FOREST COUNTY
ALL HAZARDS MITIGATION PLAN UPDATE

Prepared with the assistance of the North Central Wisconsin Regional Planning Commission

FOREST COUNTY ALL HAZARDS MITIGATION PLAN UPDATE

prepared for:

Forest County Emergency Management

by:

North Central Wisconsin Regional Planning Commission

adopted by Forest County Board on:

January 19, 2021

This update was prepared at the request and under the supervision of Forest County and its Emergency Management Director by the North Central Wisconsin Regional Planning Commission (NCWRPC). For more information, contact:

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Introduction

Part I of the Forest County All Hazards Mitigation Plan (AHMP) Update describes and documents the process used to develop the Plan Update. This includes how it was prepared and who (committee, organizations, departments, staff, consultants, etc.) was involved in the update process. It also describes the local governments involvement, the time period in which the update was prepared, and who to contact to answer questions and make recommendations for future amendments to the Plan.

Disaster Mitigation Act of 2000

The development of the Forest County All Hazards Mitigation Plan Update is a response to the passage of the Disaster Mitigation Act of 2000 (DMA2K). On October 30, 2000, DMA2K was signed into law by the U.S. Congress in an attempt to stem the losses from disasters, reduce future public and private expenditures, and to speed up response and recovery from disasters. This Act (Public Law 106-390) amended the Robert T. Stafford Relief and Emergency Assistance Act. The following is a summary of the parts of DMA2K that pertain to local governments and tribal organizations:

- The Act establishes a new requirement for local governments and tribal organizations to prepare an All Hazards Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and Hazard Mitigation Grant Program.

- The Act establishes a requirement that natural hazards such as tornados, floods and wildfires need to be addressed in the risk assessment and vulnerability analysis parts of the All Hazards Mitigation Plan. Manmade hazards such as hazardous waste spills are encouraged but not required to be addressed.

- The Act authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local, and tribal organization All Hazards Mitigation Plans.

- The Act establishes November 1, 2004 as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program.

- If a plan is not prepared by November 1, 2004, and a major disaster is declared, in order for a local government or tribal organization to be eligible to receive funding through the Hazard Mitigation Grant Program, they must agree to prepare an All Hazards Mitigation Plan within one year.

- In addition, by not having an All Hazard Mitigation Plan, local governments and tribal organizations cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

- All Hazard Mitigation Plans must be updated every five years.

The Five Parts of All Hazards Mitigation Plan Update

The Forest County All Hazards Mitigation Plan Update was categorized into five parts in order to address FEMA's local mitigation plan requirements. The five parts are as followed:

Part	I:	Update Planning Process
Part	II:	Planning Area
Part	III:	Risk Assessment
Part	IV:	Mitigation Strategy
Part	V:	Plan Maintenance Process and Adoption

Development of All Hazards Mitigation Plan Update

The Forest County Emergency Management Department received a Planning Grant in 2018 to update its All Hazards Mitigation Plan through the Pre-Disaster Mitigation (PDM) Grant Program.

In late 2018, the North Central Wisconsin Regional Planning Commission (NCWRPC) finalized a work agreement with Forest County and began preparation of the All Hazards Mitigation Plan Update at the request of the County Emergency Management Director in January of 2019.

The update planning process included committee meetings as well as extensive involvement from the local units of government within Forest County and the counties surrounding Forest. A variety of local and regional agencies were involved in the development of the update at various stages, and extensive opportunity for public participation was provided including public informational meetings.

The remainder of this chapter expands on and provides more detail on key aspects of the update development process.

Key Elements Of The Update To The 2015 Plan

The major enhancements to the Forest County All Hazards Mitigation Plan developed through this update are as follows:

- ✓ Review of Recommended Revisions - The final Crosswalk for the previous plan approval passed the plan with no recommended revisions.

- ✓ Review and update of planning area chapter - The planning area description and inventory was improved with additional information and updated statistics.

- ✓ Review and update of risk assessment - The risk assessment was updated with documentation on recent hazard events. The priority level of hazards facing the County was also reviewed and updated.

- ✓ High Hazard Dams - High hazard potential dams were specifically addressed in the risk assessment, as well as other areas of the Plan Update.

- ✓ Review and update of Mitigation Strategy - The mitigation strategies chapter begins with a complete progress report on the strategies from the 2015 plan, establishment of new set of strategies for next five-year cycle and an updated prioritization of projects.

- ✓ Concept of Community Resiliency is introduced into the Plan, see Chapter 5.

All Hazards Mitigation Plan Committee of Jurisdiction

The Forest County All Hazard Mitigation Plan falls under the jurisdiction of the Emergency Government & 911 Committee. Committee members were as follows at time of recommendation to County Board:

- Cindy Gretzinger, Chair
- Terry Lukas
- Jack Matuszewski
- Mike Miller

Local Government Involvement

There were a number of opportunities for the local units of government to become involved in the update process.

In March of 2019, a hazard mitigation issues survey was sent to each town chairperson and clerk requesting which hazards are a concern, input on past and future mitigation measures, and to document other information that could be incorporated into the All Hazards Mitigation Plan Update. Responses were received from 6 of 14 towns. A significant amount of information was gleaned from these questionnaires and incorporated into the update document.

The City of Crandon was formally introduced to the update process at a separate meeting on August 7, 2019. The participants at this meeting provided information on hazards that have significance to the City, discussed critical facilities and provided mitigation strategy ideas for the plan update. Participants in this meeting included the following:

- Dennis Rosa Mayor
- Cindy Bradley Clerk
- Jodi Albrecht Deputy Clerk
- Larry Berg City Council
- Mike Duff City Council
- Bill Ison City Council
- Sam Ison Public Works/Maintenance
- Althea McMillian City Council
- George Stamper City Council

Discussion from this meeting indicated that the City's main concerns are tornados and high winds due to power outage threat and lack of back-up generators. Flooding is also an issue. The City would like back-up generators for critical city facilities, mass sheltering (possibly school building), expanded storm sewer and improved drainage.

Neighboring Community Involvement

One of the requirements of the planning process was to include neighboring communities. In previous plans, the NCWRPC experienced low attendance in response to invitations to county emergency management staff from surrounding counties. As a result, NCWRPC staff e-conferenced during the course of the planning process with staff from Vilas, Oneida, Langlade, Oconto, Marinette, and Florence counties as well as Iron County, Michigan. In addition, Tribal emergency management officials for the Forest County Potawatomi and Sokaogon Chippewa Indian Nations were also included in the e-conference process. Ideas were exchanged about All Hazards Mitigation planning processes and strategies between the various counties.

Local and Regional Agency Involvement

Another requirement of the update planning process was to involve local and regional agencies that have a role in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-private interests. To meet this objective, the NCWRPC invited a diverse group of stakeholders to discuss potential hazard mitigation strategies.

The meeting was held on August 23, 2019 at the County Courthouse in Crandon. Agencies and organizations represented at this meeting include the following:

- Jason Theune Forest County Emergency Management
- Eugene Okrasinski Crandon Fire Department
- Jacee Shepard Forest County Health Department
- Jeannie Fannin Forest County Zoning
- Jordan Boney Forest County Health Department
- Tammy Queen Forest County Department on Aging

- Darrell Wilson Crandon Fire Department
- Darryl Landeau N. Central WI Regional Planning Com.
- Vic Burkey Hiles Fire Dept. / Forest County EMS

A number of other agencies were invited but chose not to attend.

During the meeting, the Plan Update and its components were introduced to the attendees. A summary of proposed mitigation strategies was given to each person present. Possible mitigation measures were discussed at length with the group. Part IV of the Plan was revised based on the meeting.

During the meeting a number of issues were discussed, including: the limited capacity to respond, need for preparedness planning and training, problems with cell service and radio coverage, attending to the special needs populations, and a lack of generator capacity to run essential services and maintain cooling/warming shelters among other things.

Public Review Process and Plan Update Adoption

Opportunities for public comment were provided to review the Plan Update during the drafting stage and prior to Plan Update approval. See APPENDIX A for copies of public meeting notices. A copy of the draft was made available on the Internet. Comments and questions about the Plan were directed to the Forest County Emergency Department.

A public informational meeting on the draft plan was held at the Forest County Courthouse on August 23, 2019. Notices were posted in the local newspaper. However, no one from the public attended, and thus no public comments were received. In addition, no written comments were submitted.

The County will refer the Plan Update to committee for review the prior to forwarding it to County Board for approval. Following these open, public meetings, the Update will be forwarded to the County Board for final adoption. The adopting resolution will be included in APPENDIX B along with details on any plan changes resulting from Committee and/or County Board action.

The City of Crandon was asked to adopt the Plan Update for their jurisdiction at their own properly posted and open public meeting, see APPENDIX B for this resolution of adoption.

Incorporated Plans, Studies, Reports And Technical Data

Many plans, reports, and technical data sources were referenced and incorporated into the Forest County All Hazards Mitigation Plan Update. These sources include but are not necessarily limited to the following:

Wisconsin Department of Natural Resources, North Central Wisconsin Regional Planning Commission and Forest County geographic information system

databases provided much of the base data for the mapping and analysis within the Update. Statistical reports and data from the US Census and Wisconsin Departments of Administration, Revenue and Workforce Development where used for the demographic background in Part 2 of this Update. Land use data in Part 2 was obtained from the Forest County Comprehensive Plan.

Wisconsin Department of Natural Resources Wetlands Inventory and Dams Database were used to identify and map wetlands and dams within the County in in Parts 2 and 3. The WisDNR Dams Database provided information on high hazard potential dams within the County. NFIP flood zone maps for Forest County provided the mapping of 100-year floodplain areas for flooding risk in Part 3.

NOAA National Climatic Data Center severe weather event data was used extensively for the risk assessment in Part 3. The wildfire section of the risk assessment was based on the Wisconsin Department of Natural Resources' fire occurrence database and statewide Communities At Risk (CAR) assessment.

Other plans, reports, and documents were reviewed by staff during the update process including but not limited to the State of Wisconsin Hazard Mitigation Plan; the Hazard Analysis for the State of Wisconsin, the Wisconsin Repetitive Loss Report, the Forest County Zoning Ordinance, the Forest County Land and Water Resource Management Plan, the Forest County Emergency Operations Plan, Hiles Mill Pond Dam Break Analysis and the All Hazards Mitigation Plans for the Mole Lake and Potawatomi Indian Nations. Although these may not have been directly incorporated, the review provided valuable insight and direction to the update process.

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www.co.forest.wi.gov/localgov_departments_details.asp?deptid=380&locid=145

INTRODUCTION

Part II of the Forest County All Hazards Mitigation Plan Update provides general geographical information, including demographic and economic characteristics. The general development patterns of the county are described in terms of current land use and future development trends.

In addition to developing an understanding of the planning area, this chapter represents the beginning stages of assessing vulnerability by inventorying the numbers, types and values of existing buildings, infrastructure and critical facilities within each participating jurisdiction in the planning area. This overall summary of each jurisdiction's vulnerability to hazards describes the potential impact on the community.

Land use and development trends are analyzed to project the number and type of potential future buildings, infrastructure and critical facilities within each jurisdiction so that mitigation options can be considered in future land use decisions.

The resulting information is an important element of the planning process, since sound alternative mitigation strategies cannot be formulated and evaluated without an in-depth knowledge of the relevant conditions in the study area.

GENERAL GEOGRAPHY

Location

Forest County is located in northern Wisconsin (See Map 1). The largest city and county seat is Crandon, in the south-central portion of the county. There are also several unincorporated places dispersed around the county. The county is bounded on the north by Iron County, Michigan on the east by Florence and Marinette Counties, on the south by Oconto and Langlade Counties, and on the west by Oneida and Vilas Counties.

Forest County lies approximately 107 miles northwest of Green Bay; 211 miles northwest of Milwaukee; and 212 miles north of Madison. Major metropolitan areas outside of Wisconsin are Chicago, 296 miles southeast; Minneapolis-St. Paul, 243 miles west; and Duluth, 241 miles northwest.

Civil Divisions

There are 15 municipalities (14 towns and 1 city) and 2 American Indian Reservations in the Forest County planning area. These units of government provide the basic structure of the decision-making framework. The county has a total surface area of 1,046.4 square miles, of which 3.1% is water. The area and proportion of the County within each civil division are presented in Table 1.

