirit Lake Reservation experiences flooding nearly every year. Flood events on the reservation are primarily related to rising lake levels, heavy rainfall, and snowmelt runoff.
- Many roads and bridges on the reservation are commonly washed-out or inundated during flooding events.

### Geologic Hazards

- The reservation is in an area of minimal hazard for earthquakes.
- The reservation is not in a landslide hazard area as defined by USGS. However, local conditions may vary.

### Severe Summer Weather

- Spirit Lake averages approximately ten days per year with a summer storm event. Severe wind and hail are the most common summer storm events on the reservation, and tornadoes are also a possibility in the region.

### Severe Winter Weather

- Spirit Lake Reservation averages approximately eight days per year with a winter storm event. Severe winter weather events on the reservation include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm.
- A winter storm event that causes a power outage may make it difficult for residents to heat their homes. Elderly residents and residents in mobile homes are the most vulnerable to extreme cold

# Spirit Lake

## Multi-Hazard Mitigation Plan

temperatures. Approximately 1,229 residents live in mobile homes and 319 are elderly.

### Wildland and Rangeland Fire

- Spirit Lake Reservation experiences a wildfire greater than 100 acres approximately once per year with many more smaller fires. Most wildfires cause minimal property damage.
- Arson initiated wildfires are a common occurrence and have not been able to be effectively deterred.

### Communicable Disease

- Human and agricultural disease have the potential to greatly impact the health and economy of the reservation.
- Some areas of the reservation have large amounts of standing water during the spring and summer months, which can attract potentially disease-carrying insects.

### Dam Failure

- Several dams in the Mission district keep back Devils Lake water from inundating homes, structures, and property.

### Hazardous Materials Incident

- Many residents in the reservation live in a potential hazard area for a hazardous materials incident. There were 3 reported hazardous materials incidents on the reservation between 2003 and 2017.

### Homeland Security Incident

- Terrorism and violence are an ongoing concern, but it is very unlikely a large-scale event will occur on the reservation.

### Urban Fire

- There is no history of large-scale urban fire on the reservation, but it is an ongoing concern.

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### Chapter 4: Mitigation Strategy

The mitigation strategy includes specific action items to reduce the impact of the priority hazards identified in Chapter 3. The process for identifying action items included Planning Team meetings, city council/commission meetings and a community survey. Goals were identified to guide the development of action items.

#### Capability Assessment

Before identifying goals and action items, it is important to know the capabilities of each jurisdiction to undertake different types of hazard mitigation projects. Specific capabilities are listed as part of each hazard profile in Chapter 3. Additional capabilities are summarized below.

##### Legal and Regulatory Capabilities

- *Zoning Ordinance.* The Tribe has not enacted zoning regulations, but may consider it because of benefits to ensure appropriate development and to enhance grant opportunities.
- *Comprehensive Plan.* The Spirit Lake Tribe does not have a comprehensive plan.
- *Floodplain Ordinance.* The Spirit Lake Tribe does have floodplain regulations that are actively enforced.
- *Building Code.* The Spirit Lake Tribe has adopted the North Dakota state building code for all construction projects.

##### Administrative and Technical Capabilities

- Spirit Lake Tribe has an Emergency Management Department that oversees mitigation, response and recovery activities reservation-wide.
- Spirit Lake Tribe has a floodplain administrator.

##### Fiscal Capabilities

- Spirit Lake Tribe is eligible for a variety of federal grants, including BIA and Community Development Block Grants.

The Spirit Lake Tribe has limited resources and would have difficulty implementing a wide range of comprehensive mitigation actions. The action items contained in this plan are generally small in scope and specific to the biggest issues. Funding/financing mechanisms for large projects is the greatest element that limits the capability. The Tribe does not have a tax base like counties or cities do, and any financing mechanism that increases the public tax burden is not desired by residents. As a result, a majority of projects identified in this plan have a minimal cost and can be completed by local staff. Outside funding sources and technical assistance would need to be acquired to help fund and complete the few large projects identified in this plan.

#### Goals

The goals defined below provide the general guiding principles that were used when developing mitigation activities. The goals may be used to guide the development of additional action items as the plan is evaluated in future years. The 2014 state-wide Multi-Hazard Mitigation Plan was used to guide goal creation. The goals below are all priorities and presented in no particular order.

