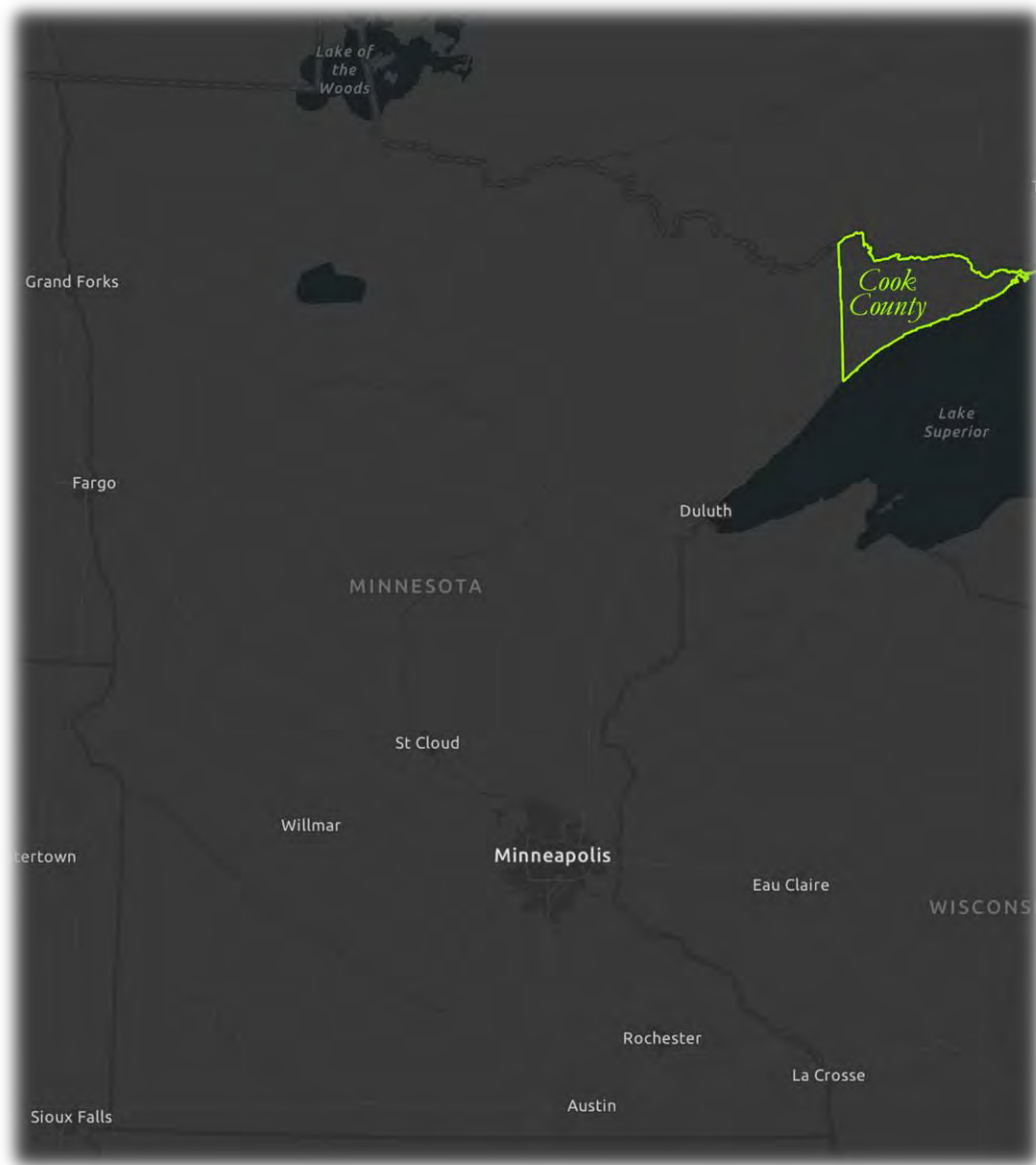


# Multi-Hazard Mitigation Plan

## Cook County, Minnesota, 2019



**UMD**  
**Geospatial Analysis Center**  
UNIVERSITY OF MINNESOTA DULUTH  
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# Multi-Hazard Mitigation Plan

## Cook County, Minnesota

2019

*Contact:*

Valerie Marasco, Director – Office of Emergency Management & Public Information  
Law Enforcement Center  
143 Gunflint Trail  
Grand Marais, MN 55604

218-387-3059  
[Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us)  
[www.co.cook.mn.us](http://www.co.cook.mn.us)

*Prepared By:*

Geospatial Analysis Center  
Swenson College of Science and Engineering  
University of Minnesota Duluth  
140 Engineering Building  
1303 Ordean Court  
Duluth, MN 55812

Stacey Stark, Director  
[slstark@d.umn.edu](mailto:slstark@d.umn.edu)  
(218) 726-7438

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# Section 1 – Introduction

## 1.1 Introduction

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

Between 1960 and 2014, natural hazards cost the U.S. an annual average loss of \$15.6 billion (Hazards & Vulnerability Research Institute, 2015).

Hazard mitigation planning and preparedness will be the most effective instrument to diminish losses by reducing the impact of disasters upon people and property. Although mitigation efforts will not eliminate all disasters, each county shall endeavor to be as prepared as possible for a disaster.

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

Researchers at the National Institute of Building Sciences looked at the results of 23 years of federally funded mitigation grants provided by the Federal Emergency Management Agency (FEMA), U.S. Economic Development Administration (EDA) and U.S. Department of Housing and Urban Development (HUD) and found mitigation funding can save the nation \$6 in future disaster costs, for every \$1 spent on hazard mitigation (National Institute of Building Sciences, 2017).

Cook County is vulnerable to a variety of potential natural disasters, which threaten the loss of life and property in the county. Hazards such as tornadoes, flooding, wildfires, blizzards, straight-line winds, ice storms and droughts have the potential for inflicting vast economic loss and personal hardship. In 2013, Minnesota had some of the highest weather-related disaster claims in the country (MN Environmental Quality Board, 2014).

This Multi-Hazard Mitigation Plan represents the efforts of Cook County and its local governments to fulfill the responsibility for hazard mitigation planning. The intent of the plan is to reduce the actual threat of specific hazards by limiting the impact of damages and losses.

This plan update was developed in coordination with the Grand Portage Band of Lake Superior Chippewa. As close jurisdictional neighbors that share common threats and hazards, Cook County and the Grand Portage Reservation have continued to share a common Multi-Hazard Mitigation Plan, adopted by both governments since 2010. The update of the 2019 plan was developed in coordination with a new Grand Portage Tribal Annex (GP Annex), which addresses vulnerabilities and mitigation projects specific to the Grand Portage Reservation. The GP Annex serves as a reservation-specific plan for the tribe with references to the county plan. As a formal tribal planning document it is not included

as an appendix to this plan. Section 2.3.1 provides detail on the coordination between Cook County and Grand Portage during the planning process.

#### **1.1.1 Scope**

The Cook County Emergency Management Director and the University of Minnesota Duluth Geospatial Analysis Center (GAC) have combined efforts to update the 2010 Cook County Multi-Hazard Mitigation Plan. The GAC contracted with Hundrieser Consulting LLC for additional emergency management planning expertise and facilitation.

This Multi-Hazard Mitigation Plan evaluates and ranks the major natural hazards affecting Cook County as determined by frequency of event, economic impact, deaths and injuries. Mitigation recommendations are based on input from state and local agencies, public input and national best practices.

The University of Minnesota Duluth Geospatial Analysis Center (GAC) performed the hazard risk assessment for 100-year floods using the Hazus GIS tool. The Minnesota Homeland Security and Emergency Management (HSEM) office has determined that Hazus should play a critical role in Minnesota's risk assessments, and therefore the 100-year flood hazard analysis is used in this plan.

This is a multi-jurisdictional plan that covers Cook County and the city of Grand Marais. The Cook County risks and mitigation activities identified in this plan also incorporate the concerns and needs of townships, school districts and other entities participating in this plan.

Members from each of these jurisdictions actively participated in the planning process by attending workgroup meetings, providing information, suggesting mitigation strategies and reviewing the plan document. Each jurisdiction will adopt the plan by resolution after approval by FEMA. County and local city resolutions will be added by Cook County after final approval by FEMA, in Appendix D in the back of the plan.

Cook County has specified the following goals for this Multi-Hazard Mitigation Plan update:

- Include more recent data documenting the critical infrastructure and hazards faced by Cook County.
- Reformat and reorganize the plan to reflect definitions of hazards as expressed in the 2014 State of Minnesota Multi-Hazard Identification and Risk Assessment Plan.
- Reflect current hazard mitigation priorities in Cook County.

#### **1.1.2 Hazard Mitigation Definition**

Hazard mitigation may be defined as any action taken to eliminate or reduce the long-term risk to human life and property from natural hazards. Following are examples of hazard mitigation measures that fall within one of five types of mitigation strategies:

- *Planning* – Development of mitigation standards, regulations, policies, and programs.
- *Structure and Infrastructure Projects* – Structural retrofits, property acquisition, local flood reduction projects, and safe room construction.

- *Natural Systems Protection* – Sediment and erosion control, stream corridor restoration, forest and vegetative management, floodplain and stream restoration.
- *Education and Awareness Programs* – Outreach programs, hazard awareness campaigns, real estate disclosure, and promotion of family/personal emergency preparedness.
- *Mitigation Preparedness & Response Support* – Emergency planning and services such as warning siren systems, CodeRed, and installing generators for critical facilities.

### **1.1.3 Benefits of Mitigation Planning**

The benefits of hazard mitigation planning include the following:

- Saving lives, protecting the health of the public, and reducing injuries
- Preventing or reducing property damage
- Reducing economic losses
- Minimizing social dislocation and stress
- Reducing agricultural losses
- Maintaining critical facilities in functioning order
- Protecting infrastructure from damage
- Protecting mental health
- Reducing legal liability of government and public officials

## **1.2 State Administration of Mitigation Grants**

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

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## Section 2 – Public Planning Process

### 2.1 Steering Committee Information

The Cook County multi-hazard mitigation plan steering committee is headed by the Cook County Emergency Management Director, who is the primary point of contact. Members of the Cook County MHMP steering committee include representatives from the public and governmental sectors. Table 1 identifies the steering committee individuals and the organizations they represent.

*Table 1. Multi-Hazard Mitigation Steering Committee*

Name	Agency/Organization	Participant Title
Valerie Marasco	Cook County Emergency Management & Public Information	Director
Mitch Everson	Cook County Environmental Health	Environmental Health Officer
Joni Kristenson	Cook County Public Health	Public Health Coordinator (2018)
Grace Grinager	Cook County Public Health	Public Health Coordinator (2019)
James Coleman	Lutsen Fire Department	Chief
Patrick Johnson	U.S. Forest Service	Assistant Fire Management Officer
Dave Grettenberg	U.S. Forest Service	Assistant Fire Management Officer
Jason White	North Shore Health EMS	Paramedic
Teresa Bragg	Sawtooth Mountain Clinic	Corporate Compliance
Joyce Klees	Sawtooth Mountain Clinic	RN
Peter James	Great Expectations School	Director
Clinton Little	MN DNR Lake Superior Coastal Program	Coastal Program Specialist
Todd Armbruster	Cook County Firewise	Firewise Coordinator
Tom Beery	MN Sea Grant	Resiliency Specialist
Todd Smith	Cook County Assessor's Office	Cook County Assessor
Kimber Wraalstad	North Shore Health	CEO
Alison McIntyre	Cook County Public Health & Human Services	Director
John Twiest	Arrowhead Electric Cooperative	Operations Manager
Jim Morrison	Gunflint Trail VFD	Fire Chief
Matthew Brown	WTIP	Director
Molly Hicken	Cook County	Attorney
Tim Nelson	Cook County Land Services	Director
Ilena Hansel	Cook County SWCD	District Manager
Mike Roth	Grand Marais	City Administrator
Thomas Nelson	Grand Marais PUC	Water/Wastewater Superintendent
Robert Thompson	Cook County	Assessor
Mike Crook	U.S. Forest Service	AFMO

Name	Agency/Organization	Participant Title
Kyle Oberg	Cook County	GIS Analyst
Judy Hill	Cook County	HR Generalist
Mitch Door	Cook County Schools, ISD #166	Assistant Principal
John Swanson	U.S. Customs	Supervisory CBPD
Brandon Law	U.S. Border Patrol	Supervisory BFA
Cameron Gjovik	MnDOT	Operations Support
Jeff Hall	MnDOT	HSEM Coordinator
Heidi Doo-Kirk	Cook County	Commissioner

Jurisdictional representatives participating on the steering committee were contacted throughout the plan update process to provide feedback on the hazards of concern to their community and the mitigation actions which they would seek to implement upon plan adoption. The list of final mitigation actions was divided into jurisdiction-specific mitigation action charts so that each jurisdiction could see and address those actions that applied specifically to their cities (see *Appendix G: Mitigation Actions by Jurisdiction*).

## 2.2 Review of Existing Plans, Capabilities & Vulnerabilities

Cook County and its local communities utilized a variety of planning documents to direct community development. These documents include an Economic Development Plan, Emergency Operations Plan, Continuity of Operations Plan, Transportation Plan, etc. (see Appendix J for a full listing of plans and programs in place in Cook County). The planning process also incorporated the existing natural hazard mitigation elements from previous planning efforts. In addition, the 2014 Minnesota All-Hazard Mitigation Plan was consulted.

In the development of the Cook County Multi-Hazard Mitigation Plan, UMD consultants reviewed and incorporated a variety of planning documents that direct community development and influence land use decisions for the county and its jurisdictions. In addition, UMD consultants worked closely with the Cook County Emergency Management Director, other key county staff, and local city officials to collect specific feedback on local mitigation capabilities and vulnerabilities that either support or hinder the ability to mitigate against natural hazards at the county and local level. Following is a summary of the assessment tools used to gather information on local capabilities and vulnerabilities during the planning process:

**Capabilities Assessment (hazard specific)** – In this assessment, detailed information was collected on current *Plans and Programs in Place* and *Program Gaps or Deficiencies* that currently exist to mitigate destruction caused by each natural hazard addressed in the plan. This information was used to inform where there were current mechanisms in place to incorporate or implement mitigation measures (i.e., existing programs, plans or policies) and where there were areas that needed to be addressed (see *Section 4.4 Hazard Profiles*).

**Jurisdictional Questionnaires** – In this questionnaire, detailed information was collected from key county departments and the city of Grand Marais on 1) Severe weather or disaster events and impacts

that have occurred within the last five years; 2) Actions taken within the last five years that have helped to reduce local vulnerabilities to future disaster events; 3) Any changes within the last five years that have increased local vulnerabilities to future disaster events; and 4) Any concerns or specific ideas for mitigation projects to help reduce or eliminate risk resulting from future severe weather or disaster events. This information was used to inform Section 4, Risk Assessment and the development of local-level mitigation actions (see *Appendix L: Jurisdictional Questionnaires* and *Appendix G: Mitigation Actions by Jurisdiction*).

**Local Mitigation Capabilities Assessment (LMCA)** – In this assessment, detailed information was collected on key elements in place that help to accomplish mitigation in the community, including: 1) Plans, authorities, or policies; 2) Staff (organizational capacity); 3) Programs; and 4) Funding or other resources. Information was further collected on what program gaps or deficiencies exist that are a barrier to accomplishing mitigation in the community. This information was used to inform the development of local-level mitigation actions (see *Appendix K: Local Mitigation Capabilities Assessment* and *Appendix G: Mitigation Actions by Jurisdiction*).

## 2.3 Planning Process Timeline and Steps

In order to update the 2010 Cook County Multi-Hazard Mitigation Plan, UMD consultants worked in coordination with the Cook County Emergency Management Director and members of the steering committee. The updated plan includes not only new data documenting the types of hazards faced by Cook County residents and emergency planning officials, but also new thinking about how to best address these hazards.

### 2.3.1 Cook County Stakeholder Coordination

On April 30, 2018, the Geospatial Analysis Center hosted a kickoff meeting online that was attended by the Cook County Emergency Management Director. The webinar included a project overview, GAC background, the roles and responsibilities of the Emergency Management Director, contents of the Multi-Hazard Mitigation Plan, planning process and projected timeline (see Appendix E for webinar slides).

In July 2018, Cook County issued a news release inviting public feedback and participation for the Cook County MHMP update (for complete documentation, see *Appendix F: Public Outreach & Engagement Documentation*).

A steering committee meeting took place on July 26, 2018, at the Cook County Community Center in Grand Marais, which included the Cook County MHMP steering committee and the UMD planning team. The steering committee was provided with an overview of the purpose, process and timeline for the Cook County Multi-Hazard Mitigation Plan update, as well as the roles and responsibilities of steering committee members. Appendix E provides documentation of steering committee meeting summaries, including participant sign-in sheets and presentation slides.

Steering committee members were engaged in providing feedback on plans and programs in place as they relate to hazards facing the county, and they discussed potential mitigation actions to be added to

the plan. This information was used to inform the development of mitigation strategies in the updated plan.

On October 16, 2018, members of the steering committee convened again with the UMD planning team to conduct a review and discussion of the draft mitigation action charts developed for Cook County and the city of Grand Marais. See Appendix E for a full meeting summary.

In order to provide opportunity for public input, Cook County issued a second news release on March 19, 2019 inviting public review and feedback on the draft plan. The news release provided information on where the plan could be viewed and comments submitted. The UMD Geospatial Analysis Center hosted a webpage to post the full draft Cook County MHMP, including excerpts of the Cook County Master Mitigation Action Chart, each of the jurisdictional mitigation action charts, and an electronic feedback form.

Appendix F provides documentation of the public outreach for feedback on the draft plan by Cook County and jurisdictions. The public feedback period for the draft plan was open from March 19, 2019 to April 15, 2019, for a total of 28 days.

*Table 2. Cook County Hazard Mitigation Update Meetings and Public Outreach*

Meeting Type	Date	Location
Public Outreach	7/13/2018	News release inviting public feedback and participation.
Kickoff Webinar	4/30/2018	Hosted online by GAC in Duluth
Steering Committee	7/26/2018	Cook County Community Center, Grand Marais, MN
Steering Committee	10/16/2018	Cook County Courthouse, Grand Marais, MN
Public Outreach	3/19/2019	Public review period for draft plan

At the close of the public outreach period, the UMD consultants worked with the Cook County Emergency Management Director and members of the steering committee to incorporate comments from the public into the Multi-Hazard Mitigation Plan.

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

### **2.3.2 Cook County – Grand Portage Coordination**

The update of the Cook County 2019 Multi-Hazard Mitigation Plan and associated Grand Portage Tribal Annex was developed with significant communication between the Cook County and Grand Portage steering committees as well as other local and regional stakeholders, including:

- Discussion and review of the draft plans at Cook County Local Emergency Preparedness Committee (LEPC) Meetings in September and November, 2018 as well as January, March and May, 2019. The Emergency Managers from Cook County and Grand Portage are both members.
- Discussion at Firewise Meetings, which were conducted the last Thursday of the month (January – April 2019). The Emergency Managers from Cook County and Grand Portage are both members.
- Discussion of the draft plans at quarterly Joint Powers Meetings, which include Cook County Commissioners, Grand Marais City Council and Grand Portage Reservation Tribal Council (RTC).
- Review and discussion of the draft plans at quarterly HSEM Region 2/Arrowhead Region Emergency Management Association (AREMA) meetings, and sub-regional meetings (Cook County and Grand Portage emergency managers both present).
- Brief presentation on the two draft plans at the Cook County Emergency Services Conference April 27-28, 2019.
- Presentations, review and discussions on the draft plans at Cross-Border Emergency Management Committee Meetings held in January, March and May (Cook County and Grand Portage emergency managers both present).
- Quarterly review of HMPG activity conducted by the Cook County and Grand Portage emergency managers.
- Posting of both the draft Cook County MHMP Update and draft Grand Portage Tribal Annex on UMD Websites for public review of each plan (March 19 – April 15, 2019).

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## Section 3 – Cook County Profile

This section offers a general overview of Cook County to provide a basic understanding of the characteristics of the community, such as the physical environment, population, and the location and distribution of services.

### 3.1 General County Description

Cook County is located in the Arrowhead Region of Minnesota. Cook County is bounded on the west by Lake County, to the north by Ontario, Canada, and to the southeast by Lake Superior. The county has a total land area of 3,340 square miles, with a majority of this land within the Superior National Forest, which includes parts of the Boundary Water Canoe Area Wilderness (BWCAW). There are 812 lakes and two major watersheds in Cook County (MN DNR- Division of Waters, Soils, and Minerals, 1968). The population in 2010 was roughly 5,176 with about 3.6 people per square mile. The largest incorporated community and county seat is Grand Marais, with a population of 1,351. The three townships within the county are Lutsen, Tofte and Schroeder. Furthermore, there are three unorganized territories as well as the Grand Portage Reservation, with a population of 565.

Leisure and hospitality services are the largest contributor to Cook County's economy, employing about 41.6% of the population. Cook County is a premiere tourist destination and sees a high level of visitors year-round as well as a significant increase in seasonal residents. Populations can increase from the census population of 5,176 to an estimated 75,000 on any given day during high seasons, yet operates with the same amount of limited resources. The county must consider the additional populations of wilderness campers, outdoor recreationists, lodging guests, and day visitors in its plans.

The individual population percent that is currently living below the poverty level is 11.9% which is just above the Minnesota average of 10.8% (United States Census Bureau, 2016).

### 3.2 Environmental Characteristics

Western Cook County is home to the highest elevation point in Minnesota, Eagle Mountain, at 2,301'. The lowest elevation point in Cook County is along the Lake Superior shoreline at 602'.

Northern Cook County is densely forested with many wetlands, while southern Cook County shares coastline with the largest body of freshwater in the world, Lake Superior. The total length of Lake Superior's shoreline is 1,826 miles (106 of which are in Cook County).

Topographic relief varies in Cook County depending on the different watersheds. The Lake Superior Watershed is characterized by fast flowing streams that have gradients ranging from 3.6 m/km on the Pigeon River to 98 m/km on Sugarloaf Creek. Steep slopes combined with shallow soils over bedrock contribute to "flashiness" – fast peak discharges after rainfall events.

The underlying bedrock in Cook County consists of igneous and metamorphic rocks. Extensive portions of the county are of more or less continuous bedrock exposure. Shallow depths of bedrock occur in the northern half of the county and inland three to five miles from Lake Superior. Only scattered areas in

the southwestern, south-central and northeast portions of the county have a mantle of glacial deposits. Even in these areas, bedrock outcrops are common.

The weathering processes on the parent materials, the bedrock and glacial deposits produce the soils of Cook County. The county has 11 major soil associations and three additional soil series. Six soil types in the county have been designated as highly erodible. These designations occur on slopes greater than 6%.

The depth of topsoil is minimal compared to the rest of the state. Topsoil is critical for tree and plant production and filters impurities, allowing clean water to enter the groundwater aquifers.

### 3.3 Geology

Cook County has a variety of surface land forms that are the result of glacial activity. The most recent glacial activity occurred 12,000 to 14,000 years ago, when glaciers retreated to the north and east. Lake Superior is located in a downward fold, or trough, of Precambrian rock. The Lake Superior basin resulted from a combination of geologic events. The gradual processes that formed the Lake Superior basin began during the late Precambrian period some 150 million years ago when the earth's crust split apart, with great floods of molten rock spewing forth on the surface as lava flows or cooling off and hardening below. As the flows congealed into new earth crust, the bedrock beneath gradually sank, tilting the overlying mass eastward.

About a million years ago, the great glaciers of the Ice Age began their slow work of carving the coast. Four successive waves of mile-thick ice gouged out the basin. During glacial retreat, meltwaters filled this basin far above present levels. The Lake Superior of that time (about 12,000 years ago) is called Glacial Lake Duluth by geologists. As outlets to the south and east opened, the lake level subsided. Eventually the lake reached its present surface elevation of 602' above sea level.

Virtually all of the bedrock of the North Shore consists of Upper Precambrian volcanic rocks poured out from a giant rift about 1.1 billion years ago, as the continent started to tear itself apart.

### 3.4 Hydrography

Cook County is part of two major basins: the Rainy River Basin in the northwestern quadrant and the Great Lakes Basin in the rest of the county. The portion of the county in the Rainy River Basin is part of the Rainy River – Headwaters Watershed, while the portion in the Great Lakes Basin is part of the Lake Superior – North Watershed (MN DNR, 2018).

The boundary between the two watersheds is part of the Laurentian Divide, which separates water flowing north to the Arctic Ocean and Hudson Bay and water flowing south towards Lake Superior and the Atlantic Ocean.

Of the 812 lakes in Cook County, 128 are listed on the Minnesota Pollution Control Agency's Impaired Waters List. The listed pollutants or stressors of these bodies of water include: mercury in fish tissue, mercury in the water column, PCB in fish tissue, total suspended solids and turbidity. Impaired waters have become a priority issue because they do not meet set water quality standards and they affect the



growth and health of communities and economies. The Clean Water Act has a mandate requiring every state to address these impairments.

Furthermore, there are 16 bodies of water that have confirmed cases of aquatic invasive species (Minnesota DNR, 2018). The invasive species for all 16 bodies of water is the spiny waterflea. According to the Minnesota DNR, the spiny waterflea is a microscopic animal that is native to Europe and Asia. The spiny waterflea is typically transferred between lakes through fishing line and equipment that is not properly cleaned, drained and dried between different water bodies. Aquatic invasive species are important to control and eradicate to keep a large, healthy population of native aquatic life.

Basic hydrography in Cook County is mapped in Figure A-1 in Appendix A.

#### **3.4.1 Groundwater**

There are three main sources of groundwater in Cook County. These aquifers include the Keweenaw Aquifer, Proterozoic Aquifer and Precambrian Undifferentiated Aquifer.

The Keweenaw Aquifer is located about 15-20 miles inland from Lake Superior with well depths ranging from 20 to 930 feet. Yields from the Keweenaw Aquifer are between 5 and 25 gallons per minute. The water pumped from this aquifer is generally saline with elevated dissolved solids and iron concentrations. The Keweenaw Aquifer is a source for domestic and public water use.

The Proterozoic Aquifer is located along the Canadian border. This aquifer has well depths of 30 to 500 feet and can supply water at rates of 5 to 70 gallons per minute. The water pumped from this aquifer is used in several domestic and municipal supplies across the region. The Proterozoic Aquifer is protected from outside contamination with an overlay of thick layer of glacial material.

The Precambrian Undifferentiated Aquifer is located in the northwestern portion of the county. This aquifer typically has yields that are less than five gallons per minute.

Aquifer vulnerability using 2011 data from the Minnesota Department of Agriculture and public wells are mapped in Figure A - 13.

#### **3.4.2 Lakes**

There are 812 lakes in Cook County, of which 10.2% are 10 acres or larger. Water covers 1,887 square miles of Cook County, or 56%.

In addition, Cook County lies along the North Shore of Lake Superior, the world's largest freshwater lake by surface area. Lake Superior has a surface area of 31,700 square miles and an average depth of 483 feet. The deepest point is 1,332 feet, located on the eastern end of the lake. The lake holds 10% of the world's fresh surface water that isn't frozen in glaciers or ice caps. It is managed through a binational agreement between Canada and the U.S., and by the Province of Ontario and the states of Minnesota, Wisconsin and Michigan (Minnesota Sea Grant, 2018).

### 3.4.3 Rivers

There are three major rivers that flow through Cook County that all drain into Lake Superior. These are the Poplar, Brule and Pigeon Rivers. However, there are many more streams and rivers. Most of these streams and rivers are fed by wetlands and begin inland where the land is flat (Cook and Lake Counties, 2017). As these bodies of water flow to Lake Superior, they encounter a drop in elevation and a subsequent increase in flow rate at the ridge along the coast of Lake Superior.

Cook County has an extensive canoe route system primarily in the rivers and streams of the Boundary Waters Canoe Area Wilderness (BWCAW). The streams within the BWCAW that flow into the Rainy River Basin tend to be slow and steady moving.

### 3.4.4 Wetlands

Wetlands cover approximately 42,000 acres in Cook County. Important benefits of wetlands include storage area for excess water during flooding; filtering of sediments and nutrients before they enter lakes, rivers and streams; and fish and wildlife habitat.

Wetlands in Cook County include eight types: seasonally flooded basins/flats, wet meadows, shallow marshes, deep marshes, shallow open water, shrub swamps, wooded swamps and bogs (Figure A - 1).

Invasive plants have spread throughout many wetlands in Minnesota. These plants can take over entire native communities and threaten wetland ecosystems. According to the MN DNR Infested Waters List, spiny waterfleas have been documented in 16 lakes in Cook County (MN DNR, 2018). Spiny waterfleas prey on native zooplankton such as *Daphnia*, an importation source of food for native fish. In some lakes, spiny waterfleas can completely eliminate certain species of native zooplankton. They do not provide a good food source for native fish due to their long tails and spines that make them hard to eat. There are currently no known methods for effective population control of spiny waterfleas in natural water bodies (MN DNR, 2018).

## 3.5 Climate

The climate of Cook County is classified as a continental climate regime characterized by wide variations in temperature. The climate of the county, especially along the North Shore, is greatly influenced by Lake Superior. The effect of the lake results in cooler summer temperatures and warmer winter temperatures. The lake also affects winter precipitation as heavy lake-effect snowfall generally occurs five to seven miles inland from Lake Superior.

August is the hottest month on average in Grand Marais, with an average high temperature of 71° F. The highest temperature ever recorded there occurred in 2005, when it rose to 95° F (Intellicast, 2018).

January is the coldest month on average in Grand Marais, with an average low of 5° F. The lowest temperature ever recorded in Grand Marais is -34° F, which occurred in February of 1933 and again in January of 1935. December and January are the snowiest months, with December averaging 12.4 inches and January averaging 12.3 inches (Intellicast, 2018).

The weather station in Grand Portage recorded a temperature of -48° F on February 14, 1896. The weather station on Gunflint Lake has recorded a temperature of -44° F on four different occasions: January 17, 1982; January 17, 2005; January 18, 2005; and January 15, 2009 (MN DNR, n.d.).

### 3.5.1 Climate Change

Minnesota's climate is currently changing in ways that are pushing us to adapt to weather patterns and extreme events that pose major threats to our health, homes, environment and livelihoods. These events cost our state millions in property loss, damaged infrastructure, disrupted business, medical care and support services, and put residents and responders at risk. Understanding how our weather is changing now and into the future will help planners and decision-makers in emergency management and supporting fields extend our progress in climate adaptation and lead to more resilient communities (MDH, 2018).

The National Climate Assessment suggests that infrastructure planning (particularly water resources infrastructure) should "be improved by incorporating climate change as a factor in new design standards and asset management and rehabilitation of critical and aging facilities, emphasizing flexibility, redundancy, and resiliency" (Georgakakos, et al., 2014).

Federal, state, and tribal governments are increasingly integrating climate change adaptation into existing decision-making, planning, or infrastructure-improvement processes (Georgakakos, et al., 2014). Definite predictions are difficult to make, as changes may vary depending on geographical location, even within Minnesota. Intense study of these topics is ongoing.

In August 2018, the Minnesota Department of Health Climate & Health Program published "Planning for Climate & Health Impacts in Northeast Minnesota: Emergency Management Considerations for HSEM Region 2." This report is one of a series of custom climate profile reports produced for each of the six HSEM regions in the state for reference to climate change projection data, impacts, and considerations for emergency management and preparedness professionals in this HSEM region.

### Climate Data Trends

Over 50 years of storm data on record document that Minnesota has experienced an increase in the number and strength of weather-related natural disasters, particularly those related to rising temperatures and heavy downpours.

According to the 2015 Minnesota Weather Almanac,

*During the three most recent decades, the Minnesota climate has shown some very significant trends, all of which have had many observable impacts...Among the detectable measured quantity changes are: (1) warmer temperatures, especially daily minimum temperatures, more weighted to winter than any other season; (2) increased frequency of high dew points, especially notable in mid- to late summer as they push the Heat Index values beyond 100°F; and (3) greater annual precipitation, with a profound increase in the contribution from intense thunderstorms (Seeley M. , 2015).*

Temperature and precipitation projections below are taken from the Minnesota Department of Health Region 2 profile. Appendix M provides the full MDH profile for Region 2, which includes Cook County. The information in this report was used to help inform the updated risk assessments in Section 4 – Risk Assessment of this plan for natural hazards and their relationship to climate change.

### Temperature

*The continued rise in winter temperatures will result in less snow pack, which will increase chances for grassland/wildfires as well as drought. The warmer winter temperatures will also have major consequences for our ecosystems, including native and invasive species, whose growth, migration, and reproduction are tied to climate cues. The increase in Lyme disease across Minnesota is also likely influenced in part by the loss of our historical winters, due to a longer life-cycle period for ticks. Freeze-thaw cycles are likely to increase as well, damaging roads, power lines and infrastructure, and causing hazardous travel conditions. By mid-century our average summer highs will also see a substantial rise, coupled with an increase in more severe, prolonged heat waves that can contribute to drought and wildfires and pose a serious health threat, particularly to children and seniors (MDH, 2018).*

### Precipitation

*There has been an increase in total average as well as heavy precipitation events, with longer periods of intervening dry spells. Our historical rainfall patterns have changed substantially, giving rise to larger, more frequent heavy downpours. Minnesota's high-density rain gauge network has captured a nearly four-fold increase in "mega-rain" events just since the year 2000, compared to the previous three decades. Extreme rainfall events increase the probability of disaster-level flooding. However, there is also an increased probability that by mid-century heavy downpours will be separated in time by longer dry spells, particularly during the late growing season. Over the past century, the Midwest hasn't experienced a significant change in drought duration. However, the average number of days without precipitation is projected to increase in the future, leading Minnesota climate experts to state with moderate-to-high confidence that drought severity, coverage, and duration are likely to increase in the state. Modeling future precipitation amounts and patterns is less straight-forward compared to temperature. Some climate models do a better job than others representing rainfall for the Midwest, and available data sources only provide average estimates on a monthly scale, masking the spikes in extremes that trigger flood and drought disasters (MDH, 2018).*

## 3.6 Demographics

Grand Marais is the largest city in Cook County (pop. 1,351) and the designated county seat. There is 1 city in Cook County, 3 townships and 3 unorganized territories.

Table 3 summarizes the population by community according to the 2010 U.S. Census. Figure 1 shows Cook County population density by census block.

Table 3. Cook County Population by Community, 2010

Community	2010 Population	% of County
East Cook UT	775	15.0
Grand Marais	1,351	26.1
Grand Portage UT	565	10.9
Lutsen Township	415	8.0
Schroeder Township	205	4.0
Tofte Township	249	4.8
West Cook UT	1,616	31.2
<b>Total:</b>	<b>5,176</b>	

Source: U.S. Census Bureau, 2010

Population growth trends have an important influence on the needs and demands of a variety of services such as transportation, law enforcement and emergency response. An understanding of population trends and location of population concentrations is important for making projections regarding potential impacts in the event of a disaster.

In 2010, Cook County had a population of 5,176, averaging 3.6 persons per square mile of land area. Grand Marais, the largest and only city in the county, had a population of 1,351 people.

Between 1940 and 2010, Cook County's population had a sharp increase, of 70.6%. However, the increase was more gradual between 2000 and 2010 with an increase of 0.15%. Historically, the population of Cook County may experience an increase or decrease in persons between decades but it is increasing steadily.

Table 4 below shows the population change in Cook County between 1940 and 2010.

Table 4. Cook County Population Change (1940-2010)

1940	1950	1960	1970	1980	1990	2000	2010	Change 1940-2010	Change 2000-2010
3,030	2,900	3,377	3,423	4,092	3,868	5,168	5,176	+70.8%	+0.15%

Source: Population.us

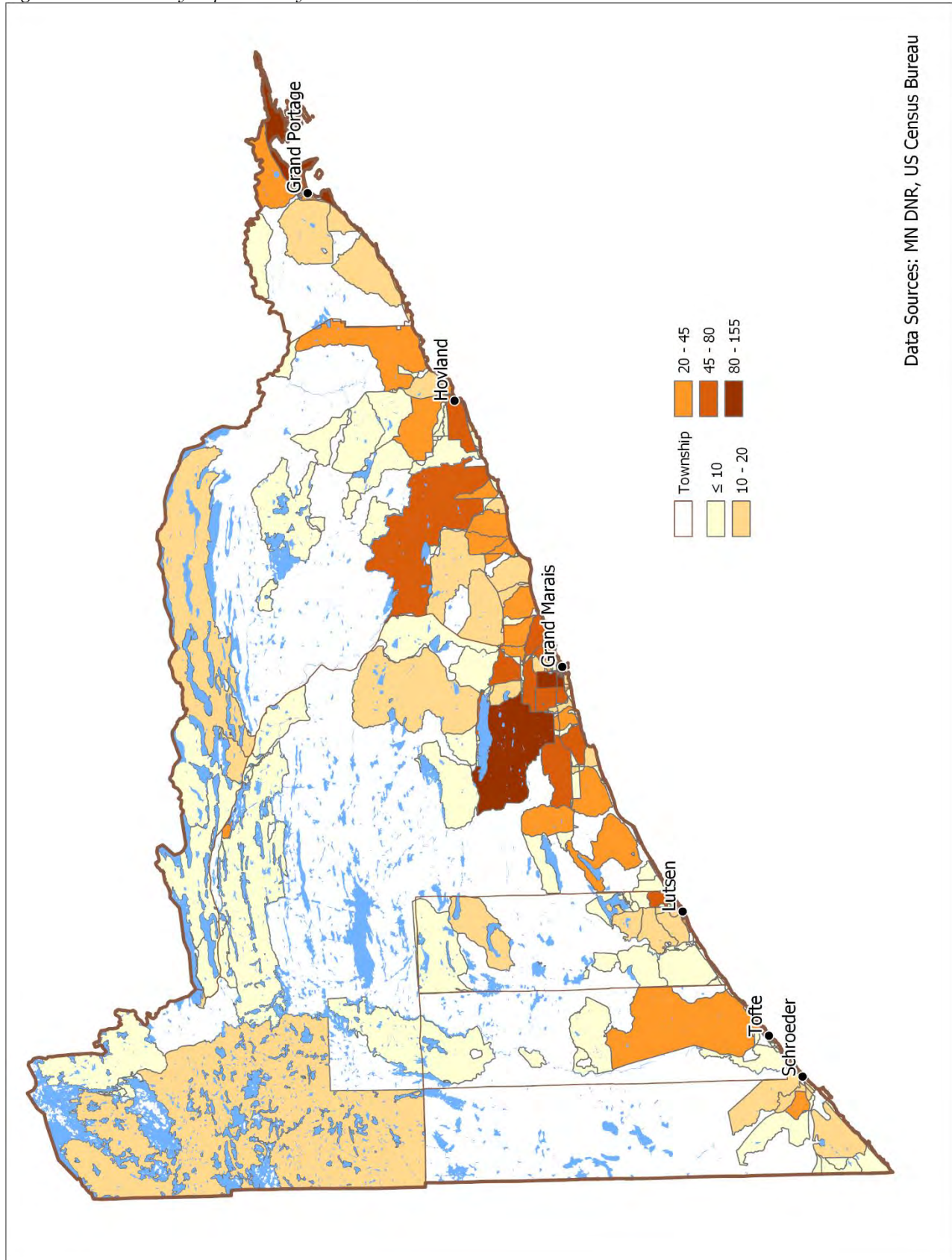
In 2015, Cook County's population was projected to increase by 5% between 2015 and 2045. Table 5 below shows population projections for Cook County until 2045.

Table 5. Cook County Population Projections (2015-2045)

2015	2020	2025	2030	2035	2040	2045	Projected Change 2015-2045
5,261	5,371	5,443	5,482	5,507	5,518	5,523	+5%

Source: Minnesota State Demographic Center, Minnesota Planning, 2014

Figure 1. Cook County Population by Census Block, 2010





### 3.7 Economy

Cook County is dominated by the leisure and hospitality industry, with approximately 42% of jobs in the county. Trade, transportation and utilities and public administration are also major components of the county's economy.

The number of jobs in the county increased by around 6% between 2007 and 2017.

Table 6 provides an overview of the annual average employment by major industry sector in Cook County.

*Table 6. Annual Average Employment by Major Industry Sector, Cook County*

Industry	Number of Jobs (2007)	Number of Jobs (2017)
Construction	170	172
Trade, Transportation and Utilities	420	486
Information	29	25
Financial Activities	72	81
Professional and Business Services	46	54
Education and Health Services	342	386
Leisure and Hospitality	1,118	1,198
Other Services	38	31
Public Administration	440	402
<b>Total Number of Jobs:</b>	<b>2,726</b>	<b>2,882</b>

*Source: Minnesota Dept. of Employment and Economic Development. Note: data discrepancies between segment values and totals exist due to data suppression for confidentiality.*

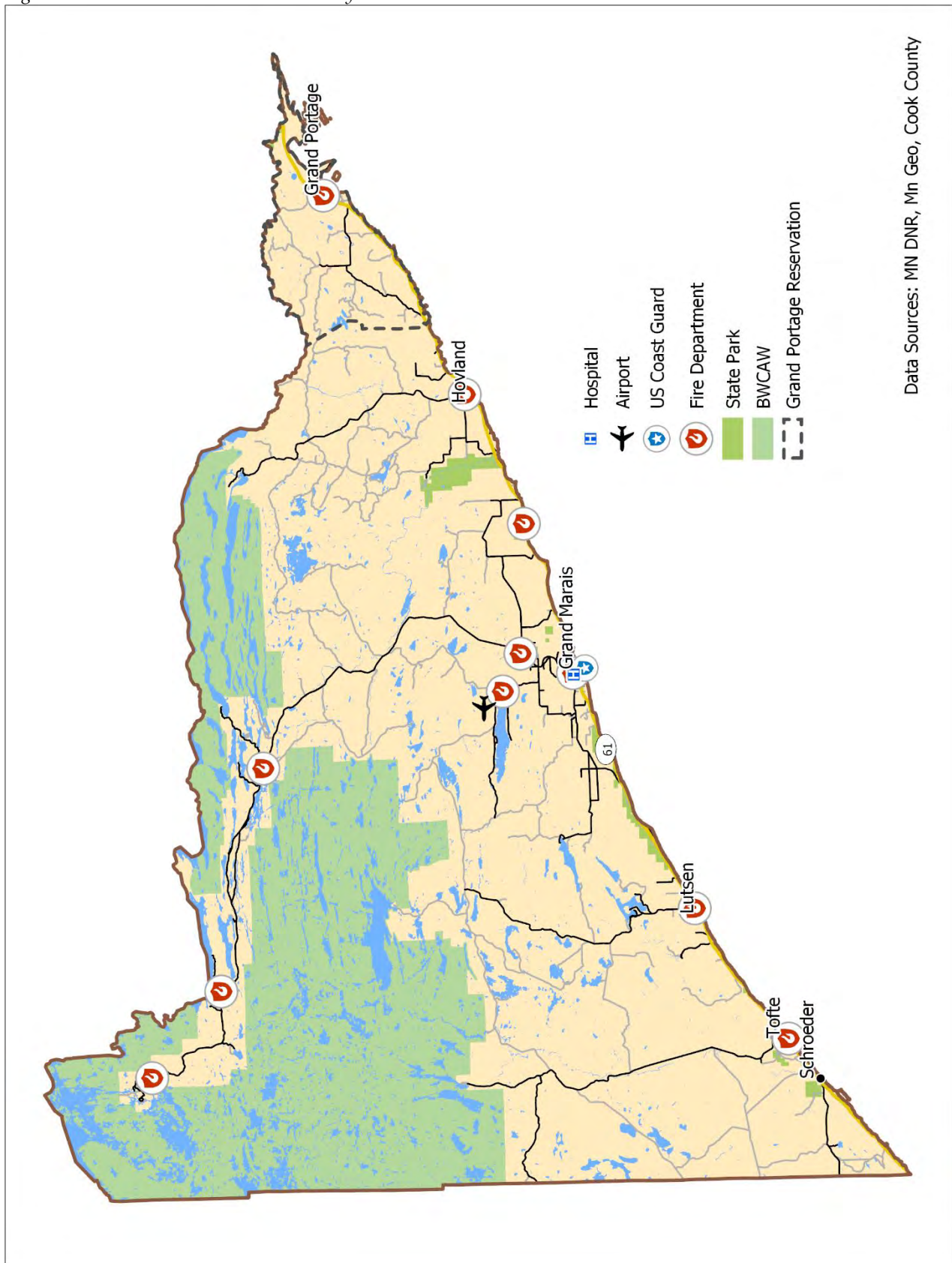
According to the 2012-2016 American Community Survey 5-year estimates, the median household income in Cook County was \$51,793, compared to a Minnesota average of \$63,217. The median household income in Cook County increased by 5.4% since the 2006-2010 estimates. The percent of the county's population living below the poverty level was 11.9%, compared to a 10.8% average for the state of Minnesota.

### 3.8 Community Services & Infrastructure

The following section provides an overview of community services and infrastructure within Cook County. Examples of community services include healthcare and public safety, while examples of community infrastructure include power utilities, water and sewer facilities, and the transportation network. Figure 2 below shows critical facilities in the county, and tables of all critical facilities are located in Appendix B.

Critical facilities in Grand Marais are mapped in Figure A - 15 in Appendix A.

Figure 2. Critical Facilities in Cook County





### **3.8.1 Health Care Providers**

There are two health care providers in Cook County, the North Shore Health Hospital and the Sawtooth Mountain Clinic, that both operate in Grand Marais. There is one dental practice, Grand Marais Family Dentistry, located in Grand Marais.

There are services provided to assist the elderly and their families through Care Partners of Cook County based out of Grand Marais.

Cook County has four ambulance districts that provide coverage to the county. The North Shore Health Hospital also has ambulance and emergency room services.

Figure A - 12 in Appendix A depicts health services within Cook County.

### **3.8.2 Public Safety Providers/Government Services**

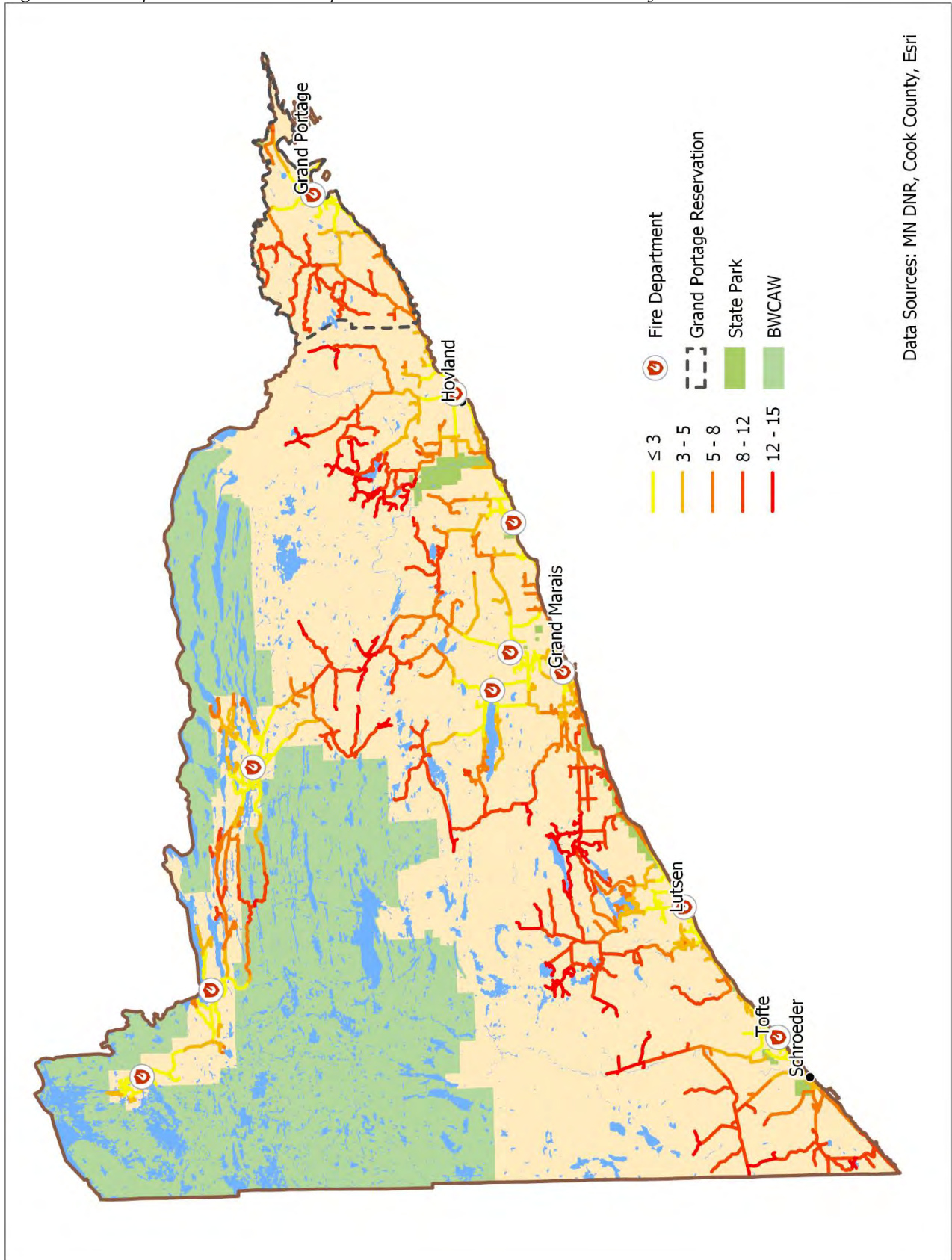
The Cook County Sheriff's Office is located in Grand Marais. Twelve fire department/fire halls are located within the county.

The Minnesota Incident Command System (MNICS) is an interagency group of state and federal partners that cooperate to manage wildfire and all risk incidents while developing standard procedures, practices and guidelines to support incidents and resource mobilization. The USFS has three T6 engines, one T7 engine, three float planes as well as access to other resources. All the resources operate under the MINICS agreement for wildfire. Through these resources the county's ability to respond to structure fires is enhanced.

Figure A - 4 in Appendix A depicts government and emergency facilities, including city halls, fire departments, the Sheriff's Department, and the Cook County Courthouse.

Figure 3 shows fire departments and fire response times in Cook County. These drive times were created using the ArcGIS Network Analyst extension and Esri's Business Analyst. The user may note discrepancies between MnDOT road data and the map in this document; Network Analyst requires a seamlessly-connected data source in order to perform the calculations for drive times, which Business Analyst provides but MnDOT does not. The Business Analyst data was used for this reason. According to this model, all communities in the county are within 15 minutes of a fire department.

Figure 3. Fire Departments and Fire Response Times in Minutes in Cook County



### 3.8.3 *Utilities/Communications*

The Arrowhead Electric Cooperative provides electricity to Cook County residents.

Established in 2004, the Allied Radio Matrix for Emergency Response (ARMER) Program, administered in coordination with the Minnesota Statewide Radio Board, manages the implementation of a 700/800 megahertz (MHz) shared digital trunked radio communication system. In Cook County, there are 15 ARMER towers (see Figure A - 5 in Appendix A).

### 3.8.4 *Transportation*

There are about 1,748 total miles of roadway within Cook County. The primary roadway that passes through the county is Trunk Highway (TH) 61. This highway follows the southern line of the county and the coast of Lake Superior. Highway 61 is an important part of the county because it provides the only direct link from the North Shore of Lake Superior in Minnesota to Thunder Bay, Canada. There are five main inland county roads that include County Highways 1, 2, 4, 7, 12 and 16.

The Cook County Public Works Department is responsible for the maintenance and construction of County State Aid Highways and County Roads, which include 297 centerline miles of roadways and 59 bridges. The department's primary functions are divided into the following four divisions:

- The Administration Division is responsible for managing the highway budget and communicating with the public on current and future highway projects.
- The Engineering Division is responsible for planning, designing and monitoring construction and improvement projects of highway and bridges. The Engineering Division is also responsible for preparing the 5-Year Transportation Improvement Plan (TIP).
- The Highway Maintenance Division is responsible for maintaining integrity and safety of roadways and bridges by removing snow and ice, overseeing the annual dust control program and repairing minor surface damages on county roads.
- The Fleet Maintenance Division is responsible for providing safe and functioning Highway Department vehicles and equipment.

Cook County completes the snow removal for all county roads. MnDOT will remove the snow from state highways as well as disperse salt or sand as needed. Township road maintenance and snow removal is handled by each township.

There is one railroad line, the LTV Mining Line, which runs 7.75 of its total 87.38 miles within Cook County. The LTV Mining Line was at one point used to transport processed taconite pellets but was closed in 2001 due to lack of demand within the steel market. Currently, there is no rail traffic in Cook County.

There is one airport that lies in Cook County, the Grand Marais/Cook County Airport CKC & Seaplane Base. This airport is located 7 miles north of Grand Marais on County Road 12. Another Seaplane Base is located on Gunflint Lake.

Cook County's transportation network is mapped in Figure A - 6 in Appendix A.

### 3.9 Land Use and Ownership

Cook County covers a total of 3,340 square miles. Of this total area, water covers 1,887 square miles (56%). Based on 2010 U.S. Census data, there were 3.6 people per square mile of land area. Cook County is the fifth least populated county in Minnesota.

Approximately 70% of land in Cook County is federally-owned, while another 15% is state-owned. Private ownership accounts for 9%.

The majority of residential and commercial development in Cook County is located on a narrow strip following Highway 61 along Lake Superior. However, there is also some inland development found along the Gunflint Trail corridor (County State Aid Highway 12) and some lakes. All of the land use on the Grand Portage Reservation is regulated by the Grand Portage Land Use Ordinance.

There are four state parks that lie within Cook County: Grand Portage, Judge C.R. Magney, Cascade River and Temperance River.

In 2012, 18 farms existed in the county, covering 2,272 acres. Of this farming land, the majority is classified as woodland, which accounts for 84% of the farming land. The number of farms increased from 2007 by 38%, while the number of acres farmed decreased by 5% (Census of Agriculture, 2012).

There are two feedlots in Cook County (see Figure A - 22 in Appendix A).

Land ownership categories from the 2008 U.S. Geological Survey GAP (Gap Analysis Program) are shown in Figure A - 8 (*Appendix A: Cook County Maps*). Land cover is mapped in Figure A - 7.

## Section 4 – Risk Assessment

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

Basing risk assessments on the best information available is important in developing effective mitigation actions that benefit communities. Geographic Information System (GIS) tools are not only helpful in producing maps, but they also show structures at risk and may determine damage estimates for potential hazard scenarios. MN Homeland Security and Emergency Management (HSEM) mitigation staff encourages the use of GIS tools in risk assessments because they produce good information to use in the risk assessment process. In recognition of the importance of planning in mitigation activities, FEMA created Hazus, a powerful GIS-based disaster risk assessment tool. This tool enables communities to predict estimated losses from floods, hurricanes and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. Hazus was used by UMD Geospatial Analysis Center staff in the flood hazard risk assessment (see section 4.4.5).

This assessment identifies the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components — hazard identification and prioritization, risk profile, and vulnerability profile.

### 4.1 Hazard Identification/Profile

#### 4.1.1 Hazard Identification

The cornerstone of the risk assessment is identification of the hazards that affect jurisdictions. To facilitate the planning process, several sources were employed to ensure that the natural hazards are identified prior to assessment.

The county maintenance of the plan includes continual updates of the hazards identified in the initial plan. The mitigation steering committee compared the hazards in the initial plan to current publications to determine if new hazards should be considered or if some should be deleted. This plan addresses natural hazards only.

Natural hazards are identified in the FEMA publication “Multi-Hazard Identification and Risk Assessment – A Cornerstone of the National Mitigation Strategy,” also known as MHIRA. FEMA Region V developed a list based on state mitigation plans in the region. Table 7 lists the natural hazards included in the 2019 Minnesota State Hazard Mitigation Plan.

Table 7. FEMA MHIRA Natural Hazards in the 2019 Minnesota State Hazard Mitigation Plan

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

\*Addressed in the State Mitigation Plan because Minnesota is a heavily forested state compared to other states in Region V.

#### 4.1.2 Vulnerability Assessment by Jurisdiction

As part of the plan update process, the steering committee reviewed, updated, and ranked the hazards faced by residents of Cook County, updated the existing mitigation actions published in the 2010 Multi-Hazard Mitigation Plan, and proposed new mitigation actions.

To engage in this process, the committee drew on a number of data sources. First, the committee examined the natural hazards identified in the 2010 Multi-Hazard Mitigation Plan (Table 8). The natural hazards that pose risk to Cook County were discussed and adjusted to reflect the definitions of natural hazards used in the 2019 Minnesota State Hazard Mitigation Plan. This was done in order to assure that the risks faced by Cook County were categorized the same way as the priority hazards established by the State of Minnesota.

Table 8. Natural hazards identified in the 2010 Cook County Multi-Hazard Mitigation Plan

Natural Hazards			
Snow Storms	Ice Storms	Thunderstorms	Lightning
Tornadoes	Hailstorms	Wind Storms	Extreme Temperatures
Flooding	Drought	Polluted Water	Wildfire
Wildfire	Infectious Diseases	Earthquakes	Solar Storms

While the focus of this MHMP is on natural hazards, planning took place with the understanding that many non-natural hazards could occur as a result of natural disasters (i.e. disruption in electrical service due to freezing rain causing problems for both utility corporations and vulnerable populations dependent on electricity for heat).

This plan draws on a variety of data sources including the State of Minnesota and Homeland Security Emergency Management Critical Infrastructure Strategy for the State of Minnesota (2010), FEMA's Local Mitigation Planning How-to Guide Integrating Manmade Hazards into Mitigation Planning (2003), and the State of Minnesota Multi Hazards Identification Risk Assessment.

Cook County ranked hazards based on a Calculated Priority Risk Index, or CPRI, as part of the development of their 2013-2015 Threat and Hazard Identification Risk Assessment (THIRA). These

rankings were considered by the steering committee in the process of ranking hazards for the MHMP update. The methodology of the CPRI is outlined below.

#### **4.1.3 Calculated Priority Risk Index**

The vulnerability assessment builds upon the previously developed hazard information by identifying the community assets and development trends and intersecting them with the hazard profiles to assess the potential amount of damage that could be caused by each hazard event. A summary of Calculated Priority Risk Index (CPRI) categories and risk levels is shown in Table 9.

##### *Definitions of CPRI Categories*

**Probability** – a guide to predict how often a random event will occur. Annual probabilities are expressed between 0.001 or less (low) up to 1 (high). An annual probability of 1 predicts that a natural hazard will occur at least once per year.

**Magnitude/Severity** – indicates the impact to a community through potential fatalities, injuries, property losses, and/or losses of services. The vulnerability assessment gives information that is helpful in making this determination for each community.

**Warning Time** – plays a factor in the ability to prepare for a potential disaster and to warn the public. The assumption is that more warning time allows for more emergency preparations and public information.

**Duration** – relates to the actual amount of time that an incident may take place over time.



Table 9. Summary of Calculated Priority Risk Index (CPRI) Categories and Risk Levels

CPRI Category	DEGREE OF RISK			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001	1	45%
	Possible	Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 0.01 and 0.001.	2	
	Likely	Occasional occurrences with at least two or more documented historic events. Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 0.1.	4	
Magnitude/Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible quality of life lost. Shutdown of critical facilities for less than 24 hours.	1	30%
	Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability and there are no deaths. Moderate quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least one death. Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours	Less than 6 hours	4	15%
	6 to 12 hours	6 to 12 hours	3	
	12 to 24 hours	12 to 24 hours	2	
	More than 24 hours	More than 24 hours	1	
Duration	Brief	Up to 6 hours	1	10%
	Intermediate	Up to 1 day	2	
	Extended	Up to 1 week	3	
	Prolonged	More than 1 week	4	



The hazard rankings for the Cook County MHMP update (Table 10) were based upon review of 1) hazard rankings in the past MHMP (2010), 2) hazard rankings in the Calculated Priority Risk Index (CPRI) conducted by the county (2013-2015), and 3) group review and discussion during the MHMP steering committee meetings (2018).

*Table 10. Hazard Ranking for 2019 MHMP Update*

Natural Hazards	MHMP Hazard Ranking
Wildfire	High
Severe Winter Storms	High
Severe Summer Storms (Thunderstorms, Lightning, Hailstorms, Windstorms, Tornadoes)	High
Extreme Heat/Extreme Cold	Moderate
Flash Floods, Riverine Floods, Coastal Floods	Moderate
Drought	Moderate
Erosion/Coastal Erosion/Land Subsidence	Moderate
Dam Failure	Low

Dam failure was removed from this plan update because there are no dams of any major consequence in the county. The five dams in the county (Kelso River, Devil Track Lake, Dutchman Lake, Northern Light Lake, and South Fowl Lake) do not pose risk to property or lives in Cook County.

#### **4.1.4 Hazard Profiling Concept of Planning**

The risk assessments identify the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components—hazard identification, risk profile and vulnerability profile.

#### **4.1.5 GIS and Risk Assessment**

The risk analysis step in this assessment quantifies the risk to the population, infrastructure and economy of the community. Hazards that can be geographically identified (wildfires, windstorms, tornadoes, hail, floods) were mapped.

FEMA's Hazus tool in ArcGIS was used to estimate the damages incurred for a 100-year flood and for general asset assessment. Hazus also generates aggregated loss estimates for the entire county due to a 100-year flood. Aggregate inventory loss estimates, which include building stock analysis, are based upon the assumption that building stock is evenly distributed across each census block. Therefore, it is possible that overestimates of damage will occur in some areas while underestimates will occur in other areas. With this in mind, total losses tend to be more reliable over larger geographic areas (groups of many blocks) than for individual census blocks. It is important to note that Hazus is not intended to be a substitute for detailed engineering studies.

#### 4.1.6 National Centers for Environmental Information (NCEI) Records

Historical storm event data was compiled from the National Centers for Environmental Information (NCEI). NCEI records are estimates of damage reported to the National Weather Service (NWS) from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to given weather events.

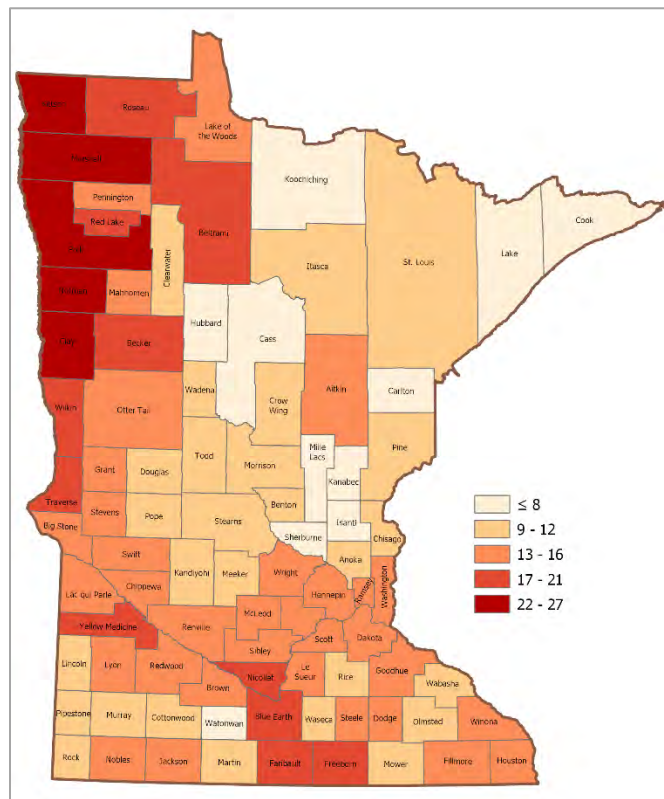
The NCEI data included 288 reported events in Cook County between 1950 and October 2018. However, some weather event categories only had available data going back as recent as 1996. No records before 1950 were available. A summary table of events related to each hazard type is included in the hazard profile sections that follow. A full table listing all events, including additional details, is included in Appendix C. NCEI hazard categories used in this plan are listed in Table 11.

Table 11. National Centers for Environmental Information Historical Hazards

Hazard	
Tornado	Hail
Thunderstorm Wind	Flood/Flash Flood
Winter Weather/ Winter Storm/Blizzard/Ice Storm/Lake Effect Snow/Heavy Snow	Cold/Wind Chill
Excessive Heat/Heat	Lightning

#### 4.1.7 FEMA Declared Disasters

Figure 4. FEMA Disaster Declarations by County



Another historical perspective is derived from FEMA-declared disasters. Four major disaster and two emergency declarations have been made in Cook County (Figure 4).

Table 12 and Table 13 show the details of the disasters including payments for Public Assistance (PA) and Individual Assistance (IA), listed under the flooding and severe storm profiles. No declarations were made for the other storms listed in the NCEI database. Reviewing the federal payments for damages from the declared disasters is a way of correlating the impact from the NCEI report.

Table 12. FEMA-Declared Major Disasters in Cook County (1953-2018)

Incident	Declaration Date and Disaster Number	Incident Period	Total PA Obligated by FEMA for Disaster in Minnesota	Total PA Obligated by FEMA for Disaster in Cook County	Individual Assistance in Minnesota	Individual Assistance in Cook County
Severe Storms, Flooding	7/6/2012 DR-4069	6/14/2012 – 6/21/2012	\$43,475,651	\$49,070	None	None
Severe Storms, Flooding	4/9/2009 DR-1830	3/16/2009 – 5/22/2009	\$29,675,993	\$74,555	None	None
Severe Storms, Flooding	6/25/2008 DR-1772	6/6/2008 – 6/12/2008	\$6,361,368	\$484,604	None	None
Severe Storms, Winds, Flooding	7/28/1999 DR-1283	7/4/1999 – 8/2/1999	\$11,270,477	\$824,292	Yes, amount unknown	Yes, amount unknown

\* Data provided by MN HSEM in August 2017, and downloaded from <https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1> on 10/17/2018. Values are estimates collected at the time of the disaster.

Table 13. FEMA-Declared Emergencies in Cook County (1974-2018)

Incident	Declaration Date and Disaster Number	Incident Period	Individual Assistance in Minnesota	Public Assistance (all affected areas)
Hurricane Katrina Evacuation	9/13/2005 EM-3242	9/29/2005 – 10/1/2005	None	None
Drought	6/17/1976 EM-3013	6/17/1976	None	Unknown

\* Data downloaded from <https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1> on 10/17/2018. Values are estimates collected at the time of the disaster.

Table 14 depicts the mitigation projects in Cook County funded through FEMA hazard mitigation assistance grant programs since 1997.

Table 14. Historical Hazard Mitigation Funding (HMGP and PDM) in Cook County

Year	Project Description	Sub-Grantee	Federal Share
2013	Cook County Hazard Mitigation Plan Update (HMGP)	Cook County	\$22,507
2012	Wildfire mitigation (retrofitting of private structures, creation of defensible space) (PDM)	Cook County	\$494,865
2008	Wildfire mitigation (retrofitting private structures) (PDM)	Cook County	\$1,913,480
2008	Wildfire mitigation (retrofitting private structures) (PDM)	Arrowhead Regional Development Commission	\$448,376
2007	Cook County Hazard Mitigation Plan Update (HMGP)	Cook County	\$19,983

Year	Project Description	Sub-Grantee	Federal Share
2000	Gunflint Trail Wildfire Vegetation Management (HMGP)	Cook County	\$74,673
1999	Portable Sprinkler Systems purchase (HMGP)	Cook County	\$30,000
1999	Permanent Sprinkler Systems purchase (HMGP)	Cook County	\$471,912
1999	Convert overhead electric power lines to underground (HMGP)	Arrowhead Electric Cooperative	\$455,700
1999	Wildfire Safety Area preparation (HMGP)	MN DNR	\$108,750
1999	Wildfire Defensible Space creation (HMGP)	Cook County	\$281,242
1999	NOAA Weather Radio Transmitters (HMGP)	St. Louis County	\$83,589
1997	Convert overhead electric power lines to underground (HMGP)	Arrowhead Electric Cooperative	\$306,915
<b>Total HMGP/PDM Funding – Cook County</b>			<b>\$4,263,616</b>

\* Data provided by MN HSEM in August 2017.

