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2023-2028

Saginaw County Multijurisdictional Hazard Mitigation Plan



"We have every reason to expect our citizens will face more disasters in the future. And when we know trouble is coming, we have the moral responsibility to prepare for and prevent it."

~Senior FEMA Official

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SECTION 1 – INTRODUCTION

This section of the Plan provides a general introduction to the Saginaw County Multi-jurisdictional Hazard Mitigation Plan (HMP.) It consists of the following subsections:

- Background
- Purpose
- Scope
- Authority
- Planning Process

1.1 BACKGROUND

Saginaw County and its local jurisdiction are vulnerable to many natural, technological, and human-caused hazards. These hazards threaten the life and safety of our county residents and visitors, potentially damaging or destroying public and private property and disrupting the local economy and overall quality of life of individuals who live, work, and visit the community.

While the threat of hazardous events may never be eliminated, there is much we can do to lessen their potential impact on our community and citizens. By minimizing the impact of hazards upon our built environment, we can prevent such events from resulting in disasters. Hazard mitigation is the concept and practice of reducing risks to people and property from known hazards.



FEMA Definition of Hazard Mitigation

“Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.”

Hazard mitigation techniques include structural measures, such as strengthening, raising, or otherwise protecting buildings and infrastructure from the destructive forces of potential hazards, and non-structural measures, such as adopting sound land use policies and creating public awareness campaigns. Effective, ongoing mitigation efforts are led locally through local leadership setting a vision, aligning programs, and supporting local efforts as needed. A comprehensive approach to mitigation planning can reduce the loss of life and property by reducing the impact of disasters through the development, implementation, and coordination of core mitigation capabilities: Planning, Operational Coordination, Public Information & Warning, Community Resilience, Long-term Vulnerability Reduction, Risk & Disaster Resilience Assessment, and Threat & Hazard Identification.

A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that mitigation planning be included in a community’s comprehensive plans. As a community formulates a comprehensive strategy to hazard mitigation, a key component is to develop, adopt, and update a Local Mitigation Strategy (LMS.) An LMS is included in the overall Hazard Mitigation Plan and should serve as a guiding principle for reducing hazard risk and proposing specific mitigation actions to eliminate or mitigate identified vulnerabilities.

The Saginaw County Hazard Mitigation Plan has evolved over the years; this is a comprehensive update to the Saginaw County 2017 Hazard Mitigation Plan. Each Saginaw County community was invited to participate in the planning process and adopt the HMP. The communities shown in *Table 1* have elected to participate in the 2022 update of the Saginaw County Multi-jurisdictional Hazard Mitigation Plan.

Table 1 – HMP Participating Communities

2022 HAZARD MITIGATION PLAN UPDATE PARTICIPATING COMMUNITIES		
Saginaw County	Albee Twp	Birch Run Village
Birch Run Twp	Blumfield Twp	Brady Twp
Brant Twp	Bridgeport Twp	Buena Vista Twp
Carrollton Twp	Chesaning Twp	City of Frankenmuth
City of Saginaw	City of Zilwaukee	Frankenmuth Twp
Fremont Twp	James Twp	Jonesfield Twp
Kochville Twp	Lakefield Twp	Maple Grove Twp
Richland Twp	Saginaw Twp	Spaulding Twp
Swan Creek Twp	Taymouth Twp	Thomas Twp
Tittabawassee Twp	Village of Merrill	Village of Oakley
Village of St Charles		

All communities listed in *Table 1* also participated in the 2017 Plan update. However, four communities from the 2017 plan either never responded to inquiries or failed to submit the needed information to be included in the 2023 plan update. Due to the limited response of these communities, it is unclear why they did not participate in the current plan update.

1.2 PURPOSE

To reduce the Nation’s mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state and local government entities to coordinate mitigation planning activities and makes adopting a hazard mitigation plan a specific eligibility requirement for any local government applying for certain types of FEMA non-emergency disaster assistance grants.

The purpose of the Saginaw County Multi-jurisdictional HMP is to:

- Reduce the loss of life and property by identifying ways to minimize the impact of disasters.
- Meet State and Federal requirements making Saginaw County and its local communities eligible to apply for funding and technical assistance from State and Federal hazard mitigation programs.
- Build partnerships by involving citizens, organizations, and businesses in planning.
- Increase education and awareness of threats and hazards, their risk, and strategies to reduce vulnerability to high-risk hazards.

1.3 FUNDING OPTIONS

Some hazard mitigation projects can be coordinated with existing or regular updates already conducted by a jurisdiction. For example, increasing the size, as needed, of a culvert during normal road or drain updates or incorporating hazard mitigation principles into scheduled updates of a jurisdiction's master/zoning plans and building codes.

Many hazard mitigation projects are beyond a community's financial capabilities; outside grants are needed to complete larger projects. In addition to post-disaster mitigation funding that becomes available in the event of a Presidentially declared disaster, the following pre-disaster mitigation grants may be a source of financing for jurisdictions.

- Hazard Mitigation Grant Program (HMGP) – this FEMA program provides funding for jurisdictions to develop hazard mitigation plans and complete projects to reduce or mitigate future disaster losses in the community.

The HMGP can fund various mitigation projects, including planning & enforcement, flood protection, retrofitting, and construction.

- Building resilient Infrastructure and Communities (BRIC) – this FEMA program supports jurisdiction's hazard mitigation projects, reducing the risks they face from disasters and natural hazards.

The BRIC programs guiding principles are supporting communities through capability- can capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

- Flood Mitigation Assistance Grant (FMA) – this FEMA program can fund projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program.

FMA funds may be used for project scoping; technical assistance; community flood mitigation projects; individual structure/property-level flood mitigation projects; and management costs.

- Pre-Disaster Mitigation Program (PDM) makes federal funds available to jurisdictions to implement sustainable, cost-effective measures to reduce the risk to individuals and property from future natural hazards. The program is authorized under the Stafford Act.

1.4 SCOPE

The Saginaw County Multi-jurisdictional HMP identifies natural, technological, and human-caused hazards to which the County and its jurisdictions are vulnerable. Each hazard was given a Relative Risk Score (%) with the higher the percentage the greater the risk and impact of the hazard.

The Plan's geographic scope (i.e., planning area) includes all locations within the political boundaries of Saginaw County. In addition, other entities such as Covenant and Ascension St. Mary's Hospitals, Saginaw

County 911 Authority, Saginaw County Road Commission, and other business or NGO stakeholders participated in the planning process.

1.5 AUTHORITY

The Saginaw County Multi-jurisdictional HMP has been developed following current state and federal rules and regulations governing local hazard mitigation plans. It has been adopted by Saginaw County and its participating communities and partners per their standard procedures. Copies of the adoption resolutions for each participating jurisdiction are provided in *Appendix D* of this Plan.

The Plan should be routinely monitored and revised to maintain compliance with the following provisions, rules, and regulations:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390); and
- FEMA’s Local Mitigation Planning Guide

1.6 PLANNING PROCESS

Local hazard mitigation planning is organizing community resources, identifying and assessing hazard risks, and determining how to minimize or manage those risks. The process results in a hazard mitigation plan that identifies specific mitigation actions to achieve short-term and long-term planning objectives.

1.6.1 Community Participation & Informational Meetings

All jurisdictions in Saginaw County were contacted by email sent to the jurisdiction’s Chief Elected Officer, informing them that the 2017 HMP was being updated. They were asked to notify the Saginaw County Office of Emergency Management (OEM) if they wished to participate in the update process so they could adopt the plan locally.

Saginaw County OEM made additional attempts to contact communities that did not respond to the first notice. In addition, two virtual meetings were scheduled, one in the morning and one in the evening, where communities with questions on Hazard Mitigation Planning and the update process could receive more information. The virtual meetings were held on February 28, 2022.

Several final notices requesting participation in the plan update were sent to jurisdictions that still had not responded to the previous communications or had not submitted all required documents.

1.6.2 Planning Team

The Saginaw County Multi-jurisdictional HMP was prepared by the Saginaw County Office of Emergency Management (OEM) with guidance from the Saginaw County Emergency Preparedness Council (SCEPC) and input from local communities, community stakeholders, and the public.

As part of the planning team development, jurisdictions wishing to participate in the plan update were asked to provide a single liaison to the Saginaw County OEM as the point of contact through which all information and requests would be passed. In addition, local jurisdictions were encouraged to engage subject matter experts within their organizations for input throughout the planning process.

Table 2 – Jurisdiction Liaisons

Jurisdiction	Liaison
Albee Twp	Aaron Kisser Fire Chief
Birch Run Village	Paul Moore Village Manager
Brady Twp	Steve Kienitz Twp Supervisor
Bridgeport Twp	Dave Smigiel Fire Chief
Carrollton Twp	Craig Oatten Twp Manager
Chesaning Village	Rebecca Short Police Chief
Frankenmuth City	Bridget Smith City Manager
James Twp	Ed Hak Twp Supervisor
Kochville Twp	Matt Uptmor Fire Chief
Maple Grove Twp	Kevin Krupp Twp Supervisor
Oakley Village	Robert Fish Village President
Saginaw City	Tom Raines Fire Chief
Saginaw Twp	Brian Rombalski Twp Manager
St Charles Twp	Don Ackerman Twp Supervisor
Swan Creek Twp	Phil Schilling Twp Supervisor
Thomas Twp	Mike Cousins Fire Chief
Zilwaukee Twp	Bruce VanBlarcom Twp Supervisor

Jurisdiction	Liaison
Birch Run Twp	Ryan Kissling Fire Chief
Blumfield Twp	Sharon Bierlein Twp Clerk
Brant Twp	Robert Fowler Twp Supervisor
Buena Vista Twp	Aaron Hoepfner Fire Chief
Chesaning Twp	Joseph Ruthig Twp Supervisor
Frankenmuth Twp	Tim Hildner Twp Supervisor
Fremont Twp	Don LaClair Twp Supervisor
Jonesfield Twp	Stan Brown Twp Supervisor
Lakefield Twp	John Schmidt Twp Supervisor
Merrill Village	Jan Wazny Twp Clerk
Richland Twp	Rob Grose Twp Manager
Saginaw County	Mark Przybylski Emergency Manager
Spaulding Twp	Ed Masters Twp Supervisor
St Charles Village	Au Hartman Village Manager
Taymouth Twp	Dennis Fent Twp Supervisor
Tittabawassee Twp	Philip Shaver Fire Chief
Zilwaukee City	Mary Bourbina City Manager

Saginaw County Emergency Preparedness Council

The Saginaw County Emergency Preparedness Council (SCEPC) consists of representatives from public and private organizations who meet monthly. The purpose of the SCEPC is to:

- Promote emergency preparedness among community Health Care providers, first responders, and other emergency or disaster response organizations.

- Promote and evaluate the quality of emergency preparedness plans and develop programs to respond effectively and efficiently to emergencies in the community.
- Act as a forum for the exchange of ideas and information.
- Provide advice to the Saginaw County Office of Emergency Management as requested.

HMP update information and Hazard Vulnerability Analysis forms were shared with the SCEPC, and members were asked to provide input in the update process.

Table 3: Organizations Represented on the SCEPC

Angie Thornton, Safety Officer Covenant Healthcare	Tom Raines, Chief Saginaw City Fire Department	Chris VanLoo, Chief Saginaw Twp Fire Department
Ryan Delong, Chief MBS Airport Fire Department	Ron Huss, Coordinator Saginaw County ARES	Audrey Shaver, Operations Saginaw-Tuscola Medical Control Authority
Jay Cooper, Ancillary Services Mobile Medical Response Inc	Al Malesky, Safety Director Great Lake Bay Health System	Tom Matzke, Safety Director Ascension St. Mary's Hospital
Chris Izworksi, Director Saginaw County 911	Kim Vallencourt, Safety Matrix Surgery Center	Cliff Block, Chief SVSU Police Department
Russ Kolb, Lieutenant Saginaw County Sheriff's Office	Mark Przybylski, EMC Saginaw County Emergency Management	Haley Christensen, Safety Saginaw County Road Commission
Cari Hillman, EPC Saginaw County Health Department		

Public Input

Information on the Hazard Mitigation Plan update was included on the Saginaw County OEM website. In addition, the link to the 2017 Plan was moved from the Hazard Mitigation page to the OEM home page to provide increased visibility.

A public survey asking for input on the level of concern and preparedness, both personal and jurisdictional, was developed with a link placed on the OEM homepage. Community outreach requesting participation in the update process was accomplished through local media outlets through a Media Release.

1.6.3 2017 Mitigation Strategies Review

Communities were provided their mitigation strategies from the 2017 Saginaw County Hazard Mitigation Plan and the 2017 plan's overall goals. They were asked to indicate which, if any, of the 2017 strategies were completed or worked on. In addition, they were asked if any other mitigation activities fulfilled one of the 2017 HMP goals.

A compiled list of completed strategies and any completed project that aligns with the 2017 HMP are included in Section 6.1 of this Plan.

1.6.4 Review of Existing Plans and Documents

In addition to the experience and knowledge of the Planning Team, federal, state, and local resources were reviewed, and information was incorporated into this plan. While not exhaustive, the list below indicates planning and reference resources.

- Federal Resources
 - Federal Census data
 - FEMA, flood insurance information
 - FEMA, Local Mitigation Planning Handbook
 - National Climate Data Center

- State Resources
 - Michigan Hazard Analysis, MSP-EMHSD
 - EGLE – Mining, Pipelines, Wels

- Local Resources
 - 2017 Saginaw County Hazard Mitigation Plan
 - 2022 Saginaw County Emergency Operations Plan
 - Local planning documents, including zoning and master plans, when appropriate

1.6.5 Hazard Vulnerability Analysis

A vulnerability analysis aims to evaluate the risks of hazards anticipated to impact people, the economy, services, housing, infrastructure, and the environment of Saginaw County and its local communities.

Participating jurisdictions and select stakeholders were provided with a Hazard Vulnerability Analysis (HVA) questionnaire. The specific hazards to score were included in the HVA sent to the Community's Liaison, who was asked to share the HVA within their organization.

Hazards included in the HVA were taken from the 2017 Plan, with a couple of hazards added for this update. While the Plan is only required to include natural hazards, as in the 2017 HMP, select technological and human-caused hazards were included in the HVA and planning process.

Further information on the HVA and scoring are provided in Sections [4.2](#) and [4.3](#) of this Plan. HVA results for each jurisdiction are included in [Annex A](#) of this Plan.

1.6.6 Capability Assessment

Jurisdictions were provided the opportunity to report on community capabilities currently in place. Capability areas included planning, regulatory, administrative, technical, financial, education, and outreach capabilities.

Jurisdictions were required to complete a Capability Assessment to be considered a participating jurisdiction. Detailed capability analysis information is included in [Section 3](#) of this Plan.

1.6.7 Develop Mitigation Strategies

Using numbers from the HVAs submitted by the community, a compiled and scored Hazard Vulnerability Analysis was returned to the respective community. If a jurisdiction submitted an HVA from more than one representative, the submitted scores were averaged and included on the compiled HVA. In some cases, Saginaw OEM assisted jurisdictions with scoring the Community Lifeline section of the HVA. A Risk = Probability/Impact formula was then used to provide a Relative Risk Score for each hazard listed.

Communities were asked, at a minimum, to identify mitigation strategies for any hazard that scored 25% or higher on the compiled and scored HVA.

1.6.8 Review Process

On completion of the update, the Plan was sent to Michigan State Police - EMHSD for review. Once reviewed and approved by EMHSD, the draft Plan was sent to the participating jurisdictions and the Emergency Manager of neighboring counties (Bay, Midland, Gratiot, Shiawassee, Genesee) for comment.

Additionally, the draft plan was posted on the Saginaw OEM webpage to allow for public comment.

Comments on the Plan were reviewed by the Saginaw OEM and included in the Plan where appropriate.

1.7 PLAN IMPLEMENTATION AND MAINTENANCE

1.7.1 Approval

After being updated as needed, the Plan will be submitted to FEMA through MSP-EMHSD for approval. Once approved, the complete plan will be made available to participating jurisdictions and the public for comment before formal adoption.

1.7.2 Adoption

The purpose of formally adopting the Saginaw County Multi-Jurisdiction Hazard Mitigation Plan is to secure buy-in from participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The plan can be adopted through local resolution by the governing board for the respective jurisdiction. The adoption document for each adopting jurisdiction can be found in [Appendix D](#) of this plan.

1.7.3 Implementation

Once adopted, participating jurisdictions may begin implementing the hazard mitigation strategies in Section 6 and Annex A of this plan. The mitigation strategy identifies the responsible agencies and entities, general timelines, prioritization, and potential funding sources to assist in strategy implementation.

Participating local communities will be encouraged to collaborate with the County and other local government units to participate in hazard mitigation planning activities. In doing so, they will become eligible for hazard mitigation grant funds, pending federal approval.

Implementation of specific plan portions will be delegated to the agency(s) most responsible for the strategy(s). For instance, the Saginaw County Public Works Department will be responsible for planning, implementing, evaluating, and monitoring the cleaning and improvement of County drains.

Community Planning Implementation

On adopting the 2023 Saginaw County Hazard Mitigation Plan, local communities will be provided with a complete copy of the plan and encouraged to reference the plan and include hazard mitigation strategies in any updates of their community's master, comprehensive, or zoning plans.

1.7.4 Monitoring and Maintenance

To remain a living document of maximum use to the jurisdictions, the mitigation plan requires periodic maintenance.

Maintenance Schedule

The Saginaw County OEM, with assistance from the SCEPC and local jurisdictions, is responsible for initiating an annual plan review to monitor progress and update the mitigation strategies. Local jurisdictions will record mitigation activities, especially related to the strategies identified in this plan. An annual mitigation action progress report will be prepared by the OEM and kept on file to assist with future updates.

The plan will require a full review and update ahead of its five-year expiration date unless a disaster or other circumstances require a change to this schedule. Therefore, it is recommended that the process of preparing the update should begin no later than 12 months before its expiration.

Maintenance Evaluation Process

The Saginaw County OEM will coordinate the annual evaluation of the plan. The plan evaluation will focus on three key areas of the 2023 Saginaw County Multijurisdictional Hazard Mitigation Plan.

- Changes in capabilities
- Changes in hazards and new hazard history
- Status updates and reviews of the mitigation strategies

Each jurisdiction will receive an Annual Review tool to assist in this process. This reporting tool allows for continual tracking of evolving risks to the jurisdictions and progresses toward mitigating the risks and impacts.

Information gathered during the annual reviews will be used when completing the comprehensive plan update in 2028.

Incorporation into Existing Planning Mechanisms

The capabilities assessment summary in Section 3.1.1 of this plan highlights specific planning mechanisms that can inform or be informed by the hazard mitigation plan.

Continued Public Involvement

Input from the public is an integral part of developing and evolving the hazard mitigation plan. Therefore, any significant change to this plan will require an opportunity for the public to provide input. Continued public involvement includes advertising planned public meetings and posting revisions for public comment. This process will follow all county or jurisdiction rules as applicable.

Note: Under Michigan Law (Public Act 130 or 2002), certain emergency planning documents are exempt from FOIA. In limited cases, some emergency planning or other excludable information was redacted from the public, and FEMA submitted versions of this plan. Redacted areas remain in the plan but are blocked out.

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SECTION 2 – COMMUNITY PROFILE

This section of the Plan provides an overview of Saginaw County, Michigan. It consists of the following subsections:

- History and Political Jurisdictions
- Geography and the Environment
- Population and Demographics
- Economics, Housing, Education, Industry, and Land Use

2.1 HISTORY AND POLITICAL JURISDICTIONS

2.1.1 History

The boundaries of the County of Saginaw were set by proclamation of Governor Cass on September 10, 1822. These boundaries were subsequently changed by an act of the Legislative Council, approved on March 2, 1831. Then, for over four years between 1831 and 1835, the district known as the County of Saginaw formed a Township attached to Oakland County for judicial purposes. In 1834, the question of conferring on the Township of Saginaw the status of a County was discussed, and a resolution of the Council passed to the effect - "That the County of Saginaw shall be organized when this act takes effect." This act of organization was approved January 28, 1835, and put into force the second Monday of February 1835.

The Legislative Council of the Territory ordained that - "all that part of the country lying with the limits of the County of Sagana here fore set off and established as the County of Saginaw, be and the same hereby be set off into a separate Township, and the name thereof shall be Sagana. The first Township meeting to be held in such Township shall be held at the Fort of Sagana on the first Monday in April, which will be in the year 1831." This act was approved on July 12, 1830, and came into force in 1831, when Gardner D. Williams was elected supervisor.

The name Saginaw is derived from the language of the Chippewa Indians and means "Land of the Sauks." The Sauks inhabited the entire Saginaw Valley until about 1520, when the Chippewas invaded the territory in great numbers, and in a series of battles, the Sauks were virtually annihilated. The bloodiest battle was fought on what has since been known as Skull Island in the Saginaw River and on a bluff on the Flint River about a mile from the present Village of Flushing.

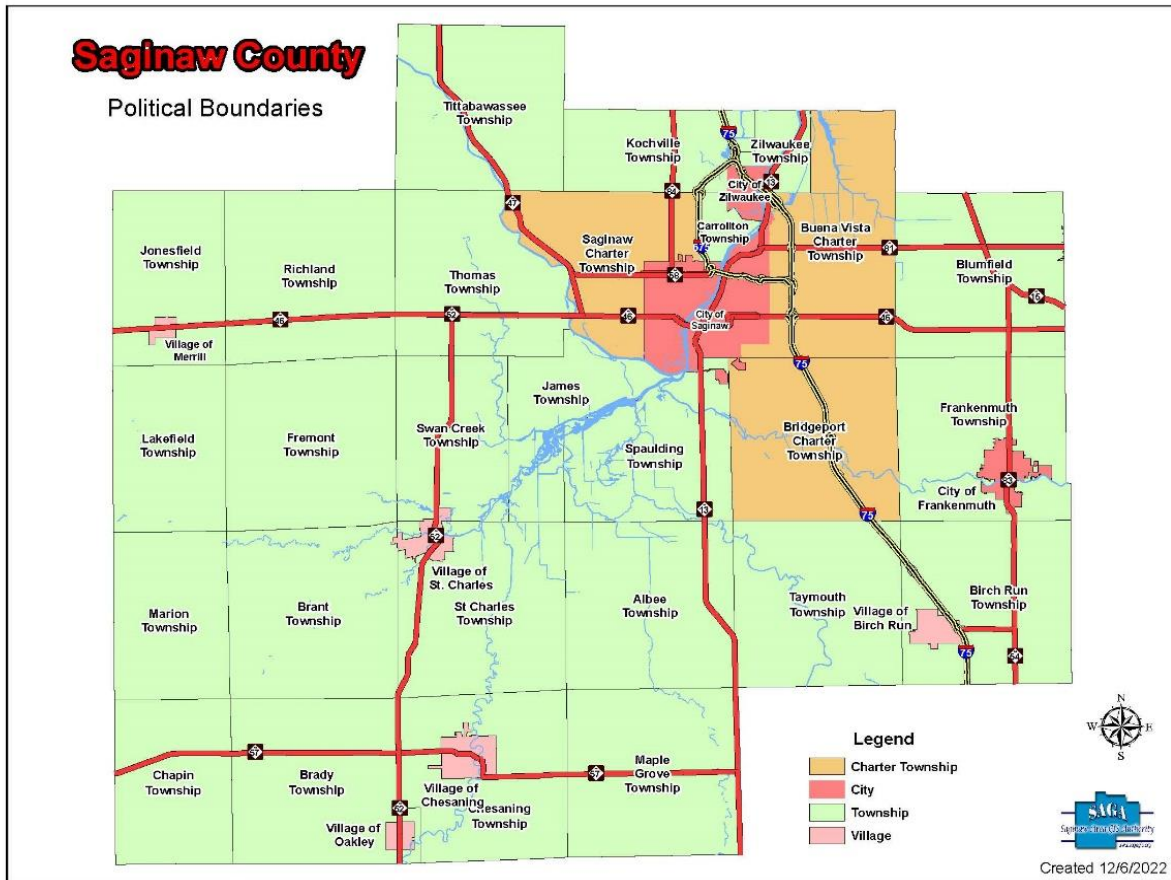
2.1.2 Political Sub-Divisions

Saginaw County contains 35 local government units, including twenty-four civil townships, three charter townships, five villages, and three cities. These jurisdictions each have local decision-making authority for governmental functions such as land use planning, zoning, building codes, and other factors that could significantly influence hazard mitigation efforts.