- Reduce the impacts of flooding and dam failure to people and property.
- Enhance the public's awareness of hazards.
- Increase legal and regulatory capacity to enhance ability to reduce impacts of hazards
- Reduce impacts of severe summer and winter weather to people and property.
- Reduce impacts of drought and wildland fires to people and property.
- Reduce impacts of human-caused threats to people and property.



# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### Previous Mitigation Actions

Mitigation actions from the 2011 Spirit Lake Tribe Multi-Hazard Mitigation Plan are shown in Appendix E. The plan included 20 actions. Five actions were completed (or ongoing). Of the 15 remaining actions, six actions were not included in this plan because tribal priorities have changed or the action was deemed infeasible. The nine remaining actions from the previous plan have been included in this plan.

The greatest challenges to completing mitigation activities have been the limited resources (time and money) of the Tribe and lack of continuity. Tribal government experiences a high level of change in leadership and employee positions. Some of mitigation actions included in this plan can be implemented through existing programs, and many require only a minimal cost. Those that require substantial costs need to be linked to grant programs that can provide much of the necessary funding. In some cases, matching funds will need to be set aside by the Spirit Lake Tribe through its budget approval process.

### Funding

Spirit Lake Tribe will need to utilize local, state and federal funding to implement the action items identified in this plan. The Spirit Lake Tribe has access to multiple state and federal funding opportunities. US Department of Housing and Urban Development (HUD) Community Development Block Grants (CDBG) and US Department of Agriculture (USDA) Community Facility Grants are available for a wide variety of uses. There are also other viable funding streams tailored specifically for hazard mitigation and disaster response. FEMA's Hazard Mitigation Grant Program (HMGP) could provide funding for a wide variety of mitigation projects, and is only available following a North Dakota disaster declaration. Additional FEMA grant programs that provide funds for mitigation include the Pre-Disaster Mitigation (PDM) program and Flood Mitigation Assistance (FMA) program.

FEMA's Hazard Mitigation Assistance Unified Guidance, which includes eligible activities for each of FEMA's mitigation grant programs, can be found at:

<https://www.fema.gov/media-library/assets/documents/103279>

### Action Items

The action items identified in Tables 4.1 - 4.12 are recommendations developed through discussion with local officials, stakeholders and other interested members of the public. A broad range of potential mitigation activities were considered; each of these potential activities is listed in Chapter 3 with the applicable hazard. The Planning Team discussed each activity in order to develop a list of priority projects that will have the greatest benefit. Further explanation of the mitigation activity selection process can be found in Appendix E. Several preparedness and response actions discussed during the planning process are also included in the plan.

The activities list found in this section provides a roadmap for targeting and implementing mitigation projects over the next five years. Projects are prioritized based on a generalized benefit-cost analysis that factors in potential cost and project benefit. It is important to note that many project costs are eligible for grant or other outside funding. Funding options and project costs may vary year-to-year, so before moving forward with implementation the jurisdiction should perform a detailed benefit-cost analysis. The implementation timeline for each project may be highly variable based on the availability of funds.

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

Table 4.1 - Spirit Lake Tribe Life Safety Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
A	High	Complete installation of generators for critical facilities	Multiple Hazards	\$25,000 - \$50,000	2020
B	High	Identify critical routes to keep plowed	Severe Winter Storms	Staff time	Ongoing
C	High	Designation/construction of community shelters	Multiple Hazards	\$100,000+	Long term
D	High	Designation and advertising of accessible heating centers	Severe Winter Storms	Staff time	2019
E	High	Complete installation of warning siren system for hazards	Multiple Hazards	Moderate	2019
F	High	Maintain early warning system for RAADS and other structures	Flooding	Staff time	Ongoing
G	High	Develop an action plan to provide emergency shelter for mobile home residents and people using temporary shelters at campsites	Severe Summer Storm	Staff time	2020

Table 4.2- Spirit Lake Tribe Emergency Response Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
H	Moderate	Update emergency operations communications tower	Multiple Hazards	Varies	2019
I	Moderate	Identify low tech local emergency response options	Multiple Hazards	Staff time	Ongoing
J	Moderate	Data digitization and emergency management program continuity system	Multiple Hazards	Staff time	2020
K	Moderate	Develop and implement RAADS failure education and response plans	Flooding	Staff time	Ongoing
L	Moderate	Reassess storage system and obtain necessary supplies for sheltering needs	Multiple Hazards	\$5,000 - \$15,000	2019
M	Moderate	Reassess evacuation routes and destination areas	Multiple Hazards	Staff time	Ongoing
N	Moderate	Enhance capacity for emergency response	Multiple Hazards	Varies	Ongoing

