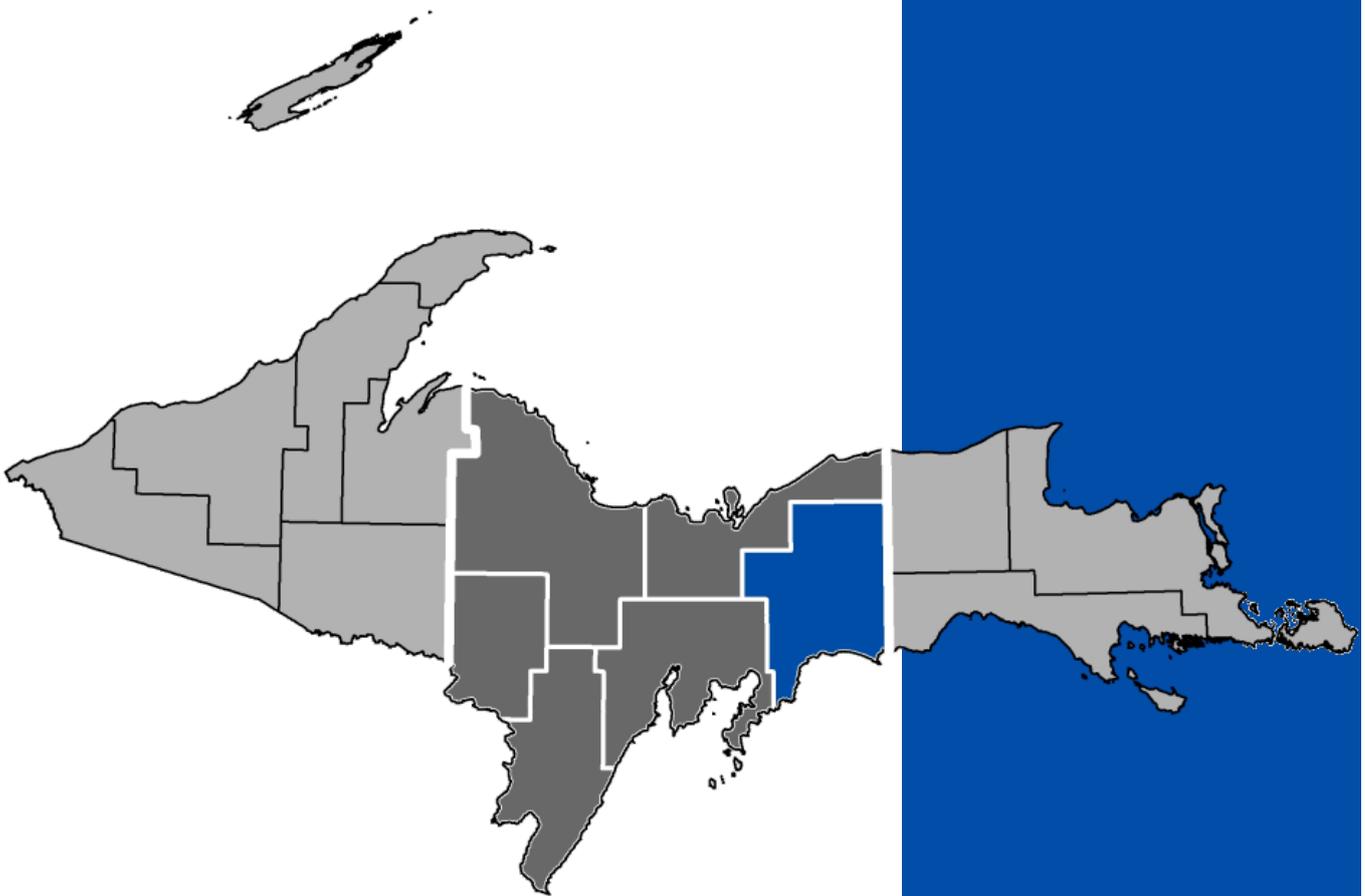


Schoolcraft County



Hazard Mitigation Plan - Update

2021

Prepared by:
Schoolcraft County Local Emergency Planning Committee
(LEPC)
and
CUPPAD Regional Commission



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1.0 Introduction

Hazard Mitigation is defined as any action taken before, during, or after a disaster to permanently eliminate or reduce the long-term risk to human life and property from natural and man-made hazards. Schoolcraft County has experienced various natural hazards such as yearly snowstorms with high winds and blowing snow.

Hazard mitigation planning is a process that assesses risks and evaluates the community vulnerability from potential hazards. Deficiencies are identified and strategies are developed that help mitigate potential problems. By developing an effective hazard mitigation plan a community can potentially reduce the affects of a future disaster. Potential affects of a disaster include loss of lives and property, environmental and economical concerns, and reduced essential services and quality of life. The result of this plan process is an Action Plan that identifies the appropriate steps to help mitigate present and future hazards.

The Schoolcraft County Board of Commissioners adopted a hazard mitigation plan on July 21, 2015. This document serves as the five-year mandatory review and update of the Schoolcraft County Hazard Mitigation Plan. FEMA, U.S. Department of Homeland Security, Region V approved the County Hazard Mitigation Plan on August 10, 2015. The expiration of the Schoolcraft County Plan is five years from the date of FEMA approval.

1.1 Background

The Federal Emergency Management Agency (FEMA) provides hazard mitigation assistance to state and local governments and to individuals through programs under the Robert T. Stafford Act, Section 404 (Disaster Relief and Emergency Assistance). The Disaster Mitigation Act of 2000 (DMA2K) amended the Stafford Act, to require communities to have an approved Hazard Mitigation Plan in order to receive FEMA funding assistance.

FEMA established project funding to develop local hazard mitigation plans. Part of these federal funds were allocated to the Michigan State Police/Emergency Management Division (MSP/EMD), which then re-granted funding to Michigan counties and major municipalities to develop local hazard mitigation plans. A hazard mitigation plan must be approved by FEMA for disasters declared after November 1, 2004.

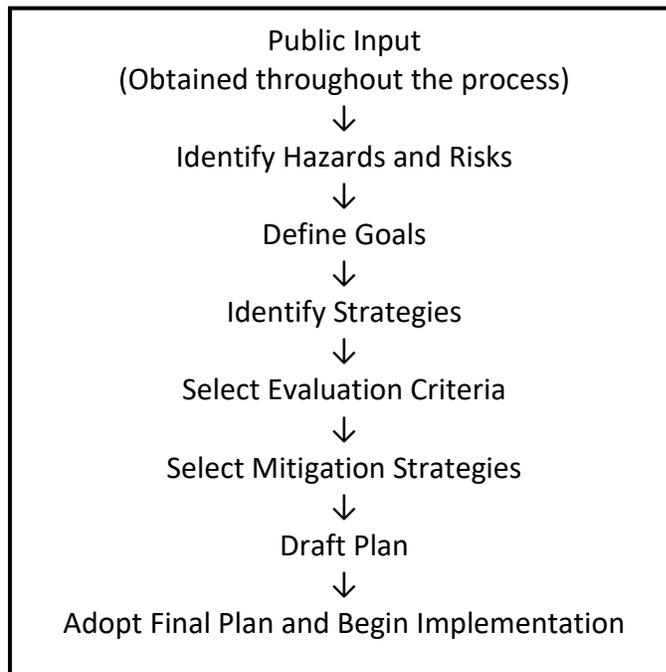
Programs that provide federal assistance are: the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Program (FMAP), and Pre-Disaster Mitigation Program (PDMP). FEMA's Hazard Mitigation Grant Guidance booklet (2013) describes these three grant programs in detail.

1.2 Plan Process

The Schoolcraft County Hazard Mitigation Plan process was given guidance by FEMA requirements and the Michigan Department of State Police-Emergency Management Division (MSP/EMD) document – Pub 207, Local Hazard Mitigation Plan Workbook. The plan process is outlined below:

Public Input is essential to the plan process in order to accurately understand the hazards faced by communities. Input into the plan was achieved through regular meetings and discussions with Emergency Management Coordinator, Hazard Mitigation Planning Committee, local officials, and various agency personnel. The Hazard Mitigation Planning Committee was established by the County Emergency Management Coordinator to assist with the development and drafting of the Schoolcraft County Hazard Mitigation Plan. Members of the Committee represented various interests in the county; some members are also on the Local Emergency Planning Committee.

Public participation takes place throughout the entire plan process and is described in more detail in section 1.3.



The **hazards and risks** were identified through extensive research, meetings, surveys, and mapping. A community profile was first compiled to summarize the main components of the county and is explained in Section 2.0. Risks in the local units of government were described under three hazard categories: natural, technological, and social. A workgroup then rated the individual hazards to determine a high, moderate or low level of risk. Section 3.0-Hazards- explains what went into the process and Table 10 shows the results.

The **goals and strategies** focus on the higher-risk hazards determined in part by the hazard identification process. The hazards addressed are: hazardous materials-transportation and transportation accidents; severe weather in the forms of ice and sleet storms, snowstorms, severe wind and thunder/lightning storms; structural and wildland fires; and infrastructure failures. Meetings and discussions with the mitigation planning committee, LEPC members, local officials, and agency personnel helped to suggest possible strategies to mitigate these hazards. Section 4.1 illustrates the issues, goals, and strategies for each high-risk hazard.

The Emergency Management Coordinator and CUPPAD staff then **selected evaluation criteria** to weight the possible mitigation strategies. The criteria in Section 4.2 address strategies affecting large and small groups of people, recurring hazards, property damage, cost effectiveness, and natural resources. Members of the Hazard Mitigation Planning Committee used the criteria to assign points and “weight” the **mitigation strategies**- Section 4.3 shows the results.

The **adoption of the plan and implementation** of strategies are addressed in Section 5.0-Action Plan. Each strategy or action to be taken is listed along with responsible agency and possible funding source. This section also addresses future plan maintenance through evaluating, monitoring and participation in the plan.

1.3 Public Participation

Participation by local governmental bodies and agencies and the general public is both a needed and required step in the plan process. Hazard mitigation is inherently a local issue. Therefore, local input about a community’s risks can help in pinpointing projects to mitigate those risks. Also, FEMA requirements state that local jurisdictions that want to apply for federal mitigation funding must:

- Participate in the plan process
- Suggest potential projects
- Adopt the Hazard Mitigation Plan

Participation in the Schoolcraft County Hazard Mitigation Plan was achieved in many different ways. The following sections discuss ways in which both local governments and the public participated in the hazard mitigation process.

At the onset of the planning process, letters were sent to all local units of government in Schoolcraft County notifying them of the hazard mitigation plan process and asking for their continued participation. A number of one-on-one meetings were held between CUPPAD staff and the County Emergency Management Coordinator.

The Schoolcraft County Emergency Management Coordinator established a Hazard Mitigation Planning Committee to assist in the planning process and work with CUPPAD staff to propose,

discuss, and prioritize strategies. During numerous meetings with the group, issues were brought forward for discussion, the committee assisted in the developing of the vulnerability assessment and identifying hazards in the county, ranking the hazards in order of importance, discussing and developing strategies to respond to the identified hazards, and prioritizing the strategies. The Committee consists of the following community representatives:

- Inwood Township
- Public Health Department
- Schoolcraft Memorial Hospital
- Seney Township
- County Sheriff Department
- City of Manistique
- Manistique Papers
- Michigan State Police
- Michigan Limestone Operations
- National Weather Service
- Manistique Public Safety
- Emergency Management

Other meeting and input opportunities were accomplished through various local organizations where the public is always welcome and encouraged to participate. Meetings were arranged with the Schoolcraft County Township Association as well as the Mitigation Planning Committee, both open to the public. During each meeting, the draft County Hazard Mitigation Plan was presented and input requested regarding additional or specific community risks and possible mitigation projects.

Meetings also took place with Manistique Public Safety, the County Emergency Management Coordinator, the Schoolcraft County Sheriff department, the Central U.P. Resource Conservation & Development Council, conservation resource agencies, and other groups/individuals to discuss draft goals, projects/alternatives and to gather any other input or suggestions. A list of these meetings and the topics discussed are listed below.

Each jurisdiction in Schoolcraft County is represented in the Schoolcraft County Hazard Mitigation Plan through the various meetings and phone discussions held with the County LEPC, local governments, and other organizations/individuals.

DATE OF MEETING	PARTICIPANTS/DISCUSSIONS
February 6, 2002	Schoolcraft County Township Association: presented project overview, provided worksheet materials and information
August 2, 2002	Schoolcraft County Law Enforcement Agencies: reviewed and discussed community profile, hazard identification, draft documents, and reviewed maps
August 23, 2002	Schoolcraft County Law Enforcement Agencies: reviewed and discussed community profile, hazard identification, draft documents, and reviewed maps
September 6, 2002	Seney Township Supervisor and City of Manistique city manager: discussed local concerns/projects, general hazard mitigation discussion
September 25, 2002	Discussed and exchanged information with healthcare, fire, police, transportation, industrial, and other appropriate entities
November 21, 2002	Emergency management personnel: Reviewed draft hazard analysis materials
March 14, 2003	Schoolcraft County Mitigation Committee: Reviewed draft hazard analysis materials and discussed hazard rating process
April 25, 2003	Schoolcraft County Mitigation Committee: Reviewed draft hazard analysis materials
July 21, 2003	Schoolcraft County Emergency Coordinator: reviewed draft hazard analysis materials
April 20, 2004	Schoolcraft County Emergency Coordinator Discussed vulnerability assessment draft materials
September 8, 2004	Schoolcraft County Mitigation Committee: discussed overview of project, distributed draft goals and project/alternatives
September 27, 2004	Manistique Public Safety: discussed and gathered input on draft goals and projects/strategies
September 29, 2004	Schoolcraft County Mitigation Committee: discussed draft goals, projects/strategies, and evaluation process
February 1, 2005	Central U.P. Resource Conservation & Development Council: discussed hazard mitigation plan and solicited projects from members
June 30, 2005	Schoolcraft County Mitigation Committee: reviewed, evaluated, and prioritized strategies.
2013 UPDATE	
February 20, 2013	LEPC: Review and discuss draft hazard mitigation plan update materials.
October 14, 2013	LEPC: Review and discuss draft hazard mitigation plan update materials.
October 28, 2013	LEPC: Discuss local hazards and revise hazard rankings for update.
November 13, 2013	LEPC: Revise and update hazard mitigation strategies.

2021 UPDATE	
June 2021	Schoolcraft LEPC completes hazard review and ranking.
August 9, 2021	LEPC: Discuss Hazard Mitigation Plan, solicit feedback for new hazards, strategies
August 10, 2021	Send high-hazard mitigation worksheets to LEPC members.
August 16, 2021	Letter sent to LUGs to review hazard rankings and solicit comments and mitigation strategies
August 17, 2021	Meeting with Schoolcraft Emergency Management Coordinator to discuss updated information and hazard response.

Letters were sent to the individual township supervisors to solicit their ideas and suggestions on specific hazards in their communities as well as ideas on potential mitigation projects. For the 2021 update, these were sent on August 16. Comments and responses received as a result of letter responses, meetings and phone conversations with supervisors or a board member jurisdictions in the county are listed below. Several communities felt that the descriptions and strategies listed in the plan were sufficient so these jurisdictions are not listed.

JURISDICTION	COMMENTS/CONCERNS
Doyle Township	<ul style="list-style-type: none"> • 2015 UPDATE: Concern about risk of hazardous train car derailment which could contaminate Gulliver Lake, McDonald Lake, and rivers leading to Lake Michigan and the surrounding families, property, and wildlife. • Concern about hazardous materials being transported on US-2. • Concern about hazardous materials at Port Inland. • Concern about gas company, propane boarding at US-2 and Gulliver Lake. • Concern about potential for trains to block all road access for Twp. residents. • Concern about potential for erosion to contaminate the water supply. • Concern about risk of landfill contaminating water supply. • 2021 UPDATE: No additional comments
Germfask Township	<ul style="list-style-type: none"> • 2015 UPDATE: Junction M-77 & CR436 needs overhead flashing signal over M-77 to slow traffic. • The business at the junction M-77 and M-98 generates parking that obscures view of traffic for vehicles going through intersection. • The junction of M-77 and Lustila Rd. is dangerous and needs improved signage to slow traffic and improve safety. • On M-98 at way out of Germfask the road and bridge are in need of replacement. • Bridge on County Road H44 is very narrow with no walkway on the side. Guard rails are short and the crossing is located on a sharp curve traveling from east to west. The Road becomes very slippery in winter months. Space between railing and bridge is several inches and a bicycle or food traffic could easily be caught. Potential solution

	<p>could be raising the railings. 2021 UPDATE: No additional comments</p>
Hiawatha Twp.	<ul style="list-style-type: none"> • 2015 UPDATE: No additional comments • 2021 UPDATE: No additional comments
Inwood Twp.	<ul style="list-style-type: none"> • 2015 UPDATE: Concern about abandoned tar pit • 2021 UPDATE: No additional comments
City of Manistique	<ul style="list-style-type: none"> • 2015 UPDATE: Catastrophic failure of the paper mill dam on North Cedar St. would endanger residential and business districts. No rapid warning system in the community. • The City has no tornado siren. • An accident or road closure on US-2 at Tannery road would completely sever east-west emergency traffic and emergency response. Need to develop a local bypass around US-2 overpass and railroad. • Drifting snow on US-2 at several intersections during snowstorms. Could install a snow fence or plant vegetation to limit drifting. • A train accident or breakdown could block all three intersections at Deer, Houghton, and West Elk streets, preventing East-West traffic for long amount of time and severely impairing emergency response to west Manistique and Schoolcraft County. This happened in February 2013 which resulted in a one hour traffic blockage. Could develop an emergency bypass. • High speed and volume traffic in a 35 mph zone on US-2 in the City; need bigger signs or yellow traffic warning lights to slow traffic. • 2021 UPDATE: No additional comments
Mueller Twp.	<ul style="list-style-type: none"> • 2015 UPDATE: Flooding is not a concern in this community • Emergency route planning is needed. • The Township does not have a useable Township hall during winter months. • 2021 UPDATE: No additional comments
Thompson Twp.	<ul style="list-style-type: none"> • 2015 UPDATE: No additional comments • 2021 UPDATE: No additional comments

Public review of the draft Schoolcraft County Hazard Mitigation Plan was achieved through the following:

- Copy of the draft plan and update were made available to the Michigan State Police/Emergency Management Division.
- Copy of the draft plan and update was provided to the Emergency Management Coordinator for review and comments.
- A copy was made available for public review at the Manistique School/Public Library.
- A notice was printed in the local newspaper informing the public on where they could review the plan.

- Comments received were reviewed for consideration and incorporated into the final draft plan and update.

1.4 Jurisdictions Participating in the Plan Update

The following jurisdictions in Schoolcraft County recognize the need for an approved Hazard Mitigation Plan. Statements of intent to participate in the planning process were filed by the following local units:

Unit of Government	Jurisdiction Plan Status	Date Signed
Schoolcraft County	Continuing Participant	08/30/2010
Doyle Township	Continuing Participant	08/05/2010
Germfask Township	Continuing Participant	08/06/2010
Hiawatha Township	Continuing Participant	09/03/2010
Inwood Township	Continuing Participant	09/14/2010
City of Manistique	Continuing Participant	08/05/2010
Manistique Township	Continuing Participant	08/24/2010
Mueller Township	Continuing Participant	08/16/2010
Seney Township	Continuing Participant	08/31/2010
Thompson Township	Continuing Participant	08/10/2010

2.0 Community Profile

This chapter provides a summary of Schoolcraft County and community information to give a better understanding of the area. Tables and maps are provided to illustrate this information. Every attempt is made to consider existing conditions and emerging trends. (Appendix A supplements the text information in this section for individual jurisdictions.)

2.1 County Overview

Located in the mid-eastern section of Michigan's Upper Peninsula, Schoolcraft County encompasses a land area of 1,219 square miles (781,497 acres), making it the fourth largest county in the state. Most of the county's 8,048 residents live in and around the county seat of Manistique.

Forests cover around 70 percent of Schoolcraft County's land area. Forty-seven miles of Lake Michigan shoreline form the southern border, and the northernmost point of the county is less than five miles from Lake Superior. Travel from one end of the Upper Peninsula to the other by major roadway requires passing through Schoolcraft County.

Federal agencies and the state of Michigan own and manage a large portion of the county, and tourism supports a large and growing hospitality industry. In addition to these industries, retail trade, manufacturing, and construction account for the majority of the county's employment. The county's major employers include UP Paper, Schoolcraft Memorial Hospital, and Manistique Area Schools.

Map 1 illustrates the location of the communities within the county. Map 2 illustrates the distribution of people living in the county. The driving distances to Detroit and Lansing are 375 and 318 miles respectively.

2.1.1 Local Governmental Units

Local governments in the county include eight general law townships and one city. The city of Manistique is the county seat and population center. Appendix A provides more detailed information for each jurisdiction as well as contact and statistical information and a brief history of the county.

Cities:

- Manistique

Townships:

- Doyle
- Germfask
- Hiawatha
- Inwood
- Manistique
- Mueller
- Seney
- Thompson

2.2 Geography

Location

Located in the mid-eastern section of Michigan's Upper Peninsula, Schoolcraft County encompasses a land area of 1,219 square miles (781,497 acres), making it the fourth largest county in the state. Mackinaw and Luce counties border Schoolcraft on the east, Alger borders it to the north and west, and Delta County borders it on the west. Forty-seven miles of Lake Michigan shoreline mark its southern land boundary, and the northernmost point of the county is less than five miles from Lake Superior.

Lakes and Rivers

Schoolcraft County is home to about 320 inland lakes and five major rivers – Manistique River, Driggs River, Creighton River, Fox River, and Indian River. Indian Lake (8,000 acres), McDonald Lake (1,600 acres) and Gulliver Lake (836 acres) are the largest of the inland water bodies. The combined length of streams and rivers totals more than 700 miles.

Soils

Detailed soil information is available from the *2013 Soil Survey of Schoolcraft County, Michigan*. The following soil associations comprise the majority of the county's land:

- Markey-Deford-Rubicon (42%)
 - Very deep, poorly drained mucky soils and excessively drained sandy soils
- Kalkaska (16%)
 - Very deep, somewhat excessively drained sandy soils
- Rubicon-Dawson (13%)
 - Very deep, excessively drained sandy soils and very poorly drained organic soils
- Amadon-Lupton-Ensley (10%)
 - Shallow to very deep well-drained loamy soils and poorly to very poorly drained organic soils

As the above descriptions suggest, soil conditions throughout much of the county are not suitable for building or onsite septic systems due to excessive wetness, shallow depth to bedrock, and/or cut bank caving. However, these soil conditions support the substantial amount of forested land and recreational opportunities in Schoolcraft County.

Land Cover

Approximately 40 percent of the county's land area is classified as wetlands - much of it forested - in the Michigan Resource Information System (MiRIS). Forested areas cover about 70 percent of the land area with upland hardwoods, swamp conifers, and upland conifers

predominating.

Elevation

Elevations range from 577 feet above sea level along the Lake Michigan shoreline to 1,049 feet in Seney Township. The elevation at the Schoolcraft County Airport is 685 feet.

Other

Topography, watershed, floodplain, and land cover/use information are provided on Maps 3, 4, 5, and 6.

2.3 Climate

Average daily maximum and minimum temperatures recorded at Manistique for the month of July (the warmest month) are 78.5 degrees and 61.0 degrees Fahrenheit, respectively. The maximum daily average in January (the coldest month) is 30.3 degrees while the minimum daily average is 16.3 degrees. High and low temperatures are greater at inland locations where Lake Michigan has less of an influence.

September is the wettest month in Schoolcraft County, experiencing 3.35 inches of rainfall annually. February is the driest, averaging 0.94 inches of precipitation annually. An average of 70.7 inches of snow falls in the county seat of Manistique each year, most of it coming in December and January. Snowfall in northern areas is much greater due to the effect of Lake Superior. In the Seney area for instance, annual snowfall averages 131.5 inches.

Afternoon thunderstorms are common during summer months, occurring on an average of 30 days per year. Although tornadic activity has been recorded, it is infrequent. Tornadoes were recorded in July 1975, July 1984 and July 1987. All three occurred in the southwestern quarter of the county. A funnel cloud was spotted over Indian Lake in 2018, but there have been no tornadic events. Winds greater than 50 miles per hour have been recorded in most years since 1997.

2.4 Community Facilities and Organizations

Table 2-1 lists major agencies and organizations providing services within the county.

Table 2-1 Community Agencies and Organizations, Schoolcraft County	
Name	Service/Function
Schoolcraft County Road Commission	Road maintenance, snow removal
Schoolcraft County Transit Authority	Public transportation
Schoolcraft County Economic Development Corp.	Economic development, housing and employment services
Schoolcraft County Chamber of Commerce	Economic promotion and development
Schoolcraft County Citizen Corps	Medical Reserve Corps and Community Emergency Response Team
Luce-Mackinac-Alger-Schoolcraft Health Dept.	Public health
Family Independence Agency	Human services
M-D-S Community Action Agency	Human services
MSU Extension	Does not currently have service agreement
Sault Ste. Marie Tribe of Chippewa Indians	Health, housing and family services
Schoolcraft County Commission on Aging	Elderly services
Schoolcraft County Housing Commission	Housing management
Manistique Housing Commission	Housing management
Manistique Downtown Development Authority	Business district improvements
Hiawatha Behavioral Health	Health and counseling services
American Red Cross, Superior U.P. Chapter	Disaster relief, training, and communication
USDA Farm Service Agency	Agricultural disaster assistance
USDA Forest Service	Hiawatha National Forest management
USDA Natural Resources Conservation Service	Natural resources management
USDA Rural Development	Development assistance programs
U.S. Postal Service	Mail service through Cooks (49817), Germfask (49836), Gulliver (49840), Manistique (49854), Seney (49883)
U.S. Coast Guard Auxiliary	Harbor patrols, search and rescue, vessel safety, safe boating courses
MI-SBTDC	Small business counseling services
CUPPAD Regional Commission	Local government assistance in planning, zoning, etc.
UPCAP	2-1-1 call center, elderly, housing and conflict resolution

Public Schools

The Manistique Area School district includes all county jurisdictions except Inwood and Seney Townships. Kindergarten through grade 12 enrollment for the 2020-2021 school year was approximately 810 students. High and middle school students attend the campus at North Cedar Street in Manistique, and elementary students attend Emerald Elementary on Oak Street in Manistique. The district also operates an alternative education center, Jack Reque High School, on Maple Street in Manistique.

Seney Township is within the Tahquamenon Area School district with instruction facilities in Newberry. Inwood Township is within the Big Bay de Noc School district with facilities just south of Garden Corners on M-183 in Delta County.

Private Schools

St. Francis de Sales School on Lake Street, affiliated with the Roman Catholic Church, provides PK-8 instruction. Enrollment for the 2017-2018 school year was approximately 133 students.

Bethel Baptist Christian School on Elk Street provides grades 3-11 instruction. Enrollment for the 2017-2018 school year was approximately four students.

Headstart

The Menominee-Delta-Schoolcraft Community Action Agency provides early childhood education programs at its facility on Chippewa Avenue, and Manistique Area Schools operates a preschool at Emerald Elementary.

2.4.1 Critical Services

Hospital

Schoolcraft Memorial Hospital is a 12-bed critical access facility with a physician-staffed 24-hour emergency room updated in 2013. A medical staff of over 60 includes eleven full-time physicians. Out-patient services include a walk-in clinic, physical and occupational therapy, cardiac rehab unit and home health services provided by Schoolcraft Memorial HomeCare. The facility is county-owned and is located in Manistique off US Highway 2. Visiting physicians offer a range of medical specialties.

Medical clinics in the county or nearby include Manistique VA Clinic (Manistique), Manistique Tribal Health (east of Manistique off US-2), Manistique Lakes Family Clinic (Curtis, Luce County), Mackinac Straits Clinic (St. Ignace, Mackinac County), West Mackinac Health Center (Engadine, Mackinac County), Burt Township Medical Center (Grand Marais, Alger County), and Baycare Medical Center (Munising, Alger County).

Public Health

Programs and services dealing with the prevention and control of disease and environmental health hazards are provided by the Luce-Mackinac-Alger-Schoolcraft District Health Department which maintains offices in Manistique.

Solid Waste

Household and commercial waste is transported from the county to Type II licensed facilities in Gulliver, Munising, Dafter, and Menominee. There are numerous waste collection services in the county.

Police and Fire Protection

Michigan State Police Post #84 in Gladstone (Delta County) provides coverage in all areas of Delta, Menominee, and Schoolcraft counties. Staffing authorization for both counties includes 16 troopers, three motor carrier officers, four sergeants and a commander. A small outpost is kept in Manistique, with coverage by 2-4 officers at a time.

Schoolcraft County Sheriff Department operates the county's 26-bed jail. The department is staffed by 12 full-time and two part-time officers. Other services include road patrol to rural areas, marine safety, and civil process service.

Sault Tribe Law Enforcement has a satellite office at tribal facilities in Manistique Township.

As needed, specially trained dogs are available for drug detection from the Escanaba Public Safety Department and the Michigan State Police. Michigan State Police also provides bomb detection dogs.

All fire departments in the county (Table 2-2) are signatory to county-wide mutual aid agreements. The Manistique Department of Public Safety provides police, fire, and EMS services for city residents with a total of 54 combine full, part-time, and volunteer personnel. Fire protection is provided to Manistique Township under a contractual arrangement. All other townships have organized volunteer fire departments.

Several volunteer departments have their own firefighting equipment, and additional firefighting equipment and trained personnel are located at facilities of the U.S. Forest Service in Manistique and the Michigan Department of Natural Resources in Seney.

Currently, all emergency calls are routed through the 911 dispatch service in Negaunee.

Emergency Medical Service

The City of Manistique provides emergency medical services in conjunction with Schoolcraft Memorial Hospital. The general service area includes the city and Hiawatha, Manistique, Doyle, Mueller, and Germfask townships. Inwood Township Volunteer Fire Department maintains and operates an emergency medical response vehicle, providing EMS services for Inwood Township. Alger County provides EMS coverage for most of Seney Township. Burt Township EMS and Luce County EMS covers the eastern portion of Seney. A mutual aid agreement exists with TriStar Garden-Nahma.

Emergency Services

The county employs a part-time emergency management coordinator who reports directly to the County Board of Commissioners. Emergency management services include preparedness and response planning and training.

The Superior Upper Peninsula Chapter of the American Red Cross has offices in Marquette, Gladstone, and Hancock. Local 911 dispatchers will contact the Schoolcraft Emergency Management Coordinator when house fires, mass evacuations or other circumstances dictate shelter needs.

Table 2-2 Fire Departments, Schoolcraft County, 2021	
Department	Force Size
Doyle Township	18 volunteers
Germfask Township	10 volunteers
Hiawatha Township	26 volunteers
Inwood Township	1 paid firefighter 18 volunteers
Mueller Township	10 firefighters (paid per call) 15 volunteers
Seney Township	10 firefighters (paid per call)
Thompson Township	11 volunteers
Manistique Public Safety	8 public safety officers 20 volunteer firefighters
Tri-County Volunteer Fire Department (serves parts of Inwood and Hiawatha; also serves parts of Alger and Delta counties)	15 firefighters

Source: Michigan Department of Licensing and Regulatory Affairs

2.5 Culture and Community Profiles

- Blaney Park:** The general area of Blaney Park extends from US-2 northward on M-77. It was built in 1935 as a resort replete with amenities featuring 32,000 acres of something different. A scaled-back hospitality industry exists here today.
- Cooks:** In 1893, the community had a population of 200 growing to about 300 by 1905. A sawmill was constructed near the time that the Minneapolis, St. Paul & Sault Ste. Marie Railroad was completed through the area. The railroad, which is now owned by the Canadian National, runs through the townsite with US-2 less than one mile to the south. The settlement is recognizable with a collection of homes and commercial establishments.
- Germfask:** While Germfask has a lumber town history like the neighboring communities, the community is most closely associated with the Seney National Wildlife Refuge. A public water supply and storage system serves 87 customers. A concentration of residences and several tourist-related businesses are located within the water system service area. Logging is a major economic activity in the area.
- Gulliver:** Gulliver is centered at the junction of CR432 and highway US-2 where the Canadian National runs just south of its right-of-way. CR432 south leads to the limestone mining operations of Port Inland. The community is distinguishable by the residential and commercial development along the highway corridor.
- Indian Lake:** A significant residential population is present along and near the lake's eastern shore. Other shoreline areas of the lake are owned principally by the state and are noted for recreation.
- Manistique:** Manistique is the county seat and population center. County industrial and commercial enterprises are concentrated in the city where municipal services are available. Highway US-2 parallels the Lake Michigan shoreline and is heavily developed with establishments that cater mainly to the tourist trade. A variety of retail businesses are present in the downtown area just north of US-2.
- Seney:** Located at the intersection of M-77 and M-28 near the Fox River, Seney was once a lumber boomtown of considerable notoriety. At the peak of its wild and raucous days in the 1880s, Seney was referred to as the Toughest Town in Michigan. Signs of the original settlement by the river have all but disappeared. Homes and tourist-related businesses are collected along and near state trunklines. A public water supply and storage system serves 85 customers.
- Steuben:** The settlement of Steuben is located on the Indian River. In 1896 the Chicago Lumber Company built a railroad from Manistique to Indian River and gave the location its name. Completion of a bridge across the Indian River enabled the railroad to be extended northward to connect with the Duluth, South Shore & Atlantic Railroad at Shingleton. Abandonment of lumber camps was about complete by the 1920s with a corresponding effect on the settlement. A few homes, camps and some tourist-related enterprises are all that remains today.
- Thompson:** Thompson began as a sawmill town and port. In the 1880s, the population was thought to exceed 500. Highway US-2 runs through the community which is recognizable with many homes and several commercial establishments.

2.6 Housing

The Census Bureau counted a total of 6,385 housing units in Schoolcraft County in 2019, compared to 5,700 in 2000. Occupied housing units accounted for about 54% (3,468) of the total stock. Eighty-three percent of these were owner-occupied and had an average household size of 2.36 persons. Household size among renter-occupied units averaged 1.85 persons. Single-unit detached structures comprise 88.3 percent of the total housing units. Mobile homes make up 6.2 percent of all county housing units.

The vacancy rate of rental units was 8.7 percent. Among the 2,917 vacant units, 2,450 were identified as seasonal, recreational, or occasional use dwellings. In other words, 84 percent of the unoccupied housing units are camps or cottages.

Both the county and city of Manistique administer their own zoning ordinances and issue zoning permits. The county issues all building permits; building and electrical code inspections are also performed by the county. Manistique Township handles electrical code inspection separately at present. State personnel are responsible for plumbing and mechanical permitting and code enforcement.

A little over 27 percent of county housing structures were constructed before 1960. Forty-two percent of homes are heated using utility gas, while the rest are primarily heated with propane, wood, or electricity.

The construction standards of many seasonal units are not known. Roads to such structures are generally constructed to meet the needs of occasional usage. Road widths, curves, grades and base sufficiency may be problematic for emergency vehicles.

There are 12 state licensed adult group homes and adult foster care facilities in the county. Most are home to 4 to 12 persons. The Schoolcraft County Medical Care Facility, a 70-bed skilled nursing home, is located in Manistique.

Name	Location	Type	Capacity
Barkers Country Living	728 Newborn Rd. R 71 Germfask, MI 49836	Adult Foster Care	6
Berry	638 Grant Rd., Rt. 1 Box 71 Germfask, MI 49836	Adult Foster Care	6
Clark's Landing	2618 N. RIVER ROAD GULLIVER , MI 49840	Adult Foster Care	4
Hidden Estates Inc.	101 LAKE STREET MANISTIQUE , MI 49854	Adult Foster Care	6
Miller AFC Home	1335 Robinson Rd.	Adult Foster	5

Table 2-3 State Licensed Adult Group Homes/Foster Care Facilities, Schoolcraft County			
Name	Location	Type	Capacity
	Germfask, MI 49836	Care	
New Delta Home	223 New Delta Manistique, MI 49854	Adult Foster Care	6
Northern Comfort Specialized Care	547 MICHIGAN AVE. MANISTIQUE , MI 49854	Adult Foster Care	6
Peterson Home	940 Ten Curves Rd. Germfask, MI 49836	Adult Foster Care	6
Seney Adult Foster Care Home	10710 N Seney Ave. Seney, MI 49883	Adult Foster Care	12
Stepping Stone I	240 New Delta Ave. Manistique, MI 49854	Adult Foster Care	6

There is a single skilled nursing facility in the county in Manistique:

- Schoolcraft Medical Care Facility- 95 beds

Publicly-subsidized housing complexes are listed in Table 2-4.

Table 2-4 Publicly Subsidized Housing Units, Schoolcraft County			
Name	Location	Year Built	Description
Parkview Estates	Cornell Road Germfask	1984	Elderly (15) 1-bedroom (1) 2-bedroom
Harbor View Towers	400 E. Lakeshore Drive Manistique	1968	Elderly (34) 1-bedroom (1) 2-bedroom
Heritage House	900 Steuben Avenue Manistique	1984	Elderly (45) 1-bedroom (3) 2-bedroom
Manistique Lakeview Apts.	701 Park Avenue Manistique	1992	Family (28) 1-bedroom (12) 2-bedroom
Maple Square	Scattered sites Manistique	1968	Family (2) 2-bedroom (18) 3-bedroom (5) detached units
Whispering Wind	600 Cherry St. Manistique	1998	Elderly (48) 1-bedroom Family

Table 2-4 Publicly Subsidized Housing Units, Schoolcraft County			
Name	Location	Year Built	Description
			(16) 1-bedroom (16) 2-bedroom
Sault Ste. Marie Tribe Housing Site	River Road Manistique twp.	1980s	Family (12) 4-bedroom (16) 3-bedroom (6) 2-bedroom (4) 1-bedroom

2.7 Public Infrastructure

Wastewater

Only the city of Manistique and Seney Township have wastewater treatment facilities. Manistique’s wastewater treatment plant is located on the Manistique River immediately south of US-2 and treats an average flow of 1.8 million gallons daily. It has a rated maximum of 6.0 million gallons per day, and is capable of serving a population of 6,400. Included in the system is one lift station on east US-2 and a small grinder station.