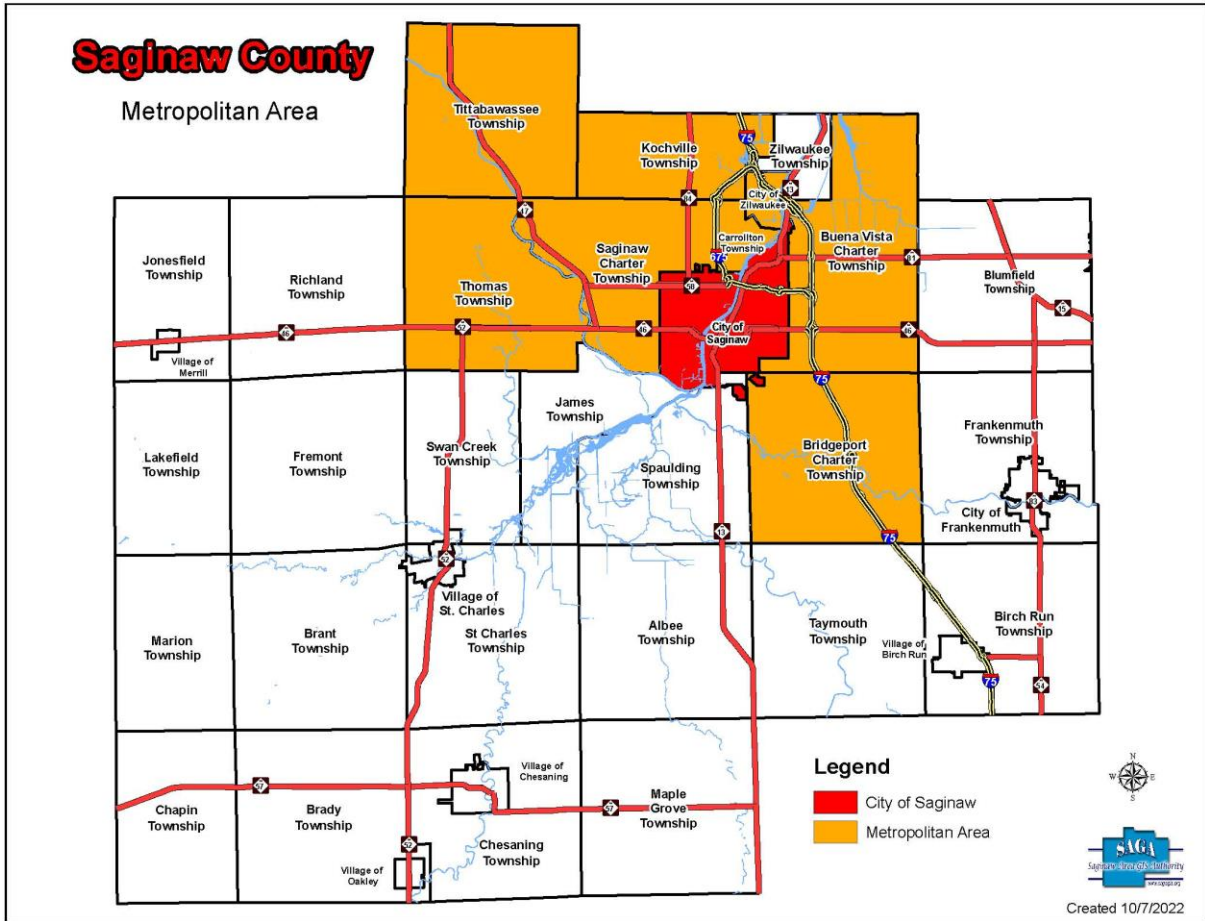
Saginaw County has been divided into Metropolitan and Out-County Areas for this Plan. The Metropolitan area consists of jurisdictions with the county's highest population but may not fit the Census definition of an Urban Area. Jurisdictions outside of the Metropolitan Area are labeled as Out-County. [*Map 1*](#) shows

the political jurisdictions in Saginaw and the structure of local government. *Map 2* shows a graphical representation of the Metropolitan and Out-County Areas and the City of Saginaw in the Metropolitan Area.

Map 1 – Political Boundaries & Structure of Government



Map 2 – Metropolitan and Out-County Areas



2.2 GEOGRAPHY AND ENVIRONMENT

2.2.1 Topography

Overall, the topography of Saginaw County can be described as flat; there is only about a 150-foot difference between the lowest and highest parts over its 816 square miles. Generally, the lower elevations exist toward the center of the County, around the Shiawassee Flats, and follow the path of the Saginaw River north into Bay County. The highest elevations exist in the southwestern corner of the County.

2.2.2 Soils

Saginaw County soils are a relatively unconsolidated variety of soil types. Since these soils were either deposited on the bottom of post-glacial lakes or piled up by wave action at lakeshores, they are generally fine-grained and of low permeability. Saginaw County’s soils range from loose sand to heavy clays. The

County's most common type of soil is loamy, which occupies about 33% of the land area. Loams and heavier soils in the area are utilized as productive farmland.

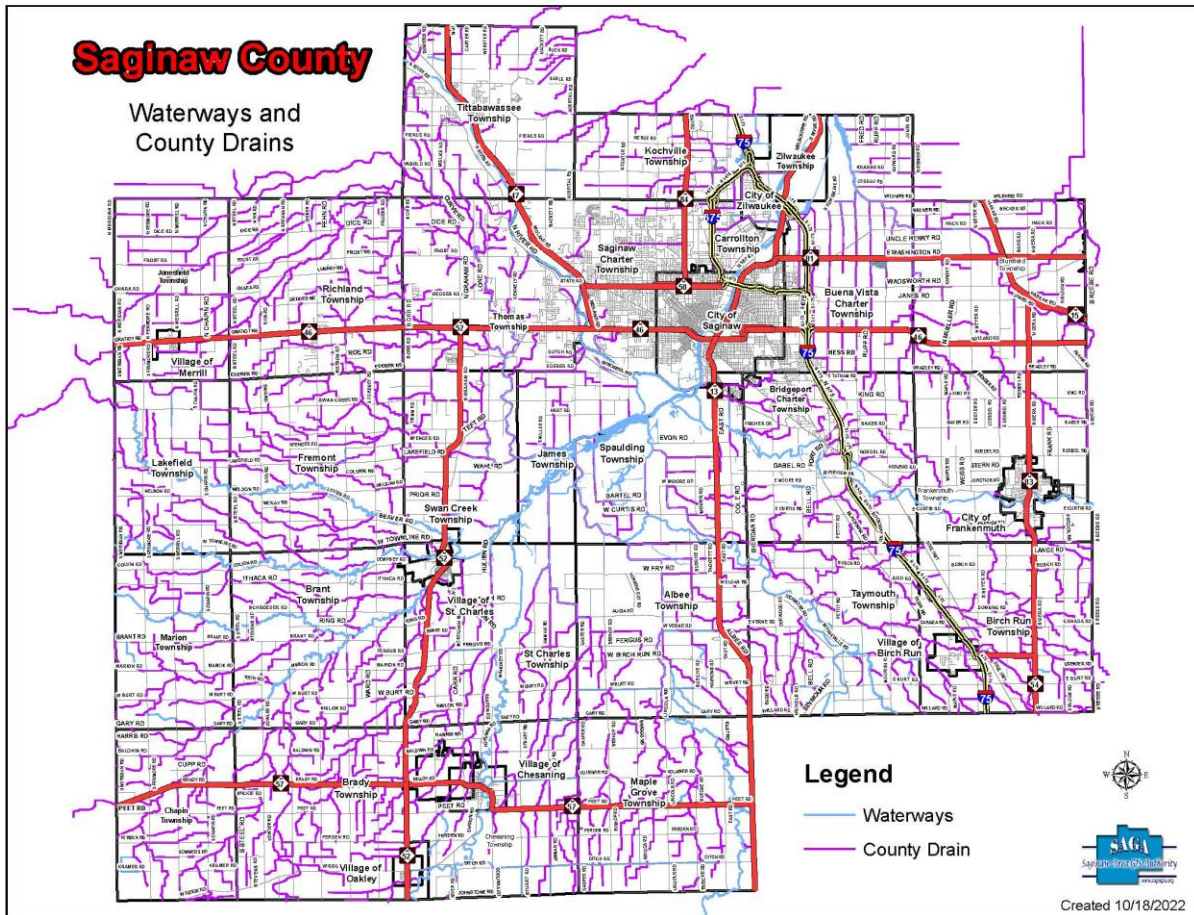
2.2.3 Drainage and Water Features

Due to the low elevation within the County, and its location in the heart of the Saginaw Valley, the confluence of the Saginaw River and several of its tributaries are within the County. The Tittabawassee, Cass, Shiawassee, and Flint Rivers are the most important; branches of the Bad River, Swan Creek, Beaver Creek, Mistequay Creek, and Cheboyganing Creek are also significant. Numerous small streams feed into the larger tributaries listed above.

The Saginaw County Department of Public Works maintains drainage ditches in the County. The Department maintains approximately 900 open drains totaling 1,800 miles and 300 partially enclosed drains totaling 400 miles. The significant waterways and drains in Saginaw County are shown in Map 3.

Saginaw County sits above two groundwater systems. Most of Saginaw is above the Saginaw Aquifer, a bedrock aquifer that overlies the Saginaw Confining Unit. The western areas of the County are above the Saginaw Confining Unit only.

Map 3 – Saginaw County Waterways and Drains



2.2.4 Wildlife

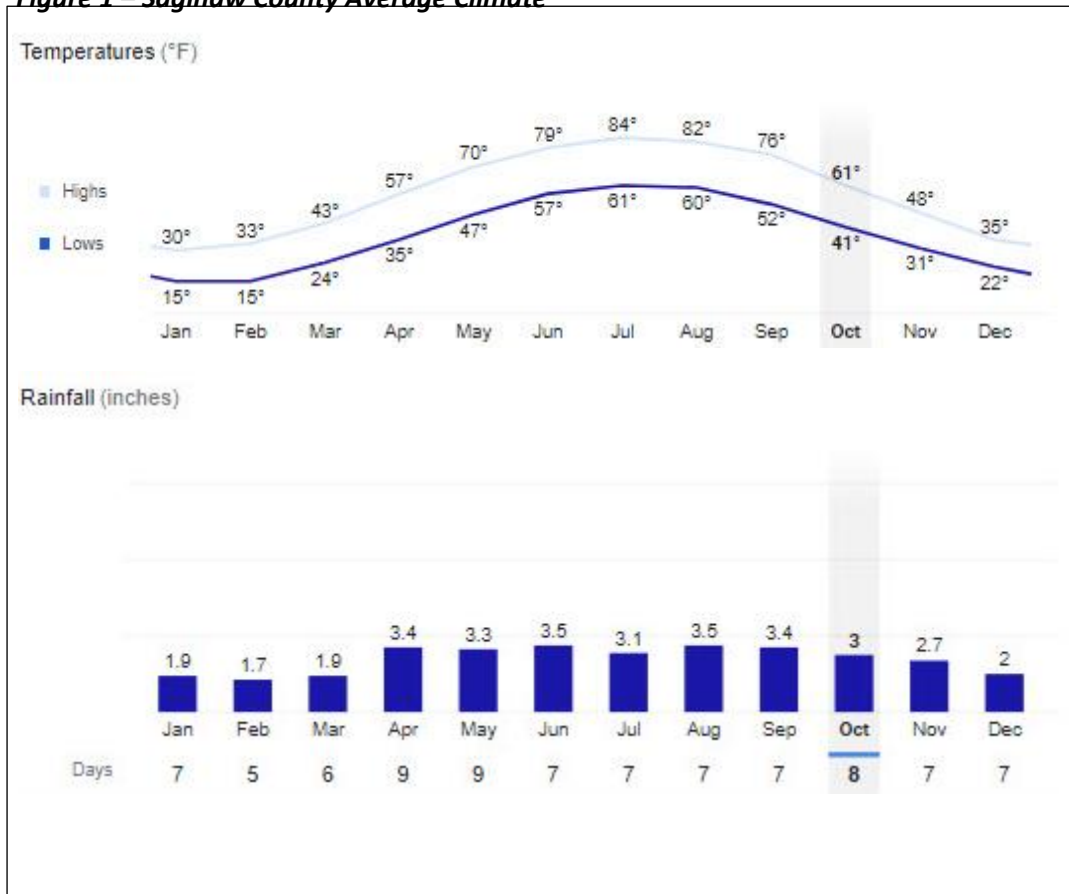
The wildlife of Saginaw County occupies forests, farmlands, wetlands, and surface waters. It includes a variety of birds, mammals, reptiles, amphibians, and fish. The Shiawassee National Wildlife Refuge, Shiawassee State Game Area, Crow Island State Game Area, and Gratiot-Saginaw State Game Area significantly impact the ability to maintain natural habitats and native animals.

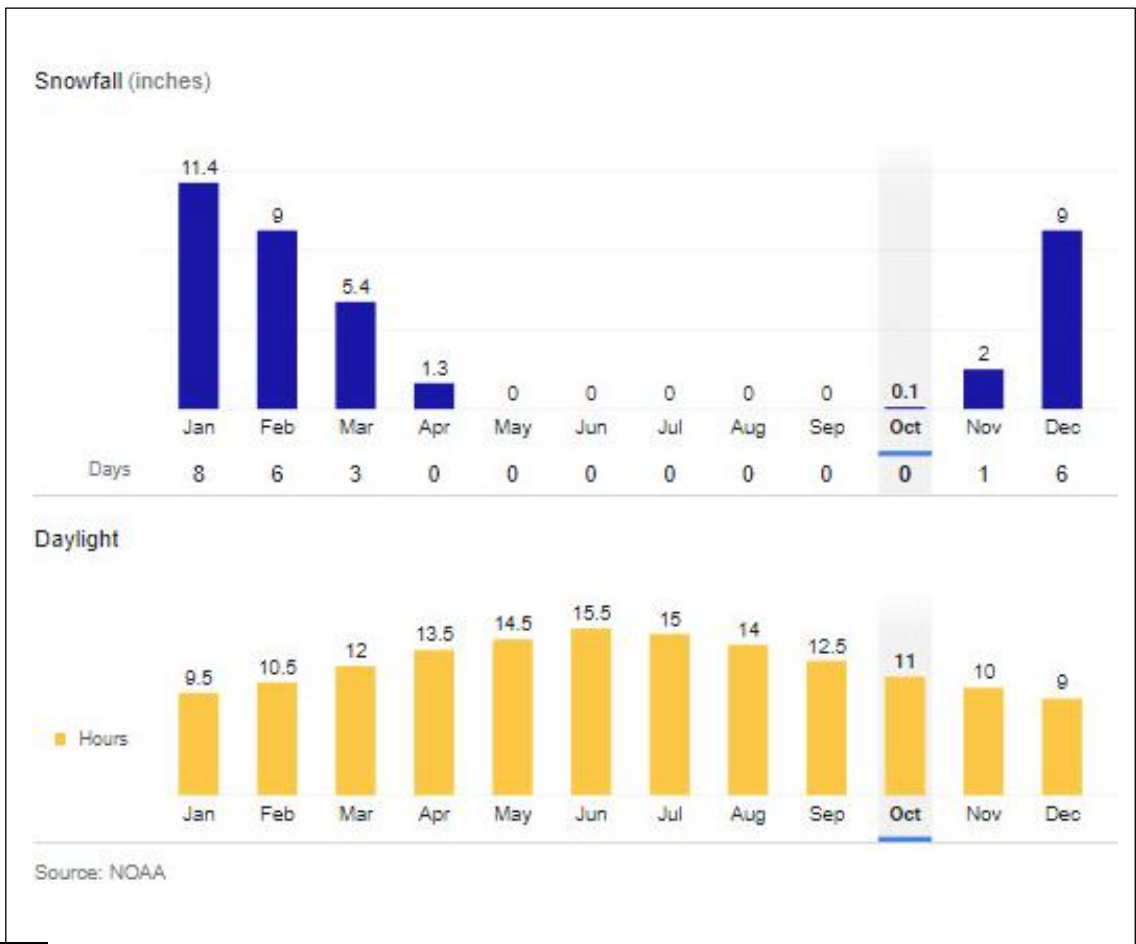
2.2.5 Climate

As with other northern interior areas of North America, the climate in Saginaw County is considered Humid Continental. The location means local temperatures are more extreme and experience a more significant season temperature difference than coastal locations at similar latitudes. The inland area of the County offers some protection from the weather that the Great Lakes influence.

The average annual temperature in Saginaw County is 47°F, with an average high of 57° and a low of 38°F. The record high of 111°F was on July 13, 1955, and a record low of -23°F on February 5, 1918. In addition, Saginaw County receives an average of 33.3 inches of rain and 42 inches of snow each year. Additional average climate information (e.g., temperatures, rainfall, snowfall, and daylight hours) is below.

Figure 1 – Saginaw County Average Climate





2.3 POPULATION AND DEMOGRAPHICS

Population and demographic information can be valuable to communities in planning the types, numbers, and locations of services offered. In addition, first responder agencies may use this information when creating response plans. For example, areas with an older population may require more assistance during evacuations or other emergency responses than younger ones.

The population and demographic data were taken from the US Census Bureau and Censusreporter.org websites.

2.3.1 Population Trends

Saginaw County has an estimated population of 190,124, according to the 2020 Census. The 30-year population trend for Saginaw County shows a 10% decline in population from 1990 to 2020. Population estimates for 2021 are even lower at 189,591 countywide. The 30-year population trend in Michigan showed a 7% increase from 9.31 million in 1990 to a 2020 population of 9.9 million.

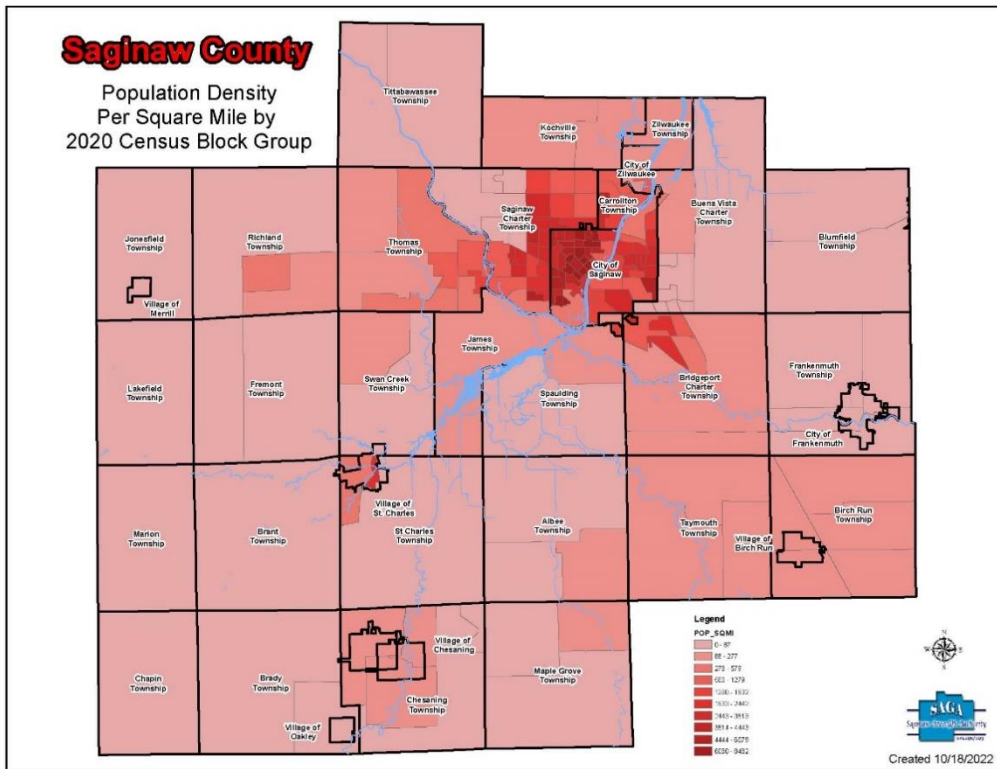
Table 4 – Thirty Year Population Trends

Area	1990	2000	2010	2020	% +/-
Michigan	9,310,000	9,952,000	9,878,00	9,967,00	7%
Saginaw County	211,946	210,039	200,169	190,124	-10%
Metropolitan Area	157,607	153,854	146,037	137,463	-13%
Out-County Area	54,339	56,045	53,834	52,405	-4%
Saginaw City	69,512	61,799	51,508	44,202	-37%

2.3.2 Population – Population Density

The map below shows the population density per square mile based on the 2020 census population.

Map 4 – Saginaw County Population Density



2.3.3 Population – Age Distribution

The figures below show the historical median and current age distribution of Saginaw County.

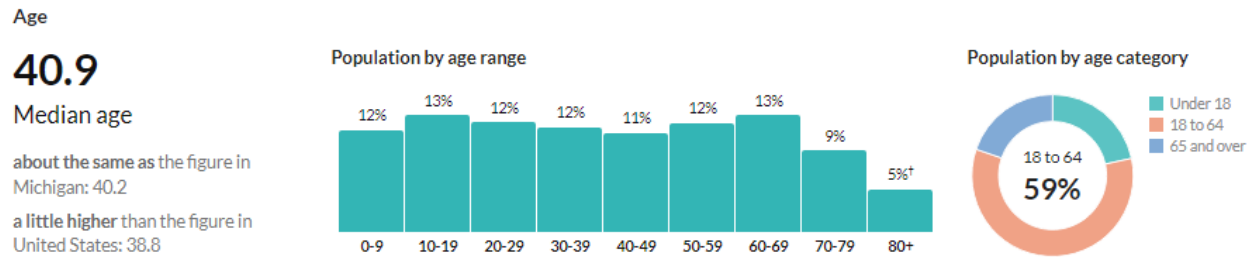


Figure 2 – Median Age / Population by Age Range

2.3.4 Population – Race & Ethnicity

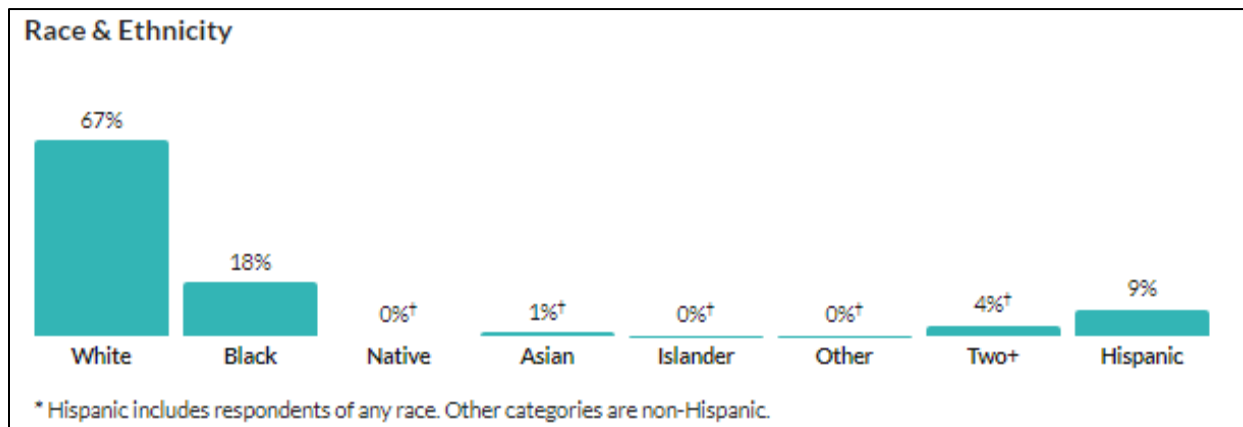


Figure 3 – Population by Race and Ethnicity

2.4 ECONOMICS, HOUSING, EDUCATION, INDUSTRY, AND LAND USE

2.4.1 Economics

Research suggests that people of different socioeconomic statuses may prepare for and respond to a disaster differently. For example, lower-income individuals may have limited ability to prepare for, evacuate, respond during, and recover from a disaster.

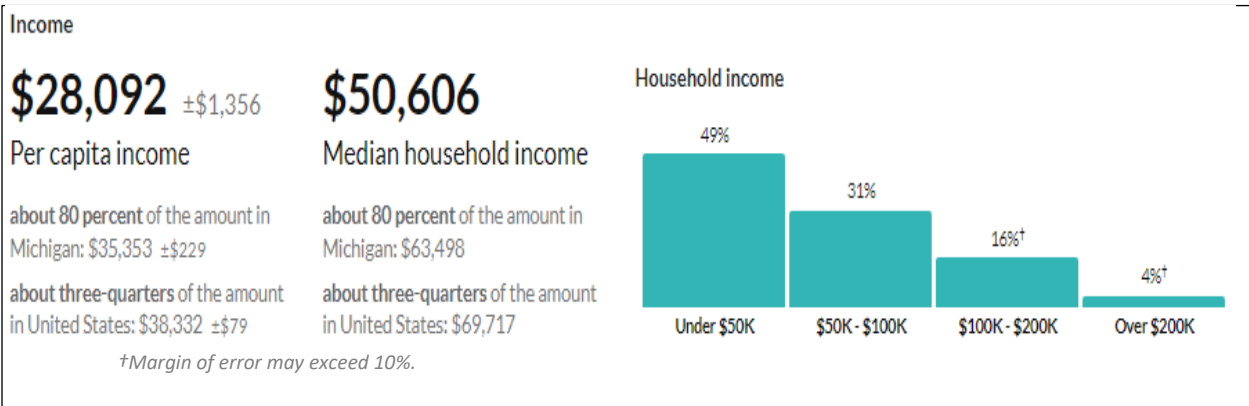


Figure 4 - Per Capita and Median Household Income

2.4.2 Housing

Natural disasters often impact housing costs by increasing the cost of materials for repairs and lowering the available housing stock. Those in areas of stable housing with higher property values may have more resources to withstand the adverse effects of a disaster.

If there are many destroyed properties after a disaster, the size of the housing stock (vacant and available housing) that is affordable will also impact a person’s ability to recover. Additionally, homeowners with more significant equity may have additional financial opportunities to repair property damage.