## 4.2 Vulnerability Assessment

County departments and jurisdictions were invited to respond to a “**Jurisdictional Questionnaire**” to provide information on impacts of recent hazard events, the increase or decrease of community vulnerabilities, and ideas for local-level mitigation actions. The complete city questionnaires can be found in *Appendix L: Jurisdictional Questionnaires*, and vulnerabilities are referred to in the individual hazard vulnerability sections.

Flooding, wind storms and wildfire are the hazards of most concern in Cook County and which make its property and residents most vulnerable. Since the last plan update, Cook County has experienced more severe rainstorms and past blowdowns in the forest continue to wildfire a serious threat. There have not been significant development changes in the county that make the county more vulnerable. However, the Cook County Firewise Coordinator did note that an aging population and property turnover may both contribute to less property maintenance for wildfire mitigation risk.

### 4.2.1 Asset Inventory

A 2010 essential facility dataset (schools, medical facilities, fire stations, and police stations compiled from state and county sources) was used to override the default Hazus input database. Other critical facilities identified by the county were geocoded and overlaid with the Hazus flood model output.

For the purposes of this plan, critical infrastructure and key resources were defined by Cook County.

Table 15 below identifies the critical facilities that were included in the analysis. Essential facilities are a subset of critical facilities. Names and locations of all critical facilities are found in Appendix B.

Table 15. Cook County Critical Infrastructure and Facilities

Infrastructure Type	Number of Facilities
Agriculture and Food	4
Banking and Finance	6
Chemical and Hazardous Materials	2
Commercial Facilities	83
Communications	2
Dams	5
Emergency Services	12
Energy	3
Government Facilities	23
Healthcare and Public Health	7
Manufacturing	1
National Monuments	1
Postal and Shipping	6
Transportation	4
Water	5

#### 4.2.2 Facility Replacement Costs

Cook County-specific building data was sourced from the parcel tax databases and parcel polygon data including building valuations and occupancy class. Structure values for each parcel were aggregated within each parcel and assigned to the parcel centroid point. Records were aggregated to the relevant census administrative boundaries for the flood hazard analysis. This process also provided total facility replacement costs and total building exposure by general occupancy class (defined by Hazus tools). The total estimated building exposure for Cook County is shown in Table 16.

Table 16. Cook County Total Building Exposure

General Occupancy	Parcels Containing Structures	Total Building Exposure
Agriculture	66	\$4,706,000
Commercial	426	\$125,352,000
Education	14	\$28,410,000
Government	280	\$57,096,000
Industrial	24	\$25,294,000
Religious/Non-Profit	64	\$28,444,000
Residential	10,478	\$1,324,570,000
<b>Total:</b>	<b>11,352</b>	<b>\$1,593,872,000</b>

### 4.3 Future Development

Because Cook County is vulnerable to a variety of natural hazards, the county government—in partnership with the state government—must make a commitment to prepare for the management of

these events. Cook County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

Development trends showed a dramatic decrease in overall development starting in 2008 through 2010, and then a slow, gradual increase in the numbers of new homes since then, but still remaining well below (approximately 34% lower) peak development and construction rates in the early to mid-2000s. The geographic settlement patterns have not changed in the last two decades, and the only real change Cook County is observing is the number of dwellings that are being converted to vacation rentals, both on a full-time or part-time basis. Cook County Land Services is in the process of working towards a comprehensive list of vacation rental operations that they hope to put into a mapping format.

The Cook County Emergency Management Director will work to keep the jurisdictions covered by the Multi-Hazard Mitigation Plan engaged and informed during the plan's cycle. By keeping jurisdictional leaders involved in the monitoring, evaluation and update of the MHMP, they will keep their local governments aware of the hazards that face their communities and how to mitigate those hazards through planning and project implementation. Each jurisdiction has identified mitigation strategies they will seek to implement in their communities (see *Appendix G: Mitigation Actions by Jurisdiction*). Jurisdictions are encouraged to include considerations for hazard mitigation in relation to future development when updating local comprehensive plans or other plans that may influence development.

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

## **4.4 Hazard Profiles**

As part of the risk assessment, each natural hazard that poses risk to the county was independently reviewed for its past history, relationship to climate change, and jurisdictional vulnerability to future events. A capabilities assessment was also conducted to review the plans and programs that are in place or that are lacking (program gaps or deficiencies) for the support of mitigation efforts.

### **4.4.1 Tornadoes**

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms to the ground, with wind speeds between 40-300 mph. They develop under three scenarios: (1) along a squall line; (2) in connection with thunderstorm squall lines during hot, humid weather; and (3) in the outer portion of a tropical cyclone. Funnel clouds are rotating columns of air not in contact with the ground; however, the column of air can reach the ground very quickly and become a tornado.

Since 2007, tornado strength in the United States is ranked based on the Enhanced Fujita scale (EF scale), replacing the Fujita scale introduced in 1971. The EF scale uses similar principles to the Fujita scale, with six categories from 0-5, based on wind estimates and damage caused by the tornado. The EF Scale is used extensively by the NWS in investigating tornadoes (all tornadoes are now assigned an EF

Scale number), and by engineers in correlating damage to buildings and techniques with different wind speeds caused by tornadoes. To see a comparative table of F and EF scales, see <http://www.spc.noaa.gov/faq/tornado/ef-scale.html>.

In Minnesota, the peak months of tornado occurrence are June and July. The typical time of day for tornadoes in Minnesota ranges between 4:00 p.m. and 7:00 p.m. Most of these are minor tornadoes, with wind speeds under 125 miles per hour. A typical Minnesota tornado lasts approximately 10 minutes, has a path length of five to six miles, is nearly as wide as a football field, has a forward speed of about 35 miles an hour, and affects less than 0.1% of the county warned.

### Tornado History in Cook County

According to the NCEI, two tornadoes occurred in Cook County between 1950 and 2018 (Figure 5). No deaths, injuries or property damages were reported.

In September of 1992, an Fo tornado was reported near Grand Marais. The tornado had a length of one mile and a width of 70 yards.

In June of 1991, an Fo tornado touched down for 0.2 miles near Cliff Creek. Its width was 10 yards.

Table 17. Tornadoes in Cook County, 1950-2018

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage
Cook County	9/16/1992	Fo	0	0	Unknown
Cook County	6/9/1991	Fo	0	0	Unknown

Source: National Centers for Environmental Information

### Tornadoes and Climate Change

Tornadoes and other severe thunderstorm phenomena frequently cause as much annual property damage in the U.S. as do hurricanes, and often cause more deaths. Although recent research has yielded insights into the connections between global warming and the factors that cause tornadoes and severe thunderstorms, such as atmospheric instability and increases in wind speed with altitude (Del Genio, Yao, & Jonas, 2007), these relationships remain mostly unexplored, largely because of the challenges in observing thunderstorms and tornadoes and simulating them with computer models (National Climate Assessment Development Advisory Committee, 2013).

According to Harold Brooks of NOAA's National Severe Weather Laboratory, there is increasing variability in the "start" of tornado season. The number of days with more than 30 EF1 or greater tornadoes is increasing, while the number of days with at least one EF1 or greater tornadoes is decreasing. Thus, tornadoes are occurring on fewer days, but *more* are occurring on outbreak days.

The earliest reported tornado in Minnesota occurred on March 6, 2017, when two tornadoes touched down in southern Minnesota, which was 12 days earlier than the previous record. The Zimmerman tornado occurred 115 miles further north than the previous record from 1968. According to State Meteorologist Paul Huttner, "Those records fit seasonally and geographically with longer term climate trends pushing weather events earlier in the season and further northward" (Huttner, MPR News, 2017).

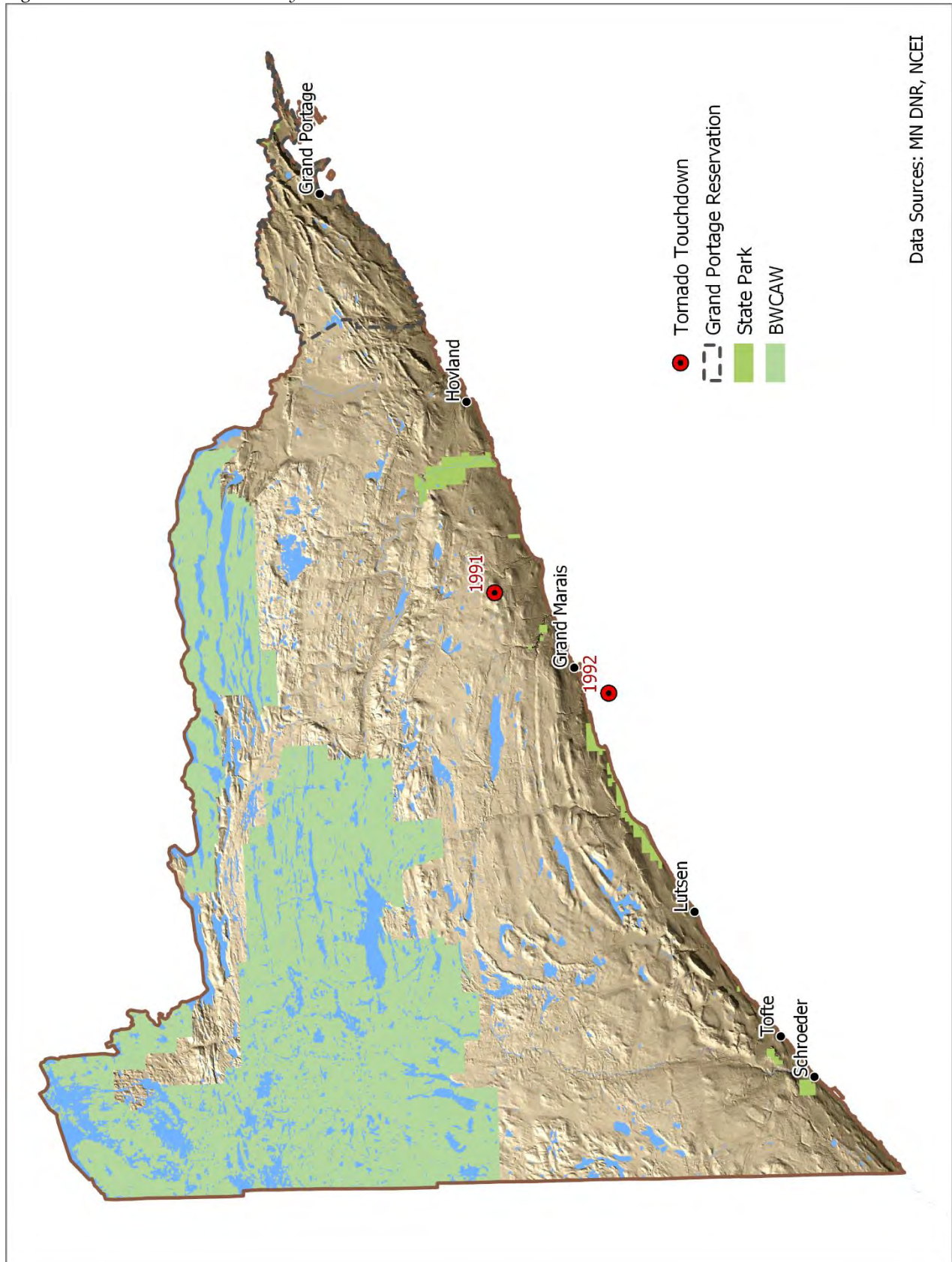


The state of Wisconsin has recorded three tornadoes in January and six in December during the period of 1844-2013 (National Weather Service Weather Forecast Office, 2014), including a January tornado in 2008.

### Vulnerability

Cook County has experienced tornadoes in two of the 68 full years on record. According to these statistics, there is a 2.9% chance of a tornado affecting the county each year. The vulnerability of each jurisdiction to severe summer storms has not changed due to any development in the last five years.

Figure 5. Tornadoes in Cook County, 1950-2018



## Plans and Programs in Place

*Emergency Operations Plan* – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to severe summer storms: emergency public information, evacuation, mass care sheltering, etc.

*Emergency Notifications* – Summer storm warnings are initiated by the National Weather Service or local trained SKYWARN spotters. The emergency warning system is activated by the dispatch center as directed. Residents receive warnings by NOAA weather radio, local media, CodeRED, and cell phone apps.

*SKYWARN Program* – Cook County offers SKYWARN training on an annual basis to local fire and law enforcement departments and local residents that wish to be trained as volunteers. SKYWARN Spotters help keep their local communities safe by providing timely and accurate reports of severe weather to their local National Weather Service office.

*Severe Weather Awareness Week* – Cook County helps promote and participates in the National Weather Service’s “Severe Weather Awareness Week” held in April each year. The event seeks to educate residents on the dangers of severe summer storms and highlights the importance of preparing for severe weather before it strikes.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

*MDH Requirements for Manufactured Home Parks* – Cook County Public Health works with the owners of manufactured home parks (MHPs) within the county to ensure they are meeting Minnesota Department of Health (MDH) requirements for storm shelters and evacuation plans. There are 2 MHPs within Cook County: Pine Mountain Mobile Home Court (located just west of County Road 6 across from the general store by Devil Track Lake, Sec 30, T62N R1E) and Paradise Park Mobile Home Court (located off of Hwy 61 to the north, and to the west of the Clearview store complex in Lutsen, Sec 26, T60N R3W).

*Backup Power* – Generator backup power is in place for the Cook County Courthouse, Jail, Sheriff’s Office, and Dispatch. The county has two out of three server room locations that are covered by a backup generator (Courthouse, Law Enforcement Center).

*Sheltering Facilities* – The following facilities in Grand Marais are designated as shelters in the event that people are temporarily displaced: YMCA/ISD #166 Schools, CC Community Center, and the Senior Center.

## Program Gaps and Deficiencies

*Warning Sirens* – There are no outdoor warning sirens in the county due to sparse population density and protected wilderness areas. Local radio and television stations do provide warnings but are only

effective if tuned to one of the local stations. Warning sirens are an important communication tool in the event of dangerous high winds.

*Aboveground Power Lines* – A majority of the power lines in the county are aboveground and subject to damage from severe spring/summer storms that include high winds and may result in falling tree limbs. Power lines that are aboveground are susceptible to coming down during severe summer storms, resulting in power outages.

*Backup Power* – Not all county and city facilities have backup power in the event of a severe summer storm that takes out power. Cook County is working to secure a generator to provide backup power for two high-priority sites: the primary EOC and the Community Center (which hosts the county’s third server room).

*Communications* – Not all Cook County residents are signed up for the CodeRED system or have NOAA weather radios. Many people also do not use social media to follow the Facebook page to receive important messages. Gaps in cell phone coverage exist in some parts of the county, i.e. nearly all of the Gunflint Trail area, Arrowhead Trail and parts of Hovland do not have cell coverage. Parts of the Gunflint Trail do not have adequate ARMER radio coverage.

*Campground Shelters* – The Grand Marais Municipal Campground has RVs and campers that are vulnerable to severe weather events such as high winds and damaging hail and thunderstorms. The campground does not have an official storm shelter or safe room. There are also many campgrounds throughout Cook County that do not have any sort of storm shelter due to their rustic nature.

*Storm Shelters / Community Safe Rooms* – Additional storm shelter areas would enhance public safety. Construction or retrofit of facilities to serve as community safe rooms for severe wind events should also be evaluated for areas where there are vulnerable populations, such as public campgrounds or the schools.

#### **4.4.2 Windstorms**

FEMA defines winds in excess of 58 miles per hour, excluding tornadoes, as windstorms. Straight-line winds and windstorms are used interchangeably in the plan. This hazard is treated as a different category than tornadoes (which may also include high winds). Windstorms are among the nation’s most severe natural hazards in terms of both lives lost and property damaged.

Severe winds can damage and destroy roofs, toss manufactured homes off their pier foundations, and tear light-framed homes apart. There are several different types of windstorms. A “downburst” is defined as a strong downdraft with an outrush of damaging winds on or near the earth’s surface. Downbursts may have wind gusts up to 130 mph and are capable of the same damage as a medium-sized tornado. A “gust front” is the leading edge of the thunderstorm downdraft air. It is most prominent near the rain-free cloud base and on the leading edge of an approaching thunderstorm and is usually marked by gusty, cool winds and sometimes by blowing dust. The gust front often precedes the thunderstorm precipitation by several minutes. Straight-line winds, when associated with a

thunderstorm, are most frequently found with the gust front. These winds originate as downdraft air reaches the ground and rapidly spreads out, becoming strong horizontal flow.

### Windstorm History in Cook County

According to NCEI records, there have been 25 severe wind events reported since 1983, with wind speeds of up to 70 knots. The NCEI has not recorded any property damage from these events.

Strong winds in October of 2018 caused significant damage in Cook County. An RV park in Grand Marais had various damaged RVs due to falling trees. A peak gust of 56 mph occurred at the Grand Marais Harbor. Over 1,000 people were without power for up to two days. According to the NCEI, the property damage was \$25,000.

In June of 2016, severe winds snapped a large tree and landed on a man who was camping with his son on Duncan Lake. The man died, and his son was seriously injured and airlifted to a hospital in Duluth. During the same storm a tree also fell on a man at Clove Lake, which is located northwest of Gunflint Lake, on the Canadian border. The man suffered injuries and was transported to the hospital in Grand Marais.

A widespread tree blowdown occurred in July of 2014 near Seagull Lake at the end of the Gunflint Trail.

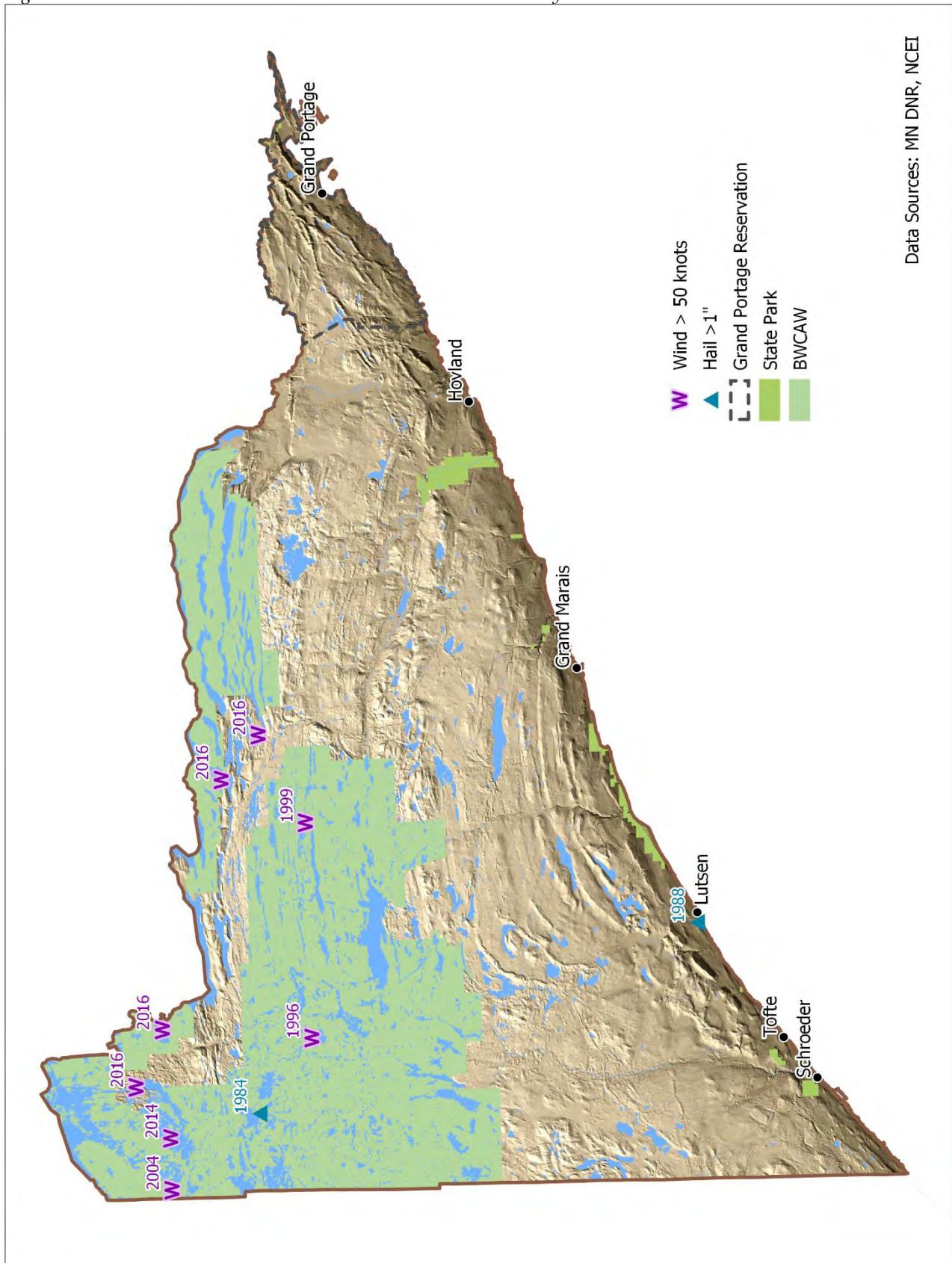
On Christmas Day of 1999, gusts of 50 mph were measured near Lake Superior. The heavy winds caused near-whiteout conditions with blowing snow. Widespread power outages occurred due to knocked down trees and power lines. Several large trees were blown down along the Gunflint Trail.

A widespread windstorm called a derecho occurred in the Arrowhead Region in July of 1999, resulting in a severe blowdown. The blowdown impacted 180,000 acres and resulted in a Presidential Disaster Declaration for Cook County. Much of the blowdown was located within the BWCAW and the Superior National Forest. According to the NCEI, timber loss was approximately .5 to .75 million cords and valued at between \$12 and \$18 million, though salvage value was only around \$5 million. Twenty people had to be airlifted to hospitals after suffering injuries from falling trees. The cost of damage and debris clearance for Lake and Cook counties was estimated at nearly \$5 million (National Centers for Environmental Information, 2018).

The most recent severe wind and hail storms in Cook County are shown in Figure 6.



Figure 6. Most Recent Severe Wind and Hail Storms in Cook County



## Windstorms and Climate Change

Lack of high-quality long-term data sets make assessment of changes in wind speeds very difficult (Kunkel, et al., 2013). One analysis generally found no evidence of significant changes in wind speed distribution. Other trends in severe storms, including the numbers of hurricanes and the intensity and frequency of tornadoes, hail, and damaging thunderstorm winds are uncertain. Since the impact of more frequent or intense storms can be larger than the impact of average temperature, climate scientists are actively researching the connections between climate change and severe storms (National Climate Assessment Development Advisory Committee, 2013).

## Vulnerability

The magnitude of summer storms each year is unpredictable and within Cook County the vulnerability of jurisdictions to windstorms does not vary geographically. The vulnerability of each jurisdiction to severe summer storms has not changed due to any development in the last five years.

## Plans and Programs in Place

*Emergency Operations Plan* – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to severe summer storms: Emergency Public Information, evacuation, mass care sheltering, etc.

*Emergency Notifications* – Summer storm warnings are initiated by the National Weather Service or local trained SKYWARN spotters. The emergency warning system is activated by the dispatch center as directed. Residents receive warnings by NOAA weather radio, local media, CodeRED, and cell phone apps.

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*Severe Weather Awareness Week* – Cook County helps promote and participates in the National Weather Service’s “Severe Weather Awareness Week” held in April each year. The event seeks to educate residents on the dangers of severe summer storms and highlights the importance of preparing for severe weather before it strikes.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

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*Warning Sirens* – There are no outdoor warning sirens in the county due to sparse population density and protected wilderness areas. Local radio and television stations do provide warnings but are only effective if tuned to one of the local stations. Warning sirens are an important communication tool in the event of dangerous high winds.

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*Storm Shelters / Community Safe Rooms* – Additional storm shelter areas would enhance public safety. Construction or retrofit of facilities to serve as community safe rooms for severe wind events should also be evaluated for areas where there are vulnerable populations, such as public campgrounds or the schools.



#### 4.4.3 Lightning

Lightning typically occurs as a by-product of a thunderstorm. In only a few millionths of a second, the air near a lightning strike is heated to 50,000° F, a temperature hotter than the surface of the sun. The hazard posed by lightning is significant. High winds, rainfall, and a darkening cloud cover are the warning signs for possible cloud-to-ground lightning strikes. While many lightning casualties happen at the beginning of an approaching storm, more than half of lightning deaths occur after a thunderstorm has passed. Lightning can strike more than 10 miles from the storm in an area with clear sky above.

Lightning strikes the ground approximately 25 million times each year in the U.S. According to the NWS, the chance of an individual in the U.S. being killed or injured by lightning during a given year is one in 240,000 (NOAA National Severe Storms Laboratory, n.d.).

Lightning is the most dangerous and frequently encountered weather hazard that most people in the United States experience annually. Lightning is the second most frequent killer in the U.S., behind floods and flash floods, with nearly 100 deaths and 500 injuries annually. The lightning current can branch off to strike a person from a tree, fence, pole, or other tall object. In addition, an electrical current may be conducted through the ground to a person after lightning strikes a nearby tree, antenna, or other tall object. The current may also travel through power lines, telephone lines, or plumbing pipes to damage property or cause fires.

#### Lightning History in Cook County

The NCEI has recorded two severe lightning events in Cook County since 1996. In June of 2004, a lightning strike caused a cabin to catch fire. The amount of property damage is unknown.

In August of 1996 a 12-year old girl died by Gunflint Lake after being struck by lightning. She and her family were walking to their cabin when the strike occurred. The girl's mother was also knocked unconscious and was without a pulse. She was revived by cardiopulmonary resuscitation.

#### Lightning and Climate Change

The projected possible intensity and frequency of tornadoes, hail, and damaging thunderstorm winds, the conditions associated with lightning, are uncertain (National Climate Assessment Development Advisory Committee, 2013). Severe rain events are becoming more common and may include an additional risk of lightning.

#### Vulnerability

The magnitude of summer storms each year is unpredictable and within Cook County the vulnerability of jurisdictions to lightning does not vary geographically. The vulnerability of each jurisdiction to severe summer storms has not changed due to any development in the last five years.

#### Plans and Programs in Place

*Emergency Operations Plan* – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to severe summer storms: Emergency Public Information, evacuation, mass care sheltering, etc.

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*Storm Shelters / Community Safe Rooms* – Additional storm shelter areas would enhance public safety. Construction or retrofit of facilities to serve as community safe rooms for severe wind events should also be evaluated for areas where there are vulnerable populations, such as public campgrounds or the schools.

#### 4.4.4 Hail

Hailstorms are a product of severe thunderstorms. Hail forms when strong updrafts within the storm carry water droplets above the freezing level, where they remain suspended and continue to grow larger, until their weight can no longer be supported by the winds. Hailstones can vary in size, depending on the strength of the updraft. The NWS uses the following descriptions when estimating hail sizes: pea size is ¼-inch, marble size is ½-inch, dime size is ¾-inch, quarter size is 1-inch, golf ball size is 1 ¾-inches, and baseball size is 2 ¾-inches. Individuals who serve as volunteer “storm spotters” for the NWS are located throughout the state, and are instructed to report hail dime size (¾-inch) or greater. Hailstorms can occur throughout the year; however, the months of maximum hailstorm frequency are typically between May and August. Although hailstorms rarely cause injury or loss of life, they can cause significant property damage.

#### Hail History in Cook County

Hail occurs on a regular basis in Cook County; however, the NCEI has not recorded any injuries or property damage due to hail in the county.

Only two hail storms have been recorded in Cook County that resulted in hail greater than 1 inch in diameter. Those storms occurred in August of 1988 (1.5”) and in June of 1984 (3”).

A complete list of hail events according to the NCEI is provided in Appendix C.

## Hail and Climate Change

According to the Federal Advisory Committee Draft National Climate Assessment (NCA), trends in severe storms, including the numbers of hurricanes and the intensity and frequency of tornadoes, hail, and damaging thunderstorm winds are uncertain. Since the impact of more frequent or intense storms can be larger than the impact of average temperature, climate scientists are actively researching the connections between climate change and severe storms (National Climate Assessment Development Advisory Committee, 2013).

The occurrence of very heavy precipitation has increased in Minnesota in recent decades and future projections also indicate this will continue (International Climate Adaptation Team, 2013). While it is unknown if this precipitation will occur during severe storms that produce hail, the possibility has not been ruled out.

## Vulnerability

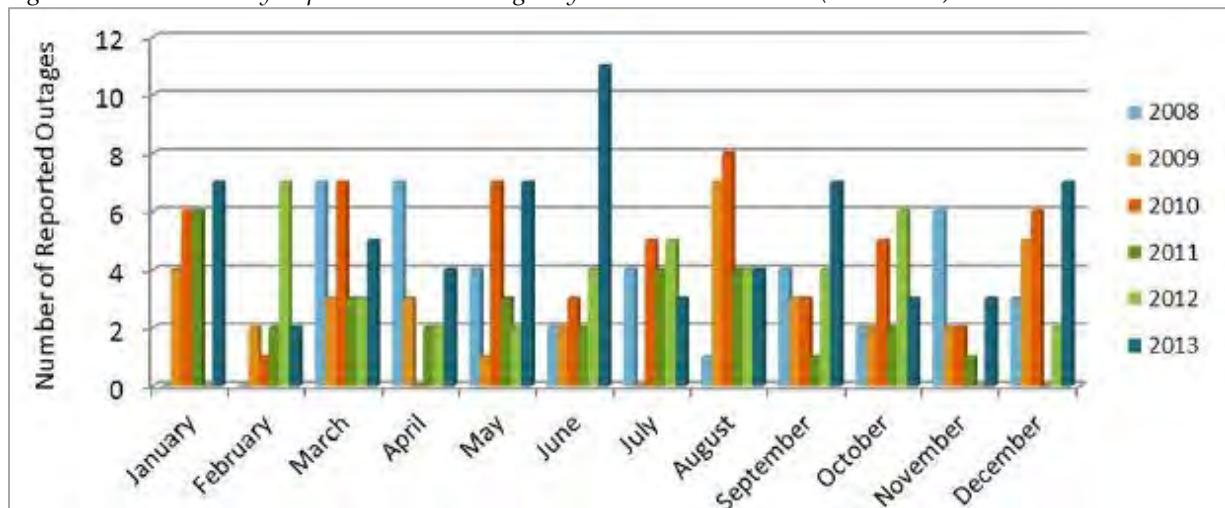
Summer storms affect Cook County each year, so there is a 100% probability that the county and its jurisdictions will be affected. According to the 67-full-year NCEI record, there is an 18% chance of a significant hailstorm any year in Cook County and a 3% chance in each year that there will be a hailstorm that produces hail greater than one inch in size.

The magnitude of summer storms each year is unpredictable and within Cook County the vulnerability of jurisdictions to summer storms does not vary geographically. The vulnerability of each jurisdiction to severe summer storms has not changed due to any development in the last five years.

## Severe Summer Storms and Electrical Outages

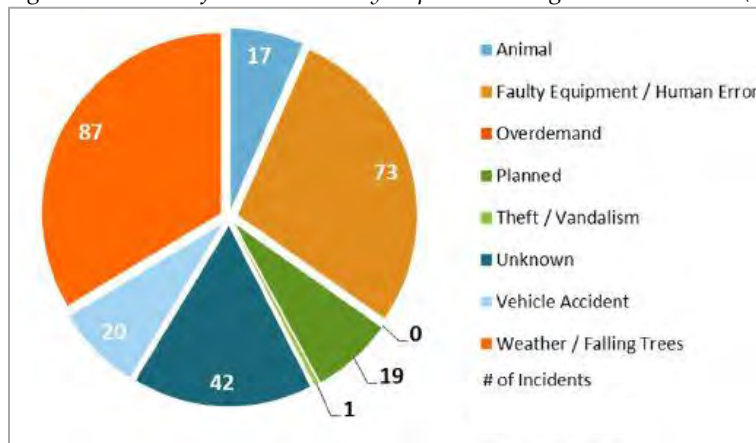
According to NOAA data, the natural hazards that caused the greatest overall property loss in Minnesota between 1996 and 2014 were thunderstorms and lightning, at \$86.3 million per year. The state also experienced 23 electric transmission outages from 1992 to 2009, five of which were due to heat waves and thunderstorms. On average, the number of people affected annually by all electric outages during 2008 to 2013 in Minnesota was 449,995, with a high of 1,460,810 in 2011 (U.S. Department of Energy, 2015). Figure 7 below shows the seasonality of electric outages by month for the years 2008-2013, and Figure 8 shows the causes of outages in the state between 2008 and 2013, with the largest cause being weather/falling trees.

Figure 7. Electric Utility Reported Power Outages by Month in Minnesota (2008-2013)



Source: U.S. Department of Energy, 2015

Figure 8. Causes of Electric-Utility Reported Outages in Minnesota (2008-2013)



Source: U.S. Department of Energy, 2015

### Plans and Programs in Place

**Emergency Operations Plan** – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to severe summer storms: Emergency Public Information, evacuation, mass care sheltering, etc.

**Emergency Notifications** – Summer storm warnings are initiated by the National Weather Service or local trained SKYWARN spotters. The emergency warning system is activated by the dispatch center as directed. Residents receive warnings by NOAA weather radio, local media, CodeRED, and cell phone apps.

**SKYWARN Program** – Cook County offers SKYWARN training on an annual basis to local fire and law enforcement departments and local residents that wish to be trained as volunteers. SKYWARN Spotters help keep their local communities safe by providing timely and accurate reports of severe weather to their local National Weather Service office.

*Severe Weather Awareness Week* – Cook County helps promote and participates in the National Weather Service’s “Severe Weather Awareness Week” held in April each year. The event seeks to educate residents on the dangers of severe summer storms and highlights the importance of preparing for severe weather before it strikes.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

*MDH Requirements for Manufactured Home Parks* – Cook County Public Health works with the owners of manufactured home parks (MHPs) within the county to ensure they are meeting Minnesota Department of Health (MDH) requirements for storm shelters and evacuation plans. There are two MHPs within Cook County: Pine Mountain Mobile Home Court (located just west of County Road 6 across from the general store by Devil Track Lake, Sec 30, T62N R1E) and Paradise Park Mobile Home Court (located off of Hwy 61 to the north, and to the west of the Clearview store complex in Lutsen, Sec 26, T60N R3W).

*Backup Power* – Generator backup power is in place for the Cook County Courthouse, Jail, Sheriff’s Office, and Dispatch. The county has two out of three server room locations that are covered by a backup generator (Courthouse, Law Enforcement Center).

*Sheltering Facilities* – The following facilities in Grand Marais are designated as shelters in the event that people are temporarily displaced: YMCA/ISD #166 Schools, CC Community Center, and the Senior Center.

### Program Gaps and Deficiencies

*Warning Sirens* – There are no outdoor warning sirens in the county due to sparse population density and protected wilderness areas. Local radio and television stations do provide warnings but are only effective if tuned to one of the local stations. Warning sirens are an important communication tool in the event of dangerous high winds.

*Aboveground Power Lines* – A majority of the power lines in the county are aboveground and subject to damage from severe spring/summer storms that include high winds and may result in falling tree limbs. Power lines that are aboveground are susceptible to coming down during severe summer storms, resulting in power outages.

*Backup Power* – Not all county and city facilities have backup power in the event of a severe summer storm that takes out power. Cook County is working to secure a generator to provide backup power for two high-priority sites: the primary EOC and the Community Center (which hosts the county’s third server room).

*Communications* – Not all Cook County residents are signed up for the CodeRED system or have NOAA weather radios. Many people also do not use social media to follow the Facebook page to receive important messages. Gaps in cell phone coverage exist in some parts of the county, i.e. nearly all of

Gunflint Trail area, Arrowhead Trail and parts of Hovland do not have cell coverage. Parts of the Gunflint Trail do not have adequate ARMER radio coverage.

*Campground Shelters* – The Grand Marais Municipal Campground has RVs and campers that are vulnerable to severe weather events such as high winds and damaging hail and thunderstorms. The campground does not have an official storm shelter or safe room. There are also many campgrounds throughout Cook County that do not have any sort of storm shelter due to their rustic nature.

*Storm Shelters / Community Safe Rooms* – Additional storm shelter areas would enhance public safety. Construction or retrofit of facilities to serve as community safe rooms for severe wind events should also be evaluated for areas where there are vulnerable populations, such as public campgrounds or the schools.

#### **4.4.5 Flash Flooding/Riverine Flooding/Coastal Flooding**

Flooding is the most significant and costly natural hazard in Minnesota. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Flash floods generally occur in the upper parts of drainage basins and are typically characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, flash floods cause damage over relatively localized areas, but they can be quite severe. Flash floods in urban areas involve the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Flash floods can occur at any time of the year in Minnesota, but they are most common in the spring and summer. Nine flash floods have been recorded in Cook County since 1999.

Riverine floods refer to floods on large rivers at locations with large upstream catchments. Riverine floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and the flood peak is much longer for riverine floods than for flash floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage.

Coastal flooding is primarily caused by storm surges and waves but many other factors have an influence. On the Lake Superior shoreline, flooding is dependent on lake levels, which vary as a result of precipitation, evaporation, and other natural processes, as well as anthropogenic activities. Ice cover impacts the flood hazard significantly. These phenomena distinguish the analysis of flood hazards on the Great Lakes from those for ocean coastal areas – as well as from riverine flooding or erosion (FEMA, 2018). Severe flood events on the Lake Superior shoreline occur when high lake levels are combined with strong winds that drive water and waves onshore. When large waves are paired with elevated lake levels, the waves are able to reach farther onshore, eroding the backshore, and potentially reaching



developed lakefront areas. Whether wave hazards reach development depends on local conditions—for instance, in many areas the bluffs are high enough to limit the wave effects to the bluff face. However, in other areas, the bluff or shore protection structures may be overtopped or waves may pass over inundated, low-lying areas. Waves can cause dramatic structural damage to buildings, including splintering walls, floating homes off foundations, and even causing collapse (Great Lakes Coastal Flood Study, 2018). In addition, periods of high water levels have plagued the City of Duluth’s sanitary sewer collection system with flooding (Berg, 1985).

Nationwide, floods caused 4,586 deaths from 1959 to 2005 while property and crop damage averaged nearly \$8 billion per year (in 2011 dollars) from 1981-2011 (Georgakakos, et al., 2014).

During the past several decades, agencies have used the “100-year floodplain” as the design standard for projects funded by the federal government. However, today floods of that magnitude are occurring far more often than once per century (Natural Resources Defence Council, 2015). In recognition of increasing risks, in January of 2015 the President issued an executive order that updates flood protection standards that guide federally-funded projects in or near floodplains or along coastlines. These new standards require federally-funded projects to either build two feet above the 100-year flood elevation for standard projects and three feet above for critical buildings like hospitals and evacuation centers; or build to the 500-year flood elevation (The White House, 2015).

### Flood History in Cook County

Below are brief descriptions of Cook County’s worst floods in recent history:

*Figure 9. Severe Flooding in Downtown Grand Marais, October 2018*



Source: Joe Friedrichs / WTIP

**October 10, 2018:** Torrential rainfall and massive waves on Lake Superior resulted in severe flooding in downtown Grand Marais (Figure 9). County Road 69 in Hovland had to be temporarily closed due to the



flooding. The basement of the Cook County Historical Museum also flooded. Beach debris and rocks were pushed onto downtown streets and into the Artist Point parking lot.

**July 5, 2014:** Heavy rain resulted in flash flooding over a stretch of Highway 61 between Lutsen and Tofte. Debris covered the road.

**July 19, 2013:** Heavy rains resulted in flash flooding along the Cascade River and Highway 61. Water was flowing over Highway 61, and part of the road washed out. Additional county roads in the area were also damaged. Cascade Lodge experienced \$50,000 in property damage. Flash flooding also occurred in the Grand Marais campground. The event resulted in a total of \$110,000 in property damage.

**June 20, 2012:** Cook County was part of the 500-year flood event in June of 2012 that hit northeastern Minnesota and northwestern Wisconsin. While the total damage for all of northeast Minnesota was estimated at \$108 million, Cook County reported \$61,000 in property damage (according to NCEI data). The flood resulted in road damages across the county. Cook County was included in federal disaster declaration DR-4069.

**June 6, 2008:** Heavy rains over a short period of time resulted in flash flooding, with roads being forced to close due to washouts and debris on roadways. Houses and businesses flooded. Rainfall totals reached four to six inches across southern Cook County. Grand Marais reported 5.1 inches of rain, which is the second highest daily rain total on record going back to 1900. The NCEI reported \$900,000 in property damage, and a federal disaster was declared (DR-1772).

Table 18 below lists Cook County's historical floods from 1997-October 2018 as recorded by the NCEI. No deaths or injuries were reported. The cumulative property damage estimate is \$1,072,000.

*Table 18. Cook County Historical Floods, 1997-October 2018*

Location or County	Date	Type	Deaths	Injuries	Property Damage
Grand Marais	10/3/2017	Flood	0	0	Unknown
Hovland	10/3/2017	Flash Flood	0	0	Unknown
Lutsen	7/5/2014	Flash Flood	0	0	\$1,000
Lutsen	7/19/2013	Flash Flood	0	0	\$100,000
Grand Marais	7/19/2013	Flash Flood	0	0	\$10,000
Taconite Harbor	6/20/2012	Flash Flood	0	0	\$61,000
Taconite Harbor	5/24/2012	Flash Flood	0	0	Unknown
Grand Marais	7/20/2011	Flash Flood	0	0	Unknown
Taconite Harbor	6/27/2011	Flash Flood	0	0	Unknown
Hovland	6/6/2008	Flash Flood	0	0	\$900,000
Lutsen	10/18/2007	Flood	0	0	Unknown
Cook County	7/5/1999	Flash Flood	0	0	Unknown

Source: National Centers for Environmental Information

The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service provides information from gauge locations at points along various rivers across the United States. There is one USGS gauging station located in Cook County, on the Pigeon River at Middle Falls near Grand Portage. Table 19 below shows data on its highest-recorded gauge heights.

*Table 19. Historical Flood Crests for USGS gauging station on the Pigeon River*

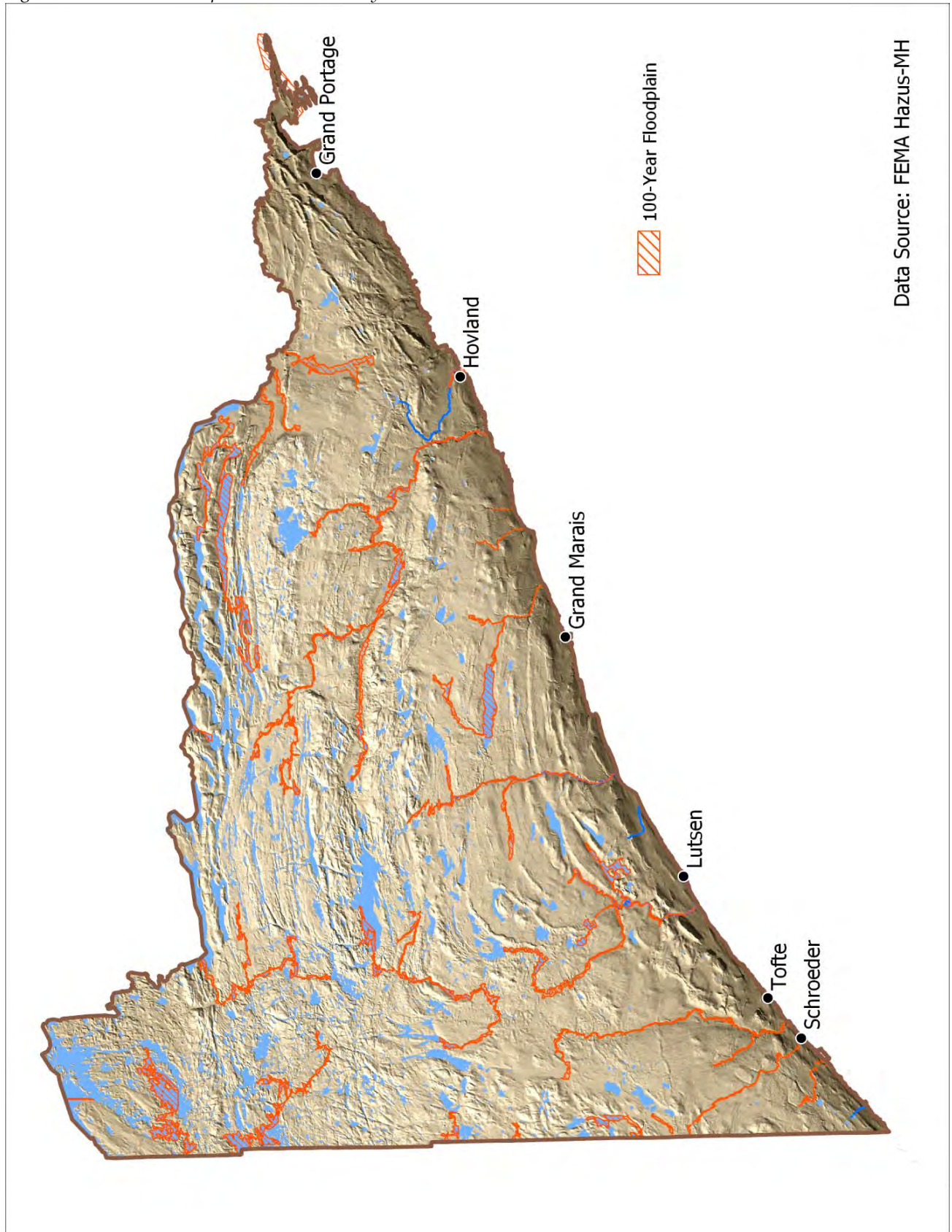
Date	Gauge Height (feet)
9/24/1977	12.37
10/19/2007	11.48
5/11/1979	11.30
4/18/1976	10.76
5/18/1996	10.71
4/24/2001	10.41
11/29/2016	10.40
4/25/1982	10.39
4/27/1948	10.31
4/30/1986	10.07

### Vulnerability and Hazus Hazard Analysis

The University of Minnesota Duluth Geospatial Analysis Center (GAC) performed the hazard risk assessment for 100-year floods using the Hazus GIS tool. In recognition of the importance of planning in mitigation activities, FEMA created Hazus, a powerful Geographic Information System (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Minnesota Homeland Security and Emergency Management (HSEM) Office has determined that Hazus should play a critical role in Minnesota's risk assessments.

FEMA's Hazus 4.2 SP01 in ArcGIS 10.5.1 was used to estimate the damages incurred for a 100-year flood in Cook County. A 10-meter Digital Elevation Model (DEM) was used to generate a 100-year floodplain and flood depth grid using Hazus hydrology and hydraulics methods. The resulting 100-year floodplain boundary is shown in Figure 10.

Figure 10. 100-Year Floodplain in Cook County



Cook County-specific building data was sourced from the parcel tax and spatial databases to include building valuations, occupancy class, square footage, year built, and number of stories. A geodatabase containing a feature class named TaxParcels was obtained from the county to locate buildings within the county. Additionally, attribute files named UMD\_Building\_info.xlsx and UMD Building info Improvement.xlsx were used and supplemented with regional averages where values were missing. The resulting spatial dataset included 14,203 unique parcel numbers. 5,676 of these records were identified as having building values and were used in the analyses.

In cases where building value, year built, or number of stories were missing, values were assigned based on best practices from values in the other variables and from the region. The data were then assigned to one parcel centroid, or building location, which served as a surrogate for each parcel's buildings to aggregate to the associated census block for use in the Hazus model.

According to the Cook County general building stock (derived from the county's parcel data and imported to the Hazus model), the Hazus model estimates there are 5,676 parcels with buildings in the region, with a total value (excluding contents) of \$797 million dollars. Approximately 92% of the buildings (and 83% of the building value) are associated with residential housing. The Hazus model estimates 1 parcel's buildings will be at least moderately damaged (>10% damage). No buildings are estimated to be completely destroyed.

The estimated total economic loss from the flood is \$4.24 million dollars. Building-related losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are associated with the inability to operate a business because of the damage sustained during the flood. Business interruption losses also include temporary living expenses for people displaced from their homes because of the flood. The estimated total building-related losses is \$1.92 million dollars. 54.51% of the estimated losses are related to business interruption of the region. Residential occupancies make up 38.56% of the total loss.

The reported building counts should be interpreted as degrees of loss rather than an exact number of buildings exposed to flooding. These numbers were derived from aggregate building inventories which are assumed to be dispersed evenly across census blocks. Hazus requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

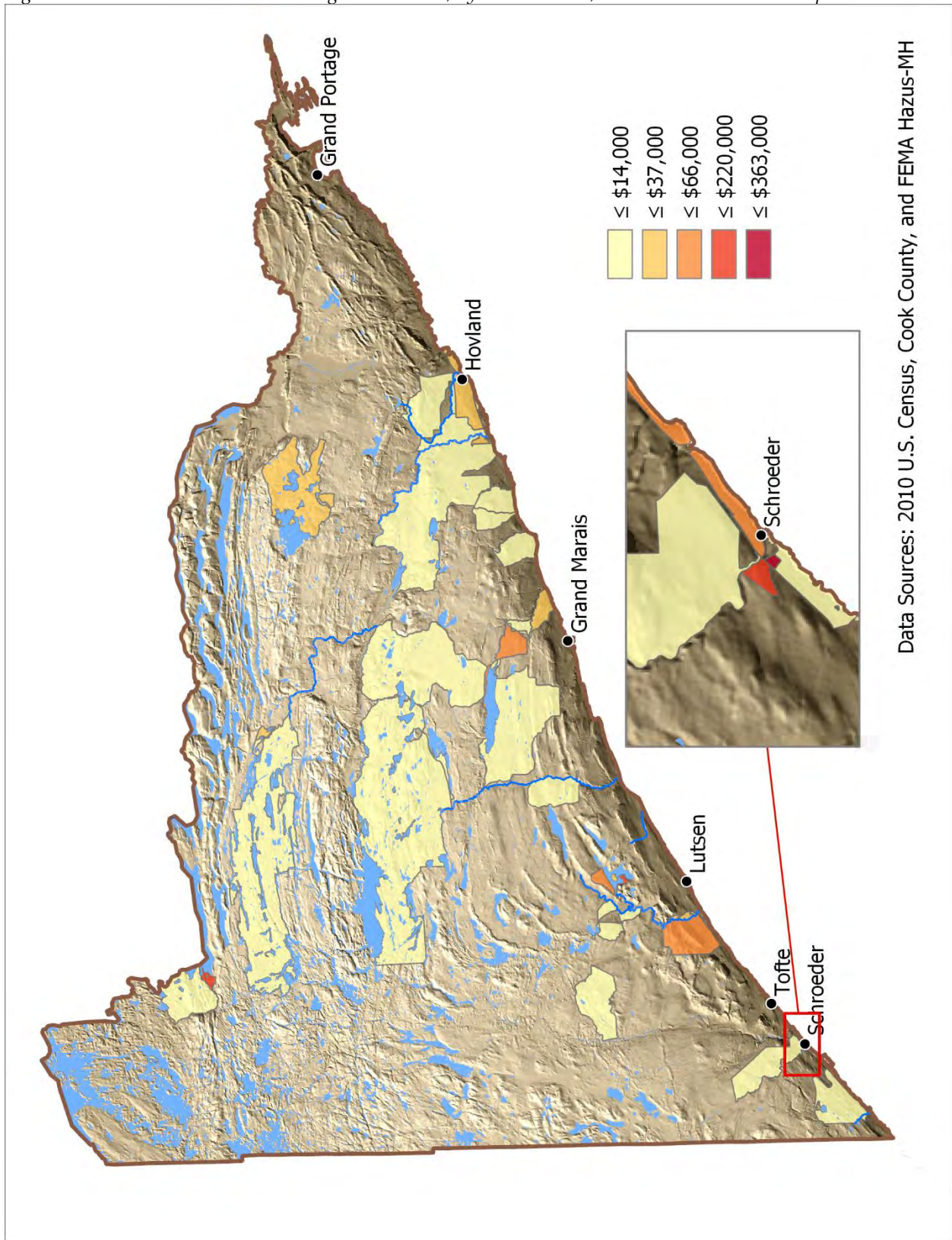
The total estimated number of damaged buildings (parcels as a surrogate), total building losses, and total economic losses for the 100-year flood are shown in Table 20. The distribution of economic losses for Cook County is depicted in Figure 11.

Table 20. Cook County Total Economic Loss from 100-Year Flood

General Occupancy	Total Parcels	Parcels with Damaged Buildings	Total Building Exposure	Total Economic Loss	Building Loss
Agricultural	66	0	\$4,706,000	\$6,000	\$1,000
Commercial	426	0	\$125,352,000	\$1,169,000	\$83,000
Education	14	0	\$28,410,000	\$0	\$0
Government	280	0	\$57,096,000	\$1,200,000	\$90,000
Industrial	24	0	\$25,294,000	\$9,000	\$2,000
Religious/Non-Profit	64	0	\$28,444,000	\$264,000	\$8,000
Residential	10,478	1	\$1,324,570,000	\$1,594,000	\$932,000
<b>Total</b>	<b>11,352</b>	<b>1</b>	<b>\$1,593,872,000</b>	<b>\$4,242,000</b>	<b>\$1,116,000</b>



Figure 11. Estimated Economic Building-Related Loss, by Census Block, within the 100-Year Floodplain



Census blocks of concern should be reviewed in more detail to determine the actual location and proximity of facilities with respect to the flood hazard areas. The aggregate losses reported in this study may be overstated due to the fact that values are distributed evenly across a census block. The three census blocks with the greatest estimated loss values (calculated by adding the total value of the buildings + the value of the buildings' contents located within a census block), which contain parcels with buildings located within the floodplain, are shown in Table 21. These potentially high loss census blocks, used for the loss estimation and the Hazus output floodplain, are shown in Figure 12, Figure 13 and Figure 14. In some cases, the assets of value may not fall in the floodplain in the same proportion that the floodplain covers the entire census block. For this reason, some potential losses may be overstated.

*Table 21. Census Blocks with the Greatest Estimated Losses, Containing Parcels with Buildings in the 100-Year Floodplain*

Census Block Number	Total Estimated Loss	Location
270314801001833	\$363,000	Schroeder
270314801001815	\$112,000	Schroeder
270314801003433	\$66,000	5 miles north of Grand Marais

An additional analysis was performed to identify the 10 parcels with the highest values (building + contents) that contain buildings which intersect the 100-year floodplain. Some of the parcels are located in one of the three census blocks with the greatest estimated loss; these parcels are labeled accordingly. The results of this analysis (and total building values) are shown in Table 22.

*Table 22. Ten Cook County Properties of Highest Building/Contents Value with Potential Building Flood Damage*

Class Description	Number of Parcels	Sum Value of Building(s) + Building's Contents on Parcels
Commercial – Entertainment & Recreation	1	\$495,200
Government – General Services	2	\$798,800
Residential – Duplex	1	\$44,550
Single Family Dwelling	6	\$1,656,600
	<b>Total</b>	<b>\$2,995,150</b>



Figure 12. Census Block #270314801001833 and 100-Year Floodplain, Schroeder

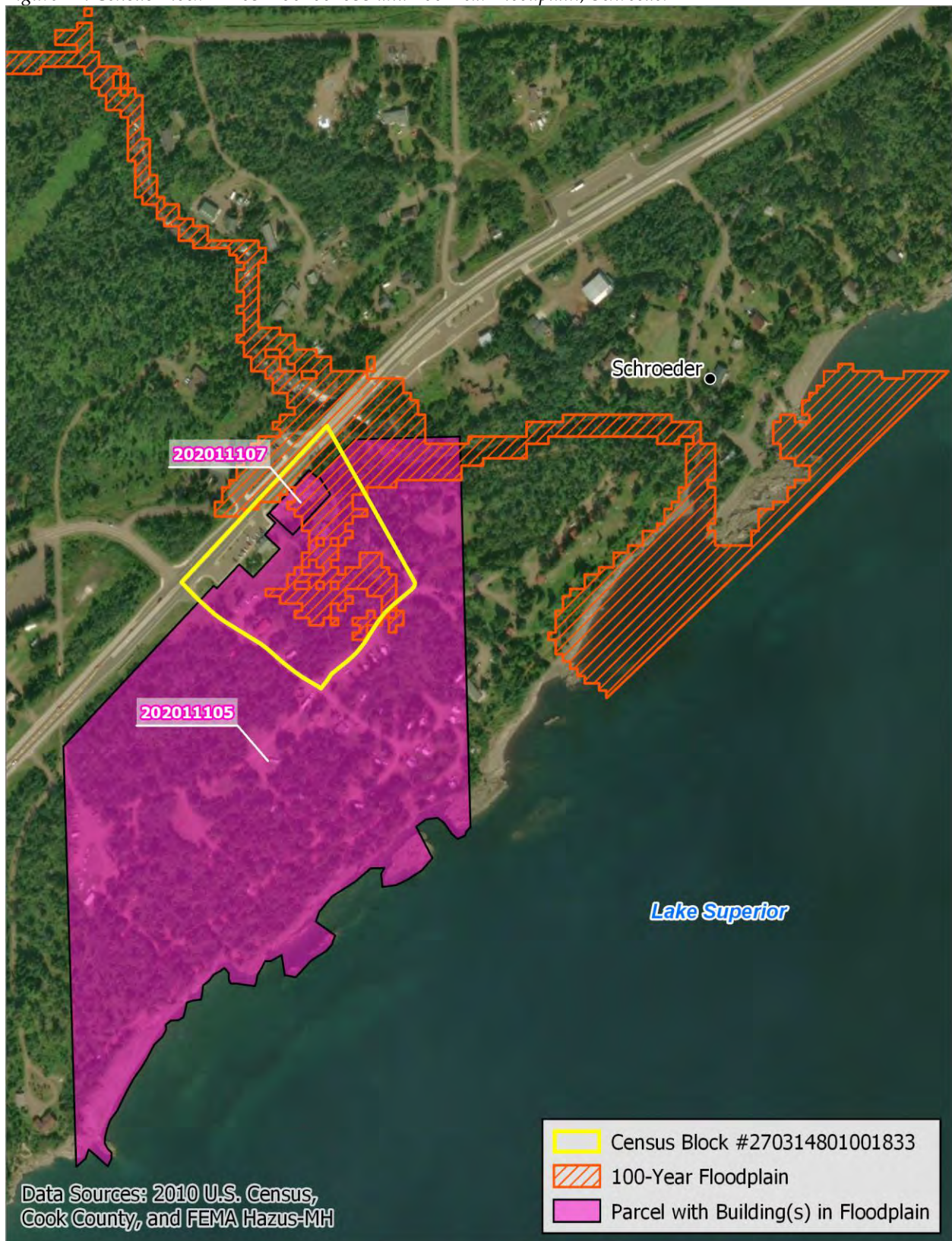


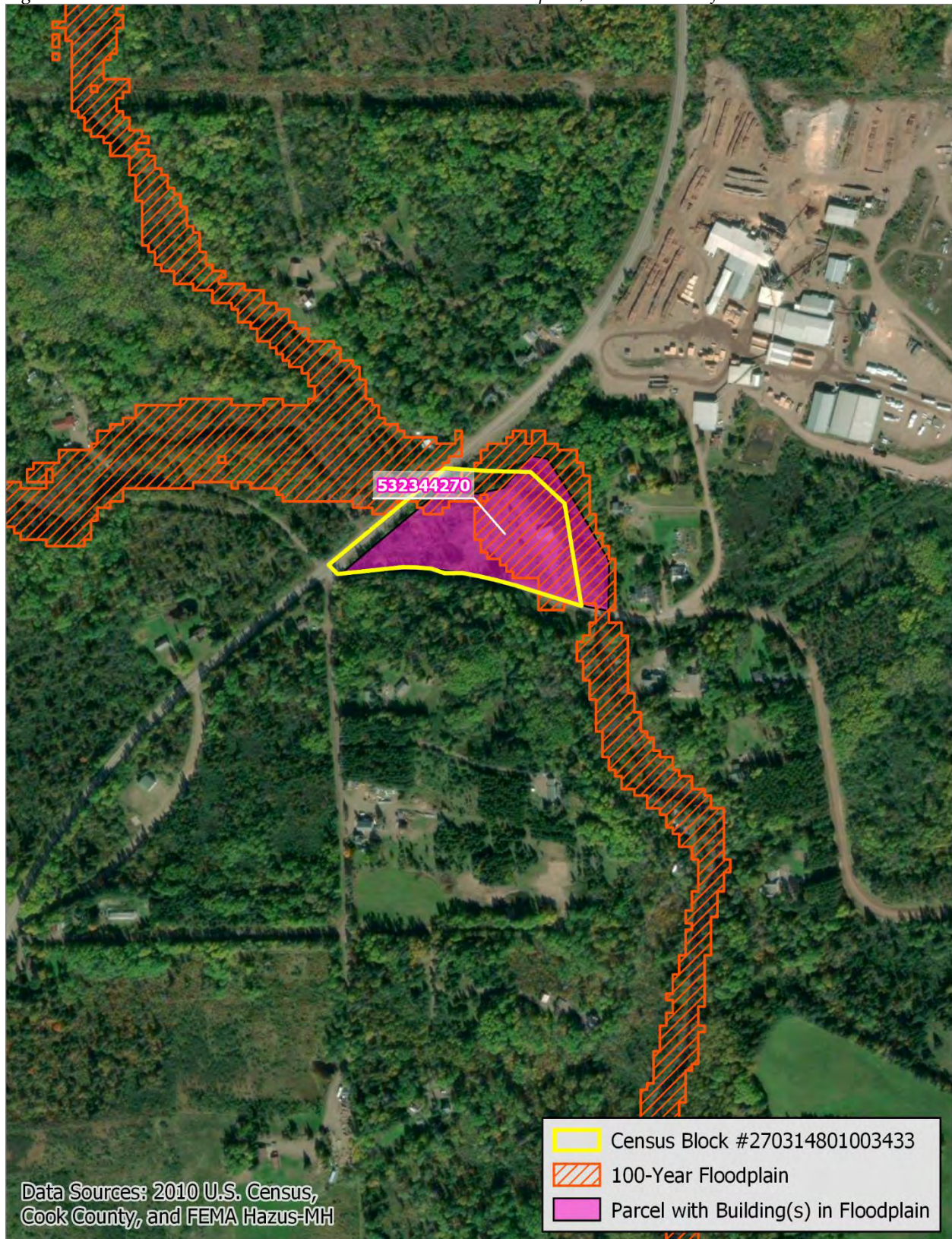


Figure 13. Census Block #270314801001815 and 100-Year Floodplain, Schroeder





Figure 14. Census Block #270314801003433 and 100-Year Floodplain, 3 miles north of Grand Marais



### *Hazus Essential Facility Loss Analysis*

Essential facilities are facilities essential to the health and welfare of the community. Buildings identified as essential facilities for the Hazus flood analysis include hospitals, police and fire stations, and schools (often used as shelters). Special consideration should be given to essential facilities located within a floodplain as these facilities are vulnerable to structural failure, extensive water damage, and loss of facility functionality during a flood, negatively impacting the communities relying on these facilities' services. Fortunately, none of Cook County's essential facilities included in the Hazus flood analysis are located within the floodplain.

### *Critical Facilities & Infrastructure within 100-Year Floodplain*

Critical facilities and infrastructure are vital to the public and their incapacitation or destruction would have a significant negative impact on the community. These facilities and infrastructures were identified through guidance of the U.S. Department of Homeland Security's Critical Infrastructure Sectors (U.S. Department of Homeland Security, 2018) and FEMA's Federal Insurance and Mitigation Administration (FEMA, 2015), and afterward verified by Cook County.

Essential facilities are a subset of critical facilities, and while only essential facilities were included in the Hazus flood analysis, it is important to identify if any critical facilities or infrastructures (except dams) are located within the 100-year floodplain given the higher risk of the facility or infrastructure being incapacitated or destroyed during a flood. However, none of Cook County's critical facilities are located within the floodplain.

### *Hazus Shelter Requirement Analysis*

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that may require accommodations in temporary public shelters. The countywide 100-year flood model estimates three households may be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, the model estimates 0 people (out of 5,176) may seek temporary shelter in public shelters.

### *Hazus Debris Generation Analysis*

Hazus estimates the amount of debris that may be generated by the flood. The countywide 100-year flood model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 605 tons of debris may be generated. Of the total amount, Finishes comprises 21% of the total, Structure comprises 41% of the total, and Foundation comprises 38%. If the debris tonnage is converted into an estimated number of truckloads, it will require 25 truckloads (at 25 tons/truck) to remove the debris generated by the flood.



## Flooding and Climate Change

As Minnesota's climate changes, the quantity and character of precipitation is changing. Average precipitation has increased in the Midwest since 1900, with more increases in recent years. The Midwest has seen a 45% increase in very heavy precipitation (defined as the heaviest 1% of all daily events) from 1958 to 2011 (National Climate Assessment Development Advisory Committee, 2013). This precipitation change has led to amplified magnitudes of flooding. Increased precipitation may also show seasonal changes, trending toward wetter springs and drier summers and falls. An example of a recent year with this character was 2012, when many MN counties were eligible for federal disaster assistance for drought, while others were eligible for flooding, and seven were eligible for both in the same year (Seeley, 2013). In 2007, 24 Minnesota counties received drought designation, while seven counties were declared flood disasters. In 2012, 55 Minnesota counties received federal drought designation at the same time 11 counties declared flood emergencies. In addition, the yearly frequency of the largest storms – those with three inches or more of rainfall in a single day – has more than doubled in just over 50 years. In the past decade, such dramatic rains have increased by more than 7% (MN Environmental Quality Board, 2014).

June 2014 was the wettest month on record in Minnesota, with a state-averaged rainfall of 8.03 inches. This broke the previous record of 7.32 inches, which occurred in both July 1897 and June 1914. Rainfall totals for much of the state ranked above the 95<sup>th</sup> percentile when compared with the historical record; in some cases the totals tripled that of the historical rainfall average for June.

## Plans and Programs in Place

*Emergency Operations Plan* – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to flooding: evacuation plans, mass notification systems, sheltering information, etc.

*Public Warning/Mass Notification* – In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Cook County utilizes the CodeRED Mass Notification System, Cook County and Cook County Sheriff's Office Facebook pages, and local news media. Cook County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service. The local newspaper & radio stations assist with sharing public information.

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

Neither Cook County nor Grand Marais participate in the NFIP; however, neither have FEMA-mapped high risk areas.

*Drinking Water Supply Management Area (DWSMA) & Wellhead Protection* – The city of Grand Marais has a wellhead protection water supply plan in place. The Minnesota Department of Health assists public water suppliers with preparing and implementing wellhead protection plans.

*Floodplain & Shoreland Ordinances* – Cook County Land Services administers land use and zoning ordinances for rural and unincorporated portions of Cook County, including for floodplains and shoreland. The department also provides information and support for environmental health issues that may impact water quality after flooding occurs. Cook County Zoning Ordinance Article 7 addresses shoreland management regulations including building regulations to mitigate against flooding during high-water elevation (for structures along lakes, ponds, flowages, rivers, and streams).

*Stormwater Management Ordinance & Plans* – The stormwater provisions in Section 7 of the Cook County Zoning Ordinance are specific to shoreland management areas, which are 1,000-feet from a lake and 300-feet from a river or stream. Cook County also has a stand-alone Stormwater Ordinance that is applicable county-wide. The Cook County SWCD has also partnered with the city of Grand Marais in the development of a 2018-2027 Stormwater Management Plan for the Grand Marais Watershed. This updated Stormwater Management Plan (from 2001) evaluates existing and proposed drainage conditions and makes prioritized recommendations for policies, upgrades, and improvements to existing infrastructure and new stormwater best management practices that address existing and future land use needs.

*Floodplain Mapping* – The Cook County Management Information Systems Department maintains the floodplain maps for the county.

*Cook County Highway Department* – The Highway Department is responsible for the efficient planning, design, construction and maintenance of the Cook County highway system, which comprises 297 centerline miles of roadways and 59 bridges. To accomplish this, the Highway Department secures funding from federal, state and local resources.