Table 1 Geographical Size by Municipality				
Municipality	Area in square miles			Area as % of County
	Water area	Land area	Total area	
Alvin town	1.01	114.98	115.99	11.1%
Argonne town	0.07	108.24	108.31	10.4%
Armstrong Creek town	0.65	47.99	48.64	4.6%
Blackwell town	0.37	66.00	66.37	6.3%
Caswell town	0.17	47.74	47.91	4.6%
Crandon town	1.99	33.79	35.78	3.4%
Freedom town	2.03	34.06	36.09	3.4%
Hiles town	9.52	131.44	140.96	13.5%
Laona town	4.15	103.39	107.54	10.3%
Lincoln town	4.80	58.12	62.92	6.0%
Nashville town	5.18	67.17	72.35	6.9%
Popple River town	0.39	50.09	50.48	4.8%
Ross town	0.10	38.49	38.59	3.7%
Wabeno town	0.95	107.34	108.29	10.3%
Crandon city	0.95	5.22	6.17	0.6%
Forest County	32.33	1,014.10	1,046.39	100.0%

Source: U.S. Census

Topography

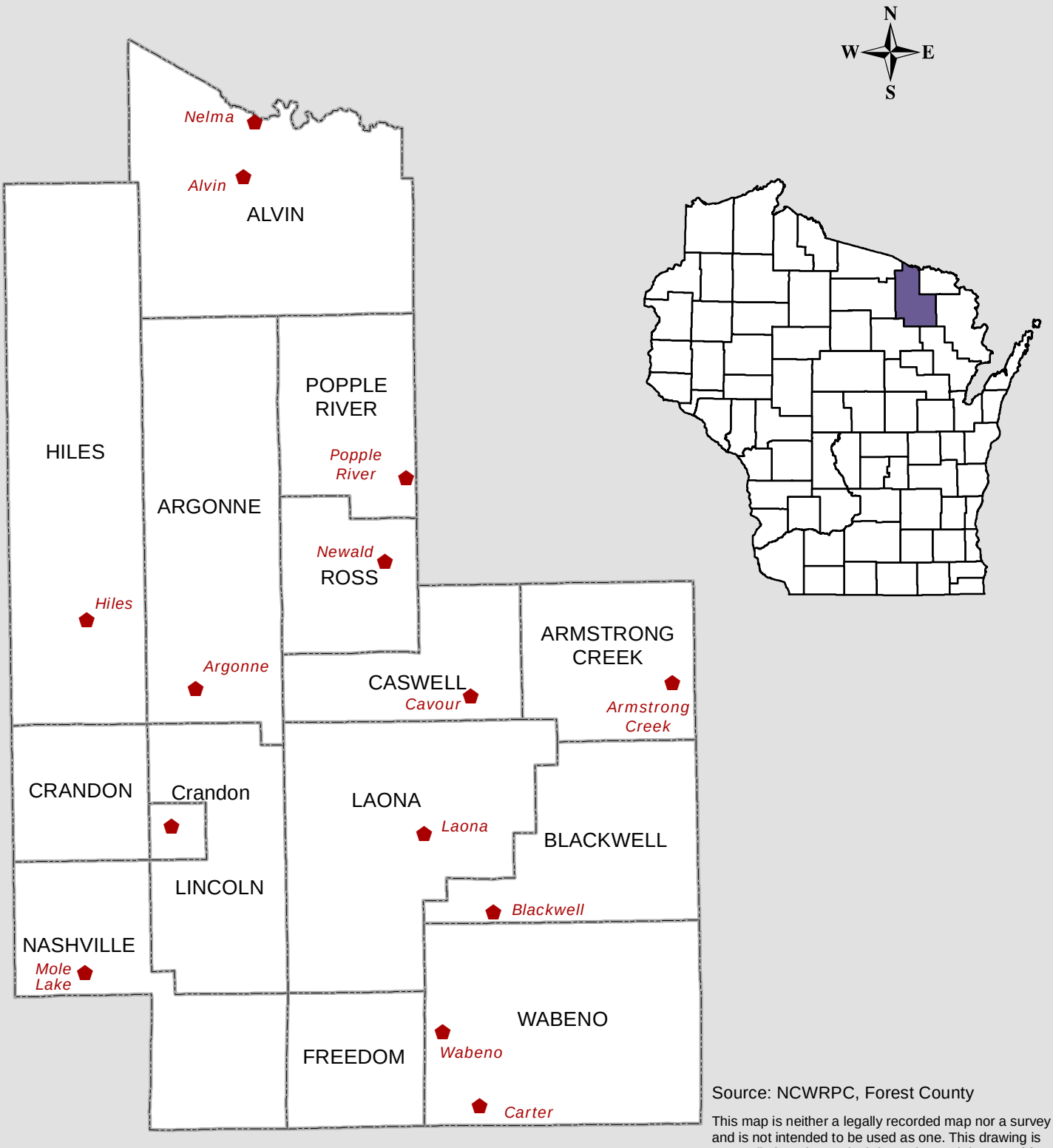
Forest County is part of the Northern Highlands geomorphic region, which is characterized by scattered outcroppings of older crystalline rock in a glaciated topography. The terrain, with high local relief occurring, is reminiscent of the northern Scandinavian countries. The landscape generally slopes from northwest to southeast. Elevations vary by more than 300 feet in many places. The fourth highest point in the state, Sugar Bush Hill, with an elevation of 1,939 feet above sea level, is located east of Crandon.

Climate

Winters in Forest County are very cold, and the short summers are fairly warm. The short frost-free period during the summer limits cropping mainly to forage crops, small grains, and adapted vegetables. Precipitation is fairly well distributed throughout the year but reaches a peak in the summer. Snow covers the ground much of the time from late fall through early spring.

Forest County, Wisconsin

Map 1
Planning Context



Source: NCWRPC, Forest County

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In winter, the average temperature is 14 degrees F and the average daily minimum temperature is 4 degrees. The lowest temperature on record, which occurred on January 17, 1982, is -39 degrees. In summer, the average temperature is 63 degrees and the average daily maximum temperature is 76 degrees. The highest recorded temperature, which occurred on July 26, 1955, is 100 degrees.

The total annual precipitation is about 30 inches. Of this total, more than 21 inches, or about 70 percent, usually falls between April and September. The growing season for crops falls within this period. In two years out of ten, the rainfall in April through September is less than 18 inches. Thunderstorms occur on about 34 days each year.

The average seasonal snowfall is about 67 inches. The greatest snow depth at any one time during the period of record was 56 inches. On average, 93 days of the year have at least one inch of snow on the ground. The number of such days varies greatly from year to year.

The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the southwest. Average wind speed of 12 miles per hour occurs in spring.

DEMOGRAPHIC AND ECONOMIC PROFILE

Population and Households

The official state 2019 population estimate for Forest County shows a population of 9,195 people for the County. This is actually a slight decline from the 2010 Census reported population of 9,304 people. Since 2010, the population of Forest County has decreased by about 1.2% or by 109 people. The decline is part of an on-going trend, common among counties in northern Wisconsin, since populations generally peaked in the late '90's/early '00's. Since 2000, Forest trails only Florence County in percentage decline among its neighbor counties, see Table 2. Marinette, Langlade, and Oneida have also seen this decline. Only Oconto and Vilas saw gains - supported by robust vacation/retirement home markets. If the twenty-year trend continues, Forest County will have a population of 8,432 by 2039.

Tribal population in the county includes the Forest County Potowatomi and Sokaogon Chippewa (Mole Lake). Population total for the Potawatomi Reservation was 704 from the 2018 American Community Survey, up nearly 20 percent from 588 in 2010. The Mole Lake Reservation had a population of 461 in 2018, up from 414 in 2010, an 11 percent increase.

TABLE 2	Population of Adjacent Counties			
County	2000	2019	# Change	% Change
Forest	10,024	9,195	-829	-8.3%
Florence	5,088	4,475	-613	-12.0%
Marinette	43,384	41,401	-1,983	-4.6%
Oconto	35,684	38,778	3,094	8.7%
Langlade	20,740	20,086	-654	-3.2%
Oneida	36,776	36,285	-491	-1.3%
Vilas	21,033	21,798	765	3.6%
Wisconsin	5,363,675	5,843,443	479,768	8.9%

Source: U.S. Census and NCWRPC.

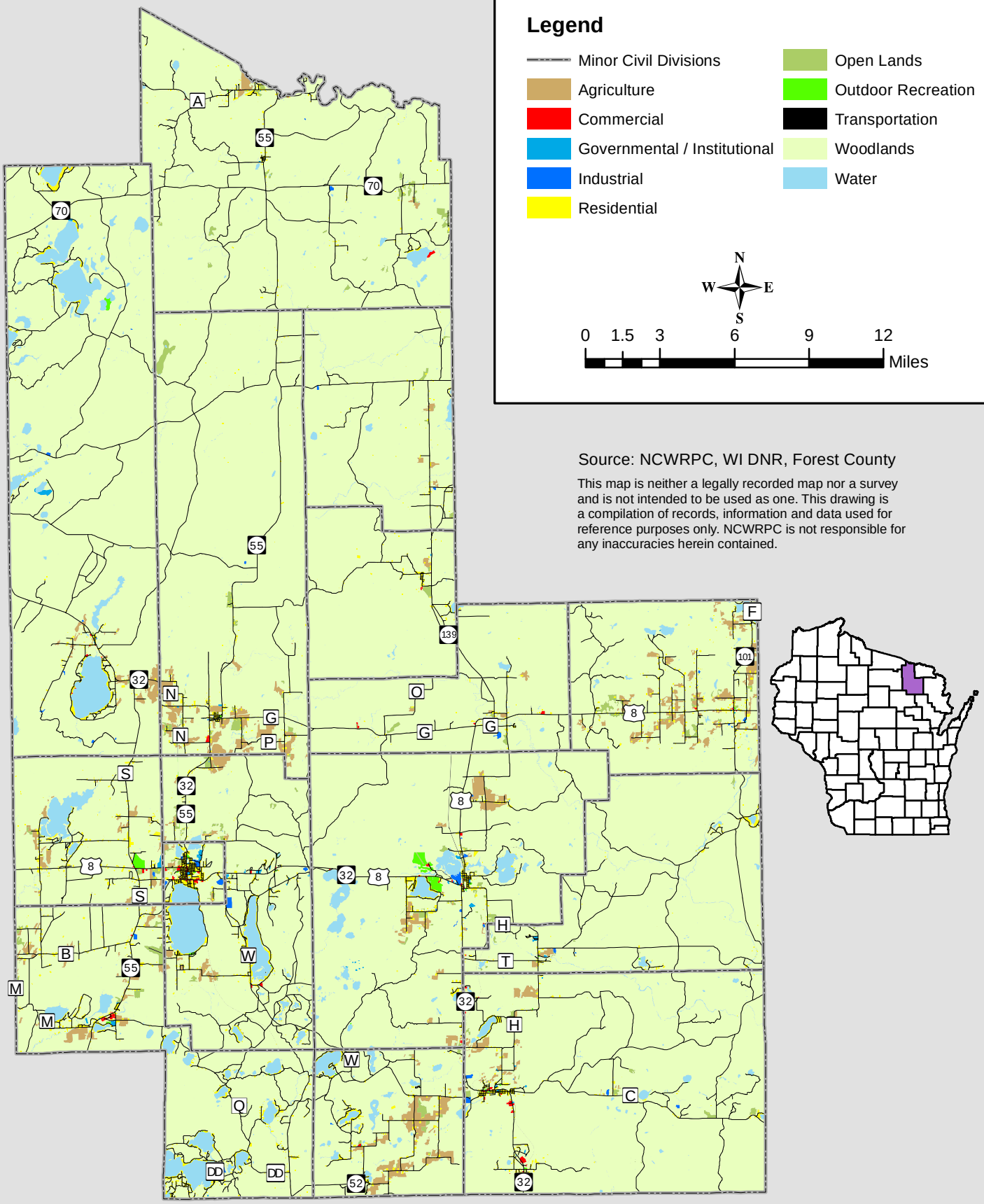
Between 2000 and 2019, all of the communities within Forest County except the Town of Crandon experienced a decrease in population (refer to Table 3). The largest percentage decrease, 46%, between 2000 and 2019, occurred in the Town of Popple River. The greatest amount of actual growth occurred in the Town of Crandon, adjacent to the City of Crandon, which added 8 new residents between 2000 and 2019.

Population concentrations and trends are important when prioritizing hazard mitigation strategies. The City of Crandon is the most densely populated and developed area in the county. Other areas of population concentrations are waterfront development and 11 unincorporated places including Nelma, Alvin, Hiles, Argonne, Cavour, Armstrong Creek, Laona, Blackwell, Mole Lake, Wabeno and Carter. Map 2 (Land Use) shows areas of population concentrations in the County. Overall population density of the county is 8.9 persons per square mile which ranges from a high of 367.8 in the City of Crandon to lows of 0.83 in the Town of Alvin and 0.74 persons per square mile in Popple River.

The median age in Forest County is about 46.2 years, making it relatively old in comparison to the State's median age of 39.1. The County has been identified as a retirement area resulting from being a vacation spot for many seasonal homeowners. Location of seasonal housing is a strong indicator in terms of retirement location. In Forest County 52% of all housing units have been identified as seasonal/recreational, which is among the highest percentages in the State.

Forest County, Wisconsin

Map 2
Generalized Land Use



Source: NCWRPC, WI DNR, Forest County

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Table 3	Population and Households Size of Civil Divisions					
MINOR CIVIL DIVISION	2000 Population	2000 Households	2019 Population	2019 Households	2000 – 2019 % Change in Population	2000 – 2019 % Change in Households
Alvin town	186	96	155	91	-16.7	-0.05
Argonne town	532	194	521	208	-2.1	0.07
Armstrong Creek town	463	207	404	202	-12.7	-0.02
Blackwell town	347	145	328	149	-5.5	0.03
Caswell town	102	41	87	38	-14.7	-0.08
Crandon town	614	238	663	276	8.0	0.16
Freedom town	376	158	351	160	-6.6	0.01
Hiles town	404	199	316	176	-21.8	-0.12
Laona town	1,367	564	1,197	544	-12.4	-0.04
Lincoln town	1,005	404	959	417	-4.6	0.03
Nashville town	1,157	485	1,075	489	-7.1	0.01
Popple River town	79	37	42	22	-46.8	-0.40
Ross town	167	75	133	67	-20.4	-0.11
Wabeno town	1,264	497	1,158	503	-8.4	0.01
Crandon city	1,961	803	1,806	860	-7.9	0.07
Forest County Total	**10,024**	**4,143**	**9,195**	**4,202**	**-8.3%**	**1.4%**

Source: U.S. Census

Seasonal Population

In addition to the full-time population, Forest County has a substantial number of seasonal and temporary residents. This reflects a housing stock which is more than half seasonal/recreational dwellings (52.7%). The impact of this seasonal population cannot be overlooked when planning for hazards. Table 4 shows an estimate of seasonal residents by municipality, based on average household size multiplied by the number of seasonal units. Determining when and for how long these seasonal residents will be in the county is problematic, but the numbers give some indication of what weekend or other peak period populations might be.

Another component of the seasonal population includes short-term accommodation such as campgrounds or hotel-style lodging. The scope of this plan did not provide for detailed inventory of accommodations, however, the Wisconsin DNR completed a general inventory as part of its statewide comprehensive outdoor recreation plan. That inventory identified 329 hotel/motel beds, 23 bed & breakfast beds, and 82 beds in tourist homes. The DNR also identifies 291 campsites in campgrounds throughout the county, as well as educational/recreational camps with a capacity of 525.