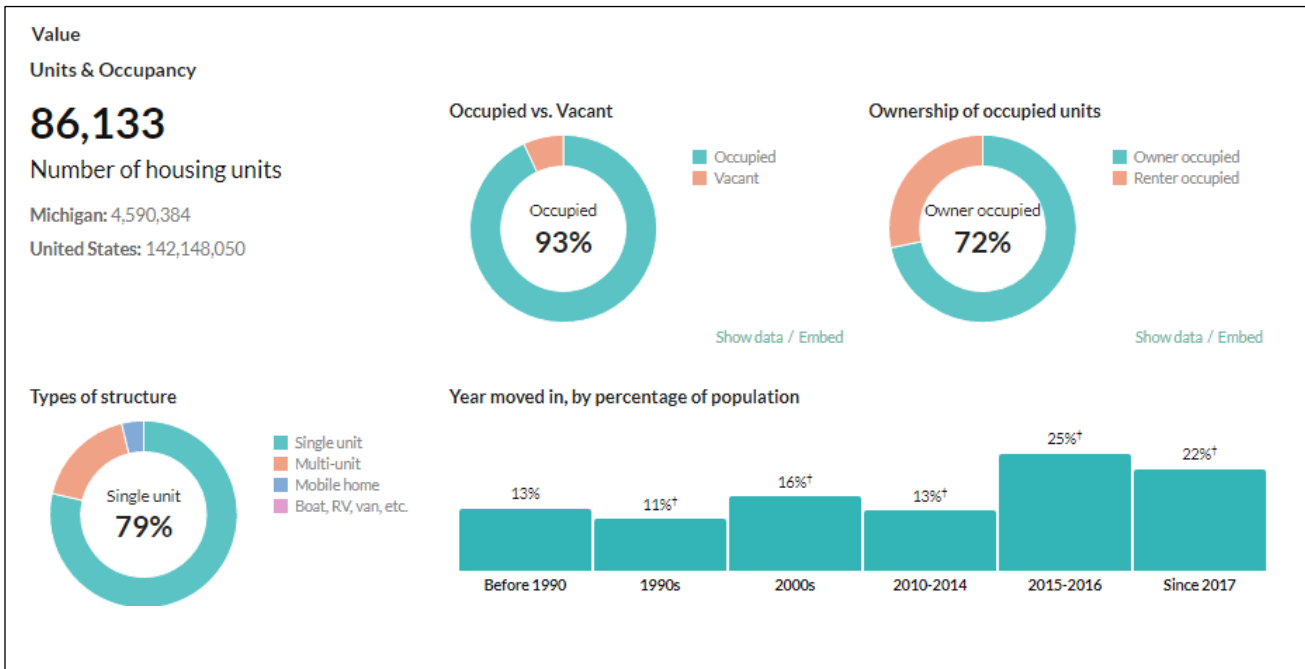


Figure 5 – Housing Occupancy & Value

2.4.3 Education

Studies have shown that the ability to prepare and recover economically and psychologically from a disaster can be related to the level of education attained; those with a higher education level can recover more completely. This resiliency may be related to education's impact on a person's financial resources.

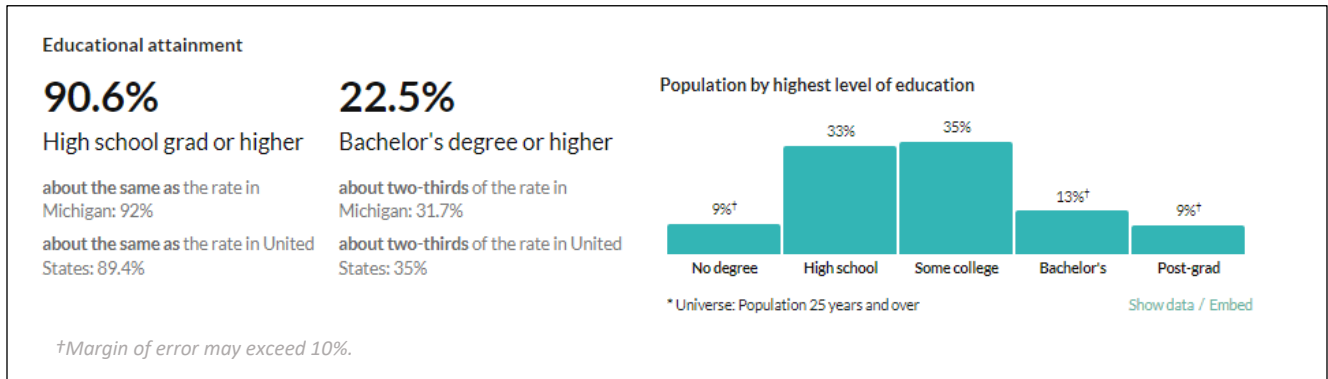


Figure 6 – Educational Attainment

2.4.4 Industry

Saginaw County is home to many multinational corporations, mid-size manufacturing companies, agricultural businesses, retailers, and startups. The diverse range of businesses in the area allows for investment opportunities in all industry sectors.

The twenty largest employers in Saginaw County are listed below.

Table 5 – Saginaw County's Largest Employers

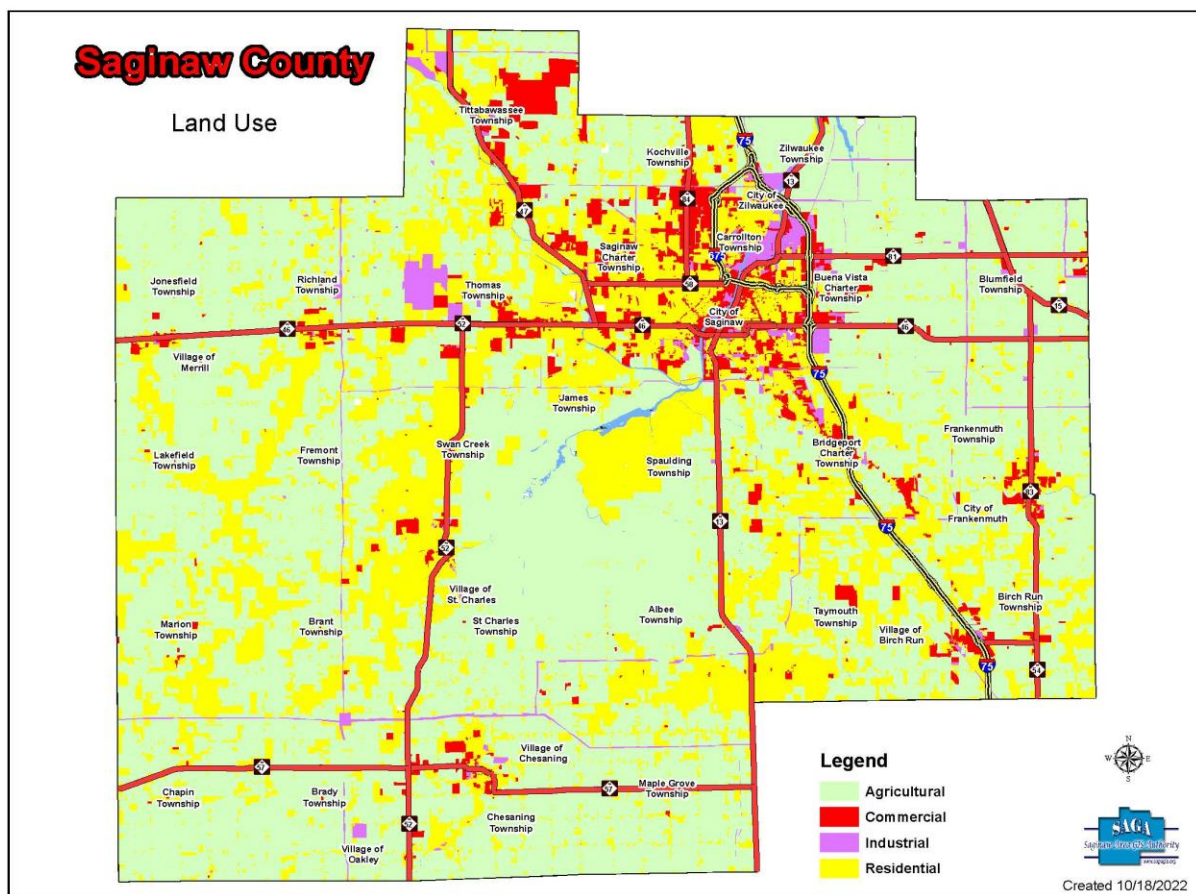
EMPLOYER	INDUSTRY	EMPLOYEES
Covenant HealthCare	Medical	4,800
Nexteer Automotive	Manufacturing	3,800
Morley Companies	Display, Interactive Services, Travel	2,148
Meijer	Retail Store	1,425
Ascension St. Mary's	Medical	1,325
Saginaw Valley State University	Higher Education	1,001
Frankenmuth Bavarian Inn	Hospitality	1,000
VA Medical System	Medical	982
Means Industries	Manufacturing	832
Frankenmuth Insurance	Financial	747
Saginaw ISD	Education	690
Hemlock Semiconductor	Manufacturing	660

EMPLOYER	INDUSTRY	EMPLOYEES
HealthSource Saginaw	Medical	617
County of Saginaw	Government	613
General Motors - SMCO	Manufacturing	582
Saginaw Public Schools	Education	576
Great Lakes Bay Health Centers	Medical	568
Saginaw Twp Community Schools	Education	521

2.4.5 Development & Land Use

The land use pattern in Saginaw County reflects a blending of urban activity in the heart of the Metropolitan Areas and agricultural fields, small towns, and undeveloped land on the periphery of Metropolitan Saginaw and the Out-County Areas.

Map 5 – Saginaw County Land Use



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SECTION 3 – INFRASTRUCTURE & CAPABILITIES

This section summarizes the capabilities of Saginaw County and its local jurisdictions that can support hazard mitigation. It also outlines the existing infrastructure for Saginaw County that influence a communities’ ability to mitigate, respond to, and recover from a disaster.

- Capability Assessment
- Public Safety Agencies
- Transportation
- Utilities

3.1 CAPABILITY ASSESSMENT

This section examines the existing studies, plans, programs, and policies incorporated into the local and county government processes. The purpose is to highlight success, identify shortcomings, and lay the groundwork for possible improvement. The adopting jurisdictions recognize that including mitigation initiatives benefits the community by reducing human suffering, property damage, and recovery costs and helps maintain a sustainable economy.

A capability assessment was conducted with each jurisdiction to identify existing success, identify shortcomings, and provide the groundwork for possible improvements. The capability assessment focused on four key areas.

3.1.1 Planning and Regulatory Capabilities

Planning and regulatory capabilities are based on implementing ordinances, policies, local laws, plans, and programs that guide and manage growth and development. Planning capabilities refer not only to the current plans and regulations but also to the community’s ability to change and improve those plans and regulations as needed.

Table 6 – Capability Assessment, Planning, and Regulatory

Jurisdiction	Comprehensive Master Plan	Zoning Ordinances	Transportation Plan	Capital Improvement Plan	NFIP Participating Community	Flood Insurance Rate Maps (FIRM) Date	Storm Water Management Plan	Emergency Operations Plan	Continuity of Government & Operations Plan	Disaster Recovery Plan
Ablee Twp	X	X			X	Oct-97	X	X		
Birch Run Twp	X	X	X	X				X	X	X
Birch Run Village		X			X	NSFHA				

Jurisdiction	Comprehensive Master Plan	Zoning Ordinances	Transportation Plan	Capital Improvement Plan	NFIP Participating Community	Flood Insurance Rate Maps (FIRM) Date	Storm Water Management Plan	Emergency Operations Plan	Continuity of Government & Operations Plan	Disaster Recovery Plan
Blumfield Twp	X						X	X	X	X
Brady Twp	X	X								
Brant Twp		X			X	Oct-97				
Bridgeport Twp	X	X		X	X	Oct-97	X	X	X	
Buena Vista Twp	X	X	X	X	X	Oct-97	X	X	X	X
Carrollton Twp	X	X		X	X	Oct-97	X	X	X	X
Chapin Twp	X			X					X	
Chesaning Twp	X	X			X	NSFHA				
Frankenmuth Twp	X	X	X		X	Oct-97	X	X	X	X
Frankenmuth City	X	X	X	X	X	Oct-97	X	X	X	X
Fremont Twp	X	X								
James Twp	X	X	X	X	X	Oct-97	X	X	X	X
Jonesfield Twp	X	X								
Kochville Twp	X	X		X	X	Oct-97	X	X		
Lakefield Twp	X	X								
Maple Grove Twp		X			X	Oct-97				
Merrill Village	X	X		X			X	X	X	
Oakley Village	X	X					X	X		X
Richland Twp	X	X						X		
Saginaw City	X	X		X	X	Oct-97	X	X	X	
Saginaw County			X	X		N/A	X	X	X	
Saginaw Twp	X	X	X	X	X	Oct-97	X			X
Spaulding Twp	X	X		X	X	Oct-97		X	X	X
St Charles Village	X	X		X	X	NSFHA	X			
Swan Creek Twp	X	X		X	X	Oct-97	X	X	X	X
Taymouth Twp	X	X	X	X	X	Oct-97	X	X	X	X
Thomas Twp	X	X		X	X	Oct-97	X	X	X	X
Tittabawassee Twp	X	X	X	X	X	Oct-97	X	X	X	X
Zilwaukee City	X	X	X	X	X	Oct-97	X	X	X	X

3.1.2 Administrative and Technical Capabilities

Administrative and technical capability refers to the community’s staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively.

Table7 – Capability Assessment – Administrative & Technical

Jurisdiction	Planning Commission	Community Planner	Mutual Aid Agreements	Building Inspector (Department)	Floodplain Administrator	Emergency Manager or EM Liaison	GIS Coordinator	ISO Rating	Outdoor Warning Siren	Designated Grant Writer
Albee Twp	X		X	X	X		X	8		
Birch Run Twp	X	X	X	X			X	5	X	
Birch Run Village	X		X	X						
Blumfield Twp	X		X	X					X	
Brady Twp	X		X	X			X			
Brant Twp	X		X	X			X		X	
Bridgeport Twp	X		X	X	X	X	X	5	X	X
Buena Vista Twp	X	X	X	X	X	X	X	5		
Carrollton Twp	X		X	X	X	X	X	5	X	
Chapin Twp		X	X	X			X			
Chesaning Twp	X		X	X			X		X	
Frankenmuth City	X	X	X	X	X	X	X	4/4y	X	
Frankenmuth Twp	X		X	X	X	X		4/4y		
Fremont Twp	X		X	X			X		X	
James Twp	X	X	X	X	X	X		5/5x	X	X
Jonesfield Twp	X	X	X						X	
Kochville Twp	X	X	X	X	X	X		5		
Lakefield Twp	X		X	X			X			
Lakefield Twp	X	X	X	X			X			
Maple Grove Twp	X		X	X				8	X	
Merrill Village	X	X	X	X				5	1	
Oakley Village			X	X			X		X	
Richland Twp	X	X	X	X		X		5/5b		
Saginaw City			X	X		X	X	3	X	
Saginaw County	X		X			X	X			

Jurisdiction	Planning Commission	Community Planner	Mutual Aid Agreements	Building Inspector (Department)	Floodplain Administrator	Emergency Manager or EM Liaison	GIS Coordinator	ISO Rating	Outdoor Warning Siren	Designated Grant Writer
Saginaw Twp	X	X	X	X	X	X		3	X	
Spaulding Twp	X	X	X	X	X	X	X	5	X	
St Charles Village	X			X	X				X	X
Swan Creek Twp	X	X	X	X		X	X	5y	X	
Taymouth Twp	X	X	X	X		X	X	6	X	
Thomas Twp	X	X	X	X	X	X	X	4	X	
Tittabawassee Twp	X	X	X	X	X	X	X	5/5		
Zilwaukee City	X		X	X			X	5	X	

3.1.3 Financial and Outreach Capabilities

Financial Capabilities

Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The costs associated with implementing mitigation activities vary. Some mitigation actions, such as building assessment or outreach efforts, require little to no cost other than staff time and existing operating budgets. Other actions, such as acquiring flood-prone properties, could require a substantial monetary commitment.

Education and Outreach Capabilities

This capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Table 8 – Financial and Outreach Capabilities

Financial Capability					Education and Outreach	
Jurisdiction	Community Development Block Grants	Authority to Levy Taxes for Specific Purposes	Fees for Utility Services	Incur Debt Through Tax Bonds	Ongoing Public Educations Programs	School Programs Related to Emergency Response
Albee Twp	X	X			X	
Birch Run Twp		X	X	X	X	X
Birch Run Village	X	X	X	X		
Blumfield Twp			X			X
Brady Twp		X				
Brant Twp						
Bridgeport Twp		X	X	X	X	X
Buena Vista Twp	X	X	X	X		
Carrollton Twp		X	X	X	X	X
Chapin Twp	X				X	
Chesaning Twp		X				X
Frankenmuth City		X	X	X	X	X
Frankenmuth Twp		X	X	X	X	X
Fremont Twp					X	
James Twp		X	X	X	X	
Jonesfield Twp		X	X			
Kochville Twp		X	X		X	
Lakefield Twp		X				
Lakefield Twp		X	X			X
Maple Grove Twp		X				
Merrill Village		X	X	X	X	X
Oakley Village		X	X	X	X	
Richland Twp		X	X	X		X
Saginaw City	X	X	X	X	X	X
Saginaw County		X		X		X
Saginaw Twp	X		X	X	X	X
Spaulding Twp		X	X		X	X
St Charles Village		X	X	X		X
Swan Creek Twp		X	X		X	X

Financial Capability					Education and Outreach	
Jurisdiction	Community Development Block Grants	Authority to Levy Taxes for Specific Purposes	Fees for Utility Services	Incur Debt Through Tax Bonds	Ongoing Public Educations Programs	School Programs Related to Emergency Response
Taymouth Twp		X			X	X
Thomas Twp	X	X	X		X	X
Tittabawassee Twp	X	X	X		X	X
Zilwaukee City		X	X	X		X

3.2 PUBLIC SAFETY AGENCIES

3.2.1 Fire Service

Local jurisdictions provide Fire Prevention and Protection activities with a mix of paid, paid-on-call, and volunteer firefighters totaling approximately 460 (excluding administrative personnel) countywide. With some departments covering more than one jurisdiction, Saginaw County has 22 public fire agencies. In addition, the Midland-Bay-Saginaw International Airport and Hemlock Semi-Conductor maintain fire suppression capabilities.

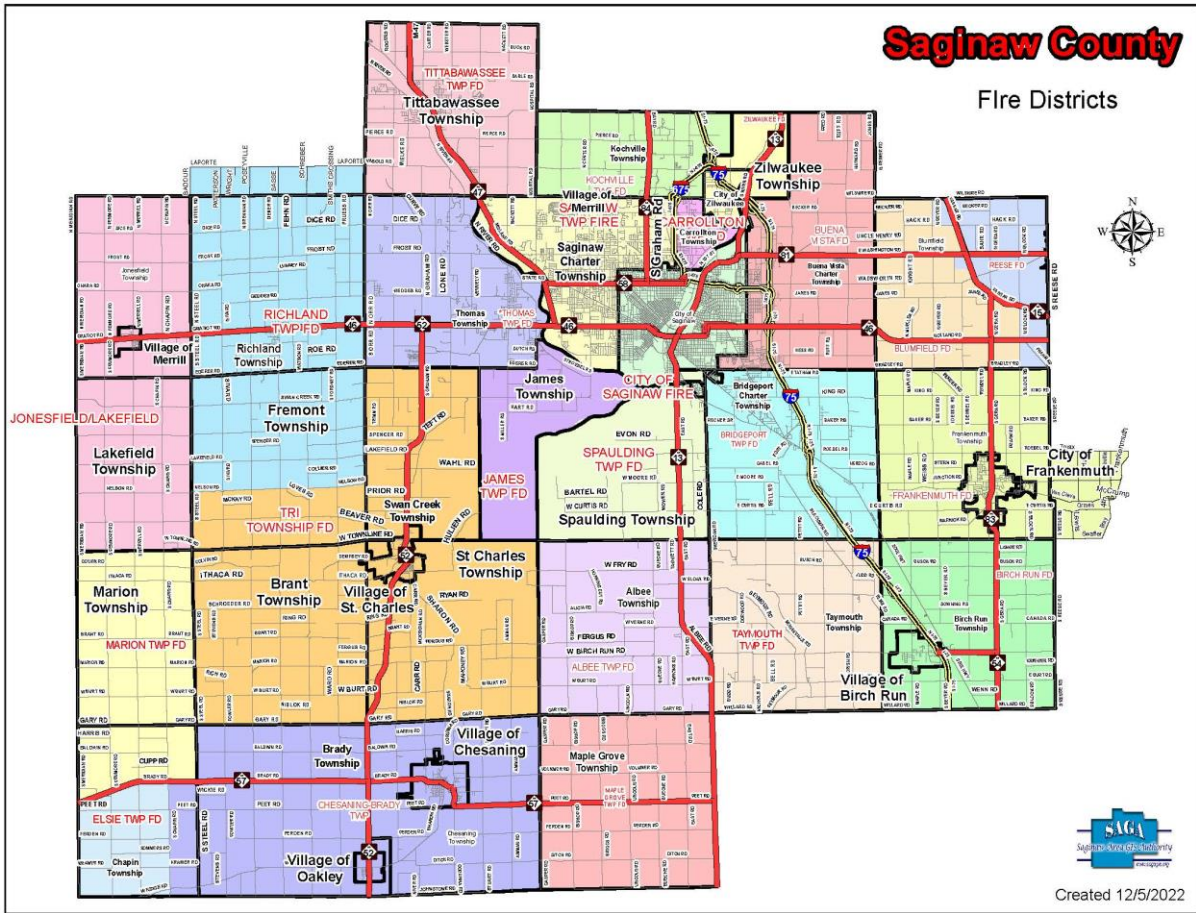
Table 9 – Saginaw County Fire Agencies

DEPARTMENT	RESPONSE TYPE	STAFFING	EMS RESPONSE
Albee Township FD	Volunteer	13	No
Birch Run Township FD	Paid on Call	20	Yes
Blumfield Township FD	Volunteer	17	Yes
Bridgeport Twp FD	Combination Paid & Paid on Call	16	Yes
Buena Vista Twp FD	Combination Paid & Paid on Call	16	Yes
Carrollton Twp FD	Paid on Call	8	No
Chesaning- Brady Twp FD	Paid On Call	24	No
Frankenmuth City FD (Also covers Frankenmuth Twp)	Volunteer	32	EMS Provided by PD
James Twp	Volunteer	17	Yes

DEPARTMENT	RESPONSE TYPE	STAFFING	EMS RESPONSE
Jonesfield-Lakefield Twp FD	Volunteer	16	Yes
Kochville Twp FD	Paid on Call	21	Yes
Maple Grove Twp FD	Volunteer	24	No
Marion Twp FD	Volunteer	12	Yes
Richland Twp FD	Paid On Call	25	Yes
Saginaw City FD	Paid	38	No
Saginaw Twp FD	Paid On Call	55	EMS Provided by PD
Spaulding Twp FD	Volunteer	12	No
Taymouth Twp FD	Paid On Call	15	Yes
Thomas Twp FD	Paid on Call	31	Yes
Tittabawassee Twp FD	Volunteer	18	Yes
Tri-Twp FD (Covers St. Charles, Swan Creek, and Brant Twps)	Paid On Call	26	No
Zilwaukee City (Also covers Zilwaukee Twp)	Volunteer	14	Yes
MBS Intl Airport	Paid	7	Yes

In addition to standard fire suppression capabilities, several Saginaw County Departments are members of the multi-jurisdictional Saginaw County Technical Rescue Team. This team is well equipped to respond to hazardous materials, high-angle, trench, and confined space incidents throughout Saginaw County. For incidents where the Saginaw County team may need additional assistance with capabilities or staffing, the Regional Response Team (RRT) for Region 3 is based in Midland County. Some members of the Saginaw County Team also respond with the R3-RRT.

Map 6: Saginaw County Fire Districts



3.2.2 Law Enforcement Services

Saginaw County has 24-hour, 7-day-a-week law enforcement services provided by the Saginaw County Sheriff’s Office and the Michigan State Police. Additionally, fifteen municipalities, including the Veterans Administration Hospital, provide primary law enforcement services that may be supplemented by the Sheriff’s Office of State Police.

Table 10: Saginaw County Law Enforcement Agencies

AGENCY	TYPE OF COVERAGE	STAFFING
Birch Run Village Police	24-7	7
Bridgeport Twp Police	24-7	9
Buena Vista Twp Police	24-7	-
Carrollton Twp Police	24-7	6
Chesaning Village Police	Partial	-
Delta College Police	Partial coverage for college property downtown	10

AGENCY	TYPE OF COVERAGE	STAFFING
Frankenmuth City Police	24-7	12
Michigan State Police (Tri-City Post also covers Midland and Bay Counties)	24-7	58
Richland Twp Police (Also covers Merrill Village)	24-7	5
Saginaw County Sheriff's Office	24-7	43
Saginaw City Police	24-7	62
Saginaw Township Police	24-7	43
Saginaw Valley State University Police	24-7	9
St Charles Village Police	Partial	3
Thomas Twp Police	24-7	8
Tittabawassee Twp Police	24-7	11
Zilwaukee City Police	Partial	3

The following special law enforcement response capabilities exist in Saginaw County.

Table 11 – Specialized Law Enforcement Units

SPECIALIZED UNIT	AGENCY
Emergency Services (SWAT Team)	Multijurisdictional, with Saginaw PD being the sponsoring agency.
Crime and Lab and Crime Scene Investigation	Michigan State Police
Bomb Squad	Michigan State Police
Dive Team	Saginaw County Sheriff's Office
Aviation (Fixed Wing & Drone)	Saginaw County Sheriff's Office
Mounted Posse	Saginaw County Sheriff's Office
K-9 (Narcotics, Explosives, Tracking)	Saginaw Police

Some agencies also maintain a reserve force of non-certified personnel that can be used to supplement staffing during large-scale events or incidents.

3.2.3 Corrections Facilities

Saginaw County is home to two correctional facilities. The Saginaw County Jail is a 511-bed facility operated by the Saginaw County Sheriff's Office and houses inmates sentenced to less than one year in jail and persons awaiting adjudication in the court system.

The Freeland Correctional Facility in Tittabawassee Twp. is a prison facility operated by the Michigan Department of Corrections. The 43-acre facility consists of 11 main buildings and houses a combination of Level I, II, and IV prisoners.

3.2.4 Emergency Dispatch / 911

Saginaw County 911 Central Dispatch serves as the Public Safety Answering Point (PSAP) in Saginaw County. All 911 calls ring into the center. Medical rescue calls are transferred to MMR for medical dispatch. 911 staff is responsible for screening 911 calls and dispatching all Saginaw County fire and police personnel.

3.2.5 Emergency Medical Services

Two EMS transport agencies serve Saginaw County. Twin-Township Ambulance is based out of New Lothrop (in Shiawassee County) and provides ALS transport services to a small area in southern Saginaw County. Mobile Medical Response (MMR) is a non-profit corporation based in the City of Saginaw that provides primary ALS services and medical dispatch within Saginaw County.