*Cook County Transportation Improvement Plan* – The Cook County Highway Department develops and maintains a 5-year transportation improvement plan which prioritizes and details the improvement projects for implementation for roads, culverts, bridges, sidewalks, and more.

### Program Gaps and Deficiencies

*Increasing Culverts and Raising Roads* – Some roads, bridges, and culverts within the county continue to need improvements as they are impacted by annual high-rain events.

*Floodplain Ordinance/Mapping* – Cook County does not have a floodplain ordinance, flood insurance rate maps or a floodplain administrator simply because FEMA currently doesn't have any designated flood zones in Cook County. FEMA has started working on some new flood maps, but it may take some

years before the county sees the final result, at which point it would be either the responsibility of the Cook County Land Services department or the SWCD (or both) to administer the floodplain program.

#### 4.4.6 Severe Winter Storms, Blizzards, Ice Storms

Blizzards are storms that contain heavy snowfall, strong winds and cold temperatures. The combination of these elements creates blinding snow with near zero visibility, deep snowdrifts, and life-threatening wind chill temperatures. Blizzards are the most dramatic and destructive of all winter storms that occur within Cook County, and are generally characterized as storms bearing large amounts of snow accompanied by strong winds. They have the ability to completely immobilize travel in large areas and can be life-threatening to humans and animals in their path. According to the National Weather Service (NWS), there is no fixed temperature requirement for blizzard conditions, but the life-threatening nature of low temperatures in combination with blowing snow and poor visibility increases dramatically when temperatures fall below 20° F. Blizzards typically occur between October and April; however, they occur most frequently from early November to late March.

The greatest numbers of blizzards historically have occurred in the months of January, followed by March and November, respectively. Cook County, along with all areas of Minnesota, is susceptible to blizzards.

Figure 15. Typical Winter Scene in Grand Marais (photo by David Barthel)



Damages from blizzards can range from human and livestock deaths to significant snow removal costs. Stranded drivers can make uninformed decisions, such as leaving the car to walk in conditions that put them at risk. Because of the blinding potential of heavy snowstorms, drivers are also at risk of collisions

with snowplows or other road traffic. Drivers and homeowners without emergency plans and kits are vulnerable to the life-threatening effects of heavy snowstorms such as power outages, cold weather, and inability to travel, communicate, obtain goods or reach their destinations. Heavy snow loads can cause structural damage, particularly in areas where there are no building codes or where residents live in manufactured home parks. The frequency of structural fires tends to increase during heavy snow events, primarily due to utility disruptions and the use of alternative heating methods by residents.

Between the years of 1975 and 1991, there were 49 deaths associated with blizzards statewide, or an average of three deaths per year. Deaths attributable to blizzards have dropped in recent years,

primarily due to increased weather awareness and warning capabilities across the state. The economic costs of winter storms are generally not recorded by the NCEI; however, a winter storm in November 2001 resulted in property damage of \$500,000.

Ice storms are described as occasions when damaging accumulations of ice occur due to freezing rain. The terms freezing rain and freezing drizzle warn the public that a coating of ice is expected on the ground and other exposed surfaces. Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers.

Communications and power can be disrupted for days while utility companies work to repair extensive damage. Ice forming on exposed objects generally ranges from a thin glaze to coatings more than 1 inch thick. Even small accumulations of ice on sidewalks, streets, and highways may cause extreme hazards to Cook County motorists and pedestrians. Sleet does not stick to trees and wires, but sleet of sufficient thickness does cause hazardous driving conditions. Heavy sleet is a relatively rare occurrence, defined as an accumulation of ice pellets covering the ground to a depth of ½-inch or more.

Ice and sleet storms typically occur from October through April. The NWS notes that over 85% of ice storm-related deaths are the result of traffic accidents. Eight ice storms have been reported in Cook County by the NCEI since 1997.

Observing winter storm watches and warnings and adequate preparation can lessen the impact of blizzard events in Minnesota. Technical advances made in transportation, including safer vehicles and improved construction and maintenance of roads, have also contributed to the decline in deaths related to blizzards. Historical estimates of dollar losses associated with blizzards were not available for the purposes of this analysis. However, costs incurred by state and local government for snow removal associated with disaster declaration DR-1158 (January 1997) totaled over \$27,300,000 dollars. Blizzards rank 9<sup>th</sup> out of the 10 natural hazards economically impacting Minnesota according to the statewide risk analysis. The chance that another winter storm affecting Cook County will occur is highly probable.

### Severe Winter Storm History in Cook County

The total of notable events defined as heavy snows, blizzards, lake-effect snow, ice storms, winter weather, and winter storms in Cook County recorded by the NCEI for the period from 1996 to October 2018 is 162. An overview of some of the most notable winter storm events is provided in Table 23 below.

Table 23. Notable Winter Weather Events in Cook County

Date	Type	Cost	Deaths	Injuries	Description
4/26/2017	Ice Storm	Unknown	0	0	Freezing rain resulted in a quarter-inch of icing, in addition to significant sleet accumulation. Traffic mishaps were reported.
3/16/2017	Heavy Snow	Unknown	0	0	Heavy rain and snow resulted in power outages, school closings and flooding. Many trees toppled. Lutsen received 13 inches of snow and Tofte received 12 inches.

Date	Type	Cost	Deaths	Injuries	Description
1/16/2011	Lake-Effect Snow	Unknown	0	0	Heavy snow occurred on the tip of the Minnesota Arrowhead, with 17 inches falling 11 miles northeast of Grand Marais.
1/24/2010	Winter Storm	Unknown	0	0	The Gunflint Trail received up to 19 inches of snow, while along Lake Superior the precipitation was primarily rain.
4/1/2009	Winter Storm	Unknown	0	0	18 inches of snow fell between Two Harbors and Grand Portage. Gusting winds resulted in blowing and drifting snow, particularly along Lake Superior.
3/23/2009	Ice Storm	Unknown	0	0	Ice accumulated to over an inch in parts of Cook County. Tens of thousands of trees were downed by ice. In some forested areas inland from Lake Superior, 75% or more of the trees sustained damage. Many people were without power for up to a week, and the Red Cross set up shelters. Neighboring Lake County was declared a federal disaster area by FEMA.
12/20/2008	Heavy Snow	Unknown	0	0	7 to 14 inches of snow fell along the North Shore between Duluth and Grand Portage.
1/11/2008	Lake-Effect Snow	Unknown	0	0	Lake-effect snow was heavy along the North Shore, with up to 26 inches falling along areas of the Gunflint Trail.
12/1/2007	Winter Storm	Unknown	0	0	Grand Marais received approximately 20 inches of snow. Wind gusts of up to 40 mph occurred near Lake Superior, resulting in severe blowing and drifting snow.
12/13/2005	Heavy Snow	Unknown	0	0	Up to 26 inches of snow fell on the higher terrain of the North Shore. Schools in the area were closed the following day.
1/25/2004	Heavy Snow	Unknown	0	0	Heavy snow fell throughout northeastern Minnesota, with the largest totals from Duluth up the North Shore, where up to 30 inches were reported.

### Severe Winter Storms and Climate Change

Historically, winter storms have had a large impact on public safety in Minnesota. This will continue, with a possible increase in snowstorm frequency and annual total snowfall. Winter weather is often a cause of power outages. Pressures on energy use, reduced reliability of services, potential outages and the potential rise in household costs for energy are major climate change risks to public health.

According to the 2015 Minnesota Weather Almanac, a recent study of seasonal snowfall records across the state from 1890-2000 showed that 41 of 46 climate stations recorded an increase in average annual snowfall, by as much as 10 inches. Higher snowfall levels can result in greater runoff potential during spring snowmelt, and many watersheds in Minnesota have shown more consistent measures of high-volume flows during spring, often at or above flood stage (Seeley M. , 2015).



## Vulnerability

The number of heavy snowfall years for the Midwest has fluctuated between 1900 and 2006. The periods of 1900-1920 and 1960-1985 had numerous years with snowfall totals over the 90<sup>th</sup> percentile. In the past three decades, the number of heavy seasonal snowfall totals has been much lower. Despite these generally lower seasonal snowfall totals, some areas of the Midwest have still experienced significant snow totals in the most recent decade. The 100-year linear trends based on decadal values show that the upper Midwest had statistically significant (1% level) upward linear trends in snowstorm frequency from 1901 to 2000 (Kunkel, et al., 2013).

Winter storms affect Cook County each year, so there is a 100% probability that the county and its jurisdictions will be affected annually. The amount of snow and ice, number of blizzard conditions, and days of sub-zero temperatures each year are unpredictable and within Cook County the vulnerability of jurisdictions to winter storms does not vary geographically. Citizens living in climates such as these must always be prepared for situations that put their lives or property at risk. It is not always the size of the storm or the depth of the cold, but an unprepared individual with a vehicle breakdown or lack of a personal winter safety kit that are at risk. Rural citizens are more vulnerable to issues with deep snow. The vulnerability of each jurisdiction to severe winter storms has not changed due to any development in the last five years.

## Severe Winter Storms and Electrical Outages

The leading cause of electric outages in Minnesota during 2008 to 2013 was weather/falling trees. Between 2008 and 2013, the greatest number of electric outages in Minnesota occurred during the month of March (U.S. Department of Energy, 2015).

## Plans and Programs in Place

*Emergency Operations Plan* – Cook County maintains an all-hazards Emergency Operations Plan which contains information applicable to severe winter storms: Emergency Public Information, mass care sheltering, etc.

*Public Warning and Notification* – In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Cook County utilizes the CodeRED emergency notification system, Cook County and Cook County Sheriff's Office & Public Safety Facebook pages, the Boreal Emergency Preparedness Portal website, and local news media. Cook County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service. The local newspaper, online news outlets, and radio stations assist with sharing public information. In 2018, Cook County upgraded its CodeRED database and can send messages to all landlines in the county, and many residents are subscribed to multiple means of CodeRED contact.

*Winter Weather Warnings* – Winter weather warnings are issued by the National Weather Service. Cook County has a policy in place for the emergency closing of county government offices in the event of severe winter weather.

*Winter Hazard Awareness Week* – Cook County helps promote and participates in the National Weather Service’s “Winter Hazard Awareness Week” held in November each year. The event provides education for residents on the dangers of winter weather and how to properly deal with it.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

*Snow Removal* – Cook County, cities, and townships complete the snow removal and disperse sand/salt as needed on all county, city and township roads. MnDOT removes the snow from State Highway 61 as well as disperses salt/sand as needed.

*Backup Power* – Generator backup power is in place for the Cook County Courthouse, Jail, Sheriff’s Office, and Dispatch. The county has two out of three server room locations that are covered by a backup generator (Courthouse, Law Enforcement Center).

#### Program Gaps or Deficiencies

*Aboveground Power Lines* – A majority of the power lines in the county are aboveground and subject to damage from ice storms, wind, and falling tree limbs. Power lines that are aboveground are susceptible to coming down during severe winter storms, resulting in power outages.

*Backup Power* – Not all county and city facilities have backup power in the event of a severe summer storm that takes out power. Cook County is working to secure a generator to provide backup power for two high-priority sites: the primary EOC and the Community Center (which hosts the county’s third server room).

*Communications* – Not all Cook County residents are signed up for the CodeRED system or have NOAA weather radios. Many people also do not use social media to follow the Facebook page to receive important messages. Gaps in cell phone coverage exist in some parts of the county, i.e. nearly all of Gunflint Trail area, Arrowhead Trail and parts of Hovland do not have cell coverage. Parts of the Gunflint Trail do not have adequate ARMER radio coverage.

#### 4.4.7 Extreme Cold

Winter in Cook County can be severe, and especially dangerous for disabled citizens and outdoor workers. Record temperature lows and arctic-like wind chills can cause cold-related illnesses such as frostbite and hypothermia, which can be deadly. Hypothermia is the greatest and most life-threatening cold weather danger.

In Cook County, cold winter weather can have severe or fatal impacts. Hypothermia occurs when the core body temperature drops below 96° F. Anyone who is exposed to severe cold without enough protection can develop hypothermia. Frostbite occurs when skin tissue and blood vessels are damaged from exposure to temperatures below 32° F. It most commonly affects the toes, fingers, earlobes, chin, cheeks, nose, and other body parts that are often left uncovered in cold temperatures. The NWS issues

“Extreme cold” warnings when it feels like -30° F or colder across a wide area for several hours. Extreme cold watches are issued a day or two before the conditions are expected.

Medical costs related to extreme heat and cold can be enormous: in 2005 the total was \$1.5 billion nationwide, or more than \$16,000 per patient (Union of Concerned Scientists, 2009).

Below zero temperatures occur almost every winter in Minnesota. January is the coldest month, with daytime highs averaging 20° F and nighttime lows averaging 2° F. However, these averages do not tell the whole story. Maximum temperatures in January have been as high as 61° F and minimums as low as 36° F below zero.

Extreme cold temperatures affect the county nearly every year. Extremely cold air settled over Minnesota on January 31<sup>st</sup> of 1996, and remained entrenched through February 4<sup>th</sup>. A new record low temperature for Minnesota was set in the town of Tower on February 2, 1996, at -60° F. Numerous record low temperatures were set during the period at St. Cloud, Rochester and the Twin Cities. Minneapolis/St. Paul set 3 new record low temperatures as well as recording the second coldest day on record on February 2, 1996. A mean temperature of -25° F was measured that day with a high of -17° F and a low of -32° F in the Twin Cities. This was within two degrees of tying the all-time record low temperature set in the Twin Cities and the coldest temperature recorded this century. Many central and southern Minnesota locations set new record low temperatures the morning of the 2<sup>nd</sup>. The Governor closed all schools that day.

In February of 2014, nearly all of Minnesota was between 10-15° F colder than normal (1981-2010 period) (High Plains Regional Climate Center, 2014). The winter of 2013-2014 was the sixth coldest on record in Minnesota (The Weather Channel, 2014), with schools in the Twin Cities canceling five times in January due to dangerous wind chills. It was the coldest winter in the Twin Cities in 35 years, with an average temperature for December-February of 9.7° F (MN DNR, 2014). Many areas in the state also experienced higher than average precipitation through the winter and spring months.

### Extreme Cold History in Cook County

January is the coldest month on average in Grand Marais, with an average low of 5° F. The lowest temperature ever recorded in Grand Marais is -34° F, which occurred in February of 1933 and again in January of 1935. December and January are the snowiest months, with December averaging 12.4 inches and January averaging 12.3 inches (Intellicast, 2018).

During the winter months when Lake Superior is unfrozen, the water temperature, as well as the additional vapor released from the lake, has a stabilizing influence, which creates warmer temperatures along the lake and colder temperatures inland (Seeley M. , 2015).

While the National Centers for Environmental information (NCEI) has recorded many instances of extreme cold/wind chill events, no deaths or injuries were reported. A complete listing of events is provided in Appendix C.

## Extreme Cold and Climate Change

Although climate research indicates that Minnesota's average winter lows are rising rapidly, and our coldest days of winter are now warmer than we have ever recorded (NCEI, 2018), cold temperatures have always been a part of Minnesota's climate and extreme cold events will continue. An increase in extreme precipitation or storm events such as ice storms as the climate changes could lead to a higher risk of residents being exposed to cold temperatures during power outages or other storm-related hazards during extreme cold.

## Vulnerability

Extreme cold temperatures affect the county nearly every year. The amount of snow and ice, number of blizzard conditions, and days of sub-zero temperatures each year are unpredictable.

Within Cook County the risk of extreme cold does not vary geographically. Citizens living in climates such as these must always be prepared for situations that put their lives or property at risk. It is not always the depth of the cold, but an unprepared individual with a vehicle breakdown or lack of a personal winter safety kit that are at risk. Rural citizens not connected to city gas lines are more vulnerable to issues with extreme cold. The vulnerability of each jurisdiction to extreme cold has not changed due to any development in the last five years.

## Plans and Programs in Place

*Public Warning and Notification* – In the event of severe cold conditions that pose danger to the public, Cook County utilizes the CodeRED Mass Notification System, Cook County and Cook County Sheriff's Office Facebook pages, and local news media. Cook County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service. The local newspaper and radio stations assist with sharing public information.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

*Mass Care Shelter Facilities* – A period of extreme cold coupled with a major power outage may require emergency sheltering for those in need. Cook County has designated shelter facilities that have agreements with the American Red Cross, as well as Sheltering and Pet Sheltering Plans.

*Winter Hazard Awareness Week* – Cook County participates in the public outreach for winter safety information to the general public, schools, businesses, and government agencies.

## Program Gaps and Deficiencies

*Mass Care Shelter Facilities* – Cook County Emergency Management is working with the Red Cross to get additional local shelters certified, and identify hotels that are willing to honor emergency shelter rates as an option for impacted residents.

*Generators for Backup Power to Shelter Facilities* – Not all of our designated shelter facilities have generator backup power to provide heat if there is a loss of power.

#### 4.4.8 *Extreme Heat*

Humans need to maintain a constant body temperature if they are to stay healthy. Working in high temperatures induces heat stress when more heat is absorbed into the body than can be dissipated out. Heat illness such as prickly heat, fainting from heat exhaustion, or heat cramps are visible signs that people are working in unbearable heat. In the most severe cases, the body temperature control system breaks down altogether and body temperature rises rapidly. This is a heat stroke, which can be fatal. The NWS issues a heat advisory when, during a 24-hour period, the temperature ranges from 105° F to 114° F during the day, and remains at or above 80° F at night.

Extreme heat events are linked to a range of illnesses, even death, and can exacerbate pre-existing chronic conditions such as cardiovascular, respiratory, liver, and neurological diseases, endocrine disorders, and renal disease or failure. Populations who are most vulnerable to extreme heat include persons over 65 or under 5 years old; living alone, without air-conditioning, or residing on the topmost floor of a building; and with an income at or below the poverty line. People who are exposed to heat because of recreational or job-related activities are also more vulnerable, including athletes, construction workers, and landscape/agricultural workers (Adapting to Climate Change in Minnesota: 2013 Report of the Interagency Climate Adaptation Team, 2013).

Medical costs related to extreme heat and cold can be enormous: in 2005 the total was \$1.5 billion nationwide, or more than \$16,000 per patient (Union of Concerned Scientists, 2009).

#### Extreme Heat History in Cook County

August is the hottest month on average in Grand Marais, with an average high temperature of 71° F. The highest temperature ever recorded there occurred in 2005, when it rose to 95° F (Intellicast, 2018).

During summertime there can be a strong temperature difference between the shoreline area of Lake Superior and areas inland from the lake. The cold waters of Lake Superior can drastically cool the air during the summer, while the highlands remain warm.

The National Centers for Environmental Information (NCEI) has not recorded any extreme heat events in Cook County.

#### Extreme Heat and Climate Change

Minnesota's average temperature has increased more than 1.5° F since recordkeeping began in 1895, with increased warming happening in recent decades (International Climate Adaptation Team, 2013). Annual temperatures in the Midwest have generally been well above the 1901-1960 average since the late 1990s, with the decade of the 2000s being the warmest on record (Kunkel, et al., 2013). Seven of Minnesota's 10 warmest years occurred in the last 15 years. Projected increases are 2° F to 6° F more by 2050 and 5° F to 10° F by 2100 (MN Environmental Quality Board, 2014). The Midwest has experienced major heat waves and their frequency has increased over the last six decades (Perera, et al., 2012). For the U.S., mortality increases 4% during heat waves compared with non-heat wave days (Anderson & Bell, 2011). During July 2011, 132 million people across the U.S. were under a heat alert – and on July 20 the majority of the Midwest experienced temperatures in excess of 100° F. Heat stress is projected to increase as a result of climbing summer temperatures and humidity (Schoof, 2012). On July 19, 2011,

Moorhead Minnesota set a new state record for the hottest heat index ever, at 134° F. That same day, Moorhead also recorded a new state record for the highest dew point at 88. It was the hottest, most humid spot on the planet that day (Douglas, 2011).

Recent statistics from NOAA show that there are more human fatalities each year due to heat waves than from floods, lightning, tornadoes and winter storms. Many cities have responded by creating Heat Wave Response Plans to ensure that those in marginal health without air conditioning can obtain the relief and care they need, and the Minnesota Department of Health developed the Extreme Heat Toolkit to help educate at-risk populations on how to reduce risks associated with heat waves (Seeley M. , 2015).

### Vulnerability

Within Cook County the risk of extreme heat does not vary geographically. The vulnerability of each jurisdiction to extreme heat has not changed due to any development in the last five years.

### Plans and Programs in Place

*Public Warning and Notification* – In the event of extreme heat conditions that pose danger to the public, Cook County utilizes the CodeRED Mass Notification System, Cook County Sheriff's Office Facebook page, and local news media. Cook County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service. The local newspaper and radio stations assist with sharing public information.

*School Closings* – All school districts within Cook County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff.

*Mass Care Shelter Facilities* – A period of extreme heat coupled with a major power outage may require emergency sheltering for those in need. Cook County has designated shelter facilities that have agreements with the Red Cross, as well as Sheltering and Pet Sheltering Plans.

*Severe Weather Awareness Week* – Cook County helps promote and participates in the National Weather Service's "Severe Weather Awareness Week" held in April each year. The event seeks to educate residents on the dangers of severe summer storms and highlights the importance of preparing for severe weather before it strikes.

### Program Gaps and Deficiencies

*Mass Care Shelter Facilities* – Cook County Emergency Management is working with the Red Cross to get additional local shelters certified, and identify hotels that are willing to honor emergency shelter rates as an option for impacted residents.

*Generators for Backup Power to Shelter Facilities* – Not all of our designated shelter facilities have generator backup power to provide cooling if there is a loss of power.

#### 4.4.9 Drought

A drought refers to an extended period of deficient rainfall relative to the statistical mean for a region. Drought can be defined according to meteorological, hydrological, socioeconomic, and agricultural criteria. Meteorological drought is qualified by any significant deficit of precipitation. Hydrological drought is manifest in noticeably reduced river and stream flow and critically low groundwater tables. The term agricultural drought indicates an extended dry period that results in crop stress and harvest reduction. Socioeconomic drought refers to the situation that occurs when water shortages begin to affect people and their lives. It associates economic goods with the elements of meteorological, agricultural, and hydrological drought. Many supplies of economic goods (e.g., water, food grains, hydroelectric power) are greatly dependent on the weather. Due to natural variations in climate, water supplies are high in some years but low in others. Fluctuating long-term climate variations make drought difficult to predict.

#### Drought History in Cook County

The last drought in Cook County occurred from 2009-2011 and was moderate.

Wildfires are the biggest immediate danger that results from drought in the county. Since the rural area often depends on groundwater or inland lake water for drinking water, drought could also reduce or limit water supplies. Water quality in lakes or river could also decrease in response to drought.

The hazard rank for drought in Cook County is moderate.

#### Drought and Climate Change

Droughts have been happening throughout Minnesota's history and it is not yet clear how climate change may impact this (International Climate Adaptation Team, 2013). While there was no apparent change in drought duration in the Midwest over the past century (Dai, 2011), the average number of days without precipitation is projected to increase in the future (National Climate Assessment Development Advisory Committee, 2013).

Even in areas where precipitation does not decrease, projected higher air temperatures will cause increased surface evaporation and plant water loss, leading to drier soils. As soil dries out, a larger proportion of the incoming heat from the sun goes into heating the soil and adjacent air rather than evaporating its moisture, resulting in hotter summers under drier climatic conditions (Mueller & Seneviratne, 2012).

Across the nation, drought is affecting water supplies, as ground and surface water levels are increasingly reduced due to growing consumption and withdrawal. These trends are expected to continue, with a higher likelihood of water shortages (Georgakakos, et al., 2014).

In 2007, 24 Minnesota counties received drought designation, while seven counties were declared flood disasters. In 2012, 55 Minnesota counties received federal drought designation at the same time 11 counties declared flood emergencies (MN Environmental Quality Board, 2014).



In May of 2015, over 90% of Minnesota was undergoing severe or moderate drought, due to low snow levels during the 2014-2015 winter and dry spring weather, with precipitation deficits totaling 3-6 inches below average across much of the state since October 2014. Water levels on streams, lakes, and wetlands were below average, and wildfires were common during April of 2015. Blowing soil was also reported due to high winds and the dried-out landscape (MN DNR, 2015).

### Vulnerability

Jurisdictions in Cook County do not vary in their vulnerability to drought. The vulnerability of each jurisdiction to drought has not changed due to any development in the last five years.

### Plans and Programs in Place

*Cook County Water Management Plan and Water Plan Coordinator* – The Cook County Soil and Water Conservation District (SWCD) develops and maintains a 10-year Water Management Plan and also has a full-time Water Plan Coordinator. The current Cook County Water Management Plan was adopted by the County Board of Commissioners on October 14, 2014. The Water Advisory Committee (WAC) provides guidance to the Water Plan Coordinator for the implementation of the plan.

*Public Awareness* – In the event of drought conditions, Cook County Emergency Management works in coordination with the MN DNR and U.S. Forest Service to raise public awareness of the dry conditions and increased danger of wildfire.

*MN Drought Response Plan* – The State of Minnesota has a statewide drought response plan in place. The plan was prepared by the Minnesota DNR.

### Program Gaps and Deficiencies

*Water Conservation Provisions/Use Restrictions* – Water conservation provisions and use restrictions in times of drought are not included in county or city ordinances.

#### 4.4.10 Wildfire

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. Wildfires can occur in undeveloped areas and spread to urban areas where structures and other human developments are more concentrated. While some wildfires start by natural causes like lightning, humans cause four out of every five wildfires. Debris burns, arson or carelessness are the leading causes of wildfires. As a natural hazard, a wildfire is often the direct result of a lightning strike that may destroy personal property and public land areas, especially on national and state forestlands. The dangers from wildfire include the destruction of timber, property and wildlife, and injury or loss of life to people living in the affected area or using the area for recreational facilities.

While wildfires are often viewed in a negative light, they are a naturally occurring part of the environment. Wildfires are an important component of healthy forest and prairie ecology, and can be beneficial by reducing dangerously high fuel levels and putting nutrients into the ground that spur new growth. In addition, many flora species require fire for seed germination. However, as people settled this country and began clearing land and building homes, roads, railroads, and campgrounds, new artificial causes of wildfire emerged and their frequency and level of destruction increased.

Causes of wildfires vary from state to state. For example, in Florida, lightning ignites approximately half of all wildfires, while in Minnesota lightning causes less than 5% of all wildfires. These variations are due to climate, vegetation, topography, and weather. People burning debris cause most wildfires in Minnesota. However, wildfires are also caused by vehicle exhaust, sparks from trains and heavy equipment, camping, smoking and lightning. A concern in Cook County is the vast acreage of blowdown in forests (Cook County CWPP, 2016).

Topography affects the movement of air and fire over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind affect the severity and duration of wildfires.

Homes threatened by wildfire are primarily those located in the “wildland-urban interface.” This is the zone where homes and subdivisions have been located in wildland areas where natural wildfires can have an impact. While wildfires are necessary for healthy ecosystems, they burn whatever fuel is in their path, whether vegetation or buildings.

One of the most common causes of a home being damaged or destroyed is due to radiant heat. In a wildfire, radiant heat is the heat given off by burning vegetation. The high temperatures of some wildfires can cause the deck, siding, or roof of a home to ignite, because the fire was too near the home. Studies in western wildfires have shown that approximately 85% of homes surviving a major wildfire had 30-50 feet of defensible space around them, coupled with fire-resistant roofing.

Approximately 1,600 wildfires occurred each year in Minnesota on average from 1976-2011 (MN DNR, 2011). Wildfires occur throughout the spring, summer and fall, however, most wildfires in Minnesota take place in March, April, and May. During this period, much of the existing vegetation has been killed due to winter temperatures and is dead, brown and combustible. Also, there is little green vegetation to serve as a barrier for a moving wildfire.

### Wildfire History in Cook County

The threat of wildfire is detailed, as well as collaboratively developed actions to reduce the ignitability of structures in Cook County, in the Cook County’s Community Wildfire Protection Plan (Cook County CWPP, 2016)

Wildfire was ranked as a high risk by Cook County. Fire occurrence is common in the county. The last wildfire recorded by the MN DNR occurred on May 3, 2018, which burned one acre. Its cause was debris burning. The most recent fire in the USFS ignition database is August 23, 2018, which burned 2.5 acres in Pickeral Bay.

The Minnesota DNR responded to 88 wildfires in Cook County between 1985 and May 2018. The majority of fires were human-caused. Only 20 of these fires were started by lightning. Combined, these wildfires burned over 711 acres. These include fires not only on state lands, but also rural private lands for which there is not another agency with primary responsibility. The largest in fire Cook County that did not involve USFS was the “Tuesday” fire, caused by lightning and burned 450 acres in 2002,

Figure 16. Ham Lake Fire, 2007 (Bauman, 2017)



northwest of Hovland. The U.S. Forest Service has mapped perimeters of fires from 1980 to 2016 and ignition points of fires from 1985 to present ( Figure 17) . In May of 2007 an unattended campfire started the Ham Lake Fire in the Superior National Forest (Figure 16). Strong winds combined with a dry winter and spring resulted in the burning of 75,000 acres and hundreds of properties were destroyed. There were also high fuel loads from the 1999 blowdown. At the time, it was the second largest and costliest wildfire in Minnesota's history since the Cloquet

Fire of 1918, costing a total of \$11 million (National Weather Service, 2011).

The Cavity Lake Fire in 2006 was one of the largest in the history of the Boundary Waters Canoe Area Wilderness, burning over 31,000 acres approximately 44 miles north of Grand Marais. The fire was concentrated where there were high fuel loads from the 1999 blowdown (BWCA , 2007). Lightning started the fire.

In 2006 there were two other substantial wildfires in Cook County: the Famine Wildfire which burned 4,000 acres, and the Redeye Fire which burned 2,000 acres.

According to MN DNR data, there are 10,534 acres of peat in Cook County. Peat is partially decayed plant matter found in ancient bogs and swamps. Minnesota has approximately six million acres of peatland, the highest total acreage in the contiguous United States. Peat fires are deep-rooted fires that burn underground, lasting for weeks, months, or even years. They can smolder during winter months beneath the snow, surfacing again in the spring to burn above ground. Peat ignites when its moisture content is low, and then it supports combustion rather than flame. Once started, combustion is persistent because peat contains oxygen and needs little or no outside oxygen to continue burning. Peat's insulating qualities mean the fire loses little heat. As the peat dries, it becomes water repellent. These factors result in long-lasting fires that require extensive operations to extinguish.

Peat fires have not been an issue in Cook County. However, if there was a long-term drought, swamps would likely burn and they contain peat soils.

### Wildfire and Climate Change

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

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

### Vulnerability

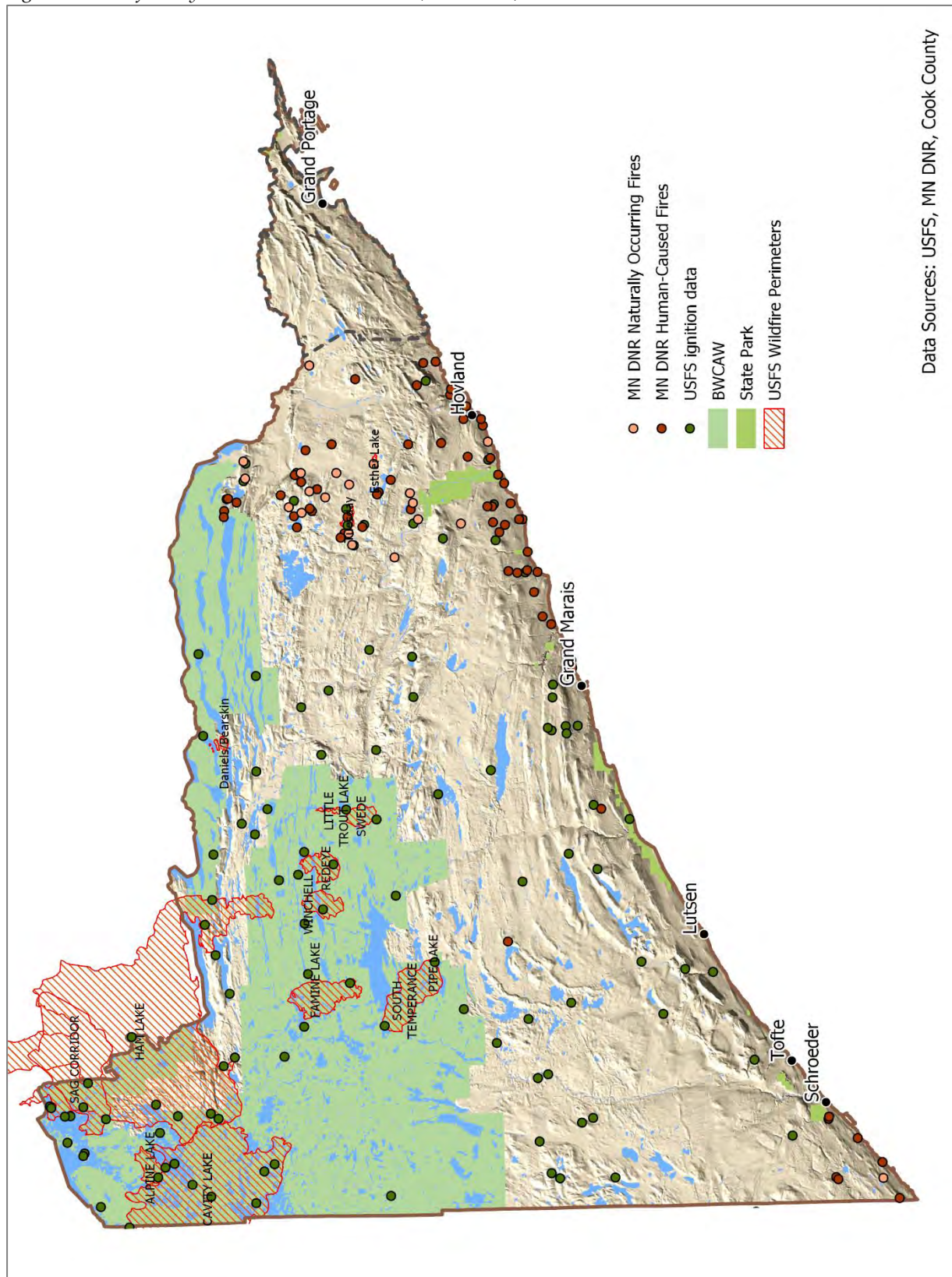
The immediate danger from wildfire is the destruction of timber, property, wildlife, and injury or loss of life to persons who live in the affected area or who are using recreational facilities in the area. The most vulnerable parts of the county to wildfires are up the Gunflint Trail and the northern parts of Tofte and Lutsen townships. However, any part of the county beginning about five miles from the shore of Lake Superior all the way to the Canadian border is high risk for wildfire. The area within five miles of Lake Superior is still at risk for wildfire, but typically isn't considered a high potential for large crown fires.

For fires outside urban areas, vulnerabilities are dependent upon fuel sources and availability. One major example of property wildfire vulnerabilities is the area impacted by the July 4, 1999 massive windstorm. This windstorm raked northeastern Minnesota with straight-line winds exceeding 90 miles per hour. In less than 30 minutes, the storm cut an unbroken fuel pathway (10 - 12 miles long and 40 miles wide) through the Boundary Waters Canoe Area Wilderness (BWCAW) in the Superior National Forest, along the Gunflint Trail outside Grand Marais, with an estimated 80 - 120 tons of fuel per acre on over 477,000 acres. Much of this land cannot be legally, cost-effectively, or safely salvaged or cleared. Downed trees and outbreaks of insects and disease previous to the blowdown storm of July 4, 1999 have significantly increased the fire risk in the area. The task of mitigating fire risk and managing any fires that may occur is complicated by: the remoteness and inaccessibility of the area; the number of government entities that have responsibility for land within the area; the extent of the area affected; constraints on the type of activity that can take place within the BWCAW; and the large number of permanent and seasonal residents and tourists that may be affected by a fire in the area. The size and severity of the Ham Lake and Cavity Lake fires can be attributed to the unique fuel conditions in that part of the state. Following the 1999 blowdown, several mitigation projects occurred in the affected area, including: construction of helipads and safety zones, development of an evacuation plan for the Gunflint Trail, fuel reduction projects, development of the Northeastern Minnesota Wildfire Integrated Response Plan, Community Wildfire Protection Plans, FireWise programs, and defensible space and sprinkler projects around structures.

As wildfires affect more people, active public involvement becomes integral to the success of any wildfire management initiative. The Lake County Community Wildfire Protection Plan (CWPP) is an example of a community-based plan with two objectives. First, to identify and prioritize Wildland Urban Interface (WUI) areas within Lake County (including state, county, federal and nonfederal lands) for hazardous fuels reduction treatments and recommends methods for achieving hazardous fuels reductions. Second, the plan outlines measures for reducing fire danger to structures throughout Lake County in at-risk communities.



Figure 17. Wildfires by Cause and Acres Burned (1985-2018) and Peat Soil Area



## Plans and Programs in Place

*Public Warning and Notification System* – In the event of wildfires that pose imminent danger to life safety and property, Cook County utilizes the CodeRED Mass Notification System, Cook County and Cook County Sheriff's Office Facebook pages, and local news media. The local newspaper & radio stations assist with sharing public information. The National Weather Service also helps to put out information on wildfire conditions via NOAA weather radios. In the event of wildfire, the county actively works with local law enforcement and partner agencies (MN DNR, U.S. Forest Service) to get the word out on wildfire conditions and safety measures via their public information centers, websites, and social media.

*Wildland Firefighting (USFS, MN DNR and VFDs)* – The U.S. Forest Service has jurisdiction on all wildfires that are on Forest Service lands and some state lands. The Minnesota DNR has jurisdiction over wildfires on state and private lands. Volunteer Fire Departments (VFDs) have structure protection authority. There are nine fire departments located in Cook County. Each department is responsible for wildfires within their department boundaries; however, they often work together on larger fires, including wildfires. Most of our large wildfires have been managed by the USFS with assistance from the MN DNR and VFDs.

*Minnesota Incident Command System (MNICS)* – MNICS is an interagency group of state and federal partners that cooperate to manage wildfire and all risk incidents while developing standard procedures, practices and guidelines to support incidents and resource mobilization. MNICS was established to enhance the use of emergency response resources for land management agencies in Minnesota, for dissemination of intelligence information and to provide a single point of contact for the cooperating agencies within Minnesota. The organization is governed by a Task Force of agency leads; the Task Force reports to the MNICS Board of Directors. The USFS has three T6 engines, one T7 engine, three float planes as well as access to other resources. All the resources operate under the MNICS agreement for wildfire. Search and Rescue sea plane docks are located at: Devil's Track Lake State Landing, Blankenberg Landing – Seagull Guard Station, and Sawbill Lake – USFS Cabin.

*Mutual Aid Agreements* – All of the municipal fire departments in Cook County have mutual aid agreements with each contiguous department that borders their respective fire district. Written mutual aid agreements are on file with each city. Cross-border wildfire agreements are in place with the Ministry of Natural Resources in Ontario, Canada, that share shores with many of Cook County's northern lakes.

*Cook County Community Wildfire Protection Plan (CWPP)* – The Cook County Community Wildfire Protection Plan has two objectives. First, it identifies and prioritizes Wildland/Urban Interface areas within Cook County (including federal and nonfederal lands) for hazardous fuels reduction treatments and recommends methods for achieving hazardous fuels reductions. Second, the plan outlines measures for reducing fire danger to structures throughout Cook County at-risk communities.

The Cook County CWPP is based on local needs of 15 planning areas which include defined Wildland Urban Interface (WUI) areas. The 15 planning areas were collaboratively defined by Cook County

communities with support from local land management agencies. Planning areas were originally defined by expanding local fire department jurisdictions to include additional infrastructure and community values at risk. Within the 15 planning areas, Wildland Urban Interface (WUI) areas were specified and mapped based on newest research and national standards that define a WUI: an area containing at least 6.17 structures per square kilometer.

This countywide plan addresses issues such as fire response, community preparedness, structure and infrastructure protection and mitigation measures for potential wildland fire fuel hazards. In development of the Cook County CWPP, communities discussed and refined priorities for protecting life, property, and critical infrastructure within the county. Four focus areas surfaced from the 15 planning areas. These four planning areas are priorities as the Firewise implementation team works toward plan implementation. These priority areas include: Greenwood/McFarland, Tom Lake, Mid Gunflint Trail, and Lutsen Township areas. Please see [http://cookcountyfirewise.org/wp-content/uploads/2018/05/FINAL\\_Cook\\_County\\_CWPP\\_signed.pdf](http://cookcountyfirewise.org/wp-content/uploads/2018/05/FINAL_Cook_County_CWPP_signed.pdf).

*Cook County Firewise Program* – Cook County has a full-time Firewise Coordinator and a Firewise Committee that meets on a monthly basis throughout the year. The Firewise Coordinator and the Committee are responsible for the monitoring and update of the Cook County CWPP on an annual basis, as well as the tracking and implementation of wildfire mitigation projects.

*Public Outreach & Education* – Firewise outreach is conducted to inform property owners of the risk from wildfires. Cook County Firewise launched an updated website in 2016 along with a Facebook page. In addition, Firewise reminders are frequently printed in Northern Wilds, the Cook County News Herald, and aired on WTIP North Shore Community Radio.

*MN DNR Information and Training* – The MN DNR maintains current statewide map information on seasonal wildfire risks. Firefighters in Cook County are encouraged to participate in annual wildfire training classes offered by the DNR Forestry Department. The DNR also works with firefighters in promoting their Fire Smart Program, which is a fire prevention program involving local public schools. Cook County has an Emergency Evacuation Plan that is used for wildfires and other events requiring evacuation.

*Sheltering Plans* – Cook County has a Sheltering and Pet Sheltering Plan for residents evacuated in the event of a wildfire.

*Burning Permits/Restrictions* – The Cook County Sheriff's Office regulates when burning permits are available and requires permit holders to notify the county prior to burning.

*Fire Prevention Week* – Fire prevention week is held annually each October. Most fire departments participate and provide an opportunity for local residents to learn fire safety with open houses. In addition to fire departments going to schools to educate youth, local media also assists in sharing fire safety information to the public.



## Program Gaps or Deficiencies

*Dry Hydrants and Water Access* – The CWPP identifies areas within the county where improved water access (such as underground tanks and dry hydrants) is needed for fighting wildfires. These areas are rural and not supported by a municipal water source.

*Public Awareness* – Raising public awareness of wildfire safety and dangerous conditions is an ongoing effort of Cook County Emergency Management, local fire departments, MN DNR Forestry and the U.S. Forest Service.

*Firewise Work on Private Lands* – The Cook County Firewise Program seeks to provide financial and technical assistance to homestead & seasonal property owners to help reduce wildland fuels on private property. However, it is very expensive and there are only a few contractors to assist with the work (i.e. fuels removal) which limits our ability to do more.

*Planning & Zoning / Ordinance Development* – New development of a Wildland Urban Interface (WUI) Ordinance would help to ensure properties are defensible in a wildfire event and accessible for emergency vehicles. This ordinance would also benefit emergency evacuations by allowing enough space for ingress of emergency responders and egressing property owners.

*Evacuation Planning* – Continued work needs to occur on developing good evacuation plans for all portions of the county.

### 4.4.11 Landslides, Soil Erosion & Coastal Erosion

The movement of a mass of rock, debris, or earth down a slope by the force of gravity is considered a landslide. They occur when the slope or soil stability changes from stable to unstable, which may be caused by earthquakes, storms, volcanic eruptions, erosion, fire, or additional human-induced activities. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high. Potential impacts include environmental disturbance, property and infrastructure damage, and injuries or fatalities (FEMA, 2013).

Erosion is the wearing away of land, such as the loss of a riverbank, beach, shoreline, or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surges and windstorms, but may be intensified by human activities. Long-term erosion is a result of multi-year impacts such as repetitive flooding, wave action, sea level rise, sediment loss, subsidence and climate change. Death and injury are not typically associated with erosion; however, major incidents of erosion, such as landslides, can destroy buildings and infrastructure (FEMA, 2013).

Coastal Erosion is defined as the wearing away of land and the loss of beach, shoreline, or dune material over a period of time as a result of natural coastal processes or human influences.

Characteristics such as supply of sand and processes such as sea level change, currents, tides, waves, and wind are natural factors that contribute to the rate of erosion. Human-caused contributors to

erosion include dredging tidal entrances, jetty and groin construction, hardening shorelines with seawall, beach nourishment, and construction of harbors and sediment-trapping dams.

As high lake levels increase, bluff recession rates also increase. Increasing assaults by wave action against the base of the bluff cause erosion and beach-building sediments. Navigational improvements and dredge-material disposal practices deplete both tributary and shore land sources of sediment; removing these sediments from the shore system contributes to erosion. Ice ridges that form and break up each winter along the shoreline cause erosion by trapping sand in floating fragments of ice that are carried offshore into deep water. This continual natural process is one of the principal mechanisms by which sand is lost from the near shore system (USGS, 1992).

Coastal erosion is usually a gradual process, and sudden incidents prompting emergency action are rare. Such rare events include strong storms with high winds or heavy wave action that can cause sudden failure of bluffs.

### **Landslides/Soil Erosion/Coastal Erosion History in Cook County**

There are areas in Cook County that have high clay content in the soils and can cause landslides when corresponding with steep slopes (Figure 18). The Cook County Zoning Ordinance offers some protection via setbacks against structures being built close to bluffs and steep slopes, but grandfathered structures, migration of the bluff edge and zoning variances have resulted in buildings on unstable slopes. Studies of these issues resulted in the following management recommendations:

- On construction sites, vegetation should be established at the earliest opportunity.
- Where possible, woody species should be phased into the herbaceous cover.
- Among woody species, the more advanced successional species are preferred, largely due to their greater root strength.
- Soil stability equations should be employed to demarcate the "100-year safe zone." Within this zone, all human activity that arrests or reverts the forest successional process should be prohibited unless it promotes advanced successional stands.
- In critical erosion sites, advanced successional woody vegetation should be actively promoted.
- Retaining peak discharges after rainfall slows erosion rates and preserves streambanks. Floodwater retention by adequate vegetative cover and leaf litter and land use practices which minimize runoff is desirable
- Vegetation which stabilizes streambanks may allow undercutting, steeper banks, and deeper pools.
- Removal of stumps and other snags is detrimental to fish populations.
- The grazing of cattle and other livestock on streambanks breaks down slopes, eliminates cover, potentially decreases stream depth, and generally disrupts the stream biota. Livestock exclusion is recommended.

In the past five years, there have been two to three landslides along the Poplar River valley (in and around Lutsen Mts) where clay soils and high slopes make these areas prone to slope failure. This has

happened in years past and is a characteristic of that river valley. The clay is also found throughout many of the river valleys along the shore and large clay areas also exist around Hovland.

### Landslides/Soil Erosion/Coastal Erosion and Climate Change

The increased magnitude and frequency of flooding events and storm activity that may result from climate change may in turn increase the risk of soil erosion and landslides. According to University of Washington geologist Dave Montgomery, "If the climate changes in a way that we get a lot more rainfall you would expect to see a lot more landslides" (Phillips, 2014).

In Minnesota, the wettest days are getting wetter. This can contribute to increased erosion in many locations due to flooding and saturation of soils. Reduced ice cover on lakes and shorelines (due to warmer temperatures) could potentially expose shorelines to increased erosion or damage during weather events when they previously may have been covered with ice (National Climate Assessment Development Advisory Committee, 2013).

According to the 2014 National Climate Assessment, "Increased precipitation intensity also increases erosion, damaging ecosystems and increasing delivery of sediment and subsequent loss of reservoir storage capacity" (Pryor, et al., 2014).

### Vulnerability

Stream channels coming down from the ridge above Lake Superior are steep and eroding faster than normal due to increased rainfall and rainfall intensity.

Another area of erosion concern is the Lake Superior shoreline. During periods of high lake levels, there are areas that can lose several cubic feet of shoreline in a given storm. However, there are no records yet of homes falling into the lake.

Figure 18 below depicts the erosion potential along the Lake Superior shore, based on a study by the Natural Resources Research Institute (NRRI). Clay soils are also mapped, with emphasis on areas where the soil has a slope greater than 15% and is actively unstable.

The vulnerability of each jurisdiction to soil erosion and landslides has not changed due to any development in the last five years.

### Plans and Programs in Place

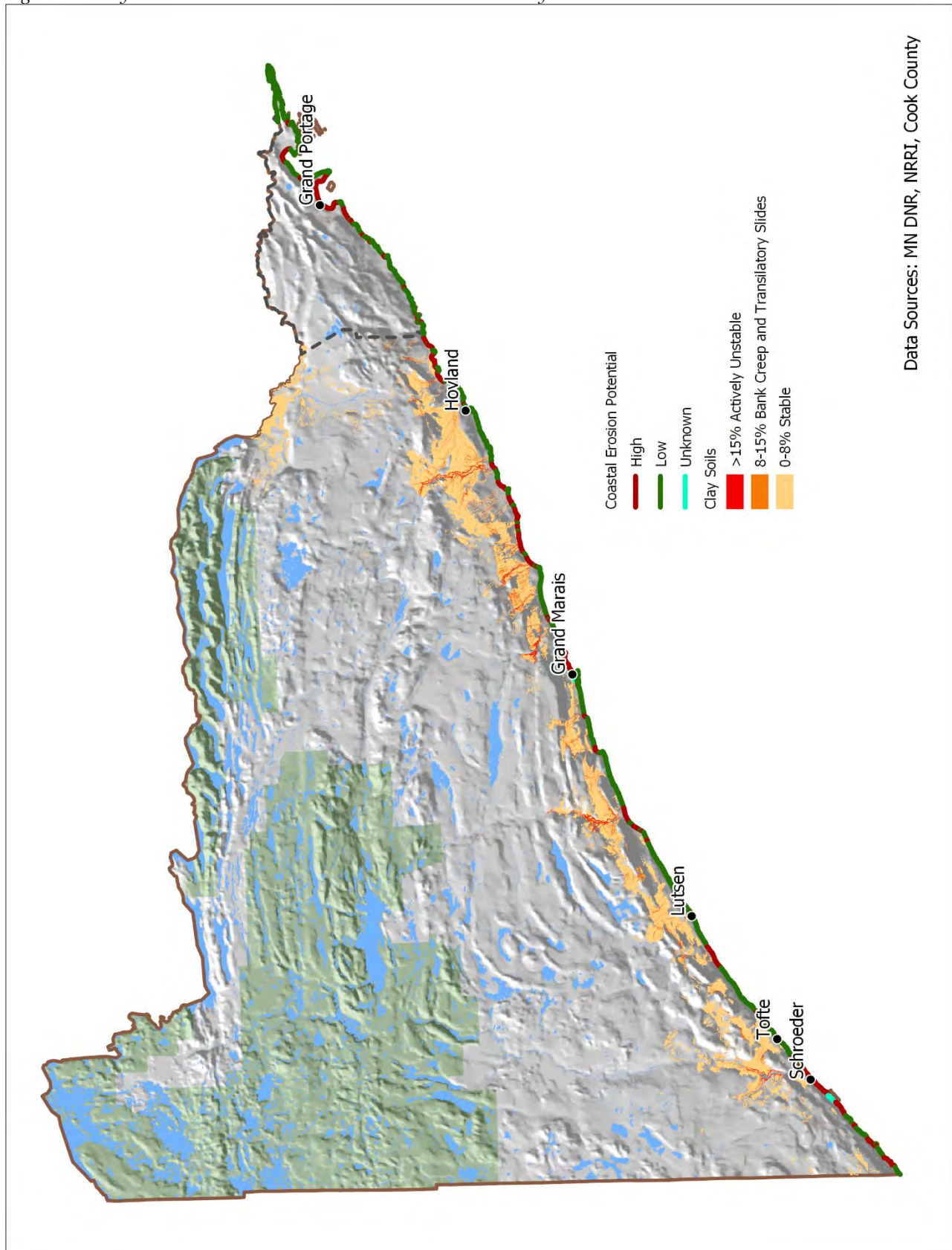
*Cook County Soil and Water Conservation District* – The Cook County Soil & Water Conservation District (SWCD) is a local agency that provides access to natural resource management and conservation services. In cooperation with local, state, and federal agencies, the SWCD provides technical, financial, and educational assistance to address natural resource concerns. Assistance is available to all taxpayers and land users within Cook County. SWCD technicians can review landowner plans for roads, building sites, and vegetation. They can advise on restoration of damaged areas and recommend specific best management practices to manage stormwater and prevent erosion and soil loss. The SWCD is allocated money each year to assist landowners in implementing conservation projects. Examples of eligible projects include erosion and sediment control, rain gardens, and shoreland restoration.

*Cook County Water Advisory Committee (WAC)* – The Water Advisory Committee (WAC) provides guidance to the Water Plan Coordinator for the implementation of the Cook County Water Management Plan. The WAC may advise on environmental, economic, and other social impacts of regulations, policies, and control techniques/technologies affecting water resources management.

#### Program Gaps and Deficiencies

No program gaps or deficiencies were identified.

Figure 18. Clay Soils and Coastal Erosion Potential in Cook County



## Section 5 – Mitigation Strategy

The goal of mitigation is to protect lives and reduce the future impacts of hazards including property damage, disruption to local and regional economies, the amount of public and private funds spent to assist with recovery, and to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment, provided in Section 4 of this plan. Mitigation should be an ongoing process adapting over time to accommodate a community's needs.

### 5.1 Community Capability Assessments

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities:

- *Appendix J:* Lists the plans and programs in place in Cook County as related to hazard mitigation.
- *Appendix K:* As part of the Cook County MHMP update, the county, its cities, and townships were asked to participate in filling out a "Local Mitigation Capabilities Assessment" (LMCA) form to report on their current mitigation capabilities and program gaps. Appendix K lists the LMCA reports gathered for Cook County.

#### 5.1.1 National Flood Insurance Program (NFIP)

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

Neither Cook County nor Grand Marais participate in the NFIP; however, neither have FEMA-mapped high risk areas.

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



by repeated flooding of the same properties. Property owners are notified of their status by FEMA. Cook County does not have any repetitive loss properties.

For more on the areas that flood repeatedly in Cook County, see Section 4.4.5 *Flash Flooding/Riverine Flooding/Coastal Flooding*.

### 5.1.2 Plans and Ordinances

Cook County and its incorporated communities have a number of plans and ordinances in place to ensure the safety of residents and the effective operation of communities, including an Economic Development Plan, Emergency Operations Plan, Continuity of Operations Plan, and Transportation Plan. In Section 4.4 of this plan (*Hazard Profiles*) a review of the plans and programs in place was included as related to each of the hazards addressed in the plan. See Appendix J for a list of all plans and programs in place in Cook County, and Appendix K for the local mitigation capabilities assessment reports.

## 5.2 Mitigation Goals

In Section 4 of this plan, the risk assessment identified Cook County as prone to a number of natural hazards. The steering committee members understand that although hazards cannot be eliminated altogether, Cook County can work toward building disaster-resistant communities.

The goals and strategies developed for the 2019 Minnesota State Hazard Mitigation Plan for natural hazards were adopted for use in the Cook County Plan (Table 24). This framework will allow for integration of the mitigation actions that are listed by Cook County and its jurisdictions into the state plan. The state will then be able to develop a statewide strategy that will benefit all of Minnesota.

Table 24. Goals from the 2019 Minnesota State Hazard Mitigation Plan

<b>Flooding Goal:</b> Reduce deaths, injuries, property loss and economic disruption due to all types of flooding (riverine, flash, coastal, dam/levee failure).
<b>Wildfire Goal:</b> Reduce deaths, injuries, property loss, natural resource and economic disruption due to wildfires (forest, prairie, grass, and peat bogs).
<b>Windstorms Goal:</b> Reduce deaths, injuries, property loss, and economic disruption due to windstorms.
<b>Hail Goal:</b> Reduce deaths, injuries, property damage, and economic disruption due to hailstorms.
<b>Winter Storms Goal:</b> Reduce deaths, injuries, property loss, and economic disruption due to winter storms (blizzard, ice, and ice storm).
<b>Lightning Goal:</b> Reduce deaths, injuries, property losses, loss of services, and economic disruption due to lightning.
<b>Tornado Goal:</b> Reduce deaths, injuries, property loss, and economic disruption due to tornadoes.
<b>Drought Goal:</b> Reduce economic loss and environmental impacts due to drought.
<b>Extreme Heat Goal:</b> Reduce deaths, injuries, and economic disruption due to extreme heat.
<b>Extreme Cold Goal:</b> Reduce deaths, injuries, and economic disruption due to extreme cold.
<b>Dam/Levee Failure Goal:</b> Reduce deaths, injuries, property loss, natural resource and economic disruption due to dam/levee failure.
<b>Erosion/Landslide/Mudslide Goal:</b> Reduce deaths, injuries, property loss, and economic disruption due to hillside, coastal, bluff: caused primarily by oversaturation of soil.



### 5.3 Mitigation Action and Project Strategies

The mitigation actions in this plan are summarized into four main strategy types, as described in the FEMA publications *Local Mitigation Planning Handbook* (2013) and *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* (2013). Also included are the new FEMA Climate Resilient Mitigation Actions (CRMA) released in 2016. Minnesota HSEM recommends the use of these mitigation strategies to be in alignment with the state plan and those recommended by FEMA. A fifth strategy type was determined by Minnesota HSEM for use within the state. They are listed in Table 25 below:

Table 25. Mitigation Strategies and Action Types

Mitigation Strategy	Description	Example Mitigation Actions
Local Planning and Regulations	These actions include government authorities, policies, or codes, that influence the way land and buildings are developed and built.	<ul style="list-style-type: none"> <li>• Comprehensive plans</li> <li>• Land use ordinances</li> <li>• Planning and zoning</li> <li>• Building codes and enforcement</li> <li>• Floodplain ordinances</li> <li>• NFIP Community Rating System</li> <li>• Capital improvement programs</li> <li>• Open space preservation</li> <li>• Shoreline codes</li> <li>• Stormwater management regulations and master plans</li> </ul>
Structure and Infrastructure Projects	<p>These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.</p> <p>This type of action also involves projects to construct manmade structures to reduce the impact of hazards.</p> <p>Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program.</p>	<ul style="list-style-type: none"> <li>• Acquisitions and elevations of structures in flood prone areas</li> <li>• Utility undergrounding</li> <li>• Structural retrofits</li> <li>• Floodwalls and retaining walls</li> <li>• Detention and retention structures</li> <li>• Culverts</li> <li>• Safe rooms</li> </ul>
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	<ul style="list-style-type: none"> <li>• Sediment and erosion control</li> <li>• Stream corridor restoration</li> <li>• Forest management</li> <li>• Conservation easements</li> <li>• Wetland restoration and preservation</li> </ul>

Mitigation Strategy	Description	Example Mitigation Actions
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	<ul style="list-style-type: none"> <li>• Radio or television spots</li> <li>• Websites with maps and information</li> <li>• Real estate disclosure</li> <li>• Presentations to school groups or neighborhood organizations</li> <li>• Mailings to residents in hazard-prone areas.</li> <li>• StormReady</li> <li>• Firewise Communities</li> </ul>
Mitigation Preparedness and Response Support	This is a State of Minnesota mitigation strategy with the intent of covering preparation and actions that protect life and property during a natural disaster.	<ul style="list-style-type: none"> <li>• Emergency operations plan</li> <li>• Flood fight plans and preparedness</li> <li>• Dam emergency action plans</li> <li>• Warning</li> <li>• Backup power</li> <li>• Emergency capabilities</li> </ul>

In the review and discussion of selected mitigation strategies and actions, steering committee members and the public were asked to consider the ranking of mitigation actions by priority for implementation. Table 26 provides criteria that were taken into consideration in the process.

### 5.3.1 Hazard Mitigation Actions

Cook County and its included municipalities share a common Multi-Hazard Mitigation Plan and worked closely to develop it. Local leaders worked together with the Cook County Emergency Management Director to assure that the hazards and mitigation actions included in this plan are accurate and addressed in their jurisdictions. The jurisdictions responsible for each action are Grand Marais and Cook County.

Appendix G contains separate mitigation action tables for each jurisdiction. Each of these mitigation action charts detail the hazard, the mitigation strategy and action to address it, the priority ranking for implementation (High Priority, Moderate Priority; Low Priority; see Table 26), its current stage of implementation, the timeframe for implementation going forward, the jurisdictions who have identified they will work to implement the action, the responsible parties to carry through with implementation, and comments on how the plan will be implemented through existing planning mechanisms and potential funding to make implementation happen.

Table 26. Criteria for Mitigation Action Priority Ranking

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

Mitigation actions that have been completed or deleted from the 2010 Cook County Multi-Hazard Mitigation Plan are identified and reported on in Appendix H. Completed and deleted mitigation actions are not carried over into the updated mitigation action chart.

In addition to ranking the hazard mitigation actions, the steering committee also reports on the status of the mitigation action. Ongoing mitigation actions from the initial review were incorporated into annual reviews by the mitigation team. The status designations are:

- New – New actions that have been identified since the last plan
- Ongoing – Actions from the last plan that require continuing application
- In Progress – Actions from the last plan that are currently being acted upon

The mitigation types are defined as follows:

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

The Cook County Master Mitigation Action Chart is provided in Table 27.