Seney Township constructed a wastewater collection and treatment facility which uses natural sewage treatment lagoons that drain into the Fox River.

Water

Water for the city of Manistique is drawn from the Indian River in Hiawatha Township. The municipal filtration facility, which has a maximum daily capacity of 2.2 million gallons, is nearby. A 400,000 gallon elevated storage tower is sited near the hospital. Nearly 4,000 users are served through 1,442 connections. Service is provided to nearby parts of Hiawatha Township.

The community of Germfask is served by a public water supply system currently serving approximately 100 customers from two deep wells. The distribution system includes about 3 miles of line, a pumping station, a 50,000 gallon storage tank, and 22 hydrants.

Two deep wells (578 feet each) provide water to 85 customers in the community of Seney. This public water supply system includes a pumping facility, a 5,000 gallon storage tank and flushing hydrants.

Telecommunications

Telephone and internet service across the county’s most populous areas (southern quarter) is provided by major national and several smaller, regional carriers. More rural areas of the

county have sporadic access to wireless communication networks.

Utilities

Northern Inwood Township and the M-77 corridor from the community of Seney northward are served by Alger-Delta Cooperative Electric Association. U.P. Power Company (a subsidiary of Wisconsin Public Service) provides electricity along US-2 in Mueller and M-77 in Mueller and Germfask townships to the community of Seney. The M-28 and M-94 corridors in Hiawatha and Seney townships are also served by U.P. Power. Cloverland Cooperative, which purchased Edison Sault Electric in 2010, provides electric power throughout the rest of the county.

Semco Energy provides natural gas in the city of Manistique, the Indian Lake area in Hiawatha Township, and east of the city along and near US-2 including Manistique River Road.

Two pipelines cross through the county. Great Lakes Gas Transmission Company owns and maintains two 36-inch natural gas pipelines; Enbridge Energy owns and maintains a 30-inch line which carries natural gas liquids (NGL) that when released to the atmosphere change to gas and are extremely flammable. The Enbridge pipeline that runs through Schoolcraft is part of the system that failed and spilled into the Kalamazoo River in 2010, resulting in a \$765 million cleanup cost.

2.8 Areas of Land Use Conflict/Future Development

- Waterfront development pressures are converting natural areas to homes and cottages at a rapid rate. New dwellings along US-2 create additional hazards by disrupting traffic flowing at posted speed limits. US-2 is a major route for heavy trucks, which require longer braking distances. Where sight distances are limited, the hazard is even greater.
- The former county landfill along M-94 in Hiawatha Township was ordered closed and capped by the state in 1992. Closure requirements preclude development for at least 50 years.
- The sedimentary limestone and dolomite bedrock of the county is susceptible to groundwater contamination. Concern is underscored by the fact that only the City of Manistique and Seney has wastewater collection and treatment facilities. Private on-site systems are used in all other parts of the county. In particular, there have been concerns with the adequacy of on-site systems on the east side of Indian Lake.
- Development and/or seasonal to year-round conversions along lakes and streams bring up environmental and transportation concerns due to erosion and traffic flow. High risk erosion areas are designated along the Lake Michigan shoreline and carry special setbacks requirements. Potential conflicts may arise where residential development occurs next to active agricultural areas.

- FEMA completed floodplain mapping for the City of Manistique in 1990, but no other communities in the county have been mapped despite their proximity to water bodies. This can make it difficult to determine flood prone areas. Vacant lakefront properties in many areas of the county are being developed. Areas along the Manistique River north of the city are not mapped and also are likely to contain some flood prone areas.
- Development along US-2 immediately east and west of the city of Manistique is expected to intensify. Ownership along the trunkline corridor is predominantly private and highly valued - two important factors that encourage development. The trend of persons moving out of the city and residing in the townships will continue. There will be continued development of residential homes along lakes and streams throughout the county.

2.9 Historic Resources

Museum facilities are found in Seney, Seul Choix Pointe and the Manistique water tower.

2.10 Transportation

Highways US-2 and M-28 are the most heavily traveled roadways in the county followed by M-94, M-77 and, to a lesser extent, M-149. Their collective in-county distance is 136.2 miles. County primary roads total 224.1 miles and there are 213 miles of county local roads. The system managed and maintained by the Schoolcraft County Road Commission includes 17 bridges, some of which have weight restrictions due to structural condition. Federal roads serving the Hiawatha National Forest and Seney National Wildlife Refuge total 173.0 miles. In the city of Manistique there are 6.9 miles of streets classified as major and 16.4 as local. All mileages cited are as certified under Act 51 for 2002.

Major trunklines and railroads are identified on Map 1. Annual average daily traffic volumes are displayed on Map 7.

The average number of vehicles per county household decreased from 1.76 in 2000 to 1.68 in 2011 according to the U.S. Census Bureau. Census 2010 data also show that work commuting time decreased from an average of 20.8 minutes in 2000, an average of 18.6 minutes for county residents in 2010, and an estimated 18.4 minutes in 2019.

Annual average daily traffic volumes as recorded by the Michigan Department of Transportation for select trunkline locations are as follows:

Steuben - 689
Germfask- 1,428
Seney- 2,313
Gulliver- 5,102
Thompson- 4,628

Manistique- 6,019

The Canadian National Railroad extends for approximately 33 miles from Cooks to Mackinac County. A north-south rail line parallels the county line from the Port Inland quarry to the Canadian National mainline.

The Schoolcraft County Airport (elevation: 685 feet) is a general utility facility with two hard-surface runways of 5,000 and 2,500 feet, respectively. Commercial passenger service is not provided. Fuel is available at the facility.

Manistique harbor at the mouth of the Manistique River is a commercial and recreational port. Supplies including fuel are loaded for transport to Beaver Island by barge. Commercial fishing operations are based in the harbor as well.

Mined limestone and dolomite is shipped from Port Inland, a deep-draft facility.

2.11 Economic Characteristics

Most employment in Schoolcraft County is found in the education, health, and social service industries, at 21.7 percent of the total workforce. The hospitality industry employs about 14.5 percent of the workforce with another 12 percent involved in retail and wholesale trade. Manufacturing employs 8.4 percent of the workforce. Table 2-5 presents more detailed information about employment by industry in the county.

Schoolcraft Memorial Hospital, Manistique Area Schools, UP Paper, Kewadin Casino, the city of Manistique and Schoolcraft County are major employers. A listing of the largest employing entities in the county as of 2012 is provided in Table 2-6.

About 8 percent of the county's workforce is engaged in manufacturing activity. The leading manufacturing employers in the county are UP Paper and Carmeuse – Port Inland.

UP Paper, which purchased the Manistique mill in 2016, has a 99 acre facility that produces kraft paper for packaging applications from 100% recycled materials.

During the production season, Carmeuse - Port Inland, operated by O-N Minerals, employs about 80 persons. The company suspends production during winter. About 50 percent of the production is used as aggregate material in asphalt and concrete, 35 percent as a fluxing agent in steel making, 5 percent as paper coating or filler, and the remainder is used in many chemical industry applications.

There are several small sawmill and/or planing operations around the county, as well as some machining and steel fabrication employing from 2 to 20 persons.

Table 2-5 Percentage of Employed Persons by Industry, 2019			
Industrial Category	Schoolcraft County	CUPPAD Region	Michigan
Agriculture, forestry, fishing and mining	5.1%	3.5%	1.2%
Construction	7.4%	6.4%	5.7%
Manufacturing	8.4%	15.6%	18.5%
Wholesale trade	1.2%	1.8%	2.4%
Retail trade	12%	11.8%	10.5%
Transportation and utilities	4.8%	4.9%	4.4%
Information	0.3%	1.6%	1.8%
Finance, insurance and real estate	7.3%	4.6%	5.4%
Professional, scientific, management, administrative, and waste management services	6.3%	6.1%	9.5%
Educational, health and social services	21.7%	22.5%	23.4%
Arts, entertainment, recreation, accommodations and food services	14.5%	12.2%	9.9%
Other services	4%	4.4%	4.7%
Public administration	6.9%	4.9%	3.83

Source: Table DP-3 Selected Economic Characteristics, American Community Survey 5-Year Estimates 2019

Table 2-6 Major Employers (50+), Schoolcraft County
Schoolcraft Memorial Hospital
Manistique Area Schools
Schoolcraft County
UP Paper
Kewadin Casino
Carmeuse Port Inland
Northwoods Home Nursing
Big Bay Schools

Table 2-6 Major Employers (50+), Schoolcraft County
Manistique Oil

Schoolcraft County’s 2019 workforce - both employed and unemployed - was estimated at 3,247. Unemployment rates for the county are typically the highest within the Upper Peninsula. Average annual unemployment rates for 2019 are as follows:

Schoolcraft County	7.9%
Upper Peninsula	6.34%
Michigan	4%
United States	3.6%

Per capita income in 2019 was \$24,647 compared to \$49,238 statewide. Median household income in 2019 was \$45,500 compared to \$59,584 for Michigan overall. The percentage of county residents with incomes below the poverty level was 16.7 percent in 2019 while the statewide rate was 13 percent.

2.12 Population

Schoolcraft County’s population is concentrated within a few miles of Lake Michigan and highway US-2. As Table 2-7 shows, the total county population has decreased by 15 percent since 1940. Since the year 2000, most of the county’s jurisdictions suffered population loss, with the county as a whole experiencing a population loss of almost 10 percent. In the past ten years, almost every township has lost population or had very limited growth. County population distribution is shown on Map 2.

In the 50-year period ending in 2020, the median age of county residents increased by over 80 percent. Generally, median age rises with distance from the population center. This is largely attributable to the living preferences of persons with no children, many of who are retired. Median age information is presented in Table 2-9. Population graphs for the county and local governmental units are provided in Appendix A.

Table 2-7 Population History, Schoolcraft County	
Year	Population
1850	16
1860*	78

Table 2-7 Population History, Schoolcraft County	
Year	Population
1870	**
1880	1,575
1890	5,818
1900	7,889
1910	8,681
1920	9,977
1930	8,451
1940	9,524
1950	9,148
1960	8,953
1970	8,226
1980	8,575
1990	8,302
2000	8,903
2010	8,485
2019***	8,048

* Records for 1860 indicate total free population of 78 and total population of 69

**1870 population information not available

***Estimated for 2019, American Community Survey

Source: U.S. Bureau of the Census for years cited

Table 2-8
Population 1940-2010, Schoolcraft County Jurisdictions

Jurisdiction	1940	1950	1960	1970	1980	1990	2000	2010	2020*	1940-2020 Change	1940-2020 Percent Change
Doyle twp.	592	556	586	615	629	616	630	624	468	-124	-21.0
Germfask twp.	793	603	650	529	607	542	491	486	469	-270	-40.9
Hiawatha twp.	588	644	695	802	1,096	1,279	1,328	1,302	1,305	+156	+121.9
Inwood twp.	685	672	624	482	592	638	722	733	704	+19	+2.77
City of Manistique	5,399	5,086	4,875	4,324	3,962	3,456	3,583	3,097	2,919	-2,480	-45.9
Manistique twp.	526	587	645	716	862	916	1,053	1,095	1,081	+555	+105.5
Mueller twp.	322	422	331	263	255	206	245	234	212	-110	-34.2
Seney twp.	260	282	236	178	174	185	180	119	101	-159	-61.2
Thompson twp.	359	296	311	317	398	464	671	795	735	+376	+104.7
COUNTY TOTAL	9,524	9,148	8,953	8,226	8,595	8,302	8,903	8,485	8,047	-1,477	-15.5

Source: U.S. Census Bureau for years cited

*2019 ACS survey estimates

Table 2-9					
Median Age, Schoolcraft County Jurisdictions, 1970-2010					
Jurisdiction	1970 Median Age	2000 Median Age	2010 Median Age	2020 Median Age*	1970-2020 Change
Doyle Township	28.8	42.2	50.7	58.0	101.4%
Germfask Township	27.9	42.7	45.2	41.2	47.7%
Hiawatha Township	33.0	45.2	53.1	56.7	71.8%
Inwood Township	23.7	44.0	51.1	55.5	134.2%
City of Manistique	33.5	38.0	43.0	49.2	46.9%
Manistique Township	23.6	39.0	46.9	49.7	110.6%
Mueller Township	32.0	51.4	58.2	64.5	101.6%
Seney Township	28.8	46.0	58.1	60.3	109.4%
Thompson Township	42.2	46.0	49.8	57.0	35.0%
SCHOOLCRAFT COUNTY	28.6	41.4	48.3	52.1	82.2%

Source: U.S. Census Bureau for years cited

*2019 ACS community survey estimate

3.0 Hazards

Schoolcraft County is subject to a wide range of natural and man-made hazards every year, therefore, an all-hazards approach was taken with mitigation planning. Research and identification of hazards was an extensive process, which gathered input from local officials and residents of Schoolcraft County.

Section 3.1 describes the hazard rating and ranking process. The results of this process guided the determination of risk and vulnerability. Section 3.2 describes what risk and vulnerability assessments are and why they are done. Last in this chapter, Section 3.3 describes each hazard with corresponding risk/rank and vulnerability statement.

3.1 Hazard Rating and Ranking

Generally, hazards of all types were evaluated according to **probability of future occurrence**, **impact** (overall effect on community), and **extent** (magnitude of impact). Specifically, the following factors were used to evaluate hazards:

1. Casualty Potential
2. Percent of Population Affected
3. Likelihood of Occurrence
4. Capacity to Cause Physical Damage
5. Size of Affected Areas
6. Corollary Effects

Local residents from business and industry, police and fire agencies, emergency services, education, public health, medical services, transportation, planning and zoning, and local elected officials participated in a review and discussion as the Schoolcraft County Local Emergency Planning Commission (LEPC). Hazards were evaluated and ranked using the above factors. As such, each ranking takes into account the probability of future occurrence, impact, and extent of hazards. Some two-dozen residents participated in the process.

2013 Revisions

In 2013, the Schoolcraft County LEPC revisited the rankings and decided to revise the order of some hazards:

- Due to recent high-profile school shootings nationwide and local weapons-related incidents, the LEPC gave school violence and workplace violence a higher hazard rating than in the 2007 plan.
- Petroleum pipeline failures were put into the moderate risk category because spill in Kalamazoo highlighted the massive cleanup costs associate with pipeline failures.
- Wildfires were moved to the “High” category because of recent incidents and the high mitigation costs.

- The LEPC gave infrastructure and dam failures a higher ranking because of the large affected population.
- Tornados received a lower ranking because of their rarity in the county.

2021 Revisions

In 2021, the Schoolcraft LEPC revised the rankings under the same standards. Notable changes include:

- The rank reduction of hazardous material releases due to transportation accidents from first rank down to seventh. This is in part due to the low occurrence of related issues in the county and wider region.
- The continued increase in rank of wildfires, moving from 10 in the 2007 plan, 7 in 2013, and 5 in 2021. High occurrence and media coverage of wildfires in the western states has led to increased local knowledge of surrounding issues.
- The movement of environmental factors related to disease, urban flooding, tornadoes and drought from ranks between 14-16 in 2007 to 24-27 in 2021, most likely due to the low occurrence of these issues in the county.

The county hazard ranking and risks for the 2007 (the original plan), 2013, and 2021 plan updates are shown in Table 3-1. Table 3-1 also contains the original hazard rating score from the 2007 plan. The rating points reflect an order of importance as a threat within the County with higher points equating to higher risk. Appendix C gives more detail into the methodology of the hazard rating and ranking.

3.2 Risk and Vulnerability Assessments

The risk and vulnerability assessments are closely related steps in the hazard analysis process. Both assessments were used in analyzing hazards in Schoolcraft County.

Risk Assessment is a description and/or map of where hazards exist in the community to gain some idea of how often they arise and how much harm they might do in the future. Each hazard is described according to its level of risk:

Cursory Assessment – is a short statement explaining why a particular hazard is not considered a threat. This type of statement is applied to low-risk hazards.

Standard Analysis – is one in which readily available information is gathered, evaluated, and explained using text and maps as appropriate but for which no special evaluation techniques were used. Explanations of this type are applied to moderate or high-risk hazards.

Advanced Analysis – includes application of theoretical or expert knowledge that requires significant time, expense, and training to be applied. This type of analysis is reserved for the highest-risk hazards and is used if the appropriate expertise is available.

Vulnerability Assessment gives quantitative estimates of the people and property in the community that are vulnerable to each hazard. Examples would be the number of people at risk, structures vulnerable to damage, key services affected, and estimates of cost.

In mitigation planning, professionals have not been able to reach agreement on where risk assessments end and vulnerability assessments start. Often these two types blend together. The risk and vulnerability assessments for Schoolcraft County hazards were combined and entered under the heading *Vulnerability*.

Table 3-1 Schoolcraft County Hazard Rankings					
Hazard	Rating Score	2007 Ranking	2013 Ranking	2021 Ranking	Risk
Snowstorms	7.05	3	3	1	High
Ice & Sleet	7.95	2	2	2	
Structural Fires	6.95	4	4	3	
Severe Wind	6.95	4	4	4	
Wildfires	5.35	10	7	5	
Transportation Accidents	6.70	6	5	6	
Hazardous Materials – Transportation	8.00	1	1	7	
Infrastructure Failures	5.20	13	9	8	
Public Health Emergencies	5.30	11	8	9	
Lightning & Thunderstorms	6.00	7	6	10	
Cyber Security	N/A	N/A	N/A	11	
Economic Recession/Adversity	5.90	8	14	12	
Temperature Extremes	5.80	9	15	13	
Dam Failures	3.15	25	9	13	
Pipeline Failures	3.30	22	11	15	
Great Lakes Flooding	3.90	19	20	16	
Active Shooter	N/A	N/A	N/A	16	
School Violence	2.75	26	12	18	
Mass Casualties	N/A	N/A	N/A	19	
Riverine Flooding	5.25	12	10	20	
Workplace Violence	1.10	30	13	20	
Hazardous Materials – Fixed Site	3.45	21	22	22	Low
Hail	3.25	23	23	22	
Environmental (invasives, diseases, etc.)	5.10	14	16	24	
Urban Flooding	4.50	16	10	25	
Tornadoes	4.65	15	17	26	
Drought	4.50	16	18	27	
Civil Disturbance	3.25	23	23	28	
Public Assembly Events	2.55	27	24	29	

Scrap Tire Fires	1.00	31	27	30
Terrorism, Sabotage, WMD	4.15	18	19	31
Subsidence	2.00	28	25	32
Bioterrorism	3.50	20	21	33
Earthquakes	1.40	29	26	34
Nuclear Power Accidents	1.00	31	27	35

3.3 Hazard Analysis

Hazards in the following sections are divided into three categories: natural, technological, and social. An analysis of each hazard is presented followed by the corresponding risk/rank and a vulnerability statement.

Weather events reported in this document are from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI). The NCEI Storm Events Database contains various types of storm reports from January 1950 to Present. NCEI receives Storm Data from the National Weather Service (NWS). The National Weather service receives their information from a variety of sources, which include but are not limited to county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry, and the general public.

Storm Data is an official publication of the NOAA, which documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. Some information appearing in Storm Data may be provided by or gathered from sources outside the NWS, such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS. The NWS makes a best guess using all available data at the time of the publication. The damage amounts are received from a variety of sources, including those listed in the Property and Crop damage should be considered as a broad estimate. It should be noted that the years identified for this update are from January 1, 2005 through December 31, 2020, unless otherwise indicated. For simplification, the dates are shown as 2005-2020, which is a sixteen-year inclusive period.

3.3.1 Natural Hazards

Hazards caused by severe meteorological events, wildfires, flooding, and unstable ground will be addressed in this section. Unstable ground includes areas impacted by mining and excavation.

Severe Weather

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Severe weather conditions are expected in Schoolcraft County. Ice and sleet, snowstorms, severe winds, lightning and thunderstorms, and extreme temperatures are considered high risk hazards.

The NWS, a division of the National Oceanic and Atmospheric Administration (NOAA), disseminates information by several means. NOAA weather radio is a readily available source for severe weather warnings. The Emergency Alert System replaced the Emergency Broadcast System (EAS) in 1996 and is used to transmit emergency information targeted to a specific area. Terms used in weather forecasts reflect the anticipated timing and severity of an approaching storm. A watch is issued if a particular hazard is possible because conditions are more favorable than usual for its occurrence. Planning and preparation is the recommended course of action when a weather watch is issued. A warning indicates that a particular weather hazard either is imminent or has been reported, and action to protect life and property is recommended.

NOAA weather radio (NWR) provides up-to-the-minute information and is a source for severe weather warnings. Schoolcraft County receives reliable radio coverage from Newberry (300 watts), Manistique (300 watts), and Grand Marais (100 watts). Additional alerts can be received from the Marquette transmitter (1000 watts). NOAA weather radio coverage maps are included as maps 8, 8A, 8B, 8C, and 8D.

Schoolcraft County does not currently have a countywide warning system.

Schoolcraft County has experienced severe weather events in all seasons. The most damaging weather events have been caused by thunderstorms and high winds. Appendix D describes severe weather events in Schoolcraft County from 1950 – 2020 inclusive.

It should be noted that severe thunderstorms are associated with damaging winds, hail, heavy rains capable of causing flash flooding, and lightning. Moreover, individual severe cold season weather events can interact to cause many hazards. The difference between rain, ice and snow can be a matter of a few degrees. The probability and damage potential of severe weather events in Schoolcraft County is high overall.

Snowstorms

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: High

Ranking: 1st

Heavy snow and/or blowing snow events are expected each winter season. Events where wind speeds gust or sustain at 35 miles per hour or more and visibility is reduced to one-quarter mile or less for at least three hours are considered blizzards. On average, blizzard events occur about every five years.

Property damage can result from fallen trees, downed power lines, and structures that collapse due to accumulated weight of fallen snow. Inconveniences - normally short-term - such as institutional and business closings or delays, treacherous driving and walking conditions with low visibility, disrupted utility services, and additional snow removal costs are caused by snowstorms. School closings due to winter weather (snow or ice storms) average two days per year. The duration and extent of a storm determines road-plowing requirements.

Snowfall amounts differ significantly within the county. Annual averages at Steuben and Seney Wildlife Refuge are 129 and 98 inches, respectively. These amounts are in sharp contrast to snowfall in southern portions of the county where the annual averages are 70 inches at Port Inland and 69 inches at Manistique. The lake effect and higher elevations are the principal reasons for greater snowfall amounts in the northern portion of the county. Ice and sleet are more common to the southern areas of the county. Seventy-three snow and blizzard events were reported in the sixteen-year period between 2005 and 2020 (4.5/year average).

Although hard to measure, a definite risk to human life accompanies snowstorms. Heart attacks and traffic accidents associated with snow events are not uncommon. Among severe weather hazards, snowstorms are rated second to ice and sleet storms.

Vulnerability: (Ice & Sleet and Snowstorms): Winter storms including ice and sleet storms and snowstorms and can be expected to occur in any year in any part of the county. Storms or blizzards may necessitate the closing of businesses, institutions, and roadways. Power outages and other utility interruptions can affect the entire population. Property damage could occur from removal, storm-induced accidents, and heavy snowloads on structures. Widespread property damage to utility lines, trees, and light duty coverings such as awnings, canopies, and carports could be anticipated.

Annual snowfall amounts differ markedly within the county from 69 inches at Manistique to 129 inches at Steuben.

Seventy-three snow and ice events have been recorded between 2005 through 2020, with \$100,000 of property damage reported in 2019. Anecdotal evidence suggests that some unreported damage likely occurs during most winter storms.

Timeframe	# of events	Casualties	Property Damage	Crop Damage	Damage total
January 1993- April 2004	49	0	\$5.05 million	0	\$5.05 million
2005- 2012	37	0	\$5,000	0	\$5,000
2013-2020	35	0	\$100,000	0	\$100,000

Average events per year (123 ÷ 28)	4.39
Average casualties per event- none reported	0
Average injuries per event- none reported	0
Estimated annual property damage (\$5.15 million ÷ 28)	\$183,928
Estimated property damage per event (\$5.15 million ÷ 123)	\$41,869
Estimated crop damage- non reported	0

Ice and Sleet

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: High
Ranking: 2nd

Ice and sleet storm occurrences average three per year throughout the state. Sleet storms occur primarily within the Upper Peninsula. The most recent ice and sleet storm recorded for Schoolcraft County occurred in February 2019. There were no reported reported damages or injury associated with the storm. Such storm events do pose a moderate risk to human life and a high risk to property. For people, the risks are secondary in the form of traffic accidents, falls, and downed power lines. A lengthy interruption of electrical service could seriously imperil human life, property, and business and institutional functions. Although they are typically of short duration, ice and sleet conditions are extremely dangerous and rated highest among severe weather hazards in the county.

Severe Winds

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: High
Ranking: 4th

High winds frequently accompany thunderstorms. Between 1983 and 2020, 40 high wind events were recorded in the National Oceanic and Atmospheric Administration’s database. Cumulative property damage was \$1,121,000; crop damage totaled \$10,613,000. Most of the

damage- \$10 million in crops (trees) and \$450,000 property damage, resulted from a high wind event of November 1998. Wind speed exceeded 100 miles per hour with heaviest damage reported in the southwest part of the county. Other instances of property damage occurred in October 1997, July 1999, and December 1999, with limited damage in recent years.

Between 2005 and 2012, there were fifteen instances of severe wind events in the county. Cumulative property damage was \$11,000, crop damage was not identified. Most of the damage was the result of downed trees and power lines. In one event, docks on Indian lake suffered damage. Winds speeds of between 50-62 knots were associated with these events.

Wind zones reflect the number and strength of recorded wind events per 1,000 square miles. These designations were established for engineering design purposes. The extreme southwest section of the county is included within Zone III. Zone III indicates a greater likelihood for a damaging wind event than the balance of the county, which is within Zone II. Zone IV, which extends as far north as Minneapolis and Green Bay, includes the tornado belt area.

Severe wind events tend to be localized and have been recorded throughout the county. The southern part of the county, which includes the city of Manistique, has recorded the most wind damage. These areas are the most intensively developed and significantly forested and, thus, will incur the greatest property damage if impacted.

On average, severe straight-line winds can be anticipated several times each year. Severe wind events are likely to cause property damage and temporarily disrupt services such as electric, telephone and cable. Human injury is infrequent and fatalities rare.

Lighting and Thunderstorms

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: Moderate
Ranking: 10th

Lightning is common during summer months with passing thunderstorms. Only floods and flash floods cause more weather-related deaths.

The diameter of a typical thunderstorm is about 15 miles and an individual event lasts 30 minutes on average. There is no discernible geographical pattern within the county. Much of the property damage damage is directly related to fallen and downed trees. A severe thunderstorm with high winds struck the Cooks area in October 1997 causing property and crop damage in excess of \$600,000.

The number of thunderstorms each year ranges from 20 to 40, and they can occur at any time of the year although spring and summer afternoons and evenings are the most common. About 10 percent of these storms are classified as severe (high winds and hail). Areas impacted by such storms range from local to regional in size. A moderate to high risk is associated with

these storms for human life and property. Most lightning damage is to property - especially electronic equipment. Lightning-induced structural and forest fires represent a significant hazard. Human injuries from lightning strikes are infrequent, deaths rare.

Vulnerability (Severe Wind and Lightning & Thunderstorms): The entire county is equally subject to thunderstorm and high wind events. Severe wind events have occurred in all areas of the county, however they tend to be localized. On average, one severe thunderstorm and high wind event can be expected each year. A direct impact on a small population occurs when structures suffer damage. Damage to utility networks with service interruptions could be expected. The impact can be direct through structural damages or it can be indirect in the form of electrical or other service interruptions. Structural damage will result from a severe storm with few, if any, human casualties.

Between January 1983 and April 2004, 24 thunderstorm and severe wind events were recorded in the county, with total damage amounting to \$11.7 million and one reported injury. Between 2005 and 2012 there were 19 thunderstorm and severe wind events recorded, with a total reported damage of \$15,000. Most of the total damage was a result of fallen and downed trees.

Timeframe	# events	Casualties	Property Damage	Crop Damage	Total Damage
January 1983-2004	24	1 injury	\$1.11 million	\$10.613 million	\$11.7 million
2005- 2012	12	0	\$11,000	0	\$11,000
2013-2020	7	0	\$4,000	0	\$4,000

Average events per year (40 ÷ 38)	1.05
Average casualties per event- non reported	0
Average injuries per event- (1 ÷ 38)	0.02
Estimated annual property damage (\$1.125 million ÷ 38)	\$29,605
Estimated property damage per event \$1.125 million ÷ 40)	\$28,125
Estimated annual crop damage (\$10.613 million ÷ 38 years)	\$279,289
Estimated crop damage per event (\$10.613 million ÷ 40)	\$265,325

Temperature Extremes

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: Moderate

Ranking: 13th

Above-average summertime temperatures are normally short-lived and a moderate risk to human life and property. Record cold temperatures are more likely to occur and present a high risk to human life and property.

Temperatures of at or below zero degrees Fahrenheit can occur within the months of November through April in any part of the county. Mean daily temperatures in the months of December through March are below freezing. County temperature data is limited to weather reporting stations in Manistique and Seney. On average, Manistique will experience such temperatures during 25.7 days each year; Seney will experience 28.8 such days. Most extremely cold weather can be expected in January and February.

Extremely cold temperatures in January 1994 resulted the issuance of a major disaster declaration as frozen water and sewer lines ruptured. During the last extreme cold event in 2014, wind chill values were recorded in the -35 to -45 below zero range and necessitated closing local schools for two days.

Cold weather threats for humans include frostbite and hypothermia, which in extreme instances can be fatal. Nationally, 700 deaths per year are attributed to extreme cold. Besides the direct risk to humans posed by extremely cold temperatures, there are many indirect risks. Poorly insulated housing with inefficient heating systems and heightened structure fire danger, equipment failure, and frozen water lines are closely associated with cold temperatures.

The Wind Chill Temperature (WCT) index has been used by the National Weather Service since 2001. It is an improved model that more accurately gauges the dangers of freezing weather and is presented in Table 3-4.

Table 3-4 Wind Chill Temperature											
Wind speed	Temperature										
Calm	35°	30°	25°	20°	15°	10°	5°	0°	-5°	-10°	-15°
5 mph	31°	25°	19°	13	7	1	-5	-11	-16	-22	-28
10 mph	27°	21°	15°	9	3	-4	-10	-16	-22	-28	-35
15 mph	25°	19°	13°	6	0	-7	-13	-19	-26	-32	-39
20 mph	24°	17°	11°	4	-2	-9	-15	-22	-29	-35	-42
25 mph	23°	16°	9°	3	-4	-11	-17	-24	-31	-37	-44
30 mph	22°	15°	8°	1	-5	-12	-19	-26	-33	-39	-46
35 mph	21°	14°	7°	0	-7	-14	-21	-27	-34	-41	-48

Note: Shaded areas indicate that frostbite will occur in 30 minutes or less.

Heat stroke (life threatening) and heat exhaustion are the major threats associated with high temperatures. Persons with health problems, the elderly and the very young are the most vulnerable. It is estimated that several hundred heat-related deaths occur in the U.S., a figure that could be much higher. Damage to roadways (buckling), additional power costs for air conditioners, and discomfort for humans and animals that must work or live in such conditions are additional factors.

Available temperature data indicates that temperatures of 90 degrees or greater occur on an average of 1.6 days at Manistique and 5.1 days at Seney. High temperature conditions are reported to the public using a heat index. The National Weather Service has designated three response levels based on the heat index:

- Excessive Heat Warning: temperatures of 105°F or greater for at least two days
- Excessive Heat Watch: temperatures greater than 100°F are expected for 1-3 days
- Heat Advisory: temperatures greater than 100°F for at least two days

Temperatures in the advisory range can cause sunstroke, heat cramps, and heat exhaustion; temperatures above 80° F can cause fatigue. The elderly, children, and overweight people are the most vulnerable to heat stress.

Vulnerability: Since temperature extremes impact wide areas, the entire population of the county would be affected at least indirectly. Mechanical equipment, water pipes (cold weather), livestock, and heating/cooling costs would be impacted by an extreme temperature event. Casualties would be limited, but property damage could be significant.

Tornadoes

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: Low
Ranking: 26th

Tornadoes can cause tremendous destruction. Tornadoes were recorded in 1975, 1984 and 1987 in the county (see Appendix D Table 2). The 1984 event, an F2 (Table 12), caused \$25,000 property damage and one injury. Property damage from the 1987 F3 tornado was placed at \$25,000; the intensity of the 1975 tornado was much less (F0) with no reported damage. All three occurred in July and in the southwestern portion of the county. There have been no confirmed tornadoes during the past 16-year period (2005-2020), though a funnel cloud was last spotted in June 2018. While they are most likely to occur during summer months, an occurrence could happen at any time of the year. Tornadoes pose a high risk to human life and property but are not likely to occur in the area.

Table 3-5 Enhanced Fujita Tornado Scale	
Rating	Wind Speed Range (in miles per hour)
EF0	65- 85
EF1	86- 110
EF2	111- 135
EF3	136- 165
EF4	166- 200
EF5	Over 200

Based on the available tornadic history of events and damages, straight-line winds are much more of a concern in the county.

Timeframe	# of events	Injuries	Casualties	Property damage	Crop Damage	Total Damage
January 1950- January 1987 (none since 1988)	3	1	0	\$50,000	0	\$50,000

Average events/year (3 ÷ 70)	0.04
Average injuries/year (1 ÷ 70)	0.01
Average casualties/year (0 ÷ 70)	0.00
Estimated annual property damage (\$50,000 ÷ 70)	\$714
Estimated annual crop damage (none reported)	\$0
Estimated annual damage (\$50,000 ÷ 70)	\$714

Vulnerability: Tornado events in the county are rare, there were three tornadoes in the 1954-2020 period. There have been no tornadoes reported since 1987. An event in an intensively developed area such as the City of Manistique, which has no emergency warning system, would cause the most property damage and affect the most people. Destruction of critical facilities and utility systems would impact a large percentage of the county population.

Drought

Hazard description: *A prolonged period of deficient precipitation with the potential to damage property and compromise human safety.*

Risk: **Low**
Ranking: **27th**

Droughts, or prolonged periods of deficient precipitation, are primarily noted for their impact on the agricultural sector but can have many far-reaching effects. However, the risk to human life and property is low. The danger of forest fires is elevated and trees can become stressed during periods of little or no precipitation. Recreation, navigation, waterfowl habitat, aquatic life, groundwater levels and well production can all be adversely affected during periods of drought. Private or public water supplies can be strained due to increased watering of gardens and yards. During periods of drought, less power generation is realized at run-of-the-river hydroelectric projects. Major droughts occur an average of every 20 to 25 years and generally affect a broad area.

Drought conditions are measured using the Palmer Drought Severity Index (PDSI) that is published jointly by the National Oceanic and Atmospheric Administration and the U.S. Department of Agriculture. The PDSI measures the departure of water supply (in terms of

precipitation and stored soil moisture) from demand (the amount of water required to recharge soil and keep water bodies at normal levels). Recognizing or predicting drought is very difficult.

Vulnerability: Tourism and forest production are mainstays of the county economy. Major droughts occur on an average of every 20-25 years. A drought would have an immediate and potentially long-term economic impact in all areas of the county. Elevated wildfire danger would threaten dwellings, especially in rural, forested areas located mostly away from the Lake Michigan shoreline. Agricultural production, which consists principally of hay and alfalfa, would be severely affected. There have been no instances of drought reported for Schoolcraft County on the National Centers for Environmental Information database in the past twenty years.

Hail

Hazard description: Any of several extreme weather events occurring singly or in combination with a potential to damage property and compromise human safety.

Risk: Moderate
Ranking: 22nd

Forty-two hail events (hail of least three-fourths of an inch in size) were reported in the County from 1987 through 2020. Hail measuring to 1-2 inches in diameter have been reported in several instances. All but one of the hail events has reported no damage, though anecdotal evidence would suggest the hailstorms have caused damage to crops and possibly vehicles parked outside.

Hail typically accompanies thunderstorms that impact local to regional areas. Risks associated with hailstorms tend to be lower than those associated with thunderstorms. With the right weather conditions, hail can occur in any month, and late spring and summer are the most common times of year.

Vulnerability: Hail is associated with thunderstorms and is generally confined to a small geographic area. All areas of the county are equally susceptible to hail events. Hail itself is seldom of a size that is dangerous to people. If large enough, hail can damage equipment, buildings, and agricultural crops. There have been 20 hail events in the past sixteen-year period in Schoolcraft County; none of which caused any major property damage.

Wildfires

Hazard description: An uncontrolled fire in grasslands, brushlands or forested areas.

Risk: High
Ranking: 5th

Human activity, largely the burning of debris, is responsible for 90 percent of wildfires; lightning strikes cause less than 10 percent. Wildfires can be separated by those that threaten public safety and those that threaten natural resources, e.g., timbered areas. Given the vast amount of forestland in Schoolcraft County, wildfires pose a significant risk.

With an ever-increasing number of rural homes and seasonal dwellings being built in wildland areas, there is a greater potential for life and property loss. Moreover, fire protection can become much more difficult due to resources being deployed to protect structures. Structures built at the wildland interface should implement a commonsense fire defense strategy.