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

Table 4.3 - Spirit Lake Tribe Critical Infrastructure Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
O	High	Monitor blue building bank stability status, and develop a contingency plan for it (Fort Totten District)	Erosion	Staff time	Ongoing
P	High	Address local flooding identified sites and roads such as Ross Acres culvert and road raise in Crow Hill District	Flooding	High	Long term
Q	High	Upgrade municipal stormwater infrastructure, including Wood Lake District	Flooding	High	Long term
R	High	Maintain and improve dikes	Flooding	High	Long term
S	Moderate	Verify BIA is monitoring RAADs for structural integrity and erosion control	Flooding	Staff time	Ongoing
T	High	Conduct a cost/analysis study of moving Casino lagoons	Erosion/flooding	High	2020
U	Low	Consult IHS Engineers about integrity and capacity of remaining lagoons	Erosion/flooding	Staff time	2021
V	Moderate	Implement structural projects to protect existing and future Tribal infrastructure	Multiple Hazards	High	Ongoing
W	Moderate	Secure and protect all cultural sites	Multiple Hazards	Varies	Ongoing

Table 4.4 - Spirit Lake Tribe Public Education Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
X	High	Explore innovative public education opportunities to discourage arson initiated wildland fires	Wildland fire	Staff time	Ongoing
Y	Moderate	Improve education outreach by implementing prioritized strategy	Multiple Hazards	Staff time	Ongoing
Z	Moderate	Implement fire setter program and expand to address public safety, fish and wildlife, and vandalism issues	Multiple Hazards	Staff time	2019



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## Multi-Hazard Mitigation Plan

Table 4.5 - Spirit Lake Tribe Environmental/Health Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
AA	Low	Collaborate with NDDOT & other agencies to protect lake from pollution	Hazardous Materials	Staff time	Ongoing
BB	Low	Rate control and analysis of herbicide and manure applications with potential to impact lake algae blooms	Hazardous Materials	\$30,000 annually	Ongoing
CC	Low	Apply for a grant and complete a study to identify runoff filtration needs	Hazardous Materials	\$30,000-60,000	2021

Table 4.6 - Spirit Lake Tribe Property Protection Action Items

ID	Priority	Action	Hazard	Cost	Time Frame
DD	Moderate	Participate in NFIP workshop	Flooding	Staff Time	2019
EE	High	Update floodplain and flood risk mapping	Flooding	Staff Time	2019
FF	Moderate	Update floodplain ordinances	Flooding	Staff Time	2019
GG	Moderate	Incorporate flood mitigation into all development and maintenance activities	Flooding	Staff Time	Ongoing
HH	Moderate	Develop a collaborative approach to floodplain management with Benson County	Flooding	Staff Time	2019
II	Moderate	Create planning and zoning guidelines, including land acquisitions for future development in flood hazard areas	Flooding	Staff Time	2020
JJ	Low	Address interior drainage for RAADs	Flooding	High	Long term
KK	Low	Investigate removing repetitive loss properties from Mission district	Flooding	Low	2021
LL	Moderate	Finalize, adopt & enforce building codes	Multiple Hazards	Staff time	Ongoing
MM	Low	Investigate and remove abandoned or collapsed structures	Urban Fire & Wildland Fire	High	2021

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### Notes for Action Items

The Spirit Lake Tribe Emergency Manager is the local champion for the plan, and responsible for maintaining energy and enthusiasm for each jurisdiction's overall mitigation program. Responsibility for implementing mitigation projects ultimately rests with each jurisdiction. The individual responsible for overseeing implementation of mitigation projects for each jurisdiction is listed as part of each project summary. This individual was identified during the planning process. The actual person performing the project may be different than the responsible party.

#### **A: Complete installation of emergency generators for critical facilities**

Generators are already on site at Fort Totten, Mission, Crow Hill, and Wood Lake community shelters, but funds are needed to pay for installation and testing to assure operational functionality. Many other critical facilities do not have emergency generators at all.

Responsible party: Spirit Lake Tribe Emergency Manager

#### **B: Identify critical routes to keep plowed**

Critical routes have already been identified, but should be revisited each year to address potential changes in the routes due to new priorities or new facilities. This is important to do annually in order that routes for people with health needs like dialysis are prioritized.