Table 27. Cook County Master Mitigation Action Chart (2019-2023)

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
1	All-Hazards	Mitigation Preparedness & Response Support	<b>EMERGENCY NOTIFICATION</b> Continue to ensure that all Cook County residents are aware of and sign-up for the County's CodeRed Emergency Notification System, and continue to promote additional outreach delivery systems that are in place.	Ongoing	High	2019-2023	Cook County	CC Emergency Management, City of Grand Marais, and Township governments	Cook County utilizes the CodeRED emergency notification system, Cook County and Cook County Sheriff's Office & Public Safety Facebook pages, the Boreal Emergency Preparedness Portal website, and local news media. Local newspaper, online news radio stations assist with sharing public information. In 2018, Cook County upgraded its CodeRED database and can send messages to all landlines in the county, and many residents are subscribed to multiple means of CodeRED contact.	County, municipal funding, MLSCP grants (outreach, planning)
2	All-Hazards	Mitigation Preparedness & Response Support	<b>911 REDUNDANCY</b> Advocate for redundant communications pathways in the event of 911 communications system failure.	Ongoing	High	2019-2023	Cook County	CC Emergency Management	Cook County has diligently worked with the MN ECN to address lack of redundancy with 911 phone lines and now, through a partnership with ECN, CenturyLink and NESC, a redundancy infrastructure has been put in and failover plans are in final testing phases to mitigate reoccurring 911 outages. As of June, 2018 this issue is resolved, except for True North Redundancy which will likely be in place within 2019.	County, MN ECN, & CenturyLink

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
3	All-Hazards	Structure & Infrastructure Projects	<b>COMMUNICATIONS INFRASTRUCTURE</b> Assess gaps in cell phone coverage and ARMER radio coverage throughout the county and evaluate feasibility to improve capacity for emergency communications through installation of new towers.	New	Moderate	2019-2023	Cook County	CC Emergency Management	Cook County expects that a new ARMER radio tower will be in place at the end of the Gunflint Trail by early summer 2019. Also, the planned MIT Lake tower will address redundant paths ensuring better mitigation of ARMER outages throughout the County but especially on the Gunflint Trail. Gaps in cell phone coverage exist in many parts of the county, including nearly all of Gunflint Trail area, Arrowhead Trail and parts of Hovland.	County funding, potential state or federal sources
4	All-Hazards	Local Planning & Regulations	<b>COMMUNITY PLANNING</b> Update County/City Comprehensive Plans and Zoning Ordinances to include mitigation considerations that help to reduce risk from natural hazards. Utilize data of past hazard events and future climate projections to help inform updates.	New	Moderate	2019-2023	Cook County, City of Grand Marais	CC Emergency Management & County Board & Departments	The county and local jurisdictions will work to incorporate mitigation considerations and climate change data into the update of land use plans and ordinances. This is also a high priority for the MN DNR Lake Superior Coastal Program (MLSCP) as well as NOAA.	County funding, MLSCP grants (Planning, Regulations)

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5	All-Hazards	Local Planning & Regulations / Mitigation Preparedness & Response Support	<b>EOP UPDATE &amp; RESCUE OPS SUPPORT PLANNING</b> Review and update the Cook County Emergency Operation Plan on an annual basis and evaluate support equipment needed for rescue operations.	Ongoing	High	2019-2023	Cook County	CC Emergency Management	Cook County maintains an all-hazards EOP which is updated and reviewed on an annual basis. Additional planning will be evaluated with VFDs and EMS for ways to improve Rescue Ops (i.e., Cost sharing for rescue equipment, better grid marking system on trails & roads, hardware/software for tablets, IPADs, etc. for mapping in the event of evacuation).	County funding, MLSCP grants (plan updates)
6	All-Hazards	Mitigation Preparedness & Response Support	<b>EM PARTNERSHIPS</b> Maintain and strengthen collaborative all-hazards emergency preparedness efforts (planning, training & exercising) with local stakeholders, key agency partners, and Canada.	Ongoing	Moderate	2019-2023	Cook County	CC Emergency Management in collaboration with CC Hwy, U.S.F.S., MnDOT, and MN DNR	Cook County works closely with a local Emergency Preparedness Committee, as well as with the MN DNR, MnDOT, and USFS on many different elements of emergency response planning. Each year an Emergency Services Conference is held in Grand Marais that engages key partners on key training topics. Cook County also coordinates closely with Canada through the Pigeon River Cross-Border Steering Committee.	County funding, U.S.F.S., MNDNR, Canada, MLSCP grants (Planning)



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7	All-Hazards	Local Planning & Regulations / Mitigation Preparedness & Response Support	<b>MASS CARE</b> Ensure mass care sheltering plans and facilities are in place to care for residents temporarily displaced from a severe weather event such as flooding, severe wind storms, or power outages during extreme cold/heat events.	Ongoing	High	2019-2023	Cook County	CC Emergency Management & CC Public Health & Human Services, in partnership with American Red Cross	Cook County has designated shelter facilities that have agreements with the American Red Cross (YMCA/ISD #166 Schools, CC Community Center), as well as Sheltering and Pet Sheltering Plans in place. CC Emergency Management is working with the Red Cross to get additional local shelters certified, and to identify hotels that are willing to honor emergency shelter rates as an option for impacted residents.	County funding, PH&HS, MLSCP grants (Planning), Public Health Emergency Preparedness Grant (PHEP)
8	All-Hazards	Education & Awareness Programs	<b>PREPAREDNESS OUTREACH &amp; EDUCATION</b> Conduct public outreach and education to promote hazard –awareness and emergency preparedness for individuals, families, schools, and businesses.	Ongoing	High	2019-2023	Cook County	CC Emergency Management	This is an ongoing effort of Cook County Emergency Management. Information is distributed to the public via the County websites, Sheriff's Office Facebook, Boreal Emergency Preparedness Portal and throughout the year during periods of severe weather. Additional information is provided during the NWS severe weather awareness weeks in spring and winter.	County funding, MLSCP grants (O&E)

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9	All-Hazards	Local Planning & Regulations / Education & Awareness Programs	<b>HEALTH EPIDEMIC</b> Develop a Points of Distribution (POD) Plan to manage response to a health epidemic in Cook County.	<b>New</b>	Moderate	2019-2023	Cook County	CC Public Health & Human Services, Sawtooth Mountain Clinic, Grand Portage Health Services, North Shore Health	Cook County Public Health & Human Services is participating in development of a statewide POD plan. Staff and key partners will be trained on the plan after it is completed. Cook County PHHS also participates in the Health Alert Network (HAN) to distribute time-sensitive health messaging from MDH to our hospital and clinic partners in the county. In the event of a health epidemic the HAN would be used to coordinate critical information.	County Funding, Public Health Emergency Preparedness Grant (PHEP)
10	All-Hazards	Mitigation Preparedness & Response Support	<b>MASS FATALITIES</b> Be prepared to manage a mass fatality event (plans and resources) in Cook County.	<b>New</b>	Moderate	2019-2023	Cook County	CC Emergency Management, CC Public Health & Human Services, North Shore EMS	Cook County Emergency Management and CC Public Health & Human Services will continue to work together on MCI planning and training and engage key agency response partners in this process.	County funding
11	All-Hazards	Mitigation Preparedness & Response Support	<b>HAZMAT TRAINING</b> Have a new/improved decon structure for Fire/EMS and provide funding to train on it.	<b>New</b>	Moderate	2019-2023	Cook County	North Shore EMS, Local VFDs	North Shore EMS and local volunteer fire departments continue to work on emergency preparedness plans, training, and equipment in order to be ready to respond to hazardous materials incidents.	North Shore EMS, VFDs

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12	All-Hazards	Mitigation Preparedness & Response Support	<b>HOSTILE INCIDENT TRAINING</b> Work with local schools to provide hostile incident training.	New	Moderate	2019-2023	Cook County	CC Emergency Management & Local Schools	CC Emergency Management and the CC Sheriff's Office participate in security assessments and joint trainings with MN HSEM School Safety Center and local schools to address threats, lockdown procedures, and physical security gaps. A School Alice Training is planned for Cook County in 2019.	County, HSEM School Safety Center Program funding
13	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<b>BACKUP POWER NEEDS ASSESSMENT</b> Identify critical facilities in the County that do not have backup power in the event of a major power outage resulting from severe winter or summer storms.  <i>(Critical facilities may include: police/fire departments, EOC, health care facilities, water &amp; sewer treatment facilities, and other facilities deemed as critical, i.e. public schools and sheltering facilities).</i>	Ongoing	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail & Unorganized Areas, Public & Private Schools	CC Emergency Management and local-level government	Generator backup power is currently in place for the Cook County Courthouse, Jail, Sheriff's Office, Dispatch, County Data Center, and North Shore Care Center. <b>Generator backup power should be obtained for:</b> <ul style="list-style-type: none"> <li>• Cook County EOC</li> <li>• Cook County Community Center,</li> <li>• Senior Center,</li> <li>• Cook County Schools ISD# 166</li> <li>• Great Expectations School</li> <li>• Birch Grove Community Center</li> <li>• YMCA</li> </ul> Municipal governments are encouraged to obtain backup generators for local critical facilities.	County, municipal funding

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14	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<b>BACKUP POWER IMPLEMENTATION</b> Purchase and install generators & hook-ups for identified critical facilities that require backup power.	New	High	2018-2022	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Management & Local EM's / Gov't	Cook County, local governments, and schools will evaluate feasibility to purchase and install generators for key facilities, and will do so as funding allows.	County, municipal funding, Possible FEMA HMA grant funding for Generators
15	Severe Winter & Summer Storms	Structure & Infrastructure Projects	<b>POWER LINE FAILURE</b> Work with rural & municipal electrical coops to identify where it is feasible and cost effective to bury or strengthen power lines to mitigate against power line failure and implement measures.	New	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail	CC Emergency Management, CC Highway & Local EM's / Gov't, Arrowhead Electric Coop.	Cook County will work with Grand Marais PUC and Arrowhead Electric Coop on this effort. Many areas throughout the county have power lines vulnerable to failure in the event of severe storms and should be evaluated for potential strengthening measures or putting them underground. Such projects could be done as part of new construction or as part of reconstruction projects. Supportive grant funding will be required for projects that are feasible as such projects are extremely expensive and difficult in the rocky terrain of the North Shore.	Rural or Municipal Electric Coop funding, Possible FEMA HMA funding for Infrastructure Retrofit

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16	Severe Winter & Summer Storms	Education & Awareness Programs	<b>NOAA WEATHER RADIOS</b> Promote the use of NOAA weather radios for weather related emergency information by residents and visitors.	Ongoing	High	2019-2023	Cook County	CC Emergency Management, Municipal EM's and local organizations and businesses	Cook County Emergency Management promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service. This is also done as part of the NWS severe weather awareness weeks. When weather radios are available CCEM works to distribute them in the community.	County funding
17	Severe Winter & Summer Storms	Education & Awareness Programs	<b>SEVERE WEATHER AWARENESS</b> Provide/promote education and awareness on severe winter, spring, and summer storms to residents and visitors and promote personal & family emergency preparedness.	Ongoing	High	2019-2023	Cook County	Cook County Emergency Management	CC Emergency Management produces seasonal PSAs, print and digital ads, online info, as well as radio interviews seasonally with our severe weather changes. CCEM also participates in the National Weather Service's "Winter Hazard Awareness Week" held in November each year and the "Severe Weather Awareness Week" held in April each year. Both events seek to educate residents on the dangers of severe storms and the importance of preparing for severe weather before it strikes. (i.e., Create personal go-kits, purchase home generators, and stock food, water, and medical supplies).	County funding, MLSCP grants (O&E, i.e., Rip current or River Hazards)

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18	Severe Winter & Summer Storms	Local Planning & Regulations	<b>WINTER ROADS TREATMENTS</b> Continue to provide for public safety on roads through snow removal, salting and sanding to minimize the impacts of snow/ice accumulation on roadways.	Ongoing	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail MnDOT	CC Hwy Dept, MnDOT, & municipal roads dept./public works	Cook County, cities, and townships complete the snow removal and disperse sand/salt as needed on all, county, city and township roads. MnDOT removes the snow from State Highway 61 as well as disperses salt/sand as needed. The MLSCP offers information on Best Management Practices for salt management to protect trout & other fish habitat.	County, municipal funding
19	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<b>TREE MANAGEMENT</b> Regularly inspect and trim trees near power lines to reduce power outages and road debris due to falling tree limbs during storms.	Ongoing	Moderate	2019-2023	Cook County, City of Grand Marais, MnDOT	CC Hwy. Dept., municipal roads dept./public works, MnDOT	Cook County, local public works, Grand Marais, PUC, and Arrowhead Electric Coop all oversee this effort respectively. Extensive brushing work is also done across the county through Firewise Programs that mitigates both power failures and wildfire risks.	County, municipal funding, MLSCP grants (Urban Tree Inventory – Two Harbors), MnDOT (Right of Way Utilities)
20	Severe Summer Storms	Mitigation Preparedness & Response Support	<b>WARNING SIRENS</b> Identify areas within Cook County that should be considered for installation of a warning siren to help warn residents to take shelter in the event of straight line winds. Install sirens as feasible.	New	High	2019-2023	Cook County	CC Emergency Management in coordination with municipal government	There are no outdoor warning sirens in Cook County due to sparse population density and protected wilderness areas. Warning sirens are an important communication tool in the event of dangerous high winds. Warning sirens should be considered for the City of Grand Marais and other rural areas (townships / unorganized areas) throughout the County.	County funding, USDA Rural Development-Community Facilities Direct Loan & Grant Program (covers warning sirens)



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21	Severe Summer Storms	Local Planning & Regulations	<b>STORM SHELTERS/SAFE ROOMS NEEDS ASSESSMENT</b> Identify community areas (i.e., parks, campgrounds) and facilities (i.e., schools, government buildings, mobile home parks) that are vulnerable to severe wind storms or tornadoes and evaluate for potential construction or retrofit of safe rooms or storm shelters.	New	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Mgmt, CC Public Health & Human Services, School Admin.	Cook County Emergency Management and local communities have identified areas of concern to include the Grand Marais Municipal Campground & RV Park, Gunflint Trail area, Caribou Trail/Lamb's/Lutsen recreation & resort areas. Safe room construction or retrofit for schools is also desired to protect students and staff.	County, municipal funding
22	Severe Summer Storms	Structure & Infrastructure Projects	<b>STORM SHELTERS/SAFE ROOMS &amp; CONSTRUCTION/ RETROFIT</b> Implement construction or retrofit projects for safe rooms or storm shelters in identified vulnerable locations.	New	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Management in coordination municipal EM's, School District Officials, Resort or other private partners (ie. Resorts)	Cook County Emergency Management will work with local jurisdictions or facilities that wish to construct a storm shelter or community safe room. FEMA grant funding may be sought to support an eligible safe room project.	County, municipal funding, Possible FEMA HMA grant for Safe Rooms
23	Severe Summer Storms	Mitigation Preparedness & Response Support	<b>SKYWARN PROGRAM</b> Ensure storm spotters in Cook County receive training on a regular basis in order to maintain their storm spotting skill level.	Ongoing	Moderate	2019-2023	Cook County	CC Emergency Management, NWS	Cook County participates in bi-annual Storm Spotter training with the National Weather Service. The last training was held May 25, 2018 and welcomed eight new trained spotters.	County & NWS funding

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24	Severe Summer Storms	Mitigation Preparedness & Response Support	<b>MOBILE HOME PARK SAFETY</b> Work to ensure Minnesota Department of Health (MDH) Evacuation Plan & Storm Shelter Requirements are met in municipalities with manufactured home parks.	Ongoing	High	2019-2023	Cook County	CC Public Health & Human Services, MHP Operators	Cook County Public Health works with the owners of manufactured home parks (MHP's) within the County to ensure that they are meeting MDH requirements for storm shelters and evacuation plans. There are 2 MHP's within Cook County: 1. Pine Mountain Mobile Home Court, located just west of County Road 6 across from the general store by Devil Track Lake, and 2. Paradise Park Mobile Home Court, located off of Hwy 61 to the north and to the west of the Clearview store complex in Lutsen.	County, MHP funding
25	Extreme Temps (Hot/Cold)	Education & Awareness Programs	<b>EXTREME TEMPS- PUBLIC SAFETY</b> Provide outreach & education to vulnerable populations in the community (i.e., senior citizens, young adults) on personal safety measures to take during periods of extreme heat / cold.	Ongoing	High	2019-2023	Cook County	CC Emergency Management, CC Public Health & Human Services in coordination with local schools and senior centers	Cook County Emergency Management and Cook County Public Health & Human Services both continue to provide awareness and education to the public on the dangers associated with extreme heat events, particularly to vulnerable populations such as the elderly. Cook County produces seasonal PSAs, print and digital ads, online info, as well as radio interviews on the topic during periods of extreme temperatures. This information is also covered during the NWS severe weather awareness weeks.	County funding, MLSCP grants (O&E)

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26	Flooding	Local Planning & Regulations	<b>FLOODPLAIN MAPS</b> Work with FEMA and the MN DNR to create digital flood insurance rate (DFIRM) maps for Cook County.	New	High	2019-2023	Cook County	CC Mgmt. I.S., CC Land Services	Cook County Management Information Systems Department maintains the current floodplain maps for the county. FEMA has started working on some new flood maps, but it may take some years before we see the final result. Once completed, they will be adopted into County and local ordinances.	County funding, FEMA / MN DNR, MLSCP (\$ to adopt into local ordinances)
27	Flooding	Local Planning & Regulations	<b>NEW DEVELOPMENT GUIDELINES</b> Work to ensure new development does not occur in flood-prone areas along the Lake Superior Coast or inland areas.	New	High	2019-2023	Cook County, City of Grand Marais	CC Mgmt. I.S., CC Land Services	Cook County and local municipalities follow the North Shore Management Plan Shoreland Guidelines and Grand Portage Land Use Ordinance for development on Lake Superior and the DNR Shoreland Guidelines for development on inland shoreland property to ensure development is setback at a proper distance from the water. Cook County also has zoning regulations in place for wetlands and development. Cook County also has designated "No Service Zones" in rural areas of the County where if development is permitted, owners acknowledge risks and waive any access to public services.	County funding, MLSCP grants (Planning, Regulations, Outreach)

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28	Flooding	Structure & Infrastructure Projects	<b>OTIS CREEK CULVERT</b> Upsize the culvert under Arrowhead Trail (CSAH 16) at Otis Creek to reduce localized flooding.	<b>New</b>	High	2019-2023	Cook County, MnDOT	Cook County Highway Dept., MnDOT	This project will be under the management of the Cook County Highway Department in collaboration with MnDOT as this culvert continues to go under TH61. It will requires coordination and partnership with state and private property owners. The MLSCP can assist with planning to mitigate impacts to fish habitat.	County, State, and private property owner funding, MLSCP grants (Planning), GLRI, Clean Water Legacy (fish habitat)

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29	Flooding	Structure & Infrastructure Projects / Local Planning & Regulations	<b>DOWNTOWN COASTAL FLOODING</b> Identify and implement projects to reduce risk from Lake Superior coastal flooding to structures or infrastructure (public or private) in the downtown area of Grand Marais.	New	High	2019-2023	Cook County, City of Grand Marais	City of Grand Marais, CC Land Services, CC, Highway Dept. and CC SWCD in collaboration with state and federal partners	The City of Grand Marais and Cook County have identified, mapped, and documented areas of risk in the downtown area of public and private property that have experienced repetitive coastal flooding and resulting damages. Mitigation projects to address coastal flooding in the downtown area of Grand Marais will be a collaborative effort that includes coordination between city, county, and State and Federal agencies (i.e., City of Grand Marais, Cook County Highway Dept., SWCD, MnDOT, MLSCP, and NOAA). Priority projects that may be eligible for FEMA HMA grant funding include reconstruction & upgrade of the sea wall at the end of Wisconsin Street to reduce road washouts, and property-specific mitigation measures in concert with private landowners along the coastal shoreline in this area.	County, federal funding, Possible MLSCP grant for design if public land. Possible FEMA HMA grant for Localized Flood Reduction Projects

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30	Flooding	Structure & Infrastructure Projects / Natural Systems Protection	<b>COOP PARKING LOT FLOODING</b> Implement plans to reduce flooding of the city parking lot near the Coop in downtown Grand Marais.	New	High	2019-2023	Cook County, City of Grand Marais	CC Highway Dept., City of GM Public Works,	This project is identified as a top priority project in the Grand Marais Stormwater Management Plan. This project will be under the collaborative management of the City of Grand Marais, Cook County Highway, and SWCD.	County, municipal funding, Possible FEMA HMA grant for Localized Flood Reduction Projects, MLSCP grants (Planning)
31	Flooding	Mitigation Preparedness & Response Support / Education & Awareness Programs	<b>PUBLIC SAFETY – HIGH WATER</b> Find ways to prevent/reduce victims being swept away in local rivers during high rain events.	Ongoing	High	2019-2023	Cook County	CC Emergency Management, CC Sheriff's Office, MN DNR	Cook County Emergency Management and the MN DNR work to raise public awareness of the dangers of our rivers during high rain events for recreational users. Messages to the public are conveyed through numerous outreach channels including Facebook and media releases, as well as cautionary signage in recreational trail areas along rivers and waterfalls. This is a priority of the MLSCP in their current annual grant.	County, MN DNR funding, MLSCP grants (O&E)



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32	Flooding	Structure & Infrastructure Projects	<b>TRANSPORTATION FLOOD IMPROVEMENT PROJECTS</b> Maintain bridge, road, and culvert infrastructure throughout the County at a level that is capable of sustaining a major storm event and will not be vulnerable to washouts.	Ongoing	High	2019-2023	Cook County, MnDOT	CC Highway Dept., MnDOT	The Cook County Highway Department develops and maintains a 5-year transportation improvement plan which prioritizes and details the improvement projects for roads, culverts, bridges, sidewalks, and more. CC Hwy is also working on a new Capital & Infrastructure Plan. The plan identifies high-priority areas for flood mitigation projects. The MLSCP has stormwater & culvert inventories that can be used for assistance in planning.	County funding, federal, state, and local resources
33	Flooding	Local Planning & Regulations / Structure & Infrastructure Projects	<b>STORMWATER MANAGEMENT</b> Identify, plan for, and implement mitigation projects to address stormwater management issues that affect stormwater and transportation infrastructure.	Ongoing	High	2019-2023	Cook County, City of Grand Marais	CC Highway Dept., City of GM Public Works, SWCD, MnDOT	The City of Grand Marais has a storm water management plan in place that identifies strategies to mitigate flooding. The City is partnering with MnDOT to implement storm water flooding mitigation strategies during the Highway 61 reconstruction.	County, municipal funding, MnDOT. Other state & federal funding (TBD), MLSCP grants (Regulations)
34	Flooding	Local Planning & Regulations / Structure & Infrastructure Projects	<b>SPRING THAW/ICE DAMS</b> Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during the spring thaw.	Ongoing	Moderate	2019-2023	Cook County, City of Grand Marais, MnDOT	CC Hwy Dept, GM Public Works, and MnDOT	This is a standing effort of the Cook County Highway Dept., City public works, and MnDOT to address snow removal and ice treatments to roads in spring and winter.	County, municipal funding, MnDOT, MLSCP grants (Regulations & Outreach)

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35	Coastal Erosion	Local Planning & Regulations	<b>COASTAL EROSION MITIGATION</b> Assess coastal erosion issues and develop recommendations to assist in future development decisions and coastal restoration efforts.	New	High	2019-2023	Cook County	CC SWCD, CC Land Services, MN DNR, MnDOT (ROW adjacent to Lake Superior)	The Cook County SWCD office is currently collaborating with local governments, MN DNR Lake Superior Coastal Program, MnDOT, and other groups along the coastal zone of Lake Superior to do a coastal erosion hazard map. It is a mapping tool that will aid in development decisions and restoration efforts along the Lake Superior coast. NOAA will be consulted in our planning efforts, as they are running a coastal structure inventory starting in late 2018.	County, SWCD, MN DNR funding, MLSCP grants (mapping, outreach, ordinances, setbacks)

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36	Flooding / Erosion	Local Planning & Regulations / Natural Systems Protection	<b>EROSION/SLOPE FAILURE</b> Identify and implement projects to reduce risk to structures or infrastructure from erosion and landslides.	Ongoing	High	2019-2023	Cook County	CC Land Services & CC SWCD (in cooperation with businesses / landowners were applicable)	The Cook County SWCD has a dataset that has mapped the co-location of clay soils and steep slopes that may be at higher risk to slope failure. The SWCD has conducted studies on these areas and has developed management recommendations to address erosion control for these areas which include strategic vegetation management to slow erosion and control runoff on hills and increase streambank stabilization. The SWCD can assist with identifying and recommending projects to Cook County Land Services. CC Land Services would work jointly with SWCD depending on the type of work and method of funding. Both CC Land Services and SWCD have identified projects that may be eligible for FEMA hazard mitigation grant program assistance related to localized flood mitigation, erosion, and slope stabilization efforts.	SWCD, Possible FEMA HMA Grant Funding for Soil Stabilization, MLSCP grants (Planning, Outreach, Ordinances)

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37	Erosion	Education & Awareness Programs / Natural Systems Protection	<b>SOIL CONSERVATION EDUCATION &amp; ASSISTANCE</b> Provide education, technical & financial assistance to landowners to help mitigate erosion issues.	Ongoing	Moderate	2019-2023	Cook County	CC SWCD	Cook County SWCD is allocated money each year to assist landowners in implementing conservation projects. Examples of eligible projects include erosion and sediment control, rain gardens, and shoreland restoration. SWCD Technicians can review landowner plans for roads, building sites, and vegetation. They can advise on restoration of damaged areas and recommend specific best management practices to manage stormwater and prevent erosion and soil loss. SWCD provides education & awareness to the public through print materials, workshops and events and special interest topics.	SWCD funding and state cost-share program, MLSCP grants (O&E i.e., development of property owner guides)

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38	Wildfire	Mitigation Preparedness & Response Support	<b>EMERGENCY WILDFIRE NOTIFICATION</b> Ensure the ability to provide timely and targeted emergency information and warning to residents and visitors in the event of wildfire danger to the public.	Ongoing	High	2019-2023	Cook County	CC Emergency Management in partnership with law enforcement, NWS, USFS, MN DNR and local VFDs	In the event of wildfire events that pose imminent danger to life safety and property, Cook County utilizes the CodeRED Mass Notification System, Cook County and Cook County Sheriff's Office Facebook pages, and local news media. Local newspaper & radio stations assist with sharing public information. The NWS also helps to put out information on wildfire conditions via NOAA weather radios. In events of wildfire, the County actively works with local law enforcement, MN DNR, and U.S. Forest Service to get the word out on wildfire conditions, evacuation orders, and safety measures via their public information centers, websites, and social media. The U.S. Canada Border Patrol is also made aware of conditions in order to reduce incoming traffic at the border if necessary. Going door-to-door to issue evacuation notices is done when & where needed in rural areas.	County funding, NWS, USFS, MNDNR

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39	Wildfire	Local Planning & Regulations	<b>MUTUAL AID AGREEMENTS</b> Maintain inter-agency, multi-jurisdictional, and cross-border efforts to identify, contain, and extinguish wildfires.	Ongoing	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail,	CC Emergency Management, VFDs, MN DNR, USFS, Arrowhead Lands Collaborative	VFD's work together through mutual aid agreements, as well as with the Fire Cooperators annual meetings, Cook County Disaster Round-Up event, MN DNR and USFS. When needed we have international mutual aid agreements with Canada, developed through the Cross-Border Wildfire Committee and the Pigeon River International Emergency Management Committee. All municipal fire departments have mutual aid agreements with each department that borders their respective fire district, and Cross-Border wildfire agreements are in place with the Ministry of Natural Resources in Ontario Canada. The Arrowhead Lands Collaborative (Cook County GIS, MN DNR, U.S.F.S.) shares geo-spatial data to support wildfire response.	County, municipal, and agency funding



#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
40	Wildfire	Local Planning & Regulations	<b>COST-SHARE PROGRAM</b> Create a cost-share program for homeowners in high risk WUIs to create or improve defensible space around structures and ingress/egress routes.	New	High	2019-2023	Cook County	CC Firewise	The Cook County Firewise Committee will explore the possibility of developing this Cost Share program. Many property owners are older cannot do the work themselves, and many structures are not accessible for EMS vehicles due to vegetation encroaching. A wildfire mitigation cost share program could help to encourage property owners to take risk reduction steps with financial assistance to do so.	CC Firewise, MN DNR, Possible FEMA HMA Grant funding for wildfire mitigation projects
41	Wildfire	Structure & Infrastructure Projects / Natural Systems Protection	<b>FIREWISE OUTREACH &amp; EDUCATION</b> Continue to build and maintain the Cook County Firewise program in collaboration with communities and key partners.	Ongoing	High	2019-2023	Cook County	CC Firewise, U.S.F.S., MN DNR, Local Fire Departments, CC PH&HS	Cook County has developed and maintains an active Firewise program in partnership with key agencies and Grand Portage Forestry. Cook County has 7 recognized Firewise USA Communities, completes between 800-1100 Firewise property assessments/year, maintains a Cook County Firewise website and Facebook page, educational video, and distributes annual action reports on the extensive Firewise activity. Cook County Firewise also provides 7 free Firewise brush disposal sites throughout the County. CC PH&HS assists in conveying health & safety information to the public when smoke is in the air.	County funding, MN DNR

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
42	Wildfire	Local Planning & Regulations	<b>NEW DEVELOPMENT: INGRESS/EGRESS PLANNING</b> Promote all new & existing development in rural areas to have adequate access and egress for emergency response vehicles.	Ongoing	High	2019-2023	Cook County	CC Emergency Management, CC Land Services, and CC Firewise	Cook County Emergency Management works with Cook County Land Services, as well as through Firewise to actively promote adequate emergency access for emergency vehicles, and guidelines for safe rural driveway access. A postcard campaign has gone out to all properties, as well as an educational video online, postcard with instructions distributed with all address applications.	County funding, MLSCP grants (Planning, Regulations)
43	Wildfire	Local Planning & Regulations	<b>NEW DEVELOPMENT: WUI ORDINANCE</b> Develop a Wildland Urban Interface (WUI) Ordinance to ensure properties are defensible in a wildfire event and accessible for emergency vehicles.	New	High	2019-2023	Cook County	CC Firewise, CC Emergency Management, and CC Land Services	Cook County Firewise will work in collaboration with CC Emergency Management and CC Land Services to explore development of a new ordinance. Note that it will be important to plan for long-term administration of the ordinance. This ordinance also would benefit emergency evacuations by allowing enough space for ingress of emergency responders and egressing property owners.	County funding, MLSCP grants (Planning)

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
44	Wildfire	Local Planning & Regulations	<b>CWPP PLANNING &amp; IMPLEMENTATION</b> Monitor and update the Cook County CWPP for the implementation of priority wildfire risk-reduction activities.	Ongoing	High	2019-2023	Cook County	Cook County Firewise Coordinator & Firewise Committee	Cook County maintains a Community Wildfire Protection Plan (CWPP) that identifies and prioritizes WUI areas within Cook County (including federal and nonfederal lands) for hazardous fuels reduction treatments and recommends methods for achieving hazardous fuels reductions. The plan also outlines measures for reducing fire danger to structures throughout Cook County at-risk communities. The Firewise Coordinator and Committee are responsible for the monitoring and update of the CWPP on an annual basis, as well as the tracking and implementation of wildfire mitigation projects. The most recent CWPP was approved in August, 2017.	County, MN DNR Firewise, USFS grant
45	Wildfire	Education & Awareness Programs / Natural Systems Protection	<b>ABANDONED FUEL TANKS</b> Inventory the location of abandoned diesel oil fuel tanks and work to remove them, as well as educate property owners on their responsibilities under State Statute.	Ongoing	High	2019-2023	Cook County	CC Firewise, CC Assessor	This is an ongoing effort and priority concern of Cook County. Hundreds of abandoned diesel fuel tanks can be found throughout the County. More can be done to educate property owners on <i>MN State Statute 116.48 – Notification Requirements</i> which detail the requirements for owners of above-ground or below-ground fuel tanks taken out of service to notify the State.	County funding, MN DNR

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
46	Wildfire	Education & Awareness Programs / Mitigation Preparedness & Response Support	<b>HOMEOWNER OUTREACH &amp; ASSISTANCE</b> Provide targeted wildfire mitigation information, training, and assistance to homeowners in high-risk WUI areas to increase defensible space and reduce fuels around structures. This includes seasonal, weekend, and elderly property owners.	Ongoing	High	2019-2023	Cook County	CC Firewise	Cook County Firewise educates homeowners on implementing fuel-reduction measures around homes in areas adjacent to woodland areas for wildland fire safety. Some examples include Firewise Demonstration Days, outreach at community events, speaking to homeowner associations at annual meetings, advertising in local media sources, establishing Firewise USA sites, and meeting with property owners on their property to conduct Level 1 Firewise Assessments. Cook County Firewise also provides 7 free Firewise brush disposal sites throughout the County.	CC Firewise, MN DNR, MLSCP grants (Coastal Hazard O&E, i.e. property owner guides)
47	Wildfire	Local Planning & Regulations	<b>BURN PERMITS/BANS</b> Enforce burning permits and burn bans during periods of high-risk for wildfire.	Ongoing	High	2019-2023	Cook County	CC Sheriff's Office	The Cook County Sheriff's Office regulates when burning permits are available and requires permit holders to notify the county prior to burning.	County funding

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
48	Wildfire	Natural Systems Protection	<b>IMPROVE WATER ACCESS</b> Identify areas within Cook County where dry hydrants or underground water holding tanks are needed to support wildland firefighting.	Ongoing	High	2019-2023	Cook County	CC Firewise in collaboration with VFDs, USFS, & MN DNR	Increasing capabilities for rural wildland fire fighting in Cook County is a high priority for our local VFD's, as well as the MN DNR and USFS. The Cook County CWPP identifies areas within the County where improved water access (such as underground tanks and dry hydrants) is needed for fighting wildfire. These areas are rural and not supported by a municipal water source. The Hovland VFD is currently working to install a dry hydrant at Horseshoe Bay.	County, municipal funding, MN DNR Firewise, Possible FEMA HMA Grant funding for wildfire mitigation, Poplar River Water District possible funding
49	Wildfire	Natural Systems Protection	<b>FUELS REDUCTION ASSISTANCE</b> Promote and provide technical and financial assistance to homestead & seasonal property owners to help reduce wildland fuels on private property.	Ongoing	High	2019-2023	Cook County	CC Firewise Program	Cook County Firewise promotes the use of financial assistance for fuel reduction efforts through the FireWise Program by property owners. The FW program also has 2 active Steven's grants for fuels reduction projects on private property and provides 7 community brush collection sites where land owners can drop off vegetative materials removed from their property. On an annual basis, Cook County Firewise conducts level 2 Firewise assessments on properties and implements brush pick-up projects.	County, municipal funding, MN DNR Firewise, USFS grant, Possible FEMA HMA Grant funding for wildfire fuels reduction

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
50	Wildfire	Structure & Infrastructure Projects	<b>STRUCTURE PROTECTION (NEW DEVELOPMENT/ RETROFITS)</b> Promote the use of building materials (i.e., metal roofs, external wildfire sprinkler systems) in new development or retrofit projects for properties located in high-risk WUI areas that can reduce the chance of property damages from wildfire.	Ongoing	High	2019-2023	Cook County	CC Firewise	Cook County Firewise actively promotes fire-safe building materials to homeowners. From approximately 2007-2014 County additionally worked on the installation of external wildfire sprinkler systems for properties in high-risk wildfire areas with the help of FEMA HMA grants. Cook County Emergency Management distributes reminders to sprinkler system owners of maintenance requirements and keeping them in good working order.	County, private landowner funding, Possible FEMA HMA grant funding for wildfire fuels reduction projects
51	Drought	Education & Awareness Programs	<b>DROUGHT AWARENESS</b> During drought conditions, provide active outreach to raise public awareness of dry conditions and the increased risk of wildfire.	Ongoing	Moderate	2019-2023	Cook County	CC Emergency Mgmt. in partnership with MN DNR & U.S.F.S.	In the event of drought conditions, Cook County Emergency Management works in concert with the MN DNR and U.S. Forest Service to raise public awareness of the dry conditions and increased danger of wildfire. (i.e., Smokey the Bear Program).	County funding, U.S.F.S., MN DNR

#	Hazard	Mitigation Strategy	Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County Comments on Planning Mechanisms for Implementation	Possible Funding
52	Drought	Local Planning & Regulations	<b>PRECIPITATION MONITORING</b> Monitor precipitation from rain and snowfall to help assess drought conditions in the county.	Ongoing	Moderate	2019-2023	Cook County	CC SWCD in partnership with MN DNR Climatology Office	Cook County SWCD runs the "Weather Watchers" program, where community volunteers record daily precipitation, snowfall, and accumulated snow on-the-ground. Records are used by state climatologists to map annual rain and snow patterns, weather forecasting and storm water management. Data gathered can help to assess when drought conditions are occurring and for how long. The City of Grand Marais Wastewater Dept. also conducts daily monitoring and sends data to the MPCA.	County, MN DNR, MLSCP grants



### **5.3.2 Mitigation Actions by Community**

This plan is a multi-jurisdictional plan that covers Cook County, its school districts and the city of Grand Marais. Steering committee members from each community participated directly in the development of local mitigation action charts for implementation. The Cook County risks and mitigation activities identified in this plan also incorporate the concerns and needs of townships and other entities participating in this plan.

Mitigation actions identified for implementation by the city of Grand Marais are listed in Appendix G.

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## Section 6 – Plan Maintenance

### 6.1 Monitoring, Evaluation, and Updating the Plan

The Cook County Multi-Hazard Mitigation Plan (MHMP) should be considered a living document. The plan should be updated and approved by FEMA at a minimum of every five years. The guidance in this section will function as the primary tool when reviewing progress on the implementation of the Cook County MHMP.

The Cook County Director of Emergency Management & Public Information is the individual responsible for leading all efforts to monitor, evaluate, and update the hazard mitigation plan within the 5-year window. Throughout the 5-year planning cycle, the Director will work with the Cook County Emergency Preparedness Committee to help to monitor, review, evaluate, and update the Multi-Hazard Mitigation Plan. The committee meets every other month and consists of representatives from Cook County Emergency Management, public health & human services, county board and administration, public works and utilities, law enforcement, fire departments and emergency services, schools, US Forest Service, MN DNR, US Border Patrol, area clinic and hospital, WTIP-North Shore Community Radio, the city of Grand Marais, and Grand Portage Reservation Emergency Management. Additional stakeholders will be added based on need. If necessary, the Cook County Emergency Management Director will convene the committee to meet on a more regular basis to monitor plan implementation progress and reassess needs and opportunities. This could be done in response to funding cycles of programs that provide resources for hazard mitigation activities. If there is a need for a special meeting due to new developments or a declared disaster occurring in the county, the committee will meet to update pertinent mitigation strategies. Depending on Cook County opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

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

Updates or modifications to the MHMP during the 5-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by county commissioners.

Throughout the 5-year window of the plan, each respective county department and jurisdiction will be required to report on the status of mitigation actions in their charts to the Cook County Emergency Management Director so that progress notes may be maintained for the next plan update.

## 6.2 Implementation

Cook County and its included municipalities share a common Multi-Hazard Mitigation Plan and work together closely to develop, revise, and implement it. This MHMP provides a comprehensive chart of mitigation actions for Cook County and its jurisdictions (see Section 5.3.1, *Hazard Mitigation Actions*). The city of Grand Marais and townships of Schroeder, Tofte and Lutsen participated in the MHMP planning process and identified the specific mitigation strategies that they would seek to implement in their communities during the 5-year planning cycle. These mitigation actions are provided in Section 5.3.

A number of implementation tools are available to address hazards. Many of these tools are below, however, in some cases additional discussion is needed in order to identify what strategies are most appropriate to use. This will be part of an ongoing discussion as Cook County looks for opportunities for plan implementation. The following tools will be considered:

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

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

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

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

**Regional Cooperation:** Counties and public safety services providers throughout the northeastern region of Minnesota often share similar challenges and concerns. In some cases, a regional approach may be warranted as a mitigation strategy in order to save resources. Mutual aid agreements are a tool already in use for a number of services. Needs assessments for fire and ambulance services and development of assistance for volunteer recruiting, training, and retention could benefit from a regional approach. Cooperation among counties could also help in lobbying for certain funding priorities that address concerns relating to challenges in service delivery in rural areas. Organizations such as FEMA

Region V and the MN Department of HSEM through the Regional Program Coordinator can offer tools and resources to assist in these cooperative efforts.

**Regulation:** Regulation is an important mitigation tool for Cook County. Regulation plays a particularly important role for land use, access to structures and the protection of water resources and public health.

### 6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the Multi-Hazard Mitigation Plan (MHMP). The Cook County Director of Emergency Management & Public Information and the Cook County Emergency Preparedness Committee members will continue engage new public stakeholders in planning discussions and project implementation during the 5-year cycle of this plan.

In order to seek continued public participation after the plan has been approved and during the 5-year window of implementation for this plan, Cook County will take the following measures:

- The plan will be posted on the Cook County Emergency Management website for the public to read and provide feedback. Collected feedback will be reviewed and the plan will be amended as necessary.
- Following any major storms or natural disasters, Cook County Emergency Management will seek to gather concerns and new ideas for mitigation from local residents to include in the next update of the plan. This may be done through public meetings, outreach via social media (i.e., Sheriff's Office & Public Safety Facebook Page), or news releases via local media.
- Each community participating in the plan will be responsible to keep their local government, schools, and community members updated and engaged in the implementation of their respective mitigation action charts. Each respective jurisdiction will be required to report on the status of mitigation actions in their charts to the Cook County Emergency Management Director.
- Jurisdictions will use numerous means of public outreach to engage new public stakeholders in providing input on mitigation efforts or concerns on hazards by sharing information at city council / township board meetings, sharing information at special events, working with local schools and partner organizations, and posting information on relevant local or social media that their communities use to inform and engage the public. As mitigation projects are implemented, jurisdictions will work to keep the public updated and engaged in those local efforts.

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## APPENDICES

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Appendix E – Steering Committee Meetings  
Appendix F – Public Outreach & Engagement Documentation  
Appendix G – Mitigation Actions by Jurisdiction  
Appendix H – Past Mitigation Action Review Status Report (2010-2018)  
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## Appendix A

### Cook County Maps

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Figure A - 1. Hydrography of Cook County