As reported by the Michigan Department of Natural Resources (MDNR) Forest, Mineral and Fire Management Division, there were 85 wildfires in Schoolcraft County between 2007 and 2020 (6/yr.), with the most in recent years being 10 fires during the 2019 season.

Springtime before green up is typically the busiest time for firefighters with grass and brush fires. The threat in forested areas increases during summer months; weather is a critical factor. Fire ignition sources are abundant - trains, off-road vehicles, farm equipment, trees falling on power lines, human activities and many others.

A lightning-ignited fire near Seney in August 1976 burned approximately 74,000 acres. Fire suppression efforts extended into September as dry material was in abundance because of summer drought conditions. It is listed among the most significant wildfires in the state with suppression and damage costs in excess of \$8 million. The Seney Wildlife Refuge and US Fish and Wildlife have dedicated fire management plans and response equipment in the area. Typically, prescribed burns are conducted each year to improve conditions for wildlife in cooperation with staff from other agencies and fire departments.

Lighting strikes from thunderstorms ignited the Pine Creek North Wildfire on the evening of May 20, 2012 in the Seney National Wildlife Refuge. The same line of thunderstorms were responsible for igniting the Duck Lake Wildfire, north of Newberry; the Duck Lake Wildfire is the third largest in modern Michigan history. The Pine Creek North Wildfire spread to 3,500 acres by May 25th, but was 95 percent contained by May 28. The Marshland Wildlife Drive, Fishing Loop, Pine Ridge nature trail and many interior roads within the refuge were all closed due to the fire. M-28 in Schoolcraft County between Seney and Shingleton was closed on May 24 for about three hours to allow for firefighting efforts. The cost of resources to fight the fire was estimated to be around \$600,000. No injuries or deaths resulted from the fire. Governor Rick Snyder declared a state of disaster in Schoolcraft County on May 25, 2012.

The National Weather Service (NWS) provides fire weather forecasts to federal agencies in the area. During periods of high fire danger, the NWS prepares a daily Wildfire Potential Statement.

The economy of the county is natural resource based. Given the vast amount of forestland, wildfires are a high-risk hazard in the county.

Vulnerability: About 70 percent of the land cover in Schoolcraft County is forestlands. Coniferous species (lowland and upland) dominate and are of greater concern because of their flammability. Residential development is represented by population cover on Map 2. This map

further shows most of the residential development taking place in the southern half of the county particularly in and around the City of Manistique.

The City of Manistique is surrounded by forest cover of high risk. It has the highest population (3,097) and number of housing units (1,617) of any community within the county. Some residences are located within the wildland urban interface (areas where lands are prone to wildfires). Almost all critical facilities are located in the city. Wildfire risk is moderate to low due to good fire protection available from city and nearby agencies. A larger wildfire risk could be attributed to land adjacent to the city both north and west to Indian Lake.

Residential development within outlying-forested areas is generally dispersed. State and federal ownership limits residential development within high-risk forest areas. An estimated 50 percent of housing units are either alongside high-risk fire areas or not in them at all. The remaining 50 percent at greatest risk are located near the various towns, lakes, creeks, and roads throughout Schoolcraft. These areas are rural and fire departments could take longer to respond.

Flooding

Hazard description: A rising or overflowing of a body of water caused by rapid snowmelt, excessive precipitation, ice buildup, storm surges, wind or sustained high water levels.

Floods are a natural occurrence. They are also the number one weather-related killers in the nation. The National Weather Service uses these terms to define threatening flood hazards:

- **Flood Watch** is the first of two basic advisories issued by the NWS. A flood watch is issued when conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent. The advisory does give a community an early notice of potential flooding.
- **Flood Warning** is the second basic advisory issued by the National Weather Service. A flood warning is issued when flooding is occurring or flooding conditions are expected to develop. In some cases, the flood warning will be for a specific river or for a height in feet. The NWS tries to issue flood forecasts with an accuracy of plus or minus one foot; however, many variables can enter into this forecast. Some of the variables are difficult to predict, yet have great impacts on flood forecasts.
- **Small Stream Advisory** means to be alert regarding potential flooding of small streams, streets, urban storm drains, underpasses, and low-lying areas.

The NWS uses the following terms to describe flooding severity:

- **Flooding** - minimal or no property damage, possibly some inconvenience
- **Moderate flooding** - inundation of some secondary roads; suggest transfer to higher ground; some evacuation may be necessary
- **Major flooding** - extensive inundation and property damage; evacuation of people and livestock and closure of primary and secondary roads is likely

Development within identified floodplain areas assumes a certain risk. A flood event can destroy or damage property, disable utilities, inundate roadways and bridges making them impassable, and affect agricultural lands. Furthermore, flooding can be life threatening and impede emergency services. The natural capacity of watersheds to retain and release moisture is altered by development that creates impervious surfaces and/or changes natural drainage patterns.

State regulations require a permit for any occupation, construction, or filling or grading within the floodplain of a river, stream or drain. The lowest floor of structures (including basements) must be elevated to or above the 100-year flood elevation.

Flooding severity is expressed in terms of frequency, i.e., 10-year, 50-year, 100-year and 500-year flood. Realistically, these flood frequencies represent the chance in any given year of experiencing a flood event. For example, a 100-year flood has a one in 100 chance of happening each year.

Flood hazard maps illustrate susceptible areas when a stream reaches full-bank level. The average Michigan floodplain map is over twenty years old. Change within a drainage basin (development) affects natural water storage capacity with a resultant increase in both the area and severity of the potential flood areas.

In the county, two local governmental units participate in the National Flood Insurance Program, the city of Manistique and Thompson Township. There is no flood map prepared for Thompson Township, as the entire township area is Zone C.

Community Name	Community Identification Number (CID)	Current Effective Map
City of Manistique	260595#	12/05/1990
Thompson Township	260519	No Special Flood Hazard Area- All Zone C
Schoolcraft County	Not participating	Not participating
Doyle Township	Not participating	Not participating
Germfask Township	Not participating	Not participating
Hiawatha Township	Not participating	Not participating
Inwood Township	Not participating	Not participating
Manistique Township	Not participating	Not participating
Mueller Township	Not participating	Not participating
Seney Township	Not participating	Not participating

Source: Community Status Book Report, FEMA, July 23, 2021

Floodplain maps illustrate susceptible areas when a stream reaches full-bank level. It is worth noting that the floodplain map for Manistique is over 30 years old. Change within a drainage basin (development) affects natural water storage capacity with a resultant increase in both the

area and severity where flooding is probable. Floodplains, as currently identified, are shown on Map 5.

To safeguard development in high-risk erosion areas, regulations establish required setback distances from the shoreline to protect new structures. The Michigan Department of Environment, Great Lakes, and Energy requires special permits for construction activities within identified at-risk erosion areas. There are no longer any high-risk erosion parcels in Schoolcraft County.

Riverine Flooding

Hazard description: A rising or overflowing of a river or creek caused by rapid snowmelt, excessive precipitation, and ice buildup.

Risk: Moderate
Ranking: 20th

Excessive precipitation or runoff, especially in springtime, can cause streams to overflow their banks with resulting damage. Parts of Manistique were flooded to second story depth in 1920 following failure of an earthen dike on the west bank of the Manistique. The flood ruined facilities and delayed production start-up at the Manistique Pulp and Paper mill. Several roads were washed out when the old Thompson Fish Hatchery dam failed due to snow melt and rain in late April 1996. This included a portion of County Road 435. Localized flooding has occurred following periods of heavy precipitation.

Vulnerability: The County has an abundance of streams, inland lakes and about 50 miles of Lake Michigan shoreline. Except in its northwest and northeast areas, the county is relatively flat with the county's three major watersheds draining to Lake Michigan. Flooding in undeveloped areas is expected in the early spring due to snowmelt or a combination of snowmelt and rainfall. With little topographic relief along the rivers and streams, excessive water spreads out from the banks rather than creating a rushing torrent. There have been no instances of severe riverine flooding in the past several years.

Floodplain mapping has been completed for only the city of Manistique. Recorded flood events outside of the city were the result of dam failures and are cited in Section 3.3.2 Technological Hazards. Map 5 identifies the floodplain area.

Urban Flooding

Hazard description: The rising of a body of water caused when drainage or pipe capacity is not sufficiently sized to carry out peak volume discharge.

Risk: Low
Ranking: 25th

When drainage or pipe capacity is not sufficiently sized or designed to carry away a peak volume discharge, urban flooding occurs. Urban flooding relates directly to how well drainage from impervious surfaces is controlled. Discerning a difference between riverine and urban

flooding may be difficult in some instances. The most common example is ponding on roadways when water depths exceed curb heights. Clogged catch basins and culverts can cause flooding as well. Urban flooding is an infrequent and temporary condition that is not considered a major hazard threat in the county.

Vulnerability: This hazard exists within the city of Manistique and areas that are intensively and moderately developed. Historically, such events have been short-lived with a minimum of damage in an isolated area.

Great Lakes Shoreline Flooding

Hazard description: The rising of Lake Michigan caused by ice buildup, storm surges, wind or sustained high water levels.

Risk: Moderate
Ranking: 16th

The average water level of Lake Michigan from 1918 to 2021 is 578.87 feet. Record high levels were reached in the period from February 1986 to January 1987 that were about 5 feet above the long-term average. Current water levels have been 1-2 feet above the long-term average since 2017. High water levels, when accompanied by onshore storms, cause significant erosion in vulnerable areas. Property damage was incurred as some structures were intermittently flooded. Other notable high-water periods were recorded in 1973-1974 and the early 1950s. Conversely, the record low periods to date occurred in 1964-65, 2008, and 2013.

Although the strongest, most damaging lake storms occur most generally in the Fall, they can occur any time of the year. Circa 1975, a winter storm threatened US-2 as high water and winds moved ice well past the normal shoreline.

Small seiches occur on the Great Lakes every day causing water levels to rise and fall. A seiche is an oscillation of the surface of a lake similar to a sloshing of water back and forth in a bathtub. An occurrence can last from a few minutes to several hours and is caused by water piling up on one side of the lake due to high barometric pressure or wind. When the cause abates, the bulging high water is free to head in the opposite direction.

Seiches can reach ten feet and cause major damage along shorelines. Seven people lost their lives as a major seiche breached a Chicago dock in 1954. Significant seiches have been recorded at various Lake Superior locations including L'Anse, Munising and Sault Ste. Marie. A recent seiche was reported in the National Centers for Environmental Information on July 19, 2019 at Manistique. A thunderstorm to the south in Lake Michigan caused high waves and minor flooding along the boardwalk area, resulting in minor damage.

Previous record high lake levels did not appreciably affect homes, businesses, or infrastructure within the county. A significant amount of high-value lakeshore development has occurred since.

This hazard is a moderate risk to property; the risk to humans is low.

Vulnerability: Lake Michigan levels have been high in recent years with a minor threat of flooding, notably during and after storms. However, erosion did occur during high water periods in the late 1980's, and minor erosion has been the cause of damage along the boardwalk. A return to the levels of that time could threaten the many high-value lakeshore developments that have since been constructed. Lakeshore development continues to occur in Schoolcraft County.

Earthquakes

Hazard description: A shaking, trembling, or upheaval of the earth's surface caused by volcanic action or bedrock shifting and breaking.

Risk: Low
Ranking: 34th

While earthquakes are extremely damaging in terms of both human life and property damage, the probability of an event occurring in Schoolcraft County is very low. Seismic hazard mapping prepared by the U.S. Geologic Survey projects the likelihood of ground motion at two percent in 50 years. This probability rating applies to all areas of Upper Michigan except the Keweenaw Peninsula where the projected probability is four percent in 50 years. Tremors have been recorded in parts of southern Michigan but are rare and have done little damage. Moderate seismic activity was recorded in Menominee County in 1905 and in 2010. Seismic activity also occurred in the Keweenaw Peninsula in 1905, 1906 and 1909. A 1925 earthquake in Quebec was felt as far away as Whitefish Point and Newberry. An Ontario-centered earthquake was felt in Sault Ste. Marie in 1944.

Vulnerability: The U.S. Geologic Survey places the likelihood of ground motion in the entire Upper Peninsula except the Keweenaw Peninsula at two percent in 50 years. There have been no earthquake events recorded in the county. The threat of this hazard is low throughout the county.

Local structures and infrastructure are not constructed to withstand a significant ground motion. An occurrence would affect people and property throughout the county.

Environmental

Hazard description: A variety of new or newly discovered threats to native plants, animals and natural ecosystems.

Risk: Low
Ranking: 24th

Exotic and invasive species and diseases pose serious threats to native animal and plant life. Species that can hide and survive arrive from all over the world on a regular basis. If successfully established, exotics can alter species diversity by eliminating or displacing native species. Adequate control and eradication measures are very costly. The Nature Conservancy

estimates that the impact of invasive species in the Great Lakes region costs more than \$200 million annually in lost revenue and prevention to United States (U.S.) and Canadian water users within the Great Lakes region.

These are very important issues in natural resource-based Schoolcraft County.

Exotic Plants and Animals

Forest Infestations

There are many pathogens and insects that threaten native tree species. Each introduces some change to the forest ecosystem. Among the most prominent insect pests affecting area forests are the emerald ash borer, pine shoot beetle and gypsy moth. Beech bark disease and oak wilt are among the region's most important exotic forest diseases.

Exotic Aquatic Plants

Exotic and invasive plants, such as the prolific purple loosestrife, threaten native wetland vegetation throughout the Great Lakes basin. It has no food value for wildlife. Massive beds of Eurasian watermilfoil make boating and swimming impossible and significantly change the habitat of fish and invertebrates. These are perhaps the best-known exotic aquatic plants that are affecting native ecosystems. Another, very noticeable widespread invasive species is the wetland phragmites (*phragmites australis*).

Exotic Fish, Mollusks and Crustaceans

Non-indigenous species have been increasing in numbers and populations throughout the Great Lakes and some inland waters. Shipping (ballast water) and unintentional releases are considered the major entry routes. Exotics compete with native fish stocks for food and habitat. Among the species that impact native fish populations are Eurasian ruffe, white perch, sea lamprey, common carp, and several varieties of goby. The zebra mussel, a prolific mollusk, is well established in Lake Michigan and is perhaps best known for clogging surface water supply intakes. Crustaceans, such as the spiny water flea, thrive on the normal food sources of juvenile fish.

Animal Diseases

Bovine Tuberculosis

Bovine TB is a lung disease that can be transmitted among animals through breathing or nose-to-nose contact. The disease has been found in cattle, goats, bison, elk, and moose. It is believed that this infectious disease is close to being eradicated in the United States. The goal of the Michigan Bovine Tuberculosis Eradication Program is to eliminate bovine TB from cattle and white-tailed deer populations. Currently within Michigan, there are two bovine TB status areas: TB Free status in the Upper Peninsula and most of the Lower Peninsula and Modified Accredited Zone (MAZ) status in four counties of Northeastern Lower Michigan. Four beef cattle herds were diagnosed as infected with Bovine TB in northeast Lower Michigan in 2020. No cases have been verified in the U.P.

Chronic Wasting Disease

It is known that white-tailed deer, elk and mule deer can be infected with Chronic Wasting Disease (CWD). CWD is related to diseases such as scrapie in sheep, mad cow in cattle, and Creutzfeldt-Jakob (a rare and fatal neurodegenerative disease of unknown cause). There is no current evidence that the disease can infect humans or livestock. It is not yet known how the disease is spread although saliva, urine and feces are considered the most likely means.

Wisconsin has confirmed a large number of white-tailed deer with CWD. In August 2008, Michigan's first case of Chronic Wasting Disease was verified in a white-tailed deer; the three-year doe was a lifelong resident of a captive breeding facility in Kent County. In October 2018, the first case of CWD was found in Dickinson County. Parts of Dickinson and Menominee Counties, and a small portion of western Delta County are currently within the Michigan DNR's U.P. Core CWD Surveillance Area. The extent to which this disease will affect deer and other wild animals is not known. Consuming meat from infected animals is not recommended.

White-Nose Syndrome

White-nose syndrome is a disease that is new to the region that affects hibernating bats. The syndrome causes a fungal infection of the muzzle, ears, and wings of the animals. The disease has an extremely high mortality rate, over 80%, and is devastating to bat populations. The long-term impact of this disease is a decline in the bat population, which may ultimately cause insect populations to increase.

West Nile Virus (WNV)

Humans, horses, many types of birds, and some other animals are susceptible to infection through the bites of infected mosquitoes. Humans usually exhibit mild symptoms or none at all. In rare instances, infected humans can become severely ill and even die. As far as is presently known, the virus cannot be spread from human to human or from animal to human. Michigan reported the first case of WNV in 2002.

There have been 3 confirmed cases of WNV in humans in the Upper Peninsula over the last decade, with the last case in Marquette County in 2019, and a single case last reported in Delta County in 2013. The CDC has recorded 1,318 WNV cases in Michigan between 1999-2019.

Eastern Equine Encephalitis (EEE)

EEE is another mosquito-borne disease that transmits from infected birds through mosquitos to mammals. In humans, the virus causes infection and swelling in the brain, with about a 30% fatality rate and survivors experiencing ongoing neurological symptoms. An outbreak in 2020 saw three human and 41 animal cases in Michigan, with one human case diagnosed in nearby Delta County.

Lyme Disease

Lyme disease is a bacterium passed to dogs (and humans) by the bite of a deer tick. Deer ticks are quite small - about the size of a sesame seed. Portions of the northeast United States and southwestern Wisconsin are considered high-risk areas. The risk in the U.P. is considered low

to moderate. Just about any outdoor activity poses some risk. In 2019, there were 276 confirmed Lyme disease cases reported in Michigan.

More than 30,000 infections are recorded in the United States annually. Evidence of infection first appears as a rash and is often difficult to detect. Infected humans will experience joint pain, nervous system, or cardiac symptoms as the disease progresses.

Vulnerability: In Michigan, numerous activities track and mitigate these species and diseases. This includes physician-based active surveillance systems, ecological studies, and laboratory evaluations. These hazards have a high impact on individuals but a low impact on the community as a whole. As a natural resource-based area, Schoolcraft County would absorb an economic impact from any alteration or destruction of natural habitat and natural resources.

3.3.2 Technological Hazards

Fixed site or transportation-related hazardous materials releases, structural fires, and infrastructure failures are the most common technological hazards.

Cyber Security

Hazard description: The protection of hardware, software, and electronic data from theft, manipulation, or disruption.

RISK: Moderate

RANKING: 11th

The increasing reliance on internet-connected devices and services has led to vulnerabilities in a number of critical services and applications that rely on uninterrupted internet connections. Malicious actors have increasingly attacked infrastructure assets and key resources in new and diverse ways that require increased vigilance and ongoing training for cyber security professionals. Cyber-attacks can also include the compromise of information security through the theft of personal information or manipulation of authentication services.

Mitigation of cyber security threats involves keeping local hardware and software systems up to date against the latest threats, and maintaining awareness from users and the general public in identifying attempts to compromise information security.

Vulnerability: In recent years, several local government systems in other states have been compromised in cyber security attacks. These attacks have involved the takeover of systems using “ransomware” and demands of payment for restoration of access.

Hazardous Materials Incidents

Hazardous materials in quantities of concern are common in most communities. If released, a risk to life, health, environment and property is possible because of the chemical, physical, or biological nature of the material. Regulatory measures apply to the manufacture, transport, storage, use, disposal and accidental release of hazardous materials.

Hazardous Materials - Transportation

Hazard description: An uncontrolled release of hazardous materials or substances during air, land, or water transport.

Risk: High

Ranking: 7th

Surface transportation accidents include road, rail and water. While such transportation is reasonably safe, accidents inevitably occur in any of many forms. Existing roadways are becoming more crowded with increasing traffic volumes, a situation that increases accident probabilities.

Federal regulations concerning the transport of hazardous materials have been incorporated into state law thereby making adherence to these regulations compulsory for both interstate and intrastate transportation. Employers are responsible to train, test, and certify all employees involved with shipping or transporting of hazardous materials. All shipments must list product name, hazard class and emergency information on a manifest. Special permits are required for the transport of medical waste and hazardous waste (EGLE) and, depending on quantity, U.S. Department of Transportation registration is necessary to transport hazardous material. Placarded vehicles are required to stop at railroad crossings; escorts are required at both the Mackinac and International bridges. About 60 percent of all transported hazardous material in the nation is moved by truck.

Transported hazardous materials bear one of ten classification placards. It is likely that all pass through the county at some time, however records are not available. A brief description of each class follows:

- Class 1 represents explosives, which are further classified according to sensitivity, projection and fire hazard characteristics.
- Class 2 includes gases further defined as flammable, non-flammable and compression, and poisonous.
- Class 3 includes flammable and combustible liquids.
- Class 4 includes flammable solids further defined as flammable solids, spontaneously combustible material, and those that become dangerous if wetted.
- Class 5 includes oxidizers and organic peroxides further defined in to subcategories.
- Class 6 represents poisons and may be poisons or infectious substances.
- Class 7 represents radioactive material.
- Class 8 includes corrosives.
- Class 9 involves miscellaneous materials not included in other classes.
- ORM-D (other regulated material) has a limited hazard potential because of its form, quantity, or packaging; usually these are consumer commodities.

Road

State trunkline US-2 is a vital route for tanker trucks carrying fuels from the port of Green Bay to the eastern half of the Upper Peninsula. Both US-2 and M-28 are important east-west routes with tanker trucks and trailer trucks carrying hazardous materials of many types. The majority of county residents live along or near trunkline routes. Commercial trucks sometimes carry multiple types of hazardous material in a single transport. Placards are required only for those materials of a reportable quantity. In the case of an accident, first responders would likely not have knowledge of all hazards involved.

Proper maintenance, loading and operation of commercial vehicles are critical. Heavy trucks use air brakes exclusively and generate drum temperatures to 600° F. Uneven loads or a faulty brake system can push drum temperatures as high as 1000°F, which is extremely dangerous. Tankers less than three-fourths full are considered dangerous due to instability caused by sloshing. Diesel fuel is hard to ignite, but the volume carried aboard large trucks can cause a big problem if ignition does occur.

Average annual daily traffic is represented on Map 7. The highest 24-hour traffic volume occurs on US-between the Maple Street and Chippewa Avenue intersections and includes the bridge over the Manistique River. This section sees over 6,100 vehicles a day including almost 700 commercial vehicles. M-94 between the Deer/Chippewa Streets intersection and the Elk/Maple Street intersection sees over 5,000 vehicles a day and includes the secondary bridge over the Manistique River. Average annual daily commercial traffic volume (includes trucks, buses, etc.) along US-2 from Delta County to Manistique is estimated at 700; from Manistique to Mackinac County, 520. Often, alternate routes to accommodate a major roadway closure are limited and may involve significant additional driving distances. Such an occurrence could result in lengthy delays for police, fire, rescue or clean-up personnel and equipment. The closure of both bridges at the same time in Manistique would require a highway detour of roughly 100 miles to reach the other side of the city.

Rail

The Federal Railroad Administration (FRA) reported there were an average of 2.59 accidents per million train miles in the United States over the past 10 years. Derailments accounted for 57 percent of the accidents. The most common accident cause is attributable to human action (46 percent); 34 percent of the accidents resulted from track defects. 3 percent of the accidents were caused by signal defects. Nationwide, there have been 155 train accidents between 2012-2021 that resulted in the release of hazardous materials.

Statistics from the FRA report almost 19,656 incidents at highway-rail crossings between 2012-2021. These incidents resulted in 2,300 fatalities. The FRA reports that highway-rail and trespassing incidents account for 95% of all fatalities.

Rail service is provided by the Canadian National Railroad to several county businesses including UP Paper, Bowman Gas, and Carmeuse Port Inland. The through line is the major route between Ontario, Canada, and the central United States. As such, a high daily volume of rail freight of all types passes through the county and is a high-risk hazard to both people and property. Approximately 100 cars carrying regulated hazardous material pass through Schoolcraft County every month.

Traffic along the US-2 corridor is limited to two lanes except in designated passing areas and through part of the city of Manistique. Vehicular traffic is significant at grade crossings in Cooks (CR442), Thompson (M-149), and Manistique (Deer Street and Houghton Avenue), which are equipped with crossing signals. The railroad crosses US-2 in Manistique Township by way of an overpass. Detour routes are available if necessary.

An estimated two of every three county residents (approximately 6,000) live within one mile of the trunkline and railroad extending from the areas of Cooks in the west to Gulliver in the east. This US-2 zone encompasses all but a small section of the city of Manistique. Nearly all critical facilities are found within the identified impact zone.

Approximately 94 percent of the railroad trackage is in rural areas with the remaining 6 percent within urbanized areas.

The last train accident in Schoolcraft County was in 2019, involving the derailment of 7 cars with no injuries. There are 35 crossings in Schoolcraft County; the last crossing accident took place in 2020 involving several intoxicated motorcyclists and causing an injury.

Water

Barge/tanker transport of fuel from Manistique harbor to Beaver Island occurs regularly from April to November. Home heating fuel and gasoline are transported via multi-compartment barge/tanker. Limestone and dolomite are regularly shipped from Port Inland.

Air

Air transportation accidents are rare. Air traffic in Schoolcraft County is light and generated primarily by small, private aircraft. Commercial passenger service is not available at the Schoolcraft County Airport.

Vulnerability: While hazardous material in transit could be released anywhere along the route of travel on any day of the year, it is more likely to occur at an intersection or in a high traffic area. Highway US-2 is the most heavily traveled roadway in the county. More than 500-700 commercial vehicles travel this route every day - many carry regulated (placarded) materials/substances. Traffic crash data cite high crash intersections in Schoolcraft on US-2 as M-77/US-2 and US-2/County Road 432. Commercial and residential development is

concentrated and expanding along US-2 from M-149 to CR438. The chance of a transportation accident involving hazardous materials is increased in this high traffic area.

Hazardous Materials - Fixed Site

Hazard description: An uncontrolled release of hazardous materials from a fixed site capable of posing a risk to life, safety, property or the environment.

Risk: Moderate
Ranking: 22nd

Those facilities having threshold quantities of extremely hazardous substances (EHS) on site are subject to reporting requirements set forth under federal statute (SARA Title III, Section 302). There are two sites in the city of Manistique that fall under this statute: UP Paper and CenturyLink. Smaller quantities of hazardous materials are commonplace and include corrosive and incendiary products such as agricultural chemicals, cleaning agents, solvents, etc.

Accidents such as fires and explosions at industrial facilities can cause a release of harmful substances. Flooding and severe weather can cause an unintended release as well. With few industrial or other sites where a significant release potential is present, the risk potential of this hazard is considered moderate for humans and property in the county.

Vulnerability: The two SARA Title III, Section 302 sites in the county are located near residential populations. Sites where threshold amounts may be stored for short periods and therefore exempt from reporting requirements are not known. A release in or nearby a populated area could interrupt essential services, the transportation network and overload emergency and medical capacities.

Structural Fires

Hazard description: The loss of life and property caused by a structural fire of any origin.

Risk: High
Ranking: 3rd

Most structural fires are caused by human error. Citizen injuries attributable to fire occur every 43 minutes in the United States. About 75 percent of all fire fatalities happen in the home with the leading cause being unintentional or careless action. Schoolcraft County utilizes a countywide house numbering system, which is integrated into their E-911 system.

According to statistics prepared by the National Fire Protection Association, 73 percent of residential fires occur in single or two-family dwellings. Another 20 percent occur in multi-family structures. Cooking related incidents are the leading cause of house fires, followed by those caused by heating equipment. Most residential fires originate in kitchens. Fire stops were not common to home construction before the mid-1960s. Approximately one-quarter of all county housing units were constructed before 1960. Fire stops were not common to home construction before the mid-1960s.

Fire prevention programs are provided in the schools. Much of this activity centers on National Fire Prevention Week each October. Programs are also offered for senior citizens and the Sault Tribe. Institutions such as schools, hospitals, nursing homes, and public housing complexes have evacuation plans and perform drill exercises periodically.

Some volunteer departments have difficulty maintaining force strength. Becoming a volunteer fire fighter requires a considerable time commitment. The training and turnout gear costs for each new member approximate \$3,000.

Equipment capabilities among departments vary. A countywide mutual fire aid agreement is in place. Manistique Public Safety Department, Hiawatha Township Fire Department and Thompson Township Fire Department have thermal imaging cameras. They are available to other fire departments within the county on a mutual aid basis.

Institutions and commercial establishments known to be equipped with sprinkler systems include:

- Manistique High School
- Woodland Meadows (assisted living)- Hiawatha Township
- Kewadin Casino (Manistique Township)
- UP Paper
- Schoolcraft Memorial Hospital
- Schoolcraft County Medical care facility
- Jacks Fresh market
- Heritage house Apartments
- State Savings Bank
- Hoholik's Ace Hardware
- Hardees Restaurant
- Quality Inn
- Comfort Inn
- Sault Tribe of Chippewa Indians Community Center (Manistique Township)

The county-wide house numbering system was implemented in 2002. The system provides first responders and fire department personnel with precise location information of the incident.

Vulnerability: Structural fires are a high-risk hazard to humans and property in the county. There are many potential ignition sources, but most originate as a result of human carelessness.

There are many wooden frame older structures in the county that were constructed before the enforcement of building codes and construction inspection. Building standards are especially suspect in the case of seasonal camps and cottages which comprise about 30 percent of the total housing units in the county. Wood is used as the principal heating fuel in about 15 percent of all residential housing units and is commonly used in seasonally-occupied housing

units. Heating with wood burning devices carries an elevated risk that is reflected in insurance rates.

Most critical facilities are equipped with a sprinkling system; most have prepared evacuation plans in case of emergency. Insurance carriers may require commercial and industrial buildings to meet certain fire suppression and safety capacity measures.

Structural fires are most life threatening when they occur at night when occupants are normally asleep. Where structures are close together, a conflagration is likely as the fire spreads to surrounding buildings. At a minimum, the heat from a well-advanced structure fire will affect buildings in the near proximity. The suppression capacity of individual fire departments is significantly enhanced by a county-wide mutual aid agreement. Response time is central to minimizing fire loss damages. Therefore, camps, cottages, homes or other structures located in remote or isolated areas are more likely to suffer extensive or total loss in a fire event. A large structure fire could result in casualties, temporary loss of utilities; shelter, clothing and food needs; disruption of the transportation network; business closures; and economic hardship including job losses.

Infrastructure Failures

Hazard description: The failure of critical public or private utility infrastructure resulting in a temporary loss of essential functions and/or services.

Risk: High
Ranking: 8th

Private and public utility infrastructure is largely taken for granted except when a failure occurs. An interruption in essential utility services such as electricity, communications, transportation, storm water drainage, water, and wastewater systems can imperil life, property, economic activity, and the environment. Manistique has undertaken a multi-year sewer separation project to prevent stormwater from overwhelming the wastewater treatment facility as has occurred during periods of heavy rainfall or rapid snow melt.

Dependence on telecommunication (including wireless) and electric power network sources are increasing. Routine and necessary individual, business, and institutional transactions rely heavily - and sometimes exclusively - on these networks. A growing number of people pay bills, bank and shop on-line.

Operating water and wastewater systems in the county is discussed in Section 2.7. The water supply for about 50 percent of county residents is derived from public systems. All areas of the county except the city of Manistique and the community of Seney utilize private, on-site septic systems.

A reliable source of electricity is vital to homes, businesses, industries and institutions in the county. Power to the entire county is supplied via overhead transmission lines from distant

generating facilities. Schoolcraft County itself has no power generating facilities. A 138 kilovolt line runs east-west through the county along the US-2 corridor, and a second 69 kilovolt line enters the county from the northwest in Hiawatha township and parallels MI-28 to Seney and then south along MI-77 to Port Inland.

Overhead power lines are subject to weather and other events that can disrupt service. Wind, ice, lightning, falling limbs and trees, and construction and traffic accidents are the most common hazards affecting power transmission. Power outages are common occurrences in the more rural areas. Underground utility lines can be damaged by excavation activities or uprooted trees.

Infrastructure failures can be extremely dangerous affecting people and property - particularly if prolonged - and represent a high hazard within the county.

Vulnerability: Public water systems supply about half of all county residents in the communities of Seney, Germfask and Manistique. Individual private wells are used in the balance of the county. Wastewater collection treatment is provided in Manistique, which serves approximately 3,600 persons and in the community of Seney, which serves 110 customers. Failure/contamination poses very serious health issues.

Roads and bridges are essential to a majority of county residents. A major transportation system failure would affect business, commerce and services throughout the county. Failures of communication, electrical, gas and other utility infrastructure would have a similar impact.

Petroleum Pipeline Failures

Hazard description: An uncontrolled release of petroleum product(s) from pressurized pipelines lying above or below the ground.

Risk: Moderate
Ranking: 15th

Major leaks or eruptions from natural gas or petroleum pipelines can have very serious consequences in a community including injuries and loss of life, environmental degradation, and economic hardship. However, serious incidents rarely occur and pipelines represent a low risk to humans. Pipeline accidents are largely the result of excavation not related to operation and maintenance of the pipeline itself. Interstate pipelines are strictly regulated and essential to the economical transport of petroleum and natural gas.

A one-inch high pressure natural gas service line punctured inadvertently by a construction crew in Minnesota resulted in an explosion that destroyed 6 buildings, killed 4 persons and injured several others. The accident happened in late 1998 with resulting property losses estimated at about \$400,000. Additionally, a pipeline owned by Enbridge failed and spilled into the Kalamazoo River in Comstock, MI in 2010, resulting in a \$765 million cleanup cost.

Major natural gas and natural gas liquid (NGL) transmission pipelines traverse the southern part of the county in an east-west direction. NGL is carried through a 30-inch diameter pipe; two 36-inch diameter pipelines carry natural gas along a parallel route.

This hazard poses a moderate risk for people and property in Schoolcraft County.

Vulnerability: Major pipelines cross the county. The pipeline routes are buffered somewhat from populated and developed areas. An explosion or rupture could result in casualties, infrastructure damage, transportation interruptions (rail and trunkline), local road closures and select area evacuations.

Dam Failure

Hazard description: Downstream flooding caused by the collapse or failure of an impoundment.

Risk: Moderate
Ranking: 13th

Extensive property and natural resource damage can result when a dam structure fails or when its capacity to hold back water is exceeded in a flood event. Maintenance and operation of dam structures are critical to public safety and property protection.

There are 52 dams and impoundments in Schoolcraft County. All but two are rated low hazard by the Michigan Department of Environmental Quality with inspections required every 5-years. The Carpenter (Indian Lake or Brewery) Dam is rated significant hazard with inspections required at 4-year intervals. The dam is designed with an outflow capacity greater than the maximum inflow to Indian Lake based on 100-year flood projections.

The Manistique Papers Dam in the City of Manistique is rated high hazard, as its failure would endanger nearby residents and businesses. Structures rated as significant or high hazards must be inspected every three years and are required to have emergency action plans (which include functional exercises) coordinated with the local emergency official. No rapid warning system for the dam exists.

An earthen dam failure on the Manistique River in 1920 caused major flooding in Manistique. In addition, five dam failures are recorded in MDEQ records. Failed dam names, location and year of failure are listed below:

- Lake Anna Louise, Mueller Township, year unknown
- Seney Wildlife Refuge C-3 dike, Manistique Township, 1977
- Kings Pond, Seney Township, 1977
- Hollenbeck, Thompson Township, 1996
- Parent Creek, Thompson Township, 1962

There have been no dam failures since the county hazard mitigation plan was last prepared and

adopted.

A moderate hazard risk applies to people and property.

Vulnerability: There are 52 dams and impoundments in the county. All except two are assigned a low-risk designation by the regulating agency, the Michigan Department of Environment, Great Lakes, and Energy. The only high-risk dam is a short distance upstream of UP Paper mill in the city of Manistique. The Carpenter Dam on the Indian River is rated a significant risk and is used to control the level of Indian Lake. Failure would increase outflow from the lake into the river which joins the Manistique River upstream of the city.

Low risk dams and impoundments are found well distant from population concentrations and critical facilities. Failures would result mainly in streambank erosion and habitat disturbance with little threat to humans.

Failure of the Carpenter Dam, a significant risk structure, would impact volume and flow of the Indian River as well as the level of Indian Lake. Failure of the UP Paper dam would impact the paper mill and structures in the floodway to Lake Michigan. Structures include single family and condominium units, harbor and boat launch facility, and public open space along the lakefront. Manistique's wastewater treatment plant is located along the river, but out of the flood zone near the mouth of the river.

Subsidence

Hazard description: Downward movement of land surface caused by human-induced activities that have weakened or removed subsurface support.

Risk: Low
Ranking: 32nd

Most incidents of subsidence in Michigan are the result of underground mining. Other human-induced activities resulting in subsidence are groundwater withdrawal and drainage of organic soils. The dissolution of soluble materials such as limestone by groundwater can create underground cavities that weaken subsurface support enough to cause a lowering or collapse of the ground surface. There are no known instances of subsidence in the county.

Vulnerability: No known subsidence or underground mining activity is recorded in the county. Gravel, sand, and limestone mining operations are isolated and distant from population concentrations. Property damage losses are highly unlikely.

Nuclear Power Plant Accidents

Hazard description: An actual or potential release of radioactive material at a commercial nuclear power plant or other nuclear facility in a quantity great enough to pose a threat to the health and safety of an off-site population.