Responsible party: Spirit Lake Tribe Emergency Manager (coordinating with local road departments)

#### **C: Designation/construction of community shelters**

Community shelters are already constructed in each district. However, additional sheltering locations would allow faster and alternative shelters in the event of emergency situations. They would also increase overall sheltering capacity and provide redundancy when needed.

Responsible party: Spirit Lake Tribe Emergency Manager

#### **D: Designation and advertising of accessible heating center locations**

In the specific case of power outages that prevent residential heating, it is important to provide alternative locations where those without other options can stay warm.

Responsible party: Spirit Lake Tribe Emergency Manager

#### **E: Complete installation of warning siren system for hazards**

Warning sirens are not currently functional in some parts of the Spirit Lake Nation. Funding is needed to pay for wiring and other warning system installation tasks.

Responsible party: Spirit Lake Tribe Emergency Manager

#### **F: Maintain early warning system for RAADS and other structures**

One of the most significant emergencies the Spirit Lake Tribe could encounter would be failure of the Roads Acting As Dikes that have been constructed to keep the high waters of Devils Lake from flooding roads, other infrastructure, and structures. The RAADS need to be monitored and maintained and appropriate warning systems are needed to give notice of potential failures. This needs to be a coordinated effort involving the BIA, the NDSWC, and the USACE.

Responsible party: Spirit Lake Tribe Highway Superintendent

#### **G. Develop an action plan to provide emergency shelter for mobile home residents and people using temporary shelters at campsites**

One of the most significant emergencies the Spirit Lake Tribe could encounter would be a tornado or high velocity straight line winds. Until mobile homes can be replaced with safer housing, a strategy should be identified and implemented to help reduce the risk from such events. Identifying or constructing emergency shelters within a very short distance from these most vulnerable residences is a lower cost interim measure. Consideration for similar provisions is advised for people using campsites found on the reservation. High visibility signage to direct people to emergency shelters should be a part of this action item.

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

Responsible party: Spirit Lake Tribe Emergency Manager (coordinating with other local administrators).

### **H: Update emergency operations communications tower**

An improved tower is needed for the communications equipment used during emergency operations. Funds needed to upgrade or replace the existing tower have been identified.

Responsible party: Spirit Lake Tribe Emergency Manager

### **I: Identify and encourage low tech local emergency response options**

Shelter during severe summer and winter weather is a critical need. Action items C, D & G are important long or medium range steps to improving shelter capabilities. However, the SLT Planning Team envisions neighbors and neighborhoods developing low cost local solutions that can be implemented on their own. Once initiated, this local approach may also be useful to address other hazards.

Responsible party: Spirit Lake Fire Department

### **J: Data digitization and emergency management program continuity system**

In order to enhance the capacity to assess risks and respond to emergencies, relevant data should be digitized into GIS file formats so that it can be readily accessed when needed. A program should be established to continually update these data. Additionally, a system should be established to maintain a comprehensive list of mitigation actions and efforts to complete them so they are not lost if there is staff turnover.

Responsible party: Spirit Lake Emergency Manager

### **K: Develop and implement RAADS failure education and response plans**

One of the most significant emergencies the Spirit Lake Tribe could encounter would be failure of the Roads Acting As Dikes that have been constructed to keep the high waters of Devils Lake from flooding roads, other infrastructure, and structures. In addition to monitoring

and maintaining appropriate warning systems to remove people from harm's way, a public education program should be developed to train people of appropriate actions to take in the event of a RAADS failure warning or actual failure. An emergency response plan should also be developed and practiced on a regular basis.

Responsible party: Spirit Lake Tribe road department leader and Spirit Lake Tribe Emergency Manager

### **L: Reassess storage system and obtain necessary supplies for sheltering needs**

Some supplies for supporting emergency shelters are stockpiled at Camp Grafton. It is important that protocols are in place and top of mind for local responders and Camp Grafton logistics and administrative staff so that the supplies can be swiftly delivered to appropriate locations on the Spirit Lake Nation. Additional supplies should be obtained and stockpiled at alternative or additional locations throughout the reservation.

Responsible party: Spirit Lake Emergency Manager

### **M: Reassess evacuation routes and destination areas**

Runaway fires, severe flooding, and hazardous material incidents could all cause the need for evacuation from certain locations on the Spirit Lake Nation. Current evacuation plans and destination areas should be evaluated and updated as needed.