In addition to the ground transport services offered above, Saginaw County has two hospital-based rotary wing aviation assets. Flight Care is operated by Ascension St Mary’s and Life Net by Covenant Healthcare.

Two separate hospital systems serve Saginaw County. Ascension St. Mary’s is an ACS Level II Trauma Center with campuses on the east and west sides of the Saginaw River. Covenant Healthcare is an adult and pediatric Level II Trauma Center with two facilities on the west side of the river.

Both health systems operate numerous satellite offices throughout Saginaw County, offering urgent care, family practice, and specialty care services.

Table 12 – Saginaw County Hospital Capacity

HOSPITAL FACILITY	BED CAPACITY	ER BEDS	ICU BEDS
Covenant Healthcare	344	65	115
St Mary’s Medical Center – Washington	177	26	40
Aleda Lutz VA Medical Center (Serves Veterans Only)	100	N/A	N/A

3.3 TRANSPORTATION

Roadways

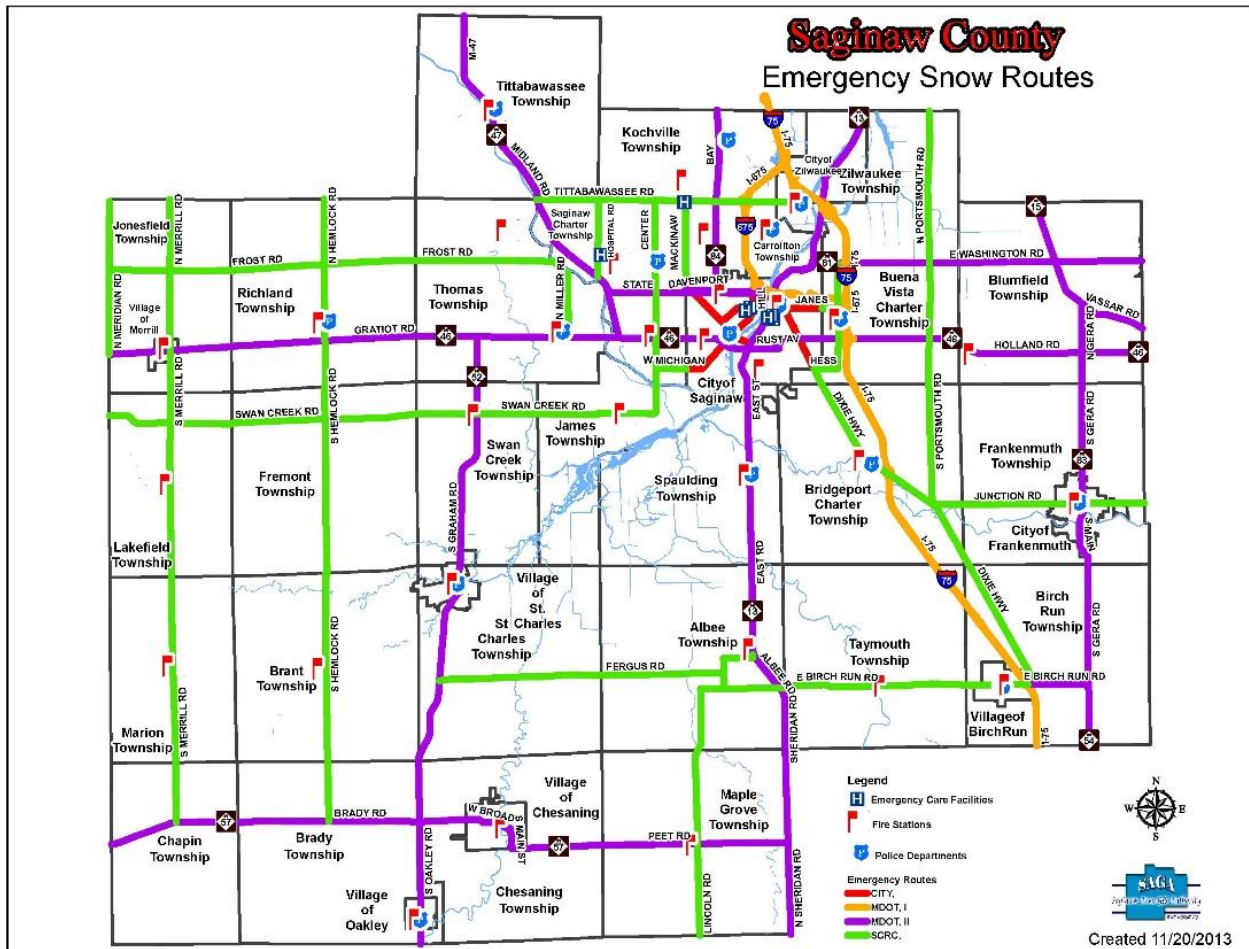
Saginaw County has approximately 2,817 miles of roadways. Most of these roadways are maintained by the Saginaw County Road Commission (SCRC.) SCRC has facilities throughout the County where crews and equipment are staged for maintenance and emergency response. In addition to the County maintained roads, the State of Michigan, cities, and villages keep roadways under their jurisdictions.

Table 13 – Saginaw County Roadway Types and Lengths

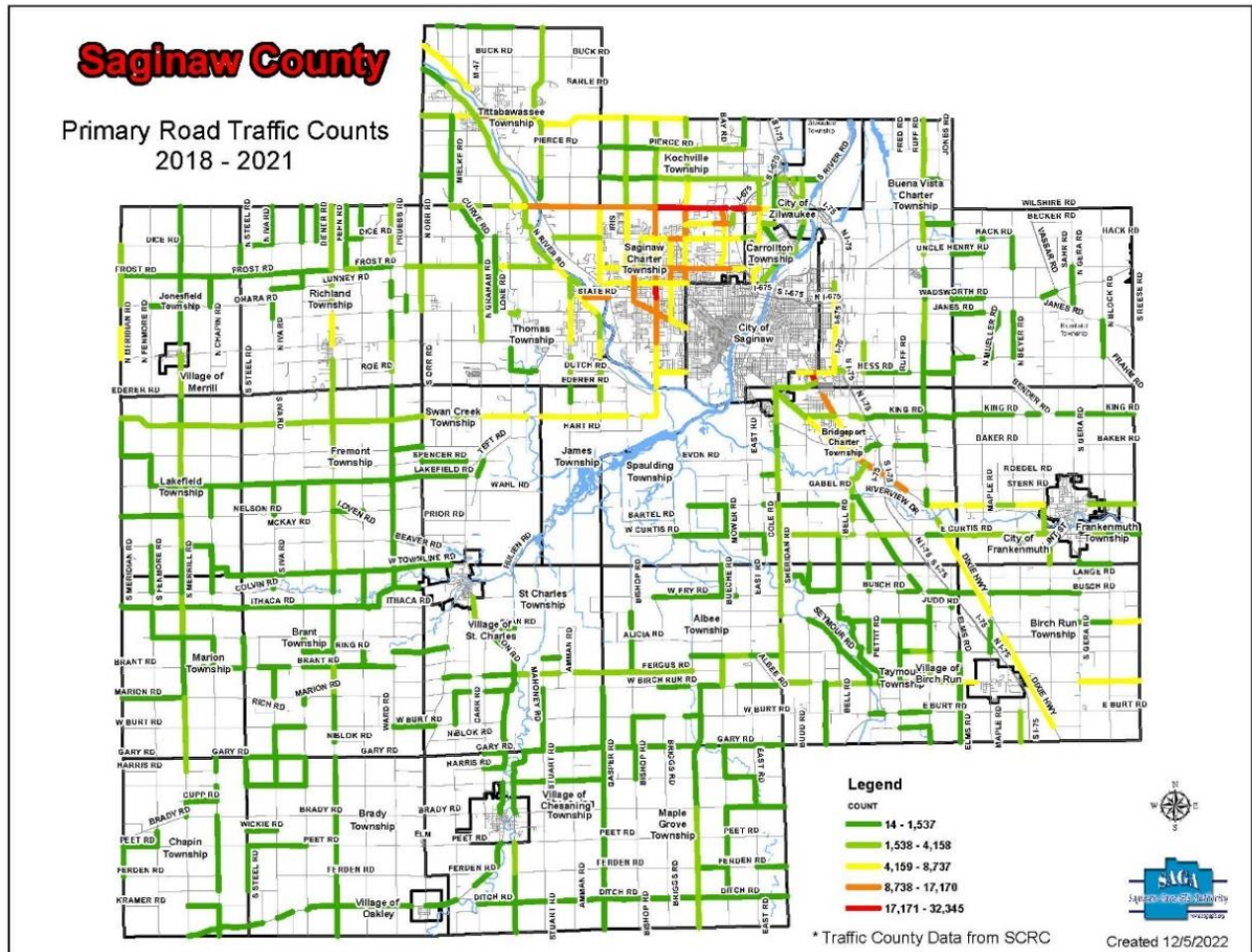
ROAD TYPE / CLASSIFICATION	MILES
County Primary Roads	506 miles
County Secondary/Local Roads	1,347 miles
State Trunk Lines	178.8 miles
Federal Highways	81.9 miles
City & Villages	Approx. 705 miles

Saginaw County has established an Emergency Route Plan that can be implemented during incidents where roadways may be impassable due to weather impacts or large amounts of debris. When activated, representatives from emergency response and road agencies (local, county, and federal) coordinate their response to ensure emergency route clearing is prioritized and dispatch crews to non-emergency roadways if emergency responders need assistance accessing areas to respond to emergency incidents.

Map 7 – Emergency Route Plan



Map 8 – Primary Rd Traffic Counts



Air

Saginaw County has four airports: two with paved and lighted runways and two with grass runways. Flint Bishop, a commercial and general aviation airport, is a 20–60-minute drive depending on where you are in Saginaw County.

- MBS International Airport is a commercial and general aviation airport in Tittabawassee Twp. Delta and United Airlines provide commercial air services, while Dow Chemical, Dow Corning, and Bierlein Companies maintain hangars for their private business use. There are two operational runways at MBS. Runway 5/23 is 8,002' long, and runway 14/32 is 6,400' long.
- The FAA categorizes H.W. Browne Airport as a local general aviation facility. It has two paved runways. Runway 9/27 is 5,000' and runway 5/23 is 2,951' in length.

Rail

Huron Eastern, Great Lakes Central Railroad, Mid-Michigan Railroad, and Lake State Railway operate all rail lines in Saginaw County. These lines carry chemical, agricultural, and other commercial commodities into and out of Saginaw County. The Lake State Railway Headquarters and rail yard are located within the northeast part of Saginaw City.

There is no direct intercity rail access in Saginaw. The closest access point to the passenger rail service is in Flint, which is accessible by motorcoach connection.

Public Ground Transportation

Public bus transportation is provided by the Saginaw Transit Authority Regional Services (STARS). Primary bus services are offered within the City of Saginaw; however, some routes service a limited number of other areas outside the city. The routes primarily travel to major shopping, employment, or education facilities.

The STARS route overlaps the Bay County Metro transit route at Saginaw Valley State University, allowing riders to access the public transit system that serves Bay County.

In addition to the public transit services, STARS offers a county-wide service providing transport to non-emergency medical appointments to passengers involved with one of STARS partner agencies.

3.4 UTILITIES

A combination of public and private companies provides utility services in Saginaw County. The level or type of services depends on location, with the greatest number of services being offered within the County metropolitan areas.

Electric

Consumers Energy is the primary electricity provider in Saginaw County; however, DTE Energy provides service to several areas along the Saginaw and Tuscola County borders near Frankenmuth.

Since the last HMP update in 2017, wind and solar power generation sites have been added to areas in Saginaw County.

Gas

Consumers Energy is the primary natural gas supplier in Saginaw County for residential and commercial customers. However, residents and businesses in areas not served by Consumers, primarily more rural areas of Saginaw County, mainly use propane. At the same time, a small percentage may still rely on fuel oil or other sources such as geothermal or solar.

Water and Sewer

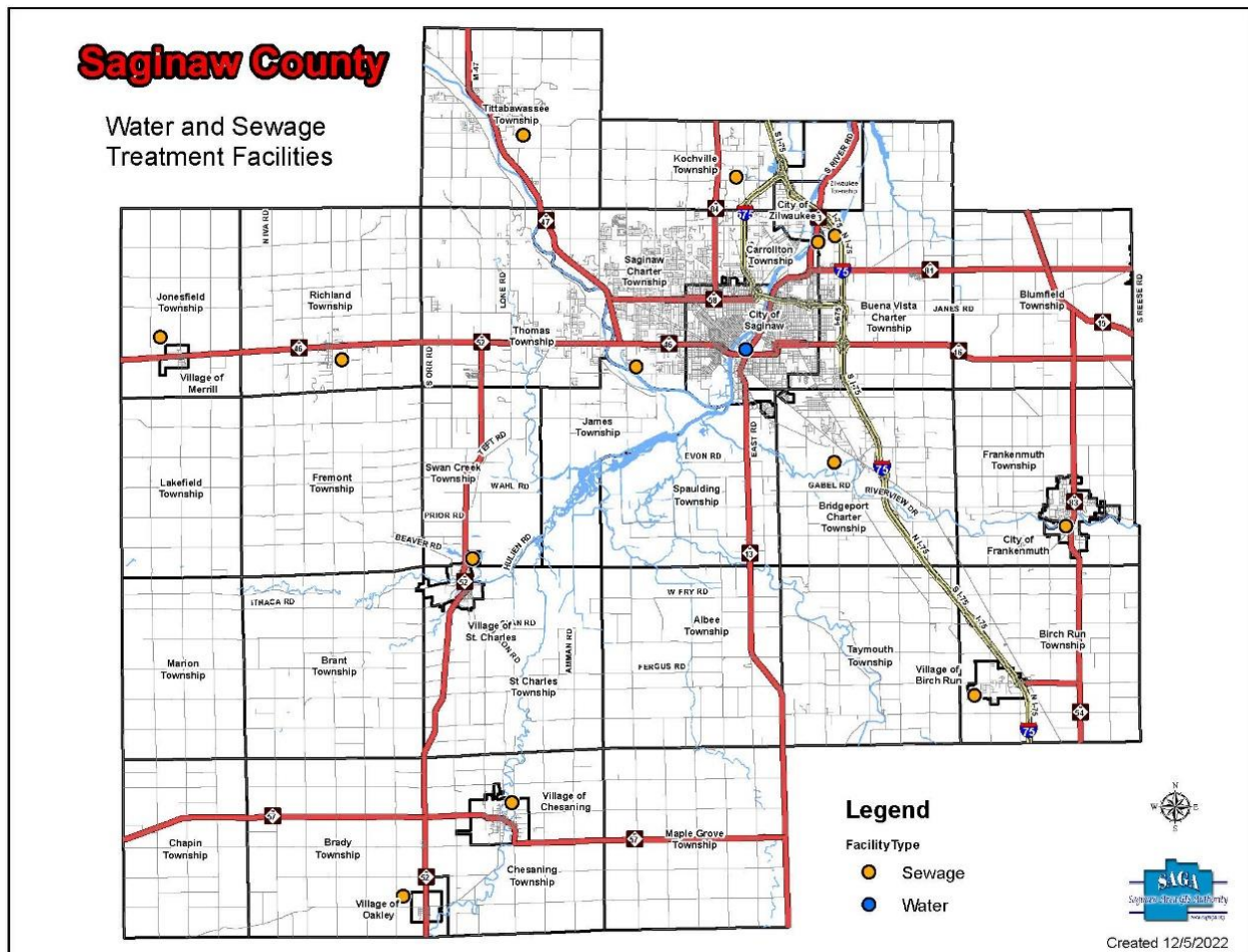
In Saginaw County, sewer systems for collecting and treating wastewater serve significant portions of the Metropolitan Area, particularly the urbanized areas. The Cities of Saginaw and Zilwaukee, as well as a substantial part or all of Saginaw, Bridgeport, Buena Vista, Carrollton, James, Kochville, Thomas, Spaulding, and Tittabawassee Townships, have access to municipal sewage systems.

Out-county municipalities, including the City of Frankenmuth, Villages of Birch Run, Chesaning, Oakley, St Charles, Merrill, and portions of Richland Township, are served by public sewers. Areas not served by a municipal sewer system rely on individual septic systems for sewage.

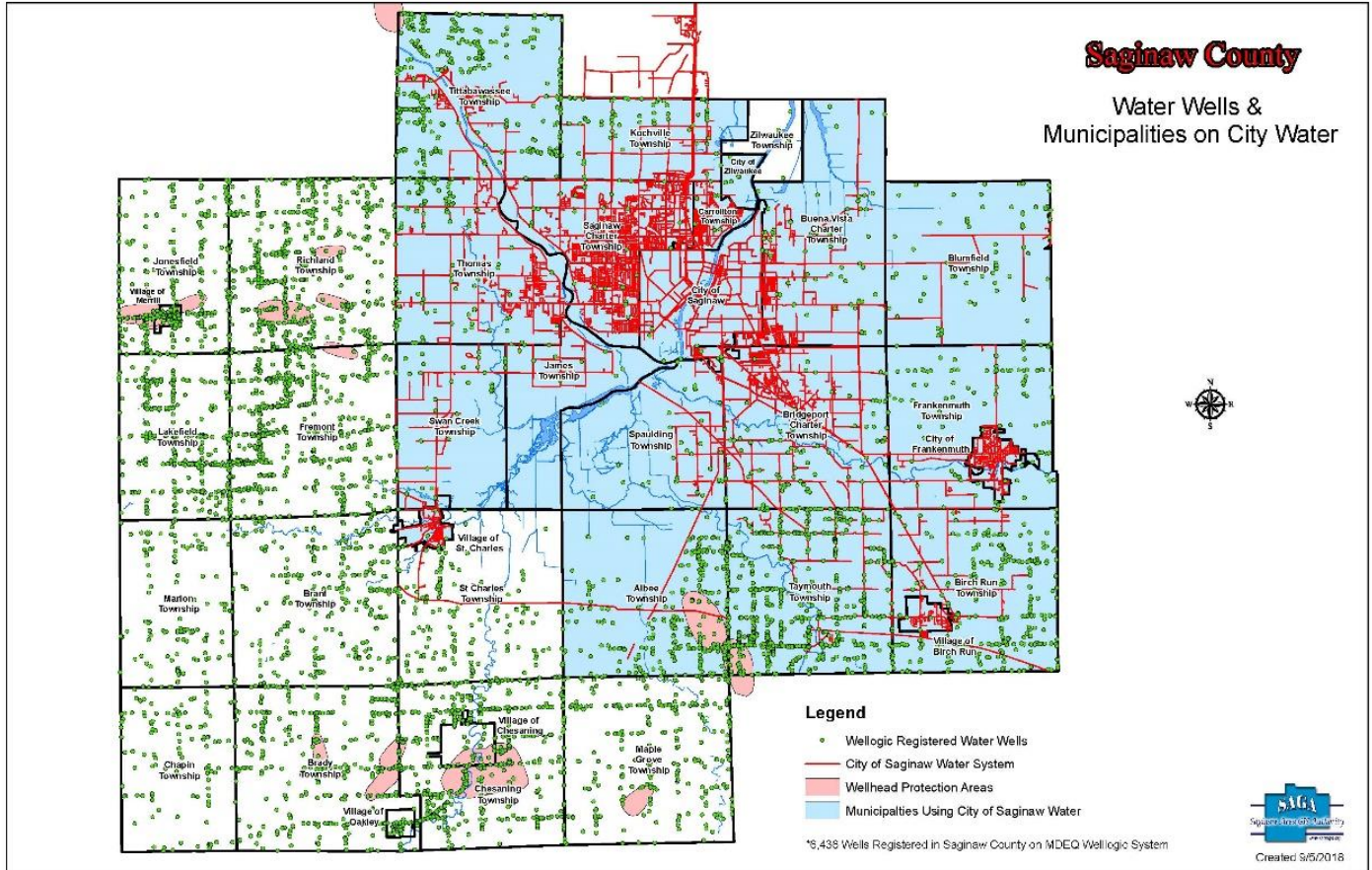
The City of Saginaw supplies water to communities beyond its borders. The City’s system functions on a regional basis providing potable water in urbanized areas and portions of outlying rural areas of Saginaw County, including Swan Creek, Richland, and Birch Run Twp. In addition, the Villages of Merrill and Chesaning use well-based municipal water systems to provide potable water.

Those areas not served by a municipal water system rely on individual wells for their fresh water.

Map 9 – Water & Sewage Treatment Plant Locations



Map 10 – Water Well and Municipal Water Locations



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SECTION 4 – HAZARD ANALYSIS

This section details how the hazard list was developed and the scoring methodology used to create a risk level.

- Hazard Identification
- Hazard Scoring and Prioritization
- Hazard Scoring Methodology

4.1 HAZARD IDENTIFICATION

Saginaw County and participating jurisdictions are vulnerable to many hazards that threaten life and property. Although only natural hazards are required by FEMA, beginning with the 2017 Saginaw County Hazard Mitigation Plan, the Saginaw County Emergency Preparedness Council (SCEPC) chose to create an all-hazards mitigation plan that included human-caused and technological hazards. The 2023 Hazard Mitigation Plan continues to be an all-hazard plan in that it contains natural and human-caused disasters.

The SCEPC and Saginaw County Office of Emergency Management reviewed the list of hazards in the 2017 Mitigation Plan when determining which hazards to include in the current update. Nuclear Attacks and Nuclear Power Plant Accidents were removed from the hazard list in the 2017 update. Based on current world geopolitical concerns, Nuclear Attack, which had been removed from the 2017 Plan, was included in this update. Nuclear Power Plant Accident was also included in the hazard list sent out to local jurisdictions; however, based on the distance from the nearest Nuclear Facility and the very low probability score for this hazard by all jurisdictions, this hazard was not included in the mitigation strategy section of this plan.

Inclement Weather was listed as a hazard in the 2017 Plan; in the current update, this hazard was broken into Severe Winter Weather and severe weather for other times of the year (Thunderstorms/Wind Events.) The 2017 update removed subsidence based on no known incidents that had occurred in the past.

While there has not been a history of subsidence in the area, with the history of coal mines in the County, Subsidence was also added to the hazard list.

The following types of hazards were provided to local jurisdictions to evaluate and score:

- **Natural Hazards** – Hazards that are generally limited to those that would occur naturally because of Earth’s geological or meteorological conditions.
- **Technological Hazards** – Hazards that originate from technical or industrial conditions, dangerous procedures, or infrastructure failure.
- **Human-Caused Hazards** – Hazards that result entirely or predominantly through human intent or error.

4.2 HAZARD SCORING AND PRIORITIZATION

A spreadsheet including the list of hazards and scoring instructions was sent to each participating jurisdiction and community stakeholders with a request to score the listed hazards related to their specific jurisdiction or facility. Additionally, Local Jurisdiction Liaisons were asked to share the scoring form with other employees of their jurisdictions. If multiple submissions were received from a jurisdiction, the specific scores were averaged to produce one score or hazard ranking for each participating jurisdiction.

A hazard scoring spreadsheet was sent to the SCEPC and County Departments to create a hazard ranking for Saginaw County. Scores on submitted County spreadsheets were then averaged to create one hazard ranking form for Saginaw County.

Hazards were scored based on the formula of Risk = Probability x Impact.

- Probability (the likelihood of occurrence)
- Incident Impact
 - Percent of the population affected
 - Number and severity of injuries
 - Amount and severity of damage
 - Number of and duration of impact on Tier 1 or Tier 2 Community Lifelines

Based on the results of the hazard scoring, each hazard was given a risk number between 0 and 100%, with a higher percentage meaning higher relative risk.

4.3 HAZARD SCORING METHODOLOGY

Hazard Risk was scored using a formula of Risk = Probability x Impact. The impact score was a product of the four subcategories of impact listed in section 4.2 of this plan. Hazard Risk is represented as a percentage, with the relative risk increasing as the percentage increases.

Probability of Occurrence

Probability Indicator	Definition	Numerical Score
Highly Likely	An event will occur frequently	4
Likely	An event is probable within three years	3
Possible	An event is probable within five years	2
Unlikely	An event is probable within ten years	1
None	An event is not likely to occur	0

Population Affected

Percentage of the Population Affected	Numerical Score
76% to 100%	4
51% to 75%	3
26% to 50%	2
0% to 25%	1

Injuries

Volume and Severity	Numerical Scoring
High Severity and High Volume	4
High Severity and Low Volume	3
Low Severity and High Volume	2
Low Severity and Low Volume	1
Injuries not likely to occur	0

Damage

Volume and Severity	Numerical Scoring
Widespread Areas of Destroyed Property	4
Widespread Major or Localized Destroyed	3
Widespread Minor or Localized Major	2
Localized Minor Damage	1
No property damage is likely	0

Community Lifelines

Lifeline and Length of Impact	Numerical Scoring
One or more Tier 1 more than 72 hours	4
One or more Tier 1 less than 72 hours	3
One or more Tier 2 more than 72 hours	2
One or more Tier 2 less than 72 hours	1

4.4 HAZARD RANKINGS

This section includes the scored Vulnerability Assessment for Saginaw County as a whole. The scored Vulnerability Assessment and specific mitigation strategies, where applicable, for each jurisdiction are included in this Plan's Community Specific Information, [Annex A](#).