Risk: Low
Ranking: 35th

Nuclear power plants are strictly regulated by the federal government. Each facility must develop appropriate emergency plans. An accidental release of radioactive materials to the environment could affect public health and safety in some locations under certain weather conditions. However, the probability of a nuclear plant accident affecting Schoolcraft County is low since such facilities are of a distance and location (prevailing wind direction) that any released material would be dispersed in relatively harmless quantities. The nearest operating commercial reactors are along the Lake Michigan shoreline southeast of the city of Green Bay, a distance of 115 miles from the southwest corner of the county. Schoolcraft County is outside of the 50-mile ingestion pathway zone for the Kewaunee Power Station, located in Carlton, Kewaunee County, WI and the Point Beach Nuclear Plant, located near Two Rivers, Manitowoc County, WI. Kewaunee Power Station is currently begin decommissioned. Spent fuel may or may not continue to remain onsite for some time after that.

Vulnerability: Schoolcraft County is somewhat isolated from the potential effects of a nuclear plant accident both in terms of distance and direction.

Radiation contamination from a power facility accident would affect the health of people, plants, and animals. In the Ingestion Pathway Zone, an approximate 50-mile radius around a plant, mitigation efforts would focus on the effects on agriculture, and food processing and distribution. Incidents at the nuclear power plants along the Lake Michigan shoreline could negatively affect the waters of Lake Michigan. Evacuation may be necessary and could have long-lasting impacts, such as rendering the area uninhabitable.

Scrap Tire Fires

Hazard description: The accidental combustion of scrap tires at a designated storage area.

Risk: Low
Ranking: 30th

Dealing with scrap tires in the waste stream is difficult and costly. Landfilling whole tires is not allowed. Hiawatha Shores Landfill in Gulliver charges to accept scrap tires according to size. By MDEQ regulations, on-site storage is limited to no more than 500 scrap tires. The major concerns associated with scrap tire storage are as mosquito breeding areas and as a fire hazard. There have been no recorded scrap tire fires of consequence in Schoolcraft County.

Vulnerability: There is no record of scrap tire fires and no large storage sites in the county. Hiawatha Shores Landfill stores accepted tires in a trailer until 500 tires are accumulated. The scrap tires are shipped out for recycling or disposal. A tire fire would be isolated to a specific site such as an automobile service center or landfill site and would produce heat and acrid smoke. Adjacent property would be endangered and evacuation of people would be required.

3.3.3 Social Hazards

The hazards associated with human behavior cannot be predicted with scientific certainty, or even in terms of probabilities. However, past events document that unruly human actions happen in many forms and under a variety of circumstances. The potential for loss of life and property is not less serious with hazards of this type.

Transportation Accidents

Hazard description: Unintended events associated with any mode of transportation that brings harm to people and property.

Risk : High
Rating : 6th

Vehicle and recreational transportation by means such as boats (power and sail), snowmobile, off-road-vehicle, and road and mountain bikes result in injuries and deaths each year. Most serious injuries and fatalities are connected with snowmobiling. Generally, the consequences of such accidents are limited to the user(s) and their recreational apparatus.

Much of the US-2 corridor is intensively developed because of its heavy traffic volume and proximity to coveted Lake Michigan shoreline. Federal highway US-2 is a major roadway with increasing residential and commercial development creating more access points and traffic flow disruptions.

School buses and county transit buses carry many passengers and make frequent stops and turns along busy roadways. Michigan statistics indicate that the highest incidence of vehicle crashes and fatal vehicle crashes occurs between noon and 6:00 p.m. Further, the crash, injury and death rate is highest along county and city roads. A 5-year ranking of Michigan's 83 counties by the number of injuries causing death or incapacitation puts Schoolcraft at 80th overall.

Manifestations of anger on the nation's roadways in recent years have been widely reported. Incidents of road rage have resulted in injuries and fatalities. Behavior of this sort reflects a lack of consideration for the safety of others, and also an unwillingness or inability to control personal emotions. Anecdotal information indicates that this behavior is less common with older drivers. Statistically, drivers between the ages of 25-34 are involved in the most fatal accidents.

The Federal Railroad Administration (FRA) reported there were an average of 2.59 accidents per million train miles in the United States over the past 10 years. Derailments accounted for 57 percent of the accidents. The most common accident cause is attributable to human action (46 percent); 34 percent of the accidents resulted from track defects. 3 percent of the accidents were caused by signal defects. Nationwide, there have been 155 train accidents between 2012-2021 that resulted in the release of hazardous materials.

A major international rail freight line runs through the entire breadth of the county. Industrial users include UP Paper, Carmeuse -Port Inland, and Bowman Gas in Gulliver.

Transportation accidents occur almost daily with an impact limited primarily to those involved. A high hazard risk applies to humans and property.

Vulnerability: Single and multiple-vehicle accidents are numerous - and mostly of the minor variety - in Schoolcraft County. As speeds, traffic volume, access points (development), and driver impatience all increase, so does the probability of serious accidents. Commercial and residential development is concentrated and expanding along US-2 from M-149 to CR438. Traffic along this segment is limited to two lanes except in designated passing areas and through part of the city of Manistique.

Insufficient traffic signals/signage and obstructed views at several intersections in Schoolcraft County present an increased risk of vehicle crashes. Communities are also concerned about road and bridge conditions.

Rail traffic through the county is of a volume that warrants concern. Vehicular traffic is significant at grade crossings in Cooks (CR442), Thompson (M-149), and Manistique (Deer Street, Houghton Avenue, and West Elk). All are equipped with crossing signals. However, a train accident or breakdown in the City of Manistique could block intersections at Deer, Houghton, and West Elk, preventing East/West traffic for long amounts of time. The railroad crosses US-2 in Manistique Township by way of an overpass. Detour routes are available if necessary.

Air and water port shipping is very limited in the county. Accidents involving air and commercial and pleasure watercraft present an extremely low probability. Accidents involving personal watercraft, snowmobiles, and all-terrain vehicles are numerous and typically involve only the operator with little collateral impact.

Economic Recession/Adversity

Hazard description: A situation characterized by business downturns and closings and severe labor force reductions.

Risk: Moderate
Ranking: 12th

Employment base losses due to closure or relocation and serious business downturns - especially if prolonged - can cause tremendous hardship and pressure on a community and its people. Desperation can lead to uncharacteristic and destructive behavior. An area is likely to experience population losses during hard times as people move to areas with better employment prospects. As disposable personal income dwindles, local businesses will find it more difficult to remain in operation. Moreover, as private and public investment wanes, the physical condition of structures and infrastructure will likely degrade.

In 2008 an economic bubble in the value of housing burst, leading to a large recession, from which it took several years to recover. Economic losses due to the Coronavirus Pandemic have yet to be fully realized.

The last severe and prolonged economic period was the Great Depression. With lifestyle changes, technology and a plethora of assistance programs, it is unlikely that those extreme difficulties will be repeated. In addition to the 16.7 percent (2019) of the county residents whose incomes fall within government poverty standards, there are many individuals and families that are perilously close to those levels.

A large part of Schoolcraft County's economy is natural resource-based (Section 2, 11.0). Major losses and damages to natural resources may have serious economic consequences for the county economy. Businesses can be destroyed by most any type of disaster. Unfortunately, most businesses store vital records on-site. If forced to close due to a disaster, it is estimated that about half of the businesses will not reopen.

A moderate risk potential is associated with this hazard.

Vulnerability: A prolonged economic slump, closure of a major employer, or a collapse of the financial market would impact nearly all persons living in the county. A decrease in property values, business, employment and investment would occur commensurate with the severity of the economic situation. A corresponding increase for services could be expected that would exceed local capacities.

Public Health Emergencies

Hazard description: Incidents of contamination or epidemic that present a clear danger to the general health and well-being of the public.

Risk: Moderate
Ranking: 8th

Disease epidemics, contaminated water supplies instances of food poisoning, and chemical, biological or radiological exposures are among the many potential causes of a public health emergency. Public health emergencies can occur as the result of a primary disaster such as a severe storm, flooding, or release of hazardous material. Normally such occurrences are confined within a locality. However, a widespread impact is possible with contagious diseases.

Food processing provides multiple opportunities for contamination through accidental or intentional action. Food service workers are required to report specific illnesses and may not work if afflicted with certain contagious diseases. To safeguard diners, licensed kitchens must designate a person-in-charge to oversee food preparation. High employee turnover in the food service industry makes it difficult to ensure that proper training has been completed. Sanitary conditions at food establishments are inspected regularly by public health officials.

Exposure to certain types of hazardous material may require special decontamination measures before transporting the victim to a medical clinic or hospital. Identification of the contaminant is necessary. Typically, first responders - many of whom are volunteers - need extensive identification and appropriate contamination procedure training. Transportation capacity is limited to the number of rescue vehicles within the county.

The West Nile virus is spread by mosquito bites and can cause encephalitis or meningitis. An incubation period is from 3 to 15 days, and many people exhibit no symptoms before fully recovering.

Public water supplies are monitored by county health officials. Private wells are sampled when new, to comply with loan requirements, or as deemed necessary by the owner. Wells not properly grouted are more susceptible to contamination - especially in areas where limestone bedrock and little overburden are present.

Such occurrences create a significant risk for humans and a low risk to property.

Vulnerability: Virtually the entire county population is susceptible to disease or epidemic. A greater concern exists for elderly and very young children. A major outbreak would stress existing medical capacities. The concern about property would be with contamination that might result in special decontamination measures, if possible, or destruction. The COVID-19 pandemic strained county resources through mitigation and response efforts from different agencies. Through the pandemic, local agencies learned to coordinate response and tracking, and may be better prepared for a future occurrence.

Terrorism, Sabotage, and Weapons of Mass Destruction (WMD)

Hazard description: Intentional, unlawful and subversive action(s) against persons and property to further political, social or religious objectives through intimidation and coercion.

Risk: Low
Ranking: 31st

Until the attacks of September 11, 2001, acts of terrorism were associated almost exclusively with other parts of the world. Besides injuring and killing people and destroying property, such acts are intended to instill fear and uncertainty on the targeted population. Places that attract large numbers of people seem to be the targets of choice for terrorists. The introduction of contaminants to food and water sources is another means of affecting many people. Weapons could be nuclear, chemical, biological, or informational. Motives could be racial, ethnic, religious, environmental, policy, or anarchical. Weapons and motives vary but the themes of fear and hate always apply.

A major terrorist action in an urbanized area could trigger an influx of people into the county in search of safety and quiet. A large and rapid population convergence on the county could strain local resources, possibly to a dangerous level.

Only prank bomb threats have been experienced in Schoolcraft County. Traditional terrorist targets are schools, universities, public buildings, public infrastructure, controversial businesses, media locations, and large gatherings. Though acts of terrorism do not seem like much of a threat in the county, they are possible and carry a large potential for harm to humans and property.

Vulnerability: Aside from prank bomb threats at local schools, there is no record of terrorist acts in the county.

Places where large numbers of people congregate or are housed such as schools, churches, nursing homes and the hospital would be most affected by an act of terrorism although the means and location of an action could impact any area of the county. Casualties and property damage potential could be significant.

Bioterrorism

Hazard description: Overt or covert act involving the dispersion of disease pathogens.

Risk: Low
Ranking: 33rd

Bioterrorism can be overt or covert and involve the dispersion of disease pathogens. Germ warfare is very difficult to defend against and places new and demanding responsibilities on the public health system and primary healthcare providers. Anthrax (*Bacillus anthracis*), botulism (*Clostridium botulinum* toxin), plague (*Yersinia pestis*), smallpox (*Variola major*), tularemia (*Francisella tularensis*), and viral hemorrhagic fevers (ebola and others) are the highest priority agents (Category A).

Category A diseases/agents have the following characteristics:

- easily transmitted from person to person
- high mortality rates and potential for major impact
- potential to incite public panic
- require special preparedness measures

Category B diseases/agents are less easily spread and less likely to cause illness or death. These include the poison ricin, bacterial food and water safety threats, and many others.

Third highest priority diseases/agents (Category C) include emerging infectious threats from pathogens such as hantavirus. Category C agents are considered easy to produce and introduce, as well as highly effective in terms of causing illness and death.

An awareness of bioterrorism has grown with anthrax and sarin threats. Although no instances have occurred within the county, a moderate risk to humans is assumed.

Vulnerability: While no acts of bioterrorism have occurred in the county, a large percentage of the population could be affected if an agent was introduced where large numbers of people congregate or through public water supplies. High casualties and elevated community anxiety would be likely.

Civil Disturbance

Hazard description: A public demonstration, gathering, or prison uprising that results in a disruption of essential services and is characterized by unruly or unlawful behavior.

Risk: Low
Ranking: 28th

Noteworthy instances of civil unrest in the county are absent from the historical record. However, a single action can trigger such conduct.

The State of Michigan operates 28 active correctional facilities. Prison security levels range from Level V (highest) to Level I (easily managed prisoners). A large 216-bed all male state correctional facility was once located at Camp Manistique, a north of city hall on Maple Street; the camp was closed in 2007. The 26-bed Schoolcraft County Jail houses both male and female prisoners. Sentences for less serious crimes or first-time offenders may be served in halfway houses or through home confinement monitored electronically.

Labor disputes, especially if prolonged, are highly emotional and can result in violent behavior.

Public meetings or proceedings dealing with controversial issues carry an elevated risk of unruly behavior. This includes meetings at every level of government and places where decisions affecting individuals are rendered such as courtrooms and regulatory/compliance agencies.

Demonstrations for or against something are usually peaceful but can transform to unruly quickly under certain circumstances.

A moderate risk potential is associated with such events.

Vulnerability: While no such incidents are found in the historical record, a single highly emotional issue can quickly trigger a disturbance.

The population base of the county is stable; it is also aging rapidly. In the unlikely event that such a disturbance was to occur, crowd control capacities would be challenged. Casualties and property damage would be limited to a specific area of the county and a small percentage of the population.

School Violence

Hazard description: Rowdy, threatening, unlawful, or otherwise aberrant behavior within educational facilities.

Risk: Moderate

Ranking: 18th

The reported incidents of serious school violence over the past decade have increased. Multiple shooting incidents at various school locations around the nation have resulted in the implementation of new security and preventative measures. According to studies, students who feel they have been bullied, threatened, injured, or otherwise treated badly are the most likely to carry out serious acts of violence.

Vulnerability: School violence events could affect one or several persons. Property damage would generally be limited to school structures and equipment. Depending on the severity, school violence could have extensive effects in the community causing fear and anxiety.

Public Assembly Events

Hazard description: Publicized congregations of people, admitted with or without fee, and held for entertainment, enrichment, socialization or education purposes.

Risk: Low

Ranking: 29th

Public gatherings are important for all sorts of reasons. The movement of people to, from and within such events can temporarily overload ingress, egress and control capacities and create a hazardous situation. Large gatherings present targets for terrorist acts as well. Celebrations are generally associated with some special accomplishment that joins people together. Normally celebrations are peaceful and fun for the participants, but can get out of hand - particularly if the revelry involves alcohol consumption. The history of public events in the county suggests that there is a low-level risk to humans and property.

Public assembly events are noted in Table 3-10.

Table 3-10 Public Assembly Events, Schoolcraft County			
Name of Event and Description	Location	Month	Estimated Attendance
Schoolcraft County Fair	Manistique	July-August -2 days	2,500
Folkfest	Manistique	July - 2 days	4,000
Vintage Car/Motorcycle/Snowmobile Rally	Manistique	Labor Day	2,000
July 4 th Parade	Manistique	July – 1 day	4,000
School (sports events, music and theatrical presentations, other extra-curricular)	Various	Various	<2,000
Church events; other organized events such as fishing derby, Christmas	Various	Various	<1,000

parade, Halloween parade, etc.			
Kewadin Casino	Manistique twp.	Daily	<1,000
Cooks Corn Roast	Cooks	August	<1,000
Farmer's Market	Manistique	Mid May to Mid September	400

Vulnerability: Numerous large public gatherings are held throughout the year. Most are family-type events that attract people of all ages. Events are held throughout the county, but are most often held in Manistique. Law enforcement activity is at a level ordinarily expected with such events. A vulnerability is present in any such situation with large crowds and heavy traffic; attendees, assembly site and adjoining properties could be harmed. Effective crowd and traffic control capacity is limited.

Workplace Violence

Hazard description: Rowdy, threatening, unlawful, or otherwise aberrant behavior within places of employment.

Risk: Moderate
Ranking: 20th

Workplace violence can be a serious and deadly hazard. Incidents of assaults or threats to employees or supervisory personnel by discharged, disgruntled, or otherwise emotionally unbalanced employees seem to be on the rise. Tragic incidents of workplace violence have spawned a variety of resources aimed at early interdiction to underlying causes. Recordable incidents are absent from the public record.

The probability of workplace violence bringing harm to humans or property is considered a low risk in the county.

Vulnerability: Incidents of workplace violence are absent from the public record.

The population of the county is aging rapidly with significant in-migration of retirees. There are only a few large employing entities. Citizens, for the most part, interact with one another and know their co-workers and neighbors. An incident would affect the victim(s) and have little impact on property.

Active Shooter

Hazard description: An individual actively engaged in killing or attempting to kill people in confined and/or populated areas.

RISK: Moderate
RANKING: 16th

Active shooter events are largely unpredictable and are usually perpetrated by individual actors using firearms or other weapons. Active shooters tend to target areas that have either large

gatherings of people, such as schools, festivals, or churches, or that they have some personal connection to, like a workplace, school, or agency. The randomness of attacks and targets make active shooter events difficult to predict or mitigate.

Vulnerability: Incidents of active shooter events are absent from the public record in Schoolcraft County. The county does have large events and schools that could possibly be targets for such an attack. Law enforcement personnel should have training related to these events, and local schools have implemented response plans.

Mass Casualties

Hazard description: An event that overwhelms the local healthcare system, where the number of casualties exceeds the local resources and capabilities in a short period of time.

RISK: Moderate

RANKING: 19th

Mass casualty incidents can occur in the wake of any disaster listed in this document and can be concurrent to disaster response. Incidents can involve the quick triage, treatment, and transport of a large number of injured persons, and require the collaboration and coordination of local entities. The local Medical Control Authority for emergency medical services assumes responsibility for communication and response measures.

Vulnerability: Schoolcraft Memorial Hospital also maintains the Schoolcraft County Medical Control Authority and the response plans for mass casualty incidents. In the event of an incident, a process is in place to notify local stakeholders and coordinate response. This process is updated regularly in coordination with the Michigan Department of Health and Human Services. A mass casualty incident is rare, however, their unpredictability and occurrence with other disasters makes preparation most important.

3.4 Identified Hazards with Affected/Vulnerable Facilities

Throughout Schoolcraft County, there are a number of critical services/facilities that are potentially vulnerable or at risk to be affected by identified hazards. Data presented in table 3-11 below identifies both the number of such facilities and the names of the facilities. Table 3-12 shows which facilities/services are potentially at risk by each identified hazard for the county. It should be noted that no new facilities are planned within the five-year planning period.

Table 3-11		
Schoolcraft County Critical Facilities		
1 Hospital	Schoolcraft Memorial Hospital	7870 W. US-2, Manistique
1 Health Department	LMAS District Health Department	300 Walnut St., Manistique
2 Medical Clinics	Sault Tribe	5698 W. US-2, Manistique
	VA	617 E. Lakeshore Dr., Manistique

12 Police/Fire Departments	Michigan State Police (minimally staffed)	401 E. Lakeshore Dr., Manistique
	Schoolcraft County Sheriff Department	300 Main St., Manistique
	Sault Tribe	5698 W. US-2, Manistique
	Doyle Twp. VFD	1159N Gulliver Road, Gulliver
	Germfask Twp. VFD	1176 Green St., Germfask
	Hiawatha Twp. VFD	1595N M-94, Manistique
	Inwood Twp. VFD	11650 W. Depot Ave., Cooks
	Seney Twp. VFD	1576 W. Railroad St., Seney
	Thompson Twp. VFD	Rt. 2 Box 2600, Manistique
	Manistique Public Safety Dept.	300 N. Maple St., Manistique
	Tri-County VFD	Ff Highway 13, Wetmore
2 Emergency Medical Services	Manistique Public Safety Dept.	300 N. Maple St., Manistique
	Inwood Twp. VFD	11650 W. Depot Ave., Cooks
	Doyle First Responder Unit	1105 N. Gulliver, Gulliver
	Seney First Responder Unit	1576W Railroad Ave., Seney
	Luce County EMS (Seney Unit)	901 Washington Blvd., Newberry
1 Solid Waste Facility	Hiawatha Shores Landfill	3098 N. CR 436., Gulliver
1 Jail Facility	Schoolcraft County Sheriff Department	300 Main St., Manistique
Schoolcraft County Public Infrastructure		
3 Municipal Water Systems	Manistique	610N Intake Park Rd., Manistique
	Germfask	8093 Pine St., Germfask
	Seney	10834N Seney Ave., Seney
2 Municipal Wastewater Systems	Manistique	321 Traders Point Dr., Manistique
	Seney	Co Rd 456, Seney
3 Electrical Service Providers	Alger Delta Co-op	426 N. 9 th St., Gladstone
	UPPCO	600 E. Lakeshore Dr., Ste. 206, Houghton
	Cloverland Cooperative	2916 W. M-28, Dafer
1 Natural Gas Provider	SEMCO Energy	1411 3 rd St., Port Huron
1 Public Airport	Schoolcraft County Airport	US-2, Manistique
1 Public Harbor	Manistique Harbor & Marina	300 S. Cedar St., Manistique
Telephone Service Providers	Century Link	116 S. Maple St., Manistique
	AT&T	1034 N. Lincoln Rd., Escanaba
	HTC Jamadots	108 W. Superior St., Munising
	Spectrum	
Cell Phone Service Providers	AT&T	1034 N. Lincoln Rd., Escanaba
	Verizon	1038 W. US-2, Manistique
	Spectrum	
Internet Service Providers	HTC Jamadots	108 W. Superior St., Munising
	Big Bay Broadband	220 Walnut St., Manistique
	Hughes Net (Satellite)	Multiple Service Providers
	Century Link	116 S. Maple St., Manistique
	Spectrum	
Schoolcraft County Education Facilities		
2 Public School Buildings	Manistique Middle and High School	100 N. Cedar St., Manistique
	Emerald Elementary	628 Oak St., Manistique
2 Private School Buildings	St. Francis de Sales	210 Lake St., Manistique

	Bethel Baptist Christian	118 E. Elk St., Manistique
1 Head Start Center	Manistique	Manistique Early Childhood Center, 426 Chippewa, Manistique
Schoolcraft County Hazardous Materials Sites (302 Sites)		
2 Hazardous Materials Sites	UP Paper LLC	402 W. Elk St, Manistique
	CenturyLink	126 S. Maple St, Manistique

Table 3-12	
Identified Hazard	Affected/Vulnerable Facilities & Infrastructures
Hazardous Materials Accidents – Transportation	Facilities located in the city of Manistique
Ice & Sleet Storms	Electrical service providers, telephone service providers
Snowstorms	Electrical service providers, telephone service providers
Severe Wind	Electrical service providers, telephone service providers
Lightning & Thunderstorms	Electrical service providers, telephone service providers
Temperature Extremes	Water systems, wastewater systems
Riverine Flooding	None
Infrastructure Failures	Water systems, wastewater systems, electrical service providers, telephone service providers, roads, bridges, culverts.
Tornadoes	All facilities and infrastructure
Urban Flooding	None
Great Lakes Flooding	Manistique Wastewater system
Structural Fires	Educational facilities, governmental facilities
Drought	Public water systems
Hail	Governmental facilities
Dam Failure	Transportation routes, Manistique water system
Workplaces Violence, Civil Disturbance	Educational facilities. Governmental facilities
Bioterrorism, Terrorism, Sabotage, WMD	Water and wastewater systems, health department, educational facilities, governmental facilities
Public Assembly events	Transportation routes
Earthquakes	Electrical service and telephone service, health department, . Educational facilities, governmental facilities, water and wastewater systems
Nuclear Power Plant Accidents	Water systems
Other Environmental	Water systems
Subsidence	Transportation routes
Scrap Tire Fires	Transportation routes

3.5 Declared Disasters in Schoolcraft County

USDA Disaster County Designation

The U.S. Department of Agriculture (USDA) gives counties suffering from extreme conditions “disaster designation,” making farmers in these areas eligible for low interest emergency loans. In 2012, the USDA designated Schoolcraft County (along with Delta, Alger, and Marquette counties) a disaster county due to excessive snow, heat, rain, hail, frost, flooding, and lightning during the winter months and drought conditions and excessive heat during spring and summer.

Federally Declared Disasters

FEMA publishes a summary of all federally declared disasters quarterly. The dataset, which begins with the first federally declared disaster in 1953, includes all three disaster declaration types: major disaster, emergency, and fire management assistance. Table 3-13 below lists the major disaster declarations that have been declared in Schoolcraft County.

Disaster Number	Declaration Date	Incident Type	Description
3035	3/2/1977	Drought	Drought
3057	1/27/1978	Snow	Blizzards & Snowstorms
1028	5/10/1994	Snow	Severe Deep Freeze
3225	9/7/2005	Hurricane	Hurricane Katrina Evacuation*
4494	3/27/2020	Biological	COVID-19 Pandemic (ongoing)

*Refers to the federal disaster aid that was made available to Michigan to supplement its efforts to assist evacuees from areas struck by Hurricane Katrina. Source: FEMA Declared Disasters,. (August 2013)

4.0 Identify and Prioritize Strategies

The Hazard Analysis results outlined in Chapter 3 helped guide meetings with various hazard mitigation participants in Schoolcraft County that produced the specific issues, goals, and strategies in this chapter. Participants include the Emergency Management Coordinator, Local Emergency Planning Committee, Fire Chiefs Association, Township and City officials.

4.1 Issues, Goals, and Strategies

4.1.1 Severe Weather

Issue(s): Severe winter weather (snowstorms, ice and sleet, extreme cold) and weather associated with thunderstorms (high winds, hail, lightning) are seasonal hazards in Schoolcraft County. NOAA weather radio coverage in the northeastern portion of the county is unreliable. Winter whiteout driving conditions occur on US-2 along the Lake Michigan coastline.

Goal: Improve the capacity of Schoolcraft County to respond to and prepare for severe weather-related incidents.

Strategies:

- Continue to encourage the use of NOAA weather tower coverage and the use of NOAA weather radios through community awareness and education programs.
- Maintain and improve/expand emergency warning systems, including the use of smartphone applications, in communities within Schoolcraft County.
- Improve/expand interoperable radio communications between first responders and Schoolcraft County Road Commission vehicles/personnel utilizing the Michigan Public Safety Communication System (MPSCS).
- Institute a public education program regarding emergency warning systems available in Schoolcraft County.
- Use snow fences or living fences to limit the blowing and drifting of snow over critical roadway segments.
- Bury/ protect power and utility lines in critical locations.
- Insulate public infrastructure, such as water lines, sewer lines, and water storage tanks from cold weather conditions.
- Identify existing shelter locations, determine strengths and weaknesses, and identify community partners to communicate needs and capacity.

- Update and/or expand public education efforts for emergency preparedness through the county website, presentations to community groups/organizations, and social media.
- Seek funding from public and private sources to install community warning sirens and/or introduce/utilize smartphone applications.
- Provide emergency generators for use at critical or vulnerable facilities.
- Provide portable pumping systems for use throughout county.

4.1.2 Hazardous Material Release and Transportation Accidents

Issue(s): Much of the US-2 corridor is intensively developed because of its heavy traffic volume and proximity to the coveted Lake Michigan shoreline. US-2 is a major route for trucks, many of which transport hazardous materials. Development along US-2 east and west of city of Manistique is expected to intensify. Running parallel and within the US-2 corridor is the Canadian National Railroad; on average 100 cars carrying hazardous materials pass through the county each month.

Goal: Minimize the possibility of a Hazardous Material Release and Transportation Accidents in Schoolcraft County and increase the County's ability to deal with such incidents.

Strategies:

- Ensure that local fire departments, law enforcement, and first responders have proper training and are prepared for hazmat and general transportation incidents that might occur on roadways, railways, and Great Lakes shipping.
- Ensure fire departments, law enforcement agencies and other first responders have adequate equipment to respond to hazmat accidents, and have proper communication protocols in place to report hazardous material incidents to other agencies.
- MDOT, road commission, and local governments should continually examine and identify problem roadways and intersections. Improve the design of such locations to alleviate the situation and/or install appropriate and traffic control.
- Identify alternative transportation detour routes and develop/update evacuation plans of facilities and communities. Confirm first responders, fire departments and law enforcement agencies are aware of such plans.
- Develop a system of alternative routes to detour traffic away from hazardous maternal spills and transportation accidents while maintaining a reasonable traffic flow.
- Utilize a geographic information system to map critical infrastructure throughout the county.

- Install signs to denote the actual speed of vehicles traveling on a roadway, especially along US-2 in Manistique.

4.1.3 Structural Fires

Issue(s): There are 5,995 housing units in the county, with 25 percent constructed before 1960; fire stops are not common to pre-1960 homes. Wood is a primary source of heating fuel for about 15 percent of the homes in Schoolcraft County. Building codes generally require public buildings and businesses over 12,000 square feet to have sprinkler system.

Goal: Reduce the County's losses from structural and commercial fires.

Strategies:

- Continue to install or upgrade sprinkler systems in downtown Manistique commercial buildings.
- Implement a county-wide fire training program, and conduct county-wide exercises with other agencies.
- Continue mutual aid agreements amongst the fire departments in the county and other appropriate agencies.
- Ensure fire departments and other responders have adequate equipment and training to respond to structural and commercial fires.
- Support recruitment, equipment procurement, and training of volunteer firefighters to ensure that departments have adequate personnel to respond to incidents.
- Update site emergency plans for schools, factories, office buildings and other appropriate sites.
- Institute regular inspections of commercial, industrial, multi-family residential use buildings, day care facilities, churches, and other buildings where large groups of people congregate.

4.1.4 Wildfires

Issue(s): With an increasing number of permanent and seasonal dwellings being built in wildland areas there is a greater potential for life and property loss. Private roads may not be constructed to permit adequate access by emergency vehicles. Debris burning is leading cause of wildfires. The threat of wildfires increases in the summer; weather is a critical factor.

Goal: Reduce the potential loss of life and property from wildfire in Schoolcraft County.

Strategies:

- Educate the public about wildfire safety.
- Create firebreaks in high-risk forest areas.
- Identify natural fire breaks (power line and pipeline ROWs, railroad grades, streams and rivers, etc.) across the landscape of the county where wildfires might be intercepted and contained.
- Create a “defensible space” around individual property in high-risk forest areas.
- Provide adequate property access for emergency vehicles and fire equipment.
- Use fire resistant building materials in high-risk wildfire areas.
- Identify escape and entry routes in areas with high wildfire risk.
- Ensure fire departments have adequate equipment and training to respond to wildfires.
- Maintain partnerships with MDNR, US Forest Service to coordinate and communicate response needs for fires in undeveloped areas.

4.1.5 Infrastructure Failures

Issue(s): Infrastructure in the form of electrical, gas, water and wastewater services, and communications are vulnerable to failures often related to severe weather. The city of Manistique and unincorporated Seney have water and wastewater systems, along with a water-only system in unincorporated Germfask. Electrical power is provided from locations outside the county through three service providers through high-voltage lines paralleling US-2 and M-28/M-77. Two gas and petroleum product pipelines travel through the county paralleling US-2. An interruption of service to any of these vectors would cause inconvenience or endanger residents, particularly in winter months.

Goal: Increase redundancy of infrastructure systems in Schoolcraft County and prepare to respond to prolonged outages.

Strategies:

- Ensure public works departments and road commission are prepared to respond to water main breaks.
- Collaborate with energy providers to communicate and coordinate outage response plans, identify vulnerabilities, and help mitigate issues.
- Purchase portable generators to provide temporary power to critical facilities.
- Promote redundancy in the construction or remodeling of critical facilities.

- Train first responders to anticipate failures of interdependent systems and develop response plans accordingly.

4.2 Evaluation Criteria

The CUPPAD Regional Commission in cooperation with the Emergency Management Coordinator devised criteria to evaluate the proposed strategies. The criteria introduces a system of points for strategies that affect large or small groups of people, recurring hazards, property damage, cost effectiveness, and natural resources. Larger point values were given to strategies that: affect large groups of people, mitigate recurring hazards, attempt to reduce property damage countywide, are cost effective to implement and use local resources.

Members of the Hazard Mitigation Planning Committee individually scored each of the strategies. The average of the scores determined the overall point score of each of the mitigation strategies for the issues listed in 4.1 of this chapter. The results of this process are shown on Table 4-2. Table 4-3 shows additional strategies new to this update.

The committee ranked these new strategies as a group, using the same criteria.

Table 4-1		
	Evaluation Criteria	Points
A	The project/alternative protects the health, safety, and general welfare of the greatest number of residents (countywide, at least ½ the population, less than ½ the population).	25 - 15 - 5
B	The project/alternative mitigates a recurring problem.	20
C	The project/alternative is intended to reduce property damage to structures community-wide.	15
D	The project/alternative is intended to reduce property damage to selected areas of a community.	10
E	The project/alternative is cost effective for the community.	20
F	The project/alternative can be implemented using only local resources (100% local resources, less than 100%)	10 - 5
G	The cost of the project/alternative does not exceed the anticipated cost of probable damage (if an event occurs).	5
H	The project/alternative is intended to protect the area's natural resources. (forests, surface water, etc.)	5

4.3 Mitigation Strategies

Below are the results of using the evaluation criteria in 4.2 to “weight” the hazard mitigation strategies discussed in section 4.1- Issues, Goals, and Strategies.

Table 4-2	
Strategies by Rank Score (2007)	Points
Continue mutual aid agreements amongst the fire departments in the county and other appropriate agencies.	100
Ensure fire departments and other responders have adequate equipment and training to respond to structural and commercial fires.	93
Ensure fire departments have adequate equipment and training to respond to wildfires.	90
Implement a county-wide fire training program.	87
Continue to encourage the use of NOAA weather tower coverage and the use of NOAA weather radio through community awareness and education programs.	85
Update and/or expand public education efforts for emergency preparedness through the county website, presentations to community groups/organizations and social media.	78
Institute a public education program regarding emergency warning systems available in Schoolcraft County.	72
Maintain and improve/expand emergency warning systems in communities within Schoolcraft County.	71
Educate the public about wildfire safety	71
Use fire resistant building materials in high-risk wildfire areas.	70
Update site emergency plans for schools, factories, mills, office buildings, and other appropriate sites.	70
Participate in the “Firewise Communities” Wildfire Protection Program.	68
Develop/update evacuation plans of facilities and of the communities. Confirm first responders, fire departments and law enforcement agencies are aware of such plans.	66
Use snow fences or living fences to limit the blowing and drifting of snow over critical roadway segments.	64
Correct shelter weaknesses by updating equipment, providing adequate generators, establish shelters for vulnerable populations, and educate the public on the availability of shelters in the event of an emergency.	58
Ensure that local fire departments, law enforcement, and first responders have training, and preparedness for hazmat and general transportation	54

Table 4-2	
Strategies by Rank Score (2007)	Points
incidents that might occur on roadways, railways, and great lakes shipping.	
Create firebreaks in high-risk forest areas	51
MDOT, road commission, and local governments should continually examine and identify problem roadways and intersections. Improve the design of such locations to alleviate the situation and/or install appropriate and traffic control.	49
Identify existing shelter locations, strengths, and weaknesses	49
Sprinkler system installation and upgrade (ex. Downtown Manistique buildings)	48
Provide adequate property access for vehicles and fire equipment.	44
Create a “defensible space” around property in high-risk forest areas.	44
Bury/ protect power and utility lines in critical locations.	34
Insulate public infrastructure, such as water lines, sewer lines, and water storage tanks, from cold weather conditions.	32

Table 4-3	
Strategies by Rank Score (2014)	Points
Utilize a geographic information system to map storm sewers, spillways and residential wells throughout the county.	105
Ensure county road commission and local public works personnel have adequate training and equipment for spill control at hazardous materials accidents.	105
Institute regular inspections of commercial, industrial, multi-family residential use buildings, day care facilities, churches, and other buildings where large groups of people congregate.	105
Develop a system of alternative routes to detour traffic away from hazardous maternal spills while maintaining a reasonable traffic flow.	105
Construct elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.	100
Acquire drainage easements in order to allow for the planned and regulated public use of privately owned land for temporary water retention and drainage.	100
Seek funding from public and private sources to maintain and improve/expand emergency warning systems in communities throughout the County.	95
Improve/update accurate flood plain mapping of communities.	95
Implement and continue to provide countywide training and equipment to respond to a public health emergency.	95

Table 4-3	
Strategies by Rank Score (2014)	Points
Increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.	95
Identify natural fire breaks where wildfires might be intercepted and contained.	90
Increase public awareness of the need for permits (MDEQ Part 31) for building in flood plain areas.	90
Enforce basic building code requirements related to flood mitigation.	90
Provide emergency generators for use at all medical and school facilities.	85
Institute public education of flood warning systems.	85
Use check valves, sump pumps, and backflow preventers in homes and buildings.	85
Ensure that fire departments have adequate equipment and training to respond to flood conditions.	85
Continue to train and equip local hazardous materials emergency response teams.	80
Identify escape and entry routes in areas with high wildfire risk.	80
Provide local training to officials on flood mitigation measures, flood plain management, flood proofing, etc.	80
Develop a database, and keep current a listing of volunteers that can assist during a major public health event.	80
Provide back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.	80
Develop and continue to update existing plans to cover possible public health emergency events.	80
Provide portable pumping systems for use through the county.	60
Encourage local governments to participate in the National Flood Insurance Program.	55
Utilize flood risks products developed by FEMA to become more informed of mitigation actions to reduce identified flood risks.	55
Install signs to denote the actual speed of vehicles traveling on a roadway.	40

Table 4-4	
Strategies by Rank Score (2021)	Points
Update and/or expand public education efforts for emergency preparedness through the county website, presentations to community groups/organizations, and social media.	100

Table 4-4	
Strategies by Rank Score (2021)	Points
Utilize a geographic information system to map critical infrastructure throughout the county.	100
Implement a county-wide fire training program, and conduct county-wide exercises with other agencies.	100
Support recruitment, equipment procurement, and training of volunteer firefighters to ensure that departments have adequate personnel to respond to incidents.	100
Train first responders to anticipate failures of interdependent systems and develop response plans accordingly.	95
Maintain and improve/expand emergency warning systems, including the use of smartphone applications, in communities within Schoolcraft County.	70
Maintain partnerships with MDNR, US Fish & Wildlife to coordinate and communicate response needs for fires in undeveloped areas.	70
Ensure public works departments and road commission are prepared to respond to water main breaks.	70
Purchase portable generators to provide temporary power to critical facilities.	65
Identify alternative transportation detour routes and develop/update evacuation plans of facilities and communities. Confirm first responders, fire departments and law enforcement agencies are aware of such plans.	50
Identify existing shelter locations, determine strengths and weaknesses, and identify community partners to communicate needs and capacity.	45
Ensure fire departments, law enforcement agencies and other first responders have adequate equipment to respond to hazmat accidents and have proper communication protocols in place to report hazardous material incidents to other agencies.	45

4.4 Means to Accomplish Mitigation

As part of the planning process, mitigation strategies were developed to reduce potential losses of natural hazards identified in the risk assessment. The strategies present methods for local jurisdictions to improve upon existing tools. Local mitigation capabilities are existing authorities, policies, programs and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities.