Responsible party: Spirit Lake Emergency Manager

### **N: Enhance capacity for emergency response**

Emergency responders should regularly be looking for opportunities to obtain additional or updated equipment and to conduct response training. A prioritized capital improvements plan that identifies equipment needs should be maintained.

Responsible party: Spirit Lake Emergency Manager and appropriate department leaders

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### **O: Monitor blue building bank stability status, and develop a contingency plan for it (Fort Totten District)**

Complete annual inspections of relevant bank stability and develop a plan to remove the risk or relocate the building functions.

Responsible party: Spirit Lake Emergency Manager

### **P: Address local flooding identified sites and roads such as Ross Acres culvert and road raise in Crow Hill District**

Some locations of localized flooding where there is no municipal infrastructure require better culverts and/or road raises. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs. Potential projects should be identified and prioritized so that when funds are available the flooding issues can be resolved. This includes Ross Acres in Crow Hill.

Responsible party: Spirit Lake road department leader

### **Q: Upgrade municipal stormwater infrastructure, including Wood Lake District**

Some locations of localized flooding need municipal stormwater infrastructure improvements to reduce the potential impacts. Potential projects should be identified and prioritized so that when funds are available the flooding issues can be addressed. Specifically address the location in the Woodlake District with past damages.

Responsible party: Spirit Lake Emergency Manager

### **R: Maintain and improve dikes**

The RAADS and other levees protecting Tribal lands and structures have not yet been raised to the match the level of protection on the northern side of Devils Lake. Funding and construction of this level of protection should be pursued.

Responsible party: Spirit Lake Emergency Manager

### **S: Verify BIA is monitoring dams for structural integrity and erosion control**

Responsibility for monitoring RAADS belongs to the BIA according to \_\_\_\_\_. The Tribe should be receiving regular reports on status and potential trouble spots to enhance readiness in the case of a potential failure. The Tribe needs to go on record holding BIA accountable for this responsibility.

Responsible party: Spirit Lake Emergency Manager

### **T: Conduct a cost analysis study of moving Casino lagoons**

The Casino lagoon system is in the floodplain and is also subject to ongoing erosion issues. A benefit cost analysis should be completed to determine if the long term solution should be to move the lagoons to a better location.

Responsible party: Spirit Lake Emergency Manager

### **U: Consult IHS engineers about structural integrity and capacity of remaining lagoons**

Each existing sewage lagoon should be inspected for effectiveness and potential risks. Appropriate action steps should be identified to mitigate any potential concerns.

Responsible party: Spirit Lake Emergency Manager and appropriate department leaders

### **V: Implement structural projects to protect existing and future Tribal infrastructure**

Flooding and potentially other hazards could damage or affect the effectiveness of tribal infrastructure. Infrastructure mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs, and should be identified for funding applications.

Responsible party: Spirit Lake Emergency Manager



# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### **W: Secure and protect all cultural sites**

The Spirit Lake Tribe's cultural heritage has an essential role in its future. All cultural sites should be identified and a strategic plan created to protect them.

Responsible party: Spirit Lake Emergency Manager

### **X: Explore innovative public education opportunities to discourage arson initiated wildland fires**

Arson initiated wildland fires are a major problem on the Spirit Lake Nation. Although significant efforts to discourage this problem have been expended, there has not been any significant result. The best approach the Planning Team has identified to change the level of arson activity has been to develop a very innovative public education program that changes perceptions about committing this crime. This may require some research to determine the appropriate message(s) and media.

Responsible party: Spirit Lake Emergency Manager

### **Y: Improve education outreach by implementing prioritized strategy**

The impacts of multiple hazards can be reduced with appropriate public education. Staff time to accomplish all the potential education may be substantial so it is important to prioritize the education by topic. Hazard-related public education campaigns should include a wide variety of topics. Potential topics include:

- Hazardous materials awareness/shelter-in-place for residents
- Community shelter promotion
- Summer and winter weather safety
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention

Responsible party: Spirit Lake Tribe Emergency Manager and department leaders

### **Z: Implement fire setter program and expand to address public safety and vandalism issues**

Plans are underway to implement a new program to reduce arson. The Planning Committee believes that it can be used as a model to address other behavioral issues affecting life and safety as well.