Table 14 – Saginaw County HVA

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Saginaw County						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will consist of natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifeline Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifeline impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 - Unlikely (but possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	

Tornado	2.4	1.2	2.4	2.2	3	44%
Flooding - Areal or Riverine	3.4	1.6	1	1.8	2	45%
Wildfire	1	0.8	0.4	0.6	0	4%
Drought	1.2	1.6	0.2	1.6	0	9%
Severe Winter Weather	3.8	3.4	1.2	1.4	2	63%
Severe Thunderstorms/Wind Event	3.6	2.2	1.2	1.8	2	54%

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS

Compiled HVA for - Saginaw County

TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will consist of natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifeline Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
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	1 - Unlikely (but possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
HazMat Incident - Fixed Site	2.2	1.4	2	1.2	1	26%
HazMat Incident - Transportation	2.2	1	1.6	1.2	1	22%
Public Health Emergency	3.2	3	2.4	0.8	3	61%
Power Outage - Long Term	1.8	2	2	1.6	2	29%
Subsidence (e.g., Sink Hole)	1	1	0.8	0.8	0	5%
Earthquakes	0.6	1.4	0.6	0.8	1	5%
Mass Violence	2	1	2.8	1.6	1	27%
Civil Unrest	1.6	1	1.6	1.4	2	20%
Major Structure Fire	2.8	1	2.4	1.6	1	35%

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS

Compiled HVA for - Saginaw County

TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will consist of natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifeline Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifeline impacted < 72 hrs	
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	1 - Unlikely (but possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Transportation Incidents (MCI)	2	1	2.8	1.2	1	25%
Oil or gas Pipeline Accident	1.2	1.2	0.6	1	1	10%
Infrastructure Failure	2.4	1.4	1.8	2	2	36%
Extreme Temperatures	2.4	3.6	2	0.6	1	36%
Nuclear Attack	0.8	3.2	2.8	3	4	22%
Nuclear Power Plant Accident	0.4	1.4	2.2	1.8	0	5%
Utility Failure - Water/Sewer	1.6	2.4	2.2	2	2	29%
Interruption of Gov. Services	1.2	2	1.3	0.8	4	20%
Average Score	1.95	1.00	1.61	1.43	1.72	23%

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SECTION 5 – HAZARD PROFILES

This section includes detailed hazard profiles for each hazard identified in the previous section as significant enough for further evaluation through a Saginaw County and local jurisdiction Vulnerability Assessment. This Plan includes the following hazards.

- **Natural Hazards** – Hazards that are generally limited to those that would occur naturally because of Earth’s geological or meteorological conditions.
 - Tornado
 - Flooding – Areal or Riverine
 - Wildfire
 - Drought
 - Severe Winter Weather
 - Severe Thunderstorm/Wind Events
 - Subsidence
 - Earthquakes
 - Extreme Temperatures

- **Technological Hazards** originate from technological or industrial conditions, dangerous procedures, or infrastructure failure.
 - Dam Failure
 - Hazardous Materials – Fixed Site Incident
 - Hazardous Materials – Transportation Incident
 - Power Outage – Long Term
 - Major Structure Fire
 - Mass Casualty Transportation Incident
 - Oil or Gas Pipeline Incident
 - Infrastructure Failure
 - Nuclear Power Plant Accident
 - Utility Failure (Water or Sewer)

- **Human-Caused Hazards** – Hazards that result entirely or predominantly through human intent or error.
 - Nuclear Attack
 - Public Health Emergency (could also be a natural hazard for naturally occurring viruses)
 - Interruption of Government Services
 - Civil Unrest
 - Mass Violence (Active Attacker)

In some instances, disasters may seem to be caused by a natural hazard but are, in fact, technological or human-caused. An example of this could be flooding because of a dam failure caused by a mechanical part (technological) failure or through an intentional human act (human-caused.)

Several sources were used to develop hazard profiles and relative risks.

- The [Saginaw County Hazard Vulnerability Assessment](#) uses the formula Risk = Probability x Impact. The following categories were assessed to determine the hazard impact: the percentage of the population affected, the number and severity of injuries, the amount and severity of property damage, and the impact on Community Lifelines.
- The [FEMA National Risk Index](#) is a tool to help illustrate the risk to communities for 18 natural hazards. The FEMA Risk Index Number is determined using the formula Risk Index = Annual Expected Loss x Social Vulnerability / Community Resilience.
- Finally, in the case where incidents in Saginaw County have been tracked probability of occurrence in any given year was determined using the formula Probability (P) = Number of Incidents (I)/ Time (T).

5.1 NATURAL HAZARDS

Natural hazards are defined as environmental phenomena that have the potential to impact societies and the human environment. FEMA identifies 18 natural hazard types; however, the Saginaw County Hazard Mitigation Plan includes nine natural hazards in this update. The remaining nine natural hazards were either combined into one hazard. For example, hail, ice storms, and winter weather were integrated into one hazard type, Severe Winter Weather. The remaining FEMA hazard types were not included as the probability of such a hazard in Saginaw County is extremely limited (e.g., Tsunami, etc.)

Natural hazards occur across different time and area scales, and each is unique in some way. For example, tornados and flash floods are short-lived, violent events affecting a relatively small area. Others, such as droughts, develop slowly but can involve a larger area and population.

Of the three hazard types, Saginaw County is most susceptible to and has the most occurrences of natural hazards.

5.1.1 Tornado

Area of Impact

All areas of Saginaw County are vulnerable

Hazard Description

A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. Tornadoes are most often generated by thunderstorm activity when cool, dry air intersects and overrides a layer of warm, moist air, forcing the warm air to rise rapidly. The destruction caused by tornadoes ranges from light to catastrophic depending on the storm's intensity, size, and duration.

Tornado Severity

The original Fujita Scale (or F Scale) was developed based on damage intensity, not wind speed. In 2007 the Enhanced Fujita Scale (EF Scale) became operational and assigned a rating based on damage intensity and wind speed.

Figure 7 – Enhanced Fujita Scale

EF Scale	Wind Speed	Damage Description
Zero (EF0)	65-85 mph	Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, and sign boards damaged.
One (EF1)	86-110 mph	Peels surface off roofs, mobile homes pushed off foundations or overturned, moving autos pushed off the roads; attached garages may be destroyed.
Two (EF2)	111-135 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
Three (EF3)	136-165 mph	Roofs and some walls torn off well-constructed houses; trains overturned; most forest trees uprooted.
Four (EF4)	166-200 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance, cars thrown, and large missiles generated.
Five (EF5)	Over 200 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles flew over 100 meters; trees debarked.

Historical & Recent Events

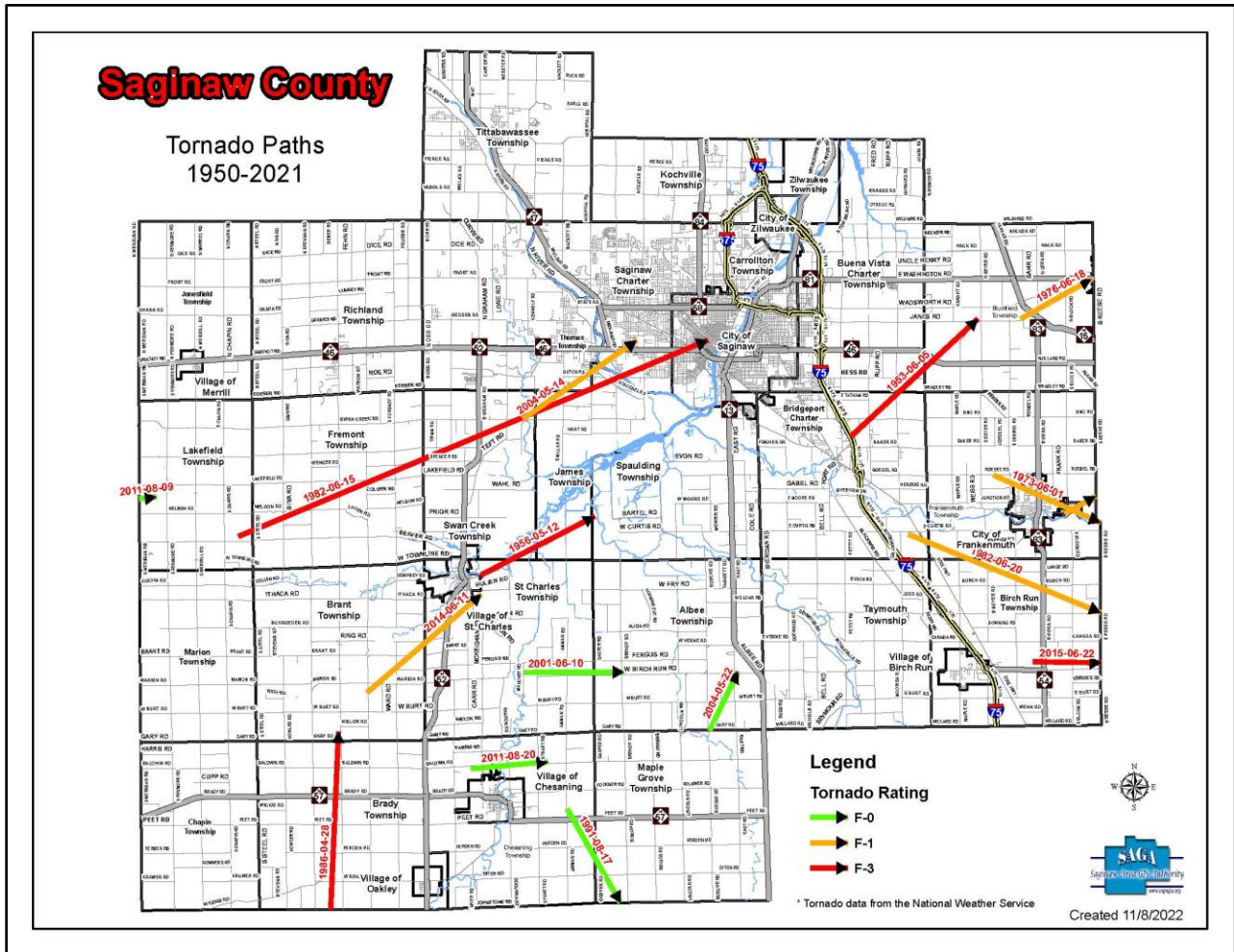
Since 1953 Saginaw County has recorded 25 tornadoes, with the most severe, an F3 tornado, occurring on June 21, 1996, in the Frankenmuth Area. There have been no tornado-related deaths and five tornado-related injuries over this time. The combined property and crop damage are estimated at 12.8 million dollars.

There have been no recorded tornados since the last HMP update. The table and map below show specific information for tornados that have occurred since 2000:

Table 15 – Saginaw County Tornados 2000-2021

Date	General Location	Intensity	Length/Width	Deaths/Injuries	Property Damage
06/22/2015	Birch Run	EF0	2.41 miles 250 yards	0/2	\$50,000
06/11/2014	Brant	EF1	5.3 miles 300 yards	0/0	250,000
8/20/2011	Chesaning	EF0	2.73 miles 100 yards	0/0	3,000
8/9/2011	Lakefield	EF0	0.6 miles 40 yards	0/0	50,000
6/5/2005	Hemlock	EF0	0.5 miles 25 yards	0/0	Unknown
5/22/2004	Blumfield	EF0	0.2 miles 30 yards	0/0	Unknown
5/22/2004	Burt	EF1	2.5 miles 50 yards	0/0	Unknown
5/14/2004	Shields	EF0	4 miles 125 yards	0/0	250,000
10/24/2001	Fosters	EF0	0.1 miles 30 yards	0/0	Unknown
06/10/2001	St Charles	EF0	2.9 miles 150 yards	0/0	5,000

Map 11 – Saginaw County Tornado Paths & Strength



Probability and Impact of Future Events

There have been 25 recorded tornadoes in Saginaw County since 1953. Using the formula $P = 1/T$, the risk of a tornado occurring in Saginaw County in any given year is approximately 36%.

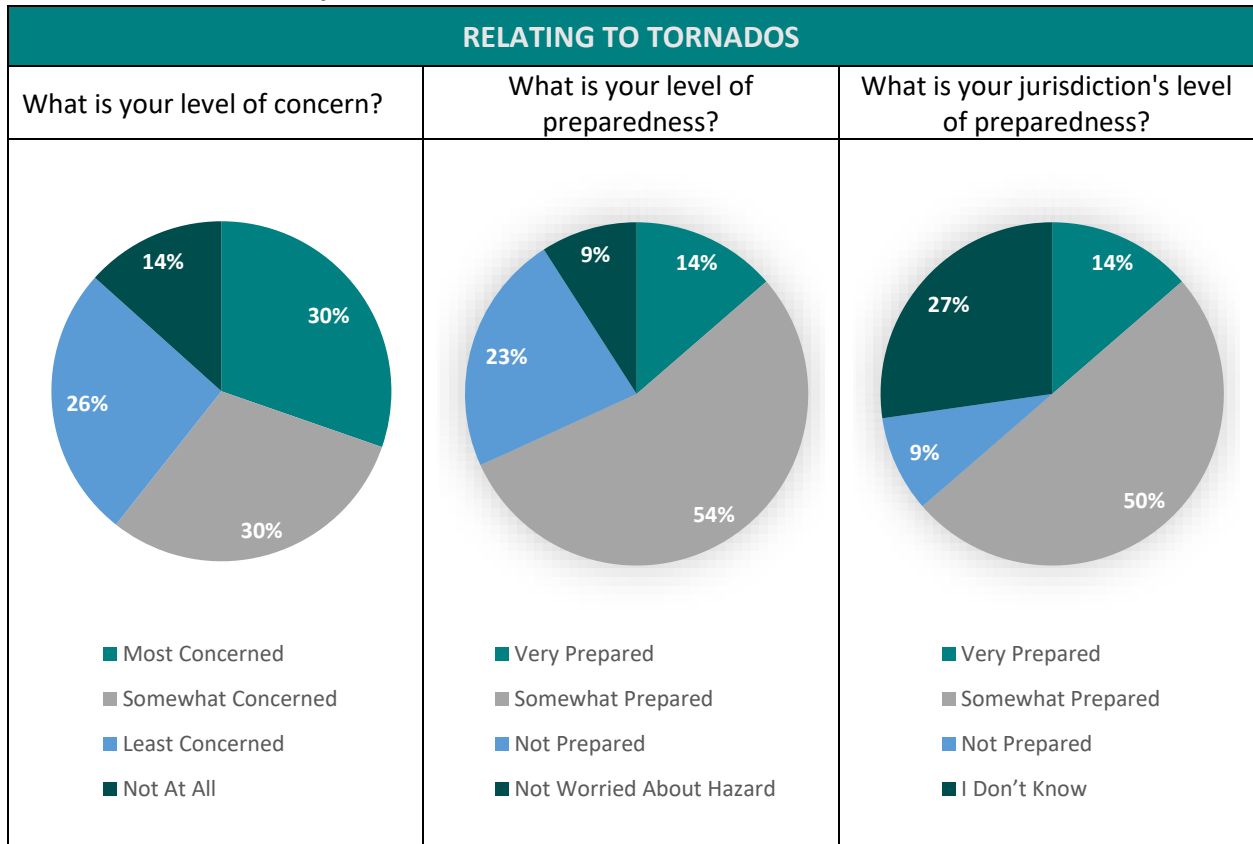
The FEMA National Risk Index lists the relative risk for tornadoes in Saginaw County as “moderate.” The FEMA national risk index is computed using an Annualized Frequency of tornadoes in Saginaw County is 0.3 events per year, and a historical loss ratio is \$8.30 per \$100,000, which is very low.

The countywide Vulnerability Assessment lists the Relative Risk of a Tornado at 44%.

Public Input

Participants in the public survey were asked to assess and identify their level of concern about a tornado incident occurring in their community and to what level they felt they and their community were prepared.

Chart 1 – Public Input - Tornadoes



Possible Mitigation Activities

The following are potential mitigation activities for tornado events. This list is not exhaustive and is not necessarily identified mitigation strategies for Saginaw County or its local jurisdictions. See *Annex A* for specific jurisdiction strategies.

- Promote the “Safe Rooms / Areas” concept in manufactured home parks, fairgrounds, shopping malls, schools, churches, or other vulnerable public structures.
- Conduct outreach activities to increase awareness of tornado risk and preparedness.
 - Teach school children about the dangers of tornadoes and how to take safety precautions.
 - Support severe weather awareness week.
 - Promote the use of weather alerting apps and NOAA weather radios.
 - Encourage families and businesses to create an emergency kit containing 1st aid equipment and other supplies needed after a disaster.
- Support 1st responders’ ability, through equipment purchases and training, to search and rescue in collapsed or partially collapsed buildings.
- Requiring new mobile homes be anchored to offer protection from a tornado and high wind events.

5.1.2 Flooding (Riverine or Areal)

Area of Impact

All areas of Saginaw County can experience areal flooding, with jurisdictions bordering major tributaries in Saginaw County experience the most significant risk for riverine flooding. FEMA creates flood maps based on the frequency of floods that cover a particular area. As determined by FEMA, Flood zones are categorized as 100-year flood zones (1% chance of occurring in any given year) and 500-year flood zones (0.2% chance of occurring in any given year.)

The most vulnerable to flooding are indicated on the FEMA Flood Zone Map for Saginaw County. An interactive Flood Zone Map is available on the Saginaw County GIS Website ([Saginaw Area GIS Map.](#)) Local jurisdiction Flood Zone Maps are included in the local jurisdiction section, *Annex A*, of this Plan.

Hazard Description

Areal flooding develops gradually from prolonged and persistent moderate to heavy rainfall. This weather results in a gradual ponding or buildup of water in low-lying, flood-prone areas, small creeks, and drainage ditches.

Riverine flooding is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and flows over the stream or riverbank into the adjacent floodplain – low-lying lands adjacent to rivers, lakes, and oceans subject to recurring inundation. For example, heavy rains that fall in a short period during intense thunderstorms can lead to high-velocity flows that overflow the normal river channel, causing extensive damage to nearby residences and businesses. These events are called “flash floods.”

Most riverine flooding occurs in early spring and results from excessive rainfall and/or the combination of rain and snowmelt. Ice jams also cause flooding in winter and early spring. Severe thunderstorms may cause flooding during the summer or fall, although these are usually localized and have more impact on watercourses with smaller drainage areas. Frequently, flooding may not be directly attributable to a river, stream, or lake overflowing its banks. Instead, it may be combined with excessive rainfall and/or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations – areas that are often not in a designated floodplain. That type of flooding is becoming increasingly prevalent in Michigan as development outstrips the ability of the drainage infrastructure to carry and disburse the water flow.

Flooding also occurs due to combined storm and sanitary sewers that cannot handle the tremendous flow of water that often accompanies storm events. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns.

Flooding is the most frequent and costly natural hazard in the United States and has caused more than 10,000 deaths since 1900. Most presidential disaster declarations result from natural events where flooding was a major component. While not the most frequent hazard in Saginaw County, flooding is the costliest compared to the value of property damage from other natural disasters in Saginaw County. Flooding accounts for the majority of declared disasters in Saginaw County.

Levels of Severity

The severity of a flood can be categorized by measuring the water level of a river or stream above an established datum at a given location. The gage datum level is usually located slightly below the lowest point of the stream bottom such that the stage is greater than the maximum water depth. Flood stage is a high-water term the National Weather Service uses and can be identified using four different labels.

- Action Stage – water may cause minor impacts and be a nuisance to persons near the stream. Local governments or agencies may take actions to reduce property damage and danger to life.
- Minor Flooding – some property flooding and public threat may occur. Roadways, trails, parkland, and private property near the stream may become flooded.
- Moderate Flooding – flooding of structures and main roadways may occur. Residences and numerous roads near the stream may become flooded. Evacuations may be necessary disruptions to daily life.
- Major Flooding – extensive flooding of structures, main roads, and other critical infrastructure may occur. Schools, hospitals, police and fire stations, residences, businesses, and roadways may flood. Evacuations may be necessary—significant disruptions to daily life.

Historical & Recent Events

According to the NOAA, Saginaw County has had 49 flood events since 1969. The highest number of events during this time was in 2004, when eight flood events were recorded. Zero flood events were recorded in 2003, 2009, 2010, 2012, and 2015.

Since the last Hazard Mitigation Plan update was adopted in 2017, Saginaw has recorded three flood events.

Table 16 – Flood Events 2017-2022

Date	General Location	Cause	Deaths Injuries	Property Damage	River Height
2/28/2018	W Saginaw	Heavy Rain & Snow Melt	0/0	None Reported	Saginaw 27.5'
5/25/2019	SE Saginaw	Heavy Rain	0/0	\$300,000	
5/19/2020	Multiple Areas	Heavy Rain & Dam Failure	0/0	\$10,000,000	Saginaw 22.2'

The most significant flood event in Saginaw County in the last 35 years occurred in May 2020. On May 17, 2020, a low-pressure system and frontal boundary stalled over the southern Great Lakes region, bringing record rainfalls. The heavy rains in the region resulted in the catastrophic failures of the Edenville and Sanford dams.

Flood levels caused evacuations in Tittabawassee, Saginaw, Thomas, and James Townships. Along with Midland, Gladwin, and Iosco Counties, Saginaw County was part of the presidential disaster declaration related to this event.

The recovery efforts by local, state, and federal governments and community organizations provided short and long-term assistance involving all but a handful of residents to return to their homes. The dollar loss related to this flood event is estimated to be \$10,000,000.

Probability and Impact of Future Events

It may not rise to the level of a declared disaster; however, some level of flooding (areal and/or riverine) occurs annually in multiple areas throughout Saginaw County. Using the formula $P = 1/T$, there is an almost certain chance of a yearly flood event in Saginaw County.

The FEMA National Risk Index lists the relative risk for riverine flooding in Saginaw County as “moderate” The FEMA Annualized Frequency of floods in Saginaw County is 1.4 events per year and a historical loss ratio of \$6.93 per \$100,000.

Based on the Saginaw County Vulnerability Assessment, the relative risk of areal and/or riverine flooding is 45%.

51 Saginaw County properties are listed as repetitive loss properties by the NFIP with a cumulative lost dollar amount of \$4,314,152. A breakdown of property by jurisdiction is below.

Table 17: NFIP Repetitive Loss Properties

Community	Single Family Residence	Business	Other	Cumulative Building Payments	Cumulative Contents Payments
Bridgeport Township	2	0	0	\$68,600	\$20,500
Buena Vista Township	2	0	0	\$17,451	\$1,007
Carrollton Township	3	0	0	\$28,768	\$725
James Township	8	0	0	\$437,463	\$10,500
Saginaw Township	8	2	0	\$1,331,585	\$63,292
Saginaw City	8	0	2	\$942,842	\$123,704
Spaulding Township	6	0	0	\$276,368	\$25,680
St Charles Village	2	0	0	\$67,211	\$0
Thomas Township	8	0	0	\$464,333	\$8,720
Tittabawassee Township	3	1	0	\$369,392	\$33,369
Zilwaukee Township	1	0	0	\$12,920	\$9,721
Saginaw County Totals	51	3	2	\$4,016,934	\$297,218

National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) to reduce the impact of flooding on private and public structures by providing affordable insurance. The program is administered by FEMA and requires participating communities to adopt and enforce floodplain management ordinances that meet or exceed the NFIP minimum requirements. In addition, if communities participate in the Community Rating System (CRS), residents and business owners can receive reduced flood insurance premiums.

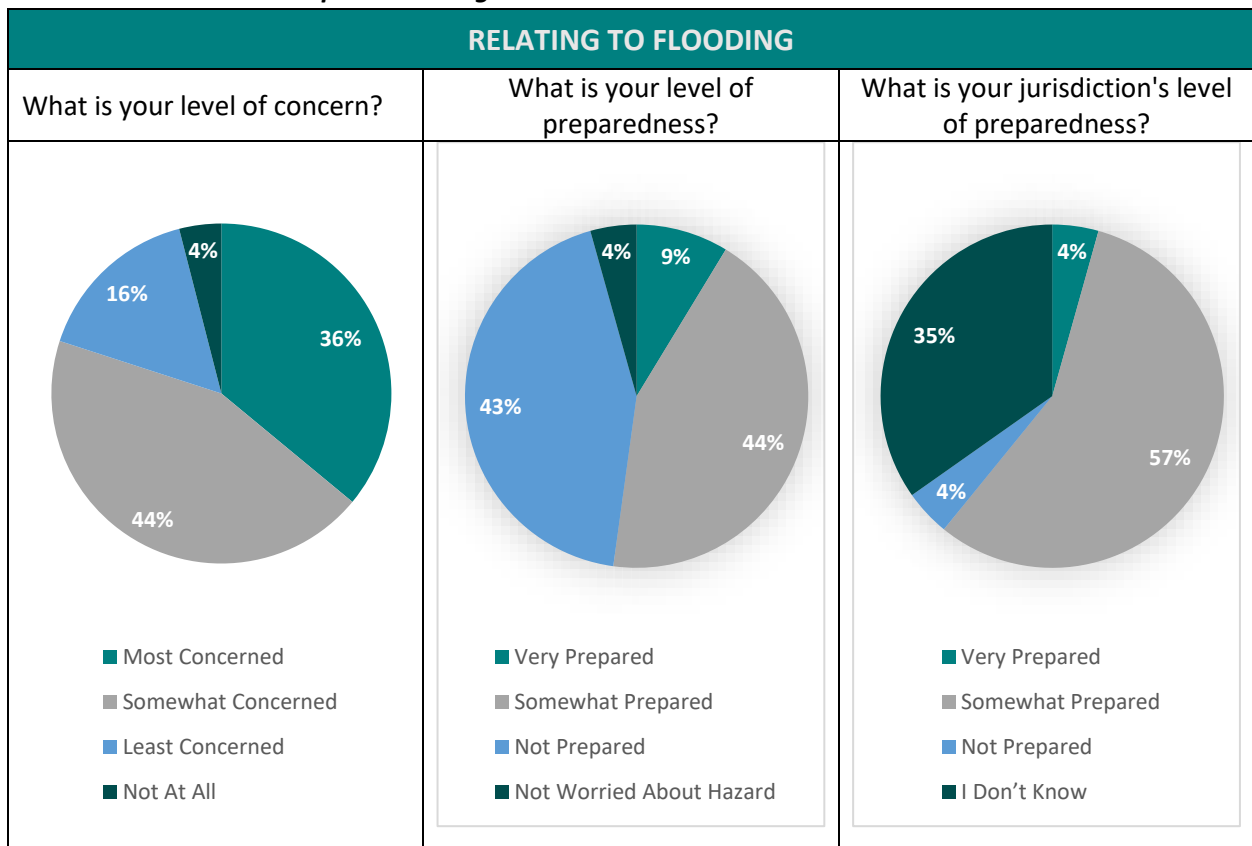
Of the 35 local government units in Saginaw County, 24 participate in the NFIP.