Planning and regulatory capabilities are plans, policies, codes and ordinances that prevent and reduce the impacts of natural hazards. These preventive measures are designed to protect new

development from hazards and ensure that potential loss is not increased. A number of preventive measures can be implemented at the local level, including:

- Building codes
- Planning and zoning
- Subdivision regulations
- Open space preservation
- Storm water management

Building Codes are an effective way to address many of the natural hazards identified in the plan. Through building code enforcement all new and improved building are to be built or rehabilitated to withstand the impacts of certain hazards, such as snow loads, high winds, extreme temperatures and flooding. Under the State Construction Code Act (Act 230 of 1972), as amended in 1999, municipalities are required to administer and enforce the statewide building, plumbing, mechanical and electrical code. Local communities are not permitted to modify the state codes. In Schoolcraft County, the County Building Department is responsible for building code enforcement for all of the municipalities within the county, including the City of Manistique. Mechanical, electrical and plumbing code enforcement is handled through the State of Michigan.

Planning and Zoning guides appropriate development based on suitability and compatibility, keeping development away from sensitive areas such as floodplains, and wetlands and protecting property from certain types of natural hazards. Master plans are utilized by local governments to guide future development within their community. A community's future development is accomplished through the local planning process that reviews a community's background, current land use, and projected needs. The master plan is to serve as the basis for regulating land use. Zoning regulations are the primary tool to implement the master plan recommendations. Zoning places restrictions on lot size, use, setback, etc. Through the different zoning districts, the community can effectively guide development. The County Zoning Ordinance regulates land use within all of the townships in the County. The City of Manistique handles zoning within the city boundaries. Both the County and City have adopted Master Plans that address future development.

Land Division (Subdivision) Regulations stipulate that all divisions of property be approved by the local unit of government. The act regulates the division of land in order to promote the public health, safety and general welfare. Review of property to assure the orderly layout, use of the land, and require the land be suitable for building sites and public improvements, etc. The City of Manistique and Manistique Township have enacted respective subdivision control ordinance.

Open Space Preservation methods are used to keep hazardous areas from development and is especially useful in flood prone areas. Prohibiting new development in hazard-prone areas is the best way to mitigate future problems. An additional benefit to open space preservation is the maintenance of agricultural and green space/park areas. The planning process can assist in identifying suitable areas to preserve.

Storm Water Management is a method to control both urban and riverine flooding. Natural groundwater serves to absorb water, urban development attributes such as paving and sidewalks tend to increase runoff and cause flooding, overloaded drainage systems, erosion, and impaired water quality. Participating NFIP communities have minimum requirements in the floodplain to mitigate future losses.

Administrative and technical capability of the jurisdiction is the community's staff and skills used in mitigation planning and to implement specific mitigation actions. The City of Manistique, as with the other communities in the county, do not have sufficient staff to assign for mitigation actions. The City Manager and other department heads have a multitude of responsibilities. Quite often, the City and the other Township governments must rely on the expertise and technical expertise of the County for emergency management, floodplain management and building inspections.

Local emergency services authorities, resources and facilities throughout Schoolcraft County are identified in Chapter 2 of the plan. All the authorities are effective in conducting and responding to incidents. Several agencies are deficient in terms of having the necessary equipment to maintain and expand their responsibilities. The same shortfalls of resources are found in municipal public work agencies and planning departments. Continued inadequate funding will compound the problem.

Suggested ways to improve and expand upon hazard mitigation efforts are:

Building Codes:

- An expanded method of communication between the county code enforcement agency and local contractors and property owners will ensure that builders are incorporating all of the current standards and requirements.

Planning and Zoning:

- Both the County and the City should review their master plans and take appropriate steps to update the plan in accordance with state law. The plans should incorporate hazard mitigation discussions and techniques.

Land Division (Subdivision) Regulations:

- The City of Manistique and Manistique Township both have adopted subdivision control ordinances. Most jurisdictions have land division ordinances. Communities should examine whether enactment of a subdivision control ordinance is appropriate for their jurisdiction.

Open Space Preservation:

- Open space preservation can be achieved through a number of means including acquisition, donation by developer's easement or regulated setback buffers or through provisions contained in the community zoning ordinance. Communities

are encouraged to review these techniques and adopt provisions that are suitable for their situation.

Storm Water Management:

- Existing storm water management programs could be expanded to require storm water does not leave a new development at a higher rate than pre-development conditions. In addition, the storm water regulations can utilize natural vegetation, buffers, and retention basins to minimize impacts within the watershed. A coordinated effort amongst affected municipalities is the most effective way to address the larger problem.

Staff Capabilities:

- The opportunity exists for jurisdictions with limited resources to utilize the regional planning agency to support mitigation planning efforts.

Emergency Services:

- The opportunity exists for agencies to further educate the public on techniques and methods to mitigate natural hazards, such as preventing wildfires and flooding, as well as suitable locations in the event of a tornado or other severe weather event.
- Seeking grant funds to acquire needed equipment is paramount to maintain and expand the level of service in order to respond to hazards. Joint or pooled purchasing arrangements can result in savings through bulk purchase and negotiated rates. A regional entity could offer pooled purchasing to interested local agencies.

5.0 Action Plan

The overall purpose of this plan is to identify strategies to mitigate the hazards identified to reduce threats to public safety and property. These strategies aim to mitigate the higher risk hazards of severe weather, disruption of municipal infrastructure, loss of property and lives from structural and wildfires, and hazardous material release.

5.1 Mitigation Actions

This section describes the action to be taken, the agency responsible, and available funding source if known. Several federal funding sources for hazard mitigation are:

- HMGP: Hazard Mitigation Grant Program
- PDMP: Pre-Disaster Mitigation Program
- FMAP: Flood Mitigation Assistance Program
- EMPG: Emergency Management Performance Grants
- PFG: HMGP Post Fire Grants
- BRIC: Building Resilient Infrastructure and Communities

Other funding sources noted in this chapter are:

- HMG: PHMSA Hazardous Materials Grant Program
- HMEP: PHMSA Hazardous Materials Emergency Preparedness Grant
- HSGP: Homeland Security Grant Program
- AFG: Assistance to Firefighters Grant Program
- USDA-RD: USDA Rural Development Programs

Possible funding sources were listed under each action. The listed funding source is not an inclusive listing of available resources nor guarantees the project would be funded through that funding source. Funding of projects listed with “local resources” may be accomplished through local funds or through other grant funds obtained by an agency. Additional information on available hazard mitigation funding can be found in FEMA’s Hazard Mitigation Assistance Unified Guidance document (2013) and FEMA’s website.

The following “Hazard Related Actions” are listed in the order of priority as explained in Tables 4-2, 4-3, and 4-4 - Strategies by Rank Score from Chapter 4. Table 5-1 summarizes the actions and agencies/personnel that would be responsible for undertaking the actions listed.

Agencies and organizations will undertake the following strategies provided there is adequate funding and resources to accomplish the project. Many of the strategies are on-going; other projects have estimated completion dates shown below. Completion of the projects should be directed towards those projects that have the highest priority.

Hazard Related Actions from the 2007 Plan

Action: Continue with existing mutual aid agreements.

Lead Agency: Fire Departments

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: On-going

Status: All townships remain signatories to the existing mutual aid agreements. Additionally, Manistique Public Safety, Thompson Township, and Hiawatha Township all have thermal imaging equipment that they share with other communities.

Action: Ensure fire departments and other responders have adequate equipment and training to respond to structural and commercial fires.

Lead Agency: Fire Departments

Supporting Agency: Emergency Medical Services, County Emergency Management

Funding Source: Local Resources, HMGP, Assistance to Firefighters Grant Program

Time Frame: On-going

Status: Continuous; some local fire departments have upgraded equipment.

Action: Ensure fire departments have adequate equipment and training to respond to wildfires.

Lead Agency: Fire Departments, MDNR

Supporting Agency: County Emergency Management

Funding Source: Local Resources, Assistance to Firefighters Grant Program

Time Frame: Ongoing

Status: Continuous; some local fire departments have upgraded equipment.

Action: Implementation of countywide fire training.

Lead Agency: Fire Departments

Funding Source: Local Resources, Assistance to Firefighters Grant Program

Time Frame: On-going

Status: Occurs regularly.

Action: Continuation of weather tower coverage and use of NOAA Weather Radio.

Lead Agency: NOAA

Supporting Agency: County Emergency Management

Funding Source: PDM, HMGP

Time Frame: On-going

Status: Schoolcraft County has sufficient NOAA coverage.

Action: Update and/or expand public education efforts for emergency preparedness.

Lead Agency: County Emergency Management

Supporting Agency: Emergency Medical Services, and Public Health

Funding Source: Local Resources

Time Frame: On-going

Status: Schoolcraft County is currently implementing public education efforts.

Action: Educate the public about emergency warning systems available in Schoolcraft County.

Lead Agency: County Emergency Management

Supporting Agency: Local Units of Government

Funding Source: Local Resources

Time Frame: On-going

Status: Schoolcraft County has access currently to send IPAWS messages via Rave Alert Software. The County also uses the TV and radio, via traditional methods, to communicate warnings with the public.

Action: Maintain and improve/expand emergency warning systems in communities across the County. (ex. sirens)

Lead Agency: County Emergency Management

Supporting Agency: Local Government, Fire Departments

Funding Source: PDM, HMGP

Time Frame: FY2017

Status: No expansion yet.

Action: Educate the public about wildfire safety.

Lead Agency: Fire Departments, MDNR, U.S. Forest Service

Supporting Agency: County Emergency Management

Funding Source: Local Resources

Time Frame: On-going

Status: The Manistique Public Safety Department conducts fire safety programs for area schools, the Sault Tribe, and senior citizens.

Action: Use fire resistant building materials.

Lead Agency: County Government

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: FY2010

Status: The County Building Inspector continues to enforce regulations.

Action: Update site emergency plans (emergency action plans) for schools, factories, office buildings, and other appropriate sites.

Lead Agency: Fire Departments

Supporting Agency: County Emergency Management

Funding Source: Local Resources

Time Frame: On-going

Status: Continuous.

Action: Participate in the “Firewise Communities” Wildfire Protection Program

Lead Agency: Fire Departments, DNR, U.S. Forest Service

Supporting Agency: Local Governments, County Emergency Management

Funding Source: Local Resources

Time Frame: FY2007

Status: Schoolcraft County participated in the CWPP; the program was ended several years ago.

Action: Develop/update evacuation plans (emergency action plans) and confirm first responder awareness of them.

Lead Agency: County Emergency Management

Supporting Agency: Fire Departments, Law Enforcement, Emergency Medical Services, and Public Health.

Funding Source: Local Resources

Time Frame: FY2007

Status: Emergency action plans for local schools and medical facilities are updated on a regular basis.

Action: Use snow fences or living snow fences to limit blowing and drifting snow over critical roadway segments.

Lead Agency: County Road Commission

Supporting Agency: Local Government, MDOT

Funding Source: HMGP, PDM

Time Frame: On-going

Status: Schoolcraft County Road Commission installs snow fences by special request.

Action: Correct shelter weaknesses by updating equipment, providing adequate generators, establishing shelters for vulnerable populations, and educate the public on the availability of shelters in an emergency.

Lead Agency: County Emergency Management

Supporting Agency: Red Cross, LMAS

Funding Source: Local Resource

Time Frame: On-going

Status: LMAS puts more emphasis on public awareness and readiness than before the 2007 plan.

Action: Training, planning and preparedness for HAZMAT and general transportation incidents on roadways, railways, and great lakes shipping.

Lead Agency: Fire Departments

Supporting Agency: MDOT, County Emergency Management

Funding Source: PDM, HMGP

Time Frame: On-going

Status: Continuous.

Action: Create firebreaks in high-risk forest areas.

Lead Agency: US Forest Service

Supporting Agency: MDNR, Fire Departments

Funding Source: Local Resources

Time Frame: On-going

Status: The U.S. Forest Service creates firebreaks as needed.

Action: Improved design, routing, and traffic control at problem roadway areas
(ex. US-2/M-77).

Lead Agency: MDOT

Supporting Agency: Schoolcraft County Road Commission

Funding Source: MDOT

Time Frame: FY2012

Status: MDOT and the County Road Commission currently collaborate to address these issues.

Action: Identify existing shelter locations, strengths and weaknesses.

Lead Agency: County Emergency Management

Supporting Agency: Red Cross, Law Enforcement, LMAS

Funding Source: Local Resources, PDM

Time Frame: On-going

Status: More emphasis has been placed on awareness of shelter locations than prior to the 2007 plan.

Action: Sprinkler system installation and upgrade. (ex. Downtown Manistique buildings).

Lead Agency: City of Manistique

Supporting Agency: Fire Departments

Funding Source: Local Resources

Time Frame: FY2012

Status: A number of area buildings have installed sprinkler systems. Further discussion is ongoing.

Action: Provide adequate property access for emergency vehicles and fire fighting equipment.

Lead Agency: County Board, County Building Code & Zoning Administration Dept.

Supporting Agency: Local Government, Fire Departments

Funding Source: Local Resources

Time Frame: FY2011

Status: The Schoolcraft County zoning ordinance mandates and enforces a minimum of seven feet access for emergency vehicles and firefighting equipment on private property.

Action: Create a “defensible space” around property in high-risk areas.

Lead Agency: Fire Departments, MDNR, U.S. Forest Services

Funding Source: Local Resources

Time Frame: FY2010 and On-going

Status: Education on this issue happens through the CWPP. Work with the Forest Service to maintain spaces is ongoing.

Action: Bury/protect utility lines.

Lead Agency: County Emergency Management

Supporting Agency: Local Government, County Government

Funding Source: HMGP, PDMP

Time Frame: FY2010

Status: The City of Manistique buries and protects utility lines when feasible.

Action: Insulate municipal infrastructure (water and sewer lines and water storage tanks).

Lead Agency: Local Government

Funding Source: HMGP, PDMP, CDBG

Time Frame: FY2011

Status: Since 2007, the City of Manistique has replaced approximately 80% of its water and sewer lines which have been placed deeper underground (7ft minimum) to protect from freezing.

POTENTIAL New Hazard Related Actions (2014 Plan Update)

Action: Seek funding from public and private sources to maintain and improve/expand emergency warning systems in communities throughout the County.

Lead Agency: County Emergency Management

Supporting Agency: Local Government, 911 Board

Funding Source: HMGP, Local Resources

Time Frame: FY2017

Status: Ongoing

Action: Continue to train and equip local hazardous materials emergency response teams

Lead Agency: Fire Departments

Supporting Agency: County Emergency Management

Funding Source: HMGP, Local Resources

Time Frame: Ongoing

Action: Explore the establishment and implementation of a “reverse 911” calling system

Lead Agency: 911 Board, Local Government

Supporting Agency: County Emergency Management

Funding Source: HMGP, Local Resources

Time Frame: FY2017

Status: County has access to Rave Alert software to send emergency messages to targeted phone lines and/or geographic areas via opt-in requests from the public or to all devices via IPAWS depending upon an emergent situation.

Action: Ensure county road commission and local public works personnel have adequate training and equipment for spill control at hazardous materials accidents/sites.

Lead Agency: MDOT

Supporting Agency: County Road Commission, Manistique DPW, County Emergency Management

Funding Source: HMGP

Time Frame: Ongoing

Action: Utilize a geographic information system to map storm sewers, spillways and residential wells throughout the county.

Lead Agency: County Government, Local Units of Government

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Work with MDOT to ensure pedestrian safety.

Lead Agency: County Road Commission, MDOT

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Provide emergency generators/transfer switches for use at all medical and school facilities

Lead Agency: County Emergency Management

Funding Source: HMGP

Time Frame: FY2017

Status: Some medical facilities have emergency generators.

Action: Institute regular inspections of commercial, industrial, multi-family residential use buildings, day care facilities, churches, and other buildings where large groups of people congregate.

Lead Agency: County Government, Building and Zoning Dept.

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Develop a system of alternative routes to detour traffic away from hazardous material spills while maintaining a reasonable traffic flow.

Lead Agency: County Road Commission

Supporting Agency: County Emergency Management, MDOT

Funding Source: Local Resources

Time Frame: Ongoing

Action: Identify escape and entry routes in areas with high wildfire risk.

Lead Agency: Fire Departments

Supporting Agency: County Emergency Management, Public Safety, Local Government

Funding Source: Local Resources

Time Frame: FY2017

Status: Ongoing

Action: Identify natural fire breaks where wildfires might be intercepted and contained.

Lead Agency: Fire Departments

Supporting Agency: County Emergency Management, Public Safety, Local Government

Funding Source: Local Resources

Time Frame: FY2017

Status: Ongoing

Action: Construct elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.

Lead Agency: County Road Commission, MDOT, U.S. Forest Service

Supporting Agency: Local Government

Funding Source: PDM, Local Resources

Time Frame: FY2017

Status: Ongoing

Action: Increase public awareness of the need for permits (EGLE Part 31) for building in flood plain areas.

Lead Agency: County Government

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Enforce basic building code requirements related to flood mitigation.

Lead Agency: County Government

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Encourage local governments to participate in the National Flood Insurance Program.

Lead Agency: County Emergency Management

Funding Source: Local Resources

Time Frame: FY2017

Status: The City of Manistique and Thompson Township participate in the NFIP.

Action: Utilize flood risks products developed by FEMA to become more informed of mitigation actions to reduce identified flood risks.

Lead Agency: County Emergency Management

Supporting Agency: Public Safety

Funding Source: Local Resources

Time Frame: FY2016

Status: FEMA products are used for site and building plans.

Action: Acquire drainage easements in order to allow for the planned and regulated public use of privately owned land for temporary water retention and drainage.

Lead Agency: County Drain Commissioner, County Road Commission

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: FY2017

Status: Discussion has occurred, no action taken.

Action: Improve/update accurate flood plain mapping of communities.

Lead Agency: FEMA

Supporting Agency: County Emergency Management, Local Government

Funding Source: FMA, Local Resources

Time Frame: Ongoing

Action: Institute public education of flood warning systems.

Lead Agency: County Emergency Management, NOAA

Supporting Agency: Local Government

Funding Source: PDM, HMGP, Local Resources

Time Frame: Ongoing

Action: Provide local training to officials on flood mitigation measures, flood plain management, flood proofing, etc.

Lead Agency: County Emergency Management, NOAA

Supporting Agency: Local Government

Funding Source: PDM, Local Resources

Time Frame: Ongoing

Action: Use check valves, sump pumps, and backflow preventers in homes and buildings.

Lead Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Ensure that fire departments have adequate equipment and training to respond to flood conditions.

Lead Agency: County Emergency Management

Supporting Agency: Local Government

Funding Source: HMGP

Time Frame: Ongoing

Action: Implement and continue to provide countywide training and equipment to respond to a public health emergency.

Lead Agency: County Emergency Management, Public Health

Supporting Agency: Local Government
Funding Source: Local Resources, HMGP
Time Frame: Ongoing

Action: Develop a database and keep current a listing of volunteers that can assist during a major public health event.

Lead Agency: Public Health

Supporting Agency: Local Government

Funding Source: Local Resources

Time Frame: Ongoing – This will always be a challenge because the small population makes it hard to get the required amount of volunteers.

Action: Provide back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.

Lead Agency: Local Governments

Funding Source: HMGP, Local Resources

Time Frame: Ongoing

Action: Increase public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.

Lead Agency: Local Government, Public Safety, Public Health

Supporting Agency: County Emergency Management

Funding Source: HMGP, Local Resources

Time Frame: Ongoing

Action: Develop and continue to update existing plans to cover possible public health emergency events.

Lead Agency: Public Health

Supporting Agency: Local Government, Public Safety, County Emergency Management

Funding Source: HMGP, Local Resources

Time Frame: Ongoing

New Hazard Related Actions (2021 Plan Update)

Action: Update and/or expand public education efforts for emergency preparedness through the county website, presentations to community groups/organizations, and social media.

Lead Agency: County Emergency Management

Supporting Agency: Local Government, Public Safety

Funding Source: HMGP, Local Resources

Time Frame: Ongoing

Action: Utilize a geographic information system to map critical infrastructure throughout the county.

Lead Agency: County Government, Local Units of Government

Supporting Agency: County Emergency Management, Public Works, Public Safety

Funding Source: Local Resources

Time Frame: FY2024

Action: Implement a county-wide fire training program, and conduct county-wide exercises with other agencies.

Lead Agency: Fire Departments

Funding Source: Local Resources, Assistance to Firefighters Grant Program

Time Frame: Regularly, as feasible.

Action: Support recruitment, equipment procurement, and training of volunteer firefighters to ensure that departments have adequate personnel to respond to incidents.

Lead Agency: Fire Departments

Supporting Agency: Local Units of Government

Funding Source: Local Resources, Assistance to Firefighters Grant Program

Time Frame: Ongoing

Action: Train first responders to anticipate failures of interdependent systems and develop response plans accordingly.

Lead Agency: 911 Board, County Emergency Management

Supporting Agency: County Government, Public Safety, Public Works, MDOT

Funding Source: EMPG, Local Resources

Time Frame: FY2024

Action: Maintain and improve/expand emergency warning systems, including the use of smartphone applications, in communities within Schoolcraft County.

Lead Agency: County Government, County Emergency Management

Supporting Agency: Public Safety, Fire Departments

Funding Source: HMAG, Local Resources

Time Frame: Ongoing

Action: Maintain partnerships with MDNR, US Forest Service to coordinate and communicate response needs for fires in undeveloped areas.

Lead Agency: Fire Departments

Supporting Agency: County Emergency Management

Funding Source: Local Resources

Time Frame: Ongoing

Action: Ensure public works departments and road commission are prepared to respond to water main breaks.

Lead Agency: Manistique Public Works, Schoolcraft County Road Commission

Supporting Agency: County Government

Funding Source: Local Resources

Time Frame: Ongoing

Action: Purchase portable generators to provide temporary power to critical facilities.

Lead Agency: Local Governments and private entities

Supporting Agency: County Emergency Management

Funding Source: HMGP

Time Frame: FY2024

Action: Identify alternative transportation detour routes and develop/update evacuation plans of facilities and communities. Confirm first responders, fire departments and law enforcement agencies are aware of such plans.

Lead Agency: MDOT

Supporting Agency: County Road Commission, first responders

Funding Source: MDOT, Local resources

Time Frame: FY2023

Action: Identify existing shelter locations, determine strengths and weaknesses, and identify community partners to communicate needs and capacity.

Lead Agency: Red Cross, Department of Human Services

Supporting Agency: County Emergency Management

Funding Source: HMGP

Time Frame: Annually

Action: Ensure fire departments, law enforcement agencies and other first responders have adequate equipment to respond to hazmat accidents, and have proper communication equipment as well as protocols in place to report hazardous material incidents to other agencies.

Lead Agency: Fire Departments, 911 Dispatch

Supporting Agency: County Emergency Management

Funding Source: HMGP, AFG, HSGP, Local Resources

Time Frame: Ongoing

Administration Actions Related to Hazard Mitigation

Action: Adopt the Schoolcraft County Hazard Mitigation Plan.

Responsible Agency: County Government, Local Government

Funding Source: Local Resources

Time Frame: Within six months after approval from FEMA

Status: To be adopted pending FEMA approval

Action: Consider hazard mitigation plans in local planning and zoning documents

Responsible Agency: Schoolcraft County and City of Manistique

Funding Source: Local resources

Time Frame: On-going

Status: Schoolcraft County and the City of Manistique considers hazard mitigation plans in local planning and zoning documents.

Table 5-1 Summary of Actions and Responsible Agencies											
	Improve/Expand Warning Systems	Map critical infrastructure	Countywide training events	Fire recruitment and equipment purchases	Improve response and evacuation plans	Wildfire prevention & mitigation	Improve problem roadway areas	Correct shelter deficiencies	Train and equip for hazardous materials response	Adopt Plan	Planning and zoning considerations
County Government	X	X	X	X	X		X		X	X	X
County Emergency Management	X	X	X	X	X	X		X	X		
Public Safety	X	X	X		X		X		X		
Fire Departments	X	X	X	X	X	X			X		
Emergency Medical Services	X		X		X				X		
Public Health			X					X	X		
MDOT		X	X		X		X		X		
MDNR			X			X					
Township/City											
Doyle Twp.	X	X	X	X			X			X	
Germfask Twp.	X	X	X	X			X			X	
Hiawatha Twp.	X	X	X	X			X			X	
Inwood Twp.	X	X	X	X			X			X	
Manistique Twp.	X	X	X	X			X			X	
City of Manistique	X	X	X	X			X			X	X
Mueller Twp.	X	X	X	X			X			X	
Seney Twp.	X	X	X	X			X			X	
Thompson Twp.	X	X	X	X			X			X	

5.2 Plan Maintenance

Maintenance of the plan consists of the responsible agencies performing the following:

- Reviewing and evaluating the original plan for changes due to new circumstances, information, or projects.
- Updating the plan on an annual or 5-year basis.
- Continued public participation in the hazard mitigation plan.

5.2.1 Reviewing, Evaluating, and Updating

The Schoolcraft County Emergency Management Coordinator will be responsible for reviewing and updating the plan. Review of the plan is recommended annually, the plan shall be reviewed every five years and updated if necessary. The 5-year mandatory review and update of the hazard mitigation plan is needed due to ever changing circumstances throughout Schoolcraft County. The next mandatory update of this hazard mitigation plan will be scheduled in five years from the date of FEMA plan approval.

Reviewing and evaluating the hazard mitigation plan is crucial since changes in the type, extent, and number of hazards are likely to occur over time. For instance, the plans identified risks and hazards may increase or decrease, new hazards may be brought forward due to new development patterns, or strategies may be implemented and new ones proposed.

The County Emergency Management Coordinator will schedule a meeting with the Local Emergency Planning Committee (LEPC) each year to evaluate the plan's performance in the past calendar year. The Committee may, if it chooses, monitor the community's land use planning to ensure that mitigation goals and objectives are being considered in the day-to-day land use decisions being made. The Committee meetings are open to the public; a notice will be sent to local units of government inviting them to attend and participate in the discussions.

Suggested measures for evaluating the plan are: changes in the number, type and/or extent of risk in the county or local jurisdiction; number of mitigation strategies accomplished; implementation problems; and recommendations on new projects or revision of current action items. The plan evaluation results will be summarized into a report. The need for plan amendments or updates will be determined at this time.

The County Board of Commissioners will approve recommendations for any appropriate changes. Local governments that have adopted the County Hazard Mitigation Plan would then adopt the new amendments or new updated plan. Communities that have local land use control, i.e. a locally adopted zoning ordinance, would be requested to consider and adopt the amendments or a new updated plan. The Schoolcraft County Zoning Ordinance governs land

use control within all of the Townships. The City of Manistique maintains local land use control through their adopted zoning ordinance.

It is recommended that the mitigating actions described in the County Hazard Mitigation Plan be incorporated into planning documents prepared and adopted by either the Schoolcraft County Board of Commissioners or local units of government within the county. Information contained in the mitigation plan would be useful to communities as they prepare or develop various planning documents. One suggested planning document is the comprehensive or master plan; the procedures for amending or adopting a plan are outlined in the in the respective County, Township and Municipal Planning Acts. The planning acts require communities with an adopted plan to review the plan every five years to determine if any necessary changes should be made to the plan. At this five-year review stage, the community should consult the Mitigation Plan to determine what findings and actions included in the Hazard Mitigation Plan are appropriate for inclusion into the local plan. It is recommended that the community not wait for the five-year interval but undertake an amendment to the plan with actions or other findings from the plan. The mitigating actions could be incorporated into the goals and objectives section of the comprehensive plan.

Another plan that may be prepared is a “Community Development Plan”, a required plan when a community applies for a federal Community Development Block Grant. The Community Development Plan includes an assessment of problems and needs of the community, a brief community profile and possible short term and long-term activities to address identified needs and problems of the area. The Hazard Mitigation Plan can be utilized in presenting the community profile, identification of community needs and problems, along with activities to address the identified hazard needs and problems.

5.2.2 Public Participation

The County Emergency Management Coordinator will achieve on-going public participation through meetings with local governments, at least annually, to update local officials and residents on hazard mitigation and inquire on potential projects. The Emergency Management Coordinator will meet with such organizations as: the Local Emergency Planning Committee, Schoolcraft County Township Association, Schoolcraft County Planning Commission, Volunteer Fire Chiefs, and the County Board of Commissioners. Ongoing public review of the Schoolcraft County Hazard Mitigation Plan will be achieved through the following:

- A letter was sent notifying local governments within Schoolcraft County and neighboring counties that the plan was available for review.
- A copy of the plan was made available for public review at the Manistique School/Public Library, county clerk’s office, and the CUPPAD website.

- A notice was placed in the local newspaper informing the public on where they could review the plan. The public was encouraged to send comments to the Emergency Management Coordinator during the thirty-day review period.
- Letters were sent notifying local governments within Schoolcraft County and neighboring counties and members of the LEPC after the County Board adopted the plan.

APPENDIX A

GENERAL INFORMATION AND STATISTICS FOR:

Schoolcraft County

Doyle Township

Germfask Township

Hiawatha Township

Inwood Township

City of Manistique

Manistique Township

Mueller Township

Seney Township

Thompson Township

SCHOOLCRAFT COUNTY

Office Location	Courthouse 300 Walnut Street Manistique, MI 49854
Total Area	1,883.69 square miles (1,178.11 land) 1,205,561.6 acres (753,990.4 land)
Population (2019*)	8,048
Housing Units (2019*)	5,995 (2,298 for seasonal, recreational or occasional use)
Total Households (2019*)	3,486
Average Household Size (2019*)	2.28 persons
State Equalized Valuation (residential, 2021)	\$359,321,050

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

County History

Schoolcraft County was named for Henry Rowe Schoolcraft, an explorer and writer who had a keen interest in Indian culture. His knowledge of Indian people led to being appointed Indian agent for tribes of Lake Superior in 1822. He went on to serve as superintendent of Indian Affairs for Michigan in 1836.

Recorded history dates back to 1833 when Father Francis Baraga (later to become Bishop Baraga) established a mission at Indian Lake. Archeological evidence suggests the presence of human habitation in the area as early as 500 BC.

Schoolcraft County was organized March 23, 1871, following its separation from Marquette County. At that time there were three townships: Onota, Monistique [sic] and Munising, with Onota serving as the county seat. In 1879, the county seat was moved to the village of Manistique when logging and lumbering was thriving.

Abundant stands of eastern white pine (*Pinus strobus*) prompted settlement. At one time, the Chicago Lumbering Company owned the entire county. Lumber boom towns and mill towns appeared almost overnight in the 1870s, and as white pine stands disappeared due to extensive logging, so did many boom settlements.

The port of Manistique was a busy place with lumber shipping and freight and passenger service. The Chicago Lumbering Company owned boats and had markets in many ports. Rail lines were constructed to move logs to Germfask where they were floated to downstream mills; Steuben and Seney were served by the railroad network as well.

Manufacturing of dressed lumber products such as window sash and doors began in the final decade of the century. Other wood products produced included cedar shingles, posts and ties. A furnace and charcoal kilns were built to produce charcoal and pig iron.

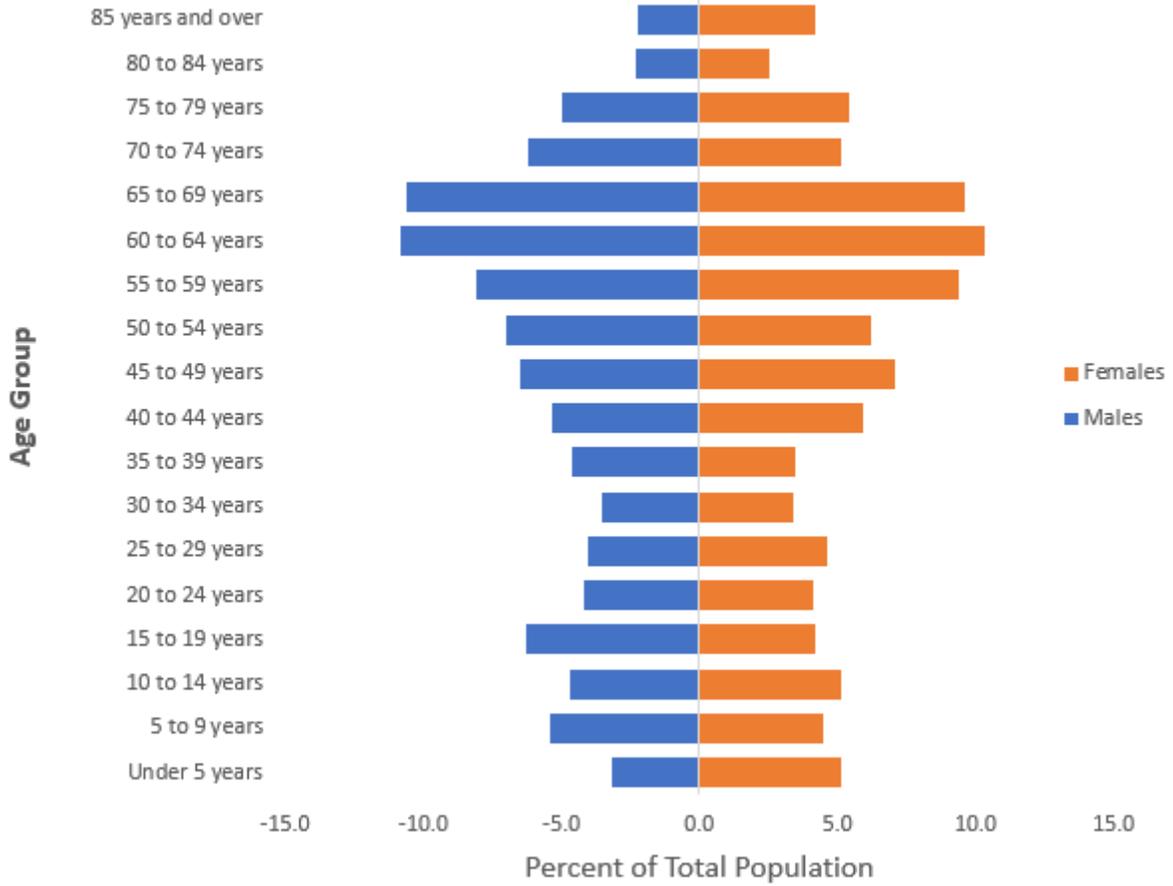
The purchase of the White Marble Lime Company by Inland Steel of Chicago in 1928 marked the beginning of extensive limestone quarrying for use in the steelmaking process. Deposits were exceptionally high in calcium carbonate content, a desirable characteristic for applications besides the steel production.

Inexpensive cut-over forest land settled by farm families was marginally successful. Dairying and growing potatoes enjoyed the most success. As many as 20,000 acres were under cultivation at one time. Most of the sustained farming operations were in the southern part of the county with the most productive soils found along the county's western boundary.

Thousands of acres of abandoned land reverted to the government due to delinquent taxes and have remained in public ownership. The Hiawatha National Forest (123,089 acres), Seney National Wildlife Refuge (93,891 acres) and the state of Michigan (247,187 acres) collectively own and manage almost two-thirds of the county land area. Most state-owned land is within the Lake Superior State Forest. The largest owner of commercial forest land in Schoolcraft County is Lyme Great Lakes Timberlands.

The vast area of public land and natural features attracts thousands of visitors annually. This has led to the development of a large hospitality industry. Recreational activity of all types and in all seasons is a dominant part of life and business in the county.

Schoolcraft County Population by Age and Sex (2019 est.)