Table 4 Estimated Seasonal Resident Population		
Municipality	2010 Seasonal Housing Units	2010 Seasonal Population
Alvin town	403	714
Argonne town	169	458
Armstrong Creek town	306	624
Blackwell town	82	315
Caswell town	120	231
Crandon town	147	394
Freedom town	277	718
Hiles town	562	1,196
Laona town	299	626
Lincoln town	674	1,630
Nashville town	753	2,156
Popple River town	54	227
Ross town	167	336
Wabeno town	353	721
Crandon city	64	238
County Total	4,430	10,346

Source: U.S. Census and NCWRPC

Employment

Like seasonal housing, employment facilities represent concentrations of people. In Forest County the Education, health care and social service sector, which includes educational services and nursing and residential care, along with social workers and other human services, accounts for about 20 percent of total employment. The Leisure and hospitality sector makes up about 17 percent of employment. Retail trade and Manufacturing each represent about a tenth of the workforce (10.8% and 10.4%, respectively), and Construction (8%) and Public Administration (8%) round out the top five occupations in Forest County.

Table 5 identifies the top employers and their general location in the county. The location of a large employment center is important when prioritizing hazard mitigation strategies.

Table 5 Top Employers in Forest County			
Company	**Product or Service**	**Size**	**Location**
FC Potawatomi Community	Tribal Government	500-999	Towns of Lincoln and Wabeno
Potawatomi Northern Lights Casino/Bingo	Casino	100-249	Town of Wabeno
Mole Lake Casino and Lodge	Casino	100-249	Town of Nashville
Crandon School District	Elementary & Secondary Schools	100-249	Various Locations
County of Forest	County Public Employment	100-249	Various Locations
Arizconsin Group	Elderly Housing	50-99	Various Locations
Schaefer Enterprises	Supermarkets	50-99	City of Crandon
Wabeno School District	Elementary & Secondary Schools	50-99	Various Locations
US Forest Service	Natural Resource Management	50-99	Various Locations
Mole Lake Band	Tribal Government	50-99	Various Locations

Source: Wisconsin DWD and NCWRPC.

LAND USE/COVER AND DEVELOPMENT PATTERNS

Land use is an important determinant in the potential impact a particular hazard may have, and in actions which may be taken to mitigate the impacts. An understanding of the amount, type, and spatial distribution of urban and rural land uses is an important consideration in the development of a sound hazard mitigation plan.

The North Central Wisconsin Regional Planning Commission (NCWRPC) has categorized land use in Forest County into general classifications using 2015 aerial photography to digitize a land use Geographic Information System (GIS) coverage. Map 2 shows the land use and development patterns in Forest County. Table 6 shows the acreage and percent of each classification.

Agriculture and Forestry

The dominant land-use in Forest County is forestry. Land area in the county is approximately 92 percent forested, comprised of approximately 613,428 acres of woodland, much of it within the Nicolet National Forest. Agricultural land covers another 12,171 acres or 1.8 percent of the county's land area, which is mostly located on previously forested tracts that were cleared by early settlers. Agricultural production in the county includes cattle & calves, egg chickens, horses & ponies, pheasants, elk, forage crops, corn for silage, oats, potatoes, and cut

Christmas trees. A short growing season, irregular topography, and relatively low soil productivity limits most of the agricultural production to the southern portions of the county.

Commercial, Industrial and Institutional Development

Commercial, industrial and institutional development makes up only about 0.4 percent of the total area of the county. Land use for commercial and industrial development is mostly located in the City of Crandon, but pockets are scattered around the county. Most industry is related to processing forest and agricultural products. There is one serviced industrial park in the county, an 18-acre site in Crandon. Government and other institutional facilities are also concentrated in Crandon, however there are a variety of facilities, such as rural schools and town halls, scattered throughout the county. Tribal facilities, including casino developments are located in three areas: Mole Lake in the Town of Nashville, the Potowatomi area in the Town of Lincoln, just east of Crandon and in the Town of Wabeno, at Carter. The U.S.F.S. Civilian Conservation Corps has a major facility on County Highway H in the Town of Blackwell.

Residential Development

Land in residential development makes up about one percent of the total county area. Residential concentrations are scattered throughout the county (see "Population and Households" above). Much of the scattered rural development is related to direct recreational demand as various types of housing have clustered along streams and lakes.

There are a number of mobile home parks in the county. According to the U.S. Census, there were 908 mobile homes in 2010. This is about 10 percent of housing units for the County compared to about 3.8 percent for the entire state. This is significant due to their vulnerability in natural hazards especially tornadoes. Map 11 (Tornado Vulnerability) displays the mobile home concentrations within the county.

Table 6 Land Use in Forest County

Description	Acres	Percent
Agriculture	12,171	1.8%
Commercial, Industrial, Institutional	1,628	0.4%
Forest/Woodland	613,428	91.6%
Recreation	738	0.1%
Residential	8,979	1.3%
Open Land	4,254	0.6%
Surface Waters	22,725	3.4%
Transportation	5,572	0.8%
Total	669,496	100.0%

Source: NCWRPC

Surface Water

Forest County is part of three major basins partially containing thirteen watersheds (see Map 3). The Upper Green Bay Basin has eight, the Upper Wisconsin River basin has three and the Wolf River basin has two watersheds within the county. Surface waters comprise about 22,725 acres or 3.4 % of the county area.

The county has 824 lakes and over 317 streams within the watersheds (see Map 3). Six of the lakes exceed 1,000 acres and account for nearly 40 % of total water surface area. The largest is Lake Metonga at 2,157 acres. Many of the lakes are small seepage lakes, particularly on the west side of the county. Major lakes number about 70 with the majority being drainage lakes, but about one-quarter are seepage lakes. Generally, greatest stream flow in the county occurs in late spring and autumn following increased periods of rainfall. Spring flooding is usually most pronounced in the western half of the county. All the streams, like the lakes, are important in the hydrological and ecological regime and should be protected by shoreland zoning and physical protective measures.

Floodplains and wetlands are important contributing components to the surface water system as described below.

Floodplains

The primary value of floodplains is their role in natural flood control. Flood plains represent areas where excess water can be accommodated whether through drainage to streams or through storage in wetlands and other natural detention/retention areas. Specific areas that will be inundated will depend upon the amount of water, the distance and speed that water travels, and the topography of the area. If uninterrupted by development, the areas shown on a map as floodplains should be able to handle the severest (regional) flood, i.e. those that have a probability of occurring once every one hundred years.

There is a value in preserving and protecting these natural flood control areas from encroachment. First, by preventing development in the floodplain, the cost of building dikes, levees, or other man-made flood control devices will be saved. Second, for each structure that is constructed in a flood-prone area, that flood-prone area expands, potentially subjecting other structures originally built outside the delineated flood hazard area to the risk of flooding. Each new structure (or modification to existing) placed in the flood plain puts more life and property in danger.

Counties, cities, and villages are required to adopt reasonable and effective floodplain zoning ordinances. The requirement is found in section 87.30 of the Wisconsin Statutes and Chapter NR 116 of the Wisconsin Administrative Code. Floodplain zoning is designed to protect individuals, private property, and public investments from flood damage.

Floodplain zoning maps identify areas where major floods occur. Regulations prohibit development in the floodway, the most dangerous flood area. In other flood areas, the flood fringe, development that is built above flood levels and otherwise flood-protected is allowed if it is in accordance with local ordinances. For regulatory purposes, a floodplain is generally defined as land where there is a one percent chance of flooding in any year (also known as the 100-year floodplain).

A FEMA approved Flood Insurance Rate Map or FIRM, has recently been adopted, allowing the County to participate in the National Flood Insurance Program. The City of Crandon entered the program back in 1987. See Table 7 for summary of NFIP status. The FIRMs delineate the "A" Zones including the floodway and flood fringe, those areas inundated by the 100-year flood within the County.

Table 7 FEMA Community Status Book Report
Communities Participating in the National Flood Insurance Program
Wisconsin - Forest County

Community	Initial FHBM	Initial FIRM	Current Map	Program Entry
Forest County	05/08/81	12/16/11	12/16/11	06/24/14
City of Crandon	06/07/74	01/02/87	12/16/11	01/02/87

Source: FEMA.

The NCWRPC made use of the new digital FIRMs, or DFIRMs, to map floodplains for use in this plan. The digital files indicate approximately 22,000 acres of floodplain in Forest County. Map 4 shows these approximate flood hazard boundary areas in Forest County. While this might only be 3 percent of total Forest County land, this represents a significant portion of the Town of Alvin and a significant portion of the total available private land.

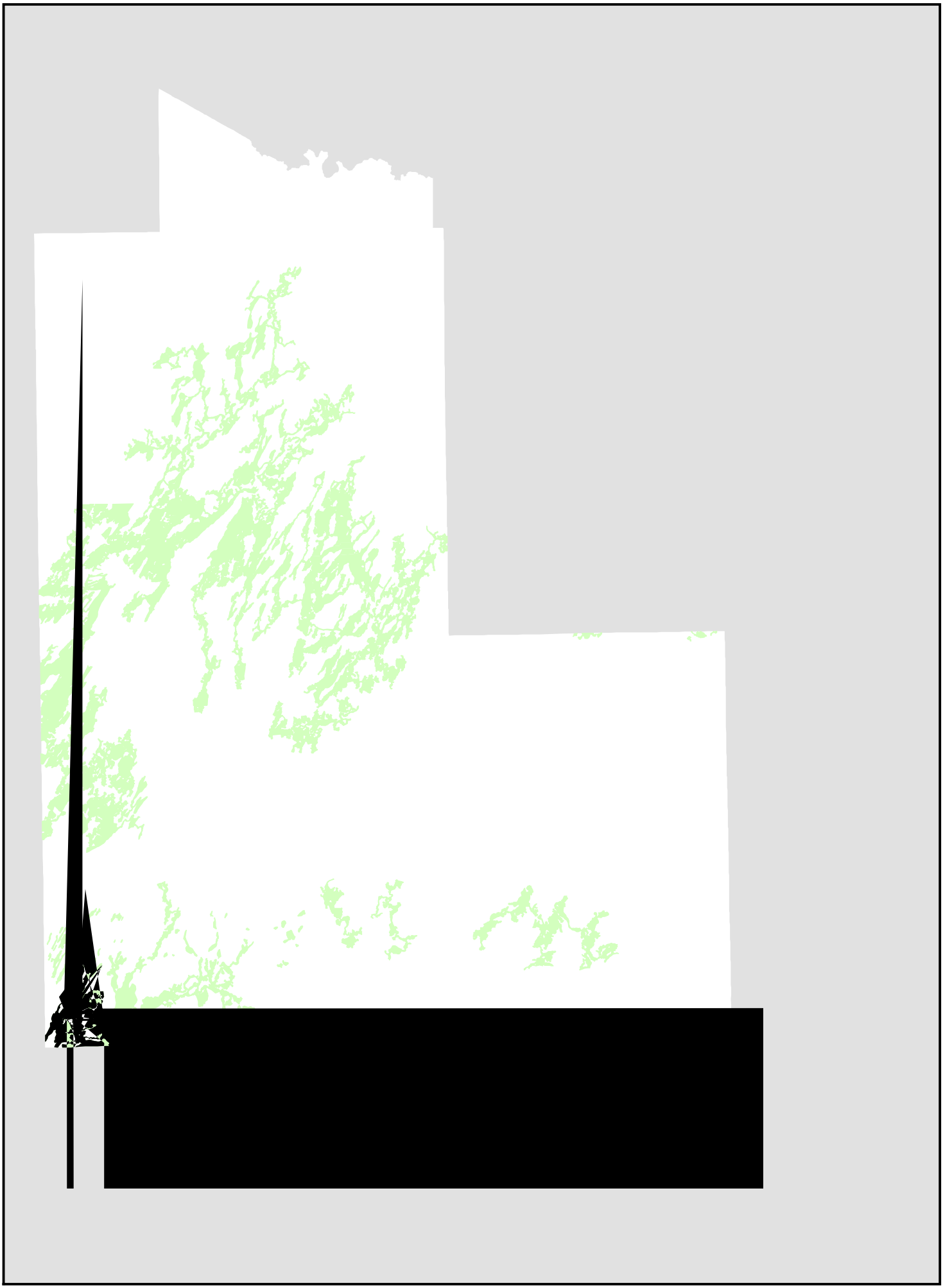
Currently, there are no repetitive loss structures, those with multiple flood insurance claims in Forest County.

Wetlands

Wetlands perform many roles in the proper functioning of the hydrologic cycle and local ecological systems. In terms of hazard mitigation, they act as water storage mechanisms in times of high water. Like sponges, wetlands are able to absorb excess water and release it back into the watershed slowly, preventing flooding and minimizing flood damage. As more impermeable surfaces are developed, this capacity for water storage becomes increasingly important.

The DNR has identified the location of wetlands on their WISCLAND database according to which Forest County has 149,230 acres, or 23 percent of its total area. There are no main concentrations of wetlands, and Map 3 shows these wetland areas to be scattered throughout the county.

Destruction of wetlands can occur through the use of fill material. This can compromise the hydrological function of the site and open the area to improper development. The Wisconsin Department of Natural Resources (DNR) has promulgated minimum standards for managing wetlands.



One major U.S. Highway, U.S.H. 8 serves Forest County, running east-west through Crandon and Laona. This highway links the county to Rhinelander, its closest regional service center and to U.S.H. 51.

Six state highways serve the county. Highway 55 is the principle north-south route traversing the entire county from the southern county line to the border with Michigan in the north. Other north-south routes include STHs 101 and 139, both of which link U.S.H. 8 with other highways outside Forest County, and S.T.H. 52 which links to S.T.H. 32 in the south central part of the county. East-west routes, in addition to U.S.H. 8, include S.T.H. 70 across the extreme northern end of the county and S.T.H. 32 which tracks northwest – southeast across the southwest corner or the county through Crandon. These highways link the county with neighboring communities and are vital to the tourism and recreation-based economy.