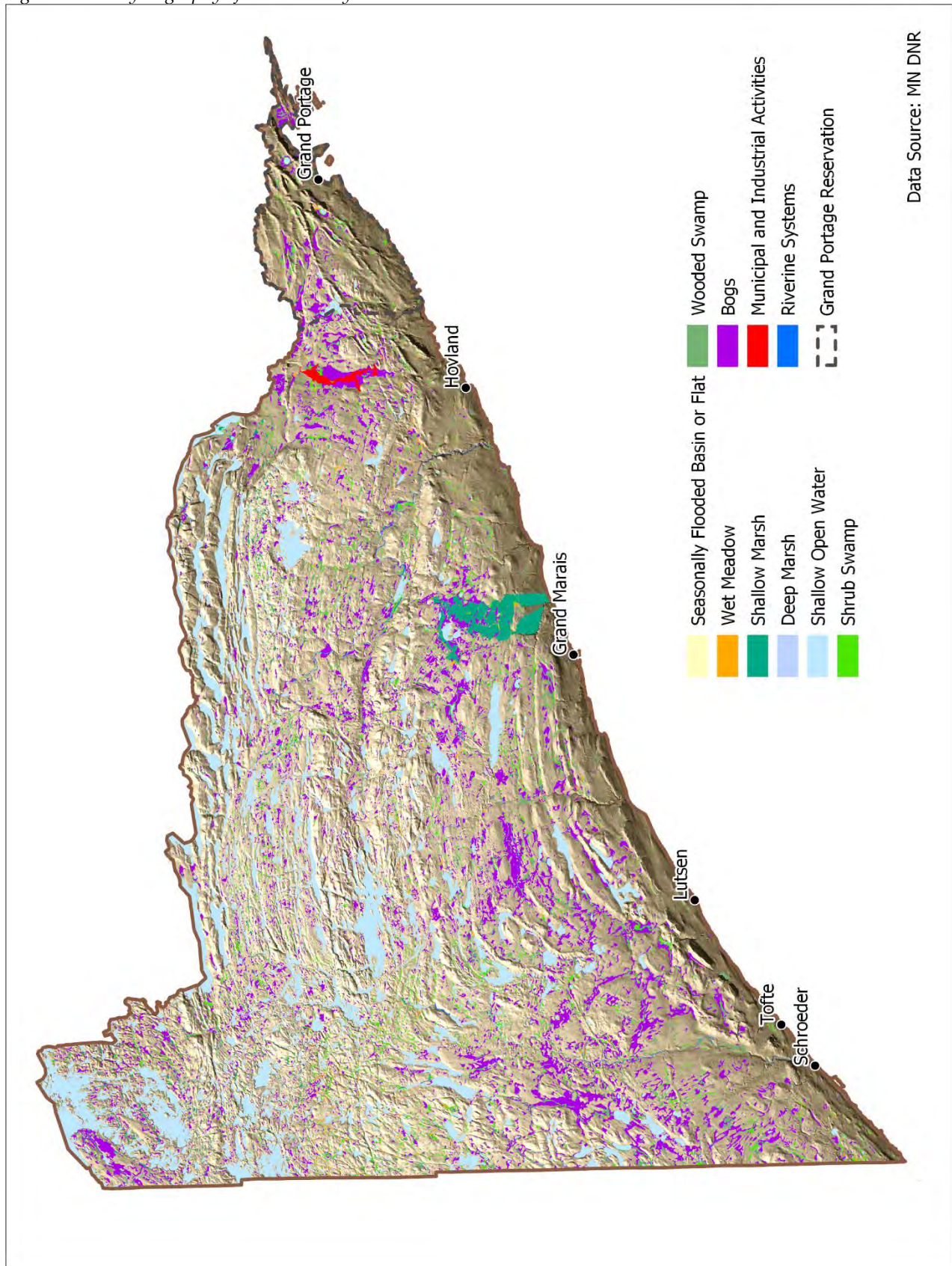


Figure A - 2. Cook County Population by Census Block, 2010

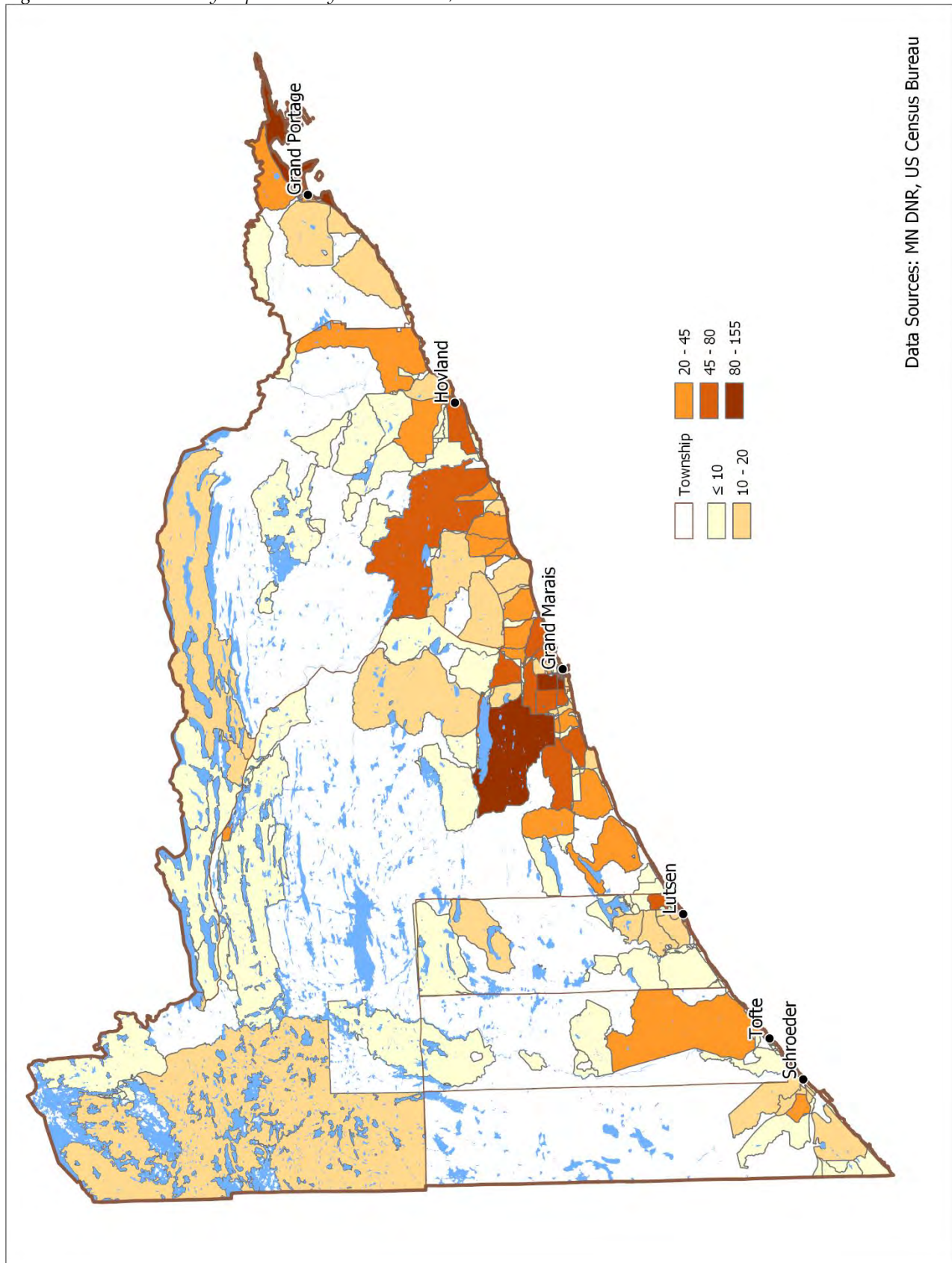




Figure A - 3. Fire Departments and Fire Response Times in Minutes in Cook County

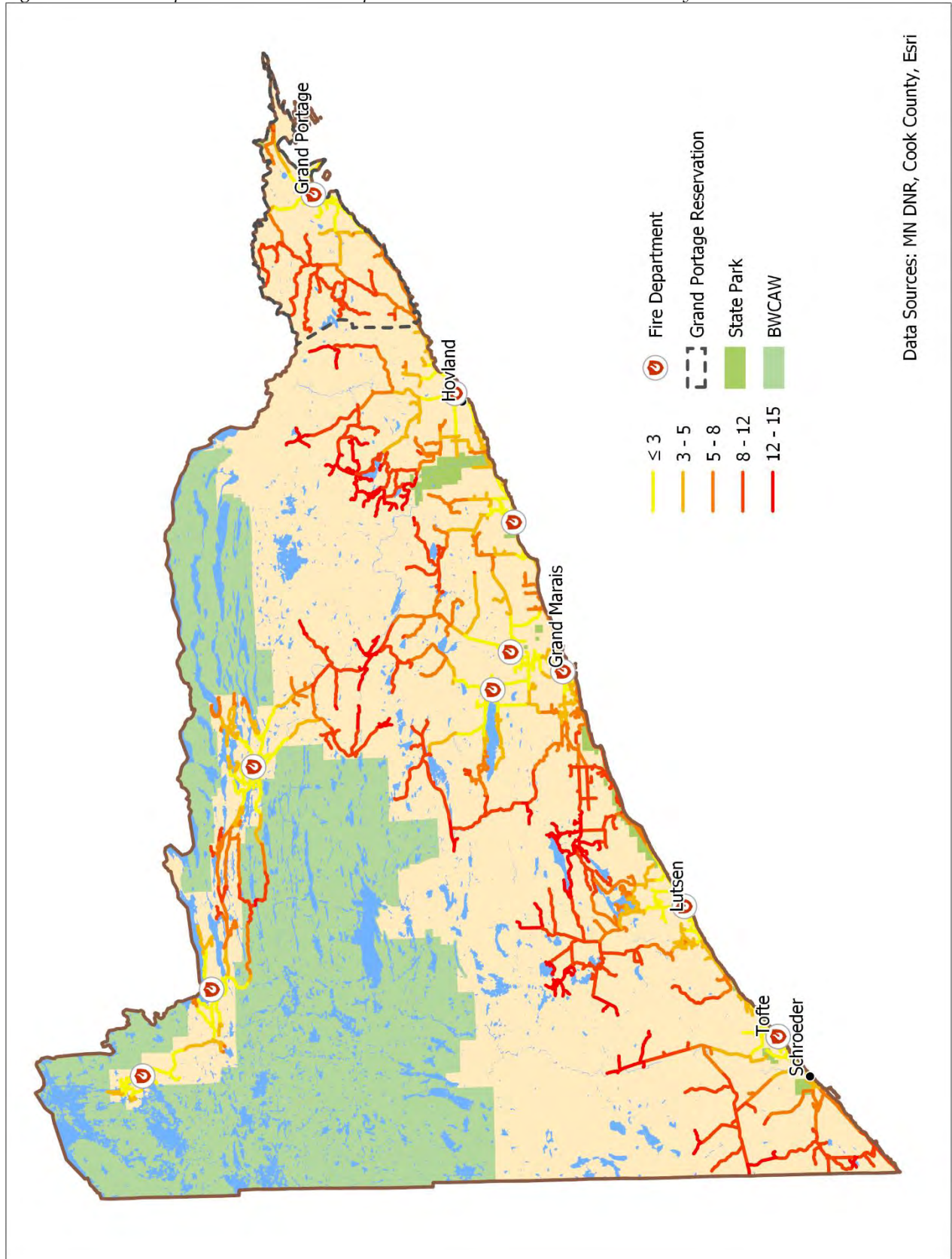


Figure A - 4. Cook County Public Safety and Government Services

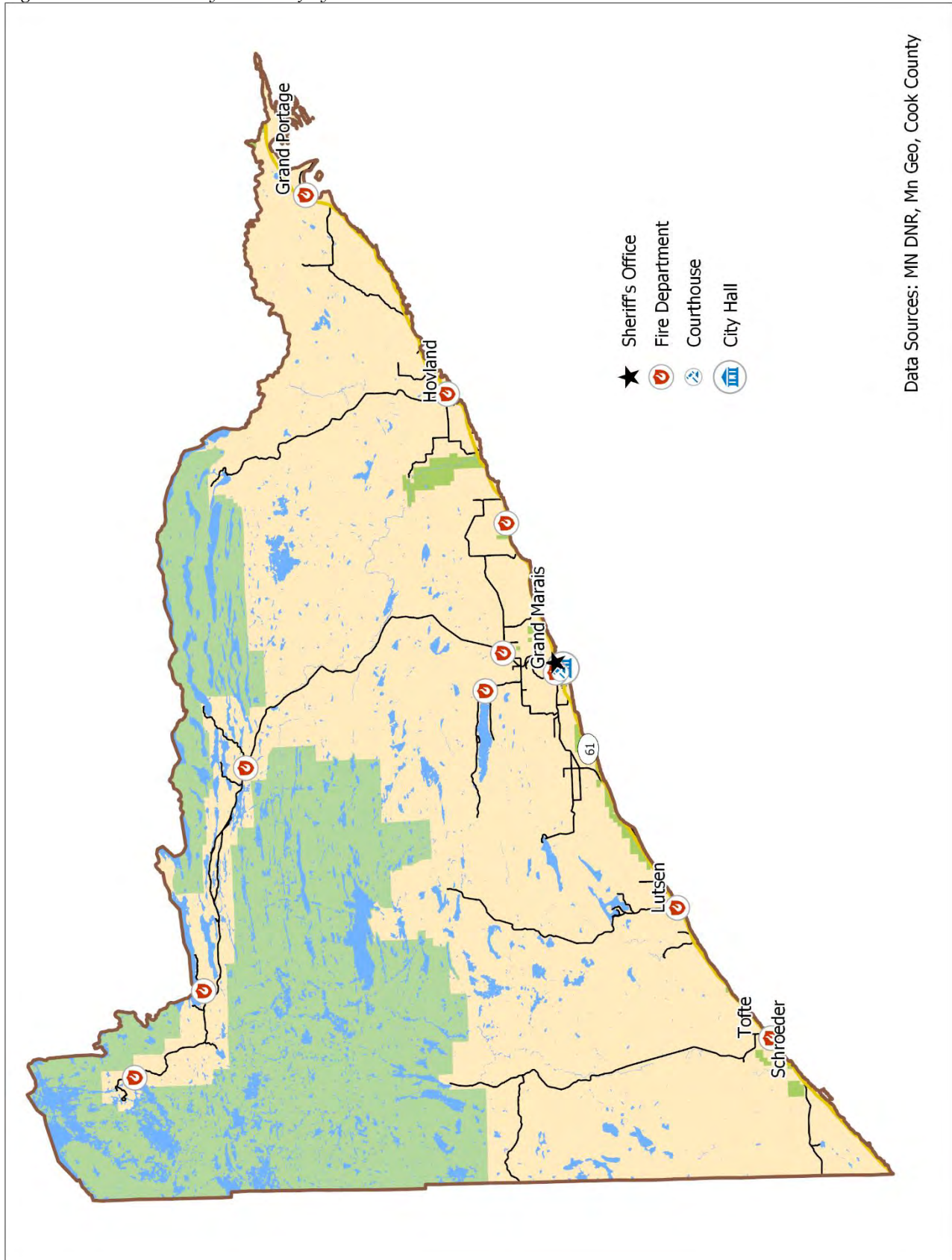




Figure A - 5. Cook County Utilities and Communication Infrastructure

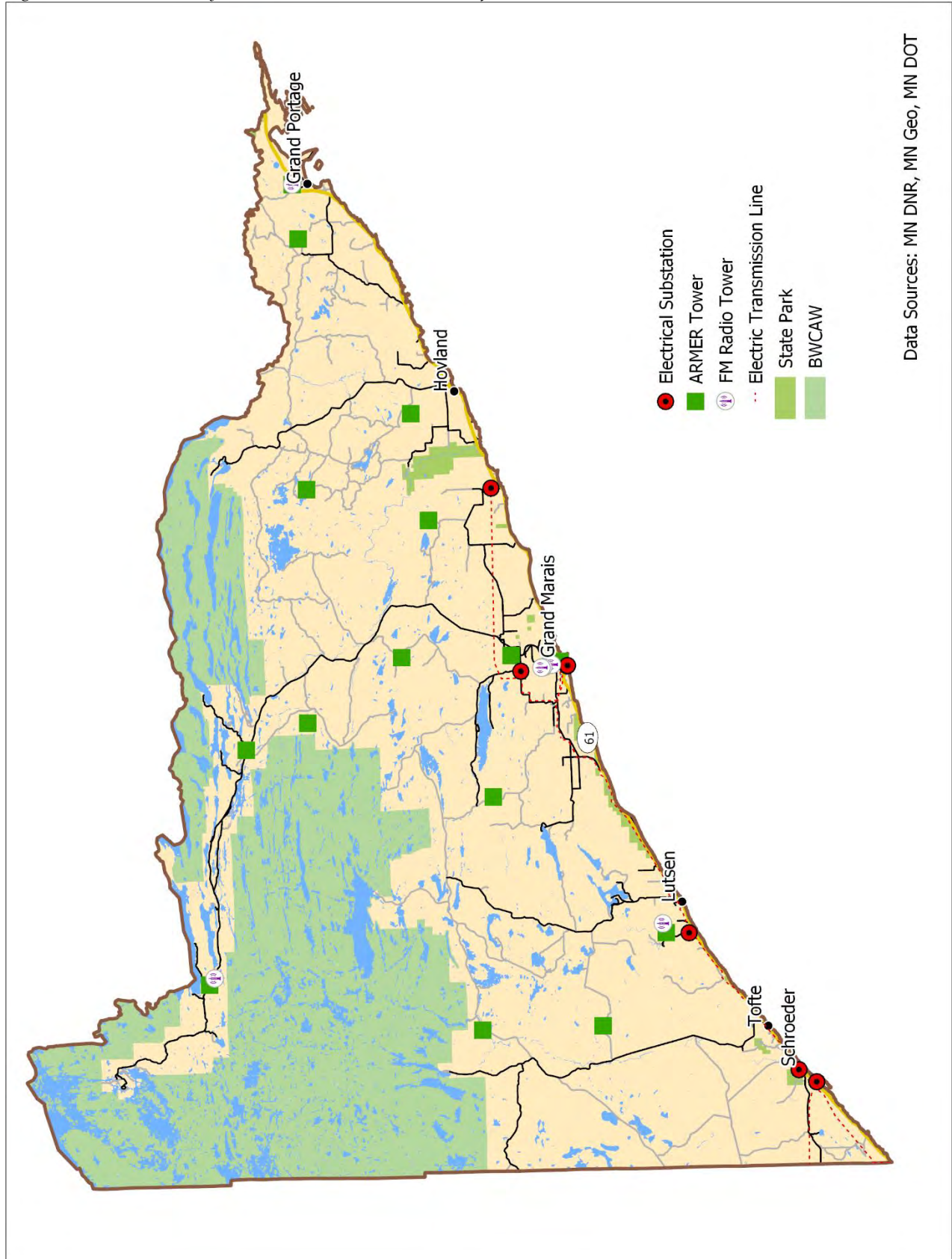




Figure A - 6. Cook County Transportation Infrastructure

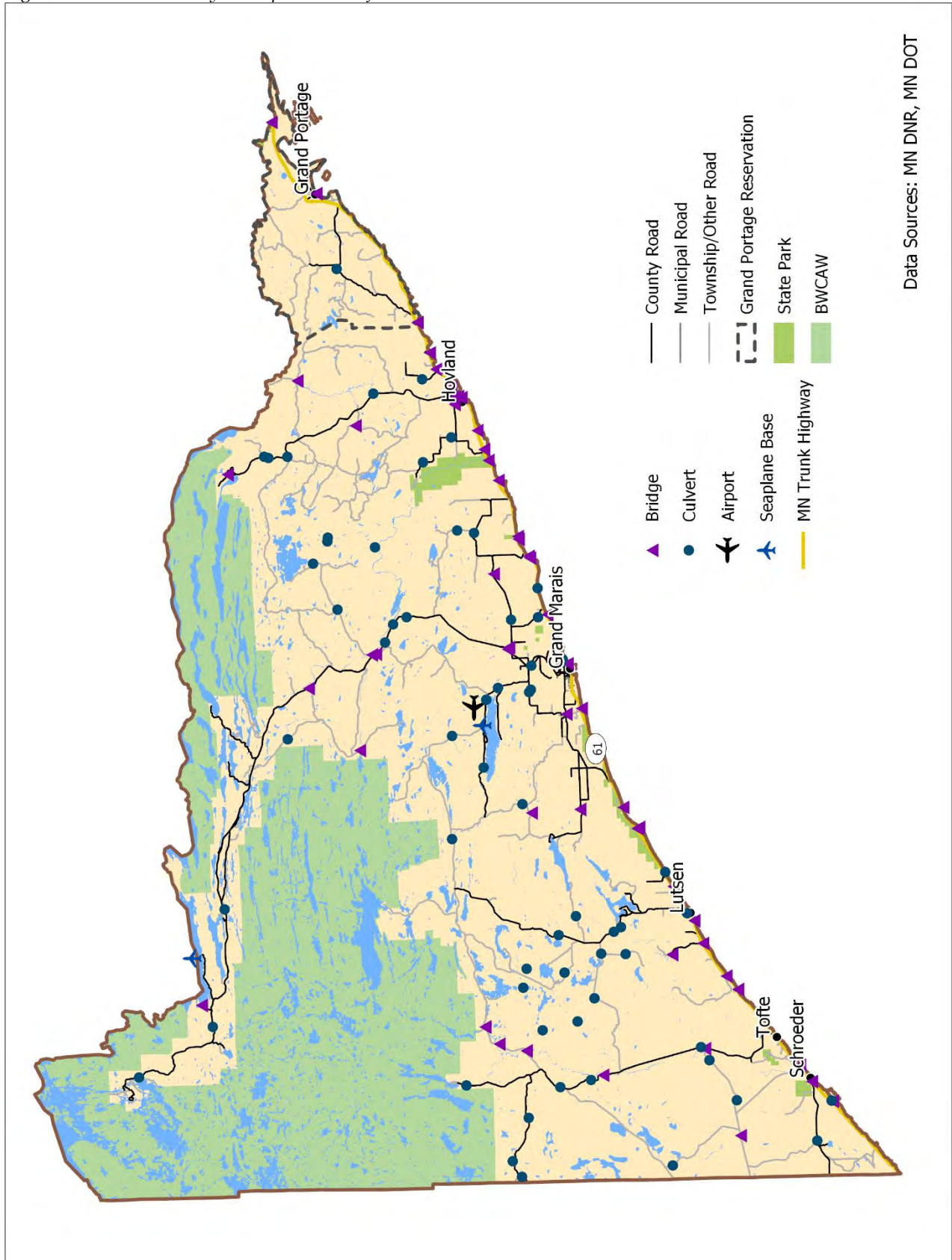


Figure A - 7. Cook County Land Cover, National Land Cover Database, 2011

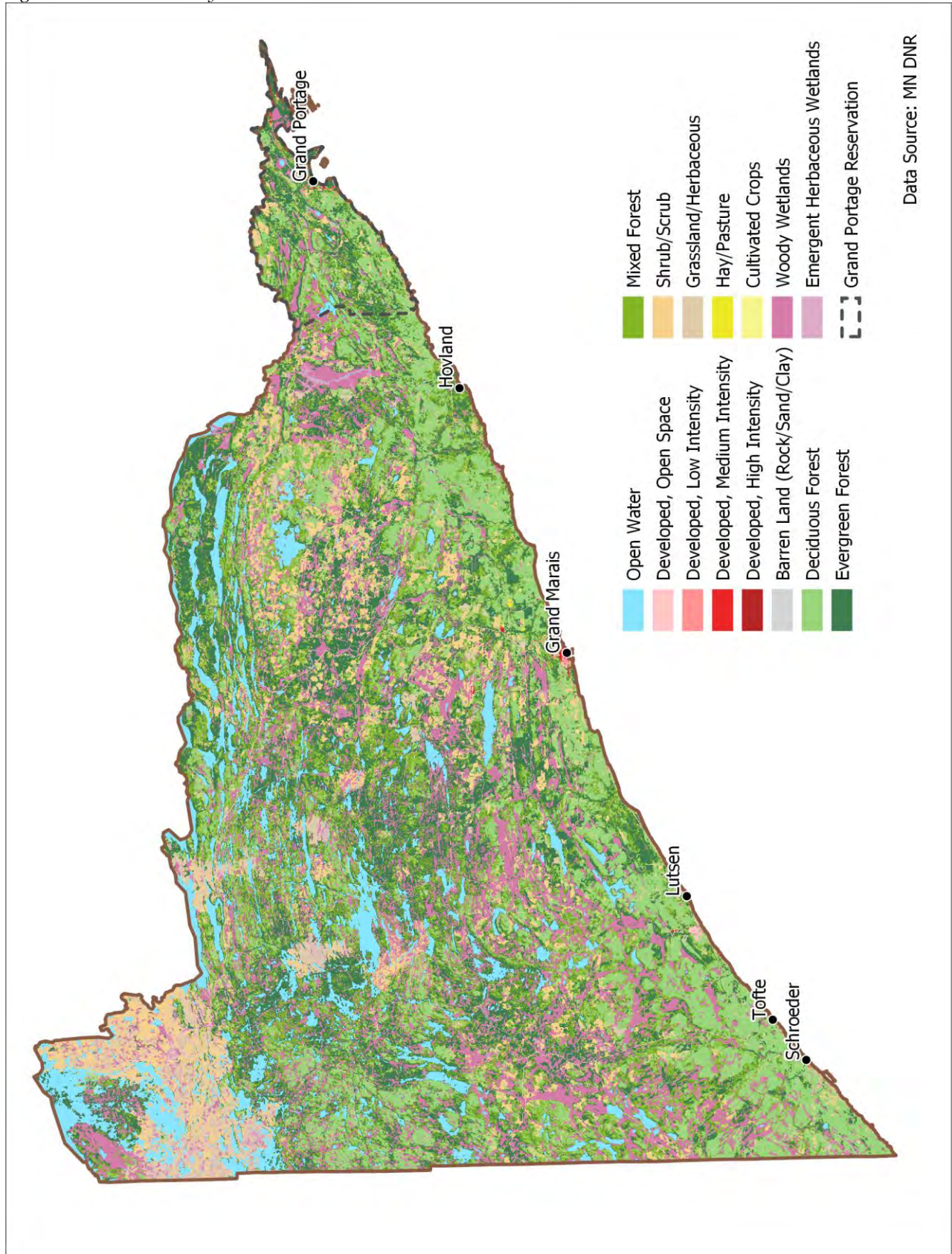




Figure A - 8. Cook County Land Ownership by Agency

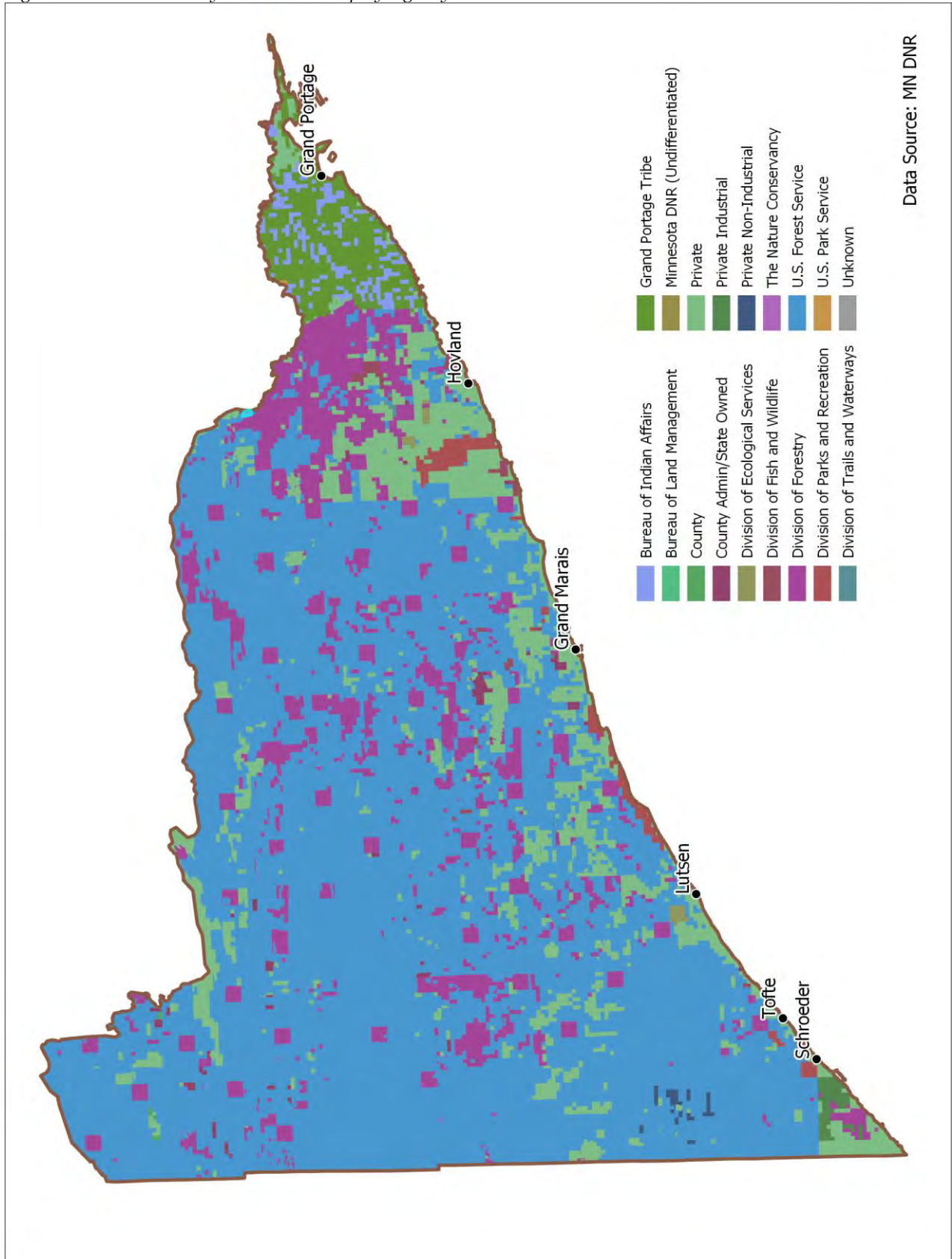


Figure A - 9. Most Recent Severe Wind and Hail Storms in Cook County

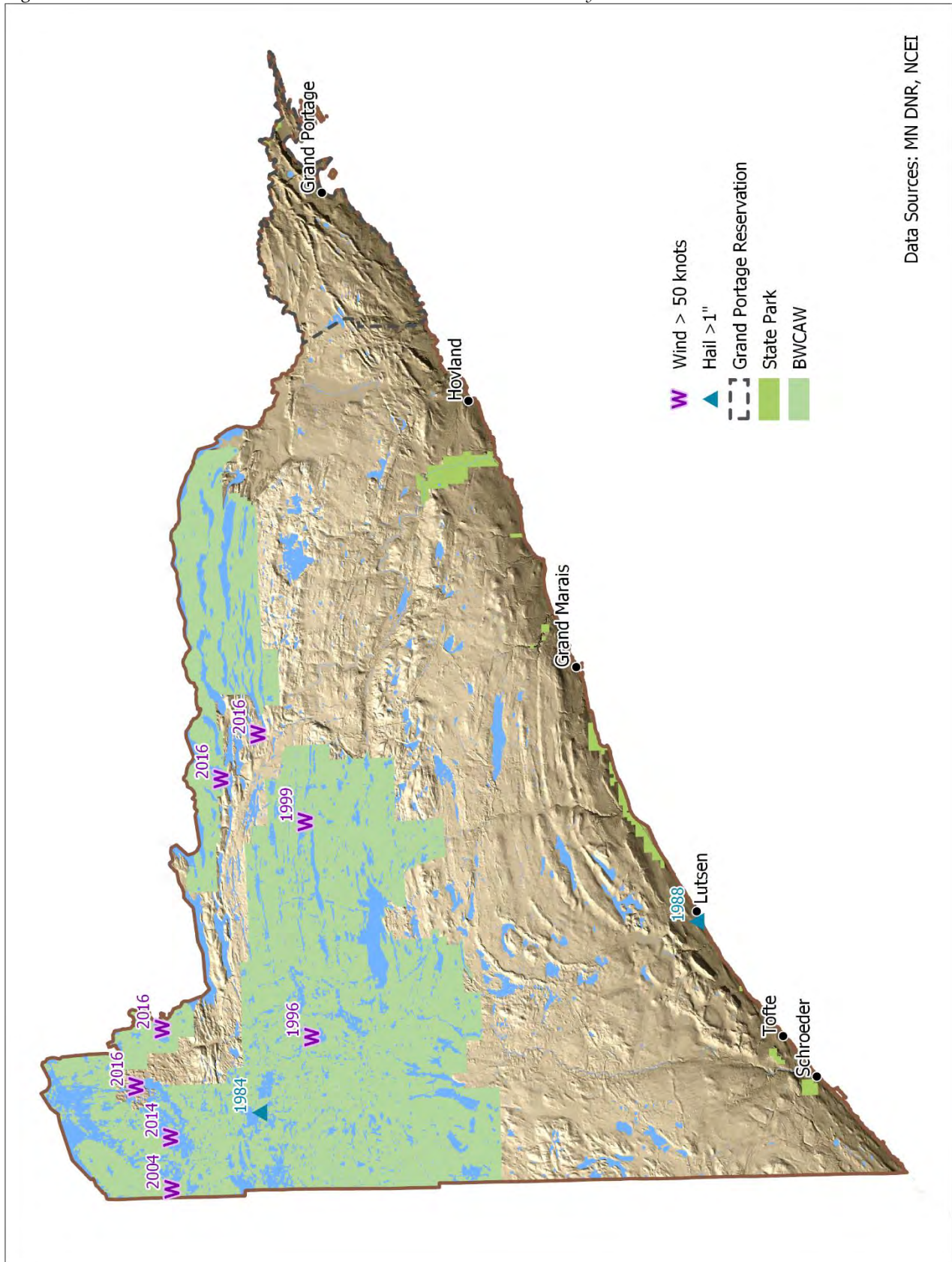




Figure A - 10. Tornadoes in Cook County, 1950-2018

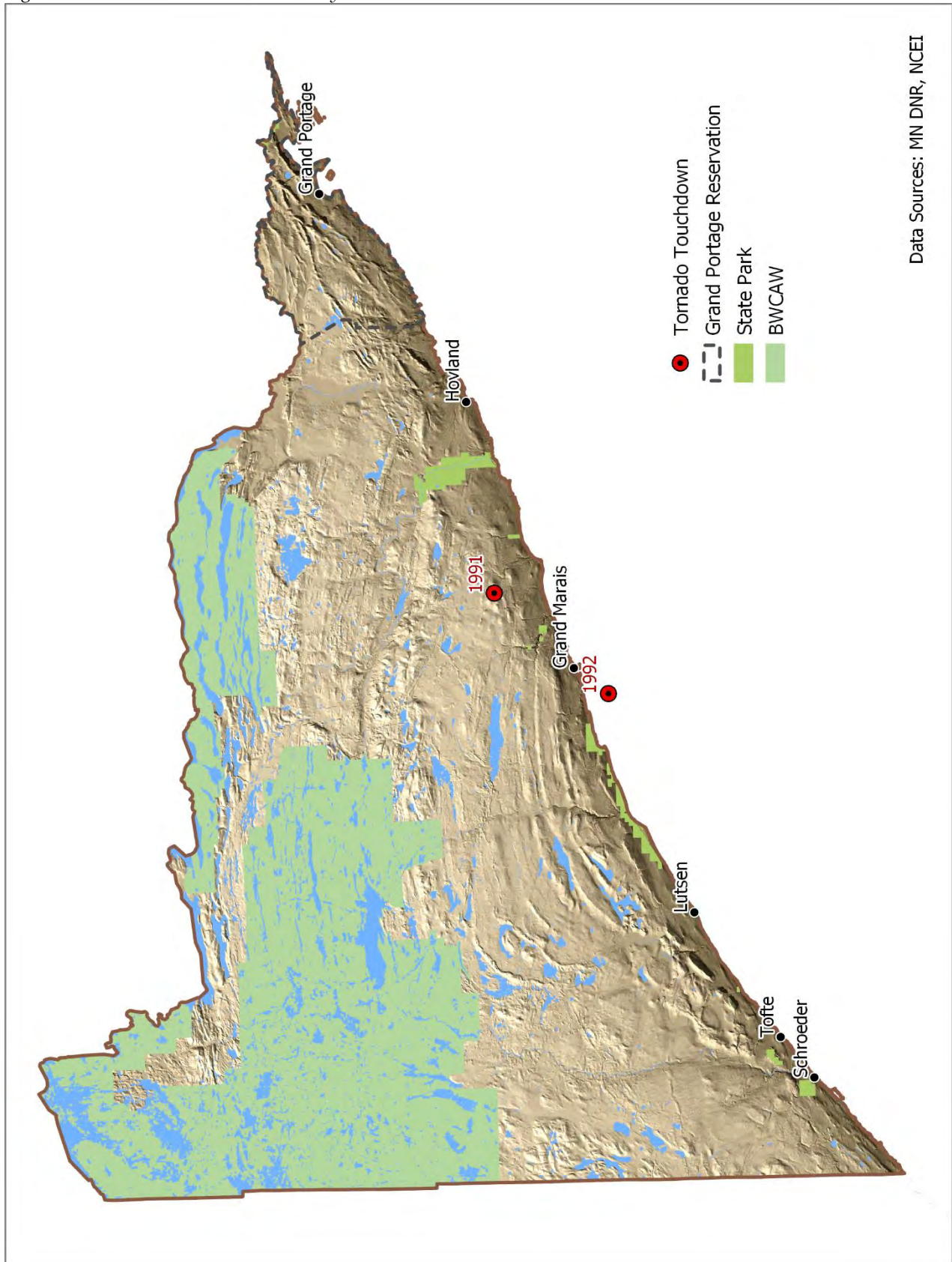


Figure A - 11. Sites with Hazardous or Chemical Waste in Cook County

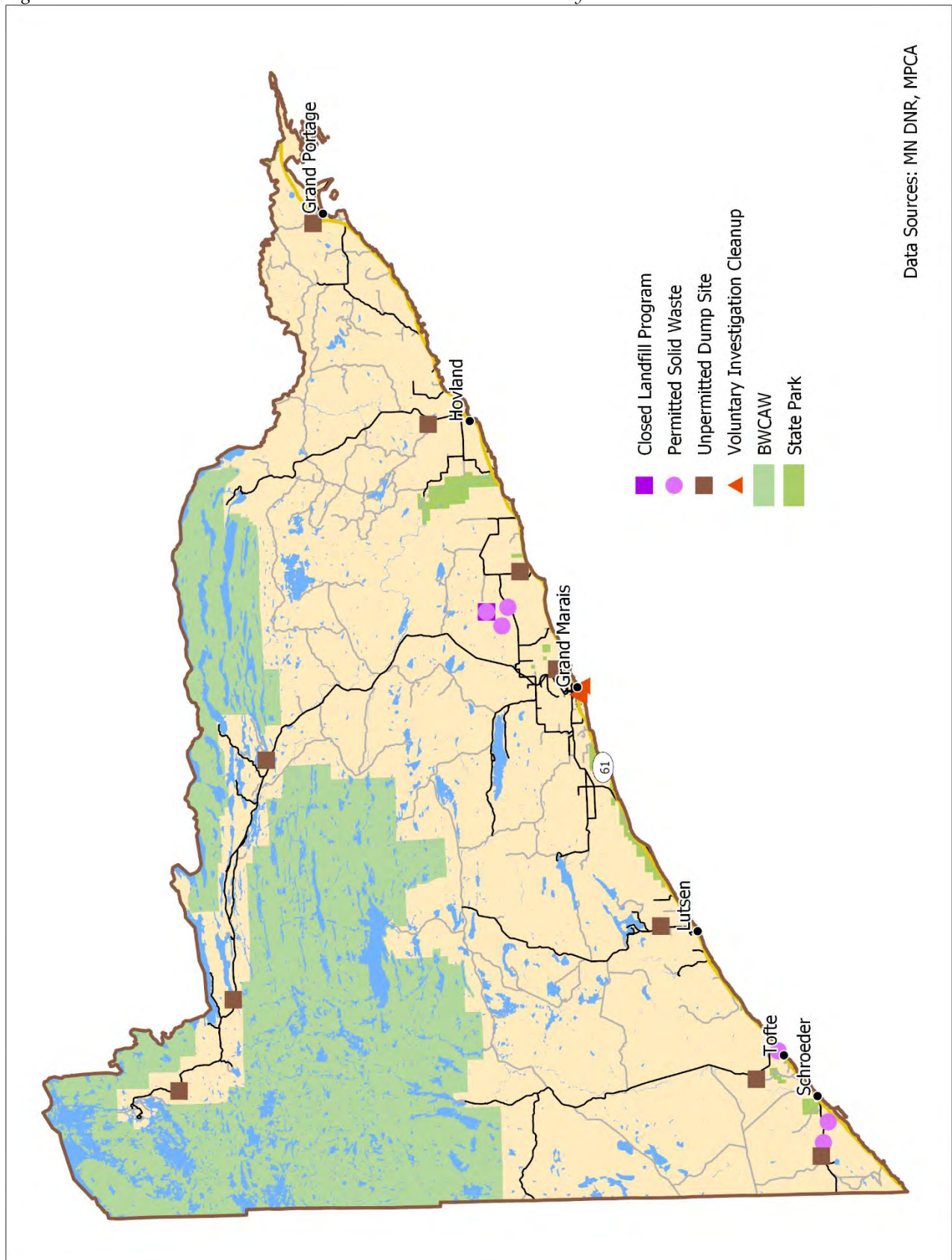


Figure A - 12. Health Care Providers in Cook County



Data Sources: MN DNR, MN Geo, Cook County



Figure A - 13. Cook County Aquifer Vulnerability and Public Wells

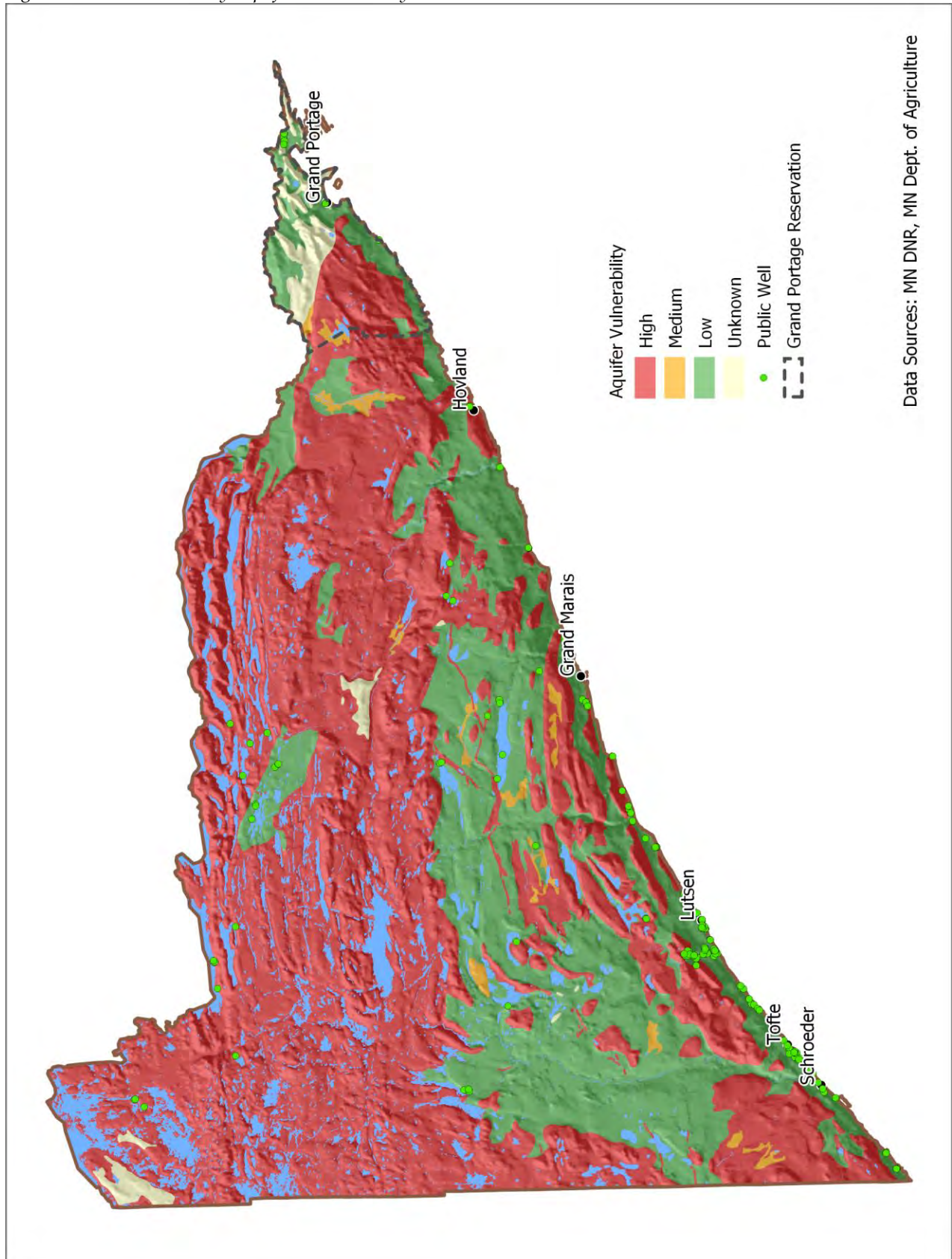


Figure A - 14. Critical Facilities in Cook County

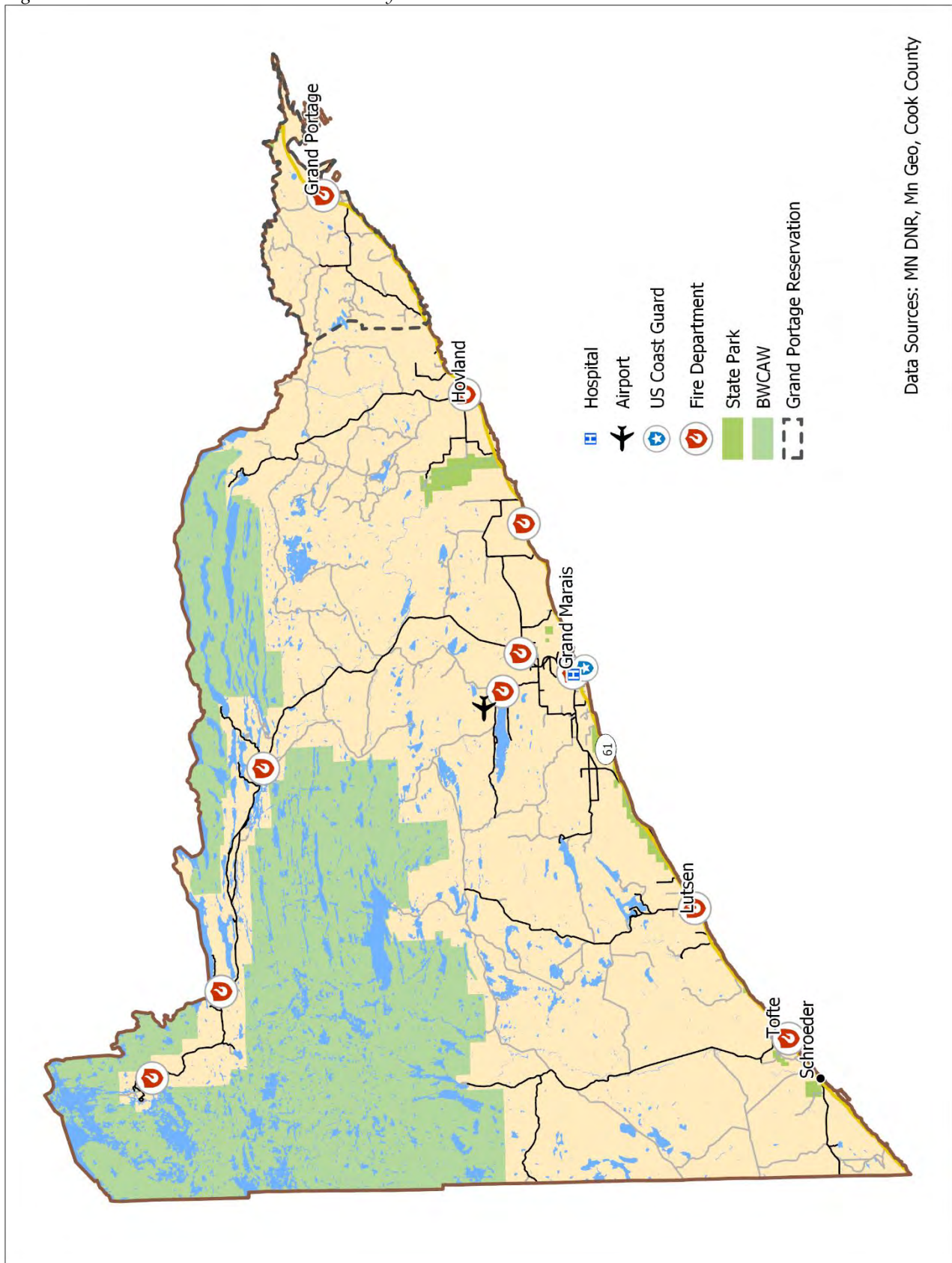


Figure A - 15. Critical Facilities in Grand Marais





Figure A - 16. Wildfires by Cause and Acres Burned (1985-2018) and Peat Soil Area

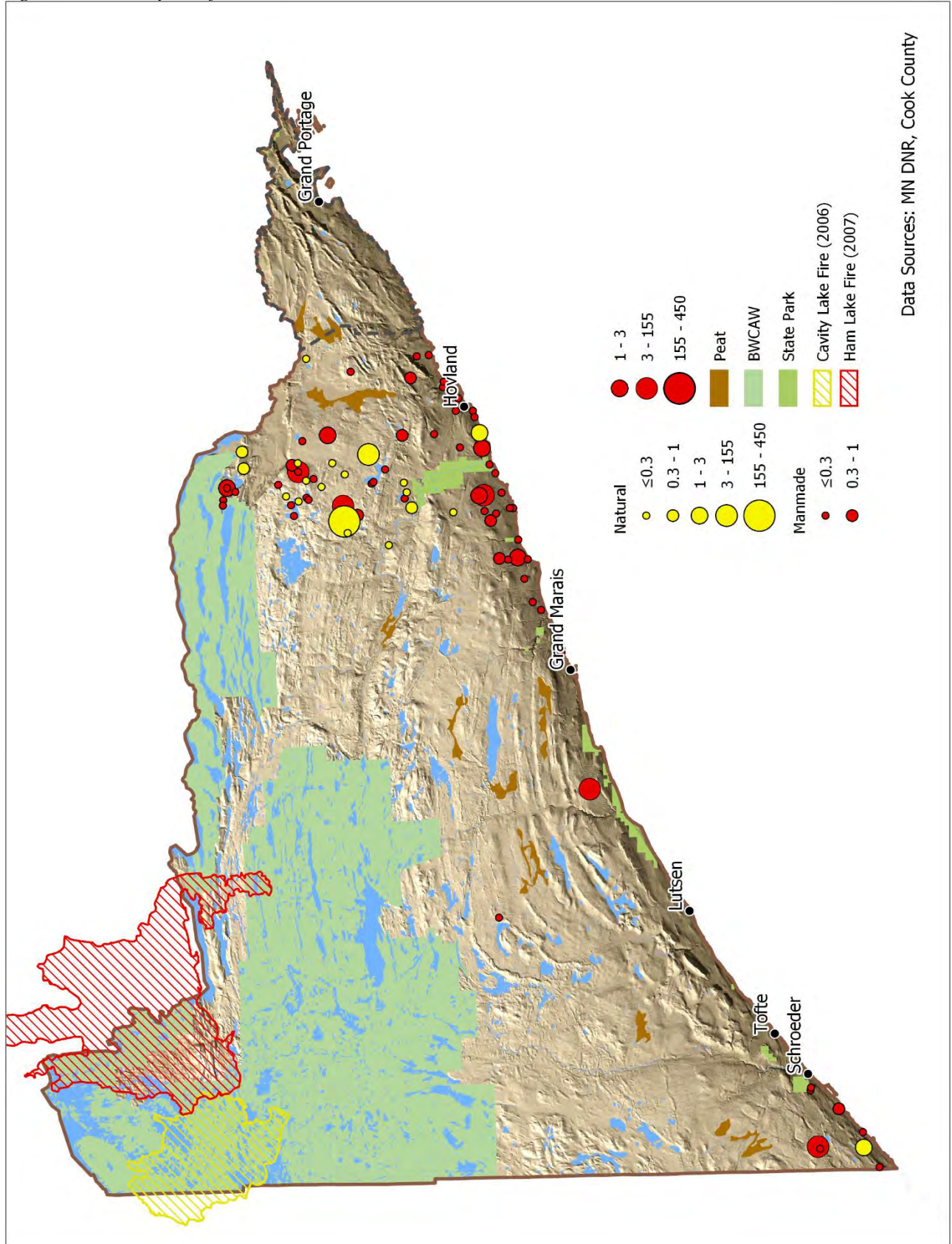


Figure A - 17. 100-Year Floodplain in Cook County

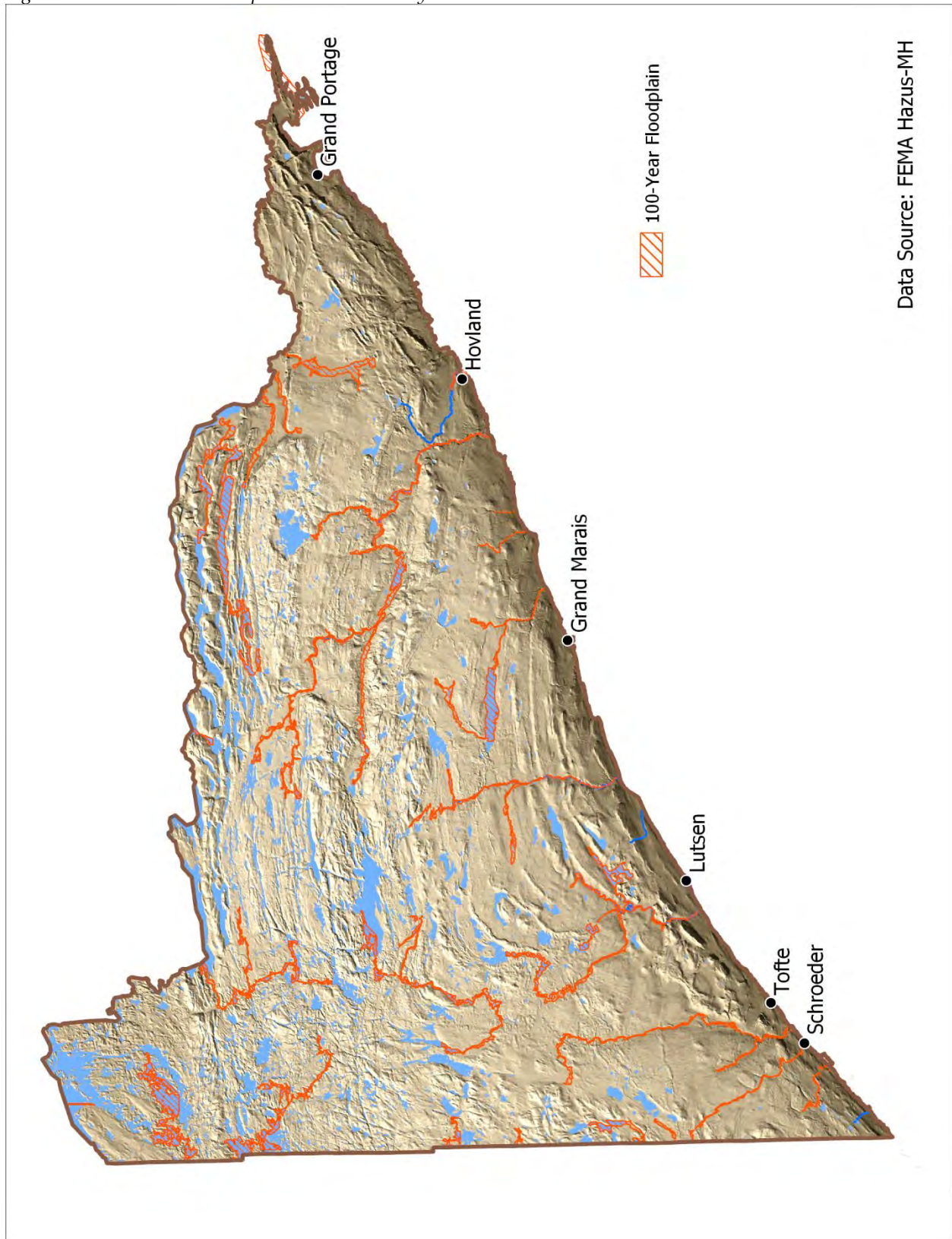




Figure A - 18. Estimated Economic Building-Related Loss, by Census Block, within the 100-Year Floodplain

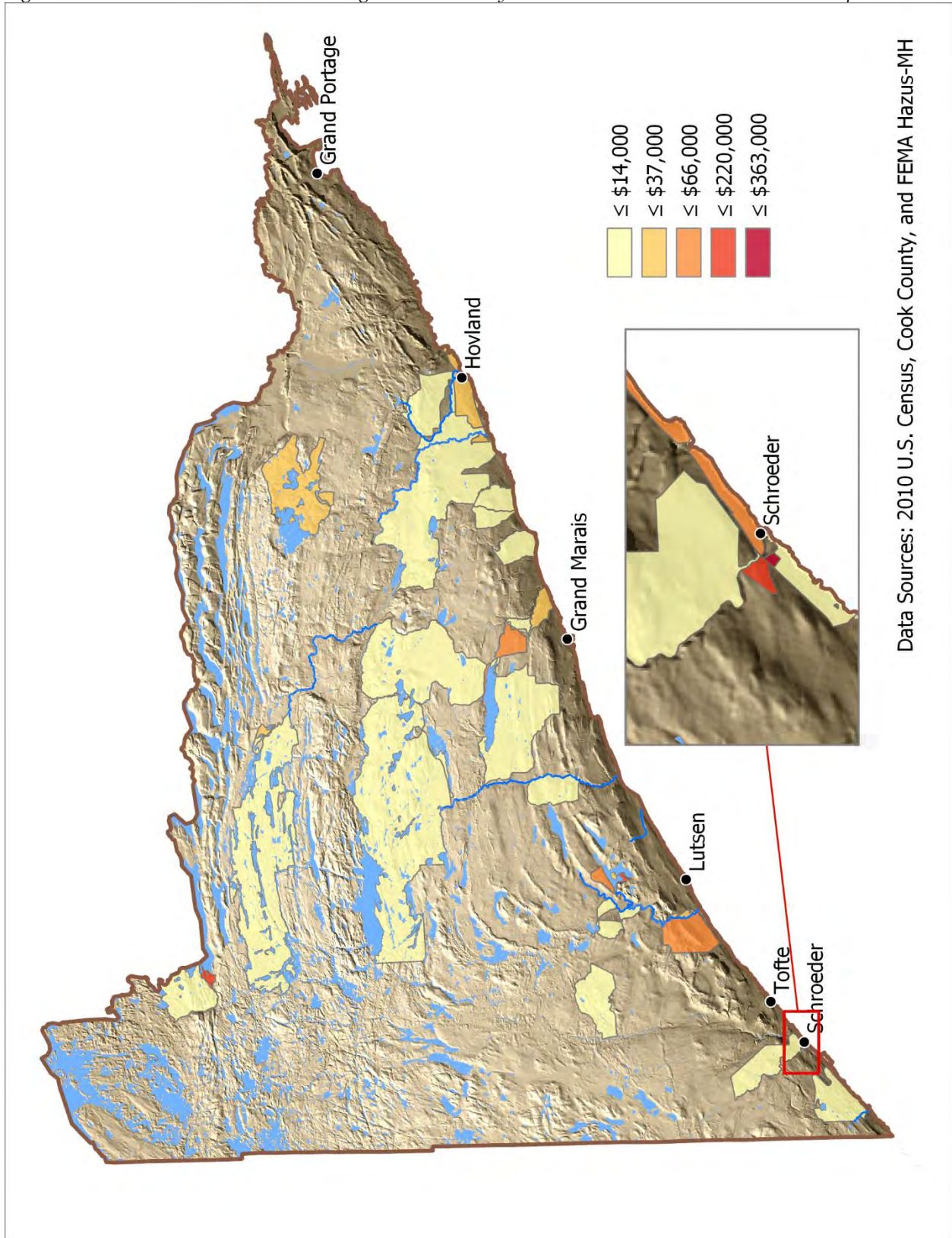




Figure A - 19. Census Block #270314801001833 and 100-Year Floodplain, Schroeder

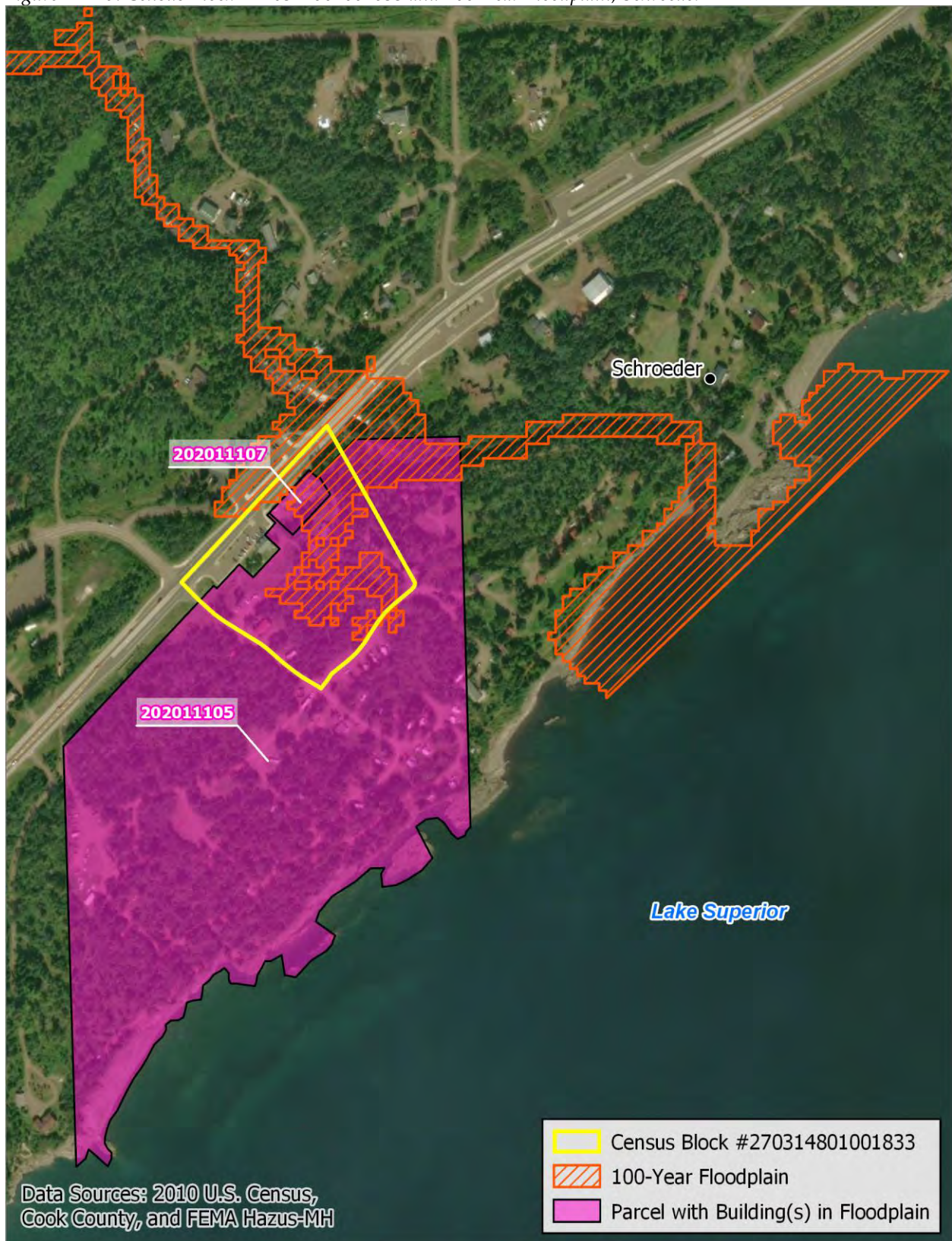




Figure A - 20. Census Block #270314801001815 and 100-Year Floodplain, Schroeder





Figure A - 21. Census Block #270314801003433 and 100-Year Floodplain, 3 miles north of Grand Marais

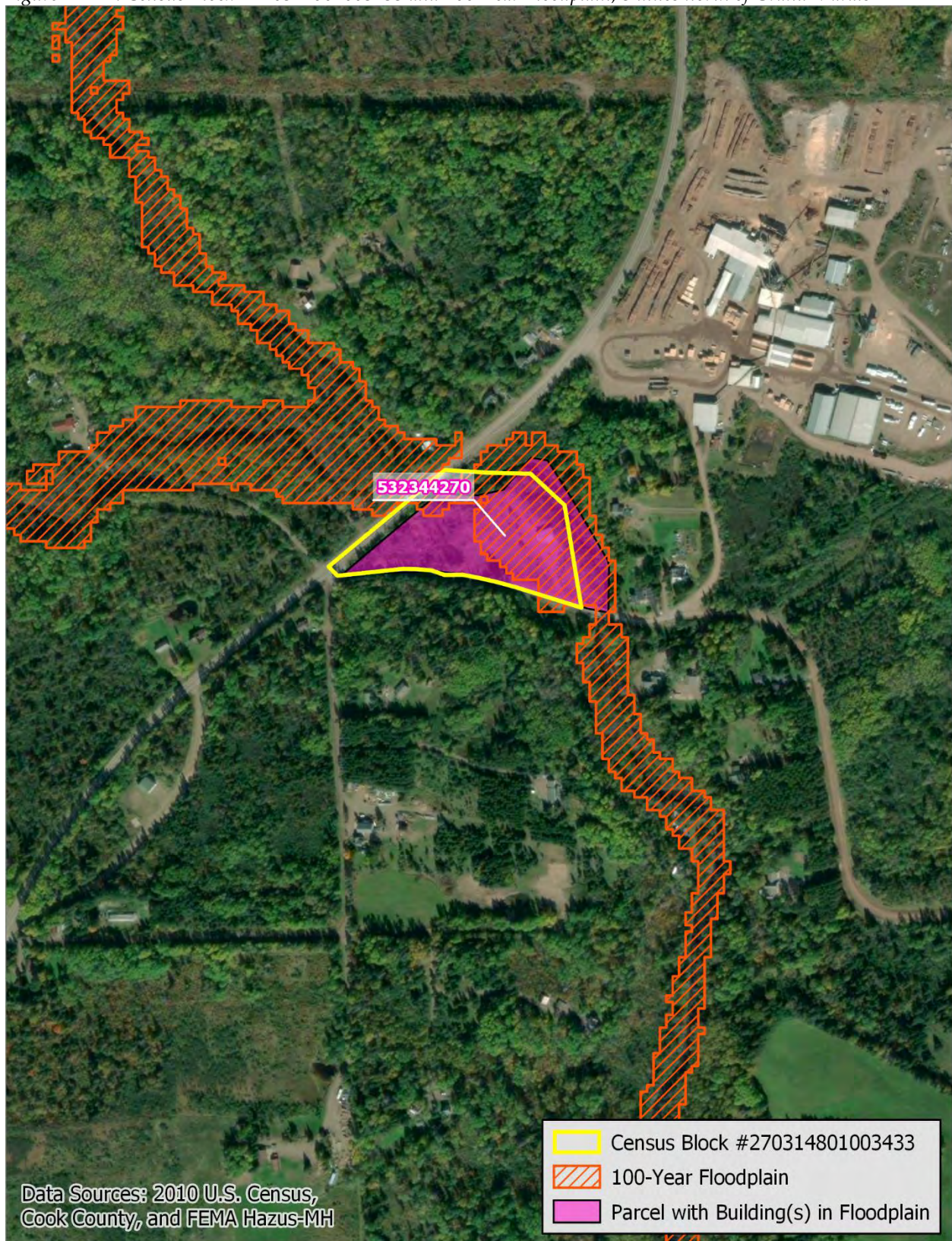




Figure A - 22. Feedlots in Cook County

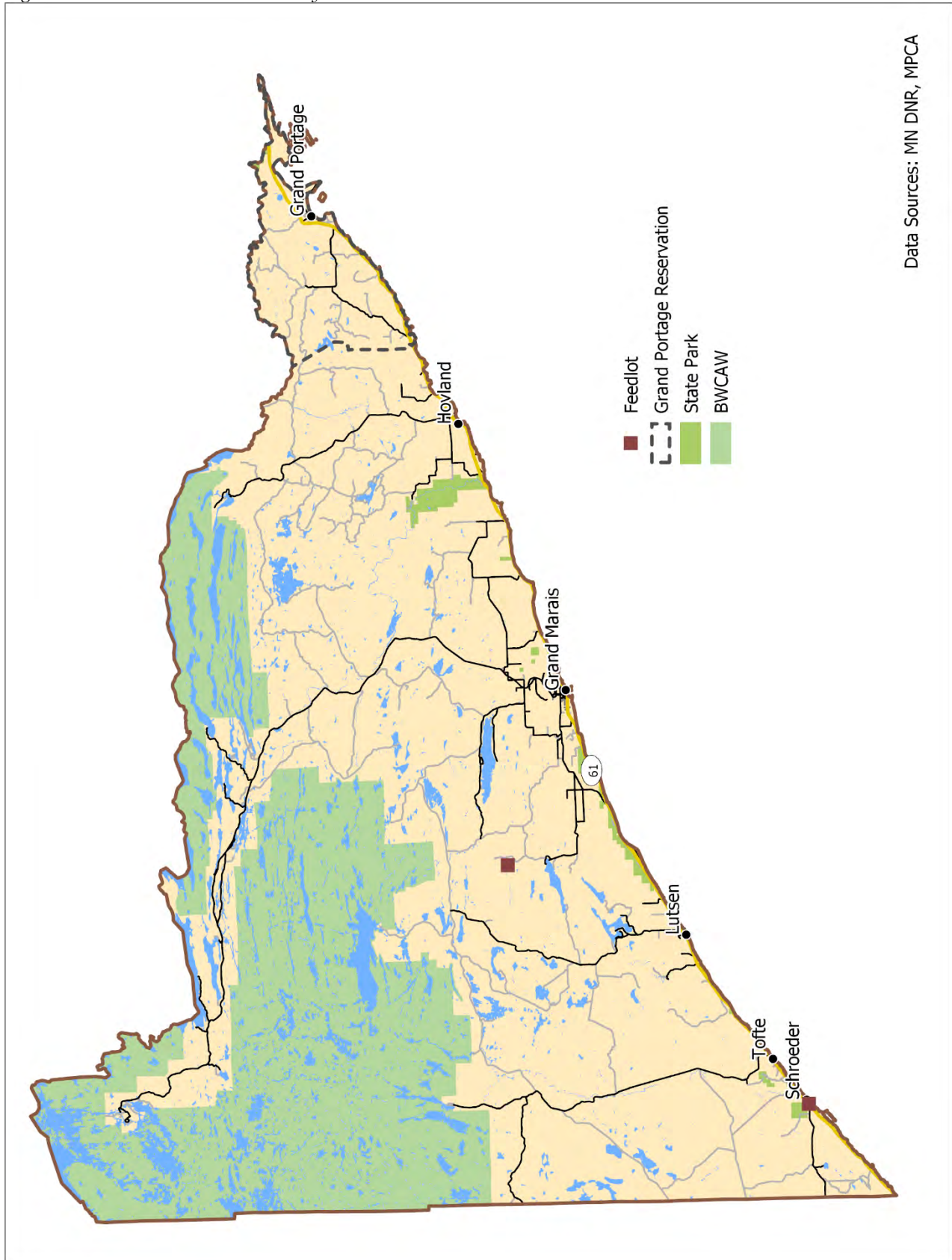
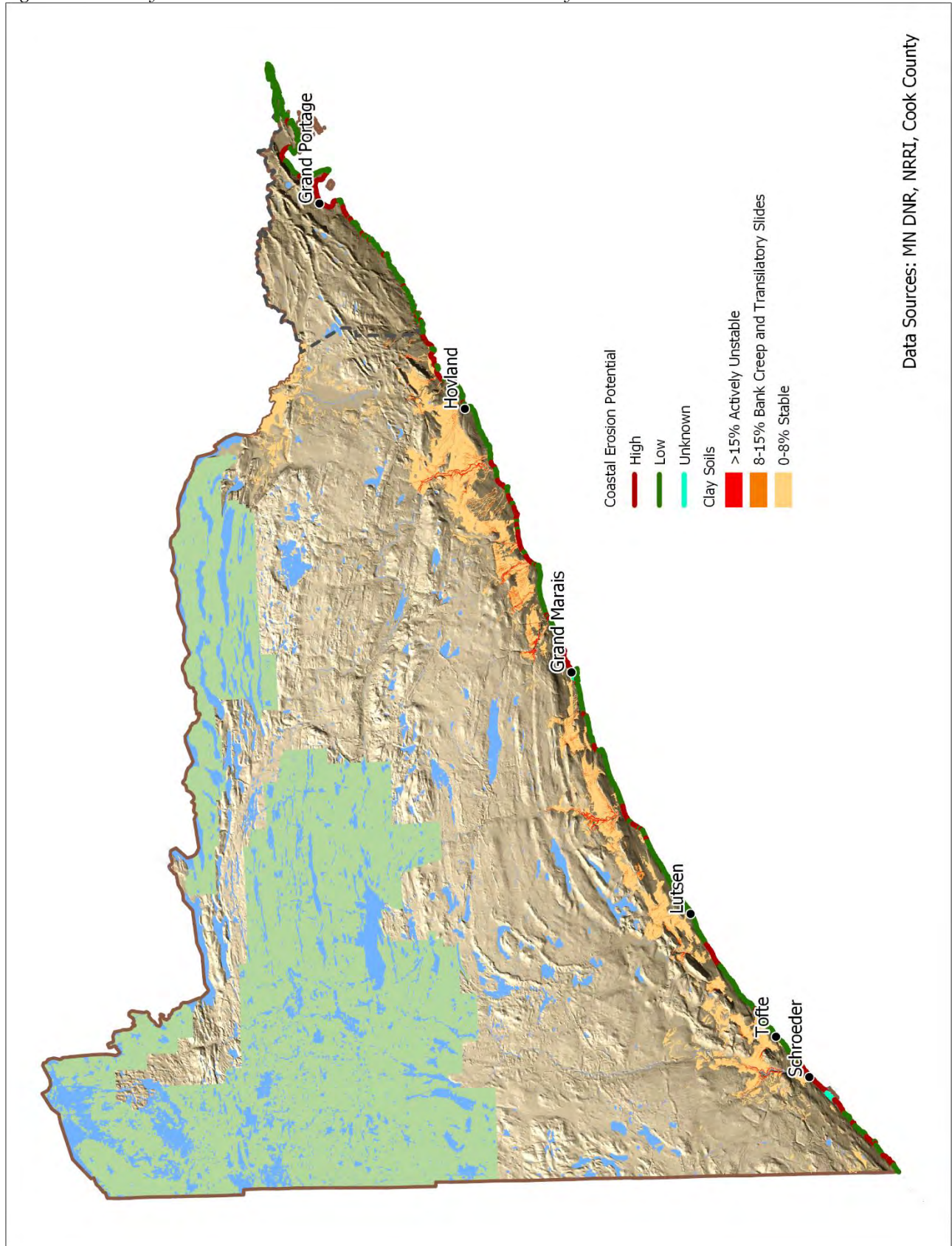


Figure A - 23. Clay Soils and Coastal Erosion Potential in Cook County



# **Appendix B**

## **Cook County Critical Facilities**



### Agriculture & Food

Berglund's Dairy Farm		Grand Marais		
Jon A Ofjord Farm		Grand Marais		
Steve Bakko		Schroeder		
Shirley Olson Farm		Tofte		

### Banking & Finance

Grand Marais State Bank	211 E. Highway 61	Grand Marais	MN	55604
Grand Marais State Bank	4 Johannes Lane	Tofte	MN	55615
North Shore Federal Credit Union	122 E. Highway 61	Grand Marais	MN	55604
North Shore Federal Credit Union	5335 W. Highway 61	Lutsen	MN	55612
North Shore Federal Credit Union	77 Mile Creek Road	Grand Portage	MN	55605
Security State Bank	6 W. Wisconsin St	Grand Marais	MN	55604

### Chemical and Hazardous Materials

Como Oil & Propane	2 Highway 61	Grand Marais	MN	55604
North Shore Waste	72 Eliasen Mill Road	Grand Marais	MN	55604

### Commercial Facilities

Gopher Cabins		Grand Marais	MN	55604
Seagull Creek Fishing Camp	12056 Gunflint Trail	Grand Marais	MN	55604
Hungry Jack Outfitters	318 S. Hungry Jack Rd.	Grand Marais	MN	55604
Loon's Nest Gift Shop	7575 Gunflint Trail	Grand Marais	MN	55604
Thompson Performance	55 Lupin Lane	Grand Marais	MN	55604
Ryden's Border Store	9301 Ryden Road	Grand Portage	MN	55605
Blue Moose	1301 W. Highway 61	Grand Marais	MN	55604
Grand Marais Mini Storage	1020 E. Highway 61	Grand Marais	MN	55604
Steve's Sports	531 E. Highway 61	Grand Marais	MN	55604
Tire and Auto Lodge	398 E. Highway 61	Grand Marais	MN	55604
Drury Lane Books	12 Wisconsin St.	Grand Marais	MN	55604
Picnic & Pine	19 Wisconsin St.	Grand Marais	MN	55604
The Attic Gift Shop	19 Wisconsin St.	Grand Marais	MN	55604
Beth's Fudge And Gifts	11 Broadway	Grand Marais	MN	55604
Sawtooth Motel & Cabins		Grand Marais	MN	55604
Gunflint Motel		Grand Marais	MN	55604
Cook County News Herald	15 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604

Commercial Facilities				
Birchbark Books	11 1 <sup>st</sup> . Ave. W.	Grand Marais	MN	55604
61 Fitness Studio	921 1 <sup>st</sup> St.	Grand Marais	MN	55604
Aspen Inn	1711 W. Highway 61	Grand Marais	MN	55604
Bennys Collision Center & My Brothers Place Auto	1803 W. Highway 61	Grand Marais	MN	55604
Birchwood Apartments	801 W. 5 <sup>th</sup> St.	Grand Marais	MN	55604
Harborview Apartments	11 E. 3 <sup>rd</sup> St.	Grand Marais	MN	55604
Grand Marais Apartments		Grand Marais	MN	55604
Grand Marais Condominiums		Grand Marais	MN	55604
Como Oil	2 W. Highway 61	Grand Marais	MN	55604
Stone Harbor Wilderness Supply	22 E. 1 <sup>st</sup> St.	Grand Marais	MN	55604
8 North Broadway Gallery	8 N. Broadway	Grand Marais	MN	55604
The Beaver House	3 E. Wisconsin St.	Grand Marais	MN	55604
Sivertson Frame Shop	14 W. Wisconsin St	Grand Marais	MN	55604
Lake Superior Trading Post	10 S. 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
Java Moose (Summer)	218 W. Highway 61	Grand Marais	MN	55604
Sivertson Gallery	14 W. Wisconsin St.	Grand Marais	MN	55604
Voyageur Brewing Company	233 W. Highway 61	Grand Marais	MN	55604
Joynes Ben Franklin	105 Wisconsin St.	Grand Marais	MN	55604
Gun Flint Tavern	111 W. Wisconsin St.	Grand Marais	MN	55604
George F Maruska	121 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
Gunflint Mercantile & Candy Company	12 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
The Big Lake Gallery	12 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
Set Out Screen Printing	10 1 <sup>st</sup> Ave. W	Grand Marais	MN	55604
Cobblestone Cove Villas	17 S. Broadway	Grand Marais	MN	55604
Moose Tracks	5 W. Wisconsin St.	Grand Marais	MN	55604
The Market	3 Wisconsin St.	Grand Marais	MN	55604
North Shore Car Wash & Laundromat	421 3 <sup>rd</sup> Ave. W.	Grand Marais	MN	55604
Napa Auto Parts	404 E W. Highway 61	Grand Marais	MN	55604
That Little Red House	113 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
E.R. Perry Signs & Engraving	200 Cardinal Road	Grand Marais	MN	55604
Coldwell Banker	101 W. Highway 61 # 101	Grand Marais	MN	55604
Wellness Center	101 W. Highway 61	Grand Marais	MN	55604
Leigh D Mathison Attorney At Law	101 W. Highway 61	Grand Marais	MN	55604
Terra Bella Floral & Gifts	407 4 <sup>th</sup> Ave. E.	Grand Marais	MN	55604
Northern Wilds	1708 W. Highway 61	Grand Marais	MN	55604
The Print Shop				

Commercial Facilities				
Viking Hus	17 W. Highway 61	Grand Marais	MN	55604
Viking Electric				
Red Pine Realty	14 S. Broadway Ave.	Grand Marais	MN	55604
Fireweed Bike Co-Op	13 Broadway	Grand Marais	MN	55604
Upstate Mn	16 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
Stephan Hoglund Jewelry	301 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604
Sawtooth Lumber	1620 W. Highway 61	Grand Marais	MN	55604
Grand Marais Professional Building		Grand Marais	MN	55604
Superior RV	1912 W. Highway 61	Grand Marais	MN	55604
Nordic Electric	123 Cedar Grove Lane	Grand Marais	MN	55604
G & G Septic	36 Devil Track Rd.	Grand Marais	MN	55604
Superior Lumber	1413 E. Highway 61	Grand Marais	MN	55604
S J Bautch Construction	1315 MN-61	Grand Marais	MN	55604
Moondance Coffee House	5335 MN-61	Lutsen	MN	55612
County Plumbing & Heating	5339 W. Highway 61	Lutsen	MN	55612
Lockport Marketplace	5362 W. Highway 61	Lutsen	MN	55612
Lutsen Mountain Shop	452 County Rd 5	Lutsen	MN	55612
Isak Hansen True Value	4921 W. Highway 61	Lutsen	MN	55612
Tofte General Store	7125 Highway 61	Tofte	MN	55615
Big Joe's Salvage		Tofte	MN	55615
Waters Edge Trading Company	7124 W. Highway 61	Tofte	MN	55615
Sawtooth Outfitters	7213 W. Highway 61	Tofte	MN	55615
Holiday Station Store				
Tofte Mini Storage	7057 W. Highway 61	Tofte	MN	55615
Waves Of Superior Spa at Surfside	20 Surfside Dr.	Tofte	MN	55615
Grand Portage Trading Post	77 Mile Creek Rd.	Grand Portage	MN	55605
Grand Portage Car Wash		Grand Portage	MN	55605
Ugly Baby Bait & Boats	7587 Gunflint Trail	Grand Marais	MN	55604
Kah-Nee-Tah Gallery	4210 W. Highway 61	Lutsen	MN	55612
Joy & Company	16 1 <sup>st</sup> Ave. W.	Grand Marais	MN	55604

Communications				
Grand Marais Tower Garden				
Centurylink				
WTIP Radio Station	1712 W. Highway 61	Grand Marais	MN	55604

Dams			
Devil Track Lake	<i>Devil Track River</i>		
Dutchman Lake	<i>Grand Portage River tributary</i>		
Kelso River	<i>Kelso River</i>		
Northern Light Lake	<i>Northern Light Lake</i>		
South Fowl Lake	<i>Pigeon River</i>		

Emergency Services				
Cook County Law Enforcement Center	143 Gunflint Trail	Grand Marais	MN	55604
Grand Marais Fire Hall	516 5 <sup>th</sup> Ave. W.	Grand Marais	MN	55604
Maple Hill Fire Hall # 2	1469 Gunflint Trail	Grand Marais	MN	55604
Colvill Volunteer Fire Department	3151 W. Highway 61	Grand Marais	MN	55604
Gunflint Trail Volunteer Fire Department	60 Voyageur Point	Grand Marais	MN	55604
Grand Portage Fire Department	105 Store Rd.	Grand Portage	MN	55605
Maple Hill Fire Hall #1	619 Devils Track Rd.	Grand Marais	MN	55604
Lutsen Fire Hall	116 Caribou Trail	Lutsen	MN	55612
Tofte Fire Hall	7240 Tofte Park Rd.	Tofte	MN	55615
Colvill Volunteer Fire Department	3151 W. Highway 61	Grand Marais	MN	55604
Hovland Fire Hall	5059 W. Highway 61	Hovland	MN	55606
Schroeder Fire Station & Town Hall	124 Cramer Rd.	Schroeder	MN	55613

Energy				
Arrowhead Electric Coop	5401 W. Highway 61	Lutsen	MN	55612
Great River Energy (GRE)	1740 County Road 14	Grand Marais	MN	55604
Grand Marais Public Utilities Commission (PUC)	15 N Broadway Ave	Grand Marais	MN	55604

Government Facilities				
Cook County Courthouse	411 W. 2 <sup>nd</sup> Street	Grand Marais	MN	55604
Cook County Community Center	317 5 <sup>th</sup> St.	Grand Marais	MN	55604
Cook County Highway Department	609 4 <sup>th</sup> Ave. E.	Grand Marais	MN	55604
Cook County LEC & Jail/Emergency Management	143 Gunflint Trail	Grand Marais	MN	55604

### Government Facilities

Colvill Town Hall	2965 East Highway 61	Colvill	MN	55604
Hovland Town Hall	4957 East Highway 61	Hovland	MN	55606
Highway Garage (Hovland)				
Highway Garage (Tofte)				
Cook County Recycling Center & Thrift Store	630 5 <sup>th</sup> Avenue W	Grand Marais	MN	55604
Lutsen Town Hall	116 Caribou Trail	Lutsen	MN	55612
Tofte Town Hall	7240 Tofte Park Rd	Tofte	MN	55615
Tofte Transfer Station	198 Sawbill Trail	Tofte	MN	55615
MN DOT Truck Station				
USFS Tofte Ranger District	7355 Highway 61	Tofte	MN	55615
USFS Gunflint Ranger District	2020 W. Highway 61	Grand Marais	MN	55604
Schroeder Town Hall	124 Cramer Rd	Schroeder	MN	55613
Seagull Guard Station				
US Coast Guard – Station North Superior	315 S. Broadway	Grand Marais	MN	55604
US Customs Port Of Entry				
MN DNR Office	Tribal Government Facility			
Tribal Council Offices	Tribal Government Facility			
Forestry	Tribal Government Facility			
Trust Lands Office	Tribal Government Facility			

### Healthcare and Public Health

North Shore Health	515 5 <sup>th</sup> Ave West	Grand Marais	MN	55604
Sawtooth Mountain Clinic	513 5 <sup>th</sup> Ave West	Grand Marais	MN	55604
Cook County Ambulance Garage		Grand Marais	MN	55604
Cook County Senior Center	10 Broadway	Grand Marais	MN	55604
Grand Portage Outpatient Clinic	62 Upper Road	Grand Portage	MN	55605
Birch Grove Outpatient Clinic	9 Good Neighbor Hill Road	Tofte	MN	55615
Grand Portage Human Services	2 Casino Drive	Grand Portage	MN	55605

### Manufacturing

Edwin E Thoreson Inc	31 Thoreson Drive	Grand Marais	MN	55604
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### National Monuments

Grand Portage National Monument	170 Mile Creek Rd	Grand Portage	MN	55605
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### Postal and Shipping

Grand Marais Post Office	117 Highway 61	Grand Marais	MN	55604
Hovland Post Office	12 Arrowhead Trail	Hovland	MN	55606
Schroeder Post Office	7940 Highway 61	Schroeder	MN	55613
Grand Portage Post Office	77 Mile Creek Road	Grand Portage	MN	55605
Lutsen Post Office	5321 Highway 61	Lutsen	MN	55612
Tofte Post Office	7223 Tofte Park Road	Tofte	MN	55615

### Transportation

Grand Marais/Cook County Airport	123 Airport Road	Grand Marais	MN	55604
Arrowhead Transit		Grand Marais	MN	55604
Seaplane Base	<i>Devil Track Lake</i>			
Seaplane Base	<i>Gunflint Lake</i>			

### Water

Grand Portage Waste Water Treatment Plant		Grand Portage	MN	55605
Grand Marais Water Pumping Station		Grand Marais	MN	55604
Grand Marais Waste Water Treatment Plant		Grand Marais	MN	55604
Grand Marais Water Tower		Grand Marais	MN	55604
Grand Portage Water Treatment		Grand Portage	MN	55605

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# **Appendix C**

## **Cook County Hazard Events**

The National Centers for Environmental Information storm events database was queried for all notable events since 1950. However, some categories of events do not have records prior to 1996. Data was available through October of 2018.

Table C - 1. All tornadoes recorded by NCEI, 1950-October 2018

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage
Cook County	9/16/1992	F0	0	0	Unknown
Cook County	6/9/1991	F0	0	0	Unknown
<b>Highest Value Property Damage</b>					<b>Unknown</b>

Table C - 2. All severe hail storm events recorded by NCEI, 1950-October 2018

Location or County	Date	Size in Inches	Deaths	Injuries	Property Damage
Lutsen	9/2/2017	0.75	0	0	Unknown
Grand Marais	9/6/2016	0.75	0	0	Unknown
Grand Marais	8/8/2015	1	0	0	Unknown
Grand Marais	8/8/2015	0.75	0	0	Unknown
Grand Marais	8/8/2015	0.75	0	0	Unknown
Grand Marais	8/8/2015	0.75	0	0	Unknown
Schroeder	7/5/2014	1	0	0	Unknown
Lutsen	8/26/2011	0.75	0	0	Unknown
Lutsen	4/10/2011	0.75	0	0	Unknown
Lutsen	7/16/2006	1	0	0	Unknown
Tofte	6/21/2006	1	0	0	Unknown
Grand Marais	5/28/2006	0.88	0	0	Unknown
Grand Marais	7/6/2003	0.75	0	0	Unknown
Lutsen	7/1/2000	1	0	0	Unknown
Grand Marais	5/15/1998	0.75	0	0	Unknown
Cook County	8/16/1988	1.5	0	0	Unknown
Cook County	6/21/1985	1	0	0	Unknown
Cook County	6/25/1984	3	0	0	Unknown
<b>Highest Value Property Damage</b>					<b>Unknown</b>

Table C - 3. All severe thunderstorm wind events recorded by NCEI, 1950-October 2018

Location Or County	Date	Type	Magnitude (Knots)	Deaths	Injuries	Property Damage
Southern Cook County	10/3/2018	Strong Wind	49	0	0	\$25,000
Schroeder	6/29/2018	Thunderstorm Wind	50	0	0	Unknown
Grand Marais	9/22/2017	Thunderstorm Wind	50	0	0	Unknown
Southern Cook County	3/7/2017	High Wind	57	0	0	Unknown
Lutsen	7/21/2016	Thunderstorm Wind	61	0	0	Unknown
Grand Marais	7/21/2016	Thunderstorm Wind	70	0	0	Unknown
Grand Marais	6/19/2016	Thunderstorm Wind	52	0	1	Unknown
Grand Marais	6/19/2016	Thunderstorm Wind	61	1	1	Unknown
Lutsen	7/22/2014	Thunderstorm Wind	61	0	0	Unknown
Lutsen	7/22/2014	Thunderstorm Wind	61	0	0	Unknown
Southern Cook County	11/26/2010	High Wind	53	0	0	Unknown
Southern Cook County	10/26/2010	High Wind	51	0	0	Unknown
Grand Marais	5/25/2010	Thunderstorm Wind	50	0	0	Unknown
Grand Marais	4/28/2004	Thunderstorm Wind	56	0	0	Unknown
Southern Cook County	12/5/2001	High Wind	46	0	0	Unknown
Grand Marais	8/8/2001	Thunderstorm Wind	52	0	0	Unknown
Northern Cook County	12/25/1999	Strong Wind		0	0	Unknown
Southern Cook County	12/25/1999	Strong Wind		0	0	Unknown
Grand Marais	7/4/1999	Thunderstorm Wind	60	0	0	Unknown
Southern Cook County	2/11/1999	High Wind	49	0	0	Unknown
Grand Marais	8/21/1996	Thunderstorm Wind	50	0	0	Unknown
Grand Marais	6/28/1996	Thunderstorm Wind	50	0	0	Unknown
Grand Marais	6/28/1996	Thunderstorm Wind	55	0	0	Unknown
Cook County	9/16/1992	Thunderstorm Wind	0	0	0	Unknown
Cook County	7/28/1983	Thunderstorm Wind	0	0	0	Unknown
<b>Highest Value Property Damage</b>						<b>\$25,000</b>

Table C - 4. All extreme flood events recorded by NCEI, 1997-October 2018

Location or County	Date	Type	Deaths	Injuries	Property Damage
Grand Marais	10/3/2017	Flood	0	0	Unknown



Location or County	Date	Type	Deaths	Injuries	Property Damage
Hovland	10/3/2017	Flash Flood	0	0	Unknown
Lutsen	7/5/2014	Flash Flood	0	0	\$1,000
Lutsen	7/19/2013	Flash Flood	0	0	\$100,000
Marais	7/19/2013	Flash Flood	0	0	\$10,000
Taconite Harbor	6/20/2012	Flash Flood	0	0	\$61,000
Taconite Harbor	5/24/2012	Flash Flood	0	0	Unknown
Marais	7/20/2011	Flash Flood	0	0	Unknown
Taconite Harbor	6/27/2011	Flash Flood	0	0	Unknown
Hovland	6/6/2008	Flash Flood	0	0	\$900,000
Lutsen	10/18/2007	Flood	0	0	Unknown
Cook County	7/5/1999	Flash Flood	0	0	Unknown
<b>Highest Value Property Damage</b>					<b>\$900,000</b>

Table C - 5. All severe winter weather events recorded by NCEI, 1996-October 2018

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Cook County	4/15/2018	Winter Storm	0	0	Unknown
Northern Cook County	4/15/2018	Winter Storm	0	0	Unknown
Northern Cook County	3/26/2018	Heavy Snow	0	0	Unknown
Southern Cook County	2/24/2018	Heavy Snow	0	0	Unknown
Northern Cook County	2/24/2018	Heavy Snow	0	0	Unknown
Northern Cook County	2/18/2018	Heavy Snow	0	0	Unknown
Southern Cook County	2/18/2018	Heavy Snow	0	0	Unknown
Northern Cook County	1/10/2018	Heavy Snow	0	0	Unknown
Southern Cook County	11/1/2017	Heavy Snow	0	0	Unknown
Northern Cook County	10/26/2017	Heavy Snow	0	0	Unknown
Northern Cook County	4/26/2017	Ice Storm	0	0	Unknown
Southern Cook County	4/26/2017	Ice Storm	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	1/2/2017	Heavy Snow	0	0	Unknown
Southern Cook County	12/25/2016	Winter Weather	0	0	Unknown
Southern Cook County	12/11/2016	Heavy Snow	0	0	Unknown
Northern Cook County	11/17/2016	Heavy Snow	0	0	Unknown
Southern Cook County	3/16/2016	Heavy Snow	0	0	Unknown
Northern Cook County	3/16/2016	Heavy Snow	0	0	Unknown
Southern Cook County	12/15/2015	Heavy Snow	0	0	Unknown
Northern Cook County	12/15/2015	Heavy Snow	0	0	Unknown
Southern Cook County	4/24/2014	Heavy Snow	0	0	Unknown
Southern Cook County	4/16/2014	Heavy Snow	0	0	Unknown
Southern Cook County	4/3/2014	Heavy Snow	0	0	Unknown
Southern Cook County	2/20/2014	Heavy Snow	0	0	Unknown
Northern Cook County	2/20/2014	Heavy Snow	0	0	Unknown
Northern Cook County	2/17/2014	Heavy Snow	0	0	Unknown
Southern Cook County	2/17/2014	Heavy Snow	0	0	Unknown
Southern Cook County	1/3/2014	Heavy Snow	0	0	Unknown
Northern Cook County	1/3/2014	Heavy Snow	0	0	Unknown
Southern Cook County	12/14/2013	Heavy Snow	0	0	Unknown
Northern Cook County	12/4/2013	Heavy Snow	0	0	Unknown
Southern Cook County	12/2/2013	Heavy Snow	0	0	Unknown
Southern Cook County	4/14/2013	Heavy Snow	0	0	Unknown
Northern Cook County	4/5/2013	Heavy Snow	0	0	Unknown
Northern Cook County	2/10/2013	Heavy Snow	0	0	Unknown
Southern Cook County	1/24/2013	Heavy Snow	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Cook County	2/26/2012	Heavy Snow	0	0	Unknown
Northern Cook County	2/26/2012	Heavy Snow	0	0	Unknown
Northern Cook County	4/3/2011	Heavy Snow	0	0	Unknown
Southern Cook County	3/6/2011	Lake-Effect Snow	0	0	Unknown
Northern Cook County	1/28/2011	Heavy Snow	0	0	Unknown
Southern Cook County	1/28/2011	Heavy Snow	0	0	Unknown
Northern Cook County	1/16/2011	Lake-Effect Snow	0	0	Unknown
Southern Cook County	1/16/2011	Lake-Effect Snow	0	0	Unknown
Southern Cook County	12/20/2010	Heavy Snow	0	0	Unknown
Northern Cook County	11/24/2010	Heavy Snow	0	0	Unknown
Northern Cook County	11/13/2010	Heavy Snow	0	0	Unknown
Southern Cook County	11/13/2010	Heavy Snow	0	0	Unknown
Southern Cook County	2/7/2010	Lake-Effect Snow	0	0	Unknown
Northern Cook County	2/7/2010	Lake-Effect Snow	0	0	Unknown
Northern Cook County	1/24/2010	Winter Storm	0	0	Unknown
Southern Cook County	1/24/2010	Winter Storm	0	0	Unknown
Southern Cook County	12/24/2009	Winter Storm	0	0	Unknown
Northern Cook County	12/24/2009	Winter Storm	0	0	Unknown
Northern Cook County	4/19/2009	Lake-Effect Snow	0	0	Unknown
Southern Cook County	4/19/2009	Lake-Effect Snow	0	0	Unknown
Northern Cook County	4/1/2009	Winter Storm	0	0	Unknown
Southern Cook County	4/1/2009	Winter Storm	0	0	Unknown
Southern Cook County	3/31/2009	Winter Storm	0	0	Unknown
Northern Cook County	3/31/2009	Winter Storm	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	3/23/2009	Ice Storm	0	0	Unknown
Southern Cook County	3/23/2009	Ice Storm	0	0	Unknown
Southern Cook County	3/10/2009	Winter Storm	0	0	Unknown
Northern Cook County	3/10/2009	Winter Storm	0	0	Unknown
Southern Cook County	1/3/2009	Heavy Snow	0	0	Unknown
Northern Cook County	1/3/2009	Heavy Snow	0	0	Unknown
Southern Cook County	12/20/2008	Heavy Snow	0	0	Unknown
Northern Cook County	12/20/2008	Heavy Snow	0	0	Unknown
Southern Cook County	12/13/2008	Winter Storm	0	0	Unknown
Northern Cook County	12/13/2008	Winter Storm	0	0	Unknown
Southern Cook County	12/10/2008	Lake-Effect Snow	0	0	Unknown
Northern Cook County	4/10/2008	Winter Storm	0	0	Unknown
Southern Cook County	4/10/2008	Winter Storm	0	0	Unknown
Northern Cook County	4/5/2008	Winter Storm	0	0	Unknown
Northern Cook County	1/11/2008	Lake-Effect Snow	0	0	Unknown
Southern Cook County	1/11/2008	Lake-Effect Snow	0	0	Unknown
Southern Cook County	12/23/2007	Winter Storm	0	0	Unknown
Southern Cook County	12/1/2007	Winter Storm	0	0	Unknown
Northern Cook County	12/1/2007	Winter Storm	0	0	Unknown
Southern Cook County	4/3/2007	Winter Storm	0	0	Unknown
Northern Cook County	4/3/2007	Winter Storm	0	0	Unknown
Northern Cook County	3/1/2007	Winter Storm	0	0	Unknown
Southern Cook County	3/1/2007	Blizzard	0	0	Unknown
Northern Cook County	12/30/2006	Winter Storm	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	12/3/2006	Heavy Snow	0	0	Unknown
Southern Cook County	12/3/2006	Heavy Snow	0	0	Unknown
Southern Cook County	12/16/2005	Heavy Snow	0	0	Unknown
Northern Cook County	12/13/2005	Heavy Snow	0	0	Unknown
Southern Cook County	12/13/2005	Heavy Snow	0	0	Unknown
Southern Cook County	1/21/2005	Heavy Snow	0	0	Unknown
Northern Cook County	1/21/2005	Heavy Snow	0	0	Unknown
Northern Cook County	1/12/2005	Heavy Snow	0	0	Unknown
Southern Cook County	1/12/2005	Heavy Snow	0	0	Unknown
Northern Cook County	1/1/2005	Winter Storm	0	0	Unknown
Southern Cook County	1/1/2005	Winter Storm	0	0	Unknown
Northern Cook County	12/30/2004	Ice Storm	0	0	Unknown
Southern Cook County	12/30/2004	Ice Storm	0	0	Unknown
Southern Cook County	12/11/2004	Heavy Snow	0	0	Unknown
Northern Cook County	12/11/2004	Heavy Snow	0	0	Unknown
Northern Cook County	3/17/2004	Heavy Snow	0	0	Unknown
Southern Cook County	1/25/2004	Heavy Snow	0	0	Unknown
Northern Cook County	1/25/2004	Heavy Snow	0	0	Unknown
Northern Cook County	1/13/2004	Heavy Snow	0	0	Unknown
Southern Cook County	1/13/2004	Heavy Snow	0	0	Unknown
Northern Cook County	11/22/2003	Heavy Snow	0	0	Unknown
Northern Cook County	3/27/2003	Heavy Snow	0	0	Unknown
Southern Cook County	3/27/2003	Heavy Snow	0	0	Unknown
Southern Cook County	12/18/2002	Ice Storm	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	12/18/2002	Ice Storm	0	0	Unknown
Northern Cook County	3/9/2002	Heavy Snow	0	0	Unknown
Southern Cook County	3/9/2002	Heavy Snow	0	0	Unknown
Southern Cook County	3/7/2002	Heavy Snow	0	0	Unknown
Northern Cook County	3/7/2002	Heavy Snow	0	0	Unknown
Northern Cook County	11/26/2001	Winter Storm	0	0	Unknown
Southern Cook County	3/11/2001	Heavy Snow	0	0	Unknown
Southern Cook County	2/24/2001	Heavy Snow	0	0	Unknown
Northern Cook County	2/24/2001	Heavy Snow	0	0	Unknown
Northern Cook County	12/20/2000	Heavy Snow	0	0	Unknown
Southern Cook County	12/20/2000	Heavy Snow	0	0	Unknown
Southern Cook County	12/7/2000	Heavy Snow	0	0	Unknown
Northern Cook County	1/22/2000	Heavy Snow	0	0	Unknown
Southern Cook County	1/22/2000	Heavy Snow	0	0	Unknown
Northern Cook County	1/17/2000	Heavy Snow	0	0	Unknown
Southern Cook County	1/17/2000	Heavy Snow	0	0	Unknown
Southern Cook County	11/23/1999	Heavy Snow	0	0	Unknown
Northern Cook County	4/5/1999	Heavy Snow	0	0	Unknown
Southern Cook County	4/5/1999	Heavy Snow	0	0	Unknown
Southern Cook County	4/3/1999	Ice Storm	0	0	Unknown
Northern Cook County	4/3/1999	Ice Storm	0	0	Unknown
Northern Cook County	4/1/1999	Ice Storm	0	0	Unknown
Southern Cook County	4/1/1999	Ice Storm	0	0	Unknown
Northern Cook County	3/17/1999	Heavy Snow	0	0	Unknown



Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	3/8/1999	Heavy Snow	0	0	Unknown
Southern Cook County	3/8/1999	Heavy Snow	0	0	Unknown
Northern Cook County	2/1/1999	Ice Storm	0	0	Unknown
Southern Cook County	2/1/1999	Ice Storm	0	0	Unknown
Northern Cook County	12/17/1998	Heavy Snow	0	0	Unknown
Northern Cook County	11/18/1998	Heavy Snow	0	0	Unknown
Southern Cook County	11/18/1998	Heavy Snow	0	0	Unknown
Northern Cook County	3/31/1998	Heavy Snow	0	0	Unknown
Southern Cook County	1/13/1998	Heavy Snow	0	0	Unknown
Southern Cook County	1/8/1998	Heavy Snow	0	0	Unknown
Northern Cook County	11/21/1997	Heavy Snow	0	0	Unknown
Southern Cook County	11/21/1997	Heavy Snow	0	0	Unknown
Northern Cook County	2/28/1997	Heavy Snow	0	0	Unknown
Southern Cook County	2/28/1997	Heavy Snow	0	0	Unknown
Northern Cook County	1/23/1997	Heavy Snow	0	0	Unknown
Southern Cook County	1/23/1997	Heavy Snow	0	0	Unknown
Northern Cook County	1/4/1997	Winter Storm	0	0	Unknown
Southern Cook County	1/4/1997	Winter Storm	0	0	Unknown
Southern Cook County	1/1/1997	Ice Storm	0	0	Unknown
Northern Cook County	1/1/1997	Ice Storm	0	0	Unknown
Southern Cook County	12/14/1996	Heavy Snow	0	0	Unknown
Northern Cook County	12/14/1996	Heavy Snow	0	0	Unknown
Northern Cook County	4/25/1996	Heavy Snow	0	0	Unknown
Southern Cook County	4/25/1996	Heavy Snow	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Cook County	2/26/1996	Heavy Snow	0	0	Unknown
Northern Cook County	2/26/1996	Heavy Snow	0	0	Unknown
Southern Cook County	1/28/1996	Heavy Snow	0	0	Unknown
Northern Cook County	1/28/1996	Heavy Snow	0	0	Unknown
Northern Cook County	1/17/1996	Heavy Snow	0	0	Unknown
Southern Cook County	1/17/1996	Heavy Snow	0	0	Unknown
<b>Highest Value Property Damage</b>					<b>Unknown</b>

Table C - 6. All severe cold/wind chill events recorded by NCEI, 1996-October 2018

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Cook County	2/4/2018	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/12/2018	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/5/2018	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/5/2018	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/3/2018	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/27/2017	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	12/25/2017	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/17/2016	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/17/2016	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/22/2015	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/22/2015	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/22/2015	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/6/2015	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/6/2015	Extreme Cold/Wind Chill	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Southern Cook County	1/4/2015	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/4/2015	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/4/2015	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	3/1/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	3/1/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/27/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/27/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/27/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/27/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/22/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/22/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/8/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/8/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/4/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/4/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/2/2014	Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/2/2014	Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/1/2014	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/1/2014	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	12/30/2013	Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/30/2013	Cold/Wind Chill	0	0	Unknown
Northern Cook County	12/28/2013	Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/28/2013	Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/11/2013	Cold/Wind Chill	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	1/21/2013	Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/19/2012	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/19/2012	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/1/2010	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/1/2010	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/13/2009	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/13/2009	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/15/2008	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	12/15/2008	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	12/15/2008	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/19/2008	Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/19/2008	Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/9/2008	Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/9/2008	Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/29/2008	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/29/2008	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/3/2007	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/3/2007	Extreme Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/2/2007	Extreme Cold/Wind Chill	0	0	Unknown
Southern Cook County	2/16/2006	Cold/Wind Chill	0	0	Unknown
Northern Cook County	2/16/2006	Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/14/2005	Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/14/2005	Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/21/2004	Cold/Wind Chill	0	0	Unknown

Location or County	Date	Type	Deaths	Injuries	Property Damage
Northern Cook County	1/21/2004	Cold/Wind Chill	0	0	Unknown
Northern Cook County	1/15/1997	Cold/Wind Chill	0	0	Unknown
Southern Cook County	1/15/1997	Cold/Wind Chill	0	0	Unknown
<b>Highest Value Property Damage</b>					<b>Unknown</b>

Table C - 7. All extreme heat/heat events recorded by the NCEI, 1996-October 2018

Location or County	Date	Type	Deaths	Injuries	Property Damage
none					
<b>Highest Value Property Damage</b>					

Table C - 8. All lightning events recorded by the NCEI, 1996-October 2018

Location or County	Date	Deaths	Injuries	Property Damage
Grand Marais	6/7/2004	0	0	Unknown
Grand Marais	8/6/1996	1	1	Unknown
<b>Highest Value Property Damage</b>				<b>Unknown</b>

# **Appendix D**

## **Adopting Resolutions**



*Resolutions to be added to Appendix D by Cook County following final approval of the plan by FEMA.*

# **Appendix E**

## **Steering Committee Meetings**

9/26/2018

## Cook County Hazard Mitigation Plan Update Kick-off Orientation Webinar

UNIVERSITY OF MINNESOTA GEOSPATIAL ANALYSIS CENTER

SWENSON COLLEGE  
OF SCIENCE & ENGINEERING  
UNIVERSITY OF MINNESOTA, DULUTH  
Driven to Discover

### Webinar Goals

#### Goals:

- Introduce the UMD Team and County contacts.
- Provide an overview of the project.
- Clarify roles and responsibilities.
- Outline the planning process, discuss key tasks and timelines.
- Discuss next steps and answer your questions.