2019 Median Age: 52.1
2010 Median Age: 48.3
2000 Median Age: 41.4

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

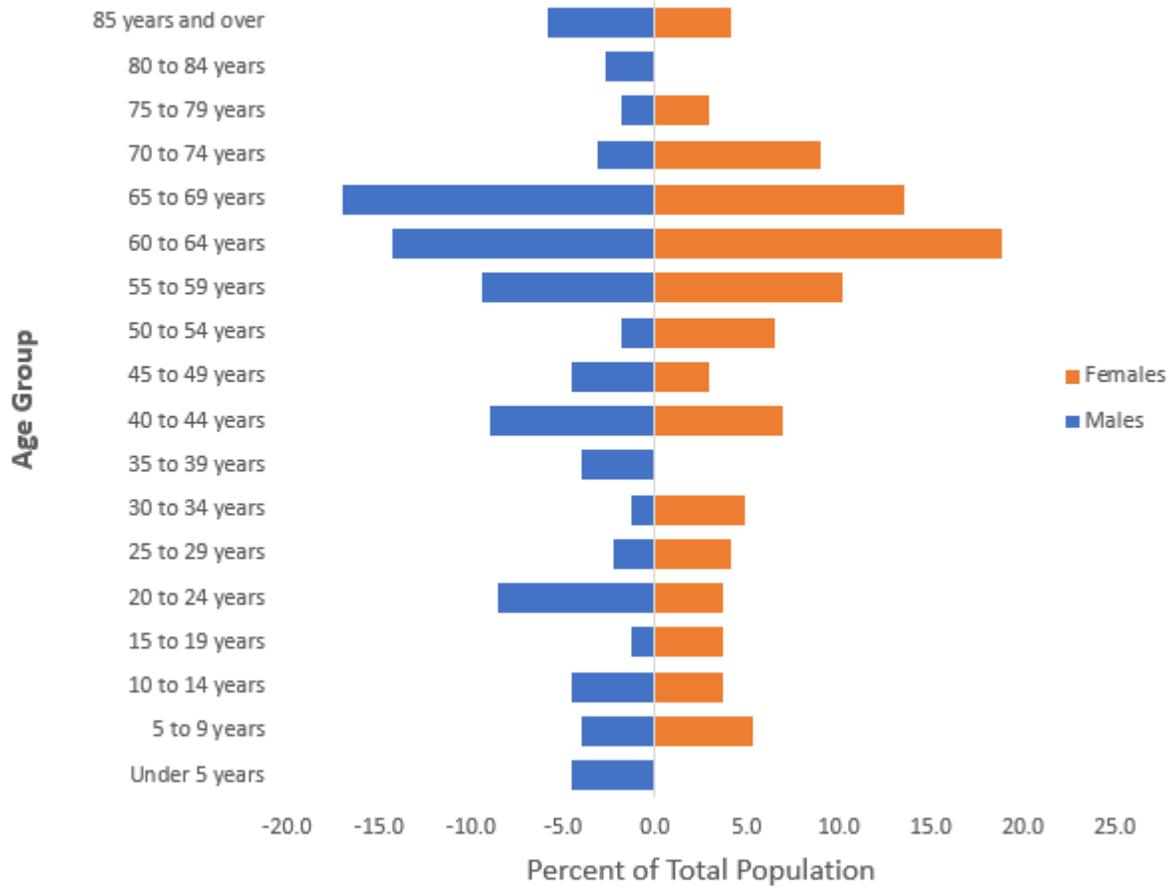
DOYLE TOWNSHIP: T41N, 42N, 43N, 44N & 45N - R14W

Office location	Township Hall 1159N Gulliver Road Gulliver, MI 49840
Mailing address	RR 1, Box 79 Gulliver, MI 49840
Phone	906.283-3227
Total Area	154.03 square miles (147.37 land) 98,579.2 acres (89,859.75 land)
Population (2019*)	468
Housing Units (2019*)	572 (311 for seasonal, recreational or occasional use)
Total Households (2019*)	211
Average Household Size (2019*)	2.22 persons
Primary Fire Department	Doyle Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 51,459,800

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Doyle Township is 6 miles wide and about 26 miles long. The northern half is part of the Seney National Wildlife Refuge; much of the southern half is included in the Lake Superior State Forest. In total, roughly 75 percent of township land area is in public ownership. The community of Gulliver, where several commercial establishments are found, lies about 10 miles east of Manistique on US-2. Residential development is concentrated along the Lake Michigan shoreline, Gulliver Lake, and within a few miles of the highway. Hiawatha Shores now operates a Type II (residential) landfill in Gulliver, MI.

Doyle Township Population by Age and Sex (2019 est.)



2019 Median Age: 58.0
2010 Median Age: 50.7
2000 Median Age: 42.2

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

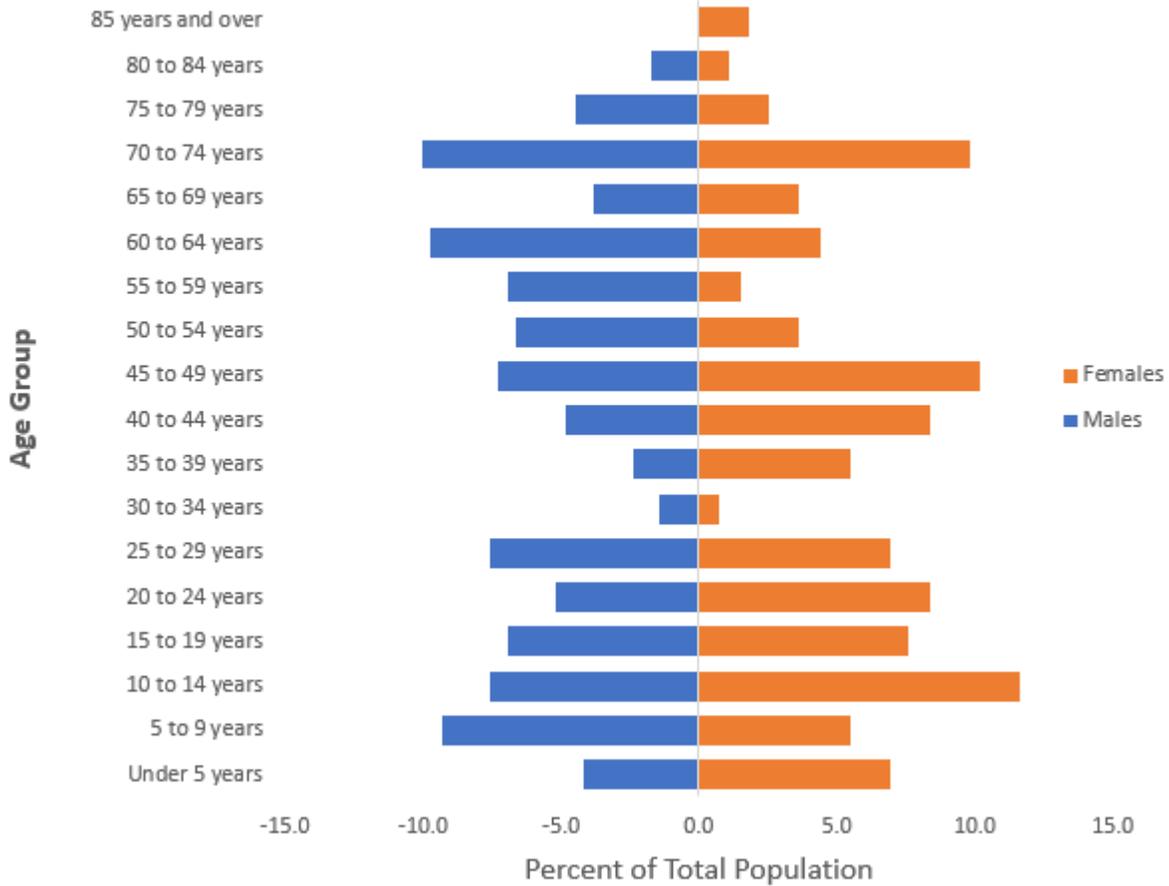
GERMFASK TOWNSHIP: T45N - R13W, T44N - R13W

Office Location	8093 Pine Street Germfask, MI 49836
Mailing Address	Same as above.
Phone	906.586.9697
Total Area	71.65 square miles (67.76 land) 45,856.0 acres (43,366.4 land)
Population (2019*)	469
Housing Units (2019*)	341 (147 for seasonal, recreational, or occasional use)
Total Households (2019*)	217
Average Household Size (2019*)	2.55 persons
Primary Fire Department	Germfask Volunteer Fire Dept.
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 12,420,900

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Germfask Township is 6 miles wide, 12 miles in length with over half its land area in public ownership. Headquarters of the Seney National Wildlife Refuge are about three miles north of the community of Germfask. Highway M-77 extends through the approximate center of the township in a north-south direction.

Germfask Township Population by Age and Sex (2019 est.)



2019 Median Age: 41.2
2010 Median Age: 45.2
2000 Median Age: 42.7

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

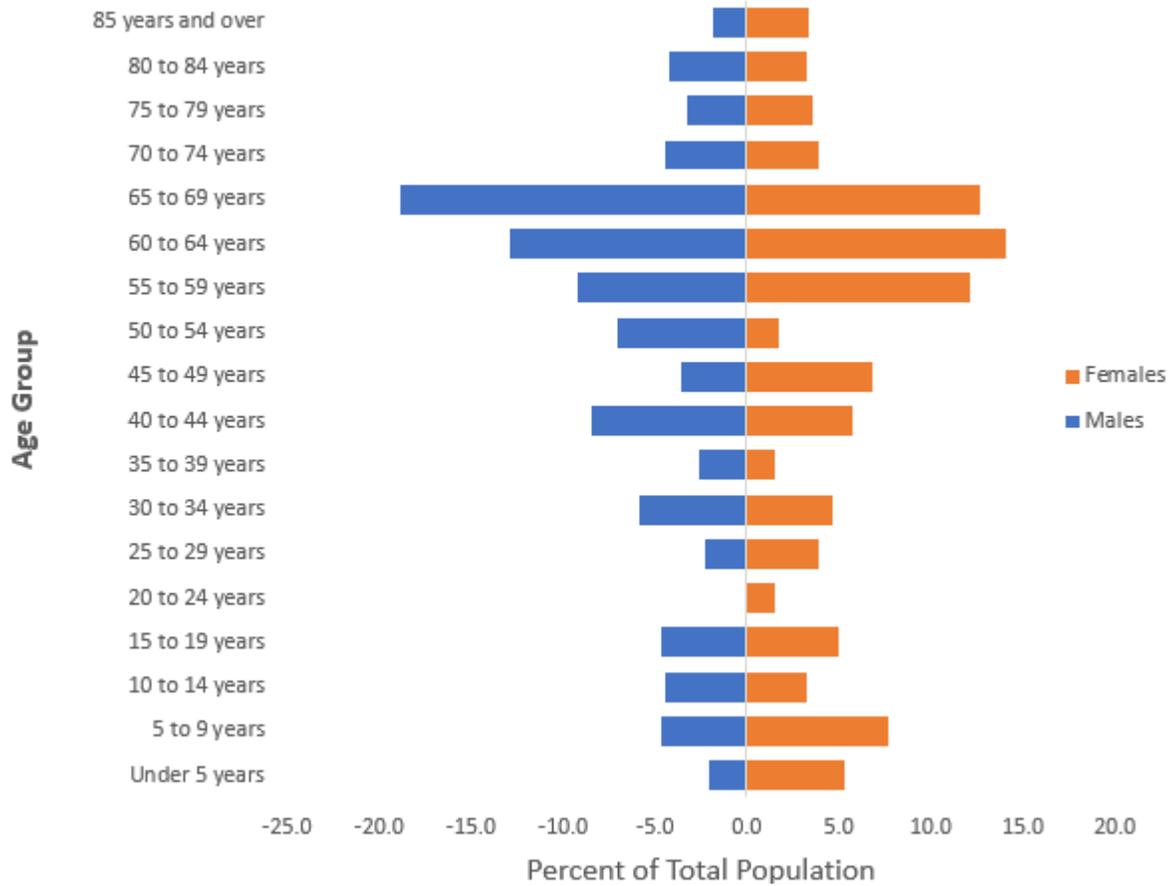
HIAWATHA TOWNSHIP: T41N, 42N, 43N, 45N, 46N & 47N - R16W; T45N - R17W; T45N - R18W

Office Location	1595N M-94 Manistique, MI 49854
Mailing Address	P.O. Box 503 Manistique, MI 49854
Phone	906.341.6897
Total Area	290.74 square miles (278.46 land) 186,073.6 acres (178,214.4 land)
Population (2019*)	1,305
Housing Units (2019*)	972 (385 for seasonal, recreational or occasional use)
Total Households (2019*)	576
Average Household Size (2019*)	2.19 persons
Primary Fire Department	Hiawatha Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 70,709,100

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Hiawatha Township extends from near the southern end of Indian Lake north to Alger County, a distance of some 36 miles. It is 18 miles across at its widest point extending east to Delta County. Nearly 70 percent of the land area is owned and managed by the state or federal governments. These public owned lands are included in the Seney National Wildlife Refuge, the Hiawatha National Forest, and the Lake Superior State Forest as well as other state agencies. Two closed landfills are located within the township. A Type III landfill that was used exclusively by Manistique Papers (now UP Paper), and a county landfill that was closed by state order in 1992.

Hiawatha Township Population by Age and Sex (2019 est.)



2019 Median Age: 56.7
2010 Median Age: 53.1
2000 Median Age: 45.2

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

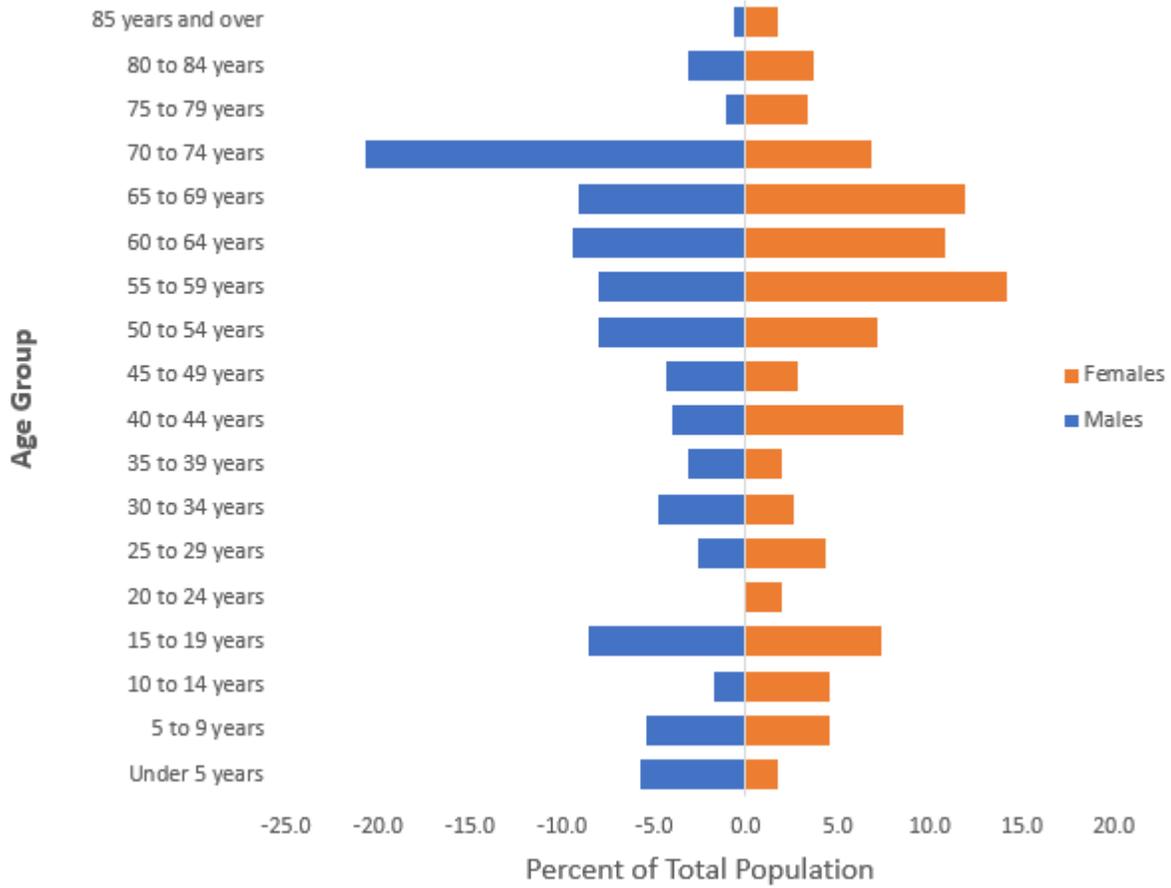
INWOOD TOWNSHIP: T41N, 42N, 43N, & 44N - R17W; T44N - R18W

Office Location	11680W Depot Street Cooks, MI 49817
Mailing Address	(send to supervisor or clerk)
Phone	906.644.2687
Total Area	126.54 square miles (120.3 land) 80,985.6 acres (76,992.0 land)
Population (2019*)	704
Housing Units (2019*)	646 (327 for seasonal, recreational or occasional use)
Total Households (2019*)	299
Average Household Size (2019*)	2.35 persons
Primary Fire Department	Inwood Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Big Bay de Noc School District
State Equalized Valuation (residential, 2021)	\$ 40,378,000

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Inwood Township borders Delta County on the west. It covers 9 miles at its widest point and 24 miles between its northern and southern boundaries. Ownership by the Hiawatha National Forest and state of Michigan account for approximately 75 percent of the land area. Commercial development is centered in and around the community of Cooks, about a mile north of highway US-2. Residential development is concentrated in southern parts of the township where most of the private land is found.

Inwood Township Population by Age and Sex (2019 est.)



2019 Median Age: 55.5
2010 Median Age: 51.1
2000 Median Age: 44.0

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.
 Schoolcraft County Hazard Mitigation Plan | APPENDIX A

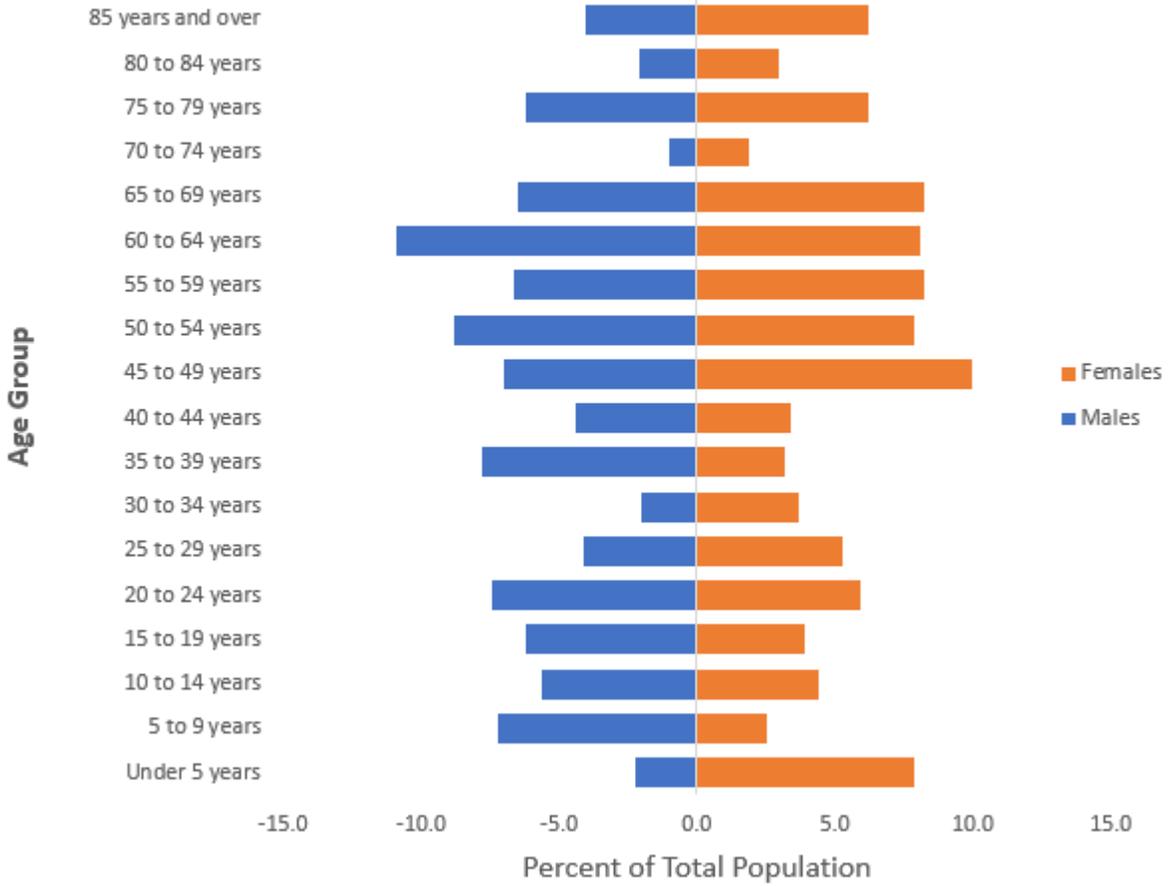
CITY OF MANISTIQUE: T41N - R15W & 16W

Office Location	City Hall 300 North Maple Manistique, MI 49854
Mailing Address	Same as above
Phone	906.341.2290
Total Area	3.5 square miles (3.19 land) 2,240 acres (2,041.6 land)
Population (2019*)	2,919
Housing Units (2019*)	1,546 (242 for seasonal, recreational or occasional use)
Total Households (2019*)	1,277
Average Household Size (2019*)	2.20 persons
Primary Fire Department	Manistique Public Safety Dept.
Primary Police Department	Manistique Public Safety Dept.
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 32,241,800

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Manistique (city) is the county seat, service, employment and population center. The Manistique River flows through the city and empties to Lake Michigan. Extensive logging operations began in the 1870s, mainly to harvest the bountiful stands of white pine. Operators used the river to float logs to downstream mills and port facilities. For all practical purposes, the logging boom was over by 1912 as there was little left to cut. The river was harnessed for power generation with a paper mill built in 1914.

City of Manistique Population by Age and Sex (2019 est.)



2019 Median Age: 49.2
2010 Median Age: 43.0
2000 Median Age: 38.0

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.
 Schoolcraft County Hazard Mitigation Plan | APPENDIX A

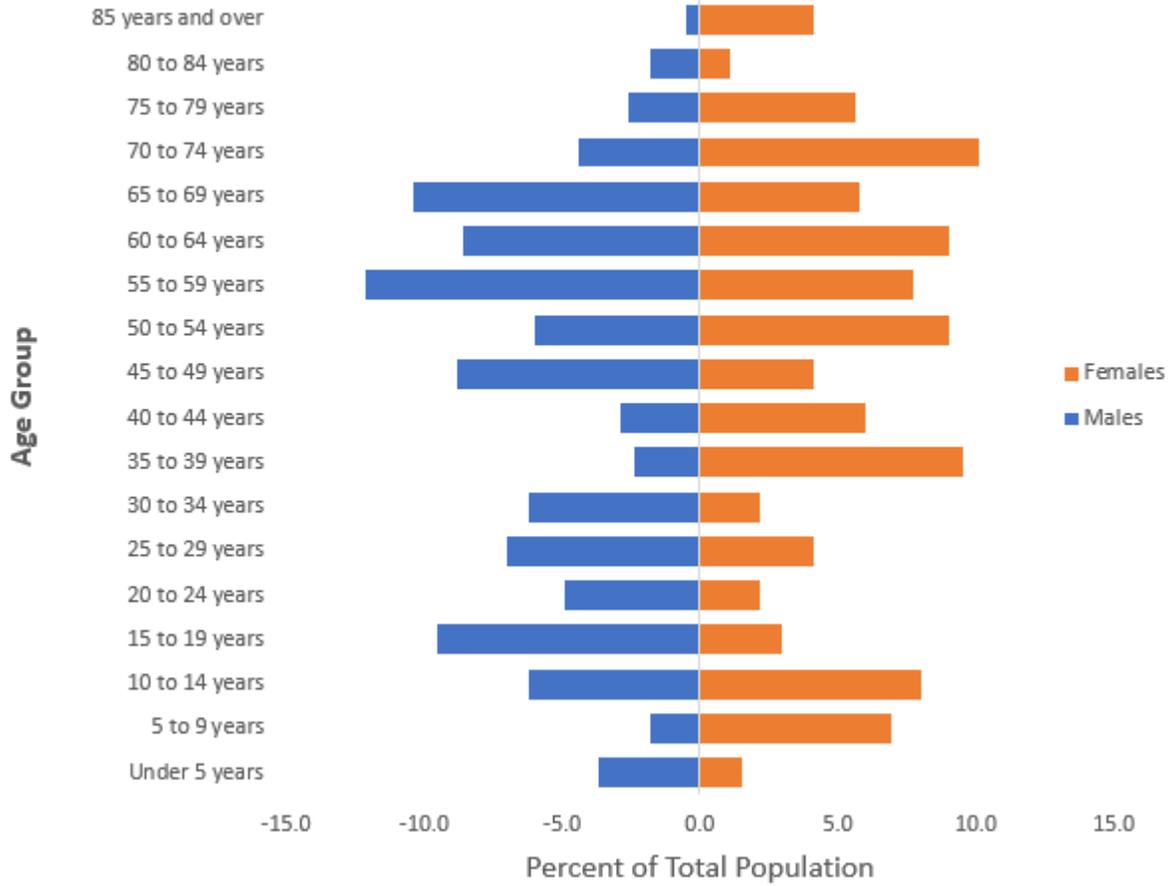
MANISTIQUE TOWNSHIP: T41N, 42N, 43N, 44N, & 45N - R15W

Office Location	Township Hall 616N River Road Manistique, MI 49854
Mailing Address	(send to supervisor or clerk)
Phone	906.341.2238
Total Area	153.65 square miles (150.28 land) 98,336.0 acres (96,179.2 land)
Population (2019*)	1,081
Housing Units (2019*)	633 (168 for seasonal, recreational or occasional use)
Total Households (2019*)	426
Average Household Size (2019*)	2.54 persons
Primary Fire Department	Manistique Public Safety Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (2021)	\$ 40,516,400

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Manistique Township extends northward in a six mile-wide band from Lake Michigan for about 26 miles. More than 60 percent of the land area is publicly-owned. Most private land is within 5 miles of the Lake Michigan shoreline. Many tourist-related businesses are found along highway US-2 including a casino. The Schoolcraft County Airport is on the north side of highway US-2.

Manistique Township Population by Age and Sex (2019 est.)



2019 Median Age: 49.7
2010 Median Age: 46.9
2000 Median Age: 39.0

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

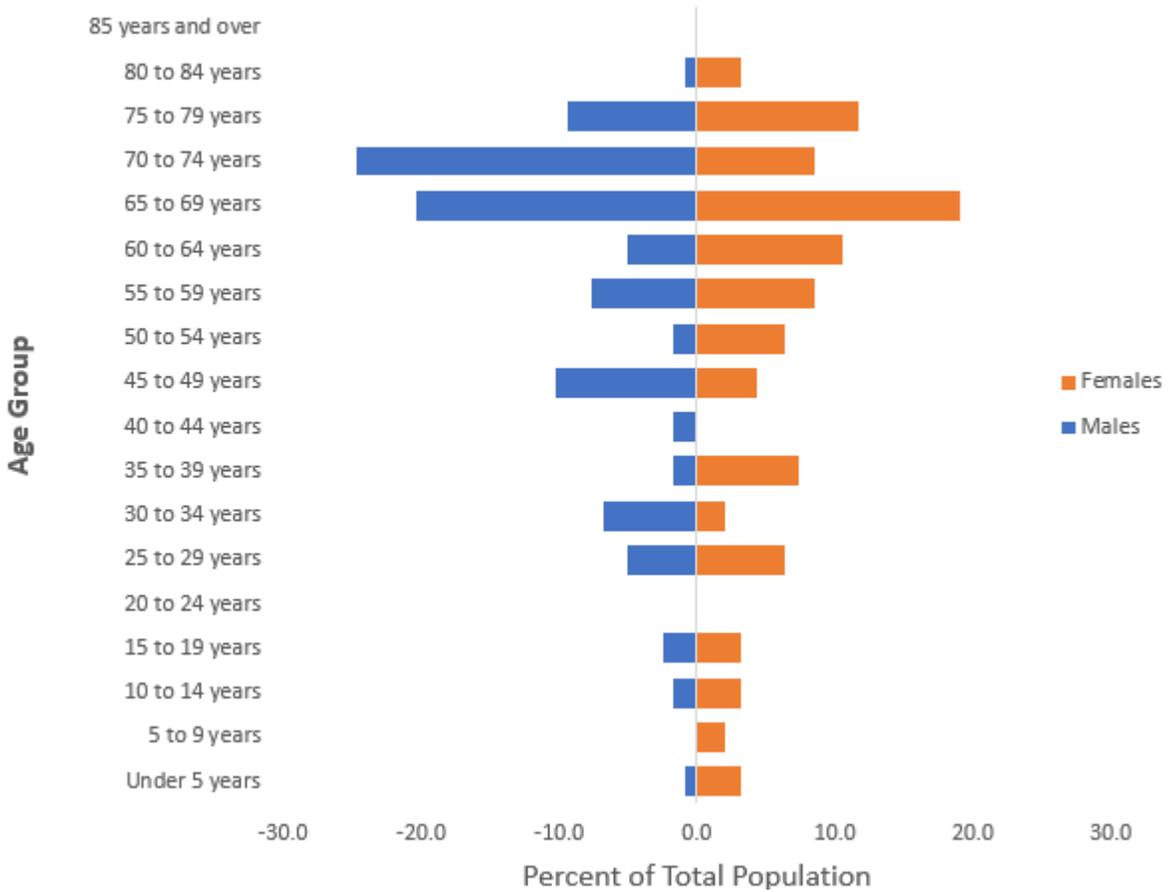
MUELLER TOWNSHIP: T41N & 42N - R13W

Office Location	184 Inland Quarry Road Gulliver, MI 49840
Mailing Address	(send to supervisor or clerk)
Phone	906.283.3238
Total Area	87.97 square miles (83.89 land) 56,300.8 acres (53,689.6 land)
Population (2019*)	212
Housing Units (2019*)	316 (198 for seasonal, recreational or occasional use)
Total Households (2019*)	99
Average Household Size (2019*)	2.14 persons
Primary Fire Department	Mueller Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 29,074,550

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Mueller Township is in the southeastern corner of Schoolcraft County. From its southernmost point at Seul Choix Point, it extends more than 16 miles to Germfask Township. It stretches 6 miles at its widest point. About 5 percent of the land area is in public ownership with extensive corporate holdings. Most commercial development is found along US-2 and Blaney Park on M-77. Active limestone and dolomite mining, crushing and shipping operations are centered at Port Inland. Residential development is heaviest along the shorelines of inland lakes and Lake Michigan.

Mueller Township Population by Age and Sex (2019 est.)



2019 Median Age: 64.5
2010 Median Age: 58.2
2000 Median Age: 51.4

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

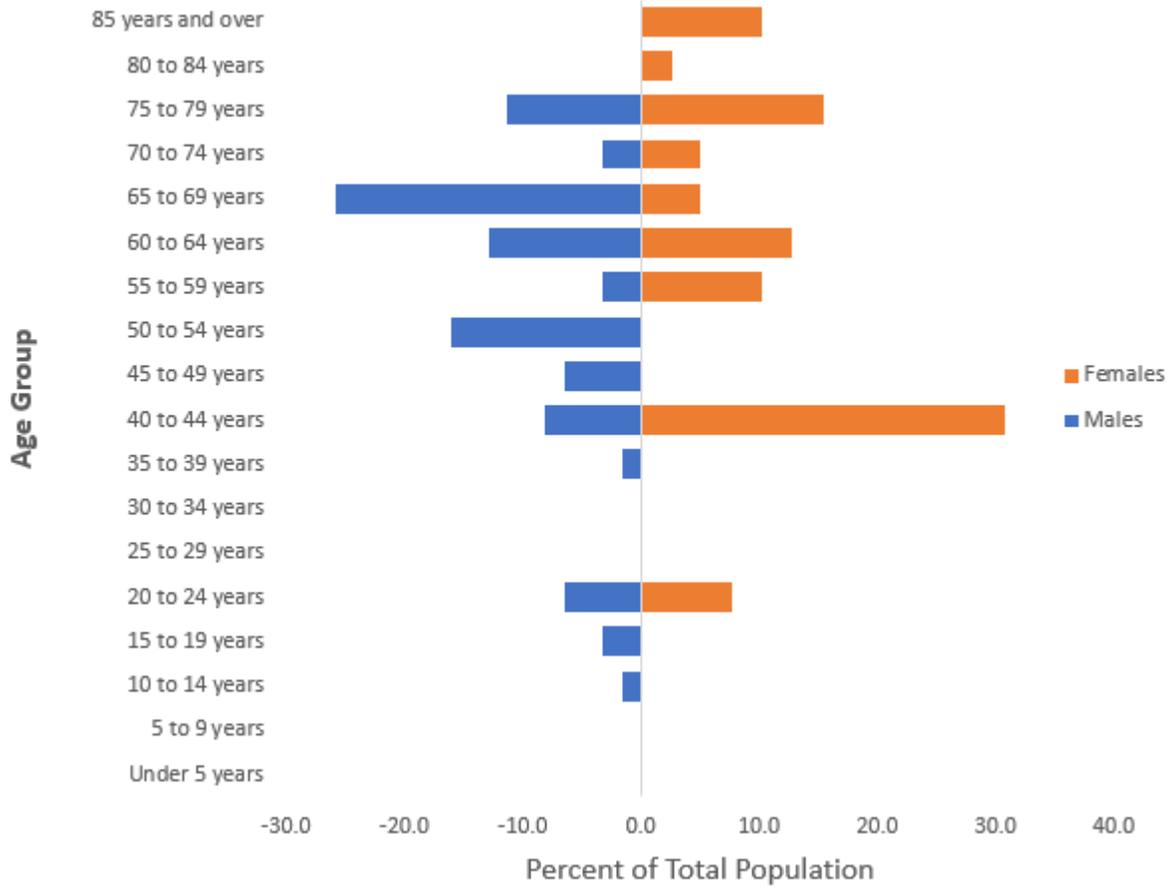
SENEY TOWNSHIP: T46N - R13W, 14W & 15W; T47N - R13W, 14W & 15W

Office Location	Township Hall 1476W Railroad Street Seney, MI 49883
Mailing Address	P.O. Box 116 Seney, MI 49883
Phone	906.499.3304
Total Area	215.63 square miles (213.91 land) 138,003.2 acres (136,902.4 land)
Population (2019*)	101
Housing Units (2019*)	232 (184 for seasonal, recreational or occasional use)
Total Households (2019*)	37
Average Household Size (2019*)	2.08 persons
Primary Fire Department	Seney Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Tahquamenon Area Schools (Newberry)
State Equalized Valuation (residential, 2021)	\$ 15,992,600

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Seney Township occupies the northeast corner of the county and shares borders with both Alger and Luce counties. Highway M-28 runs along the southern township boundary for its entire 24-mile width. Highway M-77 intersects with M-28 in the community of Seney. Over 60 percent of the land area is publicly-owned.

Seney Township Population by Age and Sex (2019 est.)



2019 Median Age: 60.3
2010 Median Age: 58.1
2000 Median Age: 46.0

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

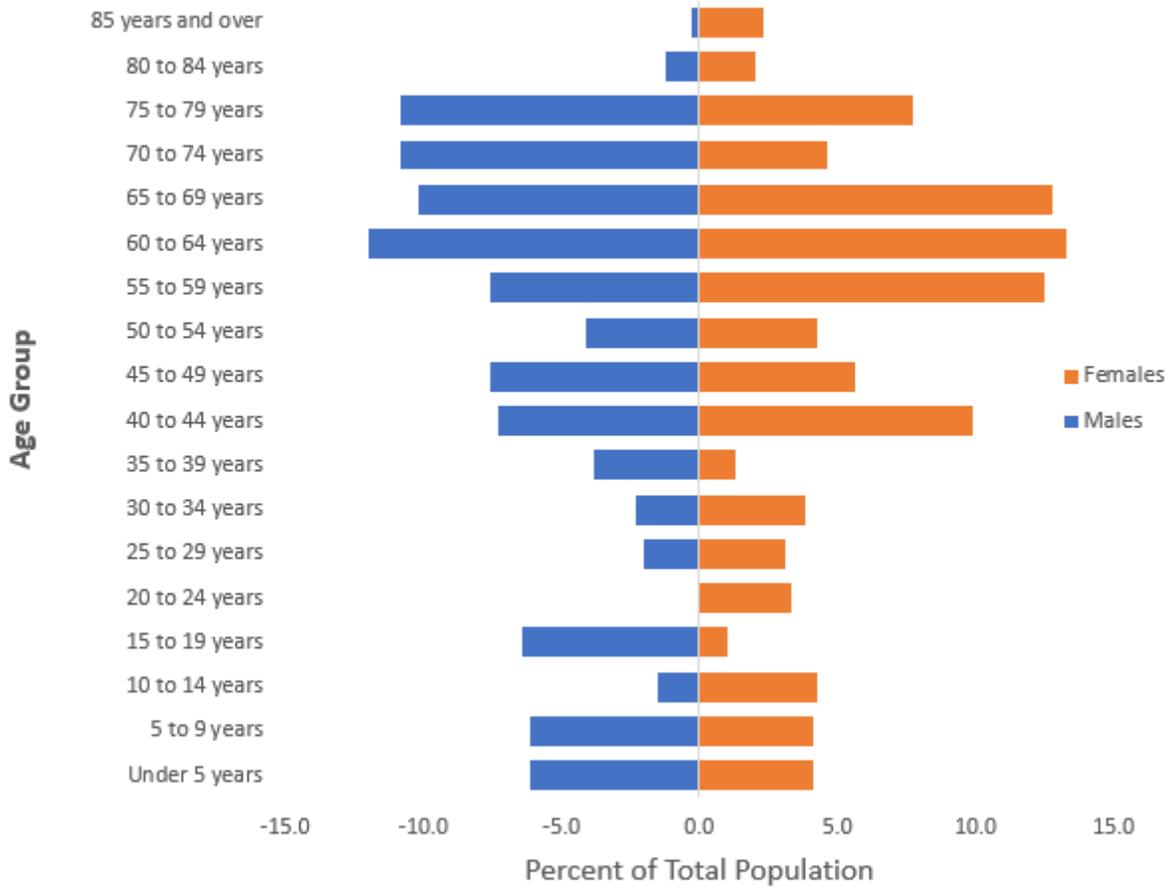
THOMPSON TOWNSHIP: T39N, 40N, 42N, 43N, & 44N -R17W; T40N, 41N, & 42N - R 16W

Office location	8906 W. Pine Street Thompson, MI 49854
Mailing address	P.O. Box 174 Manistique, MI 49854
Phone	906.341.2441
Total Area	118.37 square miles (112.95 land) 75,756.8 acres (72,288.0 land)
Population (2019*)	735
Housing Units (2019*)	697 (336 for seasonal, recreational or occasional use)
Total Households (2019*)	326
Average Household Size (2019*)	2.25 persons
Primary Fire Department	Thompson Township Volunteer Fire Department
Primary Police Department	Schoolcraft County Sheriff
School District(s)	Manistique Area Schools
State Equalized Valuation (residential, 2021)	\$ 66,527,900

Source: U.S. Census Bureau and Michigan Department of Treasury, 2021 *2019 ACS survey estimates

Thompson Township extends northward from Lake Michigan a distance of some 32 miles. Distance across the township ranges from three to 7 miles. The southern and western shorelines of Indian Lake are within the township and about 45 percent of the land area is publicly-owned. Residential development is concentrated in the southern half the township while commercial establishments are found mostly along highway US-2.