A network of County trunk highways collects traffic from rural areas. These County highways serve an important role in linking agricultural and timber resources to the county's service centers and major highways. Local roads provide access to local development, farming and forest areas, as well as the county's lakes.

The Wisconsin Department of Transportation maintains 11 bridges on U.S./State highways within the county. Forest County itself owns another 6 bridges on various County highways. The U.S. Forest Service has 17 bridges, primarily on forest roads, but three carry local roads. The various towns are responsible for 13 bridges. There is also one rail-bridge over U.S.H. 8.

The Forest County Commission on Aging coordinates transit services for the elderly and disabled. A mini-bus provides flexible-route service to various areas of the county on a weekly rotation for trips to regional medical centers as well as local service centers for groceries and other needs. The bus is available for dial-a-ride or specially planned trips when not on one of the scheduled routes. The county also has an accessible van for specialized transportation of disabled residents. A volunteer driver network is also available.

The Canadian National Railway (CN) has track running east-west through Forest County but service has been suspended for some time, including a spur into Crandon which has been abandoned by CN.

The Crandon Municipal Airport located south of the City of Crandon is the public-use airport serving the area. The airport provides general aviation service for private airplanes and daily airfreight. The Crandon Airport is a basic utility airport, which is designed to accommodate aircraft of less than 6,000 pounds gross weight, with approach speeds below 91 knots and wingspans of less than 49 feet. There are private landing strips located in the county. The nearest commercial passenger service is available in Rhinelander.

Utilities

Utility systems are important in hazard mitigation planning because of the community's reliance on water, wastewater treatment, gas service, electricity, and communications. Because of this reliance and vulnerability to hazards, utility systems must be identified for this Plan, see Map 6.

The protection of the public water supply facilities from potential contamination from flooding and other threats is a consideration for hazard mitigation planning. The City of Crandon and the Laona and Wabeno Sanitary Districts provide municipal water supplies for domestic and commercial use, while the Blackwell Civilian Conservation Corps Center provides water for its staff and visitors. Both the Potawatomi and the Sokaogon Chippewa have public water systems serving parts of their reservation area. The Potawatomi have two separate systems with one in Lincoln, and another in Wabeno which serves its Carter facilities and residents.

The protection of the wastewater systems is an important consideration for hazard mitigation planning because of its potential to contaminate nearby waterbodies in the event of flooding. Also of concern during periods of high water is the threat of damage to treatment plants. Three municipal wastewater treatment facilities, the City of Crandon and the Laona and Wabeno Sanitary Districts, provide wastewater services. Again the Tribes each have sanitary sewer services in Mole Lake, Lincoln and Carter.

The infrastructure of electric and telephone lines should be considered in the events of high wind, ice storms, tornadoes, flooding, and fire. Wisconsin Public Service provides Forest County with electric service throughout the County. As of 2001, an independent company, American Transmission Company LLC (ATC), owns, maintains, and operates the major transmission facilities located in the State of Wisconsin, including Forest County. The general locations of the major electrical transmission facilities, owned by ATC are shown on Map 6. Six providers: Verizon, CenturyLink, Charter Communication, Charter Fiberlink LLC, Powercom, and Frontier supply telephone service in the county.

Nationwide, cellular telephone systems account for about half of all 911 calls. Service coverage is based upon the handset receiving a direct line-of-sight signal from a system provider's antenna on a tower. Signals generally cannot travel well in dense forest cover, over tall hills, or through thick or multiple cement walls, so limitations for receiving a signal include topography and the thickness & type of building materials. Spotty cell service continues to be an issue in Forest County.

Natural gas transmission across Forest County generally follows USH 8 from the Town of Crandon through the Town of Armstrong Creek. This gas line is tapped by Wisconsin Public Service to provide local delivery in another pipeline that generally serves the City of Crandon, the downtowns of Laona and Wabeno, and

a 32-mile pipeline from Argonne to Hiles. The remainder of the county depends upon bottled gas from local suppliers.

Emergency Services and Facilities

The type and location of public emergency services are important considerations in hazard mitigation planning, because of the crucial role of such facilities in certain hazard situations.

There are eight fire departments within Forest County. These include Crandon, Laona, Wabeno, Alvin, Hiles, Newald, Argonne and Pickerel, see Map 7 for station locations. These departments serve the majority of the county, but some towns receive service from departments in surrounding areas.

Fire Station B, Town of Hiles

There are four EMS squads within the County, including: Goodman/Armstrong Rescue, Laona Area Rescue, Pickerel Area Rescue, and Crandon Area Rescue, see Map 7 for station locations. These departments serve the majority of the county, but some towns receive service from squads in surrounding areas.

The Forest County Sheriff's Department provides service to all the towns and the city for law enforcement. The City of Crandon and Town of Laona also have their own police departments. Station locations are shown on Map 7. The Forest County Jail in Crandon is the main correctional facility within the county.

Critical Community Facilities

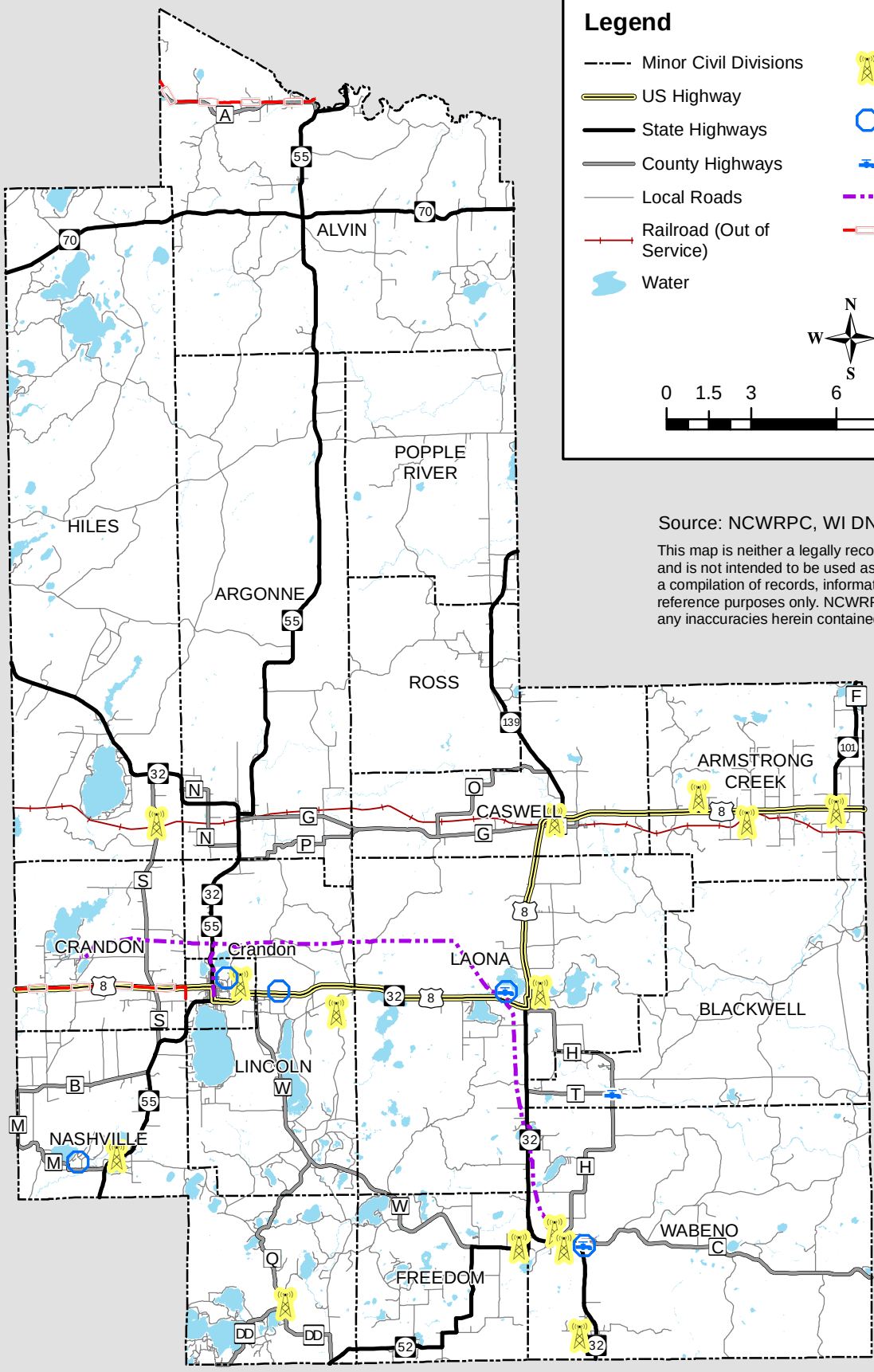
In addition to emergency service facilities, other community facilities are also important in hazard mitigation planning. Government administration buildings serve as the headquarters that link to resources in helping solve potential problems. In the event of an emergency it is important to know the location of available medical facilities. Nursing homes are vulnerable because of the high level of assistance required by the residents who live there. Since hundreds of the

county's children are there for most of the year schools are important. Map 7 shows the location of selected types of critical community facilities within Forest County. Clinic facilities are located in the City of Crandon, the Town of Laona, and the Potawatomi (T. Lincoln) and Mole Lake (T. Nashville) reservations.

Forest County Courthouse, Crandon, WI

Forest County, Wisconsin

Map 6
Utilities



Legend

- Minor Civil Divisions
- US Highway
- State Highways
- County Highways
- Local Roads
- Railroad (Out of Service)
- Water
- Celltowers
- Waste Water Treatment Plant
- Public Water Supply
- Pipeline
- High Voltage Powerline

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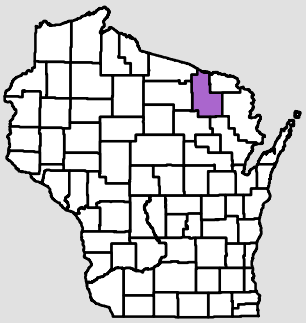
0 1.5 3 6 9 12
Miles

Source: NCWRPC, WI DNR, Forest County

This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. NCWRPC is not responsible for any inaccuracies herein contained.



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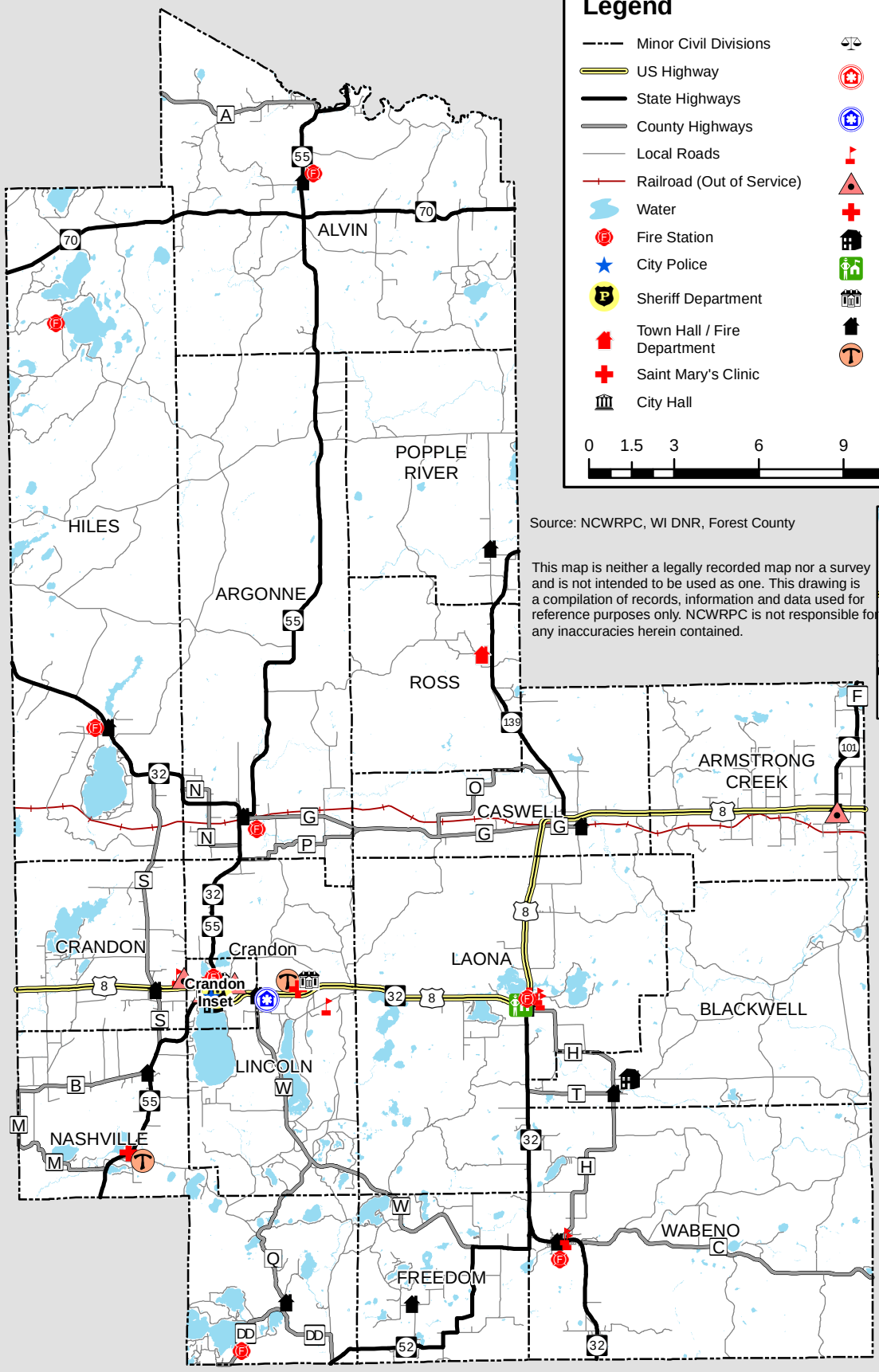
Forest County, Wisconsin

Map 7
Critical Community Facilities



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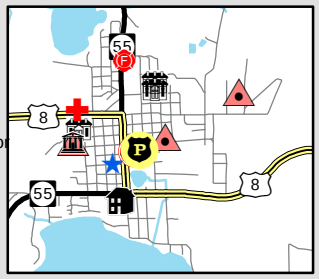
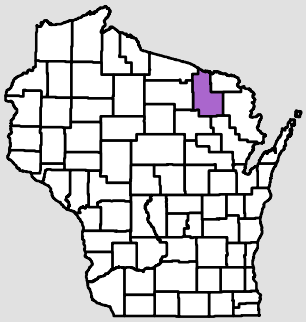


City of Crandon Inset



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INVENTORY & VALUE OF STRUCTURES/PROPERTY IN FOREST COUNTY

The value of the real estate and personal property reflects the upper end of the potential for property damages in each community. The annual equalized value of each municipality represents the Department of Revenue estimate of market value (Agricultural land is included at Use Value) of all taxable property. Property tax levies of jurisdictions are apportioned to each municipality on the basis of equalized value. Table 8 lists each municipality's total equalized values for real estate, personal property, and all property and the percent of the county total each municipality represents.