FEMA flood maps are being updated but have yet to be adopted and approved. The latest approved flood maps were effective 10/16/1997. Flood maps for those jurisdictions within the 100- or 500-year flood zone are included in *Annex A*. In addition, the interactive Saginaw County floodplain map can be accessed and viewed with the Saginaw GIS interactive map at www.sagagis.org. Updated maps will be added to this plan once they are adopted.

Public Input

Participants in the public survey were asked to assess and identify their level of concern about a tornado incident occurring in their community and to what level they felt they and their community were prepared.

Chart 2 – Public Input - Flooding



Possible Mitigation Strategies

The following are potential mitigation activities for flood events. This list is not exhaustive and is not necessarily identified mitigation strategies for Saginaw County or its local jurisdictions. See Annex A for specific jurisdiction strategies.

- Local jurisdiction participation in the National Flood Insurance Program
- Installation of river level gauges along with inundation mapping

- Removal or mitigation of repetitive flood structures
- Construction of elevated roads unaffected by flooding or road construction techniques that are more flood-resistant through better drainage and/or stabilization of vulnerable shoulders and embankments.
- Protection or restoration of wetlands and natural water retention areas

5.1.3 Severe Winter Weather

Area of Impact

All jurisdictions in Saginaw County are vulnerable to severe winter weather.

Hazard Description

The winter season brings a variety of adverse weather extremes. You may experience heavy snow, ice accumulation, freezing temperatures, and wind chill. Winter storms are often called the “deceptive killers” since many deaths can be attributed to indirect causes of adverse weather. For example, icy roads lead to an increase in traffic accidents. In addition, prolonged exposure to the cold may enhance chances for hypothermia, and stress from snow removal may increase opportunities for heart-related problems.

Severe winter weather is characterized by one or more hazards: snow, blizzards, sleet, freezing rain, and extreme cold. This plan discusses intense cold further in the Extreme Temperatures, Section 5.1.9.

- Snowstorms – In the winter, most precipitation forms as snow within the clouds because temperatures at the top of the storm are cold enough to make snowflakes. Snowflakes are a collection of ice crystals that form as water vapor condenses into water droplets and freezes.

While all snowstorms have an element of risk, the accumulation rate and vapor density of the snow affect how severe or dangerous a snowstorm is.

- Blizzards – These are severe snowstorms defined by the strength of the winds rather than the amount of snow it brings. With wind speeds at or about 35 mph, blizzards create blowing snow conditions where snow on the ground is picked up by the wind causing reduced visibility and the accumulation of snow drifts.

Hazards during a blizzard come from decreased visibility, snow drift accumulation, and a lowering of the wind chill due to the high wind speeds.

- Ice Storms – An ice storm is a winter storm with an accumulation of at least .25” of ice on all outdoor surfaces. Ice storms can be comprised of sleet, freezing rain, or a combination.

Sleet forms when snowflakes pass through a warm layer of air and partially melt. They then pass through a deep layer of cold air before reaching the surface, causing the snowflake to re-freeze into ice pellets.

Freezing rain forms when snow passes through a layer of warm air, melting completely and then through a layer of freezing air before falling.

Most severe winter weather events in Michigan originate as Canadian and Arctic cold fronts that move across the state from the west or northwest. As a result of being surrounded by the Great Lakes, Michigan experiences significant differences in snowfall over relatively short distances. The mean annual accumulation ranges from 30 to 200 inches of snow, with the highest accumulations occurring in the western parts of the Upper Peninsula. Saginaw County averages 40 inches of snow per year.

Historical and Recent Events

The two most severe winter snowstorms for Saginaw County occurred in 1967 and 1978.

- The 1967 storm began on January 26th and lasted two days. Saginaw County received 23.8" of snow during this storm.
- The 1978 storm coincidentally occurred over the same days, January 26-27. The storm left 22.5" of snow on Saginaw County.

According to the NOAA Storm Event Database, Saginaw County has experienced seven severe winter storm events since the last HMP update in 2017.

Table 18 – Saginaw County Winter Storms 2017-2022

Date	Duration	Type	Deaths Injuries	Property Loss (Not all loss is reported)	Precipitation Accumulation
2/2/2022	≤ 2 days	Heavy Snow	0/0	\$0	11+" Snow
1/11/2020	≤ 2 days	Ice Storm	0/0	\$0	Unknown
12/1/2019	≤ 1 day	Ice Storm	0/0	\$10,000	.25" Ice 1-2" Snow
1/28/2019	≤ 1 day	Winter Storm	0/0	\$0	8" Snow
11/25/2018	≤ 2 days	Heavy Snow	0/0	\$0	7+" Snow
4/14/2018	≤ 2 days	Winter Storm	0/0	\$2,000,000	2-3" Snow
12/13/2017	≤ 1 day	Heavy Snow	0/0	\$0	8.1" Snow

Probability and Impact of Future Events

There have been 188 recorded severe winter events in Saginaw County since 1950. Using the formula $\text{Probability} = \text{Incidents/Time}$, the risk of a significant winter storm occurring in Saginaw County in any given year is 100%, with an average of 2.6 events occurring yearly.

Saginaw County's Vulnerability Assessment completed for this HMP update lists the relative threat of Severe Winter Weather as 63% Risk.

The FEMA National Risk Index lists the relative risk for Winer Weather in Saginaw County as Relatively High, 29.66. The FEMA national risk index is computed using an Annualized Frequency of Winter Weather in Saginaw County of 3.5 events.

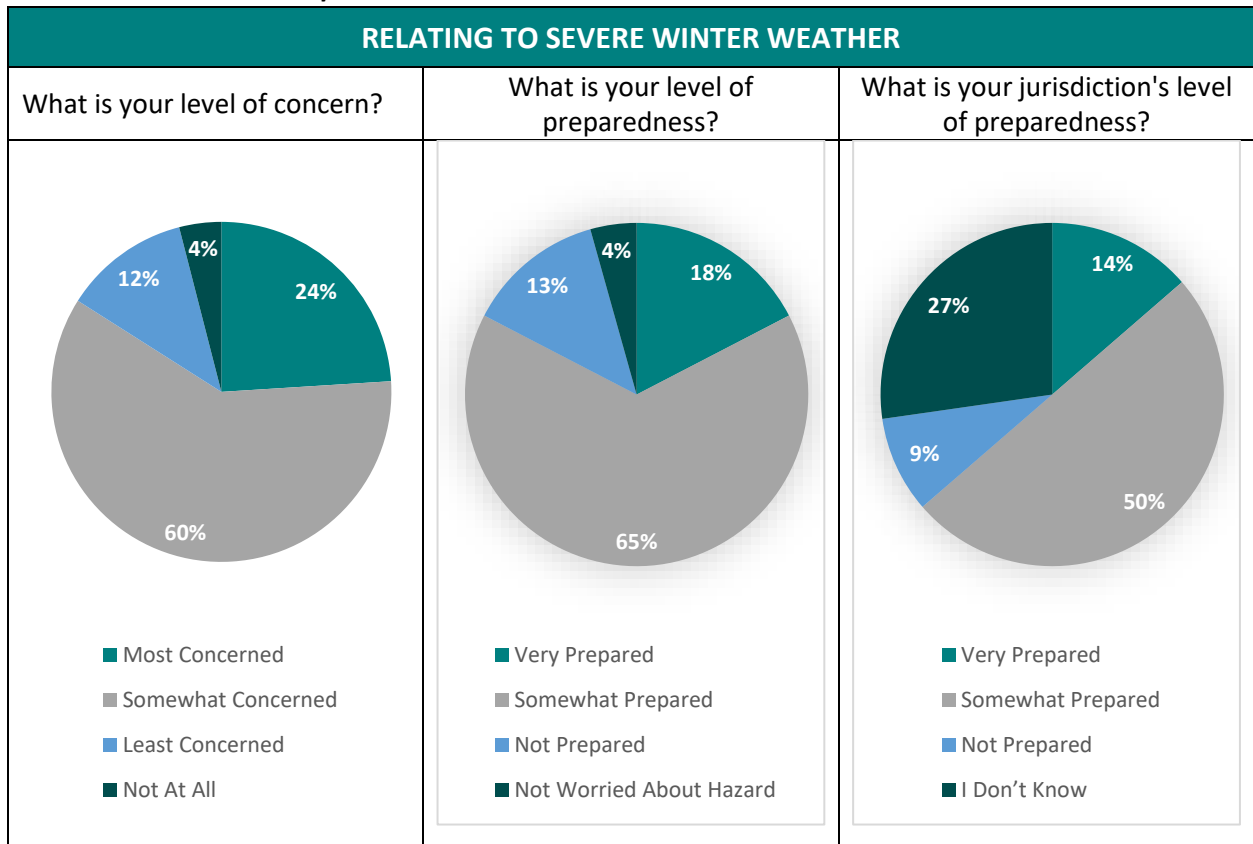
Table 19: Annual Expected Loss – Winter Weather

EXPECTED ANNUAL LOSS				
Total	Building Value	Population	Population Equivalence	Agriculture Value
\$303,349	\$71,950	0.03	\$230,717	\$682

Public Input

Participants in the public survey were asked to assess and identify their level of concern about a tornado incident occurring in their community and to what level they felt they and their community were prepared.

Chart 3 – Public Input – Severe Winter Weather



Possible Mitigation Strategies

- Encourage the use of NOAA Weather Radios and other Alerting Apps
- Encourage aggressive tree trimming along utility lines
- Bury and protect utility lines in new developments

5.1.4 Severe Thunderstorms/Wind Events

Area Of Impact

All jurisdictions in Saginaw County are vulnerable to severe thunderstorms and wind-related events.

Hazard Description

Severe thunderstorms are officially defined as storms that can produce hail that is an inch or larger or wind gusts of 58 mph. Hail this size can damage property such as plants, roofs, and vehicles. Wind this strong can break off large branches, knock them over or cause structural damage to trees. Some severe thunderstorms can produce hail larger than softballs or winds over 100 mph. Thunderstorms also produce tornados, dangerous lightning, and heavy rain that can cause flash flooding.

Straight-line winds, called Derechos, can be just as extreme as a tornado since the damage from straight-line winds is more widespread and usually affects a larger area. In addition to property damages, there is a risk of infrastructure damage from downed power lines due to falling limbs and trees.

Lightning is hotter than the sun’s surface reaching temperatures of 50,000°F holds and having a voltage potential of about 300 million Volts. Each year in the United States, about 25 million cloud-to-ground lightning flashes, and about 300 people are struck by lightning. About 30 people are killed and others suffer lifelong disabilities.

Hail is precipitation formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere. Hail can cause extensive damage and, while not common, has caused fatalities.

Historical & Recent Events

Thunderstorms and wind events in Saginaw County regularly consist of winds greater than 57 mph. However, several wind events were recorded at 80 mph per hour or more, with the highest being 86 mph.

Hail size in Saginaw County is generally about 0.75”, with the largest being 3.5” on 9/2/1984.

Significant thunderstorms and/or wind events occurring since the previous plan update (2017).

Table 20: Saginaw County Thunderstorm/Wind Events Since 2017

Date	Type	Deaths Injuries	Property Loss (Not all loss is reported)	Magnitude
2/24/2017	Hail	0/0	\$ -	0.88" Hail
3/8/2017	High Winds	0/0	\$ 23,000,000	59 MPH
6/17/2017	Thunderstorm	0/0	\$ 80,000	61 MPH
10/7/2017	Thunderstorm	0/0	\$ -	54 MPH

Date	Type	Deaths Injuries	Property Loss (Not all loss is reported)	Magnitude
5/4/2018	High Winds	0/0	\$ 2,000,000	52 MPH
5/26/2018	Thunderstorm	0/0	\$ -	56 MPH
5/27/2018	Thunderstorm	0/0	\$ -	54 MPH
8/26/2018	Thunderstorm	0/0	\$ 10,000	54 MPH
8/28/2018	Thunderstorm	0/0	\$ -	54 MPH
2/24/2019	High Winds	0/0	\$ 500,000	53 MPH
7/20/2019	Thunderstorm	0/0	\$ -	50 MPH
7/29/2019	Thunderstorm	0/0	\$ -	56 MPH
9/10/2019	Thunderstorm	0/0	\$ -	54 MPH
10/1/2019	Thunderstorm	0/0	\$ -	52 MPH
11/27/2019	Thunderstorm	0/0	\$ -	50 MPH
6/10/2020	Thunderstorm	0/0	\$ -	54 MPH
7/19/2020	Thunderstorm	0/0	\$ -	56 MPH
10/23/2020	Thunderstorm Hail	0/0	\$ -	50 MPH
11/15/2020	Thunderstorm	0/0	\$ 250,000	52 MPH
6/26/2021	Thunderstorm	0/0	\$ -	52 MPH
7/6/2021	Thunderstorm	0/0	\$ -	50 MPH
7/24/2021	Thunderstorm	0/0	\$ -	52 MPH
8/10/2021	Thunderstorm	0/0	\$ -	50 MPH
8/24/2021	Thunderstorm	0/0	\$ -	52 MPH
8/28/2021	Thunderstorm	0/0	\$ 10,000	56 MPH
9/7/2021	Thunderstorm	0/0	\$ -	55 MPH

Date	Type	Deaths Injuries	Property Loss (Not all loss is reported)	Magnitude
9/12/2021	Thunderstorm Hail	0/0	\$ -	55 MPH 1.75"
9/14/2021	Hail	0/0	\$ -	1"
12/11/2021	High Winds	0/0	\$ 400,000	52 MPH
12/16/2021	High Winds	0/0	\$ 50,000	54 MPH
3/6/2022	High Winds	0/0	\$ -	58 MPH
3/31/2022	High Winds	0/0	\$ -	54 MPH
4/14/2022	High Winds	0/0	\$ -	53 MPH
6/16/2022	Thunderstorm	0/0	\$ -	58 MPH
8/3/2022	Thunderstorm	0/0	\$ -	50 MPH
8/29/2022	Thunderstorm	0/0	\$ -	50 MPH
2/24/2017	Hail	0/0	\$ -	0.88" Hail

Probability & Impact of Future Events

There have been 328 recorded severe thunderstorms and/or wind events in Saginaw County since 1950. Using the formula Probability = Incidents/Time, the risk of a severe thunderstorm and/or wind event occurring in Saginaw County in any given year is approximately 100%, averaging 4.6 incidents per year.

Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of severe thunderstorms and/or wind events as 54%.

The FEMA National Risk Index doesn’t list thunderstorms or other related weather as a single event. Instead, hail, lightning, and strong wind Risk Index information are listed separately.

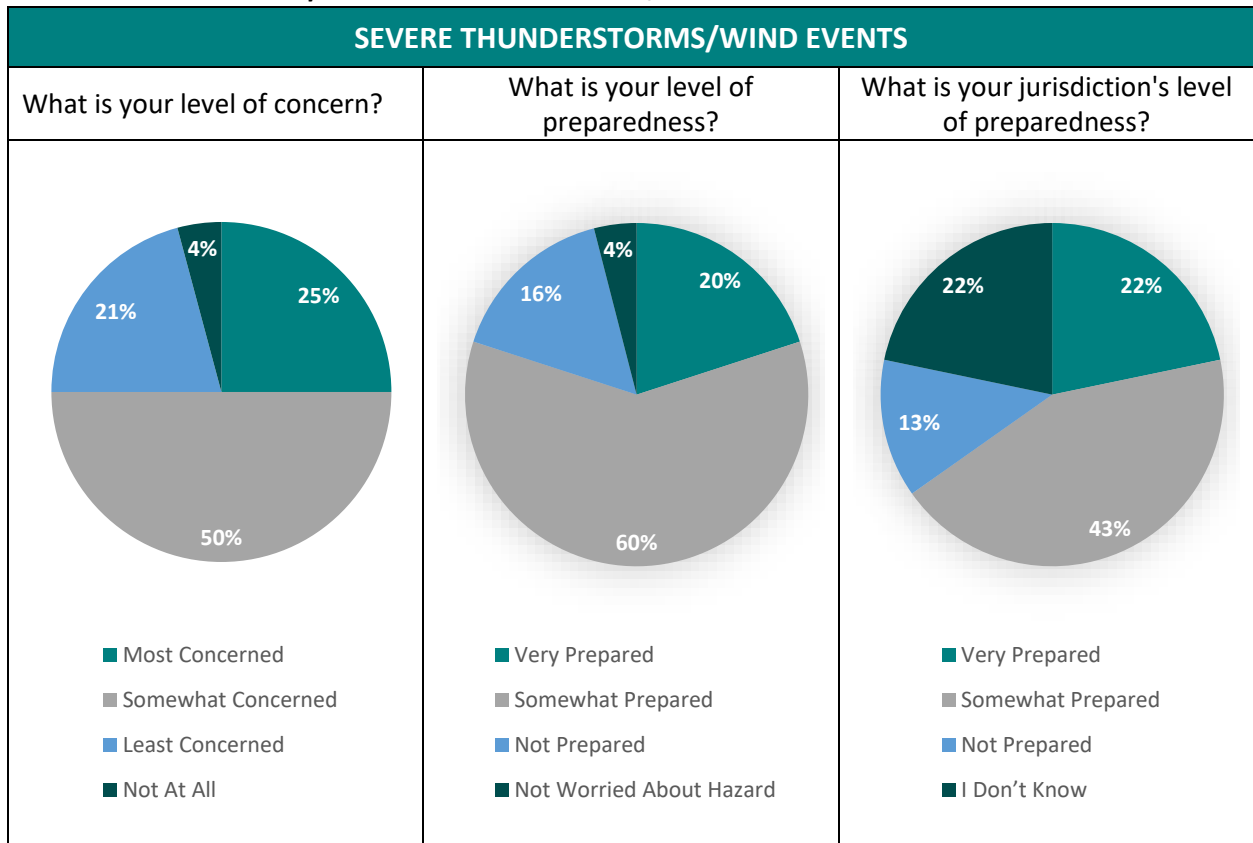
Table 21: Annual Expected Loss - Thunderstorms

Event Type	Event Frequency	Risk Index	Annual Building Loss	Expected Population Loss	Population Equivalence	Agriculture Loss
Hail	2.7	Relatively Low	\$78,207	0	\$18,211	\$59,793
Strong Winds	4.5	Relatively High	\$2.2 million	0.03	\$213,465	\$130,700
Lightning	36.1	Moderate	\$221,277	0.03	\$11,599	N/A

Public Input

Participants in the public survey were asked to assess and identify their concerns about a severe thunderstorm/wind event incident in their community and to what level they felt they and their community were prepared.

Chart 4: Public Input – Severe Thunderstorms/Wind Events



Possible Mitigation Strategies

- Encourage the use of NOAA weather radios, especially at locations with vulnerable populations.
- Use and maintenance of public alerting systems and networks.
- Encourage and support the trimming of trees along transmission lines and other infrastructure
- Encourage or require for new construction that transmission lines are installed below grade
- Construction of safe rooms/shelters in mobile home parks, fairgrounds, shopping malls, and other vulnerable locations with high occupancy.

5.1.5 Wild & Field Fires

Area of Impact

To some extent, all jurisdictions in Saginaw County are vulnerable to wildfires. Rural communities with large areas of woodlands or farm fields may be susceptible to larger wildfires than more urban areas.

Hazard Description

A wildfire or field fire is any unplanned, uncontrolled fire that threatens life and property in either rural or wooded areas. Field and wildland fires can occur when conditions are favorable, such as during a drought or during harvest season when field and natural vegetation would be drier and subject to combustibility.

Approximately 31% of Saginaw County is covered by forested areas, while farm fields cover another 39%. Due to the amount of fuel load, these areas are very vulnerable to fires when conditions are right. Ultimately, the size, strength, and behavior of wild & filed fires are influenced by three factors – fuel type and availability, surrounding weather, and topography of the area.

Historical & Recent Events

While there are, generally, several wildland or field fires in Saginaw County each year, there are no records of significant or widespread fires.

Probability & Impact of Future Events

There is not an extensive history of wildland or field fires causing significant impacts on the population and property in Saginaw County.

The risk percentage for wildland and field fires in the Saginaw County Vulnerability Analysis is very low at 4%.

The FEMA National Risk Index lists the relative risk for Wildfires in Saginaw County as Relatively Low, 15.82. The FEMA national risk index is computed using an Annualized Frequency of Wildfire Events in Saginaw County as less than 0.001% chance per year.

The FEMA National Risk Index lists the wildfire risk in Saginaw County as practically zero. There have not been any wildfires in Saginaw County recently that would rise to the level of a declared disaster. However, annually, especially during a dry season or early spring when vegetation is still brown, there are small field or grass fires along roadways. These fires are generally extinguished with initial response assets. Because of the way grass/wildfires are coded by Central Dispatch, getting an accurate number of annual calls is not possible

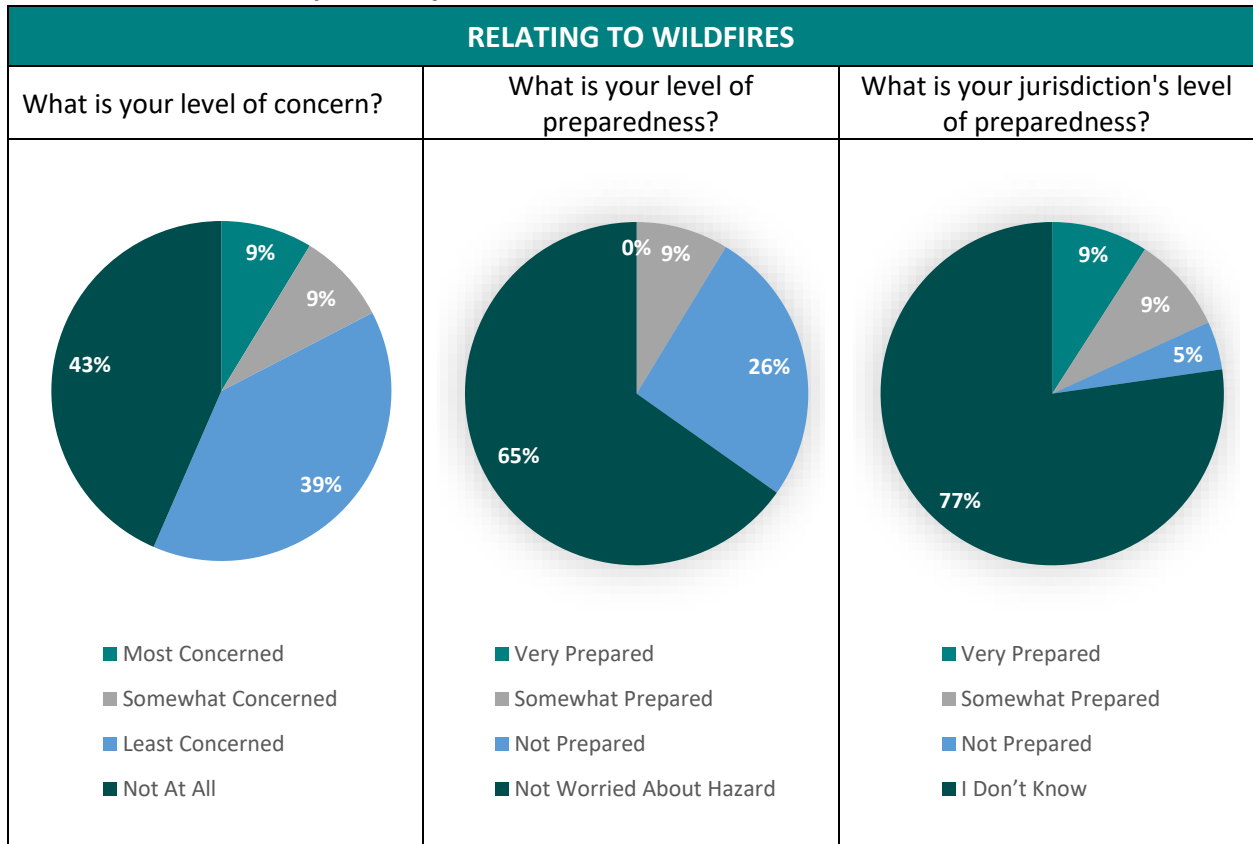
Table 22: Annual Expected Loss - Wildfires

EXPECTED ANNUAL LOSS				
Total	Building Value	Population	Population Equivalence	Agriculture Value
\$333.00	\$296.00	0.00	\$38.00	\$0

Public Input

Participants in the public survey were asked to assess and identify their concerns about a severe thunderstorm/wind event incident in their community and to what level they felt they and their community were prepared.

Chart 5: Public Input - Wildfires



Possible Mitigation Strategies

- Arson prevention activities, including the reduction of blight
- Encourage safe use and maintenance of fireplaces and chimneys
- Prescribed burns and fuel management
- Implementation of burning bans when weather appropriate

5.1.6 Drought

Area of Impact

To some extent, all areas of Saginaw County are vulnerable to drought conditions. Rural areas that rely on wells for their drinking water may be more vulnerable. Private homeowners who rely on home wells that may be shallow are the most susceptible.

Hazard Description

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in precipitation over an extended period, usually a season or more. In addition, high temperatures, high winds, and low humidity can exacerbate drought conditions.

Droughts are slow-onset hazards but can damage crops, municipal and residential water supplies, recreational uses, and wildfires over time. The direct and indirect economic impact can be significant if droughts extend over several years.

Levels of Severity

The National Oceanic and Atmospheric Administration (NOAA) categorizes five levels of drought:

- Abnormally Dry (D0) – Short-term dryness slowing planting, growth of crops or pastures, and fire risks above normal.
- Moderate Drought (D1) – Some damage to crops or pastures, high fire risk, streams, reservoirs, or wells low. Some water shortages are developing or imminent. Voluntary water restrictions may be requested.
- Severe Drought (D2) – Crop or pasture losses likely, fire risk is very high, and water shortages are common. Water restrictions are imposed.
- Extreme Drought (D3) – Major crop or pasture losses, extreme fire danger, widespread water shortages or restrictions.
- Exceptional Drought (D4) – Widespread and exceptional crop or pasture losses, exceptional fire risk, and water shortages in reservoirs, streams, and wells, creating water emergencies.