Thompson Township Population by Age and Sex (2019 est.)



2019 Median Age: 57.0
2010 Median Age: 49.8
2000 Median Age: 46.0

Source: U.S. Census Bureau. Compiled by CUPPAD Regional Commission, 2021.

APPENDIX B

Historic Sites - Schoolcraft County

Historic Sites, Schoolcraft County		
Name	Location	Historic Significance
Bishop Baraga's First Mission Church	Leduc Road, Hiawatha township at Arrowhead Inn Point	Frederic Baraga established his first church here on May 15, 1832. Baraga was a young Catholic missionary whose influence extended to much of the Great Lakes area. He attained Bishop status in 1853. A marker was erected at this site in 1958.
Blaney Inn	M-77, Mueller township	Blaney Park was developed as a resort at a former logging site early in the twentieth century. The Blaney Inn is noted for its architectural design. It was registered as a state historic site in 1987.
Old Manistique Water Tower	Deer Street, Manistique	Constructed in 1922 as part of a new waterworks system, this structure is noted for both design and utility. It is 200 feet tall, 25 feet in diameter and features a 200 gallon steel tank. In March 1980 it was designated as a state historical site and October 1981 was listed on the National Register.
Seul Choix Pointe Lighthouse	Gulliver vicinity, Mueller township	The light was activated in 1892 before the structure's completion date in 1895. The conical tower is 78'9" in height. Construction at this site was chosen due to lessen the navigational hazards of Seul Choix Pointe. It was added to the National Register in July 1984 and to the State Register in August 1987.
White Marble Lime Company Kilns	Duck Inn Road, Manistique township	Dolomite was fired in these kilns to produce quicklime for use as a building material and for the paper industry. These twin kilns built circa 1889 and were used until the early 1930s. State historic designation was given in November 1964. A marker was erected October 1968.

APPENDIX C

Hazard Risk Analysis

HAZARD RISK ANALYSIS

Hazards of all types were evaluated based primarily on the probability of an occurrence and severity of impact. Local residents from business and industry, police and fire agencies, emergency services, education, public health, medical services, transportation, planning and zoning, and local elected officials participated in a series of reviews and discussions. Hazards were ranked according to aspects and values determined by local evaluators. In all, some two dozen residents participated directly in the process.

Generally, hazards of all types were evaluated according to **probability of future occurrence**, **impact** (overall effect on community), and **extent** (magnitude of impact). Specifically, five measures, each with a weighted value, were used in the hazard risk assessment rating and are as follows:

1.	Likelihood of Occurrence	-	30%
2.	Casualty Potential	-	30%
3.	Percent of Population Affected	-	25%
4.	Economic Effect	-	10%
5.	Corollary Effects	-	5%

The likelihood of a particular hazard occurring is based on Schoolcraft County incidents to the extent that such information is available. Regional, state, and national data were used throughout. Injury and death potential was considered based on available county information and also state and national sources. The impacted population was rated based known and potential incident locations in relation to current census data. Direct and indirect impacts were considered. Economic and corollary effects were determined by known conditions, and also anticipated future conditions.

The sum of rating points from each of the five hazard aspects reflects an order of importance as a threat within the county. While this ranking is useful for planning purposes and is based on the most current information available and many hours of deliberation, it should not be assumed that lower ranked hazards will not occur. Most hazard events are extremely difficult to predict.

Rankings were updated in 2013 through quantitative analysis and LEPC discussions reflect current community concerns and incidents since approval of the original plan. The hazard rankings were updated again during LEPC meetings using the same method of analysis.

County hazard ranking and ratings are shown in the following tables.

**Table 3-1
Schoolcraft County Hazard Rankings**

Hazard	Rating Score	2007 Ranking	2013 Ranking	2021 Ranking	Risk
Snowstorms	7.05	3	3	1	High
Ice & Sleet	7.95	2	2	2	
Structural Fires	6.95	4	4	3	
Severe Wind	6.95	4	4	4	
Wildfires	5.35	10	7	5	
Transportation Accidents	6.70	6	5	6	
Hazardous Materials – Transportation	8.00	1	1	7	
Infrastructure Failures	5.20	13	9	8	
Public Health Emergencies	5.30	11	8	9	
Lightning & Thunderstorms	6.00	7	6	10	Moderate
Cyber Security	N/A	N/A	N/A	11	
Economic Recession/Adversity	5.90	8	14	12	
Temperature Extremes	5.80	9	15	13	
Dam Failures	3.15	25	9	13	
Pipeline Failures	3.30	22	11	15	
Great Lakes Flooding	3.90	19	20	16	
Active Shooter	N/A	N/A	N/A	16	
School Violence	2.75	26	12	18	
Mass Casualties	N/A	N/A	N/A	19	
Riverine Flooding	5.25	12	10	20	
Workplace Violence	1.10	30	13	20	
Hazardous Materials – Fixed Site	3.45	21	22	22	
Hail	3.25	23	23	22	
Environmental (invasives, diseases, etc.)	5.10	14	16	24	Low
Urban Flooding	4.50	16	10	25	
Tornadoes	4.65	15	17	26	
Drought	4.50	16	18	27	
Civil Disturbance	3.25	23	23	28	
Public Assembly Events	2.55	27	24	29	
Scrap Tire Fires	1.00	31	27	30	
Terrorism, Sabotage, WMD	4.15	18	19	31	
Subsidence	2.00	28	25	32	
Bioterrorism	3.50	20	21	33	
Earthquakes	1.40	29	26	34	
Nuclear Power Accidents	1.00	31	27	35	

TABLE 2 2013 HAZARD RISK ASSESSMENT – SCHOOLCRAFT COUNTY

Hazard	Identified in State HMP?	Declared Disaster?	Identified in County HMP?	Occurred Since Original HMP Approval?	Ranking
1 – Wildfires	Y	Y (State)	Y	Y	
2 - Riverine Flooding	Y	N	Y		
3 - Great Lakes Flooding	Y	N	Y		
4 - Urban Flooding	Y	N	Y		
5 – Tornadoes	Y	N	Y		
6 - Severe Wind	Y	Y (State, Presidential)	Y		
7 - Lightning & Thunderstorms	Y	N	Y		
8 – Hail	Y	N	Y		
9 – Snowstorms	Y	N	Y		
10- Ice & Sleet Storms	Y	N	Y		
11- Temperature Extremes	Y	Y (State)	Y		
12- Drought	Y	N	Y		
13- Earthquakes	Y	N	Y		
14- Other Environmental (invasive exotics, diseases, etc.)	Y	N	Y		
15- Infrastructure Failures	Y	N	Y		
16- Structural Fires	Y	N	Y		

TABLE 2 2013 HAZARD RISK ASSESSMENT – SCHOOLCRAFT COUNTY					
	Y	N	Y		
17- Dam Failures					
18- Nuclear Power Plant Accidents	Y	N	Y		
19- Subsidence	Y	N	Y		
20- Scrap Tire Fires	Y	N	Y		
21- Hazardous Materials Accident - Fixed Site	Y	N	Y		
22- Hazardous Materials Accident - Transportation	Y	N	Y		
23- Petroleum Pipeline Failures	Y	N	Y		
24- Civil Disturbance	Y	N	Y		
25- Terrorism, Sabotage, WMD	Y	N	Y		
26- Bioterrorism	Y	N	Y		
27- Public Assembly Events		N	Y		
28- School Violence	Y	N	Y		
29- Workplace Violence	Y	N	Y		
30- Public Health Emergencies	Y	N	Y		
31- Economic	N	N	Y		

TABLE 2 2013 HAZARD RISK ASSESSMENT – SCHOOLCRAFT COUNTY					
Recession/Adversity					
32- Transportation Accidents	Y	N	Y		

TABLE 3 2013 RATING TABLE – SCHOOLCRAFT COUNTY							
Indicate likelihood from 1-10 with 10 representing the greatest potential							
Hazard	Likelihood of Occurrence	Casualty Potential	Percent of Population Affected	Economic Effect	Corollary Effects	Total Rating	RANK
1 – Wildfires	9	3	4	5	5	5.35	10
2 - Riverine Flooding	8	1	6	7	7	5.25	12
3 - Great Lakes Flooding	4	1	6	5	8	3.90	19
4 - Urban Flooding	8	1	6	2	2	4.50	16*
5 – Tornadoes	6	4	4	4	5	4.65	15
6 - Severe Wind	8	6	8	5	5	6.95	4*
7 - Lightning & Thunderstorms	10	2	7	4	5	6.00	7
8 – Hail	6	1	2	4	5	3.25	23
9 – Snowstorms	10	3	10	5	3	7.05	3
10- Ice & Sleet Storms	10	5	10	7	5	7.95	2
11- Temperature Extremes	5	2	10	9	6	5.80	9
12- Drought	3	1	9	7	7	4.50	16*
13- Earthquakes	1	1	2	2	2	1.40	29

TABLE 3 2013 RATING TABLE – SCHOOLCRAFT COUNTY Indicate likelihood from 1-10 with 10 representing the greatest potential								
14- Other Environmental (invasive exotics, diseases, etc.)	10	1	3	7	7		5.10	14
15- Infrastructure Failures	5	2	7	9	9		5.20	13
16- Structural Fires	9	5	5	10	10		6.95	4*
17- Dam Failures	4	2	3	4	4		3.15	25
18- Nuclear Power Plant Accidents	1	1	1	1	1		1.00	31*
19- Subsidence	2	2	2	2	2		2.00	28
20- Scrap Tire Fires	1	1	1	1	1		1.00	31*
21- Hazardous Materials Accident - Fixed Site	4	3	3	4	4		3.45	21
22- Hazardous Materials Accident - Transportation	8	8	8	8	8		8.0	1
23- Petroleum Pipeline Failures	3	2	5	4	3		3.3	22
24- Civil Disturbance	4	2	4	3	3		3.25	23*
25- Terrorism, Sabotage, WMD	4	4	4	5	5		4.15	18
26- Bioterrorism	1	6	3	2	2		3.50	20
27- Public Assembly Events	1	4	3	2	2		2.55	27
28- School Violence	2	2	4	2	7		2.75	26
29- Workplace Violence	1	1	1	1	3		1.1	30
30- Public Health Emergencies	4	6	6	5	6		5.30	11

TABLE 3 2013 RATING TABLE – SCHOOLCRAFT COUNTY Indicate likelihood from 1-10 with 10 representing the greatest potential								
31- Economic Recession/Adversity	5	3	8	10	10		5.9	8
32- Transportation Accidents	9	9	4	2	2		6.7	6

* indicates another hazard with identical rating

	Location or County	Date	Magnitude	Death	Injury	Property Damage	Crop Damage
1	Schoolcraft	05/30/1987	0.75 in	0	0	0	0
2	Schoolcraft	08/16/1988	1.75 in	0	0	0	0
3	Schoolcraft	08/27/1990	2.75 in	0	0	0	0
4	Kenton	10/19/1995	0.75 in	0	0	0	0
5	Germfask	10/19/1995	1.00 in	0	0	0	0
6	Stueben	07/02/1997	0.75 in	0	0	0	0
7	Cooks	10/05/1997	1.00 in	0	0	100K	0
8	Creighton	05/29/1999	1.00 in	0	0	0	0
9	Thompson	07/13/2000	.88 in	0	0	0	0
10	Cooks	07/13/2000	1.00 in	0	0	0	0
11	Stueben	05/10/2001	2.00 in	0	0	0	0
12	Stueben	06/16/2001	0.75 in	0	0	0	0
13	Cooks	06/19/2001	0.75 in	0	0	0	0
14	Creighton	06/27/2001	0.75 in	0	0	0	0
15	Stueben	06/27/2001	1.00 in	0	0	0	0
16	Germfask	06/25/2002	0.75 in	0	0	0	0
17	Seney	07/02/2002	0.75 in	0	0	0	0
18	Stueben	07/04/2003	0.75 in	0	0	0	0
19	Seney	06/08/2004	0.75 in	0	0	0	0
20	Manistique	07/19/2004	1.75 in	0	0	0	0
21	Steuben	08/02/2004	0.88 in	0	0	0	0
22	Cooks	07/03/2006	0.75 in	0	0	0	0
23	Thompson	07/28/2006	1.00 in	0	0	0	0
24	Cooks	07/28/2006	0.75 in	0	0	0	0
25	Cooks	07/28/2006	0.75 in	0	0	0	0
26	Manistique	07/28/2006	0.75 in	0	0	0	0
27	Gulliver	07/08/2007	0.88 in	0	0	0	0
28	Gulliver	07/08/2007	1.00 in	0	0	0	0
29	Gulliver	05/17/2008	1.00 in	0	0	0	0
30	Cooks	06/15/2008	0.75 in	0	0	0	0
31	Hiawatha	05/07/2009	0.75 in	0	0	0	0
32	Germfask	06/09/2010	0.75 in	0	0	0	0
33	Hiawatha	08/20/2010	1.00 in	0	0	0	0
34	Germfask	08/20/2010	1.75 in	0	0	0	0
35	Hiawatha	09/12/2010	1.00 in	0	0	0	0
36	Seul Choix	06/18/2012	1.50 in	0	0	0	0
37	Thompson	07/18/2013	0.88 in	0	0	0	0
38	Germfask	09/02/2014	1.75 in	0	0	0	0
39	Seul Choix	08/02/2015	0.75 in	0	0	0	0
40	Indian Lake	07/08/2016	1.00 in	0	0	0	0
41	Ossawinamakee Beach	07/08/2016	0.75 in	0	0	0	0
42	Manistique	08/26/2020	0.88 in	0	0	0	0
Total				0	0	100K	0

	Location or County	Date	Magnitude	Death	Injury	Property Damage	Crop Damage
1	Schoolcraft	07/11/1975	F0	0	0	0	0
2	Schoolcraft	07/14/1984	F2	0	1	25K	0
3	Schoolcraft	07/11/1987	F3	0	0	25K	0
4	Indian Lake	08/06/2018	Funnel cloud	0	0	0	0
Total				0	1	50K	0

	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
1	Schoolcraft and other counties	01/12/1993	Heavy snow	0	0	50K	0
2	Schoolcraft and other counties	02/22/1993	Lake effect snow	0	0	0	0
3	Southern	03/10/1993	Heavy snow	0	0	0	0
4	Schoolcraft and other counties	03/23/1993	Freezing rain	0	0	0	0
5	Upper Michigan	11/04/1993	Heavy snow	0	0	0	0
6	Northwest and Upper Michigan	11/19/1993	Heavy snow	0	0	0	0
7	Upper Michigan	12/20/1993	Heavy snow	0	0	0	0
8	Upper Michigan	12/25/1993	Heavy snow	0	0	0	0
9	Upper Michigan	12/29/1993	Heavy snow	0	0	0	0
10	Upper Michigan	01/27/1994	Heavy snow/freezing rain	0	0	5.0M	0
11	Eastern Upper Michigan	03/20/1994	Freezing rain	0	0	0	0
12	Schoolcraft and other counties	03/04/1995	Heavy snow	0	0	0	0
13	Schoolcraft and other counties	03/06/1995	Heavy snow	0	0	0	0
14	Upper Michigan	12/13/1995	Heavy snow	0	0	0	0
15	Schoolcraft and other counties	01/18/1996	Winter storm	0	0	0	0
16	Schoolcraft and other counties	01/26/1996	Heavy snow	0	0	0	0
17	Schoolcraft and other counties	04/12/1996	Winter snow	0	0	0	0
18	Schoolcraft and other counties	03/13/1997	Winter storm	0	0	0	0

Table 3 123 Snow and Ice Events in Schoolcraft County 1950 – 2020 (NCEI) (Some dates include multiple events)							
	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
19	Schoolcraft and other counties	01/04/1998	Ice storm	0	0	0	0
20	Schoolcraft and other counties	12/29/1998	Heavy snow	0	0	0	0
21	Schoolcraft and other counties	01/02/1999	Winter snow	0	0	0	0
22	Schoolcraft and other counties	01/09/1999	Heavy snow	0	0	0	0
23	Schoolcraft and other counties	01/23/1999	Ice storm	0	0	0	0
24	Schoolcraft and other counties	11/28/1999	Heavy snow	0	0	0	0
25	Schoolcraft and other counties	01/02/2000	Heavy snow	0	0	0	0
26	Schoolcraft and other counties	02/15/2000	Winter storm	0	0	0	0
27	Schoolcraft and other counties	12/20/2000	Heavy snow	0	0	0	0
28	Schoolcraft and other counties	01/01/2002	Heavy snow	0	0	0	0
29	Schoolcraft and other counties	02/02/2002	Heavy snow	0	0	0	0
30	Schoolcraft and other counties	03/03/2002	Winter storm	0	0	0	0
31	Schoolcraft and other counties	03/08/2002	Winter storm	0	0	0	0
32	Schoolcraft and other counties	03/09/2002	Winter storm	0	0	0	0
33	Schoolcraft and other counties	03/09/2002	Ice storm	0	0	0	0
34	Schoolcraft and other counties	03/10/2002	Blizzard	0	0	0	0
35	Schoolcraft and other counties	12/18/2002	Ice storm	0	0	0	0
36	Schoolcraft and other counties	01/10/2003	Heavy snow	0	0	0	0
37	Schoolcraft and other counties	01/14/2003	Heavy snow	0	0	0	0
38	Schoolcraft and other counties	01/27/2003	Heavy snow	0	0	0	0
39	Schoolcraft and other counties	02/03/2003	Heavy snow	0	0	0	0
40	Schoolcraft and other counties	3/03/2003	Winter storm	0	0	0	0
41	Schoolcraft and other counties	04/05/2003	Heavy snow	0	0	0	0

Table 3
123 Snow and Ice Events in Schoolcraft County 1950 – 2020 (NCEI)
 (Some dates include multiple events)

	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
42	Northern Schoolcraft	11/13/2003	Blizzard	0	0	0	0
43	Schoolcraft and other counties	12/11/2003	Heavy snow	0	0	0	0
44	Schoolcraft and other counties	01/07/2004	Winter storm	0	0	0	0
45	Northern Schoolcraft	01/22/2004	Winter storm	0	0	0	0
46	Schoolcraft and other counties	03/05/2004	Heavy snow	0	0	0	0
47	Schoolcraft and other counties	03/14/2004	Heavy snow	0	0	0	0
48	Schoolcraft and other counties	12/20/2004	Winter storm	0	0	0	0
49	Southern Schoolcraft	12/25/2004	Heavy snow	0	0	0	0
50	Northern Schoolcraft	01/02/2005	Sleet	0	0	0	0
51	Southern Schoolcraft	01/02/2005	Ice Storm	0	0	0	0
52	Southern Schoolcraft	01/18/2005	Winter storm	0	0	0	0
53	Southern Schoolcraft	01/21/2005	Heavy snow	0	0	0	0
54	Northern Schoolcraft	11/23/2005	Blizzard	0	0	0	0
55	Southern Schoolcraft	11/24/2005	Winter storm	0	0	0	0
56	Southern Schoolcraft	12/14/2005	Winter storm	0	0	0	0
57	Northern Schoolcraft	01/24/2006	Winter storm	0	0	0	0
58	Schoolcraft and other counties	02/16/2006	Winter storm	0	0	0	0
59	Southern Schoolcraft	02/24/2006	Heavy snow	0	0	0	0
60	Northern Schoolcraft	03/13/2006	Winter Storm	0	0	0	0
61	Southern Schoolcraft	11/10/2006	Heavy snow	0	0	0	0
62	Northern Schoolcraft	12/06/2006	Winter storm	0	0	0	0
63	Southern Schoolcraft	02/25/2007	Winter storm	0	0	0	0
64	Schoolcraft and other counties	03/01/2007	Winter storm	0	0	0	0
65	Schoolcraft and other counties	04/04/2007	Winter storm	0	0	0	0
66	Schoolcraft and other counties	12/01/2007	Winter storm	0	0	0	0
67	Schoolcraft and other counties	01/17/2008	Heavy snow	0	0	0	0
68	Schoolcraft and other counties	01/30/2008	Winter storm	0	0	0	0
69	Southern Schoolcraft	02/14/2008	Heavy snow	0	0	0	0
70	Schoolcraft and other counties	02/17/2008	Winter storm	0	0	0	0
71	Schoolcraft and other counties	03/31/2008	Winter storm	0	0	0	0
72	Schoolcraft and other counties	04/01/2008	Winter storm	0	0	0	0
73	Northern Schoolcraft	04/11/2008	Winter storm	0	0	0	0

Table 3
123 Snow and Ice Events in Schoolcraft County 1950 – 2020 (NCEI)
(Some dates include multiple events)

	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
74	Northern Schoolcraft	12/06/2008	Blizzard	0	0	0	0
75	Schoolcraft and other counties	12/06/2008	Winter storm	0	0	0	0
76	Southern Schoolcraft	01/17/2009	Winter storm	0	0	0	0
77	Schoolcraft and other counties	02/17/2009	Winter storm	0	0	0	0
78	Schoolcraft and other counties	02/26/2009	Winter storm	0	0	0	0
79	Northern Schoolcraft	12/08/2009	Winter storm	0	0	0	0
80	Southern Schoolcraft	12/09/2009	Winter storm	0	0	0	0
81	Southern Schoolcraft	12/11/2010	Winter storm	0	0	0	0
82	Northern Schoolcraft	01/14/2011	Winter storm	0	0	0	0
83	Schoolcraft and other counties	01/01/2012	Winter storm	0	0	0	0
84	Schoolcraft and other counties	02/29/2012	Winter storm	0	0	0	0
85	Schoolcraft and other counties	03/02/2012	Winter storm	0	0	0	0
86	Northern Schoolcraft	11/23/2012	Winter storm	0	0	0	0
87	Schoolcraft and other counties	12/20/2012	Winter storm	0	0	0	0
88	Schoolcraft and other counties	01/30/2013	Winter storm	0	0	0	0
89	Northern Schoolcraft	02/18/2013	Winter storm	0	0	0	0
90	Southern Schoolcraft	02/19/2013	Winter storm	0	0	0	0
91	Northern Schoolcraft	03/18/2013	Winter storm	0	0	0	0
92	Schoolcraft and other counties	04/11/2013	Winter storm	0	0	0	0
93	Northern Schoolcraft	01/03/2014	Winter storm	0	0	0	0
94	Northern Schoolcraft	01/30/2014	Winter storm	0	0	0	0
95	Northern Schoolcraft	04/04/2014	Winter storm	0	0	0	0
96	Schoolcraft and other counties	12/28/2015	Winter storm	0	0	0	0
97	Southern Schoolcraft	01/10/2017	Winter storm	0	0	0	0
98	Southern Schoolcraft	01/14/2018	Winter storm	0	0	0	0
99	Schoolcraft and other counties	01/22/2018	Winter storm	0	0	0	0
100	Schoolcraft and other counties	03/31/2018	Winter storm	0	0	0	0
101	Schoolcraft and other counties	04/15/2018	Winter storm	0	0	0	0
102	Southern Schoolcraft	11/09/2018	Winter storm	0	0	0	0
103	Schoolcraft and other counties	01/07/2019	Winter storm	0	0	0	0
104	Northern Schoolcraft	01/24/2019	Winter storm	0	0	0	0
105	Northern Schoolcraft	01/26/2019	Winter storm	0	0	80K	0

	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
106	Northern Schoolcraft	01/29/2019	Blizzard	0	0	0	0
107	Schoolcraft and other counties	02/04/2019	Ice storm	0	0	0	0
108	Southern Schoolcraft	02/05/2019	Winter storm	0	0	0	0
109	Northern Schoolcraft	02/07/2019	Blizzard	0	0	0	0
110	Schoolcraft and other counties	02/12/2019	Winter storm	0	0	0	0
111	Northern Schoolcraft	02/14/2019	Winter storm	0	0	0	0
112	Schoolcraft and other counties	02/20/2019	Winter storm	0	0	0	0
113	Northern Schoolcraft	02/24/2019	Winter storm	0	0	0	0
114	Northern Schoolcraft	02/24/2019	Blizzard	0	0	0	0
115	Northern Schoolcraft	11/07/2019	Winter storm	0	0	0	0
116	Schoolcraft and other counties	11/11/2019	Winter storm	0	0	0	0
117	Schoolcraft and other counties	11/13/2019	Winter storm	0	0	0	0
118	Northern Schoolcraft	11/27/2019	Winter storm	0	0	20K	0
119	Schoolcraft and other counties	12/01/2019	Winter storm	0	0	0	0
120	Southern Schoolcraft	12/12/2019	Winter storm	0	0	0	0
121	Schoolcraft and other counties	12/30/2019	Winter storm	0	0	0	0
122	Schoolcraft and other counties	01/17/2020	Winter storm	0	0	0	0
123	Schoolcraft and other counties	03/05/2020	Winter storm	0	0	0	0
TOTAL				0	0	5.15M	0

	Location or County	Date	Magnitude	Death	Injury	Property Damage	Crop Damage
1	Schoolcraft	06/26/1983	0 kts.	0	0	0	0
2	Schoolcraft	07/14/1984	0 kts.	0	1	0	0
3	Curtis	07/13/1995	NA	0	0	0	0
4	Cooks	10/05/1997	100 kts.	0	0	600K	613K
5	Schoolcraft and other counties	11/10/1998	76 kts.	0	0	450K	10.0M
6	Stueben	06/06/1999	55 kts.	0	0	0	0
7	Germfask	07/05/1999	52 kts.	0	0	0	0
8	Indian Lake	07/30/1999	52 kts.	0	0	10K	0
9	Countywide	07/30/1999	60 kts.	0	0	0	0
10	Schoolcraft and	12/25/1999	59 kts	0	0	50K	0

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	other counties						
11	Stueben	06/10/2000	60 kts.	0	0	0	0
12	Seney	05/17/2001	60 kts.	0	0	0	0
13	Stueben	07/21/2001	60 kts.	0	0	0	0
14	Stueben	07/21/2001	60 kts.	0	0	0	0
15	Seney	08/08/2001	55 kts.	0	0	0	0
16	Stueben	06/26/2002	60 kts.	0	0	0	0
17	Gulliver	07/21/2002	55 kts.	0	0	0	0
18	Manistique	07/31/2002	65 kts.	0	0	0	0
19	Stueben	07/31/2002	60 kts.	0	0	0	0
20	Stueben	08/01/2002	65 kts.	0	0	0	0
21	Manistique	10/04/2002	53 kts.	0	0	0	0
22	Manistique	10/04/2002	65 kts.	0	0	0	0
23	Seney	08/21/2003	60 kts.	0	0	0	0
24	Manistique	06/30/2004	60 kts.	0	0	0	0
25	Steuben	08/09/2005	70 kts.	0	0	0	0
26	Manistique	07/01/2006	50 kts.	0	0	0	0
27	Seney	07/16/2006	55 kts.	0	0	2K	0
28	Manistique	07/28/2006	55 kts.	0	0	3K	0
29	Manistique	07/30/2006	50 kts.	0	0	0	0
30	Steuben	06/18/2007	50 kts.	0	0	0	0
31	Cooks	07/08/2007	55 kts.	0	0	2K	0
32	Scotts	06/09/2010	55 kts.	0	0	0	0
33	Ossawinamakee Beach	07/27/2010	50 kts.	0	0	0	0
35	Southern Schoolcraft Co.	10/26/2010	50 kts.	0	0	0	0
36	Northern Schoolcraft Co.	10/26/2010	62 kts.	0	0	2K	0
37	Southern Schoolcraft Co.	09/29/2011	50 kts.	0	0	2K	0
34	Ossawinamakee Beach	07/08/2016	52 kts.	0	0	1K	0
35	Southern Schoolcraft Co.	11/18/2016	51 kts.	0	0	0	0
36	Southern Schoolcraft Co.	03/07/2017	62 kts.	0	0	0	0
37	Manistique	06/11/2017	56 kts.	0	0	2K	0
38	Northern Schoolcraft Co.	10/24/2017	52 kts.	0	0	1K	0
39	Southern Schoolcraft Co.	10/03/2018	54 kts.	0	0	0	0
40	Southern Schoolcraft Co.	10/03/2018	51 kts.	0	0	0	0
Total				0	1	1.125M	10.613M

	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
1	Upper Michigan	01/03/1993	Flooding	0	0	5K	0
2	Schoolcraft and other counties	03/23/1993	Flood	0	0	0	0
3	Schoolcraft and other counties	04/19/1993	Flood	0	0	5.0M	0
4	Schoolcraft and other counties	04/20/1996	Flood	0	0	0	0
TOTAL				0	0	5.005M	0

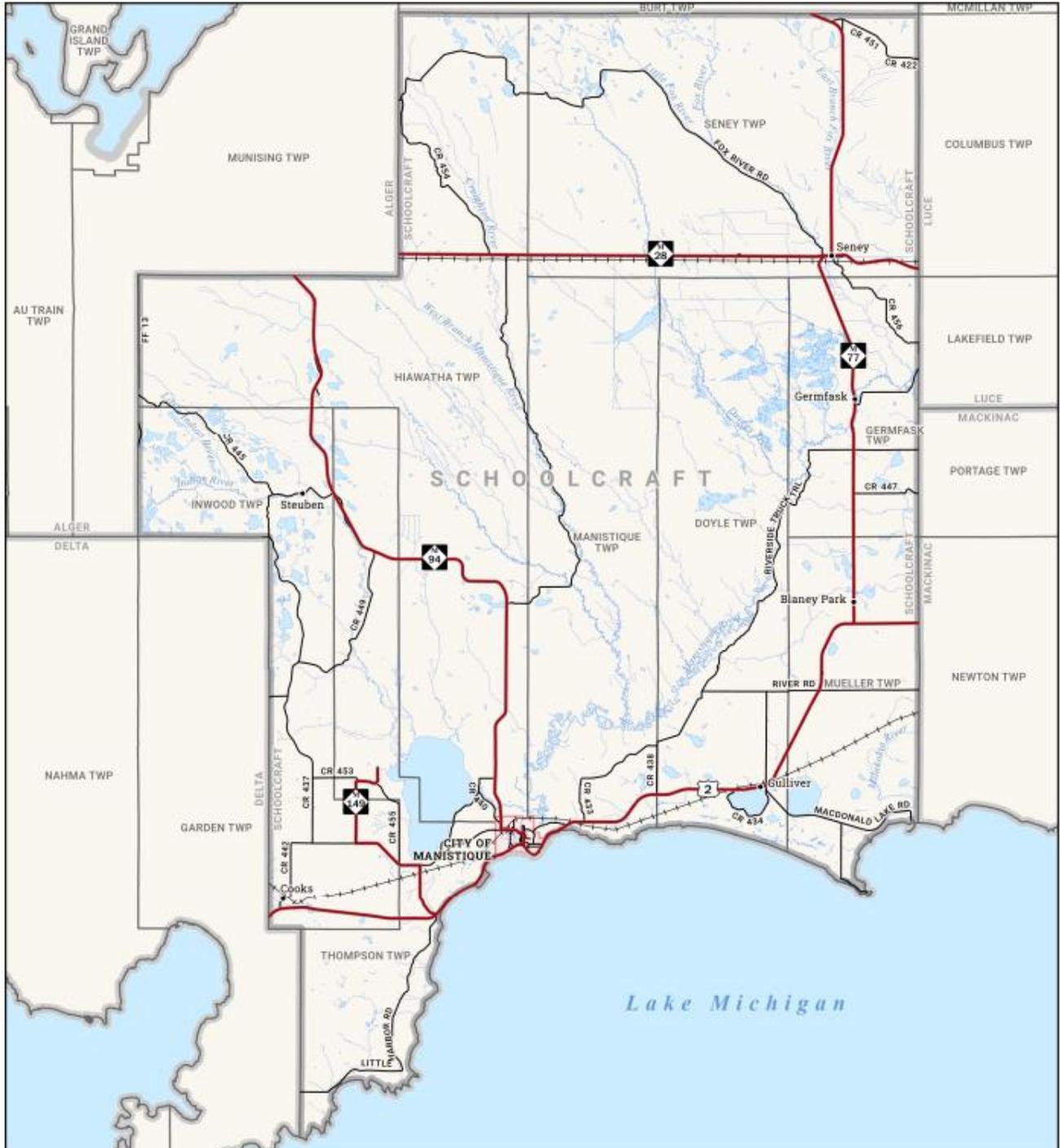
	Location or County	Date	Type	Death	Injury	Property Damage	Crop Damage
1	Schoolcraft and other counties	02/03/1996	Cold/wind chill	0	0	0	0
2	Schoolcraft and other counties	02/17/2006	Cold/wind chill	0	0	0	0
3	Southern Schoolcraft Co.	02/04/2007	Extreme cold/wind chill	0	0	0	0
4	Southern Schoolcraft Co.	02/10/2008	Cold/wind chill	0	0	0	0
5	Southern Schoolcraft Co.	01/26/2009	Cold/wind chill	0	0	0	0
6	Schoolcraft and other counties	01/19/2012	Cold/wind chill	0	0	0	0
7	Southern Schoolcraft Co.	01/21/2013	Cold/wind chill	0	0	0	0
8	Northern Schoolcraft Co.	01/22/2013	Cold/wind chill	0	0	0	0
9	Southern Schoolcraft Co.	01/01/2014	Cold/wind chill	0	0	0	0
10	Schoolcraft and other counties	01/05/2014	Extreme cold/wind chill	0	0	0	0
11	Schoolcraft and other counties	01/27/2014	Extreme cold/wind chill	0	0	0	0
12	Schoolcraft and other counties	02/27/2014	Cold/wind chill	0	0	0	0
13	Schoolcraft and other counties	01/05/2015	Cold/wind chill	0	0	0	0
14	Northern Schoolcraft Co.	02/14/2015	Cold/wind chill	0	0	0	0
15	Schoolcraft and other counties	02/18/2015	Cold/wind chill	0	0	0	0
16	Schoolcraft and	02/19/2015	Cold/wind chill	0	0	0	0

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	other counties						
17	Schoolcraft and other counties	02/22/2015	Cold/wind chill	0	0	0	0
18	Southern Schoolcraft Co.	01/25/2019	Cold/wind chill	0	0	0	0
19	Southern Schoolcraft Co.	01/26/2019	Cold/wind chill	0	0	0	0
20	Schoolcraft and other counties	02/01/2019	Cold/wind chill	0	0	0	0
Total				0	0	0	0