Table 8 Equalized Value by Municipality

Municipality	Improvement Value	Land Value	Personal Property	Total	% of Total
Alvin	$64,896,400	$24,768,000	$1,380,700	$91,045,100	8.05%
Argonne	$23,322,700	$14,239,500	$293,600	$37,855,800	3.35%
Armstrong Creek	$25,442,920	$13,372,170	$327,000	$39,142,090	3.46%
Blackwell	$24,939,800	$17,938,200	$332,200	$43,210,200	3.82%
Caswell	$10,750,420	$12,461,830	$176,100	$23,388,350	2.07%
Crandon	$6,978,900	$3,929,800	$192,000	$11,100,700	0.98%
Freedom	$36,729,900	$20,831,000	$554,300	$58,115,200	5.14%
Hiles	$38,001,400	$33,752,100	$110,400	$71,863,900	6.35%
Laona	$67,585,200	$67,599,900	$233,000	$135,418,100	11.97%
Lincoln	$60,672,500	$39,009,200	$810,900	$100,492,600	8.88%
Nashville	$82,107,700	$101,605,600	$710,300	$184,423,600	16.30%
Popple River	$105,091,800	$119,520,000	$1,352,900	$225,964,700	19.97%
Ross	$5,265,900	$7,830,600	$80,300	$13,176,800	1.16%
Wabeno	$8,212,600	$4,985,900	$273,800	$13,472,300	1.19%
Crandon	$52,269,900	$29,753,600	$607,100	$82,630,600	7.30%
Forest	$612,268,040	$511,597,400	$7,434,600	$1,131,300,040	100.00%

Source: WI Department of Revenue, 2019.

The valuation of property in a community reflects the potential for property damages across the community. However, only taxable properties are included in this valuation. Tax exempt government properties are not included. With Forest County owning many critical facilities that are needed in times of disaster the potential for damages to these structures could be devastating for the county. In Table 9a, the County owned critical facilities are listed with its general location and the value of the facilities. Estimates for local government facilities are given in Table 9b/c and Tribal facilities in Table 9d.

Table 9a Value of County Owned Properties		
Name	**Value***	**Location**
Courthouse / Sheriff	$22,592,052	Crandon city
Asphalt Plant	$96,397	Crandon city
Salt Shed	$124,342	Laona town
Salt Shed	$57,725	Alvin town
Fairgounds	$293,742	Crandon city
Veteran's Memorial Park	$534,843	Crandon city
Highway Department	$5,100,489	Lincoln town
Misc. Other	$3,318,788	Various Locations
Total	$32,118,378	Above Locations

*=Includes insured buildings, contents, and property in the open. Source: Statement of Values State of Wisconsin Local Government Property Insurance Fund and NCWRPC estimate.

Table 9b Value of City Owned Properties	
Property	**Value***
City Hall	$292,215
Police Department	$197,933
Fire Department	$762,300
Street Department	$172,963
Library	$939,409
Old Library	$112,735
Water/Sewer Plant	$3,119,357
Well and Pump Houses	$520,661
Water Tower & Reservoir	$362,069
Lift Stations 1 -11	$1,040,777
Booster Station –Hwy 8	$93,247
Storage Buildings	$208,099
Parks and Recreation	$214,603
Airport Building	$179,025
Cemetery	$76,461
Total	$8,291,854
*includes insured building contents. Source: Local Government Property Insurance Statement of Values and NCWRPC estimate.	

Table 9c: Value of Town Owned Properties		
Municipality	**Property**	**Value***
Alvin town	Town Hall	$363,825
	Garage 2	$72,765
	Garage 3 / Salt Shed	$220,605
	Recreation Area & Other	$73,920
Argonne town	Town Hall	$573,777
	Fire Hall	$443,788
Armstrong Creek town	Town Hall / Garage	$481,635
Blackwell town	Town Hall	$211,596
	Recycling Center	$35,188
Caswell town	Town Hall / Buildings	$393,855
Crandon town	Town Hall	$375,375
Freedom town	Town Hall/Garage/Salt Shed	$359,136
Hiles town	Town Hall	$375,375
Laona town	Town/Community Hall	$391,545
	Town Garage/Storage Bldgs	$280,665
	Beach Shelter & Storage	$98,175
	Municipal Building	$875,490
	Cemetary Storage Building	$136,290
	Wellhouse / Shed	$482,790
	Library	$131,670
	Water & Sewer Facility	$378,840
	Multi-purpose Facility	$494,340
	Parks Dept. & Other	$1,277,430
Lincoln town	Town Hall/Garage/Storage	$534,765
	Recycling Center	$4,620
Nashville town	Town Hall (N)	$375,375
	Community Bldg/FD/Garage	$2,640,000
	Salt Shed	$66,000
Popple River town	Town Hall	$375,375
Ross town	Town Hall	$375,375
Wabeno town	Town Hall	$461,420
	Fire Hall	$622,459
	Museum	$440,240
	Library	$303,863
	Town Shop	$172,586
	Recycling Center	$116,728
	Exhibition Facility	$696,491
	Pavilion	$93,000

*includes insured building contents and property in the open
Source: Local Government Insurance Policy Declarations and NCWRPC estimate

Potawatomi Tribal Wellness Center

Table 9d-1	Value of Tribal Owned Properties	
Tribe	**Property**	**Value**
Potawatomi	Administration Building	$9,240,000
	Convenience Store	$1,732,500
	Accounting Building	$173,250
	Office Building	$288,750
	Casino / Hotel	$20,515,000
	Health Center	$2,310,000
	Head Start / Daycare	$202,125
	Wee Care Daycare	$144,375
	Natural Resources Bldg	$231,000
	Public Works	$577,500
	Aging / Housing	$577,500
	Tribal Hall	$231,000
	Ordinance Office	$115,500
	Language & Culture Office	$173,250
	Museum	$2,310,000
	Recreation Center	$288,750
Source: NCWRPC Estimate.		

Table 9d-2	Value of Tribal Owned Properties	
Tribe	**Property**	**Value**
Mole Lake	Casino/Restaurant	$12,803,688
	Hotel Conference Ctr	$12,288,738
	Casino/Hotel Storage	$614,988
	Casino/Hotel Storage	$161,689
	Youth Center	$1,412,234
	Medical Clinic	$2,324,794
	Water Tank	$339,046
	C-Store Gas Station	$531,035
	Historical Home	$260,913
	SFI Office	$393,800
	Old Motel	$795,445
	Storage Bldg	$144,254
	Gazebo	$12,329
	Elder Apartments	$1,906,410
	Day Care Center	$156,257
	EPA Storage Garage	$94,238
	Admin./Environmental	$3,667,579
	Maintenance Bldg	$419,320
	Commodities Dist.	$178,710
	Fish Hatchery	$206,302
	Pump House	$337,885
	Recycling Bldg	$224,556
	Family Services Bldg	$289,816
	Multifamily Apartments	$1,056,550
	Water Tank	$493,161
	Housing Office	$520,497
	Housing Maint. Bldg	$962,170
	Randall Apartments	$475,200
	Infrastructure	$793,278
Source: NCWRPC Estimate		

Mole Lake Community Health Clinic

INTRODUCTION

Analyzing the hazards facing a community is an important step in the mitigation plan update process. Before mitigation strategies can be determined, a risk assessment must be made. Part III of Forest County All Hazards Mitigation Plan Update will focus on the following:

- Identification of all types of natural hazards that can affect Forest County
- An analysis of each hazard identified as pertinent to Forest County

The hazard analysis will consist of:

- Background information
- History of previous occurrences of hazard events
- An analysis of the county's vulnerability to future events
- An estimate of future probability and potential losses from the hazard

HAZARD IDENTIFICATION

The process of identifying those hazards that should be specifically addressed in the Forest County All-Hazards Mitigation Plan Update was based on consideration of a number of factors. The process included a review of past hazard events to determine the probability of future occurrences and the threat to human safety and property damage.

Worksheets from the Wisconsin Guide to All-Hazard Mitigation Planning were used by to re-evaluate and re-rank the list of possible hazards to identify which hazards should be included in the Plan Update based on threat to human safety and possible damage to property. The Plan Update Committee reviewed the results and agreed that the ranking was appropriate and without need of any adjustment. It should be noted that cyber-attack was added as part of a wider effort by the County to address issues that affected the County in the past.

The resulting priority ranking of hazards accepted by the Mitigation Plan Update Committee is as follows:

1. Winter Storm/Extreme Cold
2. Tornado
3. Thunderstorm/High Wind/Lightning/Hail
4. Flooding/Dam Failure
5. Forest Fire/Wildfire
6. Drought/Extreme Heat
7. Cyber-Attack

This Plan Update focuses primarily on natural hazards that can be mitigated on a local level and have or could cause disasters. Technological or manmade hazards include things like transportation incidents, civil disturbances, hazardous material incidents, mass casualty events, war, and terrorism. Forest County already has action plans for these types of events, so they are not included in this update process, with the exception of

cyber-attack, which is addressed here as indicated. Although of significant concern, human communicable diseases are not addressed in this Plan Update. The Forest County Health Department and area hospitals work with the Wisconsin Department of Health Services and the Center for Disease Control to monitor and plan for those situations.

Low magnitude earthquakes occur in Wisconsin every few years, but none have exceeded a magnitude of 3.9, which would have vibrations similar to the passing of a semi-truck, therefore, earthquakes are not covered in this Plan Update. Forest County does not have coastal hazard issues and conditions for landslide or subsidence problems are not significant in the County.

HAZARD ANALYSIS

The hazard analysis for each hazard included in this Plan Update is broken down into four components, as follows:

1. Background on Hazard - The next step after identifying a hazard is to define the hazard and give some general background behind it. This can include occurrence of hazard within the County or State. This section may also give some indication of the risk to public health and safety and to personal and public property.

2. History of Hazards - Past experiences of disasters is an indication of the potential for future disasters for which Forest County would be vulnerable. A review of past occurrences for each identified hazard in Forest County was completed.

Some disasters have had damages that exceeded the capabilities of local communities and state agencies. Federal assistance is then requested, which may be offered through a variety of programs. Assistance may be directed to agricultural producers, individuals and families, businesses, or local governments. A Presidential Declaration was requested for five natural disasters in Forest County, from 1971 to 2019. They include the following:

- 1975 Army Worm Infestation
- 1976 Drought – Presidential Emergency Declaration
- 1977 High Winds / Hail – Presidential Emergency Declaration
- 2000 Severe Storms/Flooding/Tornado – Presidential Disaster Declaration
- 2010 Severe Storms – State Disaster Fund
- 2019 Tornado/High Winds/Flooding - Presidential Disaster Declaration

It should be noted that this significantly underestimates the number of hazard events that have occurred in Forest County. Almost every year significant weather events or disasters cause thousands of dollars in damage when no Federal disaster assistance is requested. Major indicators of hazard severity are the deaths, injuries, and economic losses resulting from natural hazards and disasters.

The National Oceanic and Atmospheric Administration (NOAA) and National Climatic Data Center (NCDC) publish the National Weather Service (NWS) data describing recorded weather events and resulting deaths, injuries, and damages. From September 3, 1958 to December 31, 2018, NCDC reported 299 severe weather events for Forest County.

Note that since the NCDC data is somewhat incomplete, this Plan Update focuses on the 10-year period from 2009 to 2018 for hazard analysis purposes. Other sources of data are used to supplement the NCDC data. These sources include Wisconsin Emergency Management, Wisconsin Department of Natural Resources, Forest County Emergency Management, and local news reports.

3. Vulnerability Assessment For Hazards - For each hazard identified, a summary of the impact that may be caused to the community is given. When possible, existing buildings, infrastructures, and critical facilities located in the hazard areas are identified. Critical facilities are community buildings that are especially important to the health and welfare of the population following hazard events. Examples of such facilities include hospitals, police & fire stations, town halls, and shelters.

Because this is a multi-jurisdictional plan, FEMA requires that the plan assess each jurisdiction's risks where they vary from the risks facing the entire planning area. This section of the plan will identify variations in vulnerability for specific municipalities where they occur.

4. Future Probability and Potential Dollar Losses for Hazard - The historic data and vulnerability assessment for each hazard is used to project the potential future probability of such a hazard event occurring in the county, and the potential damages in dollars that might be reasonably expected. This section sets a benchmark amount for mitigation of each hazard.

HAZARD ANALYSIS: THUNDERSTORM/HIGH WIND/LIGHTNING/HAIL

Background on Severe Thunderstorm Hazard:

The National Weather Service definition of a *severe thunderstorm* is a thunderstorm event that produces any of the following: downbursts with winds of 58 miles per hour or greater (often with gusts of 74 miles per hour or greater), hail one inch (recently increased from ¾ of an inch) in diameter or greater, or a tornado. Strong winds, hail, and lightning will be addressed in this section, and tornadoes are discussed as a separate hazard.