Historical & Recent Events

Saginaw County has experienced only two recorded droughts since 1950. A review of these two droughts showed that the impacted areas affected the region or large portions of the state instead of just the Saginaw County Area.

Table 23: Historical Events - Drought

Date	Type	Deaths Injuries	Property Loss (Not all loss is reported)	Duration
7/01/2001	Drought	0/0	\$150 mil (est. across the region)	30 days
9/01/2002	Drought	0/0	\$ -	30 days

According to www.drought.gov, the following drought conditions have occurred since 2000.

Table 24: Other Drought Events

Date	Severity	Date	Severity
Feb-May, 2000	D0 – D1	Jul-Sep, 2021	D0
Jul '02 – Jun '03	D0-D1	Aug-Nov 2003	D0-D1
Sep-Dec 2004	D0-D1	Apr-May 2005	D0
Sep-Nov 2005	D0	Mar-Apr 2010	D0
Aug-Oct 2010	D0	Aug 2011	D0
Jul '12 – Feb '13	D0-D1	Sep-Dec 2013	D0
Mar-Aug 2015	D0	Jun-Sep 2016	D0-D1
Sep-Oct 2017	D0	Aug-Sep 2018	D0-D1
Aug-Sep 2019	D0	Jul 2020	D0
Mar-Jul 2021	D0-D2	Feb-Mar 2022	D0
Jul '22 – Feb '23	D0-D1		

Probability & Impact of Future Events

There have only been two recorded droughts in Saginaw County since 1950. Using the formula Probability = Incidents/Time, the risk of a drought event occurring in Saginaw County in any given year is approximately 2%

Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of drought events as 9%.

The FEMA National Risk Index provides no rating for Drought in Saginaw County and 0 as the Risk Score is Relatively Low, 15.82. The FEMA national risk index is computed using an Annualized Frequency of Drought Events in Saginaw County as less than 0.001% chance per year.

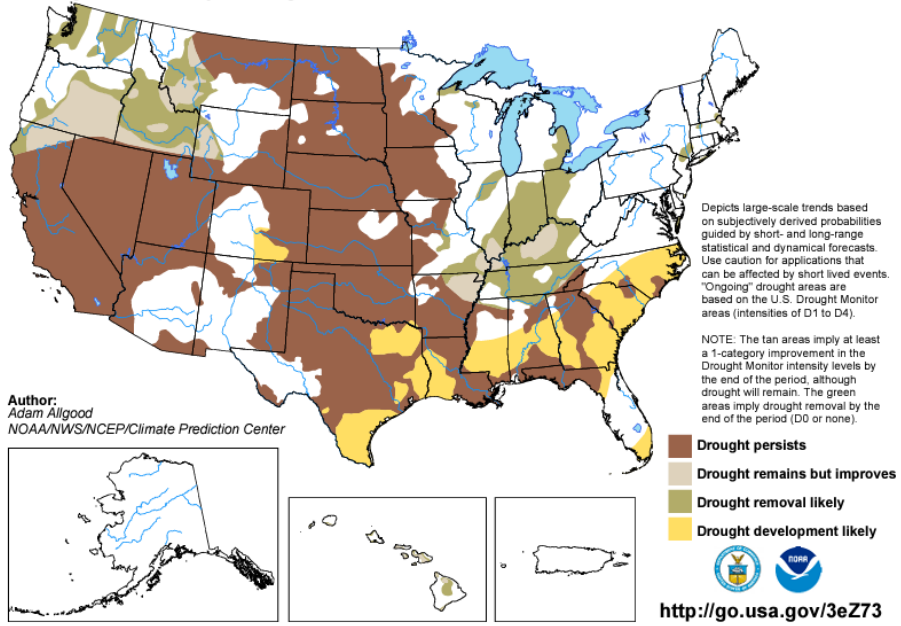
Despite the lack of official designation, areas of Saginaw County have suffered from a lack of precipitation impacting agriculture in the area. According to the State of Michigan Hazard Mitigation Plan, Michigan averages three drought events yearly with a property and crop loss of approximately seven million dollars.

Table 25: Annual Expected Loss - Drought

EXPECTED ANNUAL LOSS				
Total	Building Value	Population	Population Equivalence	Agriculture Value
No Annual Expected Loss	\$ -	0.00	\$ -	\$ -

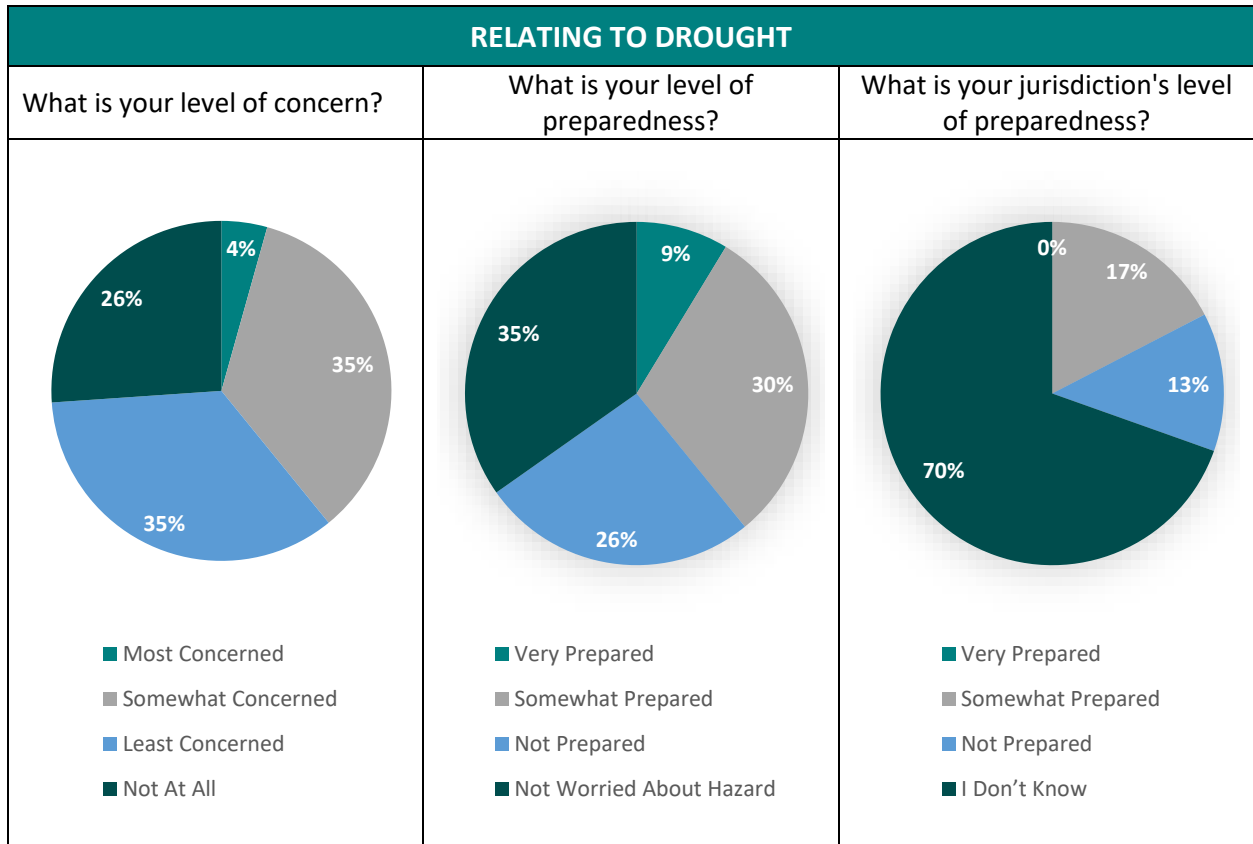
Figure 8: US Seasonal Drought Outlook through 2/2023

U.S. Seasonal Drought Outlook Valid for November 17, 2022 - February 28, 2023
Drought Tendency During the Valid Period Released November 17, 2022



Participants in the public survey were asked to assess and identify their concerns about a drought event incident in their community and to what level they felt they and their community were prepared.

Chart 6: Public Input - Drought



Possible Mitigation Strategies

- Increase storage capacity for water in drought events (especially for human needs during extreme temperatures.)
- Encouragement of water-saving measures by consumers.
- Design and plan of irrigation systems using alternate water sources

5.1.7 Subsidence

Area of Impact

Jurisdictions where mining was conducted. Known locations of coal mines in Saginaw County: Buena Vista Twp, Freemont Twp, James Twp, Saginaw City, Saginaw Twp, St Charles Twp, Swan Creek Twp.

Hazard Description

Land subsidence is the gradual settling or sudden sinking of land. Its primary cause is the removal of underground water, compactions, drainage of organic soils, and underground mining. In addition, improperly filled-in abandoned mines are susceptible to collapse due to water destabilization of wooden support beams or inadequate filling of abandoned mine shafts.

Historical & Recent Events

Coal mining in Saginaw County occurred between the late 1800s and 1950 when the last operations coal mine in Swan Creek Twp was closed. Official records of coal mine-related subsidence are limited; however, news publications list at least two incidents at the same location in the City of Saginaw.

Table 26: Historical Events - Subsidence

YEAR	LOCATION	DESCRIPTION
1977	Southwest Saginaw City	The collapse of an abandoned coal mine shaft caused a 20x20' sinkhole.
1992	Same location as above	Similar sized collapse.

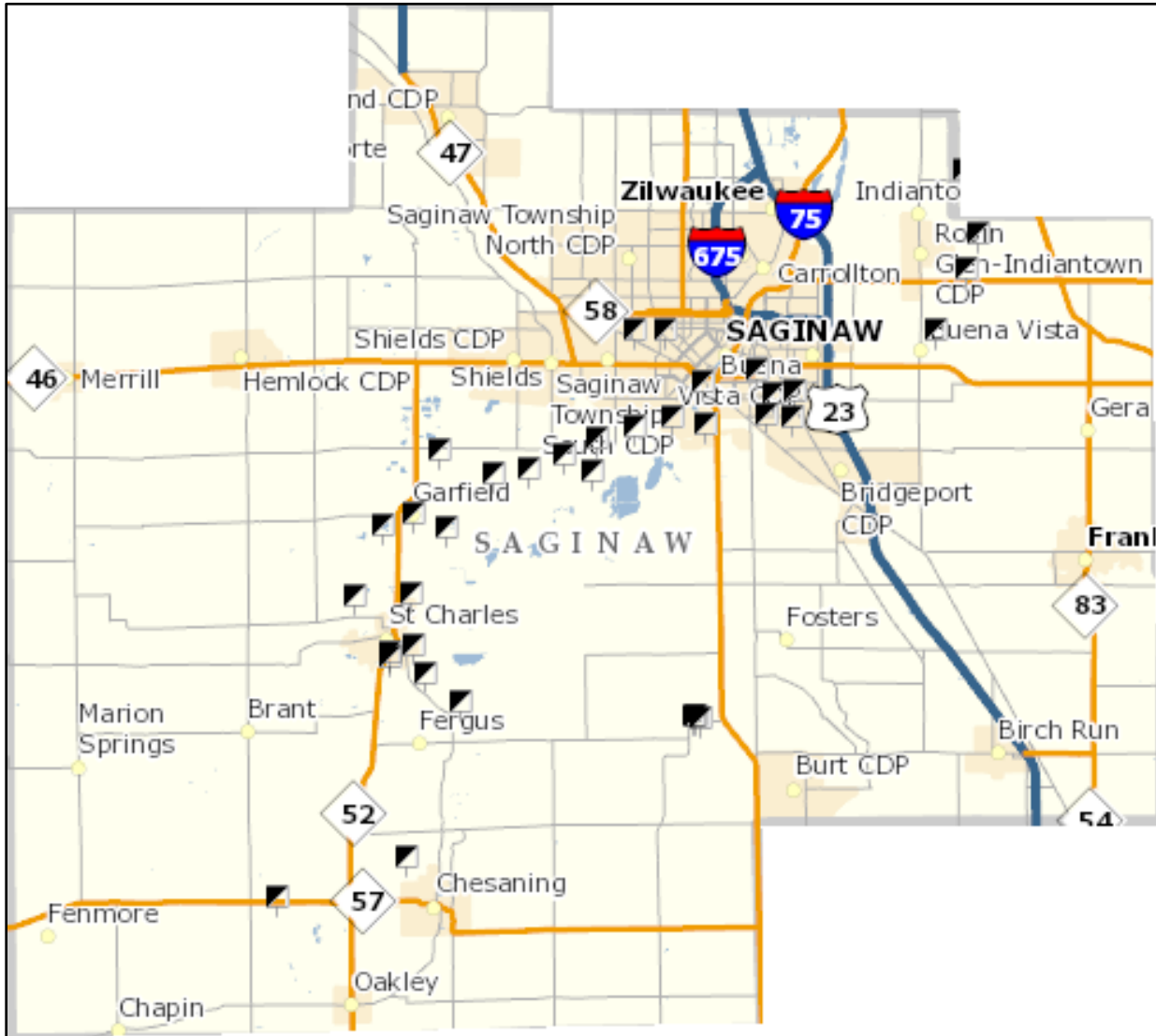
Probability & Impact of Future Events

Subsidence is not a weather event, per se, so it is not recorded in the NOAA Storm Event Database. Nor is it listed in FEMA's National Risk Index. Due to the limited records of known subsidence events in Saginaw County, determining the probability of future events is difficult.

Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a subsidence event as 5%.

While there is a limited risk of injury due to mine-related subsidence in Saginaw County, the most considerable impact is the anticipated cost to remediate the collapsed mineshaft.

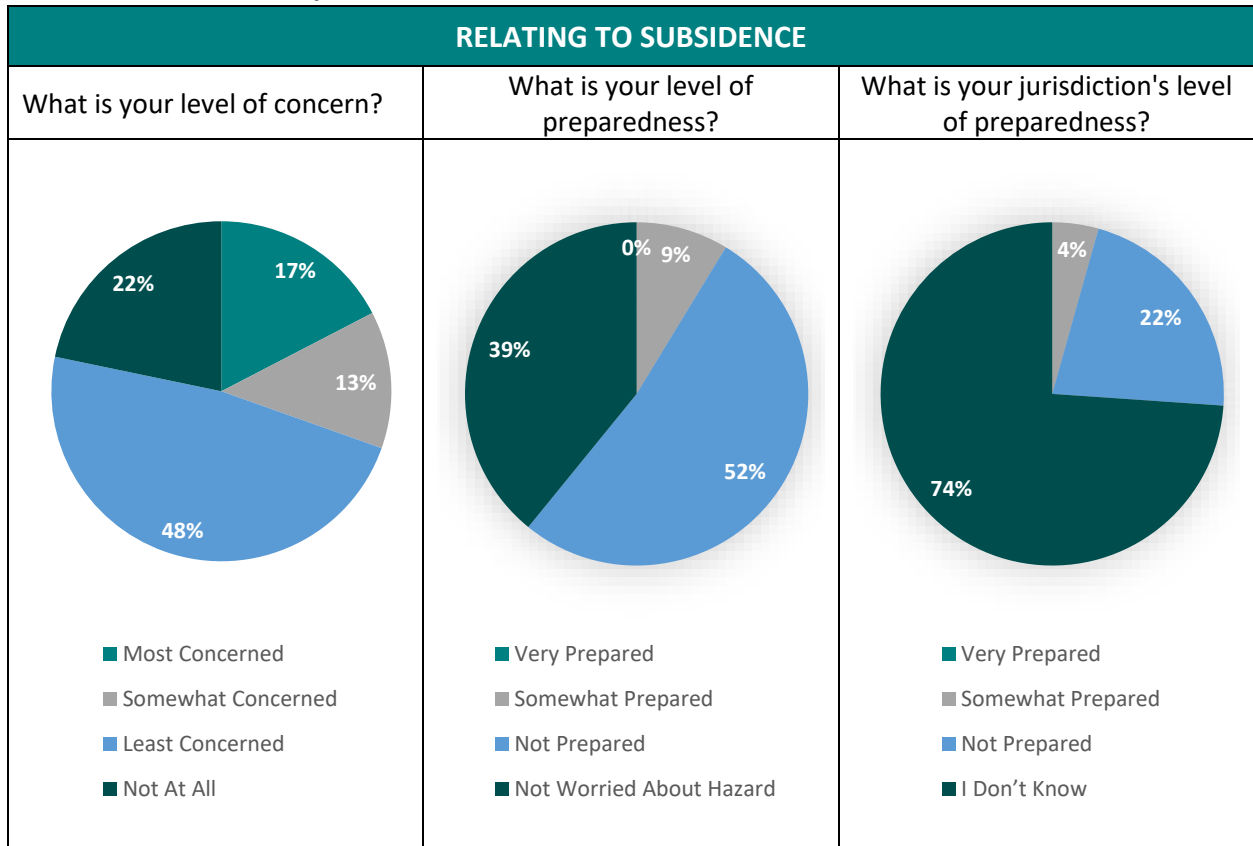
Map 12: Closed Mineshaft Locations



Public Input

Participants in the public survey were asked to assess and identify their concerns about a severe thunderstorm/wind event incident in their community and to what level they felt they and their community were prepared.

Chart 7: Public Input - Subsidence



Possible Mitigation Strategies

- Map and monitor known abandoned mine shafts

5.1.8 Earthquakes

Area of Impact

None

Hazard Description

An earthquake happens when two blocks of the earth suddenly slip past one another. The surface where they slip is called the fault or fault plane. Where the quake starts below the surface of the earth is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter.

Sometimes an earthquake has foreshocks. These minor earthquakes happen in the same place as the larger earthquake that follows. Scientists can't tell if an earthquake is a foreshock until a larger earthquake happens. The largest main earthquake is called the mainshock. Mainshocks always have aftershocks that follow. These more minor earthquakes occur afterward in the same place as the mainshock. Depending on the size of the mainshock, aftershocks can continue for weeks, months, and even years after the mainshock.

Historical & Recent Events

There are no reported earthquakes with an epicenter in Saginaw County.

Probability & Impact of Future Events

Saginaw County's Vulnerability Analysis (Risk = Probability x Impact) completed for this HMP update lists the relative threat of an earthquake as 5%.

The FEMA National Risk Index lists the relative risk for an Earthquake in Saginaw County as Very Low, 3.07. The FEMA national risk index is computed using an Annualized Frequency of Earthquake Events in Saginaw County as less than 0.017% chance per year.

While the earthquake risk in Saginaw County is very low, this often means that structures or utilities may not be built to withstand the forces of relatively gentle seismic action. Thus, while the risk of occurrence is low, the damage sustained may be greater.

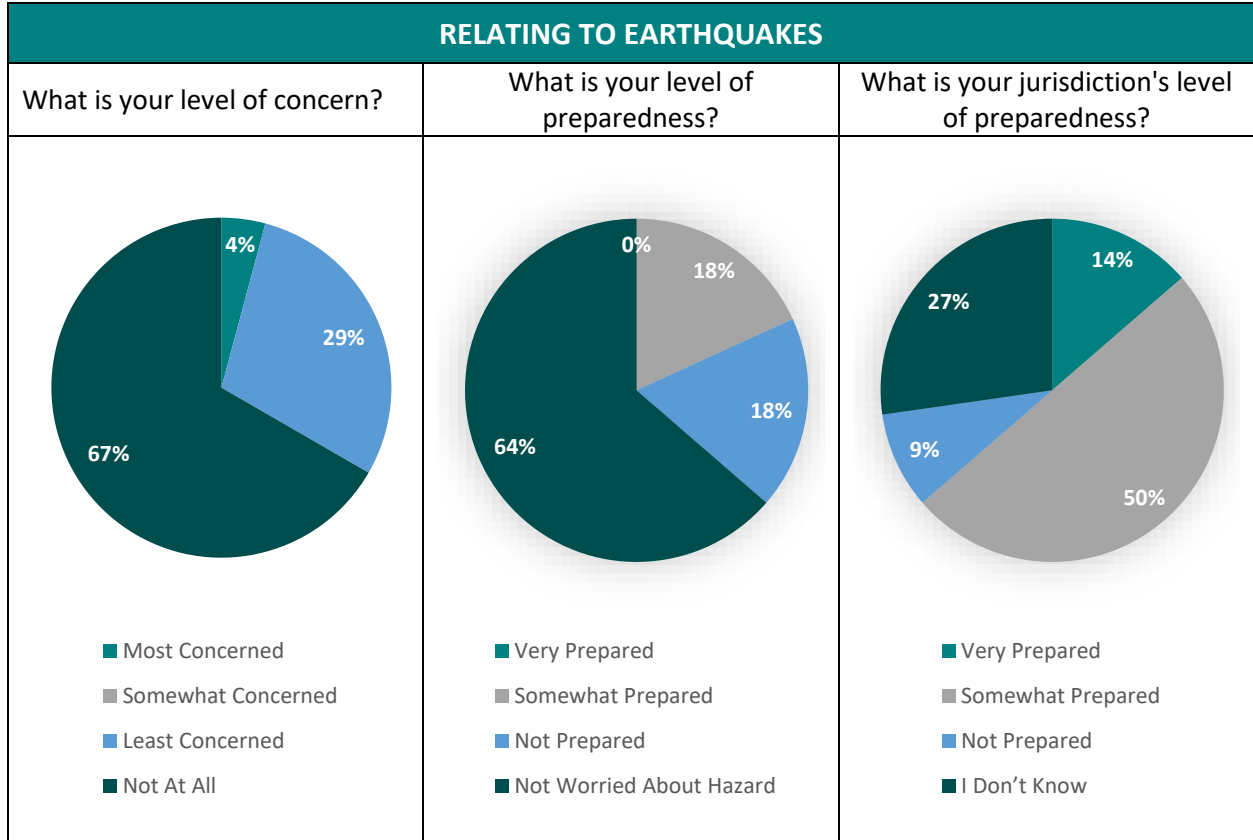
Table 27: Annual Expected Loss - Earthquake

EXPECTED ANNUAL LOSS				
Total	Building Value	Population	Population Equivalence	Agriculture Value
\$71,756	\$68,195	0.00	\$3,561	\$ -

Public Input

Participants in the public survey were asked to assess and identify their concerns about a severe thunderstorm/wind event incident in their community and to what level they felt they and their community were prepared.

Chart 8: Public Input - Earthquake



Possible Mitigation Strategies

- Encourage evaluation and improvement of seismic resistance of vulnerable utilities

5.1.9 Extreme Temperatures

Area of Impact

All jurisdictions in Saginaw County are susceptible to Extreme Temperatures.

Hazard Description

Extreme temperatures are typical in Michigan due to its geographic location and proximity to the Great Lakes. Extreme temperatures occur virtually every year. Generally, the longer the event, the greater the impact on the population and infrastructure. Older adults, very young, and people with chronic diseases are most at risk.

Extreme heat is characterized by very high temperatures and exceptionally humid conditions. This phenomenon is commonly called a heat wave when persisting over a long period. The major threats of extreme heat are heatstroke and heat exhaustion. Urban areas are at greater risk due to the Heath Island Effect. More buildings and other infrastructure in these metropolitan areas absorb and re-emit the sun's heat more than natural landscapes found in more rural locations. As a result, daytime temperatures can be 1-7°F higher than in outlying areas.

Extreme cold is characterized by prolonged periods of low temperatures often exacerbated by high winds providing a wind chill or “feels like” temperature much lower than the actual temperature. Frostbite and hypothermia are the two conditions most associated with frigid temperatures. While the risk of low temperatures in rural areas is no greater than that of an urban area, the lack of infrastructure to block winds may make the wind chill markedly lower in a rural area.

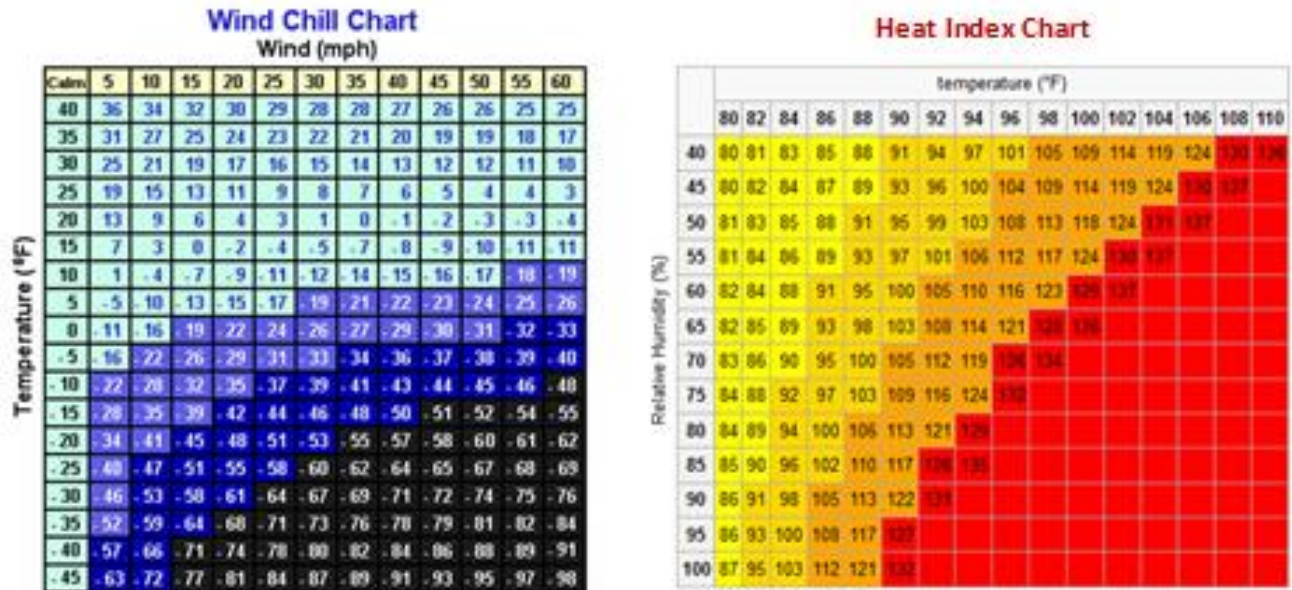
Nationwide, approximately 200 deaths a year are directly attributable to extreme heat. Extreme summer heat is also hazardous to livestock, and agriculture crops, can cause water shortages, and increase the fire risk.