Responsible party: Spirit Lake Tribe Emergency Manager and other tribal leaders

### **AA: Collaborate with NDDOT and other agencies to protect lake from pollution**

The roads acting as dams (RAADs) results in pollution from vehicles being washed or blown into Devils Lake. A strategy is needed to minimize this pollution and other sources of pollution to Devils Lake to maintain the water quality of the lake.

Responsible party: Spirit Lake Tribe Department leaders

### **BB: Rate control and analysis of herbicide and manure applications with potential to impact lake algae blooms**

Herbicide application may contribute to algae blooms on Devils Lake. In order to minimize potential impact it may be appropriate to encourage limiting the rate of application, especially of herbicides with phosphate.

Responsible party: Spirit Lake Tribe Emergency Manager and local Farm Service Agency officials

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### **CC: Apply for a grant and complete a study to identify runoff filtration needs**

Observations of increased algae blooms on Devils Lake prompt concerns about long-term degradation of the lake's water quality. An assessment of where runoff may be contributing to this situation is a first step in protecting the water quality. Once potential problem spots are identified additional actions can be taken to minimize impacts. Ideally, the assessment process should be undertaken as an educational activity by tribal schools.

Responsible party: Spirit Lake Tribe Emergency Manager and tribal school leaders

### **DD: Participate in NFIP workshop**

In order to effectively minimize impacts from flooding, there must be consistent and active floodplain management. A designated floodplain manager should receive official NFIP training to ensure confident and full floodplain management is accomplished.

Responsible party: Spirit Lake Tribe designated floodplain manager

### **EE: Update floodplain and flood risk mapping**

The RISK Mapping program results currently being developed should be incorporated into the Tribes files. Additionally, the Tribal floodplain manager should coordinate with the State Water Commission and other organizations on the flood hazard identification on the Spirit Lake Nation.

Responsible party: Spirit Lake designated floodplain manager

### **FF: Update floodplain ordinances**

Floodplain ordinances should be updated to reflect additional information available through the Risk MAP program and addition details resulting from Action Item EE.

Responsible party: Spirit Lake Emergency Manager

### **GG: Incorporate Flood Mitigation into all development and maintenance activities**

Flood risks should be clearly defined and communicated to all departments of tribal government. Each department should identify specific tasks and methods to mitigate flood risks as part of their regular operations.

Responsible party: Spirit Lake Tribe Department leaders

### **HH: Develop a collaborative approach to floodplain management with Benson County**

Work with the Benson County floodplain manager on ways the Tribe and the County can act collaboratively in floodplain management. Seek to eliminate potential gaps in development oversight and share a comprehensive list of flood risks within the reservation boundaries.

Responsible party: Spirit Lake Tribe designated floodplain manager

### **II: Create planning and zoning guidelines, including land acquisitions for future development in flood hazard areas**

Define the appropriate level of development for all areas at risk from flooding, and identify specific policies that will lower or eliminate the risks. Present this information as recommendations to be approved by the Tribal Council and implemented by appropriate departments.

Responsible party: Spirit Lake Tribe designated floodplain manager

### **JJ: Address interior drainage for RAADS**

Use existing studies and data, as well as local knowledge, to identify specific locations where stormwater runoff may lead to localized flooding. Develop a stormwater management plan to be implemented over time that will reduce the level of flooding impacts.

Responsible party: Spirit Lake Tribe Emergency Manager

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### **KK: Investigate removing repetitive loss properties from Mission District**

Identify any remaining repetitive loss properties, and develop a strategic plan including funding sources to remove the remaining properties.

Responsible party: Spirit Lake Tribe Emergency Manager

### **LL: Finalize, adopt, and enforce building codes**

Complete a review of ND Building Code, and identify any necessary changes. Develop clear guidance on how the Code can be implemented and enforced. Then present the proposed Code and implementation plan to the Tribal Council for adoption and authorization.

Responsible party: Spirit Lake Tribe designated building official

### **MM: Investigate and remove abandoned or collapsed structures**

In order to reduce the potential impact of wildland fires, abandoned and collapsed structures should be identified for removal. Ideally, neighborhood volunteers and community service workers should be utilized to minimize the cost of removal.