Lightning results from discharge of energy between positive and negative areas within a thunderstorm separated by rising and falling air. This discharge heats the surrounding air to 50,000 degrees. Hail results as the warm rising air cools, forming ice crystals which are held by the updrafts until accumulating enough weight to fall. The hail size depends on strength of the updrafts keeping it suspended.

Thunderstorm frequency is measured in terms of incidence of thunderstorm days or days on which thunderstorms are observed. Wisconsin averages between 30 and 50 incidence days per year depending on location. A given county may experience ten or more thunderstorm days per year. The southwestern area of the state normally has more thunderstorms than the rest of the state.

History of Severe Thunderstorm in Forest County:
The NCDC database reported 24 severe thunderstorm events for Forest County between 2009 and 2018. These storms typically contain some form of heavy rain, strong winds and lightning. About 14 significant hail events, typically related to a severe thunderstorm, were listed during this time period. No major lightning incident was noted.

The most recent event in Forest County took place on June 17, 2018 when thunderstorms developed across the area as a cold front encountered a very warm and unstable air mass. Some of the storms produced large hail and damaging winds. Thunderstorm winds destroyed some bird pens as the storms passed north of Argonne. NCDC estimated damages at about $2,500.

On July 8, 2013, severe thunderstorms brought high winds and hail into the Town of Nashville. The storms produced wind damage from a wet microburst, penny to nickel size hail, and heavy rainfall. The microburst, with winds estimated at 75 mph, downed about 30 trees. Numerous locations received more than two inches of rain in a three to four hour period.

On May 20, 2012, a low pressure system that passed through northwest Wisconsin dragged a cold front through the state. Severe thunderstorms developed in a moderately unstable air mass ahead of the front. The storms produced hail up to golf ball size, and downed trees and power lines. In downtown Wabeno, a band stand that was a community landmark for more than 50 years was destroyed. NCDC estimated damages at about $10,000.

On June 23, 2010, unstable air combined with a surface front and an upper level disturbance to produce severe thunderstorms across northern Wisconsin. High winds from the storms, some estimated as strong as 90 mph, caused considerable damage to trees and power lines as the storms moved through north-central and northeast Wisconsin. Roads across parts of northern Wisconsin were blocked by downed trees and power lines, including most of the roads in the Town of Nashville where numerous homes were also damaged. Power was knocked out to more than 15,000 Wisconsin Public Service customers in multiple counties including Forest. Some did not have power restored until late afternoon the following day. NCDC estimated damages at about $110,000.

On April 10, 2011, thunderstorms produced golf ball to half dollar size hail in the Argonne area and 2-inch diameter hail was reported near Crandon.

Forest County Hail

Forest County has been fortunate to not experience any lightning events between 2009 and 2018. The last lightning event in Forest County took place in 2000 in the Town of Alvin when lightning struck a house near the intersection of highway 55 and highway 70.

Severe Thunderstorm Vulnerability Assessment:
The National Weather Service can forecast and track a line of thunderstorms that may be likely to produce severe high winds, hail, and lightning, but where these related hazards form or touch down and how powerful they might be remains unpredictable. The distribution of thunderstorms and related hazard events have been widely scattered throughout the county.

Many thunderstorm events (without tornadoes) have caused substantial property and infrastructure damage and have the potential to cause future damage. In order to assess the vulnerability of the Forest County area to thunderstorms and related storm hazards, a review of the past events indicates significant impacts to:

- Infrastructure – hospitals, schools, street signs, police and fire departments
- Utilities – electric lines/poles/transformers, telephone lines, radio communication
- Transportation – debris clean-up
- Residential – mobile homes, garages, trees and limbs, siding, & windows
- Businesses – signs, windows, siding, & billboards
- Agricultural – buildings, crops, & livestock
- Vehicles – campers, boats, windshields, body, & paint

Based on review of the historic patterns of thunderstorms associated with high wind, hail, or lightning, there are no specific locations that have unusual risks. The events are spread uniformly across the landscape and are a countywide concern. However, during the City Planning Meeting for this Plan Update, the City of Crandon identified severe thunderstorm winds (high straight line winds) as a major vulnerability concern due to the potential for power outage and resulting impact on municipal services and the population itself (cooling/warming, food and water safety).

Future Probability and Potential Dollar Losses – Severe Thunderstorm:
Based on historical frequency, Forest County can expect 2.4 thunderstorm events per year on average. In other words, the probability is 1.0 or a 100% chance of multiple storms in a given year. The probability of a thunderstorm with damaging hail in Adams County is also at 1.0 or 100% chance with about 1.4 incidents in a given year. There is not enough data available regarding lightning events to indicate probability.

According to the NCDC, historic thunderstorm events with associated high wind and reported damages averaged $40,833 in property damage per incident. No crop damages

were reported. There was insufficient data regarding historic hail and lightning events. Losses in Forest County associated with severe thunderstorms could approach $979,992 over the next ten-year period.

HAZARD ANALYSIS: TORNADO

Background on Tornado Hazard:

A tornado is a relatively short-lived storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour, but some tornados may have winds in excess of 300 miles per hour.

Table 10 Tornado Wind and Damage Scale

Tornado Scale	Wind Speeds	Damage
EF0	65 to 85 MPH	Some damage to chimneys, TV antennas, roof shingles, trees, and windows.
EF1	86 to 110 MPH	Automobiles overturned, carports destroyed, trees uprooted
EF2	111 to 135 MPH	Roofs blown off homes, sheds and outbuildings demolished, mobile homes overturned.
EF3	136 to 165 MPH	Exterior walls and roofs blown off homes. Metal buildings collapsed or are severely damaged. Forests and farmland flattened.
EF4	166 to 200 MPH	Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.
EF5	OVER 200 MPH	Homes leveled with all debris removed. Schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone. Top stories demolished

Source: National Weather Service

A tornado path averages four miles but may reach up to 300 miles in length. Widths average 300 to 400 yards, but severe tornados have cut swaths a mile or more in width or have formed groups of two or three funnels travelling together. On average, tornados move between 25 and 45 miles per hour, but speeds over land of up to 70 miles per hour have been recorded. Tornados rarely last more than a couple minutes in a single location or more than 15 to 20 minutes in a ten-mile area.

Tornados are classified into six intensity categories, EF0-EF5. This scale is an updated or “enhanced” version of the Fujita Tornado Scale ("F Scale"). The scale estimates wind speeds within tornados based upon the damage done to buildings and structures. It is used by the National Weather Service in investigating tornados and by engineers in correlating building design and construction standards against anticipated damage caused by different wind speed.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornados, known as "Tornado Alley". Tornado Alley extends northeast from Oklahoma into Iowa and then across to Michigan and Ohio. Winter, spring, and fall tornados are more likely to occur in southern Wisconsin than in northern counties. Tornados have occurred in Wisconsin in every month except February.

History of Tornados in Forest County:
Forest County has had six confirmed tornados since 1963, with four occurring prior to 1995. In addition, five funnel clouds have also been reported since 1963. The most recent activity in Forest County occurred on September 19, 2012, when a funnel cloud was produced, along with large hail and damaging winds, by a thunderstorm system in the Town of Wabeno. Funnel clouds were also produced in the towns of Argonne and Nashville by a thunderstorm system on July 6, 2012.

The most recent tornado in Forest County occurred on April 10, 2011. On that day fifteen tornado were seen in the state, ten in northeast Wisconsin, which is a one-day record. Two twisters were spotted in Forest County that day. Both were spawned by major thunderstorms that developed along and ahead of a cold front as it encountered moist and unstable air across Wisconsin. These storms also produced straight line wind up to 100 miles per hour.

Tornado Damage, Forest County

The first tornado developed at 7:30 pm southeast of Argonne and travelled over nine miles to the northeast into Florence County. This was an EF2 storm. It downed hundreds of trees, many of which fell on vacation cabins, and blew the roof off a house east of Argonne. This storm did a reported $200,000 in damage. A second funnel formed just after 8 pm at Armstrong Creek and travelled for about three miles to the north and west. It damaged two houses and did $50,000 damage.

In June of 2010, a funnel cloud was observed near County Highway C in the town of Wabeno. This event took place in conjunction with severe thunderstorms and winds up to 90 mph, which damaged trees and power lines across north central Wisconsin, knocking out power for more than 15,000 Wisconsin Public Service customers.

In June of 2005, two supercell storms moved through the southern part of the county causing significant wind damage and producing a funnel cloud three-miles east of Crandon. Three square miles of trees in the Nicolet National Forest were heavily damaged as winds estimated at 90 mph hit the south part of Birch Lake. The roof was torn from a metal building in Laona. Large hail was also associated with this event.

In May of 1994, Forest County experienced a major EF2 tornado that cut a 12-mile path between Crandon and Laona causing $5 million in property damages and $50,000 in crop damage. Three mobile homes were destroyed, injuring three people. Another 25 houses were damaged or destroyed and 600 acres of timber were leveled.

The county also experienced EF2 tornados in 1972 and 1968. The September 1972 tornado cut a 53-mile long swath with $250,000 in property damage. The June 1968 tornado had a one-mile path with $25,000 in damages. In September of 1963, EF1 tornado with a one-mile path caused about $25,000 in property damages.

Table 11 Reported Tornados/Funnel Clouds in Forest County

DATE	TIME	LOCATION	LENGTH (miles)	WIDTH (yards)	DEATHS	INJURIES	F-SCALE
9/19/2012	6:20 PM	T. Wabeno	n/a	n/a	0	0	n/a
7/6/2012	7:30 PM	T. Argonne T. Nashville	n/a	n/a	0	0	n/a
4/10/2011	7:30 PM	T. Argonne	9	250	0	0	EF2
4/10/2011	8:03 PM	T. Armstrong Cr.	3	150	0	0	EF1
6/23/2010	5:15 PM	T. Wabeno	n/a	n/a	0	0	n/a
6/7/2005	6:04 PM	T. Lincoln	n/a	n/a	0	0	n/a
6/28/1994	5:20 PM	C. Crandon	n/a	n/a	0	0	n/a
5/30/1994	8:50 PM	C. Crandon T. Lincoln T. Laona	12	800	0	3	EF2
9/16/1972	4:05 PM	T. Freedom T. Wabeno	53	200	0	0	EF2
6/30/1968	4:00 AM	T. Caswell	1	200	0	0	EF2
9/19/1963	6:00 PM	T. Laona	1	33	0	0	EF1

Source: National Climatic Data Center

Tornado Vulnerability Assessment:
Though Forest County is primarily rural, concentrations of population are scattered throughout the county. Subdivisions, rural unincorporated communities, and the City of Crandon can be regarded as more vulnerable, because tornados pose a greater threat to human safety and property damage in more concentrated areas, see Map 8.

Mobile homes are of significant concern in assessing the hazard risks from tornados. In general, it is much easier for a tornado to damage and destroy a mobile home than a site-built home. According to the U.S. Census Bureau, in 2010, Forest County had 977 mobile homes, approximately 11 percent of all housing units in the county. While mobile homes are scattered throughout the county, many are concentrated in mobile home parks. Map

8 also displays the location of the mobile home parks with approximate number of units.

In addition to mobile homes, campground patrons are vulnerable to tornados because minimal shelter is usually provided. The county is a popular camping destination with campgrounds throughout the Nicolet National Forest, and a number of public and private campgrounds. Refer to Map 8. The Forest Service CCC Camp in Blackwell and the youth camp in Hiles are also notable risk areas for tornados.

The following is a list of things that may be affected by a tornado. Much of this list can be referenced in Part II.

- Community facilities – hospitals, schools
- Public Service – police and fire departments
- Utilities – power lines, telephone lines, & radio communications
- Transportation – debris clean-up
- Residential – nursing homes, mobile homes/parks, trees and limbs, siding, & windows
- Businesses – signs, windows, siding, & billboards
- Agricultural – buildings, crops, & livestock