APPENDIX E

Schoolcraft County Maps



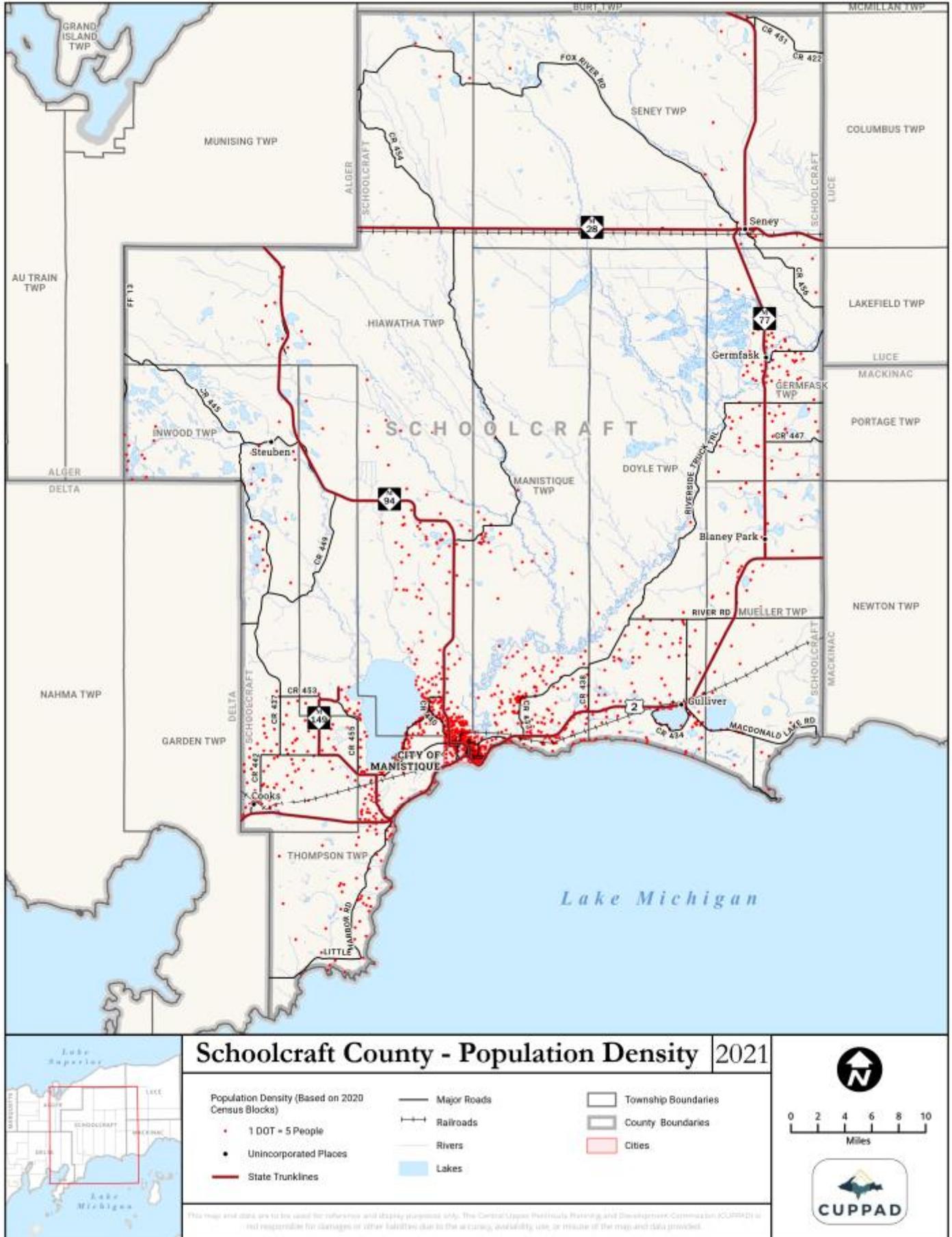
Schoolcraft County - Basemap 2021

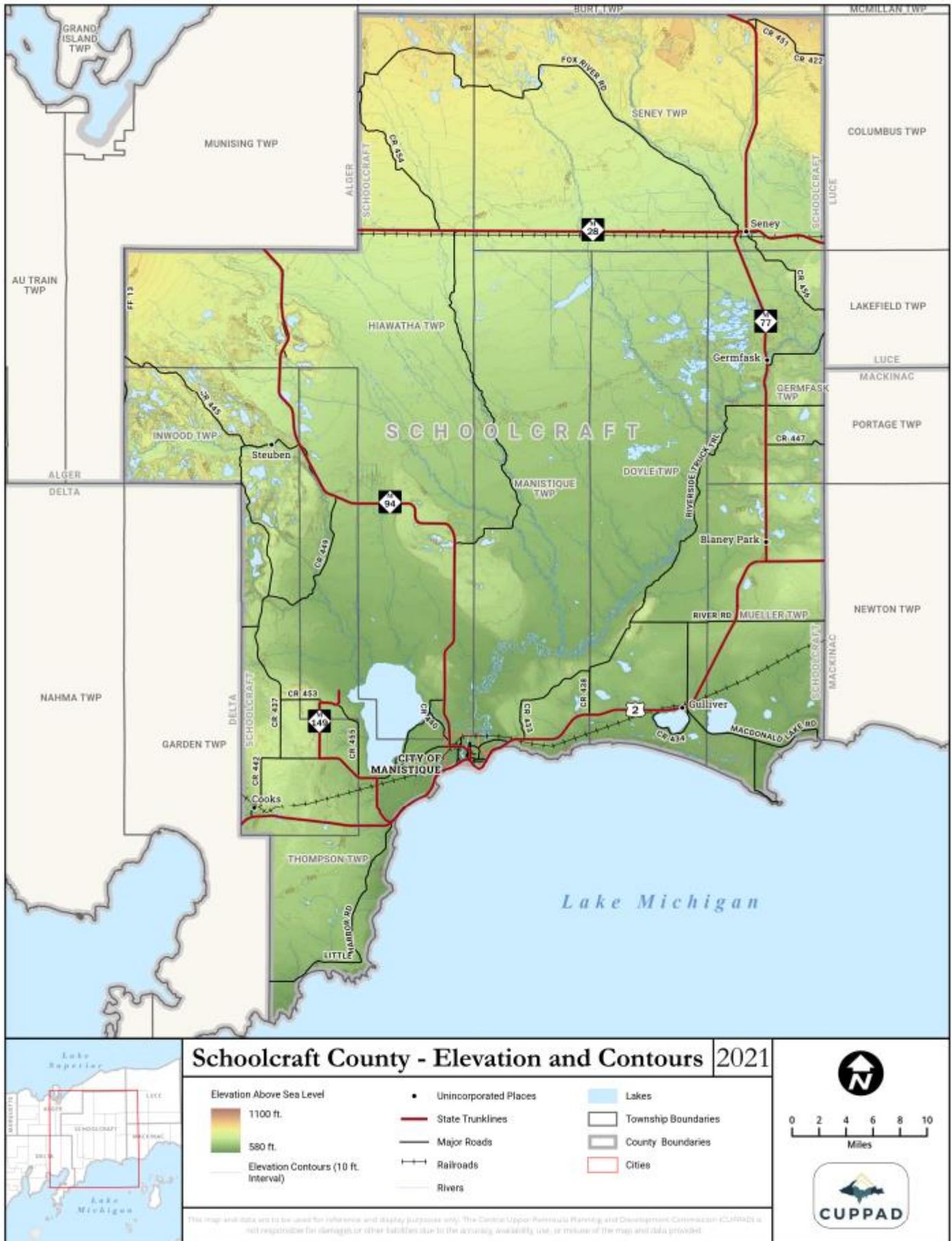
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| — State Trunklines | — Rivers | □ County Boundaries |
| — Major Roads | ■ Lakes | ■ Cities |

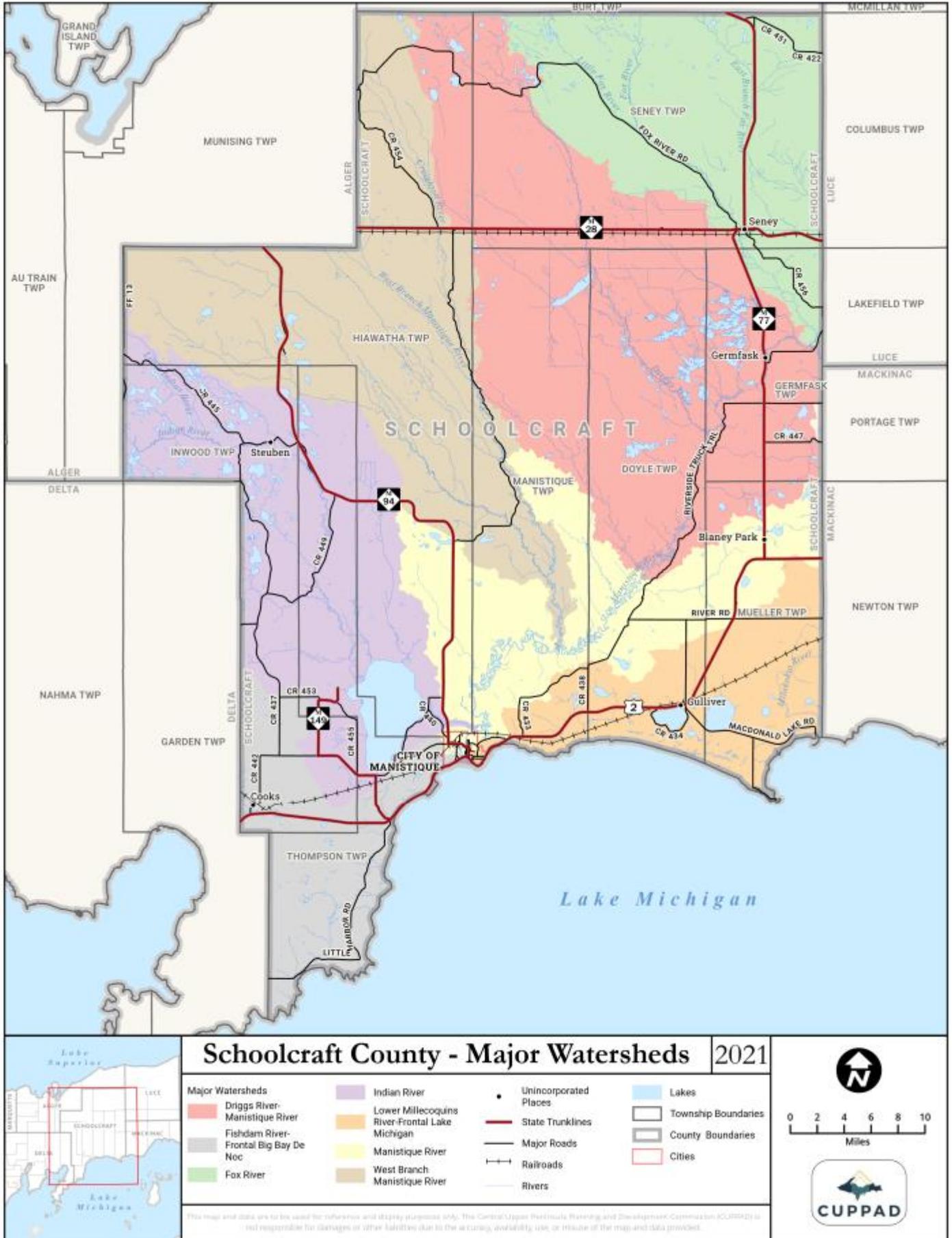
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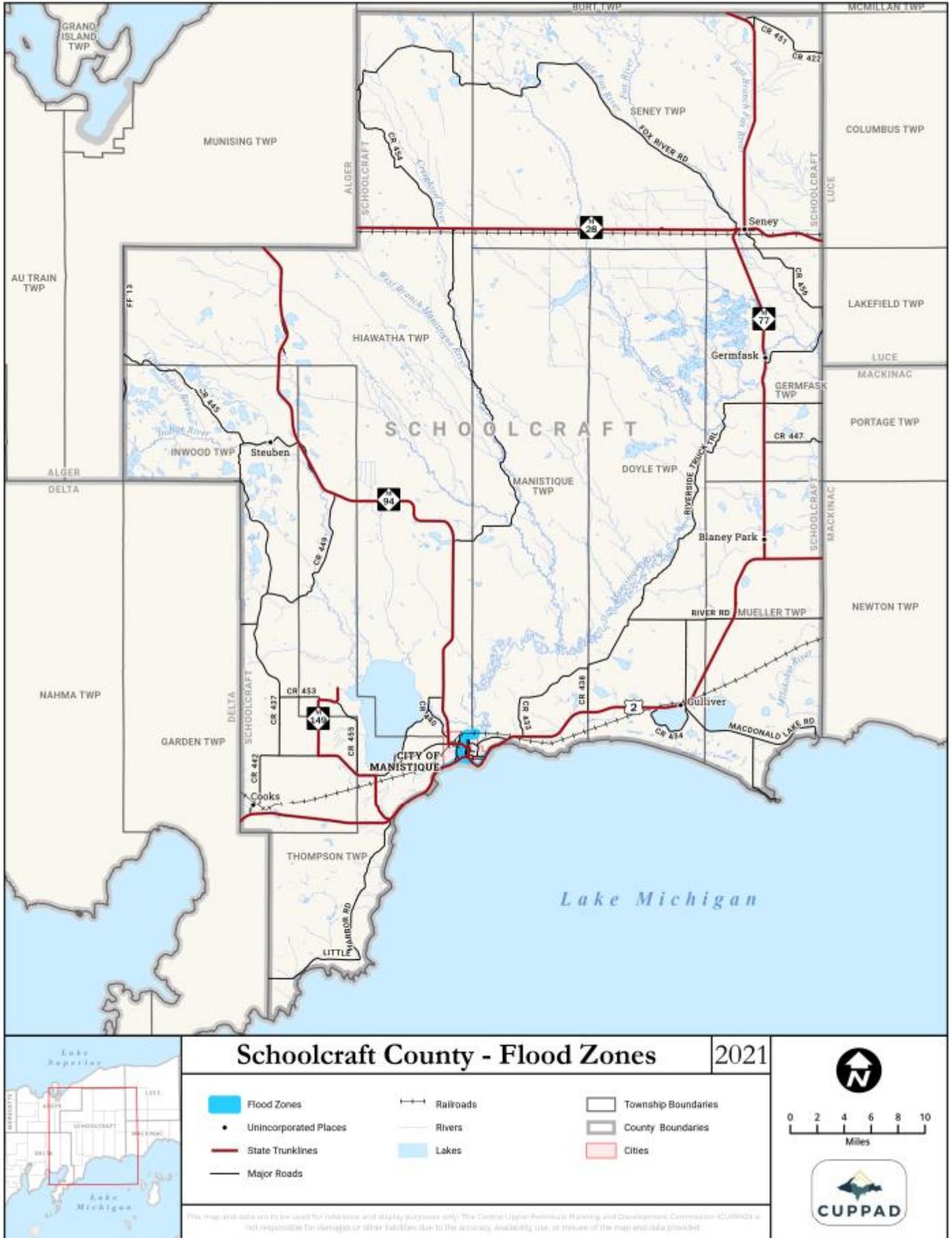


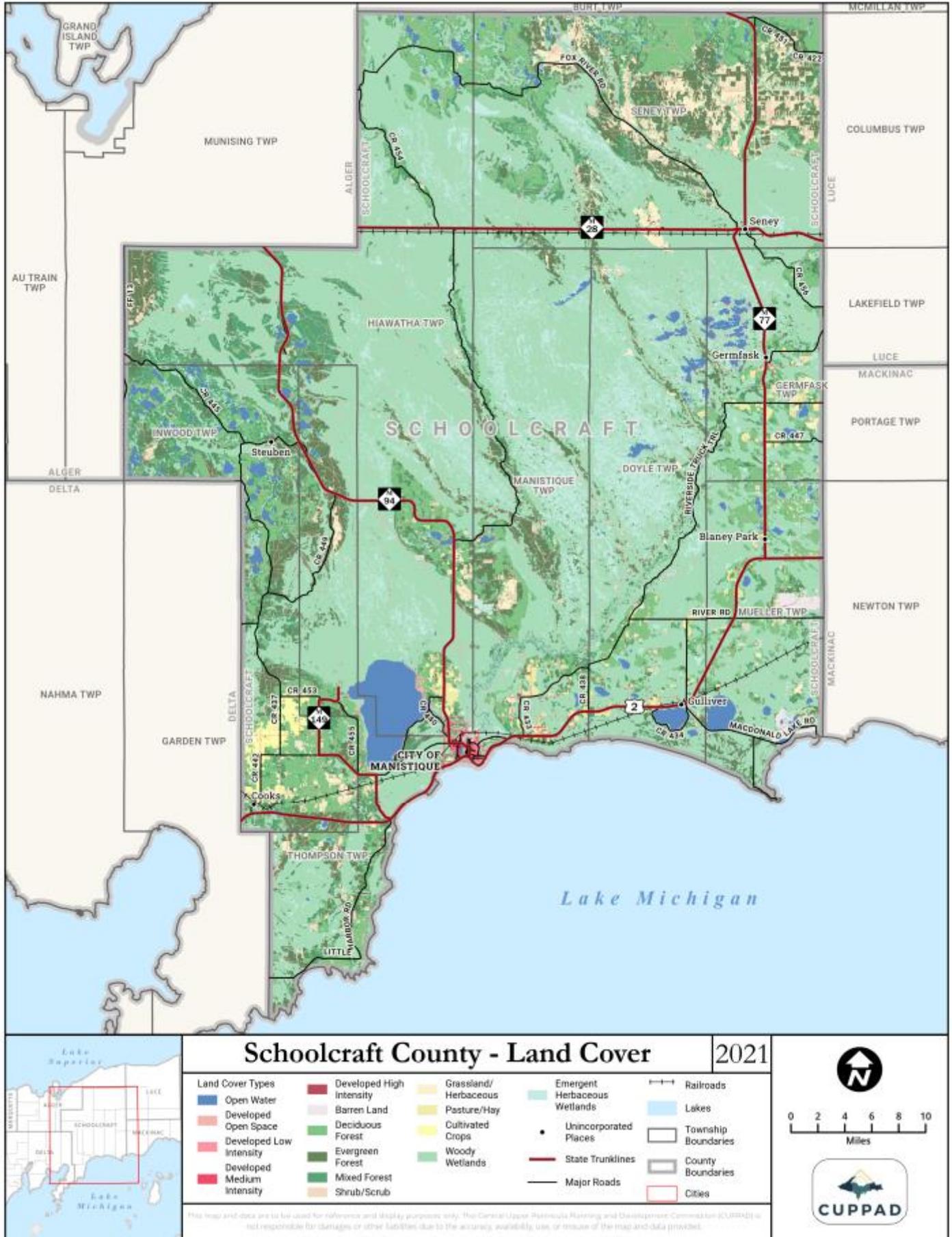
This map and data are to be used for reference and display purposes only. The Central Upper Peninsula Planning and Development Commission (CUPPAD) is not responsible for damages or other liabilities due to the accuracy, availability, use, or misuse of the map and data provided.

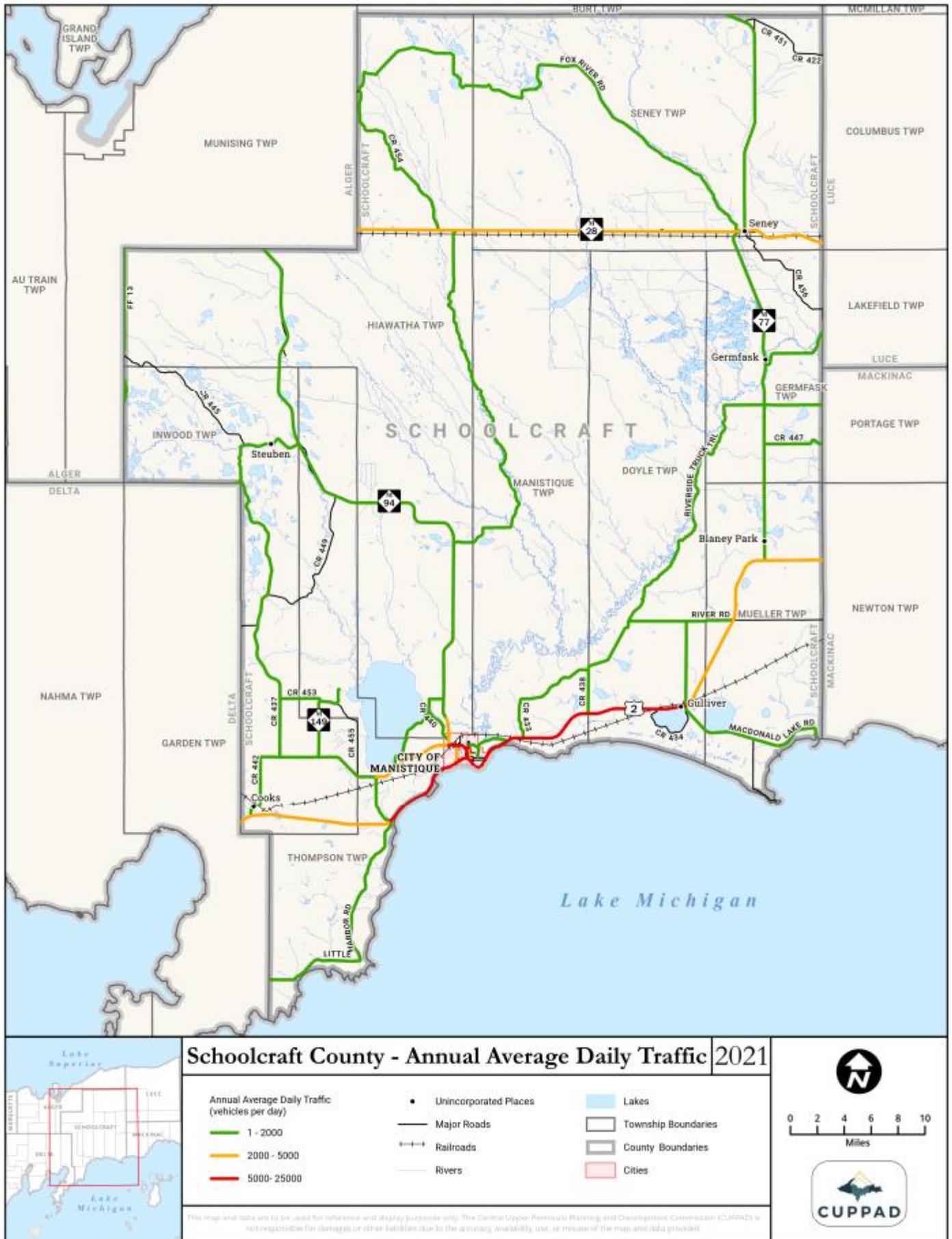




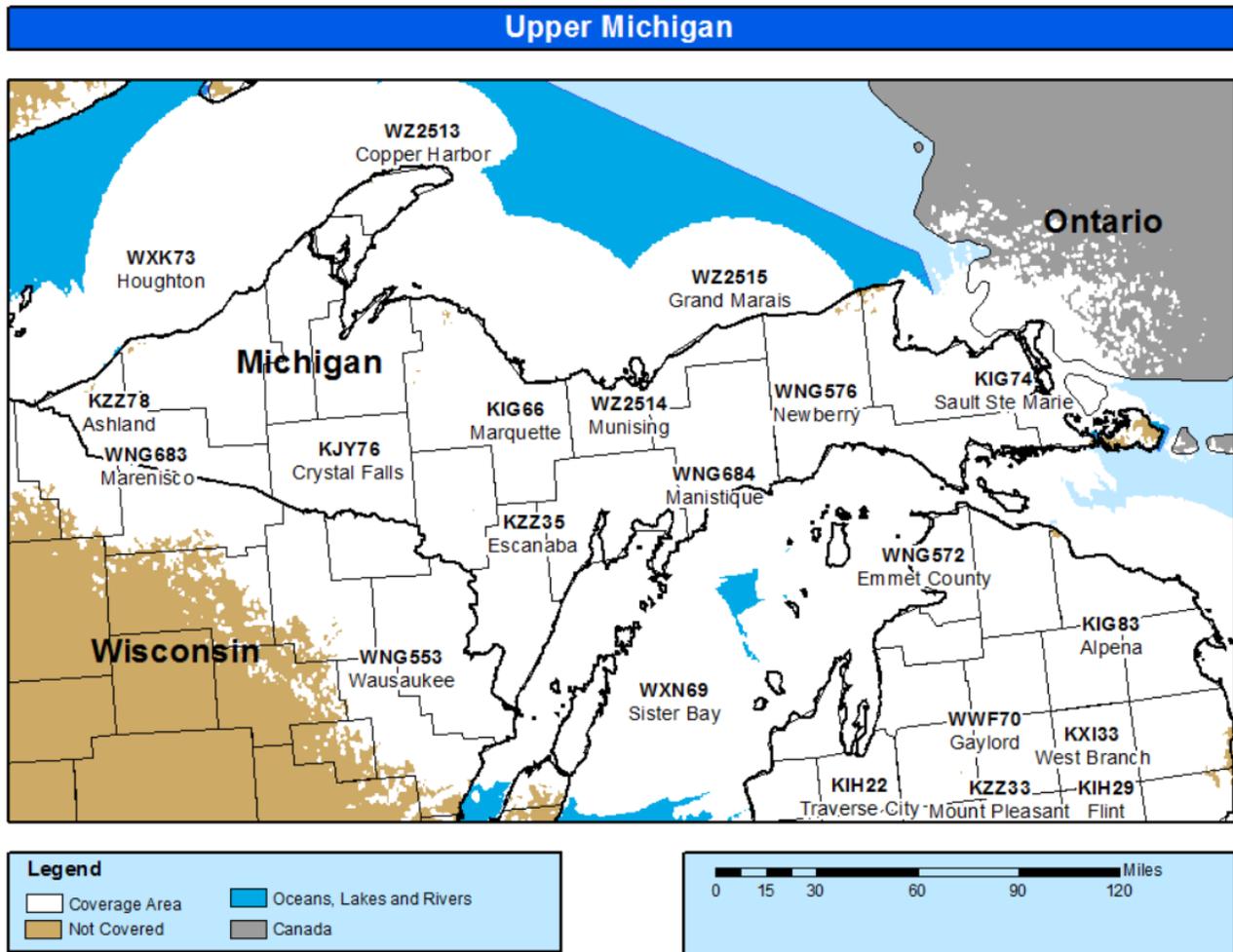








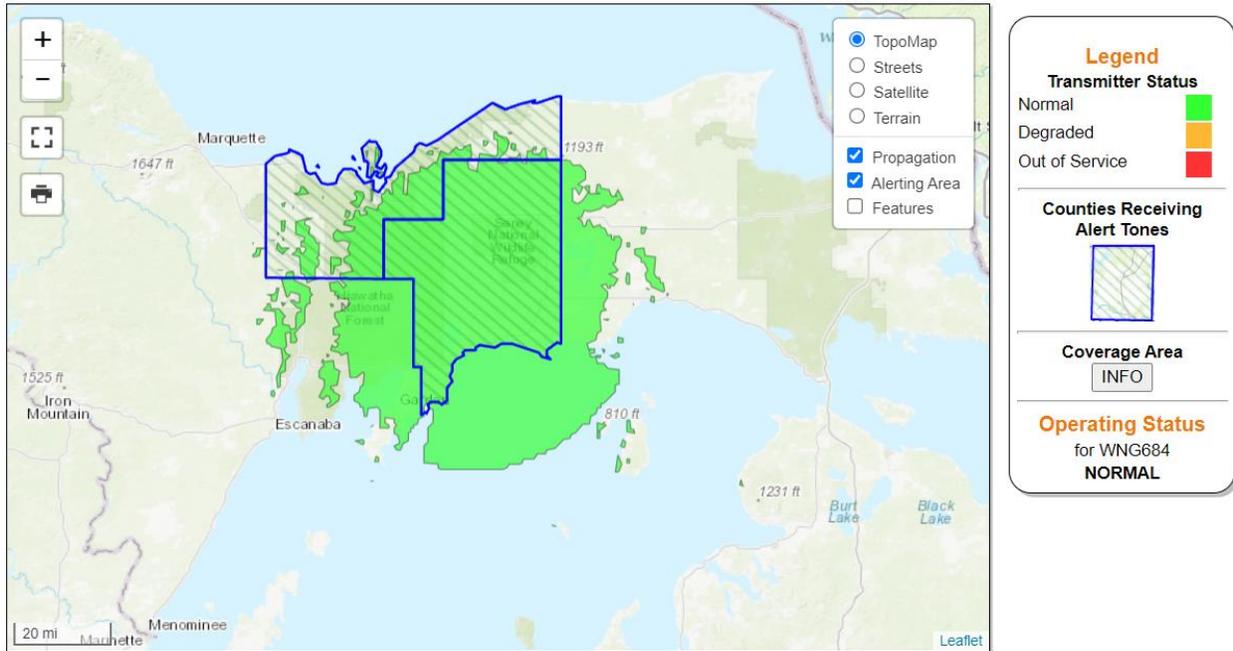
NOAA Weather Radio Coverage



NOAA Weather Radio Coverage

NOAA Weather Radio – WNG684 162.525 Manistique

Map 8A

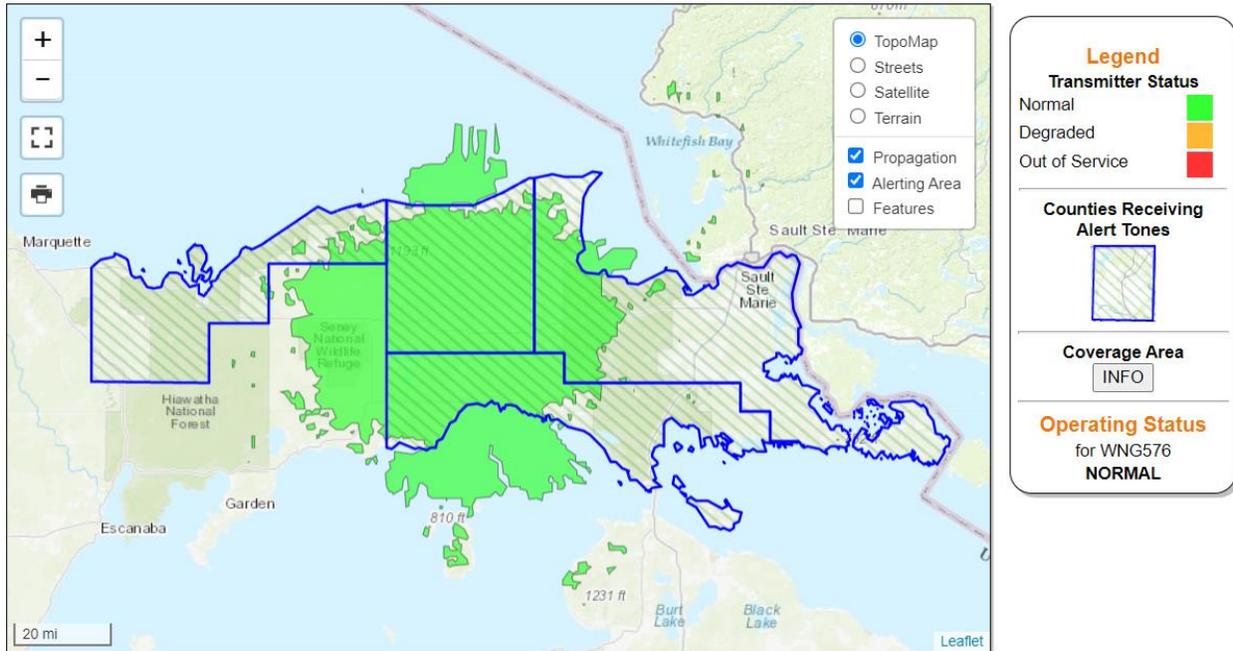


Transmitter Details	
Call Sign	WNG684
Transmitter	Manistique
Frequency	162.525
State	Michigan
Site Location	Steuben, MI
Operating Status	NORMAL
Weather Forecast Office	Marquette MI

WNG684 Counties Receiving Alert Tones			
COUNTY	STATE	SAME	REMARKS
Alger	Michigan	026003	
Schoolcraft	Michigan	026153	

NOAA Weather Radio Coverage

NOAA Weather Radio – WNG576 162.450 Newberry



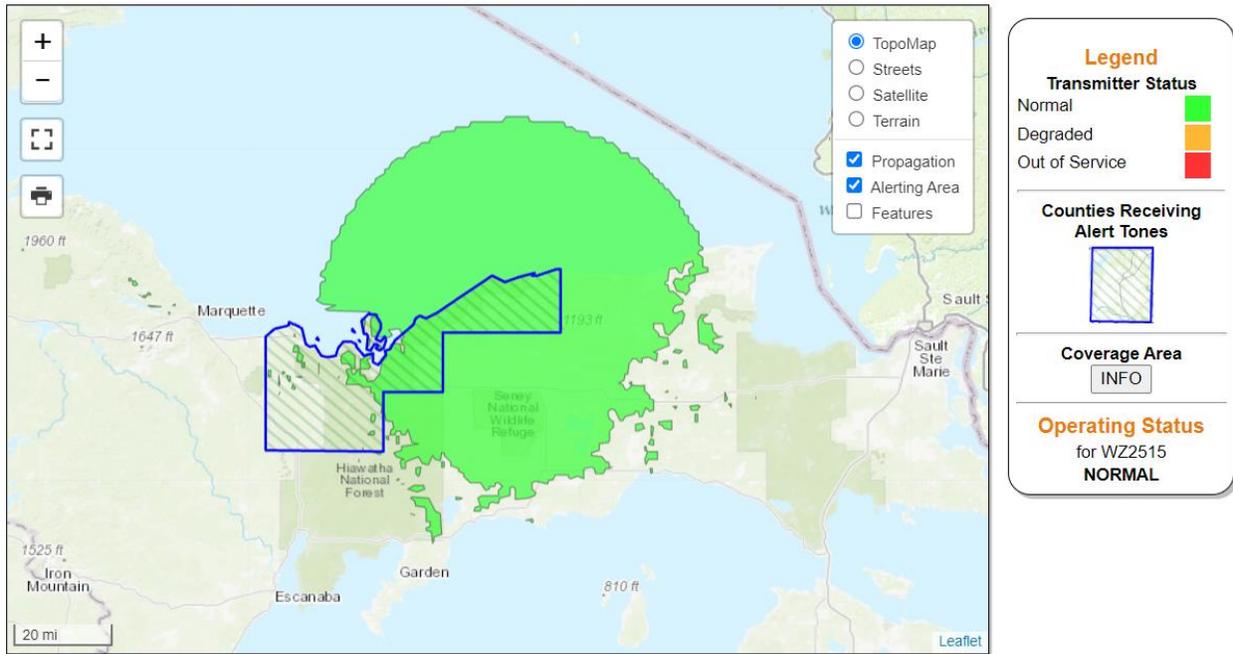
Transmitter Details	
Call Sign	WNG576
Transmitter	Newberry
Frequency	162.450
State	Michigan
Site Location	Newberry, MI
Operating Status	NORMAL
Weather Forecast Office	Marquette MI

WNG576 Counties Receiving Alert Tones			
COUNTY	STATE	SAME	REMARKS
Alger	Michigan	026003	
Chippewa	Michigan	026033	
Luce	Michigan	026095	
Mackinac	Michigan	026097	

NOAA Weather Radio Coverage

NOAA Weather Radio – WZ2515 162.425 Grand Marais

Map 8C

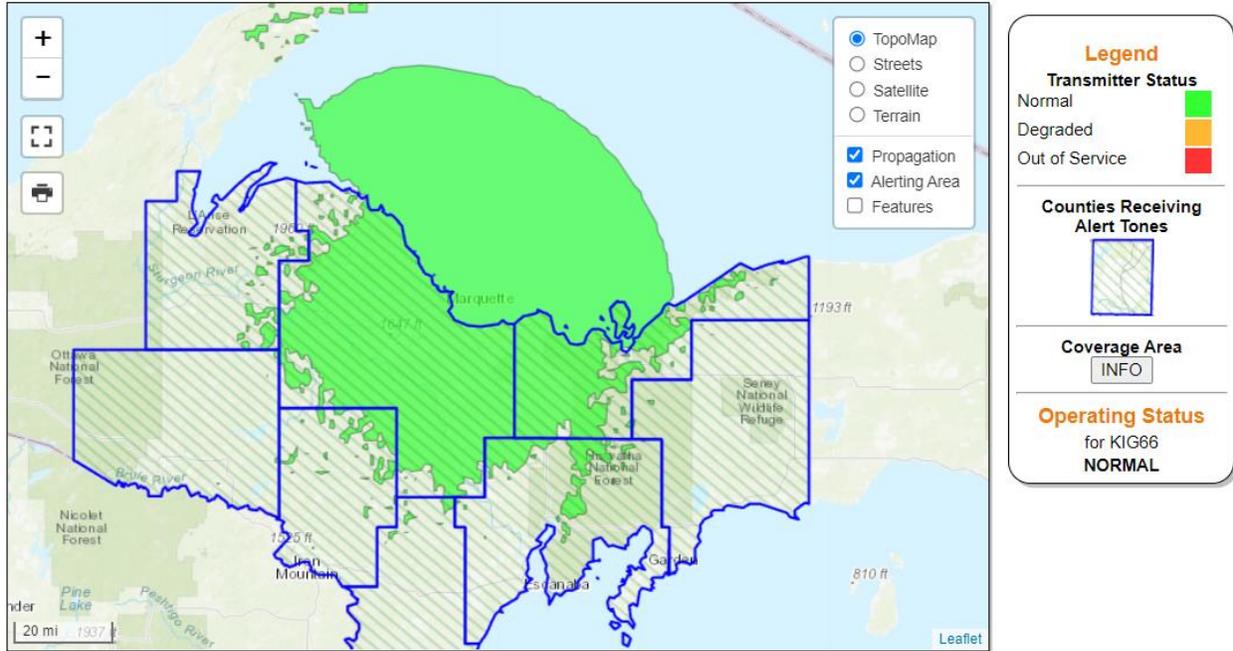


Transmitter Details	
Call Sign	WZ2515
Transmitter	Grand Marais
Frequency	162.425
State	Michigan
Site Location	Grand Marais, MI
Operating Status	NORMAL
Weather Forecast Office	Marquette MI

WZ2515 Counties Receiving Alert Tones			
COUNTY	STATE	SAME	REMARKS
Alger	Michigan	026003	

NOAA Weather Radio Coverage

NOAA Weather Radio – KIG66 162.550 Marquette



Transmitter Details	
Call Sign	KIG66
Transmitter	Marquette
Frequency	162.550
State	Michigan
Site Location	Negaunee, MI
Operating Status	NORMAL
Weather Forecast Office	Marquette MI

KIG66 Counties Receiving Alert Tones			
COUNTY	STATE	SAME	REMARKS
Alger	Michigan	026003	W1/2
Baraga	Michigan	026013	E1/2
Delta	Michigan	026041	
Dickinson	Michigan	026043	N1/2
Iron	Michigan	026071	
Marquette	Michigan	026103	
Menominee	Michigan	026109	
Schoolcraft	Michigan	026153	