### Introductions

#### Who We Are (UMD Project Team)



Stacey Stark, Director, Geospatial Analysis Center (GAC)



Micahella Penning, Research Associate, GIS Specialist, Cartographer, and Editor (GAC)



Steve Graham, Research Associate and Flood Modeling Specialist (GAC)



Zach Varva, GIS Specialist (GAC)



Bonnie Hundreser, Emergency Management Planning Consultant (Hundreser Consulting LLC)



### Why UMD-GAC?

#### Proven experience

GAC has extensive experience in the comprehensive review and update of county MHMPs, as well as update of the State MHMP.

#### Advanced Capabilities

GAC has expertise in the application of GIS, HAZUS, and research to support MHMP development and meeting all FEMA requirements.

#### Ability to Expedite

GAC has the ability to expedite the MHMP update process for multiple counties through a consistent approach and format, which also supports State and FEMA review of draft plans.

#### Planning Team

GAC project team includes working with advanced GIS students and experienced consultants to effectively complete tasks.

## Overview of MHMP Update Process

### Key Considerations for Discussion

### EM Roles & Responsibilities

- Act as main Point of Contact.
- Track required local match and submit to HSEM.
- Coordinate communication and outreach to engage local planning team, additional key stakeholders, and the public.
- Review past mitigation actions and provide status update.
- Provide information for Capabilities Assessment (Plans & Programs in Place / Program Gaps or Deficiencies) for each hazard.
- Assist in development of new mitigation action chart (must be county and jurisdictionally specific) that includes projects for HMA eligibility.
- Provide information for Critical Facilities forms.
- Provide coordination with GIS and assessor's data managers in order to obtain GIS and parcel information for GIS analyses.
- Assist in timely review of material throughout the plan update process via phone, email, and in-person meetings.

## Public Engagement

As part of the planning process, the MHMP must document how the public was given the opportunity to be involved in the planning process and how their feedback was incorporated into the plan.

Key Considerations:

- ▶ Our public outreach process consists of 2 outreach periods (early in the process and for public review of draft plan).
- ▶ We provide you with a news release for posting/distribution.
- ▶ We work with you to document your public outreach in the plan.
- ▶ We provide a website for posting the plan and collection of public feedback.
- ▶ If you wish to do additional public outreach, you may do so under your own direction (i.e., posting an online survey, providing an update meetings, or distributing information at public events, such as a booth at the County Fair).

## Hazard Identification and Risk Assessment

#### Data Needs: Critical Facilities

**Appendix A: Road**

Route	Length (km)	Width (m)	Surface	Condition	Notes
1	1.2	4.0	Asphalt	Good	
2	1.5	4.0	Asphalt	Good	
3	1.8	4.0	Asphalt	Good	
4	2.1	4.0	Asphalt	Good	
5	2.4	4.0	Asphalt	Good	
6	2.7	4.0	Asphalt	Good	
7	3.0	4.0	Asphalt	Good	
8	3.3	4.0	Asphalt	Good	
9	3.6	4.0	Asphalt	Good	
10	3.9	4.0	Asphalt	Good	
11	4.2	4.0	Asphalt	Good	
12	4.5	4.0	Asphalt	Good	
13	4.8	4.0	Asphalt	Good	
14	5.1	4.0	Asphalt	Good	
15	5.4	4.0	Asphalt	Good	
16	5.7	4.0	Asphalt	Good	
17	6.0	4.0	Asphalt	Good	
18	6.3	4.0	Asphalt	Good	
19	6.6	4.0	Asphalt	Good	
20	6.9	4.0	Asphalt	Good	
21	7.2	4.0	Asphalt	Good	
22	7.5	4.0	Asphalt	Good	
23	7.8	4.0	Asphalt	Good	
24	8.1	4.0	Asphalt	Good	
25	8.4	4.0	Asphalt	Good	
26	8.7	4.0	Asphalt	Good	
27	9.0	4.0	Asphalt	Good	
28	9.3	4.0	Asphalt	Good	
29	9.6	4.0	Asphalt	Good	
30	9.9	4.0	Asphalt	Good	
31	10.2	4.0	Asphalt	Good	
32	10.5	4.0	Asphalt	Good	
33	10.8	4.0	Asphalt	Good	
34	11.1	4.0	Asphalt	Good	
35	11.4	4.0	Asphalt	Good	
36	11.7	4.0	Asphalt	Good	
37	12.0	4.0	Asphalt	Good	
38	12.3	4.0	Asphalt	Good	
39	12.6	4.0	Asphalt	Good	
40	12.9	4.0	Asphalt	Good	
41	13.2	4.0	Asphalt	Good	
42	13.5	4.0	Asphalt	Good	
43	13.8	4.0	Asphalt	Good	
44	14.1	4.0	Asphalt	Good	
45	14.4	4.0	Asphalt	Good	
46	14.7	4.0	Asphalt	Good	
47	15.0	4.0	Asphalt	Good	
48	15.3	4.0	Asphalt	Good	
49	15.6	4.0	Asphalt	Good	
50	15.9	4.0	Asphalt	Good	
51	16.2	4.0	Asphalt	Good	
52	16.5	4.0	Asphalt	Good	
53	16.8	4.0	Asphalt	Good	
54	17.1	4.0	Asphalt	Good	
55	17.4	4.0	Asphalt	Good	
56	17.7	4.0	Asphalt	Good	
57	18.0	4.0	Asphalt	Good	
58	18.3	4.0	Asphalt	Good	
59	18.6	4.0	Asphalt	Good	
60	18.9	4.0	Asphalt	Good	
61	19.2	4.0	Asphalt	Good	
62	19.5	4.0	Asphalt	Good	
63	19.8	4.0	Asphalt	Good	
64	20.1	4.0	Asphalt	Good	
65	20.4	4.0	Asphalt	Good	
66	20.7	4.0	Asphalt	Good	
67	21.0	4.0	Asphalt	Good	
68	21.3	4.0	Asphalt	Good	
69	21.6	4.0	Asphalt	Good	
70	21.9	4.0	Asphalt	Good	
71	22.2	4.0	Asphalt	Good	
72	22.5	4.0	Asphalt	Good	
73	22.8	4.0	Asphalt	Good	
74					

- Identify specific impacts and vulnerabilities (at the county/jurisdiction level) due to natural hazards.
- Identify if and how any priorities changed since the last plan (i.e., financial, legal, political realities, and post-disaster conditions).
- Identify existing development or future development that may increase or decrease the community's vulnerability to natural hazard events.

Flood data used to create potential economic loss

Wadena County Example:

Category	Estimated Total Liabilities	Total Emerging Liabilities	Total Liabilities Repayment (\$'00000)	Total Liabilities Repayment (\$'00000)	Recovery Rate (\$'00000)
Highly volatile	1.529	0	\$8,238	\$4,830	5789
Contingent	3.36	0	\$4,128	\$1,062	\$487
Secured	29	0	\$42,304	\$48	\$47
Government	2.5	0	\$8,096	\$467	\$40
Unsecured	2.5	0	\$10,007	\$462	\$22
High Risk/Speculative	32	0	\$22,274	\$1,025	\$125
Subtotal	45.068	37	\$120,223	\$4,527	\$2,794
Total	77.008	37	\$140,851	\$14,000	\$14,000

[illegible]

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9/26/2018

## Report Outputs



## Mitigation Strategy

Key activities to support the update of the Mitigation Strategy will include a capabilities assessment for mitigating against natural hazards, as well as a comprehensive review of the status of mitigation actions in the previously approved plan.

### Key Considerations:

- Plans and Programs in Place that support mitigation.
- Program Gaps or Deficiencies that hinder mitigation.
- Past Mitigation Action Review (Completed, Deleted, or Ongoing)
- Identification of projects that may be eligible for HMA funding
- Local Mitigation Capabilities Assessment (LMCA) for jurisdictional-level mitigation actions.

## Plan Adoption

After FEMA has provided "APA" status (Approval Pending Adoption), the county and all participating jurisdictions must formally adopt the plan.

### Key Considerations:

- This step is often a difficult challenge for Emergency Managers after the plan is completed, and can bog down the process of final plan adoption and thus eligibility for applying for FEMA HMA funding.
- Engaging County and City personnel throughout the planning process will help to ensure understanding of the purpose and process of the MHMP update, including expectation of follow-through to adopt the plan.

## EM Tasks

➤ All county Emergency Managers will be provided with resources to complete the following tasks:

- ✓ Plans & Programs in Place Checklist
- ✓ Capabilities Assessment by each Natural Hazard
- ✓ Past Mitigation Action Review (Status Update)
- ✓ Public News Releases
- ✓ Compilation of Critical & Essential Facilities in Each Jurisdiction
- ✓ Coordination of Local Mitigation Capabilities Assessment
- ✓ Building Attribute Checklist for Flood Economic Loss Analysis (GIS and Assessor's office contact)

## Next Steps

UMD Team members (Bonnie/Micaella) will follow up with each EM to provide & discuss the following assignments you can begin to work on:

- Plans & Programs in Place Checklist
- Capabilities Assessment (CA)
- Past Mitigation Action Review (PMAR)
- Listing of Critical Facilities
- Obtain building data from Assessor and parcels from GIS dept
- "Section 6" text (How the plan will be monitored, evaluated and updated within a 5-year cycle, and how public participation will continue).
- Scheduling of 1<sup>st</sup> Planning Team Meeting

## Questions?

What questions do you have  
about the MHMP Update process?

9/26/2018

## Contact Information

---

Stacey Stark, MS, GISP  
**Geospatial Analysis Center**  
[slstark@d.umn.edu](mailto:slstark@d.umn.edu)  
218-726-7438

Example Plans:  
<https://z.umn.edu/hazardmitigation>





## **Cook County Multi-Hazard Mitigation Plan Update**

July 26, 2018 MHMP Planning Team Meeting #1  
Cook County Community Center – Grand Marais, MN  
2:00 p.m. – 4:00 p.m.

### **Meeting Summary:**

On Thursday, July 26, 2018, key county, city, and township representatives, as well as other stakeholders were convened to participate in a Planning Team Meeting for the update of Cook County Multi-Hazard Mitigation Plan (MHMP). The meeting was facilitated by the University of Minnesota – Duluth Geospatial Analysis Center (GAC) staff and Bonnie Hundrieser who are leading the update of the Cook County MHMP. A total of 14 people attended the meeting.

The opening presentation covered:

- The purpose of hazard mitigation planning.
- The role & responsibilities of the Planning Team.
- An overview of content in the MHMP (County physical & social profile, Asset Inventory, Hazard Assessment and Vulnerability Analysis, Capability Assessment and Mitigation Actions).
- Group review and discussion of hazards that pose risk to the County and their risk rankings.
- A review of mitigation strategies and considerations for developing local mitigation actions.
- An overview of the FEMA Hazard Mitigation Assistance (HMA) Grants program.

Following the presentation a facilitated Mitigation Action Working Session was held. Participants discussed the natural hazards of concern to their communities and filled out Mitigation Action Worksheets to identify new, jurisdictionally-specific mitigation actions to be included in the MHMP plan update. Mitigation actions were required to fall within one of the 5 mitigation action strategies:

1. Local Planning and Regulations
2. Structure and Infrastructure Projects
3. Natural Systems Protection
4. Education and Awareness Programs
5. Mitigation Preparedness and Response Support

Following the Mitigation Action Working Session, the group then discussed the upcoming process and anticipated timeline for engaging the public and other key stakeholders in an open plan review period and public meetings. Meeting attendees were told that they would be contacted for additional information and kept informed on the upcoming steps in the planning process, including opportunities for draft plan review and final selection of mitigation actions for inclusion in the plan.

**Attached to this meeting summary are the following documentation items:**

- 7-26-18 Cook County Meeting Email Invite
- 7-26-18 Meeting Agenda
- 7-26-18 Meeting Sign-in Sheets (electronic / hardcopy scanned)
- 7-26-18 Power Point Presentation Slides
- 7-26-18 Meeting Handouts (Mitigation Strategies, HMA Grants, Mitigation Ideas Worksheet)
- 7-26-18 Mitigation Ideas Working Session Notes (jurisdictional worksheets)
- Post-Meeting Public Outreach: AREMA Facebook Posting following 7/26/18 meeting

*Meeting Summary Prepared By: Bonnie Hundrieser, UMD Project Team, (Hundrieser Consulting LLC)*

**From:** Valerie Marasco  
**To:** "Mark.abrahamson@northshorehealthgm.org"; "javya.decoux@gmail.com"; "Jennifer.Backstrom@northshorehealthgm.org"; "ebogardus@fs.fed.us"; Diane Booth; "tbragg@sawtoothmountainclinic.org"; Grace Bushard; Jeff Cadwell; "marilyn.cluka@state.mn.us"; "michaelcroteau@fs.fed.us"; "lcrotteau@fs.fed.us"; "Steve.Duchien@northshorehealthgm.org"; Pat Eliassen; Mitch Everson; "Carlos.garcia-velez@redcross.org"; "Jason.p.hanson@state.mn.us"; Molly Hicken; "Amy.james@northshorehealthgm.org"; "pijohnson@fs.fed.us"; "Craig.kalar@cbp.dhs.gov"; "mikeK@grandportage.com"; "joyce@sawtoothmountainclinic.org"; Joni Kristenson; "amy.lacina@northshorehealthgm.org"; "Christopher.lange@northshorehealthgm.org"; "rlnehan@grandportage.com"; "emarsball@cookcountymca.org"; "Robert.mcgregor@northshorehealthgm.org"; Alison McIntyre; "smcmanus@arrowhead.coop"; "aaron.mielke@state.mn.us"; Lindsay Mielke; Dusty Nelms; Tim Nelson; "sue@sawtoothmountainclinic.org"; "cpeterson@fs.fed.us"; "rita@sawtoothmountainclinic.org"; Rena Rogers; "cityhall@boreal.org"; Will Sandstrom; "raul@grandportage.com"; "Vera.schumann@northshorehealthgm.org"; "kim.hertzog@courts.state.mn.us"; Brian Silence; "twiest@arrowhead.coop"; "Matthew.Webb@hdchr.org"; "lwenzel@fs.fed.us"; "jason.white@northshorehealthgm.org"; "Kimber.Wraalstad@northshorehealthgm.org"; "jeremiah@grandportage.com"; Myron Bursheim; Ginny Storlie; "lisab@boreal.org"; "content@boreal.org"; "ericklock3@gmail.com"; "newsheald@grandmarais-mn.com"; "engineer@wtip.org"; "wtip@radio.org"; "volunteer@wtip.org"; "rhonda@wtip.org"; "bcf@boreal.org"; "peterjohnjames@yahoo.com"; "rjames@boreal.org"; "amvjames40@yahoo.com"; "bcrandall@isd166.org"; "bdewitt@isd166.org"; "ndorn@isd166.org"; "tnelson@isd166.org"; "abeeren@isd166.org"; "director@oshkiqimaag.org"; CommissionersBoardRoom; Schumann,Vera; Teresa Bragg; KALAR, CRAIG; John Twiest; Wraalstad, Kimber L; emarsball@cookcountymca.org; Abrahamson, Mark T; Mike Keyport; Allison Plummer; Lori Ericson; Martina Williams; Sara Hadley; javya.decoux@gmail.com; bcrandall@isd166.org; jim/cherlyn morrison; Bob Vogel (rvogel jr\_@hotmail.com); andersonlogging@live.com; terry spieker; labodagrading@boreal.org; "bennys@boreal.org"; ahlock57@gmail.com; rinelson@boreal.org; schroederfire98@gmail.com; James Coleman (lutsenfire@gmail.com); LutsenFMS@gmail.com; michael; Paul Goettl; Matthew Curran - US Border Patrol; LAW, BRANDON S; wwtf@boreal.org; steckelberg.council@gmail.com; kelly\_sweatingen@msn.com; lutsentownship@gmail.com; raempjenho@startmail.com; christineordemann@gmail.com; grothif@gmail.com; lutsentownship@gmail.com; schroedertownship@gmail.com; toftemn@boreal.org; Bev Wolke; McCartney, Wendy - FS; Jackson, Jeffery (DNR); toddambrust@gmail.com; Brady Powers; block@boreal.org; Timothy P. Miller; Ben Petz; dave@solbakkenonsuperior.com; don kufahl; Erik Carlson; Heidi Doo-Kirk; mcgowan; shinski.1@osu.edu; Jim & Cheryl Morrison; Johnson, Patricia J - FS; Joseph Routh; kmsullivan8@gmail.com; Pat Eliassen; Johnson, Patrick C - FS; Paul Nelson; Aaron Mielke (E-mail); Barbara Bottger; Moy, Marshall - FS; MAT team; smcmanus@arrowhead.coop  
**Cc:** Bonnie Hundrieser; slstark@d.umn.edu  
**Subject:** Your Input is Needed - Please Attend Stakeholder Meeting for the Cook County Multi-Hazard Mitigation Plan Update  
**Date:** Thursday, June 28, 2018 11:43:48 AM

Greetings,

Your presence is requested at a Planning Team Meeting for the update of the **Cook County Multi-Hazard Mitigation Plan** on:

**Date:** Thursday, July 26, 2018  
**Time:** 2 - 4 pm  
**Location:** Cook County Community Center

The update of the County's Hazard Mitigation Plan is a requirement by the State of Minnesota Department of Homeland Security & Emergency Management (HSEM) as well as the Federal Emergency Management Agency (FEMA) every five years. Our plan is due for an update and our planning is currently underway. The plan addresses the natural hazards that face Cook County and will result in mitigation actions for implementation that will reduce or eliminate loss of life or damage to property as a result of natural hazard events. As being part of a County Department, City or Township, partner in response, affiliated agency or jurisdiction or additional key stakeholders, your input is valued.

**Your participation in this hazard mitigation plan is important for several reasons:**

1. You will have input on projects we can implement at the county and local level that will help to eliminate or reduce the impacts of future natural disaster events.
2. Participating cities and the County will be eligible to apply for significant federal mitigation funding from FEMA to implement specific projects that meet eligibility requirements.
3. Mitigation planning is a fundamental element in emergency management and local planning that we all must address to keep our communities safe and resilient.
4. FEMA and the State of Minnesota require that local jurisdictions participate in the planning process. Your participation is important so that the County can ensure that we meet this requirement.

During this two-hour meeting we will discuss & rank the hazards that face our county and discuss mitigation actions to include in the plan. The meeting will be facilitated by the University of Minnesota – Duluth Geospatial Analysis Center and Bonnie Hundrieser, an emergency management planning consultant working closely with us on this project.

If you cannot attend, please seek to send someone in your stead to represent your county department/city jurisdiction/agency or other organization.

If you have any questions, please do not hesitate to contact me. My apologies in advance, if you receive this email more than once, some recipients may serve on multiple committees and contacts may get duplicated.

Thank you,

**Valerie Marasco**

Director – Office of Emergency Management & Public Information  
Cook County, Minnesota  
Law Enforcement Center  
143 Gunflint Trail  
Grand Marais, MN 55604

Office: 218-387-3059

Cell: 218-387-5366

Fax: 218-387-3032

[Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us)

[www.co.cook.mn.us](http://www.co.cook.mn.us)



EMERGENCY MANAGEMENT  
& PUBLIC INFORMATION

## **Cook County** **Multi-Hazard Mitigation Plan Update**

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### **Planning Team Meeting #1**

Thursday, July 26, 2018, 2-4 pm

Cook County Community Center – Grand Marais, MN

#### **Presenting:**

- Stacey Stark, University of Minnesota –Duluth, Geospatial Analysis Center
- Bonnie Hundrieser, Hundrieser Consulting LLC (UMD MHMP Project Team)

#### **Agenda:**

1. Welcome and Introductions
2. Cook County MHMP Update
  - *About the Plan*
  - *Planning Team*
  - *Plan Content & Prioritization of Natural Hazards*
3. Review of Mitigation Strategies and Developing Mitigation Actions
4. Hazard Mitigation Assistance (HMA) Grants
5. Mitigation Action Working Session

**Contact:** *For more information on the Cook County MHMP, please contact:*

- Valerie Marasco, Cook County Director of Emergency Management & Public Information  
218-387-3059 / [Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us)
- Bonnie Hundrieser, UMD Project Team Member  
218-343-3468 / [hundrieserconsulting@gmail.com](mailto:hundrieserconsulting@gmail.com)



Cook County 7/26/18 Planning Team Meeting #1  
Participant Sign-in List (14 attendees)

Cook County MHMP Update Thursday, July 26, 2018 Planning Team Meeting #1 - 2:00 p.m. to 4:00 p.m. Participant Sign-in List			
Name	Agency/Organization	Title	Email
Mitch Everson	Cook County Enviro Health	Environmental Health Officer	<a href="mailto:Mitch.Everson@co.cook.mn.us">Mitch.Everson@co.cook.mn.us</a>
Joni Kristenson	Cook County Public Health	Public Health Coordinator	<a href="mailto:joni.kristenson@co.cook.mn.us">joni.kristenson@co.cook.mn.us</a>
James Coleman	Lutsen Fire Dept	Chief	<a href="mailto:lutsenfire@gmail.com">lutsenfire@gmail.com</a>
Patrick Johnson	US Forest Service	Asst Fire Management Officer	<a href="mailto:pcjohnson@fs.fed.us">pcjohnson@fs.fed.us</a>
Dave Grettenberg	US Forest Service	Asst Fire Management Officer	<a href="mailto:dgrettenberg@fs.fed.us">dgrettenberg@fs.fed.us</a>
Jason White	North Shore Health EMS	Paramedic	<a href="mailto:jason.white@northshorehealthgm.org">jason.white@northshorehealthgm.org</a>
Teresa Bragg	Sawtooth Mountain Clinic	Corporate Compliance	<a href="mailto:tbragg@sawtoothmountainclinic.org">tbragg@sawtoothmountainclinic.org</a>
Joyce Klees	Sawtooth Mountain Clinic	RN	<a href="mailto:joyce@sawtoothmountainclinic.org">joyce@sawtoothmountainclinic.org</a>
Peter James	Great Expectations School	Director	<a href="mailto:peter.james@greatexpectationsschool.com">peter.james@greatexpectationsschool.com</a>
Clinton Little	MN DNR Coastal Program	Coastal Program Specialist	<a href="mailto:clinton.little@state.mn.us">clinton.little@state.mn.us</a>
Todd Armbruster	Cook County Firewise	Firewise Coordinator	<a href="mailto:firewise@co.cook.mn.us">firewise@co.cook.mn.us</a>
Tom Beery	MN Sea Grant	Resiliency Specialist	<a href="mailto:tbeery@d.umn.edu">tbeery@d.umn.edu</a>
Todd Smith	Cook County Assessor's Office	Cook County Assessor	<a href="mailto:todd.smith@co.cook.mn.us">todd.smith@co.cook.mn.us</a>
Valerie Marasco	Cook County Emergency Management & Public Information	Director	<a href="mailto:valerie.marasco@co.cook.mn.us">valerie.marasco@co.cook.mn.us</a>

Take one  
set ↑

**Cook County – Multi Hazard Mitigation Plan Update  
Planning Team Meeting – Thursday, July 26, 2018 – 2:00 p.m. to 4:00 p.m.**

**PARTICIPANT SIGN IN SHEET**

Name	Agency/Organization	Title	Email
1. MITCH EVERSON	Cook County Envir. Health	Environmental Health Officer	Mitch.Everson@co.cook.il.us
2. Joni Kristensen	Cook Co. P.H.S.	PH Coordinator	
3. JAMES COLEMAN	Lutsen Fire Dept	Chief	lutsenfire@gmail.com
4. Patrick Johnson	USFS	Assistant Fire Mgmt Officer	pcjohnson@fs.fed.us
5. DAVE GREGGENDER	USFS	AFMO	DAVEGREGGENDER@fs.fed.us
6. Jason White	North Shore Health EMS	Paramedic	jason.white@northshorehealth.org
7. Teresa Bragg	SMC	Corporate Compliance	teresa.bragg@santitaschools.org
8. Joyce Klees	SMC	RN	joyce.klees@smc.edu
9. Peter James	GES	Director	peter.james@greatexpectations-schools.org
10. Clinton Little	MNDNR - Central Region	Coastal Program Specialist	clinton.little@state.il.us
11. Todd Ambuster	Cook County Firewise	Firewise Coordinator	firewise@co.cook.il.us
12. Tom Beem	MN Sed Grant	Resilience Specialist	tbeem@du.edu
13. TODD SMITH	COOK CO. ASSESSOR	CA Assessor	TODD.SMITH@CO.COOK.IL.US
14. Valerie Marasco	COOK CO. Emergency Manage	Director EMI	valerie.marasco@co.cook.il.us
15.			
16.			
17.			
18.			
19.			
20.			



7/25/2018

## Cook County Multi-Hazard Mitigation Plan Update



July 26, 2018  
Planning Team Meeting #1

## Agenda

1. Welcome and Introductions
2. MHMP Plan Overview
  - About the Plan
  - Planning Team
  - Plan Content & Prioritization of Natural Hazards
3. Review of Mitigation Strategies and Developing Mitigation Actions
4. Hazard Mitigation Assistance (HMA) Grants
5. Mitigation Action Working Session



Cook County Multi-Hazard  
Mitigation Planning Team  
Meeting #1

## About your UMD Project Team



- The **Geospatial Analysis Center (GAC) at the University of Minnesota Duluth** was contracted by Minnesota HSEM to facilitate the development of this plan and to conduct spatial analysis, mapping and research for the plan.
- The GAC has worked on 30 MHMP's (2011-2018), working with both Minnesota counties and tribes.
- Working with the GAC is **Bonnie Hundrieser**, who specializes in Emergency Management planning.

## About the Plan

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). **The development of a local government plan is required in order to maintain eligibility for certain federal hazard mitigation grant funding programs.**

### **MHMP's must:**

- Be updated every 5 years
- Identify hazards and conduct a risk assessment
- Include goals, strategies, and mitigation actions
- Address all jurisdictions
- Engage stakeholder and include public participation

## What is Hazard Mitigation?

- HM is **sustained action** to reduce or eliminate long-term risk to people and their property from hazards.
- HM Planning is the process local government use to **identify risks and vulnerabilities** associated with natural disasters, and develop long-term strategies for protecting people and property from future hazard events.
- HM planning allows communities to strategically plan for and **work together** to implement activities that are cost effective, technically feasible and environmentally sound ... **BEFORE** a disaster strikes.
- A dollar spent on mitigation grants leads to an average of \$6 in avoided post-disaster relief costs and increased federal tax revenues.

## The MHMP Planning Team

An MHMP **must** be developed with the participation of jurisdictional representatives and other key stakeholders. This group is referred to as the "Planning Team".

### **The role of the Planning Team is to help:**

1. Rank hazards, prioritize mitigation strategies and identify specific projects for implementation.
2. Assist with public outreach and participate in public meetings.
3. Review the draft plan and provide feedback.
4. Facilitate final adoption of the MHMP by local government.

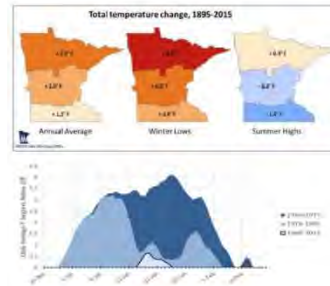


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### Hazard Vulnerability Example: Climate Projections

Hazard	Projections through century	Confidence in projected changes
Extreme cold	Continued loss of cold extremes and dramatic warming of coldest conditions	Highest
Extreme rainfall	Continued increase in frequency and magnitude; unprecedented flash-floods	
Heat waves	More hot days with increases in severity, coverage, and duration of heat waves	High
Drought	More days between precipitation events, leading to increased drought severity, coverage, and duration	Moderately High
Heavy snowfall	Large events less frequent as winter warms, but occasional very large snowfalls	Moderately low
Severe thunderstorms & tornadoes	More "super events" possible, even if frequency decreases	

### Hazard Vulnerability Example: Warming Climate Projections



Winter warming 13x faster than summer

Number of days where daily average is below 10°F is drastically declining

### What Hazards are Addressed?

A Multi-Hazard Mitigation Plan looks primarily at natural disasters, including:

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

*Hazard Categories from the Minnesota State Plan*

Manmade hazards are not required by the DMA 2000 to be addressed in the MHMP.

### How are Hazards Identified & Ranked for a Community?

- Previous Hazard Events
- Historical Data (National Climatic Data Center)
- Calculated Priority Risk Index (CPRI)

#### CPRI Risk Factors

PROBABILITY  
MAGNITUDE/SEVERITY  
WARNING TIME  
DURATION

CPRI Assessment for Hazard Risk Ranking

### Prioritization of Risks Faced by Cook County

Following are the natural hazards proposed for inclusion in the Cook County Multi-Hazard Mitigation Plan.

A discussion on the prioritization of these hazards by their risk severity will provide the County direction in the development of mitigation actions for the next 5 years.

Prioritization of Hazards for Cook County		
Type		Risk Severity
Wildfire		High
Severe Summer Storms (Thunderstorms, Lightning, Hailstorms, Windstorms, Tornadoes)		High
Severe Winter Storms (Blizzards, Heavy Snow, Ice Storms)		High
Flash Flood, Riverine Flood, & Coastal Flood		Moderate
Extreme Temperatures (Heat & Cold)		Moderate
Drought		Moderate
Erosion / Coastal Erosion and Land Subsidence		Low
Dam Failure		Low

### Wildfire

- **Probability:** High
- **Possible Impacts:**
  - Danger to Life Safety (homes in wooded areas)
  - Loss of Forests and Natural Resources
  - Damage to Property
  - Cascading Effects such as air quality pollution, need for extended evacuation.



**Proposed Risk Ranking: HIGH**



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## Severe Summer Storms

- **Probability:** High
- **Possible Impacts:**
  - Danger to Life Safety
  - Damage to Natural Resources
  - Damage to Property
  - Cascading Effects such as flooding to roads, area lakes & streams, downed power lines & extended power outages to homes and critical facilities.



Proposed Risk Ranking: HIGH

## Severe Winter Storms

- **Probability:** High
- **Possible Impacts:**
  - Danger to Life Safety (road passage, homes)
  - Interruption to Transportation and Community Services
  - Damage to Property
  - Cascading Effects such as downed power lines & extended power outages to homes and critical facilities.



Proposed Risk Ranking: HIGH

## Flooding

Flash Flood, Riverine Flood, and Coastal Flooding

- **Probability:** Moderate to High
- **Possible Impacts:**
  - Danger to Life Safety (road passage, flooding of homes)
  - Interruption to Transportation and Community Services
  - Flooding of Wild Rice Lakes and lost harvest
  - Damage to Property
  - Cascading Effects such as pump station failure



Proposed Risk Ranking: MODERATE

## Extreme Temperatures (Heat/Cold)

- **Probability:** Moderate
- **Possible Impacts:**
  - Possible Danger to Life Safety
  - Health Vulnerability of Adults or Children to Heat Stroke or Hypothermia
  - Cascading Effects such as need to provide temporary sheltering.



Proposed Risk Ranking: MODERATE

## Drought

- **Probability:** Low to Moderate
- **Possible Impacts:**
  - Impacts to local water resources and lakes
  - Impact to Wild Rice Lakes to Produce Sustainable Harvest
  - Cascading Effects such as increased danger for wildfire.



Proposed Risk Ranking: Moderate

## Erosion, Coastal Erosion, Land Subsidence

- **Probability:** Low to Moderate
- **Possible Impacts:**
  - Erosion of coastal shore areas, streambanks, riverbanks, lake edges
  - Sediment load to lakes
  - Damage to Property
  - Cascading Effects such as increase in landslides on steep hills during high rain events.



Proposed Risk Ranking: LOW

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## Dam Failure

- **Probability:** Low
- **Possible Impacts:**
  - Danger to Life Safety (downstream) or flooding of roads.



Proposed Risk Ranking: **LOW**

### Mitigation Strategy #1: Local Planning and Regulations

Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses.

*Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.*

## Review of Mitigation Capabilities

Multi-Hazard Mitigation Plans require that each jurisdiction **must** document the existing authorities, policies, programs, and resources in place for mitigation.

- What **plans and programs** are in place to support mitigation against that hazard?
- What **program gaps or deficiencies** exist to support mitigation against that hazard?

## Local Planning & Regulations Examples



### Mitigation Strategy #2: Structure and Infrastructure Projects

Actions that involve the construction of structures to reduce the impact of a hazard, such as dams, levees, floodwalls, seawalls, retaining walls, and safe rooms; and actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.

*Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass. Climate Resilient Mitigation Actions include flood diversion and storage and green infrastructure. This mitigation strategy includes road/bridge/culvert projects for local flood mitigation.*

## Acquisition of Flood Prone Properties and Conversion to Open Space



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Community Safe Rooms  
Wadena-Deer Creek School, June 17 2010



August, 2012 – 1<sup>st</sup> school based  
tornado safe room (Wadena)



Green Infrastructure Projects



Power Line retrofit/burial



### **Mitigation Strategy #3:** **Natural Systems Protection**

**Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems.**

*These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, wetland restoration and preservation, aquifer storage and recovery and floodplain and stream restoration.*

Natural Systems Protection  
examples





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#### **Mitigation Strategy #4:** **Education and Awareness Programs**

**Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.**

*Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.*

#### Education & Awareness Program Examples



#### **Mitigation Strategy #5:** **Mitigation Preparedness & Response Support**

*(HSEM added strategy for use in the state)*

**Actions that protect people and property prior to, during and immediately after a disaster or hazard event. Services include warning systems and emergency response services.**

*These activities are not typically considered mitigation, but support reduction of the effects of damaging events.*

#### Mitigation Preparedness & Response Support examples



#### Mitigation Actions Update

*So far, the following has been completed in the review of mitigation actions in the last MHMP:*

1. What mitigation actions **have been completed** since the last plan was adopted.
2. What mitigation actions **should be deleted**.
3. What mitigation actions **have not been completed or may be an on-going action** to roll-over into the new plan.

#### Next Steps in Developing Actions

1. Identify specific mitigation strategies and actions at the jurisdictional level based on the community's risk and vulnerabilities.
2. Consider priority, timeframe, who's responsible, and what is in place to support implementation.
3. Consider potential funding and cost/benefit.
4. Engage key partners and stakeholders in providing local expertise and feedback.
5. Provide opportunities for public involvement and feedback in the planning process.

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## FEMA's Hazard Mitigation Assistance (HMA) Grant Program

The Federal Emergency Management Agency (FEMA) provides grant funding to help communities to implement eligible mitigation projects that will help to reduce or eliminate the impact of future hazard or disaster events.

*Not all mitigation actions are eligible for federal HMA funding. Identification of eligible projects for potential HMA funding is a critical part of the MHMP planning process!*



## Mitigation Grant Eligibility

- Local Units of Government
- All jurisdictions in State
  - City, County, Tribal, private non-profit
- Cost Share - 75%/25%
- **Project must be identified in local HM plan**

## Application Process

- Notice of Available Funds
- Application
- Benefit Cost Analysis
- Environmental Historic Preservation
- State and FEMA review
- Award ~ 3 year period of performance
- Closeout

## Eligible project types

- **Acquisition/Elevation/Relocation**
  - Substantially or repetitively damaged (flood or erosion)
  - Threat of imminent danger (slope failure)
- **Tornado Safe Rooms** (severe storms/tornadoes)
- **Power line retrofit/strengthening** (severe storms/ice)
- **Wildfire sprinklers/defensible space/resistant materials**
- **Slope stabilization**
- **Flood risk reduction activities**

## New! Climate Resilient Mitigation Actions (CRMA)

FEMA encourages communities to incorporate **climate resilience** in all mitigation actions through use of **green infrastructure methods** and designing projects to increase **ecosystem service benefits**

1. Aquifer Storage and Recovery (ASR)
2. Floodwater Diversion, Storage, and Recovery
3. Floodplain and Stream Restoration

## Historical projects in Cook County resulting from Hazard Mitigation funding

Year	Project Description	Sub-Grantee	Federal Share
1997	Convert overhead electric power lines to underground (HMGP)	Arrowhead Electric Cooperative	\$306,915
2008	Wildfire Retrofit Project (PDM)	Cook County	\$1,913,480
2009	Arrowhead Fire Mitigation Project (PDM)	ARDC	\$448,375
2011	Wildfire Mitigation (PDM)	Cook County	\$494,864
Total HMGP/PDM Funding - Cook County			\$3,163,634

# Mitigation Strategies

For every community, there are a range of mitigation actions that can be taken to work to reduce or eliminate the impacts of future natural hazard and disaster events. Following are the four types of mitigation strategies recommended by the Federal Emergency Management Agency (FEMA) for the organization of mitigation actions:

- 1) **Local Planning and Regulations:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- 2) **Structure and Infrastructure Projects:** Actions that involve the construction of structures to reduce the impact of a hazard, such as dams, levees, floodwalls, seawalls, retaining walls, and safe rooms; and actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass. CRMA include flood diversion and storage (FDS) and green infrastructure.
- 3) **Natural Systems Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation. Aquifer storage and recovery (ASR) and floodplain and stream restoration (FSR).
- 4) **Education and Awareness Programs:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

*A fifth strategy was added by Minnesota HSEM for use in the state:*

- 5) **Mitigation Preparedness and Response Support:** Actions that protect people and property prior to, during and immediately after a disaster or hazard event. Services include warning systems and emergency response services.. These activities are typically not considered mitigation, but support reduction of the effects of damaging events.





State of Minnesota  
 Department of Public Safety  
 Division of Homeland Security and Emergency Management  
 445 Minnesota Street, Suite 223  
 St. Paul, MN 55101-6223

## HAZARD MITIGATION ASSISTANCE

Hazard Mitigation Assistance (HMA) grant programs provide funding with the aim to reduce or eliminate risk to property and loss of life from future natural disasters. HMA programs are typically a 75%/25% cost share program. The federal share is 75% of total eligible project reimbursement costs. The local applicant is responsible for 25% of the project costs. The amount of HMGP funds availability is based on a percent of Public Assistance provided by Federal Emergency Management Agency (FEMA).

- Hazard Mitigation Grant Program (HMGP) funds assists in implementing long-term hazard mitigation measures following a Presidential major disaster declaration
- Pre-Disaster Mitigation (PDM) provides funds for hazard mitigation planning and projects on an annual basis
- Flood Mitigation Assistance (FMA) provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis

### Who is eligible for grant funding?

All applicants must have or be covered under an approved Hazard Mitigation Plan. Eligible applicants include: State and local governments; certain private non-profit organizations or institutions; and Tribal Communities

### What types of projects can be funded?

All projects must be eligible, technically feasible, and cost-effective. All projects are subject to environmental and cultural resource review. Examples of projects include:

- ***NEW! Climate Resilient Mitigation Activities*** are eligible under the Hazard Mitigation Assistance programs to support communities in reducing the risks associated with climate change. These activities are: ***Aquifer Storage and Recovery, Floodplain and Stream Restoration, Flood Diversion and Storage, and Green Infrastructure Methods.*** These activities can mitigate any natural hazard; however, the activities are focused on mitigating the impacts of flood and drought conditions.
- **Property Acquisition and Structure Demolition or Relocation** – The voluntary acquisition of an existing at-risk structure and the underlying land, and conversion of the land to open space through the demolition or relocation of the structure. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions.
- **Safe Room Construction** - Safe room construction projects are designed to provide immediate life-safety protection for people in public and private structures from tornado and severe wind events. Includes retrofits of existing facilities or new safe room construction projects, and applies to both single and dual-use facilities
- **Minor Localized Flood Reduction Projects** - Projects to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, and stormwater management activities, such as creating retention and detention basins. These projects must not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.

- **Infrastructure Retrofit** - Measures to reduce risk to existing utility systems, roads, and bridges.
- **Soil Stabilization** - Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geotextiles, stabilizing sod, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring. These projects must not duplicate the activities of other Federal agencies.
- **Wildfire Mitigation** - Projects to mitigate at-risk structures and associated loss of life from the threat of future wildfire through: Defensible Space for Wildfire, Application of Ignition-resistant Construction and Hazardous Fuels Reduction
- **Post-Disaster Code Enforcement** – Projects designed to support the post-disaster rebuilding effort by ensuring that sufficient expertise is on hand to ensure appropriate codes and standards, including NFIP local ordinance requirements, are used and enforced.
- **Generators** – Emergency equipment to provide a secondary source of power. Generators and related equipment (e.g., hook-ups) are eligible provided that they are cost-effective, contribute to a long-term solution to the problem they are intended to address, and meet other program eligibility criteria.
- **5 Percent Initiative Projects** – These projects, which are only available pursuant to an HMGP disaster, provide an opportunity to fund mitigation actions that are consistent with the goals and objectives of the State or Indian Tribal (Standard or Enhanced) and local mitigation plans and meet all HMGP program requirements, but for which it may be difficult to conduct a standard Benefit-Cost Analysis (BCA) to prove cost-effectiveness.
- **All-Hazard Mitigation Plans**  
Update or enhance sections of the current FEMA-approved mitigation plan, such as:
  - Risk and vulnerability assessment based on new information, including supporting studies, such as economic analyses;
  - Mitigation strategy, specifically strengthening the linkage to mitigation action implementation, with emphasis on available HMA project grant funding; or
  - Incorporate climate adaptation, green building, or smart growth principles into the risk assessment and/or mitigation strategy.

#### **How do I apply?**

Start by submitting a Notice of Interest, available on HSEMs website at:

<https://dps.mn.gov/divisions/hsem>

#### **Where can I obtain further information?**

For additional information about the HMA grant program, you can refer to the FEMA website:

<http://www.fema.gov/hazard-mitigation-assistance>

#### **For additional information contact:**

- Jennifer Nelson, State Hazard Mitigation Officer at (651) 201-7427 or [Jennifer.E.Nelson@state.mn.us](mailto:Jennifer.E.Nelson@state.mn.us)
- Jim McClosky, Hazard Mitigation Planner at (651) 201-7455 or [James.McClosky@state.mn.us](mailto:James.McClosky@state.mn.us)

## **MITIGATION ACTIONS WORKSHEET**

HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**

HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**

HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**



HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**

HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**

HAZARD: \_\_\_\_\_ / JURISDICTION: \_\_\_\_\_

**Mitigation Strategy:**

- |  |   |
|--|---|
| <input type="checkbox"/> Local Planning & Regulations          | <input type="checkbox"/> Education and Awareness                      |
| <input type="checkbox"/> Structure and Infrastructure Projects | <input type="checkbox"/> Mitigation Preparedness and Response Support |
| <input type="checkbox"/> Natural Systems Protection            |   |

**Mitigation Action:**

Cook County  
July 26, 2018 MHMP Planning Meeting #1  
**Mitigation Ideas Worksheet Notes**

Following are notes from the Cook County 7-26-18 MHMP Planning Team Meeting #1 “Mitigation Action Working Session” part of the meeting. Participants worked individually or in groups and used Mitigation Action Worksheets to brainstorm new mitigation ideas for the County or their jurisdiction. Participants used the worksheets to develop mitigation action ideas, identifying:

- Hazard – what natural hazard does the action focus on?
- Jurisdiction – what jurisdiction is for? (City/Township/County)
- Strategy – which mitigation strategy does this action relate to?
- Action – What is a description of the mitigation action?

The mitigation actions identified during this session will be used to support development of new mitigation actions to include in the Cook County MHMP 2018 Update.

**Cook County Emergency Management**

*Contact: Valerie Marasco, Director of Emergency Management & Public Information*

Hazard: Straight-line Winds (Warning Sirens)  
Strategy: Mitigation Preparedness & Response Support  
Action: Install warning sirens in the City of Grand Marais and townships to help warn residents to take shelter in the event of straight line winds.

Hazard: Ice Storm  
Strategy: Structure & Infrastructure Projects  
Action: Work with power company to identify where it is feasible to bury powerlines underground to mitigate against power line failure.

Hazard: Severe Thunderstorms/Wind Storms (Safe Rooms)  
Strategy: Structure & Infrastructure Projects  
Action: Construct safe rooms in areas where there are residents or visitors vulnerable to severe storms (i.e., Grand Marais Municipal Campground & RV Park, Gunflint Trail area, Caribou Trail/Lamb's/Lutsen recreation & resort areas.

**Cook County Highway Department**

*Contact: Krysten Foster, Highway Engineer*

Hazard: Flooding (Otis Creek Flooding)  
Strategy: Structure & Infrastructure Projects  
Action: Upsize culvert under Arrowhead Trail (CSAH 16) at Otis Creek to reduce localized flooding. Also explore upsize of other culverts within the watershed in partnership with state and private property owners.

Hazard: Flooding (Wisconsin Street - Sea Wall)  
 Strategy: Structure & Infrastructure Projects  
 Action: Reconstruct and upgrade sea wall at end of Wisconsin Street to reduce road washouts. Requires coordination with federal agencies.

Hazard: Flooding (City of Grand Marais Flooding)  
 Strategy: Structure & Infrastructure Projects / Natural Systems Protection  
 Action: Implement plans to reduce flooding of city parking lot near the Coop. Work with the City of Grand Marais and the SWCD.

**Cook County Firewise**

Contact: Todd Armbruster, Firewise Coordinator

Hazard: Wildfire  
 Strategy: Natural Systems Protection  
 Action: Cost share for creating or improving defensible space around structures and ingress/egress routes. Many property owners are older cannot do the work themselves. Many structures are not accessible for EMS vehicles due to vegetation encroaching.

**Cook County Public Health**

Contact: Joni Kristenson, Public Health Coordinator

Hazard: Severe Weather/Wind (City of Grand Marais/Gunflint Trail)  
 Strategy: Structure & Infrastructure Projects  
 Action: Construct community safe room for Grand Marais municipal campground and areas along the Gunflint Trail.

Hazard: Severe Storms and Extended Power Outage  
 Strategy: Structure & Infrastructure Projects  
 Action: Generator back-up power should be obtained for the Cook County EOC, Birch Grove-Tofte School ISD# 166, Cook County Community Center, Sr. Center, and the Birch Grove Community Center.

Hazard: All-Hazards  
 Strategy: Education & Awareness Programs  
 Action: Educate residents on the need to sign up for CodeRed, and how to be ready with a personal go-kit in the event of an evacuation (i.e., due to wildfire).

**Sawtooth Mt. Clinic**

Contact: Joyce Klees and Teresa Brass

Hazard: Severe Storms (Loss of Communication Systems)  
 Strategy: Education & Awareness Programs  
 Action: Educate residents and visitors on the use of NOAA weather radios.

Hazard: Health Epidemic  
 Strategy: Local Planning & Regulations / Education & Awareness Programs

Action: Establish Points of Distribution (POD) Plan. Train staff on the plan and educate the public on it (outreach opportunity).

Hazard: All-Hazards (Mass Fatality Event)

Strategy: Local Planning & Regulations

Action: Be prepared to manage a mass fatality event (plans and resources).

#### **North Shore Health EMS**

Contact: Jason White, Paramedic

Hazard: Hazardous Materials Exposure

Strategy: Mitigation Preparedness & Response Support

Action: Have a new/improved decon structure for Fire/EMS and provide funding to train on it.

Hazard: Mass Casualty Incident (MCI)

Strategy: Mitigation Preparedness & Response Support

Action: Funding training between departments for MCI.

#### **U.S Forest Service**

Contact: Patrick Johnson, Assistant Fire Management Officer

Hazard: Wildfire

Strategy: Structure & Infrastructure Projects / Natural Systems Protection

Action: Implement Countywide defensible space projects on a larger scale.

Hazard: Wildfire

Strategy: Mitigation Preparedness & Response Support

Action: Exercise large-scale simulated wildfire response.

#### **Lutsen Township**

Contact: James Coleman, Lutsen Fire Department

Hazard: High Water from High Rain Events (Public Safety)

Strategy: Mitigation Preparedness & Response Support / Education & Awareness Programs

Action: Find ways to prevent/reduce victims being swept away in local rivers during high rain events.

Hazard: Severe Storms

Strategy: Mitigation Preparedness & Response Support

Action: Secure generators for power outages (critical facilities, public safety)

#### **Great Expectations School**

Contact: Peter James, Director

Hazard: Severe Weather/Storms

Strategy: Structure & Infrastructure Projects

Action: Safe room construction in schools where sheltering in place is a likely scenario for students and staff. This could include generators for these sites.

**Arrowhead Regional Emergency Management Association (AREMA)**  
**Facebook Posting of Cook County 7-26-18 MHMP Planning Meeting #1**



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Emergency  
Management  
@AREMARegion2

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**Arrowhead Region Emergency Management**  
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Led by Cook County Emergency Management, key stakeholders, including County Assessor and Engineer, Environmental Health Officer, the US Forest Service, DNR, Coastal Programs, wildfire managers, local emergency response departments, public health and more, came together Thursday in Cook County Minnesota to begin updating the County's All Hazard Mitigation Plan. The County is working with the UMD Geospatial Analysis Center on the new plan. Cook County, Minnesota Cook County Sheriff's Office & Public Safety




2 Shares



## **Cook County**

### **Multi-Hazard Mitigation Plan Update**

October 16, 2018 MHMP Planning Team Meeting #2

Cook County Courthouse – Grand Marais, MN

2:00 p.m. – 4:00 p.m.

#### **Meeting Summary:**

On Tuesday, October 16, 2018 members of the Cook County Multi-Hazard Mitigation (MHMP) Planning Team convened to conduct a review and discussion of the draft mitigation action charts developed for the Cook County MHMP. The meeting was facilitated by Bonnie Hundrieser, a member of the University of Minnesota – Duluth Geospatial Analysis Center (GAC) planning team that is leading the update of the Cook County/Grand Portage MHMP. A total of 25 people attended the meeting, representing Cook County government, department personnel, and other agency & organizational stakeholders.

The opening Power Point presentation covered a re-cap of key points regarding the MHMP plan (*purpose of the plan, who the plan covers, who needs to participate, what hazards are addressed and how they are ranked, mitigation strategies to be used, and what projects may be eligible for FEMA HMA funding*). The presentation also provided a discussion of climate change adaptation and resilience in relationship to hazard mitigation. A detailed breakdown of the Mitigation Action Chart was provided to explain the relevance of each column to be addressed in the chart.

Following the presentation, the planning team participated in a facilitated discussion of the County's new draft 5-year Mitigation Action Chart. New mitigation actions included in the chart were identified through the review of current and new mitigation actions during the first planning team meeting and capabilities assessment process. The planning team discussed each of the mitigation actions, adding comments, corrections, and notes on where potential funding sources or project partners would be applicable.

Following the Mitigation Action Chart review, the group discussed the upcoming process of public outreach, the option of holding a public meeting, and posting the final draft of the plan for the public to review and comment on, followed by submission of the draft plan to HSEM and FEMA for final review and approval.

#### **Attached to this meeting summary are the following documentation items:**

- Cook County HMP Mtg. #2 Email Invite
- 10-16-18 Meeting Agenda
- 10-16-18 Meeting Sign-in Sheets
- 10-16-18 Power Point Presentation Slides

*Meeting Summary Prepared By:*

*Bonnie Hundrieser, UMD Project Team, (Hundrieser Consulting LLC)*

**From:** Valerie Marasco  
**To:** "Mark.abrahamson@northshorehealthgm.org"; "javy.a.decoux@gmail.com"; "Jennifer.Backstrom@northshorehealthgm.org"; "ebogardus@fs.fed.us"; Diane Booth; "tbragg@sawtoothmountainclinic.org"; Grace Bushard; Jeff Cadwell; "marilyn.cluka@state.mn.us"; "michaelcroteau@fs.fed.us"; "lcrotteau@fs.fed.us"; "Steve.Duchien@northshorehealthgm.org"; Pat Eliassen; Mitch Everson; "Carlos.garcia-velez@redcross.org"; "Jason.p.hanson@state.mn.us"; Molly Hicken; "Amy.james@northshorehealthgm.org"; "pijohnson@fs.fed.us"; "Craig.kalar@cbp.dhs.gov"; "mikeK@grandportage.com"; "joyce@sawtoothmountainclinic.org"; Joni Kristenson; "amy.lacina@northshorehealthgm.org"; "Christopher.lange@northshorehealthgm.org"; "rlnehan@grandportage.com"; "emarsball@cookcountymca.org"; "Robert.mcgregor@northshorehealthgm.org"; Alison McIntyre; "smcmanus@arrowhead.coop"; "aaron.mielke@state.mn.us"; Lindsay Mielke; Dusty Nelms; Tim Nelson; "sue@sawtoothmountainclinic.org"; "cneterson@fs.fed.us"; "rita@sawtoothmountainclinic.org"; Rena Rogers; "cityhall@boreal.org"; Will Sandstrom; "raul@grandportage.com"; "Vera.schumann@northshorehealthgm.org"; "kim.hertzog@courts.state.mn.us"; Brian Silence; "twiest@arrowhead.coop"; "Matthew.Webb@hdchr.org"; "lwenzel@fs.fed.us"; "jason.white@northshorehealthgm.org"; "Kimber.Wraalstad@northshorehealthgm.org"; "jeremiah@grandportage.com"; Myron Bursheim; Ginny Storlie; "lisab@boreal.org"; "content@boreal.org"; "ericklock3@gmail.com"; "newsheald@grandmarais-mn.com"; "engineer@wtip.org"; "wtip@radio.org"; "volunteer@wtip.org"; "rhonda@wtip.org"; "bcf@boreal.org"; "peterjohnames@yahoo.com"; "rjames@boreal.org"; "amyjames40@yahoo.com"; "bcrandall@isd166.org"; "bdewitt@isd166.org"; "ndorn@isd166.org"; "tnelson@isd166.org"; "abeeren@isd166.org"; "director@oshkiqimaag.org"; CommissionersBoardRoom; Schumann,Vera; Teresa Bragg; KALAR, CRAIG; John Twiest; Wraalstad, Kimber L; emarsball@cookcountymca.org; Abrahamson, Mark T; Mike Keyport; Allison Plummer; Lori Ericson; Martina Williams; Sara Hadley; jay.a.decoux@gmail.com; bcrandall@isd166.org; jim/cherlyn morrison; Bob Vogel (rvogel jr\_@hotmail.com); andersonlogging@live.com; terry spieker; labodagrading@boreal.org; "bennys@boreal.org"; ahlock57@gmail.com; rinelson@boreal.org; schroederfire98@gmail.com; James Coleman (lutsenfire@gmail.com); LutsenFMS@gmail.com; michael; Paul Goettl; Matthew Curran - US Border Patrol; LAW, BRANDON S; wwtf@boreal.org; steckelberg.council@gmail.com; kelly\_sweatingen@msn.com; lutsentownship@gmail.com; raempjenho@startmail.com; christineordemann@gmail.com; grothif@gmail.com; lutsentownship@gmail.com; schroedertownship@gmail.com; toftemn@boreal.org; Bev Wolke; McCartney, Wendy - FS; Jackson, Jeffery (DNR); toddambrust@gmail.com; Brady Powers; fblock@boreal.org; Timothy P. Miller; Ben Petz; dave@solbakkenonsuperior.com; don kufahl; Erik Carlson; Heidi Doo-Kirk; mcgowan; shinski.1@osu.edu; Jim & Cheryl Morrison; Johnson, Patricia J -FS; Joseph Routh; kmsullivan8@gmail.com; Pat Eliassen; Johnson, Patrick C -FS; Paul Nelson; Aaron Mielke (E-mail); Barbara Bottger; Moy, Marshall - FS; MAT team; smcmanus@arrowhead.coop  
**Cc:** Bonnie Hundrieser; slstark@d.umn.edu  
**Subject:** Your Input is Needed - Please Attend the 2nd Planning Team Meeting for the Cook County Multi-Hazard Mitigation Plan Update  
**Date:** Monday, September 24, 2018 4:36:38 PM

Greetings,

Your presence is requested at the **2nd Planning Team meeting** for the update of the **Cook County Multi-Hazard Mitigation Plan** on:

**Date:** Tuesday, Oct 16, 2018  
**Time:** 2 – 4 pm  
**Location:** Cook County Courthouse (Commissioners Room) 411 W 2nd St, Grand Marais, MN 55604

During this meeting we will be reviewing the draft Cook County **Five-year Mitigation Action Chart** to be included in the plan. Your feedback will be needed to identify & discuss the mitigation actions that will be listed for your city/county department/agency/or organization. This is a State and Federal requirement we must cover for the plan to be approved. The meeting will be facilitated by Bonnie Hundrieser, a member of the UMD Team who is working closely with us on this project.

**Please RSVP your attendance to me. If you cannot attend, please seek to send someone else in your stead as your representation.** It is really important that we have input from key County government officials and Departments, City of Grand Marais (Mayor and Council representation/City Administrator and Public Works), Township Representatives, and key partners such as the USFS, MN

DNR, local schools, public utilities, and MnDOT.

If you have any questions, please do not hesitate to contact me. Many thanks in advance for your time and attention to local hazard mitigation planning.

Thank you,

**Valerie Marasco**

Director – Office of Emergency Management & Public Information  
Cook County, Minnesota  
Law Enforcement Center  
143 Gunflint Trail  
Grand Marais, MN 55604

Office: 218-387-3059

Cell: 218-387-5366

Fax: 218-387-3032

[Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us)

[www.co.cook.mn.us](http://www.co.cook.mn.us)





## **Cook County** **Multi-Hazard Mitigation Plan (MHMP) Update**

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### **Planning Team Meeting #2**

Tuesday, October 16, 2018, 2:00 p.m. – 4:00 p.m.