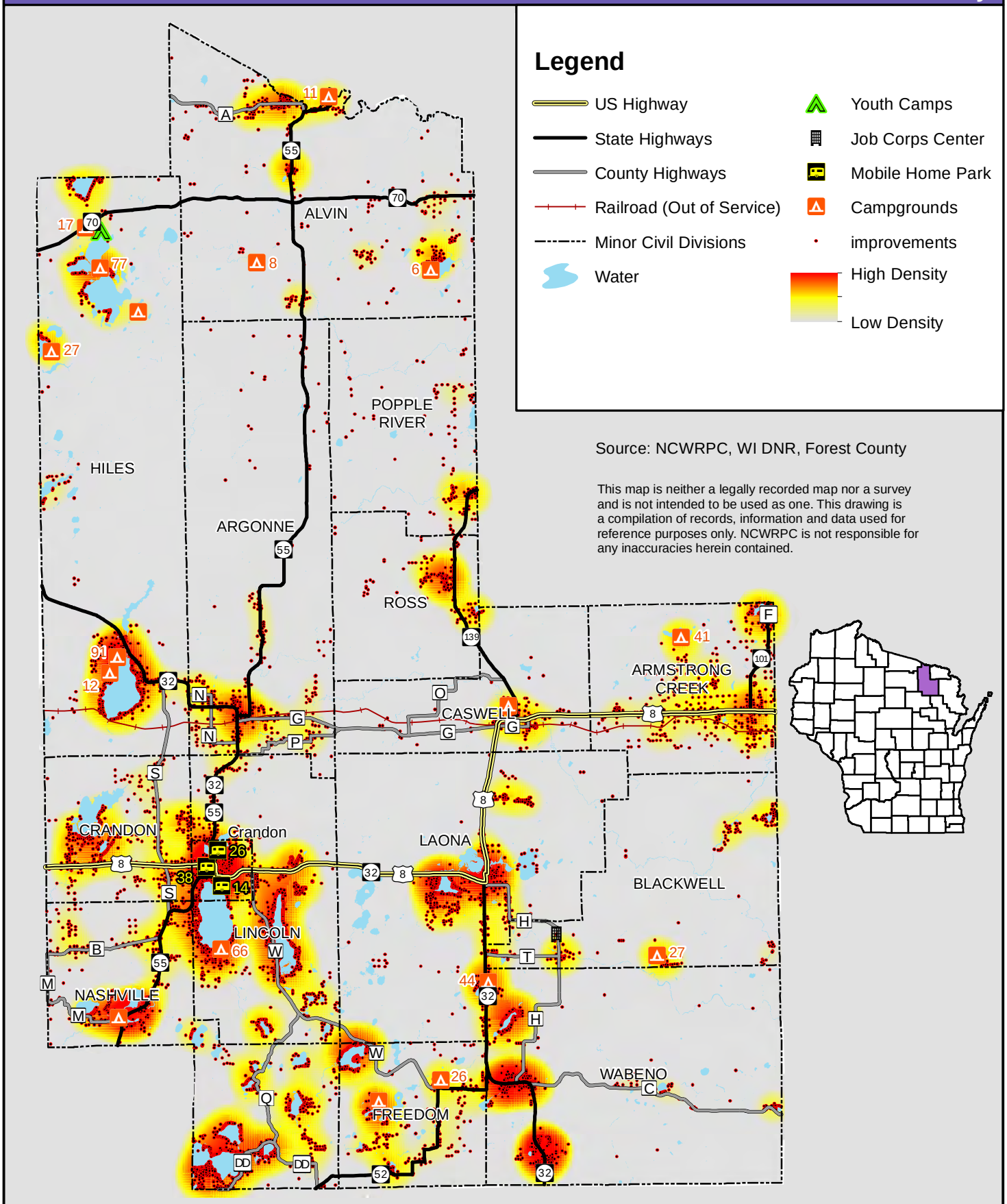
Based on review of the historic events of tornados, there are no specific areas in the county that have unusual risks. The events are a countywide concern. However, during the City Planning Meeting for this Plan Update, the City of Crandon identified tornados as a major vulnerability concern due to the potential for power outage and resulting impact on municipal services and the population itself (cooling/warming, food and water safety). General vulnerability by geographic area (local unit of government) is identified in Map 8.

Future Probability and Potential Dollar Losses – Tornados:
Based on the historic data presented here, between 2009 and 2018 Forest County experienced a tornado event about every 5 years. This equates to a probability of 0.2 or about a 20 percent chance in a given year. While tornadoes are not especially common, funnel cloud sightings occur more often and serve as reminders of the potential threat of a tornado in Forest County. Not enough data exists to indicate the probability of tornados of a specific magnitude.

Historic data is again used to estimate potential future dollar losses due to a tornado. Estimated damages resulting from tornados in Forest County range from zero to $5 million. On average, Forest County might expect damages of $925,000 per tornado, however, only one of the six historic tornados resulted in damages exceeding $250,000, the most recent tornado did $200,000 in damage, one other did $250,000, and the rest were $50,000 or less. Over the next ten-year period, tornado losses in Forest County could approach $1.8 million.

Forest County, Wisconsin

Map 8
Areas of Vulnerability



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HAZARD ANALYSIS: FLOODING/DAM FAILURE

Background on Flood Hazard:
A variety of classifications are used to describe for flood events including coastal, dam failure, flash, lake, riverine, stormwater, and urban/small stream. Forest County has the potential for all these types of flooding, except coastal. The following descriptions of the types of flooding are compiled from various FEMA and other notable hazard planning sources:

Coastal – Different from other types of flooding which relate to movement of water through a watershed, coastal flooding is due to the effect of severe storm systems on tides resulting in a storm surge. Primarily known as an ocean-based event, the Great Lakes coastal areas can also be affected.

Dam Failure – More of a technology related hazard than a natural hazard, various factors can result in the failure of the structural components of a dam, thus causing flooding of areas downstream of the dam, often similar in effect to flash flooding.

Flash – Involves a rapid rise in water level moving at high velocity with large amounts of debris, which can lead to damage including tearing out of trees, undermining buildings and bridges, and scouring new channels. Dam failure, ice jams and obstruction of the waterway can also lead to flash flooding. Urban or built-up areas are increasingly subject to flash flooding due to removal of vegetation, covering of ground with impermeable surfaces, and construction of drainage systems.

Lake – Prolonged wet weather patterns can induce water-level rises that threaten lakeshore areas.

Riverine – Also known as overbank flooding, this is the most common type of flooding event. The amount of flooding is a function of the size and topography of the watershed, the regional climate, soil type, and land use characteristics. In steep valleys, flooding is usually rapid and deep, but of short duration, while flooding in flat areas is typically slow, relatively shallow, and may last for long periods.

The cause of flooding in rivers is typically prolonged periods of rainfall from weather systems covering large areas. These systems may saturate the ground and overload the streams and reservoirs in the smaller sub-basins that drain into larger rivers. Annual spring floods are typically due to the melting of snowpack.

Stormwater – Water from a storm event which exceeds the capacity of local drainage systems, either man-made or natural, can result in flooding. Inadequate storm sewers and drainage systems are often the primary factor resulting in this type of flooding.

Urban and Small Stream – Heavy rainfall can lead to flooding in smaller rivers and streams. Streams through urban or built-up areas are more susceptible due to increased surface runoff and constricted stream channels.

Flooding problems in Forest County tend to occur in the spring, when melting snow adds to normal runoff, and in summer or early fall, after intense rainfalls. Flooding occurs in the spring due to snowmelt and frozen soil. This build up continues until the river or stream overflows its banks, for as long as a week or two and then slowly recedes inch by inch. The timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and protection of property.

Flooding is a potentially significant hazard in Forest County, particularly because of the extensive water features found throughout the County. As described in Part II, there are approximately 317 rivers and streams in Forest County within 13 main watersheds and 3 major drainage basins.

Floodplains are described in Part II and shown on Map 4. These floodplains are narrow along tributaries and lakes but extensive throughout the County. The Federal Emergency Management Agency (FEMA) identifies these floodplains on Digital Flood Insurance Rate Maps (DFIRMs) as downloaded by the NCWRPC from FEMA's website.

There are 26 dams in Forest County (see Map 4), but most do not pose a significant hazard if they fail. According to the DNR, Forest County has eleven large dams, fourteen small dams and the other one was not classified, see Table 12. Most of these dams are the “mill” type, built 50-plus years ago. There are also small dams for watering livestock and various recreational ponds around the County. The Wisconsin DNR regulates all dams on waterways to some degree, however the small dams are not stringently regulated for safety purposes.

A dam can fail for a number of reasons such as excessive rainfall or melting snow. It can also be the result of poor construction or maintenance, flood damage, weakening caused by burrowing animals or vegetation, surface erosion, vandalism, or a combination of these factors. Dam failures can happen with little warning, resulting in the loss of life and significant property damage in an extensive area downstream of the dam.

The WDNR assigns hazard ratings to dams within the state. When assigning hazard ratings, two factors are considered: existing land use and land use controls (zoning) downstream of the dam. Dams are classified into three categories that identify the potential hazard to life and property downstream should the dam fail. A high hazard indicates that a failure would most probably result in the loss of life. A significant hazard indicates a failure that could result in extensive property damage. A low hazard exists where failure would result in only minimal property damage and loss of life is unlikely. In Forest County, none of the dams have a high hazard rating, however, two: Connor’s Dam and Hiles Mill Pond, have a rating of significant. Thirteen other dams have a low hazard rating, while nine remain unrated. Four of the dams, Bog Brook, Hay Meadow Creek, Lily Lake and Little Rice Lake, have emergency action plans (EAPs) currently in place.

Table 12 Dams in Forest County					
Name	**Size**	**Hazard Rating**	**Stream Name**	**Owner**	**EAP Date**
Above Bog Brook	n/a	-	Bog Brook	Private	n/a
Adams	Small	-	unnamed	Private	n/a
Alvin Creek	Small	Low	Alvin Creek	USFS	n/a
Bog Brook	Large	Low	Bog Creek	County	2017
Briss Lake	Large	Low	Pine Creek Tributary	USFS	n/a
Connor's Dam	Small	Significant	Rat River	Private	n/a
Coyote Creek	Large	Low	Coyote Creek	USFS	n/a
Davison	Small	-	Lake Lucerne Tributary	Private	n/a
Deer Creek	Large	Low	Otter Creek Tributary	USFS	n/a
Hay Meadow Creek	Large	Low	Hay Meadow Creek	USFS	n/a
Hiles Mill Pond	Large	Significant	Pine Creek	Town	2019
Klescewski 1	Small	-	no waterway	Private	n/a
Klescewski 2	Small	-	no waterway	Private	n/a
Knowles Creek	Large	Low	Knowles Creek Tributary	USFS	n/a
Lily Lake	Large	Low	Lily River	Town	2007
Little Rice Lake	Large	Low	Wolf River	DNR	2013
Metonga Lake	Small	Low	Swamp Creek Tributary	County	n/a
Pichotta 1	Small	-	Newman Creek	Private	n/a
Pichotta 2	Small	-	Newman Creek	Private	n/a
Pine Lake Outlet	Small	Low	Wolf River	Town	n/a
Roberts Lake	Small	Low	Lily River	Private	n/a
Rusch Dam	Small	-	N. Branch Oconto River	N/A	n/a
Schlafke	Small	-	no waterway	Private	n/a
Swamp Creek	Small	Low	Swamp Creek	Tribal	n/a
West Allen Creek	Large	Low	West Allen Creek	USFS	n/a
Wildcat Creek	Large	Low	Wildcat Creek	USFS	n/a

Source: WisDNR

History of Flooding in Forest County:

Flooding was a principal cause of damage in only one of four Presidential Disaster Declaration requests in Forest County from 1971 to 2018. This event occurred in 2000, when a nearly stationary front across Wisconsin combined with upper air and abundant moisture to produce a prolonged period of thunderstorms. Flooding from heavy rain caused the majority of problems, including flooded roads and basements.

Flood Damage. US Hwy 8

Rainfall totals ranged from 2 to 4 inches in a 24- hour period. Small streams and creeks overflowed their banks and rural areas suffered some crop damage.

The most recent flood event was in April 2002. Significant rainfall and snow melt resulted in flooding of roads and low-lying areas. In 1999, heavy rainfall caused flash flooding in the Town of Alvin. Roads were damaged and some homes and businesses suffered water damage to basements and minimal first floor inundation. In 1996, heavy runoff from spring snowmelt and rain resulted in widespread minor flooding across several northern counties including Forest. Numerous roads and culverts were washed out.

There are no records of significant dam failure within Forest County. Some of the dams have developed holes or other damage but have not caused flooding problems.

Flood Vulnerability Assessment:
Flood events in the county have caused substantial property and infrastructure damage in the past and have the potential to cause future damage, since a significant number of structures still exist in the floodplain. Looking at past events, the following have been significantly impacted by flooding:

- Infrastructure – flooded public facilities, and schools
- Utilities - down electric lines/poles/transformers, telephone lines, and radio communication
- Roadways – washouts, inundated roadways, debris clean-up
- Residential structures – flooded basements, damaged septic systems
- Businesses – loss of commerce
- Agriculture - inundated cropland

To assess the vulnerability of Forest County to flooding hazards, basic inventory data in Part II must be analyzed. For this purpose, consideration should be given to structures (specifically critical facilities), infrastructure, and cropland within the flood plain.

One of the first reports to reference in assessing vulnerability to structures during flooding is the State of Wisconsin Repetitive Loss Report. This Report provides the status of repetitive loss structures by community. FEMA, through the Federal Insurance Administration, classifies a repetitive loss structure “when more than one flood insurance claim of at least $1,000 is made within a ten-year period.” The information is used as a floodplain management tool and to supplement information provided by communities for flood mitigation grants administrated WEM. According to the report, there are no repetitive loss structures in Forest County. Since no structures are listed in the Repetitive Loss Report, structures within floodplains were analyzed. The floodplain boundaries (for watershed boundaries see Map 3) within Forest County are shown on Map 4.

Since no structures are listed in the Repetitive Loss Report, structures within floodplains were analyzed, see *methodology* outlined below. The floodplain boundaries within Forest County are shown on Map 4. Table 13 shows the number of structures in each municipality identified as "vulnerable to flooding" according to proximity to floodplains.

There were a total of 187 structures identified in the designated floodplain boundaries, see Map 9.

Table 13
Approximate Values of Structures in Floodplains Forest County

Municipality	Number	Total Value
Alvin town	25	$1,675,600
Argonne town	9	$419,000
Armstrong Creek town	1	$75,100
Blackwell town	12	$236,900
Caswell town	16	$450,800
Crandon town	44	$1,887,900
Freedom town	9	$517,500
Hiles town	3	$208,700
Laona town	15	$772,800
Lincoln town	3	$84,900
Nashville town	18	$1,288,200
Popple River town	6	$82,800
Ross town	4	$198,500
Wabeno town	10	$484,800
Crandon city	12	$816,600
Forest County	187	$9,200,100

Source: U.S. Census and NCWRPC

Methodology – Structures within Floodplains:

1. *NCWRPC downloaded the new DFIRM floodplain maps from the FEMA website into a GIS coverage for the County.*
2. *A building point cover was digitized from current digital aerial photography of the floodplain areas.*
3. *The floodplain coverage was then combined with the building point coverage to identify those structures within the floodplain boundary.*
4. *Total structures with the floodplain were then tabulated by municipality.*
5. *Land records data was used to determine the total value for the identified vulnerable structures by municipality.*

In addition to structural damage from flooding, there may also be significant damage to public roadways, particularly to roadway surfaces, culverts, and bridges. Flooding could inundate or close roadways from a period of a few days up to as much as three months. Such interruptions in the County transportation network would cause travel delays through detours.

The primary impact from damages to roadways is to businesses. The monetary impact is unknown, but past floods have restricted public access and even closed businesses. Tourism is an important industry in the county and several campgrounds, lodges and restaurants may be affected by flooding.