Responsible party: Spirit Lake Tribe Emergency Fire Department Chief and District leaders

# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

### Chapter 5: Plan Maintenance

This chapter details the plan maintenance process to make sure the Spirit Lake Tribe Multi-Hazard Mitigation Plan will remain an active and relevant document. The plan maintenance process includes monitoring the implementation of mitigation projects, evaluating the effectiveness of the plan at achieving its goals and updating the plan. This chapter also includes information regarding how the plan will be integrated into existing planning mechanisms.

#### Plan Monitoring and Evaluation

The Local Emergency Planning Committee (LEPC) will monitor and evaluate the plan once per year. A basic agenda for each meeting should include:

- Discussion of project progress for the current period (and uncompleted projects from previous periods)
- Local champion reports on project status
- Discussion of upcoming projects and grant/funding opportunities
- Develop action list for upcoming reporting period

The responsible party should provide the following basic information about projects in the reporting period:

- What was accomplished for the project since the last meeting
- What obstacles, problems or delays the project encountered
- If the project needs to be changed or revised

Project progress should be recorded on the Mitigation Action Progress Report Form found in Appendix G. A form should be completed for each project during the reporting period (and projects from previous reporting periods that have not been completed). If time constraints are an issue, the LEPC may decide to only complete the form for high

priority projects; lower-priority projects may be generally discussed without completing the form.

The Spirit Lake Tribe Emergency Manager should maintain a folder with all Mitigation Action Progress Report Forms and meeting notes.

The risk and vulnerability assessment should be evaluated during a LEPC meeting approximately two years after plan adoption. Any changes to risks since plan adoption, such as a major flood event that damaged areas thought to be safe from flooding, should be noted. If studies or monitoring activities indicate changes to risks since plan adoption, these risks should also be noted. The critical facilities list should also be reviewed to see if any additions or deletions need to be made. A report detailing these changes should be made. If significant changes are required, the Emergency Manager should schedule a meeting to discuss amending the current plan. If no significant changes are required, the Emergency Manager should save the report of changes for reference during the next five-year plan update.

LEPC meetings that are reserved for discussion of the plan should be open to the public and advertised.

#### Integration into Existing Reservation-wide Planning Mechanisms

The Tribe's 2011 Multi-Hazard Mitigation Plan discussed approaches to integrating the plan into existing mechanisms, and integrating the plan into other plans and plan updates. This integration has only been partially successful.

Due to the limited resources and staff turnover of the Spirit Lake Tribe, implementation of some planning procedures and mitigation strategies has been delayed. Future resources are anticipated to remain scarce in the near future. For the next five years, specific effort needs to be directed at maintaining interest by Tribal leaders and staff in mitigation. The limited resources do not allow for many activities beyond the standard course of business, and mitigation can get overlooked. It is the role of each responsible party identified in Chapter 4 to be present at annual budget meetings and advocate for consideration of mitigation projects. Additionally, it is essential that leaders and staff continue to look for opportunities to implement



# Spirit Lake Tribe

## Multi-Hazard Mitigation Plan

mitigation strategies into all maintenance, development, and planning activities.

Many of the mitigation actions identified in Chapter 4 can be implemented in parts. For instance, actions to mitigate a particular hazard may involve both administrative and capital investment components. While waiting for funding opportunities to address the capital investment components, leaders and staff should brainstorm ways to implement administrative components as quickly as possible. The development of a comprehensive plan or updated strategic plan could create a vision for the tribe and help to guide decision-making and investment in an efficient and hazard-resilient manner. It should be noted that a comprehensive plan is also needed as a foundation for zoning regulations.

Items from the risk/vulnerability assessment and action items that involve response activities should also be integrated into the tribe's Local Emergency Operations Plan (LEOP).

## Updating the Plan

The Spirit Lake Tribe Emergency Manager is responsible for overseeing the five-year update process. Twelve months should be allowed for completion of the plan - nine months to develop a draft and three months to collect DES and FEMA comments/revisions and formally adopt the plan. The Emergency Manager should begin the plan update process approximately one year prior to the expiration of the current plan. The first step is to develop the project scope by utilizing the Plan Update Evaluation Worksheet in Appendix G. Funding opportunities from DES/FEMA may also be evaluated when determining project scope.

The Emergency Manager should maintain any documentation gathered during the five-year period that will be useful when developing the update. This will help to greatly reduce the research collection phase of the plan update, which will reduce the time and cost of the plan update. It will also ensure that any priority items identified during LEPC monitoring meetings will be included in the plan.