Cook County Courthouse (Commissioners Room) – Grand Marais, MN

**Presenting:**

Bonnie Hundrieser, UMD MHMP Project Team Member

**Agenda:**

1. **Welcome & Introductions**
2. **MHMP Presentation**  
Recap of Key Points (Plan purpose, process and content)  
Overview of MDH Region 2 Climate Profile / Climate Resilient strategies  
Mitigation Action Chart Overview - Explanation of all columns of the MAC
3. **MAC Working Session: Group Review & Feedback**  
Group review and feedback of Cook County MAC (corrections, revisions, new items)
4. **Discussion of Next Steps**
  - Finalize Mitigation Action Chart
  - Public Outreach & Engagement (News Release, Online plan review & comment period)

**Contact:**

*For more information on the Cook County MHMP, please contact:*

- Valerie Marasco, Cook County Director of Emergency Management & Public Information  
218-387-3059 / [Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us)
- Bonnie Hundrieser, UMD Project Team Member  
218-343-3468 / [hundrieserconsulting@gmail.com](mailto:hundrieserconsulting@gmail.com)



Cook County 10/16/18 Planning Team Meeting #2  
Participant Sign-in List (25 attendees)

Cook County MHMP Update Tuesday, October 16, 2018 Planning Team Meeting #2 - 2:00 p.m. to 4:00 p.m. Participant Sign-in List			
Name	Agency/Organization	Title	Email
Heidi Doo-Kirk	Cook County	Commissioner	<a href="mailto:Heidi.doo-kirk@co.cook.mn.us">Heidi.doo-kirk@co.cook.mn.us</a>
Jeff Hall	MnDOT	HSEM Coordinator	<a href="mailto:jeffrey.hall@state.mn.us">jeffrey.hall@state.mn.us</a>
Cameron Gjovik	MnDOT	Operations Support	<a href="mailto:cameron.gjovik@state.mn.us">cameron.gjovik@state.mn.us</a>
Brandon Law	U.S. Border Patrol	Supervisory BFA	<a href="mailto:brandon.s.law@cbp.dhs.gov">brandon.s.law@cbp.dhs.gov</a>
Clinton Little	MN DNR	Coastal Program Specialist	<a href="mailto:clinton.little@state.mn.us">clinton.little@state.mn.us</a>
John Swanson	U.S. Customs	Supervisory CBPD	<a href="mailto:john.e.swanson@cbp.dhs.gov">john.e.swanson@cbp.dhs.gov</a>
Mitch Dorr	Cook County Schools, ISD #166	Assistant Principal	<a href="mailto:mdorr@isd166.org">mdorr@isd166.org</a>
Judy Hill	Cook County	HR Generalist	<a href="mailto:judy.hill@co.cook.mn.us">judy.hill@co.cook.mn.us</a>
Kyle Oberg	Cook County	GIS Analyst	<a href="mailto:kyle.oberg@co.cook.mn.us">kyle.oberg@co.cook.mn.us</a>
Mike Crook	U.S. Forest Service	AFMO	<a href="mailto:mcrook@fs.fed.us">mcrook@fs.fed.us</a>
Robert Thompson	Cook County	Assessor	<a href="mailto:Bob.Thompson@co.cook.mn.us">Bob.Thompson@co.cook.mn.us</a>
Thomas Nelson	City of Grand Marais/PUC	Water/Wastewater Superintendent	<a href="mailto:wwtf@boreal.org">wwtf@boreal.org</a>
Joni Kristenson	Cook County Public Health	PH Coordinator	<a href="mailto:joni.kristenson@co.cook.mn.us">joni.kristenson@co.cook.mn.us</a>
Mike Roth	Grand Marais	City Administrator	<a href="mailto:cityhall@boreal.org">cityhall@boreal.org</a>
James Coleman	Lutsen Fire	Fire Chief	<a href="mailto:lutsenfire@gmail.com">lutsenfire@gmail.com</a>
Ilena Hansel	Cook County SWCD	District Manager	<a href="mailto:ilena.hansel@co.cook.mn.us">ilena.hansel@co.cook.mn.us</a>
Tim Nelson	Cook County Land Services	Land Services Director	<a href="mailto:tim.nelson@co.cook.mn.us">tim.nelson@co.cook.mn.us</a>
Molly Hicken	Cook County	County Attorney	<a href="mailto:molly.hicken@co.cook.mn.us">molly.hicken@co.cook.mn.us</a>
Joyce Klees	Sawtooth Mountain Clinic	RN	<a href="mailto:joyce@sawtoothmountainclinic.org">joyce@sawtoothmountainclinic.org</a>
Matthew Brown	WTIP	Director	<a href="mailto:matthew@wtip.org">matthew@wtip.org</a>
Jim Morrison	Gunflint Trail VFD	Fire Chief	<a href="mailto:redpinemorrison@gmail.com">redpinemorrison@gmail.com</a>
John Twiest	Arrowhead Electric Cooperative	Operations Manager	<a href="mailto:jtwest@arrowhead.coop">jtwest@arrowhead.coop</a>
Valerie Marasco	Cook County Sheriff's Office	Director of Emergency Management & Public Information	<a href="mailto:valerie.marasco@co.cook.mn.us">valerie.marasco@co.cook.mn.us</a>
Alison McIntyre	Cook County Public Health & Human Services	Director	<a href="mailto:Alison.McIntyre@co.cook.mn.us">Alison.McIntyre@co.cook.mn.us</a>
Kimber Wraalstad	North Shore Health	CEO	<a href="mailto:kimber.wraalstad@northshorehealthgm.org">kimber.wraalstad@northshorehealthgm.org</a>

Cook County – Multi Hazard Mitigation Plan Update  
Planning Team Meeting #2 – Tuesday, October 16, 2018 – 2:00 p.m. to 4:00 p.m.

**PARTICIPANT SIGN IN SHEET**

Name	Agency/Organization	Title	Email
1. Heidi BOO-Kirk	Cook City	Grmsh	
2. Jeff Hall	MnDOT	HSEM Coordinator	Jeffrey.hall@state.mn.us
3. Cameron Gjovik	MnDOT	Operations Support	cameron.gjovik@state.mn.us
4. Brandon Law	U.S. Border Patrol	Supervisory ZFA	BRANDON.S.LAW@CBP.DHS.GOV
5. Clinton Little	MN DNR	Coastal Program Specialist	clinton.little@state.mn.us
6. John Swanson	U.S. Customs	Supervisory CBPO	John.E.Swanson@CBP.DHS.gov
7. Mitch Hill	ISD #166	Asst Principal	mitch@isd166.org
8. Judy Hill	Cook City	HR Generalist	judy.hill@co.cook.mn.us
9. Kyle Oberg	Cook City	GIS Analyst	kyle.oberg@co.cook.mn.us
10. MIKE CROOK	USFS	AFMO	mcrook@fs.fed.us
11. Robert Thompson	Cook County Assessor	Appraiser	Bob.Thompson@Co.Cook.Mn.us
12. Thomas Nelson	City of Glenview	water/sewer/solid waste Superintendent	tom.nelson@co.cook.mn.us
13. Dan Kristensen	Cook County PHHS	PH Coordinator	dan.kristensen@co.cook.mn.us
14. Mike Roth	Grand Minis	City Administrator	carlroth@grand.mn.us
15. James Coleman	Lutsen Fire	Chief	Lutsenfire@gmail.com
16. Elena Tansel	Cook County	Deputy Manager	elena.tansel@co.cook.mn.us
17. Tim Nelson	Cook Land Services	Land Services Director	tim.nelson@co.cook.mn.us
18. Molly Hicken	Cook Co Attorney	Co. Atty	molly.hicken@co.cook.mn.us
19. Jonica Flees	Sawtooth Mt. Clinic	PA	jonica@saawtoothmountainclinic.mn.us
20. MATTHEW BROWN	WTP	MANAGER	MBROWN@WTP.MN.US



Name	Agency/Organization	Title	Email
21. Jim Morrison	GTUFD	Chief	re/pine/morrison@gtufd.com
22. John Twiest	AECI	of 5 <del>Chief</del> <sup>member</sup>	jtwest@aecinc.com
23. Valerie Marasco	COOK COUNTY EM/SHERIFF'S OFFICE	Director - Emergency	valerie.marasco@co.cook.il.us
24. Alison McIntyre	CCPUIS	Deputy Emergency + Public Info	
25. Helen Wines	North Shore Health	CEO	Helen.Wines@northshorehealth.org
26.			
27.			
28.			
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10/15/2018

## Cook County Multi-Hazard Mitigation Plan Update

October 16, 2018  
Planning Team Meeting #2

### MITIGATION ACTION CHART REVIEW



## Agenda

1. Welcome and Introductions
2. MHMP Presentation
3. Mitigation Action Chart (MAC)  
Review & Discussion
4. Overview of Next Steps



Cook County  
Hazard Mitigation  
Planning Meeting #2

## MHMP Recap

Overview of the Purpose, Process, and Content of the Multi-Hazard Mitigation Plan & Grand Portage Tribal Annex

## Overview

- Cook County is updating its **Multi-Hazard Mitigation Plan (MHMP)**. The plan must be updated every 5 years.
- The Grand Portage Reservation is developing a **Tribal Annex** to the Cook County MHMP.
- The purpose of the plan is to identify & assess natural hazards that pose risk to the County and **develop long-term strategies and mitigation actions** that will help to reduce or eliminate the impact of future hazard or disaster events.

## Cook County MHMP

The Cook County MHMP will identify:

- **Hazard impacts and vulnerabilities** that are specific to the County.
- **Capability strengths & gaps** for mitigation that are specific to the County and its jurisdictions.
- **Mitigation activities for implementation** that reduce or eliminate the impact of future disasters.
- **Projects that may be eligible for FEMA-HMA grant funding** to support future mitigation project implementation

## FEMA Participation Requirements

**#1**  
Engage Local Government  
and Key Stakeholders in the  
planning process.



- Planning Team Meetings
- Capabilities Assessment
- Public Outreach
- Engagement of Partners
- Plan Review & Feedback

**#2**  
Provide opportunities for the  
public to ask questions and  
have input into the process.



- Distribute Media News Releases,  
Social Media, Email
- Provide Online Plan Review &  
Comment
- Optional Public Meeting

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## Content of the MHMP

- Physical and social profile
- Asset Inventory
- Hazard Assessment and Vulnerability Analysis
- Capability Assessment
- Mitigation Actions



## Hazard Risk Rankings

Prioritization of Hazards for Cook County & Grand Portage Reservation	
Type	Risk Severity
Wildfire	High
Severe-Summer Storms (Thunderstorms, lightning, hailstorms, wind storms, tornadoes)	High
Severe-Winter Storms (Blizzards, Heavy Snow, Ice Storms)	High
Flash Flood, Riverine Flood, & Coastal Flood	Moderate
Extreme Temperatures (Heat & Cold)	Moderate
Drought	Moderate
Erosion / Coastal Erosion and Land Subsidence	Moderate
Dam Failure	Low

## Minnesota Climate Change Projections

Hazard	Projections through century	Confidence in projected changes
Extreme cold	Continued loss of cold extremes and dramatic warming of coldest conditions	Highest
Extreme rainfall	Continued increase in frequency and magnitude; unprecedented flash-floods	
Heat waves	More hot days with increases in severity, coverage, and duration of heat waves	High
Drought	More days between precipitation events, leading to increased drought severity, coverage, and duration	Moderately High
Heavy snowfall	Large events less frequent as winter warms, but occasional very large snowfalls	Moderately low
Severe thunderstorms & tornadoes	More "super events" possible, even if frequency decreases	

## Planning for Climate Change & Community Resilience



## Climate Adaptation and Resilience & Hazard Mitigation

**Climate Adaptation and Resilience** - Building capacity to prepare for and respond to the impacts of climate change on the community, the environment, and the local economy.

**Hazard Mitigation** - can help local government and Emergency Management identify strategies and actions to help plan for & mitigate against:

- *More frequent & larger rain events*
- *Warmer temperatures (winter/summer)*
- *Impacts to vulnerable populations, critical infrastructure, and natural resources*

## Review of Mitigation Strategies

These strategies support long-term risk-reduction activities that help to protect people & property from future hazard events.

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### Local Planning & Regulations

Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses.

#### Mitigation Examples

- Planning & Zoning
- NFIP
- Building Codes
- CIP's
- Open Space Preservation
- GIS Mapping
- Community Assessments



### Structure and Infrastructure Projects

Actions that involve construction or modification of existing buildings or structures to reduce the impact of a hazard or remove them from the hazard area.

#### Mitigation Examples

- Property Acquisition
- Flood Diversion & Storage
- Road, Bridge, & Culvert Improvements
- Community Safe Rooms
- Green Infrastructure



### Municipal/Rural Electric Power Line retrofit/burial projects



### Natural Systems Protection

Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems.

#### Mitigation Examples

- Sediment & erosion control (Coastal, Streambank, Slope Stabilization)
- Forest and vegetation management
- Wetland restoration
- Floodplain and stream restoration.



### Education and Awareness Programs

Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate against them to protect life safety and property.

#### Mitigation Examples

- Public Outreach via media/social media
- Preparedness Training
- NWS Severe Weather Awareness Weeks



### Mitigation Preparedness and Response Support

Actions that protect people and property prior to, during and immediately after a disaster or hazard event. Services include warning systems and emergency response services.



#### Mitigation Examples

- Emergency warning notification systems
- Generators for Critical Facilities
- Training & Education for Local Elected Officials
- Shelter/Evacuation Plans
- Emergency Mgmt. Training & Exercises





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## Climate Adaptation and Community Resilience

Actions that help communities to plan for and mitigate against natural hazards influenced by climate change and the potential impacts to public health, vulnerable populations, community infrastructure, and the local economy.



## Mitigation Action Chart (MAC) Overview

The MAC identifies the specific mitigation measures that the jurisdiction(s) will seek to implement over the next 5 years to reduce or eliminate the impacts of natural hazard events.

### "Hazard" column



Hazard	Climate Change	Wildfire	Earthquake	Severe Weather	Heat	Drought	Other
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Each mitigation action **must** address a particular natural hazard.

"All-Hazard" mitigation actions relate to more than one type of natural hazard or may relate to other categories of technological and man-made threats/hazards.

### "Mitigation Strategy" column



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

Each mitigation action **must** identify which type(s) of mitigation strategies relate to the mitigation measure.

1. Local Planning & Regulations
2. Structure and Infrastructure Projects
3. Natural Systems Protection
4. Education and Awareness Programs
5. Mitigation Preparedness and Response Support

### "Mitigation Action" column



Mitigation Action	Climate Change	Wildfire	Earthquake	Severe Weather	Heat	Drought	Other
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Each mitigation action **must** include a description of what effort is to be implemented. Mitigation actions should be written to be clear, concise, and action-oriented (start with a verb). The action should seek help to reduce or eliminate long-term risk to life safety and property damage from future natural hazard events.

### "Status" column



Status	In-Progress	On-going	New
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Each mitigation action **must** include an indication of current status. They are:

- **"In-Progress"** – a defined mitigation project or effort that is currently underway.
- **"On-going"** – a mitigation project or effort that continues without end.
- **"New"** – a new mitigation project or effort identified to include in the new plan.



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### "Priority Ranking" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** be ranked as being of High, Moderate, or Low priority to help provide guidance in implementation. Priority rankings should be based on key considerations, such as:

- Known effectiveness of the mitigation measure.
- Local capability to implement the mitigation measure.
- Cost effectiveness of the mitigation measure. (Benefit vs. Cost)
- Longevity of the mitigation measure.
- Community support for the mitigation measure.
- Eligibility for federal grants (FEMA HMA Grant Program).

### "Timeline" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** indicate a timeframe for implementation.

- For mitigation actions that are "In-Progress" or "New" a known timeframe may be identified (i.e., 2017-2019).
- Some mitigation actions may be identified to be implemented within the 5 year period of the MHMP (2017-2021).

### "Jurisdictions" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Jurisdictions	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** identify what jurisdictions will seek to implement that action.

- Some mitigation actions will be specific to only the County for implementation.
- Other mitigation actions are those that all cities (or only some cities) would agree are important to include in their own jurisdictions.
- Schools and townships may be identified as well.

### "Responsibility" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Responsibility	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** include a brief identification of what agency or department or specific personnel has lead responsibility to implement that project or effort, such as:

- "County/City Emergency Management"
- "Planning and Zoning Department"
- "County Highway Department"
- "SWCD in collaboration with MN DNR"
- "Public Works Department"

### "Comments on Planning Mechanisms for Implementation" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Jurisdictions	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** include a description of how the mitigation measure will be incorporated into existing or future planning or project efforts by the jurisdiction provided. For example:

- Reference related plans or programs that relate to the mitigation measure (such as comprehensive land use plans, Capital Improvement Programs, public outreach and education programs)
- Reference existing partnerships that relate to the mitigation measure (such as "This is a standing effort of the County/City emergency management program in partnership with Public Health."

### "Possible Funding" column



Item #	Mitigation Title	Mitigation Description	Location	Priority Ranking	Timeline	Responsibility	Responsible Agency	Comments on Planning Mechanisms for Implementation	Possible Funding
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Each mitigation action **must** include identification of what possible funding will be used to implement the mitigation action:

- In most cases, "County/City" budget generally implies staff time to work on the mitigation measure or internal funding to purchase equipment, etc.
- When applicable, other funding such as outside grants, state or federal funding that may support the mitigation measure should be identified.
- It is particularly important to identify mitigation measures that may be eligible for FEMA HMA grant funding.

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### MAC Working Session

1. We will go through the Mitigation Action Chart together.
2. We will discuss any changes or additions of new mitigation actions to add to the chart.
3. You will have an opportunity to review this again with the entire draft plan before the plan is sent to HSEM and FEMA for review.

### Overview of Next Steps

1. Final draft MAC will be submitted to UMD. The draft County MHMP & Grand Portage Tribal Annex will be completed by UMD.
2. The draft plans will be submitted to the EM's for preliminary review and revisions.
3. The full draft plan will be posted online for public review & comment. Public outreach will be conducted for the open review period. A public meeting is optional.
4. Any resulting revisions will be made, and the plan will be submitted to HSEM and FEMA for review and approval.

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# **Appendix F**

## **Public Outreach & Engagement Documentation**

**Cook County MHMP**  
**Appendix F – Public Outreach & Engagement Documentation**  
**Record of Public Input & Incorporation**

**News Release #1 – July 13, 2018, “Public Feedback and Participation Invited for Cook County 2018 Multi-Hazard Mitigation Plan Update”**

On July 13, 2018, Cook County Emergency Management put out a news release announcing the start of the County’s Multi-Hazard Mitigation Plan. The news release was shared via numerous channels to reach the public, including direct email to planning team members, Boreal.org website, Cook County Herald, Cook County Sheriff’s Office Facebook, Lake Superior Twitter Feed and the Cook County website. The news release provided information on the purpose and content of the plan, who the plan covers, stakeholders involved in the plan update and examples of hazard mitigation activities.

Cook County used the news release to gather feedback from residents and businesses from across the County to incorporate into the plan, inviting feedback to the following:

- What are the natural hazards you feel pose the greatest risk to your community?
- Have you experienced a previous disaster event?
- What concerns do you have, and what sorts of mitigation actions or projects do you feel would help to reduce the damages of potential future events for your personal property, your community, or the County as a whole?

The public was strongly encouraged contact Cook County Office of Emergency Management and Public Information to submit comments, concerns, or questions regarding natural disasters and potential mitigation actions to be included into the plan update process.

***Record of Public Input & Incorporation:***


Cook County Emergency Management did not receive any public input following News Release #1.



## News Release #2 – March 19, 2019, “Public Review and Feedback Invited for Cook County’s Multi-Hazard Mitigation Plan”

On March 19, 2019 Cook County Emergency Management put out a news release announcing the completion of the draft Cook County Multi-Hazard Mitigation Plan and invitation for public review and comment. The news release was shared via numerous channels to reach the public, including a live interview with WTIP Radio, the Cook County Herald online, Advertisement with Cook County Emergency Services Conference Flyer and in Northern Wilds Magazine, Cook County website, Cook County Sheriff’s Office & Public Safety Facebook and Lake Superior News (online). The Cook County Office of Emergency Management and Public Information Director also sent an email directly to all planning team members and other stakeholders (i.e., Pigeon River Cross Border Committee) inviting their review and feedback. The news release informed the public that a copy of the draft MHMP and a survey for public feedback was available online at <https://scse.d.umn.edu/cook-county-mhmp>. The public feedback period for the draft plan was open from March 19 – April 15, 2019, for a total of 28 days.

## UMD Website for Public Review of Cook County MHMP Update March 19 – April 15, 2019


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**Geospatial Analysis Center**  
Home • Swenson College of Science and Engineering • Public Feedback for Cook County MHMP Update

### Public Feedback for Cook County MHMP Update

**Contact us**  
[umdgis@d.umn.edu](mailto:umdgis@d.umn.edu)  
 (218) 726-7438  
 TTY/TDD:  
 (800) 627-3529  
 Kirby Plaza 389  
 Duluth, MN 55812





**Give us your feedback!**

Cook County is currently in the process of updating its Multi-Hazard Mitigation Plan. Before the plan is submitted to the State of Minnesota and FEMA for approval, we need your feedback! Please review the draft plan, in particular the mitigation actions for your jurisdiction, and then fill out this [quick form](#).

- [Cook County MHMP 2019 draft](#) 📄
- [Cook County Mitigation Actions](#) 📄
- [Grand Marais Mitigation Actions](#) 📄

In addition, the Grand Portage Band of Lake Superior Chippewa has developed a Tribal Hazard Mitigation Plan Annex to the county plan for the Grand Portage Reservation. It is also available for public review.

- [Grand Portage MHMP Tribal Annex 2019 draft](#) 📄

Help us make Cook County safer from natural disasters!

If you have any questions or comments, please contact [umdgis@d.umn.edu](mailto:umdgis@d.umn.edu).

***Record of Public Input & Incorporation:*****ONLINE COMMENT (1)**

I am pleased to see that climate change is included in the plan. Climate change will have an impact on the frequency and severity of weather events in the coming years. Although the MHMP has an emphasis on natural hazards I think there is another element to consider. A recent Duluth news article suggested that as impacts of climate change are felt around the country, Duluth could see an influx of new residents seeking a more stable environment. I think the same could be said for Cook County: More people seeking to move to the Cook County to escape climate impacts elsewhere in the country . This may be more of a social challenge, but with environmental impacts. Cook County already has an influx of retirees, and artists, but are faced with increasing housing prices and small percentage of buildable private land. What buildable private land that is left is the marginal land with increased susceptibility to environmental impacts (slopes, wet lands, wildland urban interface). – Jim Wiinanen, Cook County Resident and Former Cook County Emergency Management Director

**Incorporation: No changes regarding the discussion on climate change within the plan were deemed necessary based on this comment.**

**DIRECT EMAILS TO COOK COUNTY EMERGENCY MANAGEMENT DIRECTOR:**

Good morning Valerie,  
Just wanted to let you know that I reviewed the Cook County Multi-Hazard Mitigation Plan. It is comprehensive and educational for anyone interested in the historical hazards that have been experienced in Cook County. I appreciate all of the hard work that went into the update and believe that it will provide the basis for an effect, coordinated emergency preparedness response.

Bob Svaleson

**Incorporation: No changes needed to MHMP.**

Hi Valerie,

It was so nice to meet with you and Marilyn yesterday. More and more I am understanding my role with Emergency Preparedness for the County. I took some time to review the draft of the Multi-Hazard Mitigation Plan. Nice work! I am in total awe that you put together such a comprehensive guide. I have a few small comments to share. First, starting on page 99, under the areas “Mass Care” and “Health Epidemic” we should list the Public Health Emergency Preparedness Grant (PHEP) under “Funding.” These are CDC dollars that pass through MDH to fund a small portion of my time with PHHS. Also Joni is still listed as the Public Health Coordinator on E-26. The last thing which I didn’t see (though maybe I missed it), is our involvement with the Health Alert Network (HAN) to distribute time-sensitive health messaging from MDH to our hospital and clinic partners in the county.

Grace Grinager  
Public Health Coordinator  
Cook County Public Health and Human Services  
411 West 2<sup>nd</sup> Street  
Grand Marais, MN 55604  
(218)387-3605

**Incorporation: Corrections/additions were made in the Cook County MHMP and Mitigation Action Chart as referenced above.**

Hey Valerie,

Good job on the plan, it is quite a bit different from what we had twenty years ago when I got here, great job..! Here are the comments that I have with regards to the Multi-hazard mitigation plan update:

1. Page 39 – “Cook County Land Services is in the process of mapping all of the vacation rental operations in the county”.

*I think it would be more appropriate to say that we are working towards a comprehensive list of vacation rental operations that we would hope to put into a mapping format.*

2. Page 69 – “Cook County Zoning Ordinance Article 7 addresses Stormwater Management for the County”.

*The stormwater provisions in Section 7 of the Cook County Zoning Ordinance are specific to shoreland management areas, which are 1,000-feet from a lake and 300-feet from a river or stream. Cook County also has a stand-alone Stormwater Ordinance that is applicable county-wide.*

3. Page 114 – “CC Land Services would be lead to work with any businesses or landowners on projects for saving structures.”

*I think we would work jointly with the SWCD depending on the type of work and method of funding.*

4. Page 119 – “Cook County Firewise will work on collaboration with CC Emergency Management and CC Land Services to explore development of a new ordinance.”

*We are happy to work collaboratively on a wildland urban interface ordinance, but it will be important to adequately anticipate the long-term impacts for administering any new ordinance.*

That last comment is more of just a heads-up to you that I am very happy to work towards an ordinance, but one of the key elements has to be long term administration of the ordinance and it’s impact on staff resources.

Again, great Job..! And let me know if you have any questions of me or need any clarification.

Timothy J. Nelson  
Cook County Land Services Director  
411 West Second Street  
Grand Marais, MN 55604  
218-387-3633 – Office  
218-387-3042 – Fax  
218-387-5536 – Cell

**Incorporation: Corrections/additions were made in the Cook County MHMP and Mitigation Action Chart as referenced above.**

Hi Val,

There are a few things that jumped out at me just skimming through it the plan.

I'm thinking some of the info in here may be misleading for fire history. It looks like potentially you only have the MNDNR data and not the USFS data. I could provide the FS data if you want

FS emergency response resources aren't listed. We have 3 T6 engines, 1 T7 engine, 3 float planes, access to other resources. Seagull Guard station isn't showing on the map where we house an engine.

This statement "*Their occurrence is common in the county, and the last one recorded by the MN DNR occurred on May 3, 2018, which burned one acre. Its cause was debris burning.*" is incorrect. We had fires last summer. I can provide you some more accurate date if needed.

I have access to a climate change assessment done for the FS that explains a little more about the impacts that will have on wildfire occurrence. In a nutshell, we will see longer durations of wet and dry periods. The longer dry periods will mean we can get those droughty conditions where we have large fires more often. However, the longer durations of wet periods may saturate things enough to balance that some. Also, the higher temps in conjunction with the wet periods actually mean more humid conditions where we wouldn't have as much fire activity.

With the vulnerability section, we now have some risk assessment data that I could provide to show the high risk areas.

Under the plans and programs in place, there isn't anything about the FS. The FS has jurisdiction on all wildfires that are on FS lands and some state lands and considering that makes up a good portion of the county, we might want to add something. The DNR has jurisdiction over wildfires on state and private lands. VFD departments have structure protection authority. So, I think we should make that clear in the plan. Most our large wildfires have been managed by the FS because of this with assistance from the DNR and VFDs. I know this is different than Canada where the provinces manage wildfire incidents so I just want to make sure that is understood.

All the resources operate under the MINICS agreement for wildfire. We should probably add something about the MINICS agreement in the plan.

Under program GAPS and Deficiencies, I think Firewise work on private lands is the most important work that can be done and there is still a ton of it that could be done in the county. It is very expensive and we have only a few contractors which is what limits our ability to do more. I also think planning and zoning requirements could be improved upon. Other gaps I think are good evacuation plans for all portions of the county.

In the critical facilities list, I'm not seeing the FS communication towers in the list of for communications or the USFS in the list of emergency services.

I'm not seeing any fires listed in Appendix C for hazard events.

Patty Johnson, USFS

**Incorporation: Corrections/additions were made within the Cook County MHMP and Mitigation Action Chart as referenced above. The Cook County Emergency Manager and UMD Geospatial Analysis Center worked in close coordination with the U.S. Forest Service to address where data revisions or additions were needed within the plan regarding wildfire history and resources. Changes were made and were approved by the Cook County Director of Emergency Management.**

Hi Valerie,

I responded with a few comments on the HMP using the online form, but wanted to point out some of the big items. The wildfire data in the last paragraph on page 81 of the HMP is way off. It appears to be missing wildfires on federal land which are where the majority of our large fires occur. Same thing goes for figure 17 and A-16. There are a bunch of small fires missing that I assume aren't in the DNR data because they weren't state jurisdiction, but federal instead. I mentioned this to the GIS person at the initial HMP meeting.

Todd Armbuster, Cook County Firewise Coordinator

**Incorporation: The Cook County Emergency Manager and UMD Geospatial Analysis Center worked in coordination with the Cook County Firewise Coordinator to obtain correct shape files for documenting wildfire history.**

***Compiled By:***

Bonnie Hundrieser

UMD Project Team Member





[www.co.cook.mn.us](http://www.co.cook.mn.us)

## MEDIA RELEASE

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### Public Review and Feedback Invited for Cook County Multi-Hazard Mitigation Plan Update

**March 19, 2019** – Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs.

Update of the plan has been under the direction of the Cook County Office of Emergency Management & Public Information in cooperation with the University of Minnesota Duluth – Geospatial Analysis Center and representatives from County departments, local municipalities (city and township), school districts, and other key stakeholders such as the MN Department of Natural Resources, U.S. Forest Service and Arrowhead Electric. The County has also partnered with the Grand Portage Band of Lake Superior Chippewa to develop a Tribal Annex to the County Plan. The Tribal Annex will identify vulnerabilities and mitigation projects that are specific to the Grand Portage Reservation and provide a means for the County and Tribe to collaborate on similar mitigation projects in the future.

Community involvement and feedback are vital to the success of the plan. Cook County invites public review and feedback of the draft plan prior to submitting it to the State of Minnesota and the Federal Emergency Management Agency (FEMA) for review. A copy of the draft County MHMP and Tribal Annex and a survey for public feedback is available online at <https://scse.d.umn.edu/cook-county-mhmp>. The plan review and comment period will be open until Monday, April 15, 2019.

#### About the Plan

The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County, including the City of Grand Marais, townships, and unincorporated areas. The Cook County MHMP also incorporates the concerns and needs of school districts, public utilities, the Grand Portage Reservation and other stakeholders participating in the Plan.

Cook County is vulnerable to a variety of potential natural disasters, which threaten the loss of life and property in the county. The plan addresses how to mitigate against hazards such as tornadoes, flooding, wildfires, blizzards, straight-line winds, ice storms, and droughts which have the potential for inflicting vast economic loss and personal hardship.

The plan update identifies cost-effective and sustainable mitigation actions to reduce or eliminate the long-term risk to human life or property from natural hazards. Some examples include improvement of roads and culverts that experience repetitive flooding; construction of safe rooms at campgrounds to protect lives in the event of tornados or severe wind events; wildland fuel-reduction activities, burying powerlines that may fail due severe storms; mitigation for coastal areas adjacent to Lake Superior, and conducting public awareness and education campaigns to help people be prepared to take safe action before, during, or following a hazard event.

### **The Benefits of Hazard Mitigation Planning**

Hazard mitigation planning ultimately helps us protect Cook County residents. By working with local communities we can identify vulnerabilities and develop strategies to reduce or eliminate the effects of a potential hazard. In addition, increasing public awareness of local hazards and disaster preparedness helps to create a community that is resilient to disaster, and breaks the cycle of response and recovery. Update of the plan will further allow the county and its jurisdictions to apply for eligible projects under future Hazard Mitigation Assistance (HMA) grant funding from FEMA for projects that are cost-effective and will help to reduce or eliminate impacts of future natural disaster events.

**Contact:** Valerie Marasco, Director – Office of Emergency Management & Public Information, 218-387-5366 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)



## MEDIA RELEASE

### Public Feedback and Participation Invited for Multi-Hazard Mitigation Plan Update

**July 13, 2018** – The Cook County Office of Emergency Management & Public Information is currently working with the University of Minnesota Duluth – Geospatial Analysis Center (GAC) to prepare an update of the County's 2010 "Multi-Hazard Mitigation Plan" (MHMP). The Plan is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000), and must now be updated every five years in order to maintain eligibility for federal hazard mitigation funding programs.

Development of the Plan is under the direction of the Cook County Office of Emergency Management & Public Information, in cooperation with a planning team of representatives from County Departments, local municipalities, school districts, and other key stakeholders such as utility providers. The County is also working with the Grand Portage Band of Lake Superior Chippewa to participate in the planning process and develop a Tribal Annex to the County Plan. The Planning Team is responsible for providing feedback required for the Plan update, including the ranking of hazards and identification of strategic, cost-effective mitigation activities that may reduce future losses for the County and individual jurisdictions. Some mitigation activities may be eligible for future FEMA Hazard Mitigation Assistance (HMA) grant funding, such as: localized flood reduction measures, property acquisition and relocation/conversion to open space, infrastructure retrofits, wildfire mitigation, and safe room construction or retrofits to provide immediate life-safety protection for people vulnerable to tornado and severe wind events.

#### About the Plan

The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County, including the City of Grand Marais, townships, and unincorporated areas. The Cook County MHMP also incorporates the concerns and needs of school districts, public utilities, and other stakeholders participating in the Plan.

Cook County is vulnerable to a variety of potential natural disasters, which threaten the loss of life and property in the County. Hazards such as wildfire, straight line winds, flooding, blizzards, ice storms, and droughts have the potential for inflicting vast economic loss and personal hardship.

"Hazard mitigation planning is a central part of our emergency management program," said Valerie Marasco, Director of Emergency Management & Public Information. "Understanding the natural hazards that can cause serious impact to our communities and taking action to reduce or eliminate the impact of future disasters makes us more resilient. Hazard mitigation helps us to break the cycle of damage and repair caused by things like wildfire, flooding, ice storms, and severe wind events that can damage property, stress economies, and threaten life safety in our county."

Examples of hazard mitigation include actions such as improvement of roads and culverts that experience repetitive flooding; implementation of wildland fuels reduction; construction of safe rooms at campgrounds, parks, mobile home parks or schools to protect lives in the event of tornados or severe wind events; burying powerlines that may fail due to heavy snow, ice or wind storms; ensuring timely emergency communication to the public through warning sirens and mass notification systems, and conducting public awareness & education campaigns to help people to be prepared to take safe action before, during, or following a hazard event.



## MEDIA RELEASE

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### **Public Feedback and Participation is Encouraged**

As part of the planning process, gathering input from the public is an important and required step. Cook County seeks to gather feedback from residents and businesses from across the County to incorporate into the Plan:

- What are the natural hazards you feel pose the greatest risk to your community?
- What concerns do you have, and what sorts of mitigation actions or projects do you feel would help to reduce the damages of potential future events for your personal property, your community, or the County as a whole?

The public is strongly encouraged to submit your comments, concerns, or questions regarding natural disasters and potential mitigation actions to be included into the plan update process. Please submit your feedback to Valerie Marasco, Cook County Director of Emergency Management & Public Information: 218-387-3059 or [Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us). Comments may also be submitted on the Cook County Sheriff's Office & Public Safety Facebook Page.

The public will have a continued opportunity to participate in the MHMP update in the coming months. A draft of the Plan will be available for public review prior to submission to the State of Minnesota. Future opportunities for public involvement will be publicly advertised and shared through media.

-30-

**Contact:** Valerie Marasco, Director – Office of Emergency Management & Public Information, 218-387-5366 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)



**From:** Valerie Marasco  
**To:** [Ginny Stodie](#); [Heidi Doo-Kirk](#); [Jan Sivertson](#); [Myron Bursheim](#); [Robert Deschampe](#); [MAT team](#); [Dispatch Bonnie Hundrieser](#); ["Mike Keyport"](#); [Matthew Curran](#) - US Border Patrol; [Crotteau, Michael J](#) -FS; [LAW, BRANDON S](#); [slstark@d.umn.edu](#); [jav.a.decoux@gmail.com](#); [cityhall@boreal.org](#); [citycommunications@boreal.org](#); [lutsentownship@gmail.com](#); [toferm@boreal.org](#); [schroedertownship@gmail.com](#); [terry.spieker](#); [labodagrading@boreal.org](#); [Paul McFarlane](#); [James Coleman](#) ([lutsenfire@gmail.com](#)); [Jim & Cheryl Morrison](#); [Barb Tuttle](#); [andersonlogging@live.com](#); [schroederfire98@gmail.com](#); [rinelson@boreal.org](#); [Bob Vogel](#) ([rvogel\\_ir@hotmail.com](#)); [schroederfire98@gmail.com](#)  
**Cc:**  
**Subject:** Media Release - Public Feedback and Participation Invited for Multi-Hazard Mitigation Plan Update  
**Date:** Friday, July 13, 2018 2:33:30 PM  
**Attachments:** [image002.png](#)  
[Media Release - Cook County Updating All-Hazard Mitigation Plan - Public Feedback Welcome.pdf](#)

## Public Feedback and Participation Invited for Multi-Hazard Mitigation Plan Update

**July 13, 2018** – The Cook County Office of Emergency Management & Public Information is currently working with the University of Minnesota Duluth – Geospatial Analysis Center (GAC) to prepare an update of the County’s 2010 “Multi-Hazard Mitigation Plan” (MHMP). The Plan is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000), and must now be updated every five years in order to maintain eligibility for federal hazard mitigation funding programs.

Development of the Plan is under the direction of the Cook County Office of Emergency Management & Public Information, in cooperation with a planning team of representatives from County Departments, local municipalities, school districts, and other key stakeholders such as utility providers. The County is also working with the Grand Portage Band of Lake Superior Chippewa to participate in the planning process and develop a Tribal Annex to the County Plan. The Planning Team is responsible for providing feedback required for the Plan update, including the ranking of hazards and identification of strategic, cost-effective mitigation activities that may reduce future losses for the County and individual jurisdictions. Some mitigation activities may be eligible for future FEMA Hazard Mitigation Assistance (HMA) grant funding, such as: localized flood reduction measures, property acquisition and relocation/conversion to open space, infrastructure retrofits, wildfire mitigation, and safe room construction or retrofits to provide immediate life-safety protection for people vulnerable to tornado and severe wind events.

### About the Plan

The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County, including the City of Grand Marais, townships, and unincorporated areas. The Cook County MHMP also incorporates the concerns and needs of school districts, public utilities, and other stakeholders participating in the Plan.

Cook County is vulnerable to a variety of potential natural disasters, which threaten the loss of life and property in the County. Hazards such as wildfire, straight line winds, flooding, blizzards, ice storms, and droughts have the potential for inflicting vast economic loss and personal hardship.

“Hazard mitigation planning is a central part of our emergency management program,” said Valerie Marasco, Director of Emergency Management & Public Information. “Understanding the natural hazards that can cause serious impact to our communities and taking action to reduce or eliminate

the impact of future disasters makes us more resilient. Hazard mitigation helps us to break the cycle of damage and repair caused by things like wildfire, flooding, ice storms, and severe wind events that can damage property, stress economies, and threaten life safety in our county.”

Examples of hazard mitigation include actions such as improvement of roads and culverts that experience repetitive flooding; implementation of wildland fuels reduction; construction of safe rooms at campgrounds, parks, mobile home parks or schools to protect lives in the event of tornados or severe wind events; burying powerlines that may fail due to heavy snow, ice or wind storms; ensuring timely emergency communication to the public through warning sirens and mass notification systems, and conducting public awareness & education campaigns to help people to be prepared to take safe action before, during, or following a hazard event.

#### **Public Feedback and Participation is Encouraged**

As part of the planning process, gathering input from the public is an important and required step. Cook County seeks to gather feedback from residents and businesses from across the County to incorporate into the Plan:

- What are the natural hazards you feel pose the greatest risk to your community?
- What concerns do you have, and what sorts of mitigation actions or projects do you feel would help to reduce the damages of potential future events for your personal property, your community, or the County as a whole?

The public is strongly encouraged to submit your comments, concerns, or questions regarding natural disasters and potential mitigation actions to be included into the plan update process. Please submit your feedback to Valerie Marasco, Cook County Director of Emergency Management & Public Information: 218-387-3059 or [Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us) . Comments may also be submitted on the Cook County Sheriff's Office & Public Safety Facebook Page.

The public will have a continued opportunity to participate in the MHMP update in the coming months. A draft of the Plan will be available for public review prior to submission to the State of Minnesota. Future opportunities for public involvement will be publicly advertised and shared through media.

-30-

**Contact:** Valerie Marasco, Director – Office of Emergency Management & Public Information, 218-387-5366 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)

#### **Valerie Marasco**

Director – Office of Emergency Management & Public Information  
Cook County, Minnesota  
Law Enforcement Center  
143 Gunflint Trail  
Grand Marais, MN 55604

Office: 218-387-3059



## Advertisement on Conference Flyer and in Northern Wilds Magazine

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Individuals or groups are needed to adopt a meal - prep, serve and clean-up one of four meals for our community heroes - call: Teresa at 370-9568

Own a business and want to support your emergency crews (Fire, EMS and Law Enforcement, Search & Rescue, STOP Teams and others)? Make a cash or prize donation to the conference, contact: Valerie Marasco, Cook County Emergency Management Director at 218-367-3059 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)

An event from:  **EMERGENCY MANAGEMENT & PUBLIC INFORMATION**


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**Public Comment Wanted on Draft Hazard Mitigation Plan**

Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs. The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County, including the City of Grand Marais, townships, and unincorporated areas. The Cook County MHMP also incorporates the concerns and needs of school districts, public utilities, the Grand Portage Reservation and other stakeholders participating in the Plan.

Community involvement and feedback are vital to the success of the plan. Cook County invites public review and feedback of the draft plan prior to submitting it to the State of Minnesota and the Federal Emergency Management Agency (FEMA) for review.

A copy of the draft County MHMP and Tribal Annex and a survey for public feedback is available online at <https://scse.d.umn.edu/cook-county-mhmp>. The plan review and comment period will be open until Monday, April 15, 2019.



## Cook County Website

**Cook County MN News**

**Public Review and Feedback Invited for Cook County Multi-Hazard Mitigation Plan Update**

**March 26, 2019** - Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs.

The plan of the plan has been signed by the director of the Cook County Office of Emergency Management & Public Information in cooperation with the University of Minnesota Duluth - Geographic Analysis Center and representatives from County departments, local emergency help and emergency school districts, and other key stakeholders such as the MN Department of Natural Resources, U.S. Forest Service and Arrowhead Electric. The County has also partnered with the Grand Portage Band of Lake Superior Chippewas to develop a Tribal Annex to the County Plan. The Tribal Annex will identify vulnerabilities and mitigation projects that are specific to the Grand Portage Reservation and provide a means for the County and Tribe to collaborate on similar mitigation projects in the future.

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The plan updates identifies cost-effective and sustainable mitigation actions to reduce or eliminate the long-term risk to human life or property from natural hazards. Some examples include improvement of roads and bridges that experience repetitive flooding, construction of safe rooms at municipalities to protect lives in the event of tornadoes or severe wind events, withdrawal from evacuation activities, buying properties that may fall due severe storms, mitigation for coastal areas adjacent to Lake Superior, and conducting public awareness and education campaigns to help people be prepared to take safe actions before, during, or following a hazard event.

**The Benefits of Hazard Mitigation Planning**  
Hazard mitigation planning ultimately helps to protect Cook County residents. By working with local communities we can identify vulnerabilities and develop strategies to reduce or eliminate the effects of a potential hazard. In addition, increasing public awareness of local hazards and disaster preparedness helps to create a community that is resilient to disaster and breaks the cycle of response and recovery. Update of the plan will further allow the county and its jurisdictions to apply for eligible projects under future Hazard Mitigation Assistance (HMA) grant funding from FEMA for projects that are cost-effective and will help to reduce or eliminate impacts of future natural disaster events.

-0-

Contact: Valerie Marasco, Director - Office of Emergency Management & Public Information, 218-367-3059 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)

## Cook County Facebook

**Cook County, Minnesota**  
Page Liked · March 27

Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs. The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County. ...  
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COOK COUNTY  
MINNESOTA

## Cook County Sheriff's Office Facebook

**Cook County Sheriff's Office & Public Safety**  
Published by Sheriff Cook · March 27

An extraordinary amount of work and information has gone into the development of the updated Hazard Mitigation Plan from all areas of the County, including public safety. Congrats to the Emergency Management Office for making this happen and completing such a detailed plan with the UMD Geospatial Analysis Center. The plan is now open for public review and comment. If you have a few minutes, there is a wealth of interesting information in here.

**Multi-Hazard Mitigation Plan**  
Cook County, Minnesota, 2019

UMD  
Geospatial Analysis Center  
University of Minnesota Duluth  
Drive to Discover

COOK COUNTY  
MINNESOTA

**Cook County, Minnesota**  
March 27

Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). ...  
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6 check-ins

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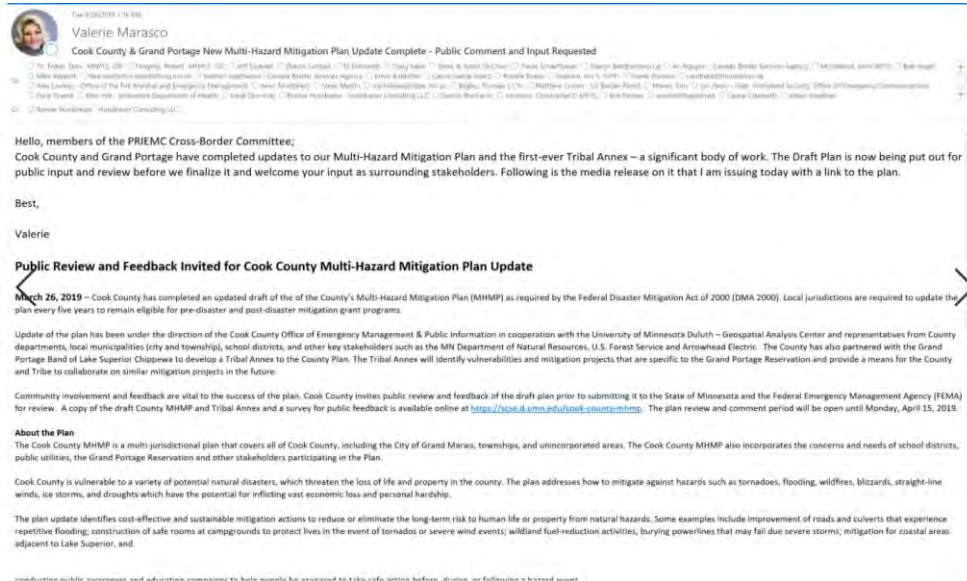
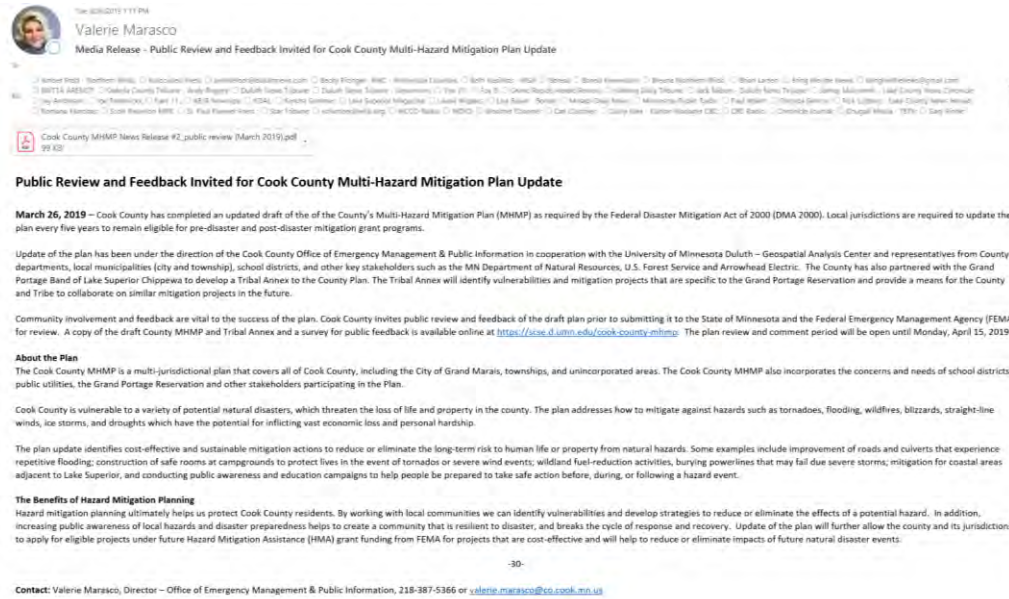
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## Direct Emails from Cook County Emergency Management to Stakeholders



## Cook County News Herald online article

les/public-review-and-feedback-invited-for-county-multi-hazard-mitigation-plan-update/

**COOK COUNTY NewsHerald**

Thursday, May 9, 2019

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Marketplace: Dining and Entertainment General Real Estate

### Public review and feedback invited for county multi-hazard mitigation plan update

By Valerie Mangap  
Director, Emergency Management & Public Information

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Cook County has completed an updated draft of the county's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs.

Update of the plan has been under the direction of the Cook County Office of Emergency Management & Public Information in cooperation with the University of Minnesota Duluth - Geospatial Analysis Center and representatives from county departments, local municipalities (city and township), school districts, and other key stakeholders such as the Minnesota Department of Natural Resources, U.S. Forest Service and Arrowhead Electric.

The county has also partnered with the Grand Portage Band of Lake Superior Chippewa to develop a Tribal Annex to the county plan. The tribal annex will identify vulnerabilities and mitigation projects that are specific to the Grand Portage Reservation and provide a means for the county and tribe to collaborate on similar mitigation projects in the future.

Community involvement and feedback are vital to the success of the plan. Cook County invites public review and feedback of the draft plan prior to submitting it to the State of Minnesota and the Federal Emergency Management Agency (FEMA) for review. A copy of the draft county MHMP and tribal annex and a survey for public feedback is available online at [cookcountymn.gov/mhmp](http://cookcountymn.gov/mhmp). The plan review and comment period will be open until Monday, April 15, 2019.

**About the Plan**

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Cook County is vulnerable to a variety of potential natural disasters, which threaten the loss of life and property in the county. The plan addresses how to mitigate against hazards such as tornadoes, flooding, wildfires, blizzards, straight line winds, or storms, and droughts, which have the potential for inflicting vast economic loss and personal hardship.

The plan update identifies cost-effective and sustainable mitigation actions to reduce or eliminate the long-term risk to human life or property from natural hazards.

Some examples include improvement of roads and culverts that experience repetitive flooding, construction of safe rooms at campgrounds to protect lives in the event of tornadoes or severe wind events, wildland fuel-reduction activities, buying power lines that may fail due to severe storms, mitigation for coastal areas adjacent to Lake Superior, and conducting public awareness and education campaigns to help people be prepared to take safe action before, during, or following a hazard event.

**Benefits of Hazard Mitigation Planning**

Hazard mitigation planning ultimately helps protect Cook County residents. By working with local communities we can identify vulnerabilities and develop strategies to reduce or eliminate the effects of a potential hazard.

In addition, increasing public awareness of local hazards and disaster preparedness helps to create a community that is resilient to disaster, and breaks the cycle of response and recovery. Update of the plan will further allow the county and its jurisdictions to apply for eligible projects under future Hazard Mitigation Assistance (HMA) grant funding from FEMA for projects that are cost-effective and will help to reduce or eliminate impacts of future natural disaster events.

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## Lake Superior News

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**Public Review and Feedback Invited for Cook County Multi-Hazard Mitigation Plan Update**

**Cook County MINNESOTA**

**UMD Geospatial Analysis Center**  
University of Minnesota Duluth  
Division of Research

**#LSN\_News #LSN\_CookCounty**

**COOK COUNTY, MINNESOTA - March 26, 2019 (LSN)** - Cook County has completed an updated draft of the County's Multi-Hazard Mitigation Plan (MHMP) as required by the Federal Disaster Mitigation Act of 2000 (DMA 2000). Local jurisdictions are required to update the plan every five years to remain eligible for pre-disaster and post-disaster mitigation grant programs.

**PRINCE ARTHUR HOTEL**

Tweets by [@princearthurhotel](#)

Lake Superior News  
@LakeSuperiorNews  
Snow for northern Minnesota Rain for Thunder Bay Area forecast  
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@ThunderBayNews  
@LakeSuperiorNews

Storm Brings Heavy Wet Snow Tonight  
Total Snowfall  
0.7 PM Wind -> 3 PM Time  
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NAN SIGN MOVA TO ADDRESS POVERTY, HOMELESSNESS IN  
@LakeSuperiorNews



**Boreal.org Website Page**  
**Cook County MHMP Media Release #1, July 13, 2018**

The screenshot shows the Boreal.org website interface. At the top, there's a navigation bar with links: Submit Event, List Your Business, Login/Join, Check Email, Classifieds, and About Boreal. Below this is a banner with the BOREAL logo and the tagline "Your Access to the Arrowhead". A secondary navigation bar includes links for NEWS, CALENDAR, WTIP RADIO, COMMUNITY, ARTS+CULTURE, OUTDOORS, LOCAL LIFE, and DIRECTORY. A weather widget displays forecasts for five locations: TofteVaag, MN (67°F, Clear); Tucker Lake, MN (64°F, Clear); Grand Marais Airport, MN (63°F, Clear); SundewTech, MN (74°F, Clear); and Grand Portage Village, MN (64°F, Clear). The main content area features a news article titled "Public Feedback and Participation Invited for Multi-Hazard Mitigation Plan Update" dated July 13, 2018. The article includes the Cook County Minnesota logo, which consists of a green triangle and a blue triangle forming a larger shape, with the text "COOK COUNTY" above and "MINNESOTA" below. To the right of the article is a sidebar with a search bar and a calendar for July 2018. The calendar highlights several events: Harbor House Grille - Open 11:00 to 8:00 Mon - Sat (07/27/2018, 12:00AM - 08:00PM); Wunderbar Week Events (07/27/2018, 12:00AM); Terra Bella Floral hours (07/27/2018, 12:00AM); JHP Art Gallery Now Accepting Exhibition Applications 2019-2020 (07/27/2018, 08:00AM); and Try it: Timber Framing.



**Lake Superior News Twitter Feed and Website Postings**  
**Cook County MHMP Media Release #1, July 13, 2018**



7/31/2018

Feedback and participation invited for Multi-Hazard Mitigation Plan update | Cook County News Herald



# COOK COUNTY NEWS Herald



Tuesday, July 31, 2018

## Feedback and participation invited for Multi-Hazard Mitigation Plan update

*By ohtadmin | on July 20, 2018*

Staff reports

The Cook County Office of Emergency Management & Public Information is currently working with the University of Minnesota Duluth— Geospatial Analysis Center (GAC) to prepare an update of the county's 2010 "Multi-Hazard Mitigation Plan" (MHMP).

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The county is also working with the Grand Portage Band of Lake Superior Chippewa to participate in the planning process and develop a Tribal Annex to the county plan. The planning team is responsible for providing feedback required for the plan update, including the ranking of hazards and identification

<https://www.cookcountynews-herald.com/articles/feedback-and-participation-invited-for-multi-hazard-mitigation-plan-update/>

1/6

7/31/2018

Feedback and participation invited for Multi-Hazard Mitigation Plan update | Cook County News Herald



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### **Public feedback and participation is encouraged**

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7/31/2018

Feedback and participation invited for Multi-Hazard Mitigation Plan update | Cook County News Herald



your feedback to Valerie Marasco, Cook County Director of Emergency Management & Public Information: 218-387-3059 or Valerie. [Marasco@co.cook.mn.us](mailto:Marasco@co.cook.mn.us).

Comments may also be submitted on the Cook County Sheriff's Office & Public Safety Facebook Page.

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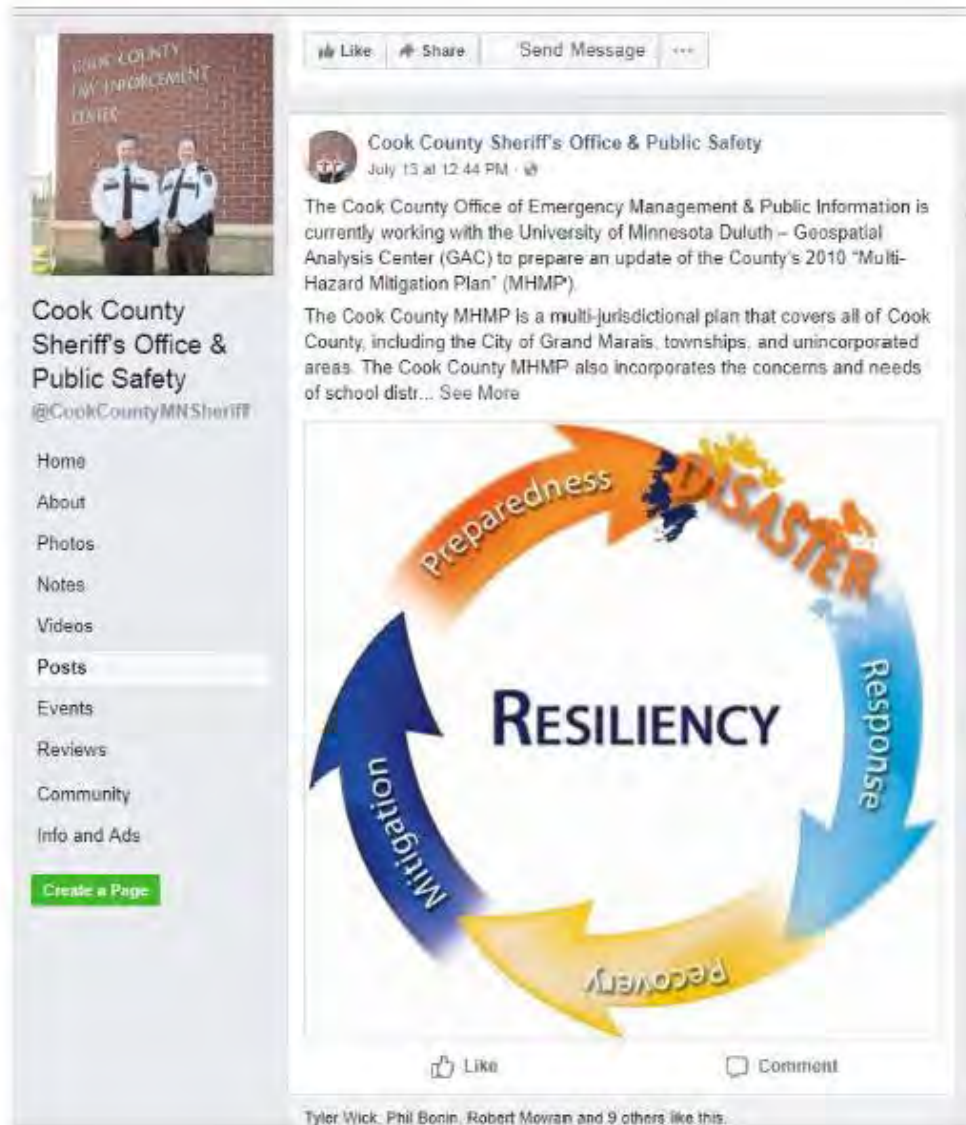
## More From Front Page

[Go To The Front Page Section](#)

Local photographer has a filter named after him



**Cook County Sheriff's Office Facebook Page**  
**MHMP Media Release #1, July 13, 2018**



The screenshot shows the Facebook page of the Cook County Sheriff's Office & Public Safety. The page header includes the name, profile picture, and navigation buttons (Like, Share, Send Message). The main post is dated July 13 at 12:44 PM. The text of the post states that the Cook County Office of Emergency Management & Public Information is working with the University of Minnesota Duluth - Geospatial Analysis Center (GAC) to update the 2010 Multi-Hazard Mitigation Plan (MHMP). It also mentions that the MHMP is a multi-jurisdictional plan covering all of Cook County, including the City of Grand Marais, townships, and unincorporated areas, and that it incorporates the concerns and needs of school districts. Below the text is a circular diagram illustrating the disaster management cycle: Preparedness (orange arrow), Disaster (red explosion icon), Response (blue arrow), Recovery (yellow arrow), and Mitigation (dark blue arrow). The word 'RESILIENCY' is written in the center of the cycle. The post has received 9 likes from Tyler Wick, Phil Bonin, Robert Morvan, and 6 others.

**Cook County Sheriff's Office & Public Safety**  
 @CookCountyMNSheriff

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**Cook County Sheriff's Office & Public Safety**  
 July 13 at 12:44 PM · 🌐

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**RESILIENCY**

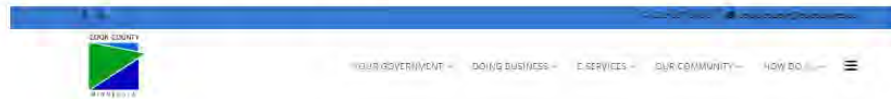
Preparedness  
 Disaster  
 Response  
 Recovery  
 Mitigation

Like Comment

Tyler Wick, Phil Bonin, Robert Morvan and 9 others like this.



## Cook County Website MHMP Media Release #1, July 13, 2018



### Cook County MN News

#### Media Release - Public Feedback and Participation Invited for Multi-Hazard Mitigation Plan Update

July 13, 2018 - The Cook County Office of Emergency Management & Public Information is currently working with the University of Minnesota Duluth - Geospatial Analysis Center (GAC) to prepare an update of the County's 2010 "Multi-Hazard Mitigation Plan" (MHMP). The Plan is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000), and must now be updated every five years in order to maintain eligibility for federal hazard mitigation funding programs.

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The Cook County MHMP is a multi-jurisdictional plan that covers all of Cook County, including the City of Grand Marais, townships, and unincorporated areas. The Cook County MHMP also incorporates the concerns and needs of school districts, public utilities, and other stakeholders participating in the Plan.

Cook County is vulnerable to a variety of potential natural disasters which threaten the loss of life and property in the County. Hazards such as wildfire, straight line winds, flooding, blizzards, ice storms, and droughts have the potential for inflicting vast economic loss and personal hardship.

"Hazard mitigation planning is a central part of our emergency management program," said Valerie Marasco, Director of Emergency Management & Public Information. "Understanding the natural hazards that can cause serious impact to our communities and taking action to reduce or eliminate the impact of future disasters makes us more resilient. Hazard mitigation helps us to break the cycle of damage and repair caused by things like wildfire, flooding, ice storms, and severe wind events that can damage property, stress economies, and threaten life safety in our county."

Examples of hazard mitigation include actions such as improvement of roads and culverts that experience repetitive flooding; implementation of wetland fuels reduction; construction of safe rooms at campgrounds, parks, mobile home parks or schools to protect lives in the event of tornadoes or severe wind events; burying powerlines that may fall due to heavy snow, ice or wind storms; ensuring timely emergency communication to the public through warning sirens and mass notification systems, and conducting public awareness & education campaigns to help people to be prepared to take safe action before, during, or following a hazard event.

#### Public Feedback and Participation is Encouraged

As part of the planning process, gathering input from the public is an important and required step. Cook County seeks to gather feedback from residents and businesses from across the County to incorporate into the Plan:

- What are the natural hazards you feel pose the greatest risk to your community?
- What concerns do you have, and what sorts of mitigation actions or projects do you feel would help to reduce the damages of potential future events for your personal property, your community, or the County as a whole?

The public is strongly encouraged to submit your comments, concerns, or questions regarding natural disasters and potential mitigation actions to be included into the plan update process. Please submit your feedback to Valerie Marasco, Cook County Director of Emergency Management & Public Information: 218-387-3058 or [Valerie.Marasco@co.cook.mn.us](mailto:Valerie.Marasco@co.cook.mn.us). Comments may also be submitted on the Cook County Sheriff's Office & Public Safety Facebook Page.

The public will have a continued opportunity to participate in the MHMP update in the coming months. A draft of the Plan will be available for public review prior to submission to the State of Minnesota. Future opportunities for public involvement will be publicly advertised and shared through media.