The agriculture industry is a sector that faces substantial losses, during floods. Flood conditions cause the following economic setbacks for farmers:

- Delayed planting (reduced growing season)
- Prevention of fields from being seeded
- Seed and agricultural chemicals washing out of fields
- Rotting of plants due to excess moisture
- Areas where planted crops are left in the fields due to excessive moisture
- Crops not reaching full maturity or stunted growth
- Requirements of additional soil amendments by farmers causing expenditures of greater amounts of money
- Lower quality (nutritional value) of harvestable crops as a feed source.

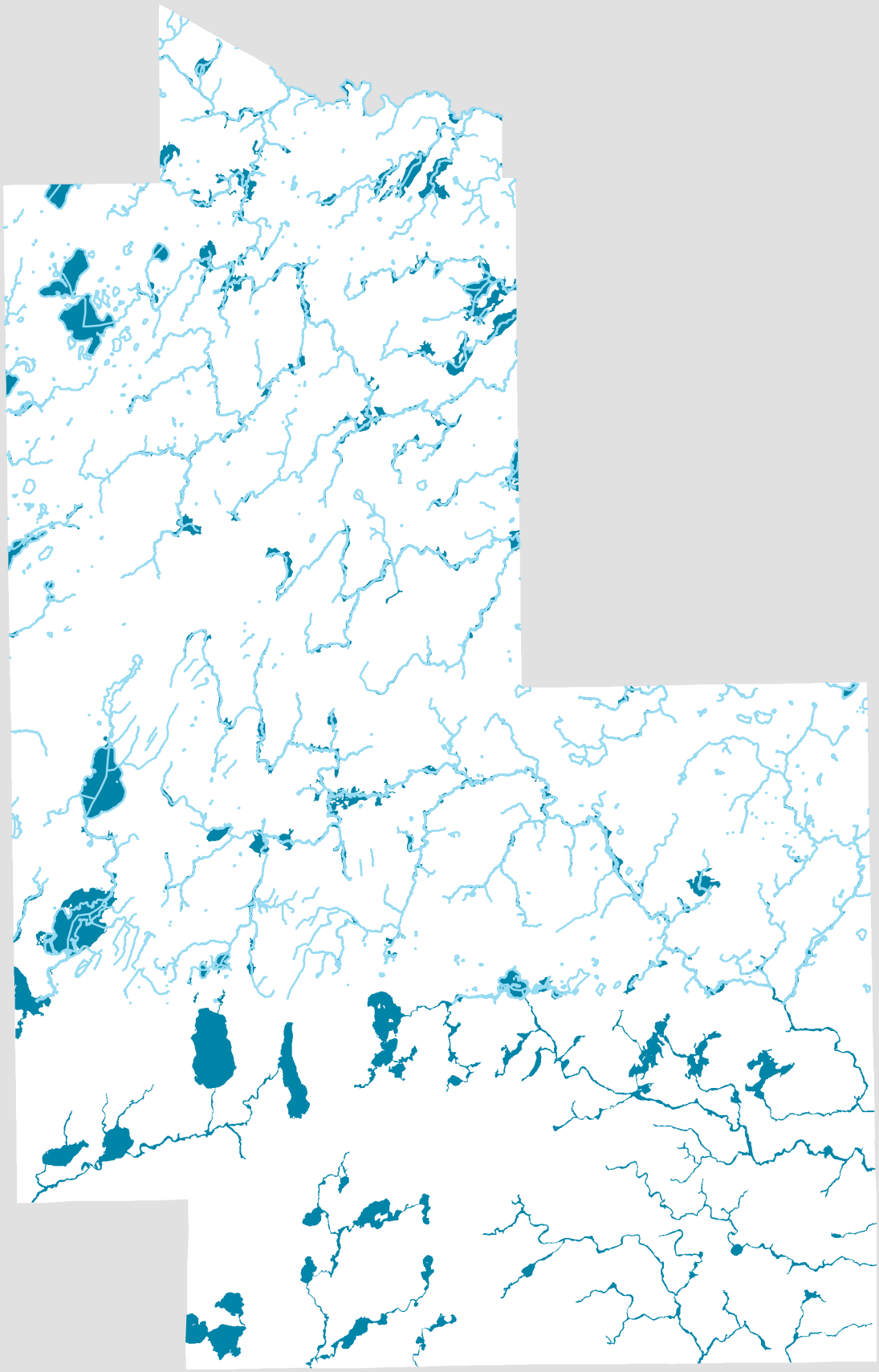
Reductions in quantity can result in loss of revenues from cash crops and increased expenses for purchasing the needed livestock feed from outside sources. Additionally, reductions in crop quality result in lower prices received for cash crops and increased spending for nutritional supplements to animal feed, which need to be added even in much of the purchased feed.

Economic losses to farmers can generate a ripple effect in the local community as well. Reduction in farm income can curtail the farmers' ability to purchase new equipment and make other improvements. Farmers will have less money to spend at farm dealers, farm supplies, building/hardware suppliers, fertilizer, feed and seed dealers, and other agribusiness and retail establishments. The State itself will have reduced tax revenues. Farmers will have less money to save and invest, and suffer increasing debt loads.

The forest products industry is affected similarly to agriculture. Forestlands become too wet for logging operations and many water-logged tree plantations suffer high mortality rates. Mill inventories become low, resulting in increased prices for consumers.

The areas considered to have a higher risk for impact from flooding include those communities with structures in floodplains as shown in Map 9. In addition, the City of Crandon identified flooding as a concern during the mitigation planning meeting for this Update. The City has had issues with flooding and drainage.

Future Probability and Potential Dollar Losses – Flood:
The NCDC data reported that Forest County had three floods from 1999-2018 (due to the limited number of flood events, a 20 year period is examined). Based on historic data presented here (frequency of past events), Forest County can expect a significant flood event about every six to seven years on average. This equates to a probability of 0.15 or about a 15 percent chance in a given year. The percentage chance of a dam failure is estimated to be less than one percent.



FOREST COUNTY
SHERIFF AND JUSTICE COMMITTEE MEETING

Date:	**May 6th, 2019**
Committee:	**Sheriff & Justice**
Committee Members Present:	**Shaffer, Stamper, Savard, Huettl, Chaney**
Sheriff:	**John Dennee**
Chief Deputy:	**Alex Walrath**
Other Appearances:	**Scott Goode, Tom Tallier, Jason Theune, Josh Bradley, Randy Burl**

MEETING MINUTES

1. 4:30 p.m. Shaffer called the meeting to order.

2. Roll Call

3. Motion by Stamper to approve the agenda as read at the discretion of the chairman. Seconded by Savard. Carried.

4. Motion by Chaney to approve the minutes from the April 2019 Sheriff & Justice Committee meeting. Seconded by Savard. Carried.

5. Discussion and Possible Approval for School Resource Officer Travel Requisition. Chief Deputy Walrath requests to send School Liason Deputy Belland to attend the 10th Annual School Resources Officer Conference from June 18th through the 20th. Motion by Stamper to approve the request and a second by Savard. Carried.

6. Discussion and Possible Action on Repair Quotes for Sally Port heaters and generator. Sheriff Dennee advised the Committee that two quotes were received one to fix the heater in the sally port and one for replacement parts on the Sheriff's Office generator. A motion from Savard to approve the quotes by the Sheriff & Justice Committee and forward the quotes to the Building Committee. Second by Stamper. Carried.

7. Discussion and Possible Action on Brush Guard Purchases. Chief Deputy Walrath requests approval for brush guard purchases for the squad cars out of the drug task force accounts. Motion to approve the brush guard purchase by Chaney. Second by Savard

8. Discussion and Possible Action on Jail Inmate Fees. Jail Administrator Bradley submitted a list of jail fees accessed to inmates and arrestees. Bradley requested the list be approved to have a standardized list of fees that are charged. Motion by Stamper to approve the fees and put information into a resolution then forward to the full County Board. Second by Chaney. Carried.

9. Discussion and Possible Action on Hiring of 6 New Dispatchers/Future Hiring Staff Issues. The hiring and cost of 6 new Dispatchers to staff a new Dispatch Center was discussed. Tom Tallier advised the committee that he will be traveling to Madison soon to lobby for an annual grant of $250,000 to pay for emergency services. Tallier is fairly confident Forest County will receive the grant. A motion was made by Stamper to forward the proposal to the Finance Committee. Second by Chaney. Carried. Sheriff Dennee advised the committee that other counties and municipalities have been offering hiring bonuses and lateral transfers to new Law Enforcement employees. Sheriff Dennee stated it might be something to consider in the future to get interest in Law Enforcement jobs in Forest County. Sheriff Dennee also

suggested the possibility of having the Crandon Police Department Secretary assist the Sheriff's Office Secretary with data entry and split some of the employee costs with the City of Crandon.

10. Appearance by Darryl Landeau to discuss updates to the Mitigation Plan. Darryl Landeau advised he was working with Emergency Management on the Emergency Mitigation Plan. Darryl stated this is a 5 year update.

11. Public comments on agenda items. Sheriff Dennee discussed employee issues, see item # 9. Tom Tallier advised he has been having discussions with the Forest Co. Potawatomi about grant writing.

12. Approve school requests. See #5.

13. Motion by Stamper to approve vouchers from the month of April 2019 as submitted. Seconded by Savard. Carried.

14. Any other business that may lawfully come before the committee. Chief Deputy Walrath advised the Sheriff & Justice committee that the 2018 Water Safety Patrol Reimbursement was receive in the amount of $3,243.12. This amount was 75% of the submitted amount.

15. Future agenda items. None.

16. Motion by Chaney to adjourn the meeting. Seconded by Stamper. Carried.

FOREST COUNTY
MEETING NOTICE

COMMITTEE: SHERIFF & JUSTICE COMMITTEE

DATE: MONDAY, MAY 6, 2019

TIME: 4:30 P.M.

PLACE: COUNTY BOARD ROOM

AMENDED - AGENDA

1. Call to Order
2. Roll Call
3. Approve Agenda
4. Approve Minutes from the April 2019 Sheriff & Justice Meeting
5. Discussion and Possible Approval for School Resource Officer Travel Requisition
6. Discussion and Possible Action on Repair Quotes for Sally Port Heaters and Generator
7. Discussion and Possible Action on Brush Guard Purchases
8. Discussion and Possible Action on Jail Inmate Fees
9. Discussion and Possible Action on Hiring of 6 New Dispatchers/Future Hiring Staff Issues
10. Appearance by Darryl Landeau to discuss updates to the Mitigation Plan
11. Public Comments on Agenda Items
12. Approve School/Training Requests, if any
13. Approve April Vouchers for Payment
14. Any other business that may lawfully come before the committee
15. Future Agenda Items
16. Adjournment

Agenda was e-mailed to committee members, the Forest Republican, The Human Service Center, WLSL Radio, and WERL-WRJO Radio on May 1, 2019.

The agenda was posted to the public at the east/west entrances of the Forest County Courthouse, on the east door of the Law Enforcement Center, and in the office of the Forest Republican on May 1, 2019.

Every effort will be made to reasonably accommodate persons with special needs. Please contact the County Clerk's Office at 715-478-2422 to address your concerns.

Amended Agenda Posted at 10:00 A.M. on May 1, 2019 by Jennifer McLean, Forest County Sheriff's Office.

Appendix B – Resolutions of Plan Update Adoption

RESOLUTION
02-2021

Resolution offered by the Emergency Government & 911 and Risk Management Committees:

WHEREAS, the Disaster Mitigation Act of 2000 (DMA2K) is a law established to minimize losses from disasters, reduces public funding and private expenditures and to speed up response and recovery from disasters; and

WHEREAS, the Forest County Emergency Management Committee with the assistance of North Central Wisconsin Regional Planning Commission prepared an update to its Forest County All Hazards Mitigation Plan; and

WHEREAS, the All Hazards Mitigation Plan needed to be updated in order to be eligible for public funding in the event of a disaster; and

WHEREAS, the update also involved communication with neighboring counties such as Vilas, Oneida, Langlade, Oconto, Marinette, as well Iron County in Michigan. All of the communities of Forest County as well as the Forest County Potawatomi and Sokaogon Chippewa Indians Nation were also involved in the update.

NOW, THEREFORE, BE IT RESOLVED, by the Forest County Board of Supervisors that the All Hazards Mitigation Plan Update is approved in its entirety.

Resolution approved by Emergency Government & 911 Committee, _____, 2021.
Vote: AYE ___, NAY ___

_____
Committee Chair

Resolution approved by Risk Management Committee, _____, 2021.
Vote: AYE ___, NAY ___

_____
Committee Chair

I, County Clerk, in and for the said County of Forest, State of Wisconsin, do hereby certify that the foregoing is a true and correct copy of a Resolution adopted by the County Board of Supervisors of Forest County, Wisconsin, in legal session on the 19 day of January, 2021.

Nora Matuszewski
Nora Matuszewski, Forest County Clerk

Dated this 19 day of January 2021.

Cindy Onotzinger
Supervisor

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SAMPLE

RESOLUTION # _____

ADOPTING THE FOREST COUNTY ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the City of Crandon recognizes the threat that natural hazards pose to people and property; and

WHEREAS, under taking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save tax payer dollars; and

WHEREAS, an adopted All Hazards Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, all hazard mitigation plans are required to be updated every 5-years; and

WHEREAS, the City of Crandon adopted its last All Hazards Mitigation Plan Update in 2012; and

WHEREAS, the City of Crandon participated jointly in the planning process with Forest County and the other local units of government within the County to prepare an update to the existing multi-jurisdictional All Hazards Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL, that the City of Crandon hereby adopts the Forest County All Hazards Mitigation Plan Update as an official plan; and

BE IT FURTHER RESOLVED, that the Forest County Emergency Management Department will submit, on behalf of the City, the adopted All Hazards Mitigation Plan Update to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval.

PASSED:_____.

_____

Certifying Official