-30-

Contact: Valerie Marasco, Director - Office of Emergency Management & Public Information, 218-387-3058 or [valerie.marasco@co.cook.mn.us](mailto:valerie.marasco@co.cook.mn.us)

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## **Appendix G**

# **Mitigation Actions by Jurisdiction**

Table G - 1. Mitigation Actions Identified for Implementation by the city of Grand Marais (2019-2023) (from Cook County Master Mitigation Action Chart)

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
4	All-Hazards	Local Planning & Regulations	<b>COMMUNITY PLANNING</b> Update County/City Comprehensive Plans and Zoning Ordinances to include mitigation considerations that help to reduce risk from natural hazards. Utilize data of past hazard events and future climate projections to help inform updates.	New	Moderate	2019-2023	Cook County, City of Grand Marais	CC Emergency Management & County Board & Departments	The county and local jurisdictions will work to incorporate mitigation considerations and climate change data into the update of land use plans and ordinances. This is also a high priority for the MN DNR Lake Superior Coastal Program (MLSCP) as well as NOAA.  <i>City Comment: The city is taking on a Climate Action Plan and revisions of its City Code.</i>	County funding, MLSCP grants (Planning, Regulations)

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
13	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<p><b>BACKUP POWER NEEDS ASSESSMENT</b> Identify critical facilities in the County that do not have back-up power in the event of a major power outage resulting from severe winter or summer storms.</p> <p><i>(Critical facilities may include: police/fire departments, EOC, health care facilities, water &amp; sewer treatment facilities, and other facilities deemed as critical, i.e. public schools and sheltering facilities).</i></p>	Ongoing	High	2019-2023	<p>Cook County, <b>City of Grand Marais</b></p> <p>Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail &amp; Unorganized Areas, Public &amp; Private Schools</p>	CC Emergency Management and local-level government	<p>Generator backup power is currently in place for the Cook County Courthouse, Jail, Sheriff's Office, Dispatch, County Data Center, and North Shore Care Center.</p> <p><b>Generator backup power should be obtained for:</b></p> <ul style="list-style-type: none"> <li>• Cook County EOC</li> <li>• Cook County Community Center,</li> <li>• Senior Center,</li> <li>• Cook County Schools ISD# 166</li> <li>• Great Expectations School</li> <li>• Birch Grove Community Center</li> <li>• YMCA</li> </ul> <p>Municipal governments are encouraged to obtain back-up generators for local critical facilities.</p> <p><i>City Comment: The city has backup capacity for all load amounts within the PUC service area and will maintain such. Backup redundancies are present at water treatment and wastewater treatment plants.</i></p>	County, municipal funding

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
14	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<b>BACKUP POWER IMPLEMENTATION</b> Purchase and install generators & hook-ups for identified critical facilities that require backup power.	<b>New</b>	High	2018-2022	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Management & Local EM's / Gov't	Cook County, local governments, and schools will evaluate feasibility to purchase and install generators for key facilities, and will do so as funding allows.  <i>City Comment: See above.</i>	County, municipal funding, Possible FEMA HMA grant funding for Generators



#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
15	Severe Winter & Summer Storms	Structure & Infrastructure Projects	<b>POWERLINE FAILURE</b> Work with rural & municipal electrical coops to identify where it is feasible and cost effective to bury or strengthen power lines to mitigate against power line failure and implement measures.	<b>New</b>	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail	CC Emergency Management, CC Highway & Local EM's / Gov't, Arrowhead Electric Coop.	<p>Cook County will work with Grand Marais PUC and Arrowhead Electric Coop on this effort. Many areas throughout the county have power lines vulnerable to failure in the event of severe storms and should be evaluated for potential strengthening measures or putting them underground. Such projects could be done as part of new construction or as part of reconstruction projects. Supportive grant funding will be required for projects that are feasible as such projects are extremely expensive and difficult in the rocky terrain of the North Shore.</p> <p><i>City Comment: The PUC will bury appropriate lines as a part of Hwy 61 redesign and other reconstruction projects. Maintenance of right of way is an implemented best practice and the City will work with County/FEMA to identify and fund burying vulnerable lines.</i></p>	Rural or Municipal Electric Coop funding, Possible FEMA HMA funding for Infrastructure Retrofit

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
18	Severe Winter & Summer Storms	Local Planning & Regulations	<b>WINTER ROADS TREATMENTS</b> Continue to provide for public safety on roads through snow removal, salting and sanding to minimize the impacts of snow/ice accumulation on roadways.	Ongoing	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail MnDOT	CC Hwy Dept, MnDOT, & municipal roads dept./public works	Cook County, cities, and Townships complete the snow removal and disperse sand/salt as needed on all, county, city and township roads. MnDOT removes the snow from State Highway 61 as well as disperses salt/sand as needed. The MLSCP offers information on Best Management Practices for salt management to protect trout & other fish habitat.  <i>City Comment: Concur.</i>	County, municipal funding
19	Severe Winter & Summer Storms	Mitigation Preparedness & Response Support	<b>TREE MANAGEMENT</b> Regularly inspect and trim trees near power lines to reduce power outages and road debris due to falling tree limbs during storms.	Ongoing	Moderate	2019-2023	Cook County, City of Grand Marais, MnDOT	CC Hwy. Dept., municipal roads dept./public works, MnDOT	Cook County, local public works, Grand Marais, PUC, and Arrowhead Electric Coop all oversee this effort respectively. Extensive brushing work is also done across the county through Firewise Programs that mitigates both power failures and wildfire risks.  <i>City Comment: PUC maintains right of way clearances on a regular schedule.</i>	County, municipal funding, MLSCP grants (Urban Tree Inventory – Two Harbors), MnDOT (Right of Way Utilities)

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
21	Severe Summer Storms	Local Planning & Regulations	<b>STORM SHELTERS/SAFE ROOMS NEEDS ASSESSMENT</b> Identify community areas (i.e., parks, campgrounds) and facilities (i.e., schools, government buildings, mobile home parks) that are vulnerable to severe wind storms or tornadoes and evaluate for potential construction or retrofit of safe rooms or storm shelters.	New	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Mgmt, CC Public Health & Human Services, School Admin.	Cook County Emergency Management and local communities have identified areas of concern to include the Grand Marais Municipal Campground & RV Park, Gunflint Trail area, Caribou Trail/Lamb's/Lutsen recreation & resort areas. Safe room construction or retrofit for schools is also desired to protect students and staff.  <i>City Comment: City will investigate best practices to ensure safety of campers in the campground.</i>	County, municipal funding
22	Severe Summer Storms	Structure & Infrastructure Projects	<b>STORM SHELTERS/SAFE ROOMS CONSTRUCTION/RETROFIT</b> Implement construction or retrofit projects for safe rooms or storm shelters in identified vulnerable locations.	New	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail, Public & Private Schools	CC Emergency Management in coordination municipal EM's, School District Officials, Resort or other private partners (i.e. resorts)	Cook County Emergency Management will work with local jurisdictions or facilities that wish to construct a storm shelter or community safe room. FEMA grant funding may be sought to support an eligible safe room project.  <i>City Comment: City is open to discussion pertaining to safe room construction and will need funding assistance to complete.</i>	County, municipal funding, Possible FEMA HMA grant for Safe Rooms

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
27	Flooding	Local Planning & Regulations	<b>NEW DEVELOPMENT GUIDELINES</b> Work to ensure new development does not occur in flood-prone areas along the Lake Superior Coast or inland areas.	New	High	2019-2023	Cook County, City of Grand Marais	CC Mgmt. I.S., CC Land Services	Cook County and local municipalities follow the North Shore Management Plan Shoreland Guidelines and Grand Portage Land Use Ordinance for development on Lake Superior and the DNR Shoreland Guidelines for development on inland shoreland property to ensure development is setback at a proper distance from the water. Cook County also has zoning regulations in place for wetlands and development. Cook County also has designated "No Service Zones" in rural areas of the County where if development is permitted, owners acknowledge risks and waive any access to public services.  <i>City Comment: Concur. City has adopted a Stormwater Management Plan to mitigate flooding in low lying areas.</i>	County funding, MLSCP grants (Planning, Regulations, Outreach)

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
29	Flooding	Structure & Infrastructure Projects / Local Planning & Regulations	<b>DOWNTOWN COASTAL FLOODING</b> Identify and implement projects to reduce risk from Lake Superior coastal flooding to structures or infrastructure (public or private) in the downtown area of Grand Marais.	New	High	2019-2023	Cook County, City of Grand Marais	City of Grand Marais, CC Land Services, CC, Highway Dept. and CC SWCD in collaboration with state and federal partners	<p>The city of Grand Marais and Cook County have identified, mapped, and documented areas of risk in the downtown area of public and private property that have experienced repetitive coastal flooding and resulting damages. Mitigation projects to address coastal flooding in the downtown area of Grand Marais will be a collaborative effort that includes coordination between city, county, and State and Federal agencies (i.e., City of Grand Marais, Cook County Highway Dept., SWCD, MnDOT, MLSCP, and NOAA). Priority projects that may be eligible for FEMA HMA grant funding include reconstruction &amp; upgrade of the sea wall at the end of Wisconsin Street to reduce road washouts, and property-specific mitigation measures in concert with private landowners along the coastal shoreline in this area.</p> <p><i>City Comment: City Stormwater Plan seeks to address this in conjunction with the agencies mentioned above.</i></p>	County, federal funding, Possible MLSCP grant for design if public land. Possible FEMA HMA grant for Localized Flood Reduction Projects



#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
30	Flooding	Structure & Infrastructure Projects / Natural Systems Protection	<b>COOP PARKING LOT FLOODING</b> Implement plans to reduce flooding of the city parking lot near the Coop in downtown Grand Marais.	New	High	2019-2023	Cook County, City of Grand Marais	CC Highway Dept., City of GM Public Works,	This project is identified as a top priority project in the Grand Marais Stormwater Management Plan. This project will be under the collaborative management of the city of Grand Marais, Cook County Highway, and SWCD.  <i>City Comment: Concur.</i>	County, municipal funding, Possible FEMA HMA grant for Localized Flood Reduction Projects, MLSCP grants (Planning)
33	Flooding	Local Planning & Regulations / Structure & Infrastructure Projects	<b>STORMWATER MANAGEMENT</b> Identify, plan for, and implement mitigation projects to address stormwater management issues that affect stormwater and transportation infrastructure.	Ongoing	High	2019-2023	Cook County, City of Grand Marais	CC Highway Dept., City of GM Public Works, SWCD, MnDOT	The city of Grand Marais has a storm water management plan in place that identifies strategies to mitigate flooding. The city is partnering with MnDOT to implement storm water flooding mitigation strategies during the Highway 61 reconstruction.  <i>City Comment: Concur.</i>	County, municipal funding, MnDOT. Other state & federal funding (TBD), MLSCP grants (Regulations)
34	Flooding	Local Planning & Regulations / Structure & Infrastructure Projects	<b>SPRING THAW/ICE DAMS</b> Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during the spring thaw.	Ongoing	Moderate	2019-2023	Cook County, City of Grand Marais, MnDOT	CC Hwy Dept, GM Public Works, and MnDOT	This is a standing effort of the Cook County Highway Dept., City public works, and MnDOT to address snow removal and ice treatments to roads in spring and winter.  <i>City Comment: Concur. Ongoing effort.</i>	County, municipal funding, MnDOT, MLSCP grants (Regulations, Outreach)

#	Hazard	Mitigation Strategy	City of Grand Marais Mitigation Action	Status	Priority Ranking	Time-frame	Jurisdictions	Responsibility	County/City Comments on Planning Mechanisms for Implementation	Possible Funding
39	Wildfire	Local Planning & Regulations	<b>MUTUAL AID AGREEMENTS</b> Maintain inter-agency, multi-jurisdictional, and cross-border efforts to identify, contain, and extinguish wildfires.	Ongoing	High	2019-2023	Cook County, City of Grand Marais, Schroeder, Tofte, Lutsen, Hovland, Colvill, Gunflint Trail,	CC Emergency Management, VFDs, MN DNR, USFS, Arrowhead Lands Collaborative	<p>VFD's work together through mutual aid agreements, as well as with the Fire Cooperators annual meetings, Cook County Disaster Round-Up event, MN DNR and USFS. When needed we have international mutual aid agreements with Canada, developed through the Cross-Border Wildfire Committee and the Pigeon River International Emergency Management Committee. All municipal fire departments have mutual aid agreements with each department that borders their respective fire district, and Cross-Border wildfire agreements are in place with the Ministry of Natural Resources in Ontario Canada. The Arrowhead Lands Collaborative (Cook County GIS, MN DNR, U.S.F.S.) shares geo-spatial data to support wildfire response.</p> <p><i>City Comment: Fire Department just adopted Standard Operating Procedures manual and acknowledges these mutual aid agreements.</i></p>	County, municipal, and agency funding

# **Appendix H**

## **Past Mitigation Action Review**

### **Status Report (2010-2018)**

## Cook County – Past Mitigation Review Status Report (2010-2018)

Following is a report on the status of each of the mitigation actions that were included in the 2010 Cook County multi-hazard mitigation plan. This report meets the following FEMA crosswalk requirement:

***D2. Was the plan revised to reflect progress in local mitigation efforts? (44 CFR 201.6 (d)(3))***

*The plan **must** describe the status of hazard mitigation actions in the previous plan by identifying those that have been completed or not completed. For actions that have not been completed, the plan **must** either describe whether the action is no longer relevant or be included as part of the updated action plan.*

### **COMPLETED**

The following mitigation actions from the past MHMP have been completed and will be removed from the plan update.

- (All-Hazards) Adopt a community notification system for weather, wildfire, or other public safety event.  
***Completed/Ongoing.** Since 2005, Cook County now actively uses CodeRED, along with the Sheriff's Office & Public Safety Facebook Page, County website, and the Boreal Emergency Preparedness Portal to support provision of emergency information and warning to our residents. We also partner with local radio station (WTIP).*

### **NOT COMPLETED (DELETE)**

The following mitigation actions from the past MHMP have been deemed as not relevant and will be removed from the plan update.

#### Violent Storms and Extreme Temperatures

- Ensure that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm as well as when on occurs in the county.  
***Delete.** Not a relevant mitigation action. (Emergency Manager posts eminent weather info and sends heads-ups to Board of Commissioners and management team involved in Emergency Operations.*
- Increase strategically located signage along roadways informing people about emergency information radio frequency.  
***Delete.** Not a strong mitigation action. Since 2005, people are accustomed to using advanced cell phone technology such as apps to get emergency weather notifications. Local radio stations also support emergency announcements. Cook County also has the ability to send out IPAWS and CODERed warnings.*
- Support Cook County schools in working with the State on allowing additional school closing days in case of a severe winter that warrants a larger number of school closing days that are allotted during a given school year due to severe weather.  
***Delete.** This is a not a strong mitigation action. School districts work on their own school closing policies and emergency procedures for school to be closed in the event of dangerous weather.*

- Inform the public on the snow removal policy so there is an understanding of the timeframe it may take to remove snow from certain routes. The most effective way to do this would be through local media (e.g. newspaper ads and WTIP).

***Delete.** This is not a strong mitigation action. Informing the public on the state of snow removal following a severe winter storm is a standard communication effort by the County.*

#### Flooding

- Include vulnerability of infrastructure and population put at risk when setting funding priorities for infrastructure projects.

***Delete.** Not a strong mitigation action on its own. The County maintains a five-year transportation improvement plan that considers a range of factors in the prioritization of projects, including the vulnerability of infrastructure and populations at risk.*

#### **NOT COMPLETED (ONGOING/KEEP FOR PLAN UPDATE)**

The following mitigation actions from the past MHMP have not been completed, have been deemed as still relevant and will be carried over into the plan update. Actions will be revised as necessary.

#### Violent Storms and Extreme Temperatures

- Continue the winter storm awareness program. In particular, reach out to residents that have moved into the area in the last five years, since winter storm weather has been mild and these residents may not be as prepared.

***Ongoing – revise as needed for plan update.** Cook County produces seasonal PSAs, print and digital ads, online info, as well as radio interviews on the topic.*

- Expand information on risks of heat related illnesses. Key audiences are the elderly and the younger population engaging in physical activities.

***Ongoing – revise as needed for plan update.** Cook County produces seasonal PSAs, print and digital ads, online info, as well as radio interviews on the topic.*

- Review and update current information and delivery systems in place.

***Ongoing –** Cook County utilizes CODERed for notification delivery as well as NOAA. In addition, County maintains an dynamic website with Emergency Plans and documents, and has also been the guiding partner in the development of the new Boreal Emergency Preparedness Portal (<http://www.boreal-emergency.org/>) which focuses on "Know Before You Go" and consolidates a variety of emergency and preparedness partners in the area, an active CC Sheriff's Office & Public Safety Facebook page (over 2,000 followers), and a dedicated PIO Office.*

- Ensure storm spotters in Cook County receive training on a regular basis in order to maintain their storm spotting skill level.

***Ongoing – revise as needed for plan update.** Cook County participates in regular Storm Spotter training with the National Weather Service – the last training was held May 25, 2018 and welcomed eight new trained spotters.*

- Promote the use of NOAA weather radios for weather related emergency information during storm awareness weeks.

**Ongoing.** Cook County continues to promote the use of NOAA weather radios to local residents, businesses, critical facilities, and visitors coming to the area.

**(Also Ongoing – revise plan as needed for update)** – Cook County works with schools to mitigate man-made hazards such as hostile incidents and threats. CC Emergency Management and Sheriff's Office participates in security assessments and joint trainings with MN HSEM School Safety Center to address threats, lockdown procedures, and physical security gaps.

- Increase education on the risks of heat for senior populations and populations that engage in strenuous physical activities during periods of severe heat.

**Ongoing.** Cook County Emergency Management and Cook County Public Health both continue to provide awareness and education to the public on the dangers associated with extreme heat events, particularly to vulnerable populations such as the elderly.

- Locate power lines underground where it is feasible and cost effective. This could be done as part of new construction or as part of reconstruction projects.

**Ongoing.** This is a mitigation measure that should be maintained in the new plan as many areas throughout the county have power lines vulnerable to failure in the event of severe storms and should be evaluated for potential strengthening measures or putting them underground.

- Maintain an aggressive brushing program in order to reduce risks of downed trees interrupting the power supply.

**Ongoing – revise as needed for plan update.** Cook County, local public works, and the electric utility companies oversee this effort. Extensive brushing work is also done across the County through Firewise Programs that mitigates both power failures and wildfire risks.

- Maintain an aggressive brushing program in order to reduce the amount of debris that could block a road after a severe windstorm or winter storm.

**Ongoing – revise as needed for plan update.** Cook County, local public works, and the electric utility companies oversee this effort. Extensive brushing work is also done across the County through Firewise Programs that mitigates both power failures and wildfire risks.

## Flooding

- Maintain bridge, road, and culvert infrastructure at a level that is capable of sustaining a major storm event and will not be vulnerable to washouts.

**Ongoing – revise as needed for plan update.** Cook County maintains a five-year transportation improvement plan, and is working on a new Capital & Infrastructure Plan.

- Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during the spring thaw.

**Ongoing – revise as needed for plan update.** This is a standing effort of the Cook County Highway Dept., City public works, and MnDOT to address snow removal and ice treatments to roads in winter.

- Coordinate with the DNR and the USFS to keep forest road right-of- ways for emergency access in case of a road washout.



***Ongoing – revise as needed for plan update.*** Cook County works closely with the MN DNR and USFS on many different elements of emergency response planning. The focus here is our ongoing partnership on emergency preparedness planning.

- Steer development away from areas that may be difficult to serve with reliable road access. For example, development that will require access through an area that would be prone to washouts or flooding, such as wetland areas.

***Ongoing – revise as needed for plan update.*** Cook County has zoning regulations in place for wetlands and development, and the Cook County CWPP also helps to identify high-risk wildfire areas where developers should be aware of risks and mitigation measures for construction of any new homes. Cook County also has designated "No Service Zones" in rural areas of the County where if development is permitted, owners acknowledge risks and waive any access to public services.

- Follow the North Shore Management Plan Shoreland Guidelines and Grand Portage Land Use Ordinance for development on Lake Superior and the DNR Shoreland Guidelines for development on inland shoreland property to ensure development is setback at a proper distance from the water.

***Ongoing – revise as needed for plan update.*** Cook County and local communities continue to develop and follow guidelines and policies for new development.

#### Utility/ Telecommunications Outage

- Advocate for redundant communications pathways and backup utility systems county wide especially for critical public services and businesses.

***Ongoing – revise as needed for plan update.*** This is a continuous effort by Cook County and local jurisdictions (i.e., to have back-p generator power for critical facilities). Cook County has diligently worked with the MN ECN to address lack of redundancy with 911 phone lines and now, through a partnership with ECN, CenturyLink and NEC, a redundancy infrastructure has been put in and failover plans are in final testing phases (June 2018), to mitigate reoccurring 911 outages.

#### Wildfire

- Continue and where necessary expand efforts to educate area residents through the FireWise Program on how they can reduce the risk of wildfire doing damage to their property through vegetation management and use of fire resistant building materials. Information on the FireWise Program can be found at [www.dnr.state.mn.us/firewise/index.html](http://www.dnr.state.mn.us/firewise/index.html).

***Ongoing – revise as needed for plan update.*** Cook County has developed and maintains an active Firewise program. Cook County has seven recognized Firewise USA Communities, completes between 800-1100 Firewise property assessments/year, maintains [www.cookcountyfirewise.org](http://www.cookcountyfirewise.org), along with a Cook County Firewise Facebook page, educational video, and distributes annual action reports on the extensive Firewise activity.

- Promote the use of financial assistance for fuel reduction efforts through the FireWise Program by property owners.

***Ongoing – revise as needed for plan update.*** Cook County has developed and maintains a very active Firewise program. Cook County Firewise uses [www.cookcountyfirewise.org](http://www.cookcountyfirewise.org), along with a Cook County Firewise Facebook page, educational video, and distributes annual action reports on

*the extensive Firewise activity, an annual communication plan/promotional calendar to promote Firewise opportunities.*

- Continue to promote the use of building materials and roof sprinkler systems that can reduce the chance of property damages.

***Ongoing – revise as needed for plan update.*** Cook County has developed and maintains an active Firewise program. From approximately 2007-2014 County additionally worked on installation of external wildfire sprinkler systems for properties in high-risk wildfire areas with the help of FEMA HMA grants. The Office of Emergency Management distributes reminders to sprinkler system owners of maintenance requirements and keeping them in good working order.

- Maintain an on-going effort to educate people how to respond in case of a large wildfire event so both residents and area visitors respond accordingly to warnings and are aware of evacuation routes.

***Ongoing – revise as needed for plan update.*** Wildfire education and information on evacuation routes and procedures is an on-going effort for both local residents and visitors to the area. Cook County, MN DNR, and USFS all work jointly on this important communication to the public. Cook County uses several tools including website, print ads, Emergency Preparedness Portal, social media and in-person training exercises with our VFDS in high-risk areas that sees people visit each residence.

- Inventory areas where firefighting capacity is limited through the availability of water and consider strategic installation of dry fire hydrants or water holding tanks.

***Ongoing – revise as needed for plan update.*** Increasing capabilities for rural wildland fire fighting is a high priority for our local volunteer fire departments, as well as the MN DNR and USFS. The Hovland VFD is working to install a dry hydrant at Horseshoe Bay.

- County planning staff and area fire chiefs should coordinate to ensure new development will have adequate access and egress for emergency response vehicles.

***Ongoing – revise as needed for plan update.*** Emergency Management works with Land Services, as well as through Firewise to actively promote adequate emergency access for emergency vehicles, and guidelines for safe rural driveway access. A postcard campaign has gone out to all properties, as well as an educational video online, postcard with instructions distributed with all address applications.

- Continue inter-agency and multi-jurisdictional efforts to identify, contain, and extinguish wildfires.

***Ongoing – revise as needed for plan update.*** Volunteer Fire Departments work together through mutual aid agreements, as well as with the Fire Cooperators annual meetings, Cook County Disaster Round-Up event, MN DNR and USFS. When needed we have international mutual aid agreements with Canada, developed through the Cross-Border Wildfire Committee and the Pigeon River International Emergency Management Committee.

# **Appendix I**

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## **Appendix J**

# **Cook County Plans & Programs in Place**

**Planning & Regulatory**

<b>Plans/Programs</b>	<b>Yes/No</b>
Comprehensive/Master Plan	In Development
Capital Improvements Plan	In Development
Economic Development Plan	Yes
Emergency Operations Plan	Yes
Continuity of Operations Plan	Yes
Transportation Plan	Yes
Stormwater Management Plan	In Development - 2018-2027 Stormwater Management Plan for the Grand Marais Watershed
Community Wildfire Protection Plan	Yes
FireWise Program	Yes
Water Conservation/Emergency Preparedness Plan	Yes
Wellhead Protection Plan	
Database of dry hydrants/well access	Yes
Burning permits/restrictions	Yes
Water Management Plan	Yes - Cook County Comprehensive Water Management Plan – Expires in 2024 – covers the Laurentian Divide North (Rainy River Headwaters Watershed portion of the County) Lake Superior North Comprehensive One Watershed, One Plan – Expires in 2027 – covers the Lake Superior North portion of the County
Zoning ordinance	Yes
Subdivision ordinance	Yes
Floodplain ordinance	No
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes - Stormwater and Steep Slope
Flood insurance rate maps	No
Acquisition of land for open space and public recreation uses	Yes
School closing policy/communications plan in event of inclement weather/temperatures	Yes
Storm shelters (list all locations)	Yes (YMCA/ISD #166 Schools, CC Community Center, Senior Center)
Warning sirens (list all locations)	No - There are no outdoor warning sirens in the county due to sparse population density and protected wilderness areas.
SKYWARN Program	Yes
CodeRED Mass Notification System	Yes
Severe Weather Awareness Week	Yes
Winter Weather Awareness Week	Yes
NOAA Weather Radios	Yes
THIRA	Yes
Other*	Evacuation Plan, Land Use Guide Plan 2016

**Administrative & Technical**

<b>Administration</b>	<b>Yes/No</b>
Planning Commission	Yes
Mitigation Planning Committee	Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes
Mutual aid agreements	Yes
<b>Staff</b>	<b>Yes/No</b>
Chief Building Official	Yes
Floodplain Administrator	No
Emergency Manager	Yes
Community Planner	No
Civil Engineer	Yes
GIS Coordinator	Yes
<b>Technical</b>	<b>Yes/No</b>
Warning systems/services (Reverse 911, outdoor warning signals)	Yes
Hazard data and information	Yes
Hazus analysis	Yes
<i>Other*</i> Cook County has Zoning Administrator, Stormwater/Enforcement Officer, Commissioner/Parks Director, Wetlands/Land Use Specialist, Environmental Health Specialist, and a Land Services Director, as well the Cook County Soil & Water Conservation District includes: Soil & Water Tech, Conservation Technician, SWCD Program Manager, and District Manager	Yes

**Education & Outreach**

<b>Program/Organization</b>	<b>Yes/No</b>
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes
Natural disaster or safety related school programs	Yes
StormReady certification	Yes
Firewise Communities certification	Yes
Public-private partnership initiatives addressing disaster-related issues	Yes
<i>Other*</i> We do not have a floodplain ordinance, flood insurance rate maps or a floodplain administrator simply because FEMA currently doesn't have any designated flood zones in Cook County. FEMA has started working on some new flood maps, but it may take some years before we see the final result, at which point it would be either the responsibility of Cook County Land Services department or the SWCD (or both) to administer the floodplain program.	

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# **Appendix K**

## **Local Mitigation Capabilities**

### **Assessment Report**

As part of the 2018 Cook County Multi-Hazard Mitigation Plan update, city and township jurisdictions as well as County departments were invited to respond to a “Local Mitigation Capabilities Assessment” (LMCA) questionnaire to provide information about the current capabilities they have in place to support hazard mitigation, as well as any identified gaps or deficiencies. Information from the LMCAs was used to assist in developing new mitigation actions for the 2018 plan update. Following are the responses from those departments or jurisdictions that participated.

### Cook County Board of Commissioners

*Submitted By:* Myron Bursheim, Cook County Commissioner

**Q1. What plans, authorities, or policies are in place to help accomplish mitigation in your community?**

- The county has ordinances for shoreland regulations and plans for stormwater management.
- The county has a Community Wildfire Protection Plan (CWPP) to address wildfire mitigation.

**Q2. What staff (organizational capacity) are in place to help accomplish mitigation in your community?**

- Emergency Management Director and active Emergency Management Team
- Firewise Coordinator
- Cook County has Zoning Administrator, Stormwater/Enforcement Officer, Commissioner/Parks Director, Wetlands/Land Use Specialist, Environmental Health Specialist, and a Land Services Director, as well the Cook County Soil & Water Conservation District includes: Soil & Water Tech, Conservation Technician, SWCD Program Manager, and District Manager

**Q3. What programs are in place to help accomplish mitigation in your community?**

- We have an Emergency Management Plan and Critical Incident Team
- Firewise Program

**Q4. What funding or other resources are available to help accomplish mitigation in your community?**

- We have state and federal funds and County funds

**Q5. What program gaps or deficiencies do you feel exist that are a barrier to accomplishing mitigation in your community?**

- None I am aware of

## **Cook County Firewise Program**

*Submitted By:* Todd Armbruster, Cook County Firewise Coordinator

**Q1. What plans, authorities, or policies are in place to help accomplish mitigation in your community?**

- We have a Community Wildfire Protection Plan (CWPP). This plan is broken down into 15 planning zones which provide details about the amount of Wildland Urban Interface area, risk rating, mitigation activities, outreach, and local fire department needs in each planning zone to reduce wildfire risk.
- The CWPP is implemented through the CWPP Committee (Firewise Committee) which prioritizes projects throughout the county.

**Q2. What staff (organizational capacity) are in place to help accomplish mitigation in your community?**

- The CWPP Committee (Firewise Committee). The Firewise Committee is composed of a County Commissioner, the Cook County Emergency Management and Public Information Director, the Cook County Firewise Coordinator, a Department of Natural Resources Representative, a Cook County Fire Chiefs Association Representative, a Cook County Community Firewise Representative and a U.S. Forest Service Representative.
- The County Firewise Coordinator.
- The County Emergency Manager.
- The U.S. Forest Service Fire Management Officer, Fuels Technician and Fuels Planner.
- The Minnesota Department of Natural Resources Forester.
- Volunteer fire department representatives.
- County Auditor's office.

**Q3. What programs are in place to help accomplish mitigation in your community?**

- Cook County Firewise educates homeowners on implementing fuel-reduction measures around homes in areas adjacent to woodland areas for wildland fire safety. Some examples include Firewise Demonstration Days, outreach at community events, speaking to homeowner associations at annual meetings, advertising in local media sources, establishing Firewise USA sites, and meeting with property owners on their property.
- Cook County Firewise has two active Steven's grants for fuels reduction projects on private property. These reduce risk on properties and allow time for Firewise education one on one with the property owners.
- Cook County Firewise has seven community brush collection sites where property owners can drop off vegetative materials removed from their property to reduce wildfire risk.

- Cook County Firewise annually conducts level 2 Firewise assessments on properties and brush pick-up projects.

**Q4. What funding or other resources are available to help accomplish mitigation in your community?**

- Cook County Firewise regularly receives a DNR Firewise grant to help maintain brush disposal sites and conduct level 2 assessments.
- Cook County Firewise regularly receives Steven's grants from the USFS for hazardous fuels reduction projects.
- Cook County Firewise uses Secure Rural Schools Title III funding to promote Firewise USA and other programs.
- DNR and USFS staff are on the Cook County Firewise Committee.

**Q5. What program gaps or deficiencies do you feel exist that are a barrier to accomplishing mitigation in your community?**

- Many of the property owners in the Wildland Urban Interface areas of Cook County are seasonal or weekend visitors and the owners are often elderly. Outreach and education can be a challenge to connect with absentee property owners. Furthermore, it is difficult for elderly property owners to conduct Firewise mitigation work on their properties and dispose of the material.

**Cook County Soil & Water Conservation District**

*Submitted By:* Ilena Hansel, District Manager

**Q1. What plans, authorities, or policies are in place to help accomplish mitigation in your community?**

- The Conservation District has adopted the Cook County Comprehensive Local Water Management Plan and the Lake Superior North, Comprehensive "One Watershed, One Plan". The district is charged with managing the plan for Cook County. The plans identify work for implementation and maintaining best management practices for soil and water conservation.
- Our SWCD office is collaborating with many local governments and groups along the coastal zone of Lake Superior to do a coastal erosion hazard map. It is a long term project and we have just started it. It is a mapping tool that will hopefully aid in development decisions and restoration efforts along the Lake Superior coast.

**Q2. What staff (organizational capacity) are in place to help accomplish mitigation in your community?**

- The staff in the SWCD office work with private land owners, USFS, DNR, City of Grand Marais, Cook County Land Services, Cook County GIS, Grand Portage, and University of MN Extension to implement practices with landowners following hazards such as flooding.

**Q3. What programs are in place to help accomplish mitigation in your community?**

- *SWCD Technical Assistance* - The Cook Soil & Water Conservation District staff provides access to natural resource management and conservation services. In cooperation with local, state, and federal agencies, the SWCD provides technical, financial, and educational assistance to address natural resource concerns. Assistance is available to all taxpayers and land users within the borders of Cook County.
- *Shoreline Erosion Reduction Program* - The Cook County SWCD has had a "Shoreline Erosion Reduction Program" (2015-2019) to help public and private property shoreline owners stabilize their lake or stream shoreline for improved water quality. This program, made possible with the help of Clean Water Land & Legacy Funds, allowed Cook SWCD to assist interested landowners in shoreline erosion reduction Best Management Practices that reduce sediment and improve water quality of the lake and/or stream adjacent to their property.
- *Volunteer Monitors Program* – Cook County SWCD has a volunteer monitoring program for lakes and streams, as well as for rain and snow monitoring. "Weather Watchers" record daily precipitation, snowfall, and accumulated snow on-the-ground. Records are used by state climatologists to map annual rain and snow patterns, weather forecasting and storm water management. MNGage is the Precipitation Observing Program administered by the MN DNR Climatology Office.

**Q4. What funding or other resources are available to help accomplish mitigation in your community?**

- The SCWD office will sometimes be awarded funding to assist landowners following flooding to mitigate soil erosion and landscape changes. Funding in the past has been both federal and state. (i.e., State of MN Board of Soil & Water Resources; Clean Water, Land & Legacy Amendment funds).

**Q5. What program gaps or deficiencies do you feel exist that are a barrier to accomplishing mitigation in your community?**

- Provide more active outreach to assist landowners in understanding why development in a particular location is not a good long term decision. There is an opportunity for new development to be more proactive and for those developing (from contractors, relators, homeowners and local units of government) to work together to make better building and land use decisions. This will help avoid development in hazard zones and the need to mitigate problematic situations that could have been avoided. Our SWCD office is collaborating with many local governments and groups along the coastal zone of Lake Superior to do a coastal erosion hazard map. It is a long term project and we have just started it. It is a mapping tool that will hopefully aid in development decisions and restoration efforts along the Lake Superior coast.

### Cook County Public Health & Human Services

*Submitted By:* Joni Kristenson Public Health Coordinator

**Q1. What plans, authorities, or policies are in place to help accomplish mitigation in your community?**

- We have a Shelter/Evacuation plan and a Medical Countermeasure/Mass Dispensing plan that is an annex to the county EOP.
- The County EOP has MOU's in place with Red Cross identifying our shelter sites.

**Q2. What staff (organizational capacity) are in place to help accomplish mitigation in your community?**

- HHS staff will work with Red Cross to staff the Evacuation/Shelter sites. Coordination would also occur with local and regional partners.

**Q3. What programs are in place to help accomplish mitigation in your community?**

- Code Red is in place for our local Emergency preparedness committee partners.
- Training needs are identified at the local level with the EP committee.

**Q4. What funding or other resources are available to help accomplish mitigation in your community?**

- (blank)

**Q5. What program gaps or deficiencies do you feel exist that are a barrier to accomplishing mitigation in your community?**



- Our departments are small in people resources will call on regional and other partners for assistance.

**City of Grand Marais, MN**

*Submitted By:* Mike Roth, City Administrator

**Q1. What plans, authorities, or policies are in place to help accomplish mitigation in your community?**

- We have a storm water management plan identifying strategies to mitigate flooding.

**Q2. What staff (organizational capacity) are in place to help accomplish mitigation in your community?**

- The City has the following full time maintenance staff available for mitigation activities: (2) Lineworkers, (3) Water and Sewer maintenance workers, (3) Property and Street maintenance workers, (2) Parks maintenance workers.

**Q3. What programs are in place to help accomplish mitigation in your community?**

- All ongoing mitigation programs are implemented with partners: Cook County Soil and Water, Cook County Firewise,

**Q4. What funding or other resources are available to help accomplish mitigation in your community?**

- The City is partnering with MnDOT to implement storm water flooding mitigation strategies during the Highway 61 reconstruction.

**Q5. What program gaps or deficiencies do you feel exist that are a barrier to accomplishing mitigation in your community?**

- Additional funding will be necessary to implement all storm water management strategies.

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# **Appendix L**

## **Jurisdictional Questionnaires**

As part of the Cook County 2018 Multi-Hazard Mitigation Plan update, city and township jurisdictions as well as County departments were invited to respond to a **"Jurisdictional Questionnaire"** to provide information on impacts of recent hazard events, the increase or decrease of community vulnerabilities, and ideas for local-level mitigation actions. Following are the responses from those departments or jurisdictions that participated.

### Cook County Board of Commissioners

*Submitted By:* Myron Bursheim, Cook County Commissioner

1. **In the last 5 years has your community experienced any severe weather or disaster events that resulted in loss of life, caused property damage, or incurred costs for recovery? Please describe.** None to my knowledge.
2. **In the last 5 years has your community taken any particular actions to reduce the vulnerability of your community against future severe weather or disaster events?** Improved Emergency Management Procedures and access to facilities/equipment.
3. **In the past 5 years, has anything changed that you feel has increased your community's vulnerability to future severe weather or disaster events?** More severe rains.
4. **What concerns do you have / what mitigation actions you think would help your community to reduce or eliminate risk against future severe weather or disaster events?** Safe space for city and area campgrounds. Improved culverts for better rain capacities.

### Cook County Firewise Program

*Submitted By:* Todd Armbruster, Cook County Firewise Coordinator

1. **In the last 5 years has your community experienced any severe weather or disaster events that resulted in loss of life, caused property damage, or incurred costs for recovery? Please describe.** We have experienced several high wind events that caused substantial blowdown of trees. We experienced a fall storm with large waves on Lake Superior that eroded shoreline areas.
2. **In the last 5 years has your community taken any particular actions to reduce the vulnerability of your community against future severe weather or disaster events?** Cook County Firewise has worked in partnership with key partners to implement numerous wildfire mitigation projects to educate the public and improve firefighting capacity, reduce hazardous fuel loads, and protect property structures. Examples include:

- We have conducted Firewise outreach to inform property owners of the risk from wildfires. Cook County Firewise launched an updated website in 2016 along with a Facebook page. In addition, Firewise reminders are frequently printed in Northern Wilds, the Cook County News Herald, and aired on WTIP North Shore Community Radio.
- Conduct Firewise assessments for homeowners. Plans call for private properties to have a new FW Assessment every 5 years.
- Installation of dry hydrants in various remote areas of the district
- County implementation of FEMA PDM grants for installation of external wildfire sprinkler systems to wet down structures or slow down the fire behavior of an approaching fire
- Fuels reduction treatments on federal lands adjacent to private lands
- Understory hazardous fuels reduction work on private property
- Hazardous fuels clean up on common property and private property
- Cook County agreement with USFS to manage slash disposal sites and to burn/chip debris
- Brush pick up days: Cook County Firewise has sponsored 12 brush pick up days in 2015 and 2016. These projects encouraged property owners to remove hazardous fuels on their property and improve defensible space. Property owners piled the materials at the end of their driveway for a truck to pick up and haul to the community brush disposal site.

3. **In the past 5 years, has anything changed that you feel has increased your community's vulnerability to future severe weather or disaster events?** The 1999 blowdown leveled large areas of forest. Now those forest areas have regenerated into thick stands of evenly aged balsam fir, a highly flammable species. Fuel loads are extremely high in many areas.

There has also been an increase in the elderly population and turnover of properties to new ownership. This has caused many properties to not be maintained in a manner that reduces wildfire risk either because the established property owners are too old or the new owners are not aware of the risk, or don't care about the risk.

4. **What concerns do you have / what mitigation actions you think would help your community to reduce or eliminate risk against future severe weather or disaster events?** A priority concern is being able to motivate and/or enable elderly property owners to maintain defensible space around their property. This relates to thinning flammable vegetation around structures and providing adequate vegetation clearance for emergency vehicles on roads and driveways.

Developing a Wildland Urban Interface ordinance would ensure properties are defensible in a wildfire event and accessible for emergency vehicles. This would also benefit emergency evacuations by allowing enough space for ingress of emergency responders and egressing property owners.

Perhaps a County-wide wildfire mitigation cost share grant could also encourage property owners to take these risk reduction steps.

### Cook County Soil & Water Conservation District

*Submitted By: Ilena Hansel, District Manager*

- 1. In the last 5 years has your community experienced any severe weather or disaster events that resulted in loss of life, caused property damage, or incurred costs for recovery? Please describe.** Increased rainfall events both in amount and frequency has increased erosional issues on stream banks. Landowners have asked for assistance to stabilize banks and minimize erosion.
- 2. In the last 5 years has your community taken any particular actions to reduce the vulnerability of your community against future severe weather or disaster events?** The City of Grand Marais has worked with the SWCD office to develop a stormwater management plan, taking into account increased rainfall events.
- 3. In the past 5 years, has anything changed that you feel has increased your community's vulnerability to future severe weather or disaster events?** Increased rain events and rain amounts have created changes in streams and increased flooding in the City of Grand Marais.
- 4. What concerns do you have / what mitigation actions you think would help your community to reduce or eliminate risk against future severe weather or disaster events?** Become more proactive with development would be great. Assisting landowners in understanding why development at a location is not a good long term decision, for example. Ensuring measures are taken so driveways and roads are built correctly and culverts installed properly.

### City of Grand Marais, MN

*Submitted By: Mike Roth, City Administrator*

- 1. In the last 5 years has your community experienced any severe weather or disaster events that resulted in loss of life, caused property damage, or incurred costs for recovery? Please describe.** Downtown structures were damaged by wave action from East Bay during a high wind and rain event. Small events include wind damage to trees and power lines, and rain events flooding downtown and eroding streambanks.
- 2. In the last 5 years has your community taken any particular actions to reduce the vulnerability of your community against future severe weather or disaster events?** The City



has prepared a storm water management plan identifying flooding reduction as a goal. The City has worked with Cook County Soil and Water on a number of small stabilization and mitigation projects. Our utilities regularly inspect and maintain rights of way to mitigate the threat of wind damage.

3. **In the past 5 years, has anything changed that you feel has increased your community's vulnerability to future severe weather or disaster events?** Lake Superior level is higher. Winter rain and freezing rain are more common.
4. **What concerns do you have / what mitigation actions you think would help your community to reduce or eliminate risk against future severe weather or disaster events?** We need more effective ice control strategies. We need to implement storm water management plan recommendations.

# **Appendix M**

## **Minnesota Department of Health**

### **Climate & Health Report**

# Planning for Climate & Health Impacts in Northeast Minnesota

Emergency Management Considerations for HSEM Region 2

Published by the Minnesota Climate & Health Program in August 2018



## ABOUT THE REGIONAL PROFILE

### EXTREME WEATHER IS A FAMILIAR CONCERN FOR MINNESOTANS

While experience has helped Minnesotans adapt to historical weather patterns, climate change trends are pushing us to adapt even further to weather patterns and extreme events that pose major threats to our health, homes, environment, and livelihood. Over 50 years of storm data on record document that Minnesota has experienced an increase in the number and strength of weather-related natural disasters, particularly those related to rising temperatures and heavy downpours. These events cost our state millions in property loss, damaged infrastructure, disrupted business, medical care and support services, and put residents and responders at risk. Understanding how our weather is changing now and into the future will help planners and decision-makers in emergency management and supporting fields extend our progress in climate adaptation and lead to more resilient communities.

### CLIMATE PROJECTION DATA AS A TOOL

Climate projections can help us prepare for the future. These data result from highly sophisticated global climate models and provide a general idea of trends in temperature and precipitation many decades into the future at ever-increasing time and spatial scales. Like every dataset, there are limitations to our understanding and application of the information to real-life decision-making. Yet despite limitations, climate projection data offer a crucial glimpse into our potential futures, and allow us to start considering the best way to allocate our preparedness dollars and management resources to reduce the severe impacts of extreme weather.



*Pagami Creek Fire (Greg Sietz, 2011)*

### PUTTING CLIMATE CHANGE INTO CONTEXT

Sometimes, climate change and extreme weather events and the impact on our communities appear distant and abstract. That is why the Minnesota Department of Health's Minnesota Climate & Health Program teamed up with state and local emergency management and preparedness professionals as well as state climatologists to develop a custom climate profile for each of the six Homeland Security and Emergency Management (HSEM) regions across the state. Each regional profile includes a description of climate change trends along with a summary of climate projection data to illustrate these trends. Regional climate data are presented alongside population projection data, as it's important to consider both our climate future and population future as we plan to minimize risk and build resilience against climate impacts.

Additionally, each regional profile provides a local case study, a "focusing event," to illustrate the links between extreme weather and natural disasters and what climate projection data can (and cannot) signify for similar events in the future. Each case study features a recent natural disaster that impacted the HSEM region and provides a comparison between temperature and precipitation measures related to that event alongside historical baseline trends and future projection estimates. Taken together, the six HSEM regional profiles provide an extensive overview of climate change trends for Minnesota and describe the potential impact of these trends for emergency management and preparedness professionals and their partners.

### FOR MORE INFORMATION

A long form report, including all six profiles, individual county data, and a more comprehensive description of climate change trends and supporting research will be available at:

[Minnesota Climate & Health Planning Tools & Data](http://www.health.state.mn.us/divs/climatechange/data.html)  
([www.health.state.mn.us/divs/climatechange/data.html](http://www.health.state.mn.us/divs/climatechange/data.html))

## REGION 2 OVERVIEW

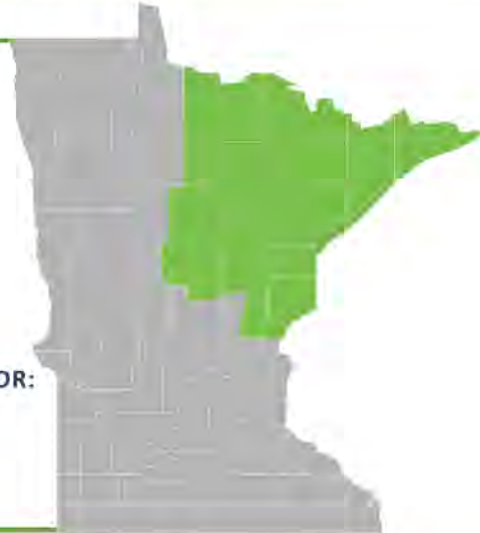
### REGION 2: Northeast Minnesota

#### COUNTIES

- Atkin
- Carlton
- Cass
- Cook
- Crow Wing
- Itasca
- Kanabec
- Koochiching
- Lake
- Pine
- St. Louis

#### HSEM REGIONAL PROGRAM COORDINATOR:

Roy Holmes  
218-327-4496  
[roy.holmes@state.mn.us](mailto:roy.holmes@state.mn.us)



## MINNESOTA CLIMATE & POPULATION TRENDS

### OUR KNOWLEDGE OF CLIMATE CHANGE IS EXPANDING RAPIDLY

Climate records show that across the Midwest and here in Minnesota we are experiencing an increase in warmer, wetter conditions as well as an increase in extreme weather events and related natural disasters. Experts expect these conditions to continue well into the future. By mid-century, Minnesotans can expect much warmer winters, more severe summer heat waves, a higher frequency of very heavy rain events and a higher frequency of late growing season drought conditions.

Many communities in Minnesota rely on economies rooted in agriculture and outdoor recreation, such as wintertime tourism, including snowmobiling, ice fishing, and skiing. Future climate conditions may stress agricultural economies by delaying planting and fieldwork, increasing disease and pest pressure, and reducing crop yields due to cycles of flooding and dry spells. Rapidly warming winter temperatures will turn snowfall into rain and reduce the depth and timing of lake ice cover, affecting winter recreation.

Extreme rainfall events will increase flood risk, particularly in floodplain areas, disrupting transportation and utility service, and damaging property and infrastructure. In addition, surface runoff may lead to soil erosion, lake pollution, and reduced drinking water quality. Nutrient runoff in particular, along with warmer temperatures, are likely to contribute to a larger occurrence of harmful algal blooms on waters, many valued for recreation. Changing climate conditions are likely to strain the viability of native species, including popular recreational fish, invite encroachment by invasive species, and increase the geographic range and types of ticks and mosquitoes.

Some of these trends are evident in the current climate projection data that are available. However, because these data are often averaged or summarized for large areas over large time periods, they can mask the local peaks in temperature and precipitation that can trigger disasters. Until more finely-scaled climate projection data become available to Minnesota planners and decision-makers, the current data still remain useful for exploring the future ahead and establishing a baseline understanding of what our weather challenges may be moving forward.



## REGION 2 CLIMATE PROFILE

*Use the following information on temperature, precipitation, and vulnerable populations to help plan for future weather-related incidents.*

### TEMPERATURE

**There has been an increase in winter and summer temperatures.** Our average winter lows are rising rapidly, and our coldest days of winter are now warmer than we have ever recorded. In fact, Minnesota winters are warming nearly 13 times faster than our summers. The continued rise in winter temperatures will result in less snow pack, which will increase chances for grassland/wildfires as well as drought. The warmer winter temperatures will also have major consequences for our ecosystems, including native and invasive species, whose growth, migration, and reproduction are tied to climate cues. The increase in Lyme disease across Minnesota is also likely influenced in part by the loss of our historical winters, due to a longer life-cycle period for ticks. Freeze-thaw cycles are likely to increase as well, damaging roads, power lines and infrastructure, and causing hazardous travel conditions. By mid-century our average summer highs will also see a substantial rise, coupled with an increase in more severe, prolonged heat waves that can contribute to drought and wildfires and pose a serious health threat, particularly to children and seniors. Here are temperature trends for HSEM Region 2:



Average Summer Maximum  
Temperature for HSEM Region 2

1981-2010	2050-2075	Change
77.2 °F	84.6 °F	+7.4 °F



Average Winter Minimum  
Temperature for HSEM Region 2

1981-2010	2050-2075	Change
1.2 °F	11.3 °F	+10.1 °F

### PRECIPITATION

**There has been an increase in total average as well as heavy precipitation events, with longer periods of intervening dry spells.** Our historical rainfall patterns have changed substantially, giving rise to larger, more frequent heavy downpours. Minnesota's high-density rain gauge network has captured a nearly four-fold increase in "mega-rain" events just since the year 2000, compared to the previous three decades. Extreme rainfall events increase the probability of disaster-level flooding. However, there is also an increased probability that by mid-century heavy downpours will be separated in time by longer dry spells, particularly during the late growing season. Over the past century, the Midwest hasn't experienced a significant change in drought duration. However, the average number of days without precipitation is projected to increase in the future, leading Minnesota climate experts to state with moderate-to-high confidence that drought severity, coverage, and duration are likely to increase in the state. Modeling future precipitation amounts and patterns is less straight-forward compared to temperature. Some climate models do a better job than others representing rainfall for the Midwest, and available data sources only provide average estimates on a monthly scale, masking the spikes in extremes that trigger flood and drought disasters. Trend data provided here for HSEM Region 2 are summarized for early summer, when historically Minnesota receives most of its rainfall, and for early fall when rainfall scarcity may threaten crop harvests and local agricultural economies:



Average Early Summer  
Precipitation for HSEM Region 2

1981-2010	2050-2075	Change
4.1"	4.7"	+0.6"



Average Early Fall  
Precipitation for HSEM Region 2

1981-2010	2050-2075	Change
2.9"	2.9"	0.0"



## VULNERABLE POPULATIONS

**There has been an increase in the older adult population.** Extreme weather events cause a range of health impacts and disruptions that vary across population groups. The vulnerability of a group is a function of its sensitivity to a hazard, exposure to risks, and capacity for responding or coping with the impacts. Children and older adults are often identified as groups vulnerable to climate change threats, including extreme weather and natural disasters. For example, physiologically these groups have a lower capacity to tolerate extreme heat and are often dependent on others for transportation to cooling centers. These groups are also often critically dependent on others during a disaster, such as needing help to evacuate during a flood or wildfire, or to find alternative housing if displaced. Planning for the specific needs of vulnerable populations strengthens local efforts to reduce the impact of extreme weather-related events. Population trend data provided here for HSEM Region 2 are intended to highlight the changes in two key demographic groups for the region, but planners and managers should also consider future changes in other populations of concern, such as those with low incomes, immigrant groups, indigenous peoples, persons with disabilities, or vulnerable occupational groups (such as outdoor workers):



**Childhood Population (0-14) Projection  
Estimates for HSEM Region 2**

2015	2050	Change
76,714	66,044	-14%



**Elder Population (65+) Projection  
Estimates for HSEM Region 2**

2015	2050	Change
93,639	121,876	+30%

## REGION 2 CASE STUDY

The following case study is intended to illustrate the links between climate and weather and natural disasters. Acting as a “focusing event,” the case study demonstrates how a previous weather-related event (i.e., wildfire) impacted important economic drivers, environmental resources, and population health. Then, the Climate Projection Data section compares weather data from the case study with baseline and projected weather data to show the possibilities of future disaster events. This case study highlights the relevancy of climate projection data for understanding future climate and weather risks in Minnesota.

**EVENT: WILDFIRE**

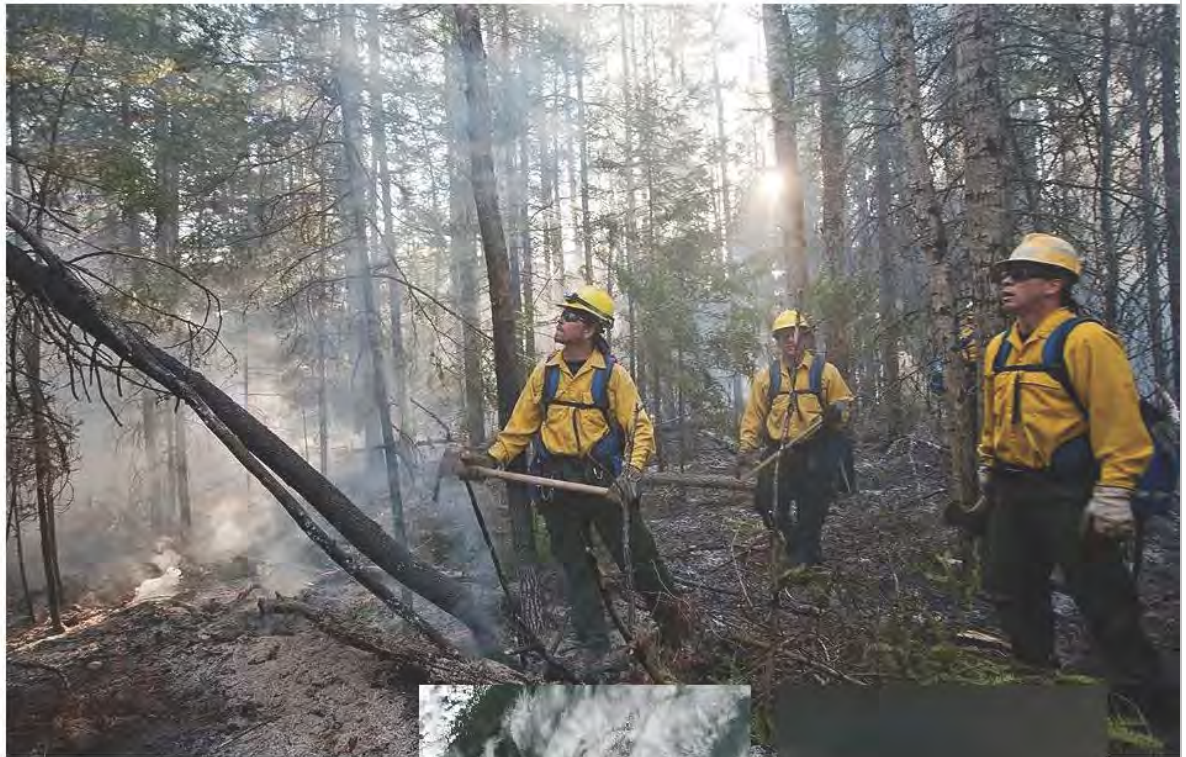
**DATE: 2011**

The Pagami Creek Wildfire was first detected on August 18th, 2011 in Lake County, approximately 13 miles east of the town of Ely, inside the Boundary Waters Canoe Area Wilderness (BWCA). Likely caused by a lightning strike in a bog area, it grew to become the largest wildfire in Minnesota since 1918.

At first the fire kept to a small quarter acre within the bog, but on August 26th, a drop in relative humidity coupled with strong wind pushed flames up into tree tops spreading the fire to approximately 130 acres. Dry conditions and a lack of rain made fire suppression difficult. Then, on September 12th, extreme shifting winds caused the fire to expand dramatically in multiple directions to approximately 93,000 acres. Smoke from the Pagami Creek Wildfire drifted east and south to the Upper Peninsula of Michigan, Ontario, Chicago, even as far as Poland, Ukraine, and Russia. The extent of smoke drift demonstrates that while wildfires may occur locally, the air quality impacts are far-reaching.



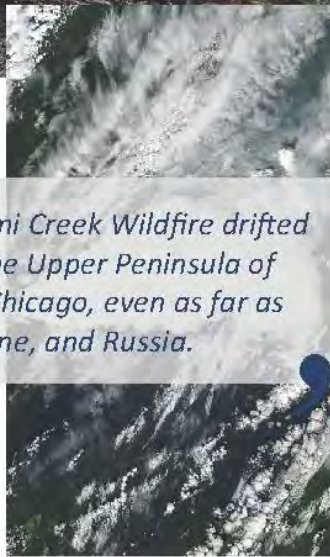




“

*Smoke from the Pagami Creek Wildfire drifted east and south to the Upper Peninsula of Michigan, Ontario, Chicago, even as far as Poland, Ukraine, and Russia.*

”



*Top: Firefighters in the BWCA (Steve Foss, 2011)  
Bottom left: Aerial visual of smoke (NASA, 2011)  
Bottom right: Smoke plume over water (Greg Seitz, 2011)*

## CLIMATE PROJECTION DATA

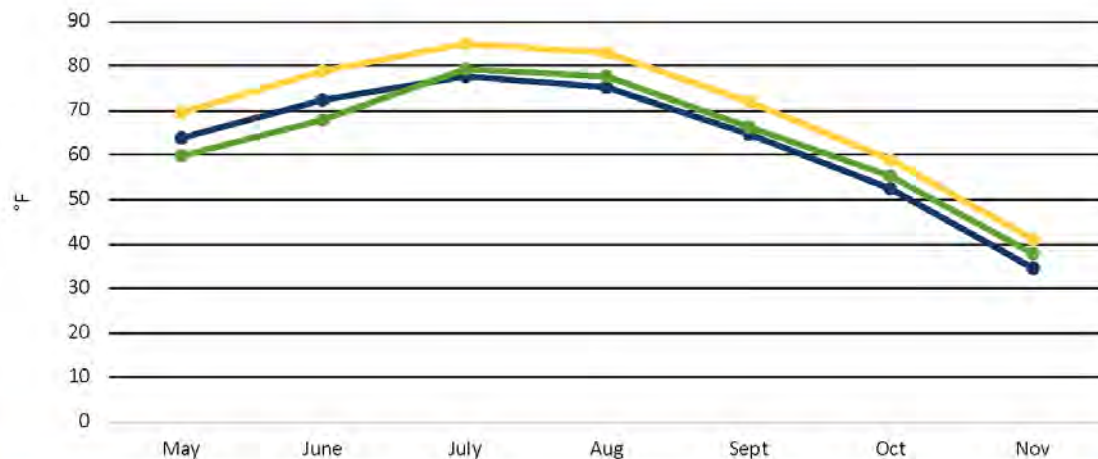
Following are visual representations of climate projection data for Region 2 Lake County, given that the Pagami Creek Wildfire burned mainly within this county. (Data for individual counties are available in the long-form report.) The graphs below compare future temperature and precipitation projection data (in yellow) with a historical climate baseline (in blue) and weather data associated with the Pagami wildfire (in green). Although wildfires seem to have an abrupt onset, they are often enabled by persistent weather conditions, like high temperatures and lack of rainfall. Thus, data are provided starting from the early part of summer to the end of fall to highlight conditions leading up to the event and those that persisted which exacerbated the spread of the fires and complicated management and risk reduction activities.

### LEGEND

- Historical: 1981- 2010
- Case Study: 2011 wildfire
- Projected: 2050- 2074

### Maximum Temperature

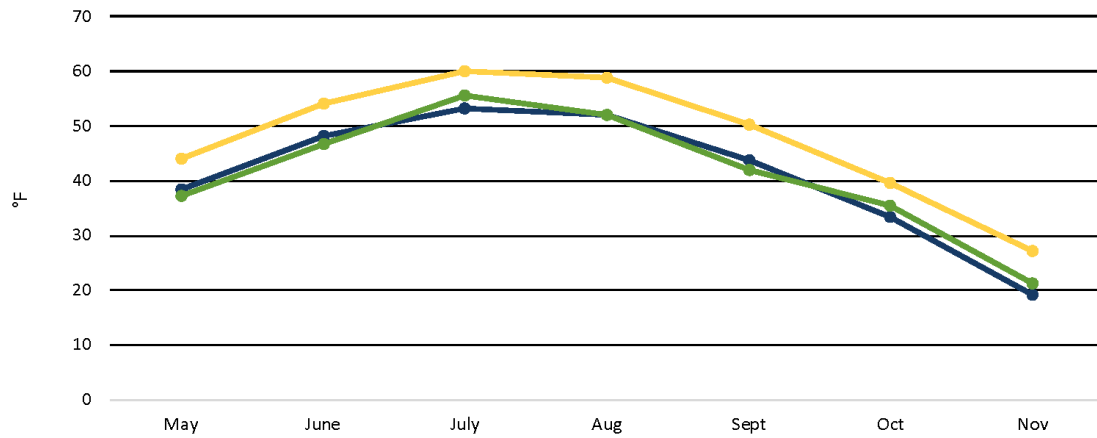
Trend comparison to 2011 wildfire data



	May	June	July	August	September	October	November
Historical	63.7	72.5	77.5	75.2	64.8	52.3	34.5
Case Study	59.9	68.0	79.5	77.6	66.3	55.2	37.7
Projected	69.4	78.8	85.1	82.9	72.1	59.0	41.2

**Minimum Temperature**

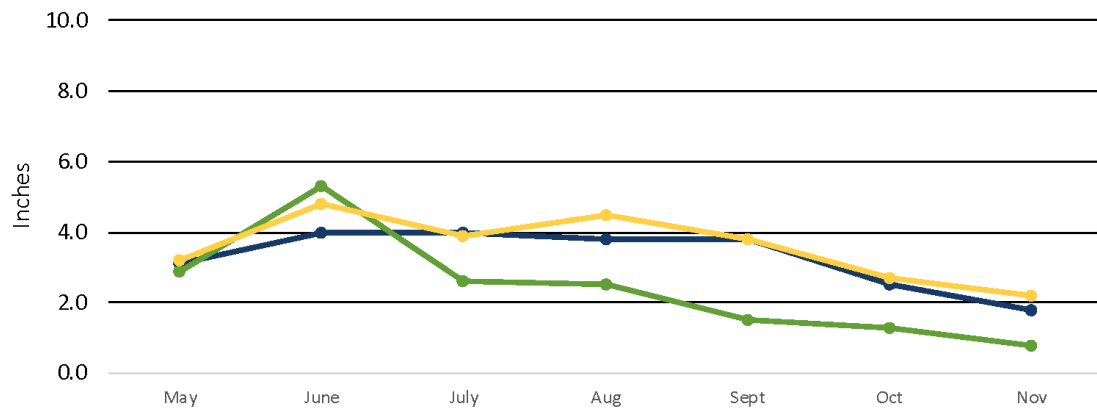
Trend comparison to 2011 wildfire data



	May	June	July	August	September	October	November
Historical	38.5	48.2	53.4	52.0	43.7	33.4	19.2
Case Study	37.2	46.6	55.5	52.0	42.0	35.6	21.3
Projected	44.2	54.1	60.1	59.0	50.4	39.7	27.1

**Total Precipitation**

Trend comparison to 2011 wildfire data



	May	June	July	August	September	October	November
Historical	3.1	4.0	4.0	3.8	3.8	2.5	1.8
Case Study	2.9	5.3	2.6	2.5	1.5	1.3	0.8
Projected	3.2	4.8	3.9	4.5	3.8	2.7	2.2



## SUMMARY

**CLIMATE DATA EXPERTS** expect that future climate conditions across the Midwest will continue to change and affect our environment, economy, and public health. Such conditions are projected to lead to a higher frequency of late growing season drought conditions, elevated winter temperatures with reduced snowpack, prolonged high heat days, and extended periods of low rainfall. Similar conditions in the past likely contributed to the 2011 Pagami wildfire disaster. Summer maximum and minimum temperatures were slightly above average leading up to the start of the wildfire. Midcentury climate estimates indicate that average summer maximum and minimum temperatures for Lake County will be approximately 6-8°F warmer than historical trends. These significantly warmer temperatures will likely increase the risk of wildfires, particularly in areas with existing vulnerabilities, such as dead or dying vegetation or expansion of residential development in wilderness areas.

Precipitation was well below average for the spring and summer season leading up to the start of the wildfire. This dry period continued into the fall season, making suppression efforts difficult. Midcentury climate estimates indicate minimal changes in average monthly precipitation for Lake County, with the exception of March, June, and August, which may receive well over a half inch additional rain compared to historical trends. The additional rain may help alleviate some of the fire pressures brought about by rising temperatures. However, climate experts predict that rainfall patterns will change across the Midwest, with rainfall occurring more often as heavy precipitation events separated in time by longer, more severe dry spells. Prolonged periods without rain can harden the ground so when rainfall does occur, it is less likely to be absorbed by the dry soil, and it will remain susceptible to fire.

**CLIMATE DATA IS A CRITICAL TOOL** in planning for resilient communities into the future. Assessing threats from climate change and planning effective mitigation and response strategies is a key element for emergency managers and other planners to reduce future risk. It is crucial to understand the potential impacts of climate change and the associated priorities and vulnerabilities of communities, including population, the environment, critical infrastructure, and more. However, vulnerability is a nuanced concept and most effective as an indicator of risk when planners seek to understand and address vulnerability as close to the individual level as possible and in association with a specific hazard.

*“Climate data is a critical tool in planning for resilient communities into the future.”*

For example, in HSEM Region 2, population projections show a decrease in children but a substantial increase in seniors. Older people may be more at-risk for respiratory complications during dry, dusty periods, or have limited access to transportation if wildfires necessitate evacuation. Considering the impacts of climate change to vulnerable populations is just one example of how to prioritize mitigation and response planning.

**CLIMATE PROJECTION DATA** continues to improve and should be considered as a priority to advance for Minnesota. Currently, global climate models that produce climate projection data for the Midwest are more accurate at simulating future temperature changes than they are for precipitation. However, the accuracy and resolution of these models are advancing rapidly as are their ability to model the future prevalence in short-duration, high-intensity localized heavy rainfall events.

Minnesota would benefit from a statewide high-quality climate projection dataset that is derived using the climate and environment features unique to our state, similar to datasets developed for other states. Meanwhile, data from national resources, like the U.S. Geological Survey (USGS) and National Oceanic and Atmospheric Administration (NOAA), can still provide a powerful input to regional scenario-planning efforts by allowing planners, managers, and analysts a means of “unpacking” general climate change predictions for the Midwest by looking at potential monthly fluctuations in coarse precipitation and temperature measures for Minnesota and its counties.



## NEXT STEPS: MINIMIZE RISK & BUILD RESILIENCE

Prepare today for tomorrow's climate hazards. Emergency managers, planners, elected officials, and the public play a critical role in creating safe and healthy communities, especially in the face of extreme weather events. There are steps you can take to minimize local risk and build more resilient communities:



**BRING EVERYONE TO THE TABLE:** Build an inclusive yet nimble team to collectively identify climate hazards and potential impacts. Be sure to include members of the community; local department professionals responsible for built, natural, and health resources; planning commissioners; faith-based and cultural organizations; research centers; and commercial organizations. Including diverse perspectives throughout your process will help support more equitable planning efforts that best leverage cross-functional resources.



**INCORPORATE CLIMATE INTO PLANNING:** Incorporate climate projection data into planning efforts, such as exercise scenarios and long-range planning, to comprehensively identify future climate hazards and potential cascading effects. Explore how these interact with non-climate hazards in the community, such as aging infrastructure, to understand potential exposure to multiple threats and prioritize actions that build the community's capacity to respond.



**CHAMPION CLIMATE & HEALTH:** Be a champion for climate and health data. Seek opportunities to learn about these data and incorporate it in your work on an iterative basis. Support its application in professional networks and articulate the need to fund dynamically downscaled climate projection datasets for Minnesota. Climate data is a critical multi-discipline tool in proactively planning for resilient communities.

## RESOURCES & REFERENCES

### TOOLS & DATA

- [Climate at a Glance: National Climatic Data Center](http://www.ncdc.noaa.gov/cag/), National Oceanic and Atmospheric Administration  
Source for all historical and much of the case study data presented in this profile.  
[www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/)
- [Incident Information System](https://inciweb.nwcg.gov/), InciWeb  
National data source for incident related information, including wildfire.  
<https://inciweb.nwcg.gov/>
- [Minnesota Climate and Health Profile Report \(PDF\)](http://www.health.state.mn.us/divs/climatechange/docs/mnprofile2015.pdf), Minnesota Department of Health  
Profiles historic climate trends, future projections, and likely climate change impacts on the health of Minnesotans.  
<http://www.health.state.mn.us/divs/climatechange/docs/mnprofile2015.pdf>
- [Minnesota Climate Change Vulnerability Assessment \(PDF\)](http://www.health.state.mn.us/divs/climatechange/docs/mnclimvulnreport.pdf), Minnesota Department of Health  
Assesses five climate hazards and the populations that are most vulnerable to the hazards in Minnesota.  
<http://www.health.state.mn.us/divs/climatechange/docs/mnclimvulnreport.pdf>
- [Minnesota Population Projection Data](https://mn.gov/admin/demography/data-by-topic/population-data/our-projections/), Minnesota State Demographic Center  
Source for all population projection data presented in this profile.  
<https://mn.gov/admin/demography/data-by-topic/population-data/our-projections/>
- [National Climate Change Viewer](http://www2.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp), United States Geological Survey  
Source for all climate projection data presented in this profile.  
[www2.usgs.gov/climate\\_landuse/clu\\_rd/nccv/viewer.asp](http://www2.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp)

## RESOURCES & REFERENCES

### KNOWLEDGE & CAPACITY

- [Climate Change and Minnesota](https://www.dnr.state.mn.us/climate/climate_change_info/index.html), Minnesota Department of Natural Resources  
Source of information on climate change trends and impacts for Minnesota, with an emphasis on natural resources.  
[https://www.dnr.state.mn.us/climate/climate\\_change\\_info/index.html](https://www.dnr.state.mn.us/climate/climate_change_info/index.html)
- [Five Steps Toward Enhancing Climate Resilience](https://www.domesticpreparedness.com/resilience/five-steps-toward-enhancing-climate-resilience/), Emily Wasley, DomesticPreparedness.com  
Practical action steps to help emergency managers build a path to enhance their climate resilience.  
<https://www.domesticpreparedness.com/resilience/five-steps-toward-enhancing-climate-resilience/>
- [U.S. Climate Resilience Toolkit](https://toolkit.climate.gov/), United States Global Change Research Program  
Information and tools to help communities adapt to climate change, featuring real-world case studies.  
<https://toolkit.climate.gov/>
- [Wildfire Information Center](https://www.dnr.state.mn.us/forestry/fire/wildfirereports_tools.html), Minnesota Department of Natural Resources  
Information source for fire danger and updates, including fire weather forecasts for Minnesota.  
[https://www.dnr.state.mn.us/forestry/fire/wildfirereports\\_tools.html](https://www.dnr.state.mn.us/forestry/fire/wildfirereports_tools.html)

### REFERENCES

- United States Department of Agriculture Forest Service, 2012. [Pagami Creek Wildfire](https://www.fs.usda.gov/detail/superior/home/?cid=stelprdb5341928).  
<https://www.fs.usda.gov/detail/superior/home/?cid=stelprdb5341928>



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Front cover photo: Pagami Creek Fire (Derek Montgomery, 2011)

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Climate & Health Program  
[health.climatechange@state.mn.us](mailto:health.climatechange@state.mn.us)  
651-201-4899  
[www.health.state.mn.us/divs/climatechange/](http://www.health.state.mn.us/divs/climatechange/)