Like heat waves, periods of prolonged, freezing weather can result in significant temperature-related deaths. Each year in the United States, approximately 700 people die from severe cold temperature-related causes. A considerable number of cold-related deaths are not the direct result of “freezing” conditions but rather illnesses and diseases negatively impacted by frigid weather. Damage to buildings, pipelines, and other infrastructure occurs in bitterly cold conditions, resulting in expensive repairs and potential days of business and school shutdowns.

Temperature Severity Scale

When temperatures factor with the wind speed during cold weather or humidity during hot weather, a “feels like” temperature is determined. The cold “feels like” temperature is called the wind chill, while the hot is called the heat index.

Figure 9: Wind Chill & Heat Index



Historical & Recent Events

According to NOAA, there have been 27 Extreme Temperature related events in Saginaw County since 1950.

The highest record temperature in Saginaw County was 111°F on July 13, 1936, and the lowest was -23°F on February 5, 1918.

The records of extreme temperature events in Saginaw County since the adoption of the last Hazard Mitigation Plan (2017) are listed below.

Table 28: Historical Events – Extreme Temperatures

Date	Type	Deaths Injuries	Property Loss (Not all loss is reported)	H/L Temp Wind Chill (WC) Heat Index (HI)
1/01/2018	Cold/Wind Chill	0/0	\$0.00	1°F /-16° WC
6/30/2018	Heat	0/0	\$0.00	93°F/110° HI
7/01/2018	Heat	0/0	\$0.00	93°F/106° HI
1/29/2019	Cold/Wind Chill	0/0	\$0.00	-1°F/-16° WC

Probability & Impact of Future Events

There have been 27 recorded extreme temperature events in Saginaw County since 1950. Using the formula $\text{Probability} = \text{Incidents/Time}$, the risk of a severe thunderstorm and/or wind event occurring in Saginaw County in any given year is approximately 37%.

Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of an extreme temperature event as 36%.

The FEMA National Risk Index doesn't list extreme temperatures as a single event. Instead, extreme hot and cold temperature event Risk Index information is listed separately.

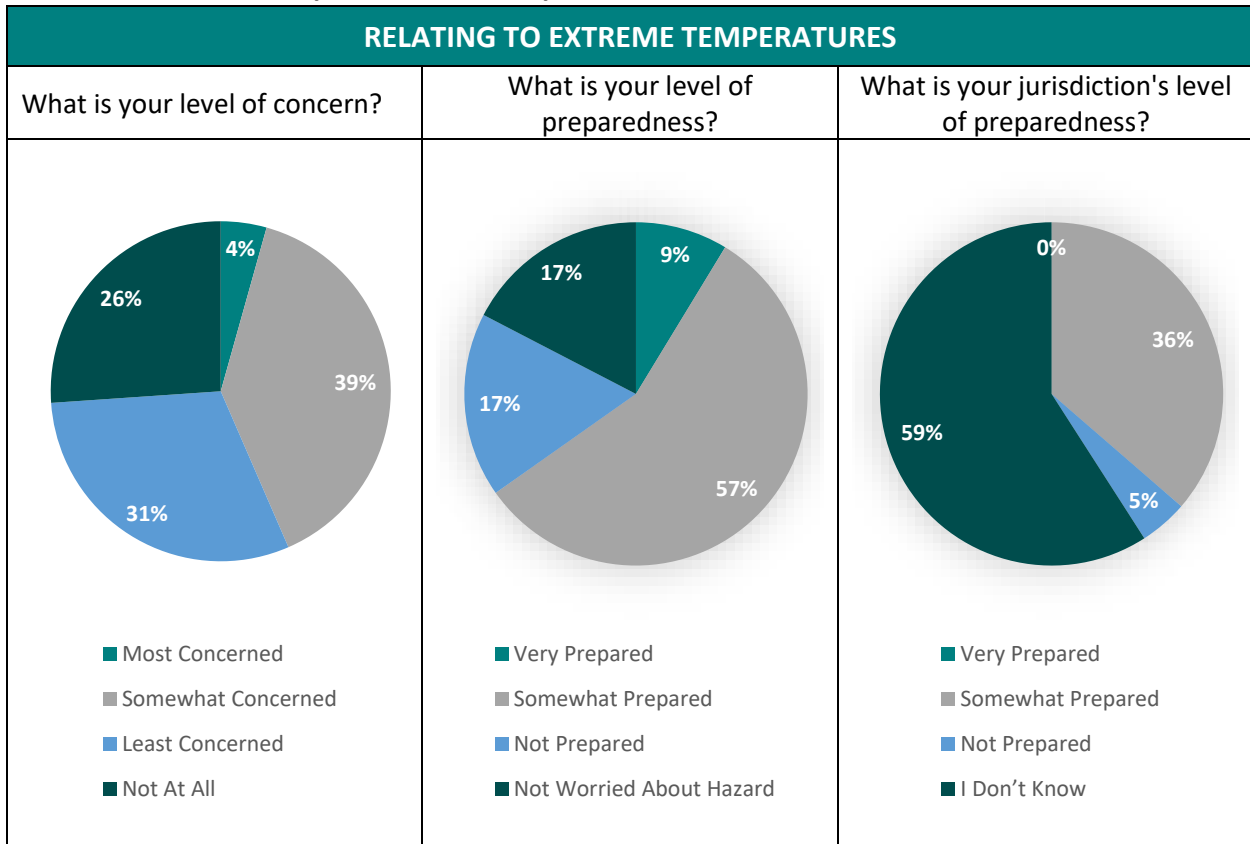
Table 29: Expected Impact – Extreme Temperatures

Event Type	Event Frequency	Risk Index	Annual Building Loss	Expected Population Loss	Population Equivalence	Agriculture Loss
Cold Wave	0.5	Relatively High	\$2,446	0.05	\$349,758	\$500
Heat Wave	4.5	Relatively High	\$1,673	0.07	\$519,947	\$5,421

Public Input

Participants in the public survey were asked to assess and identify their concerns about a severe thunderstorm/wind event incident in their community and to what level they felt they and their community were prepared.

Chart 9: Public Input – Extreme Temperatures



Possible Mitigation Strategies

- Education and outreach activities to encourage residents to create emergency preparedness kits allowing them to be self-sufficient for at least 72 hours.
- Encourage local communities to use existing government buildings to open warming or cooling centers as needed and ensure these centers have sufficient generator power available.
- Identification of vulnerable individuals, emphasizing homebound individuals with limited mobility or health issues.

5.2 TECHNOLOGICAL & HUMAN-CAUSED HAZARDS

Human-caused hazards are those that result entirely or predominantly from human activities and choices, whereas technological hazards are those that originate from technological or industrial conditions, dangerous procedures

Human-caused and technological disasters often have little to no warning and may devastate the people, the environment, and the economy.

While all Natural Hazards listed on the Hazard Vulnerability Analysis were addressed in this Plan, only those Technological and Human-caused hazards with an HVA Risk Score of 25% or higher were included. The only exception is Hazardous Material Release – Transportation Related, which had an HVA Risk Score of 22%. This hazard was included due to being closely related to the HazMat – Fixed Site hazard.

5.2.1 Dam Failure

Area of Impact

Areas surrounding and especially those downstream from high-hazard dams, including Albee Twp, Maple Grove Twp, Tittabawassee Twp, Saginaw Twp, James Twp

Hazard Description

Dams are structures built across a river or stream to hold back water in reservoirs. Reservoirs can store water for farming, industry, household use, recreation, or flood prevention and control.

Federal and state government officials classify dams according to the potential impact a dam failure would have on upstream or downstream areas or locations remote from the dam. There are three classification levels used: low, significant, and high.

Table 30: Dam Hazard Classification

Hazard Classification	Summary	Potential Loss of Life	Economic, Environmental, Lifeline Losses
Low	Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of life and low economic or environmental losses. The losses are primarily limited to the owner's property.	None expected	Low; generally limited to the owner
Significant	Those dams where failure or misoperation results in no probable loss of human life but can cause economic and environmental losses or community lifeline disruption.	None expected	Yes
High	Those dams where failure or misoperation will probably cause loss of human life.	Probable; one or more expected	Yes (but not a requirement for this classification)

Historical and Recent Events

The only known incident of a dam failure that impacted Saginaw County occurred in May 2020 when dams on the Tittabawassee River in Gladwin and Midland Counties failed. The resulting flood waters, in combination with heavy rains, caused the highest level of flooding in recent history, requiring the temporary evacuation of hundreds of residents and causing an estimated \$10 million worth of damage.

Probability and Impact of Future Events

Dam Failure was included as an unranked hazard in the 2017 plan. It was inadvertently left off of the hazard assessment for the current plan update. However, a likely cause of a dam failure is due to an infrastructure failure, so the probability is likely equal to or less than a Relative Risk Score of 32%.

There are 26 dams listed on the National Inventory of Dams. Only one of those 26, Mistequay Creek Structure 4A, is categorized as a High-Hazard Dam. A failure of Structure 4A impacts would be limited to

the homes in the immediate area of the dam. Since the Mistequay Creek structure was built, there has only been once incident where the impounded water levels even came close to reaching the spillway height.

There will undoubtedly be a flood risk in the event of future failure of the Sanford Dam in Midland County; however, as the dam is still being rebuilt, the impact is unknown at this point. However, the repaired dam will almost certainly be in better condition than the previous dams, and thus the risk of failure should be reduced.

Table 31: Saginaw County Dam Locations

Dam Name	Location	Dam Type	Owner Type	Year Completed	Hazard Potential
Mistequay Creek Structure No. 4	Maple Grove Township	Earthen	Private	1967	High
Mistequay Creek Structure No. 3A	Maple Grove Township	Earthen	Private	1966	Low
Pool One A	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Local)	1958	Low
Pool One B	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Local)	1958	Low
Pool Two	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Federal)	1970	Low
Pool Three	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Federal)	1967	Low
Pool Four	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Federal)	1955	Low
Pool Five	Spaulding Twp (Wildlife Reserve)	Earthen	Public (Federal)	1971	Low
Dude Estates Dame	Thomas Township	Earth Gravity	Private	1979	Low
Cole Dam	Tittabawassee Township	Earth	Private		Low
Crow Island Dam	Zilwaukee Township	Not Indicated	Public (State)	1949	Low
Haney Dam	Brant Township	Earth	Private	1963	Low
Lincoln's Dam	Tittabawassee Township	Earth	Private	1951	Low
Pool Six Dam	Spaulding Township	Earth	Public (Federal)	1959	Low
Shiawassee Flats Dam	Swan Creek Township	Not Indicated	Public (State)	1964	Low
Wending Dam	Maple Grove Township	Earth	Private	1966	Low

Dam Name	Location	Dam Type	Owner Type	Year Completed	Hazard Potential
Gross Dam	Maple Grove Township	Earth	Private	1966	Low
Nelson Dam	Lakefield Township	Earth	Private	1962	Low
Gillam Dam No. One	Lakefield Township	Not Indicated	Private	Not Indicated	Low
Gillam Dam No. Two	Lakefield Township	Not Indicated	Private	Not Indicated	Low
Shin Dam	Lakefield Township	Not Indicated	Private	Not Indicated	Low
Birchmeier Dam	Maple Grove Township	Not Indicated	Private	Not Indicated	Low
Peet Packing Co Dam	Chesaning Township	Not Indicated	Private	Not Indicated	Low

Possible Mitigation Strategies

- Ensure emergency response plans for high-hazard dams are reviewed and kept current.
- Regular inspection of the high-hazard dam structure

5.2.2 Civil Disturbances

Area of Impact

All jurisdictions in Saginaw County are vulnerable to Civil Disturbances; however, communities with larger populations or near facilities that may have a significant political or symbolical nature have a higher vulnerability.

Hazard Description

Civil Disturbances can occur due to socioeconomic, political, or other reasons. They include acts of violence or disorder contrary to public law and order, including those that follow a major disaster. Acts of Civil Disturbances include riots, acts of violence, insurrections, unlawful obstructions or assemblages, or other disorders.

Michigan law defines the following:

- Civil Disorder – any public disturbance involving the use of any firearm, explosive, or incendiary device by three or more assembled persons that causes an immediate danger to or results in damage to any property or person.
- Riot – an act where five or more persons, acting in concert, wrongfully engage in violent conduct and thereby intentionally or recklessly cause or create a serious risk of causing public terror or alarm.
- Unlawful Assembly – to assemble or act in concert with four or more persons to engage in conduct constituting a crime of riot or to be present at an assembly that either has or develops such purpose and to remain a threat with intent to advance such purpose.

Historical & Recent Events

While the frequency of Civil Disturbances has increased worldwide, 282% since 2011, there have been very few such events in Saginaw County.

There were riots in Saginaw County during the civil rights riots that swept the country in 1967. However, despite several highly publicized political and social events, even during increased acts of Civil Disturbances across the United States, there were no significant incidents in Saginaw County. The lack of incidents may be due to the direct involvement of local government officials and leaders of Saginaw County social and community organizations. This cooperation has helped reduce the risk that these trends would materialize in Saginaw County.

Possibility & Impact of Future Events

While not zero, the probability of future occurrences is very low based on history.

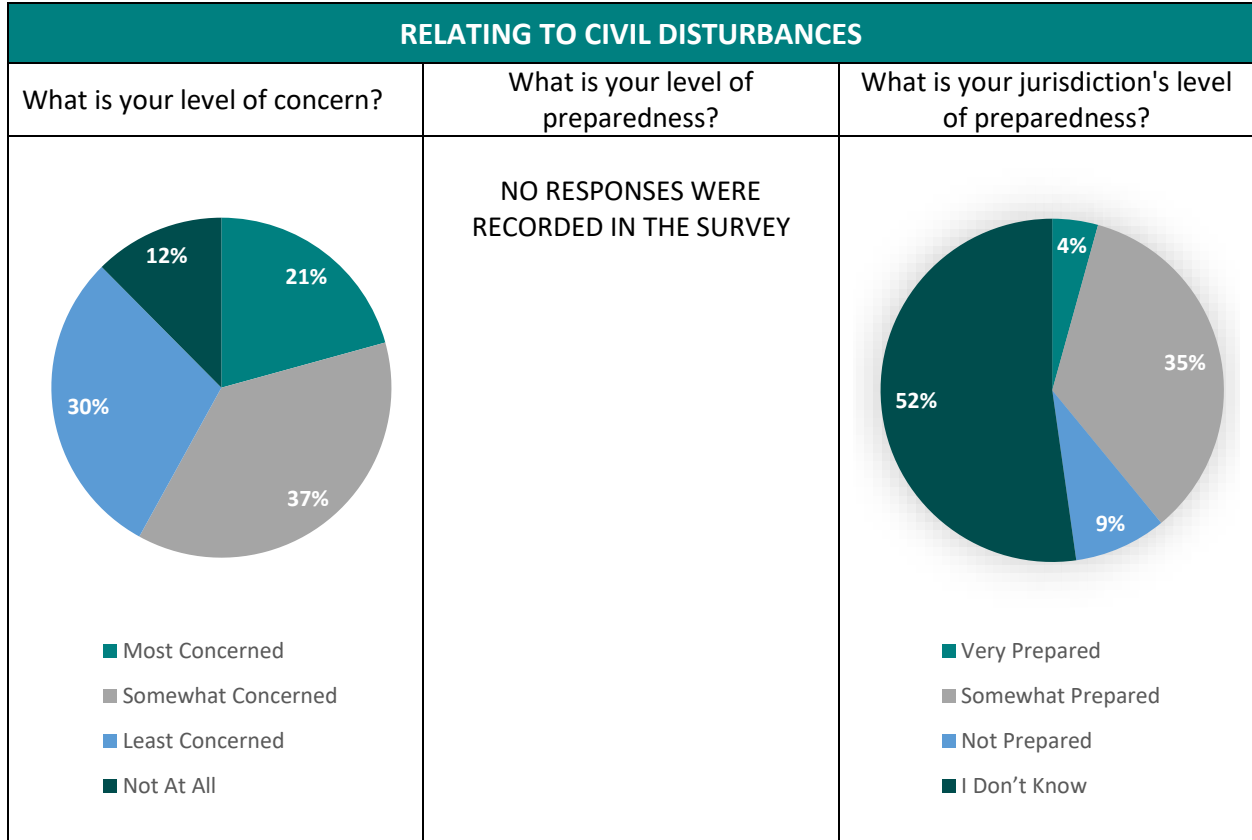
Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Civil Disturbance event as 20%.

Should such an event occur, there could be a severe direct and indirect impact on the population, infrastructure, and economy of Saginaw County.

Public Input

Participants in the public survey were asked to assess and identify their level of concern about a Civil Disturbance incident occurring in their community and to what level they felt they and their community were prepared.

Chart 10: Public Input – Civil Disturbances



Possible Mitigation Strategies

- Provide updated training and response equipment for county law enforcement agencies.
- Encourage continued communication and relationships between government and community representatives.

5.2.3 Hazardous Material Incident – Fixed Site

Area of Impact

As a result of the number of agricultural operations, whether commercial or “hobby” farms, in Saginaw County and the number of SARA III sites, all jurisdictions in the county are vulnerable to Hazardous Material Incidents.

Those communities with SARA Title III sites that contain large quantities of Extremely Hazardous Substances (EHS) are more vulnerable.

Hazard Description

Fixed-site hazardous material incidents occur when an uncontrolled release of hazardous materials from a fixed site poses risks to health, safety, property, and the environment. Due to technological advances, dangerous materials are present in quantities of concern in business and industries, agriculture, hospitals, utilities, and other facilities. These include corrosives, explosives, flammable materials, radioactive materials, poisons, oxidizers, and dangerous gases.

The EPA has created a list of chemicals considered Extremely Hazardous Substances (EHS) – known as “the list-of-lists.” Under the Emergency Planning and Community Right to Know Act (EPCRA), facilities with a specified quantity of EHS must report, under Section 302 of EPCRA, the substance, amount, and location stored to the Local Emergency Planning Committee (LEPC). The reports submitted to the LEPC are called Tier II reports. The LEPC must create emergency response plans for any facility with EHS that exceeds the Threshold Planning Quantity (TPQ.)

The purpose of Tier II reports is to inform responders and the community as a whole where EHS are stored or used. Offsite response plans are designed to provide responders with basic information, such as the type, quantity, and location of EHS over the TPQ. Offsite response plans are updated annually and provided as a reference to first responders in the affected communities.

Unlike Hazardous Materials Incidents, which impact community members, an Industrial Accident, even if it involves hazardous materials, only affects the facility's employees and/or property.

Historical & Recent Events

The 2017 Hazard Mitigation Plan listed three Hazardous Material Incidents. Fortunately, there have not been any significant Hazardous Material Incidents in Saginaw County since 2012.

While there have not been major Hazardous Material Incidents since the last plan update, there have been, however, several more minor incidents or Industrial Accidents that have required a HazMat response from Saginaw County 1st Responders.

Table 32: Historical Events – Hazardous Materials Fixed Site

Date	Jurisdiction	Description
9-26-2017	Kochville Twp	A subject at SVSU was using Phenol during a scientific experiment when. During the experiment, the substance was released that caused injuries. Five people sustained minor injuries and were treated at the scene or a local hospital.
3-19-2018	Thomas Twp	Thomas FD responded to a local SARA III 302 site experiencing a release of Silicon Tetrachloride. The release was minor and posed no hazard off the property. Facility safety staff mitigated the release before the arrival of Thomas FD. Two employees were exposed; however, they did not require medical treatment.
1-14-2021	Chesaning Village	A contractor was removing an unknown material from a storage tank at a former water treatment plant at a closed facility. The container developed a leak causing the substance to spill onto the ground. There was a risk of the spill moving to the Shiawassee River. Chesaning-Brady FD responded, and EGLE and a private contractor mitigated the incident.
11-17-2021	St Charles Twp	Two thousand gallons of diesel fuel leaked from a storage container at a local farm. The fuel saturated the ground and seeped into a nearby drainage ditch. EGLE and a private contractor mitigated the incident.

Possibility & Impact of Future Events

Reporting is inconsistent, so determining a reasonable probability percentage using the P=I/T formula is difficult.

Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Hazardous Material Incident – Fixed Site event as 26%.

Saginaw County is home to numerous businesses that store and use EHS and other hazardous materials daily, including many agricultural operations. Due to these factors, the risk of a hazardous material incident at a fixed site is highly probable. Specifically, 171 active facilities in Saginaw County must report their chemical inventory under SARA III, and 59 facilities (listed in *Table 27*) require an emergency response plan to be developed by the LEPC.

Appendix C of this Plan contains a complete list of all SARA III sites in Saginaw County.

Table 33: SARA III Sites With Offsite Plans

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
3948	Healthcare Industries Materials Site (HIMS)	Hemlock	Thomas Township FD
4847	Advanced Micronutrient Products, Inc.	REESE	Blumfield Township FD
18344	ALEDA E. LUTZ VAMC	SAGINAW	Saginaw FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
3935	AT&T - M25074	SAGINAW	Saginaw FD
3910	BIRCH RUN CDO - M25515	BIRCH RUN	Birch Run Township FD
3911	BRIDGEPORT #3 ESS - M25562	BURT	Albee Township FD
5996	Bridgeport Co - M25560	SAGINAW	Bridgeport FD
7450	BRIDGEPORT WWTP	SAGINAW	Bridgeport FD
10648	BUENA VISTA WWTP	SAGINAW	Buena Vista FD
20190	CMI Schneible, Inc. - Plant 3	Saginaw	Saginaw FD
22166	FedEx Ground - Saginaw	Saginaw	Saginaw FD
3875	Frankenmuth	FRANKENMUTH	Frankenmuth FD
3912	FRANKENMUTH #5 BRSM - M25521	FRANKENMUTH	Frankenmuth FD
16559	Fraza	Bridgeport	Bridgeport FD
5997	Freeland #3 ESS - M25527	FREELAND	Tittabawassee Twp FD
4851	Freeland Bean & Grain inc.	Freeland	Tittabawassee Twp FD
3933	FRONTIER HEMLOCK C O- 943-50909-82545	HEMLOCK	Richland Township FD
21041	Gera	Frankenmuth	Frankenmuth FD
3888	GM - SAGINAW METAL CASTING OPERATIONS	SAGINAW	Saginaw FD
3928	HELENA	SAGINAW	Tri-Township FD
3897	Hemlock Semiconductor Operations LLC	Hemlock	Thomas Township FD
3898	HI-TECH STEEL TREATING, INC.	SAGINAW	Saginaw FD
11288	Lake State Railway Company	Saginaw	Saginaw FD
22153	Means Industries, Inc.	Saginaw	Buena Vista FD
4861	Means Industries, Inc.	Saginaw	Buena Vista FD
21375	METC MURPHY SUBSTATION	Hemlock	Richland Township FD
21363	MI-0332X_Charter Communications	Zilwaukee	Zilwaukee City FD
20373	MI-25662_Charter Communications	Saginaw	Saginaw FD
18246	Michigan Premier Laundry	SAGINAW	Buena Vista FD
21238	MORLEY BUILDING - M25049	Saginaw	Saginaw FD
21946	Morrison Industrial Equipment	Saginaw	Buena Vista FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
21754	New Cingular Wireless PCS, LLC - USID94882	Reese	Blumfield Township FD
3931	Nexteer Automotive	SAGINAW	Buena Vista FD
17144	Oldcastle Lawn & Garden - Bridgeport	Bridgeport	Bridgeport FD
7454	PBG Saginaw	Saginaw	Buena Vista FD
22738	Pegasus Wind	Reese	Blumfield Township FD
19222	Plant 96W	Chesaning	Chesaning-Brady FD
4867	PLASTATECH ENGINEERING LTD	SAGINAW	Buena Vista FD
11289	S MICHIGAN EXPRESS STOP	SAGINAW	Saginaw FD
21354	Saginaw	Saginaw	Saginaw FD
20217	SAGINAW	SAGINAW	Kochville Township FD
5999	Saginaw - Shields #2 - M25590	SAGINAW	Saginaw FD
9810	SAGINAW CHARTER TOWNSHIP GOV'T	SAGINAW	Saginaw Township FD
11845	SAGINAW CHARTER TOWNSHIP RETENTION BASIN	SAGINAW	Saginaw Township FD
12632	SAGINAW CHARTER TOWNSHIP WWTP	SAGINAW	Saginaw Township FD
22465	Saginaw Lightcore Hut	Saginaw	Saginaw FD
8130	SAGINAW MAIN & 4A - M25540	SAGINAW	Saginaw FD
3907	Saginaw Stoker Drive	SAGINAW	Saginaw FD
6001	Saginaw West Co - M25541	SAGINAW	Saginaw Township FD
17311	SAM'S CLUB #6663	SAGINAW	Saginaw FD
13672	STC	ST CHARLES	Tri-Township FD
21881	The Andersons - Hemlock	Hemlock	Richland Township FD
20991	Tuscola Bay Wind Energy Center	Reese	Blumfield Township FD
8745	UMBRA GROUP, Linear Motion, LLC	SAGINAW	Saginaw FD
16681	Unique Instruments, Inc. DBA Orchid Orthopedic Solutions	BRIDGEPORT	Bridgeport FD
14892	Verizon Business - - XOGLMI (MIXOGLMI)	SAGINAW	Carrollton Township FD
4874	WASTEWATER TREATMENT PLANT	SAGINAW	Saginaw FD
4878	WATER TREATMENT PLANT, SAGINAW	SAGINAW	Saginaw FD

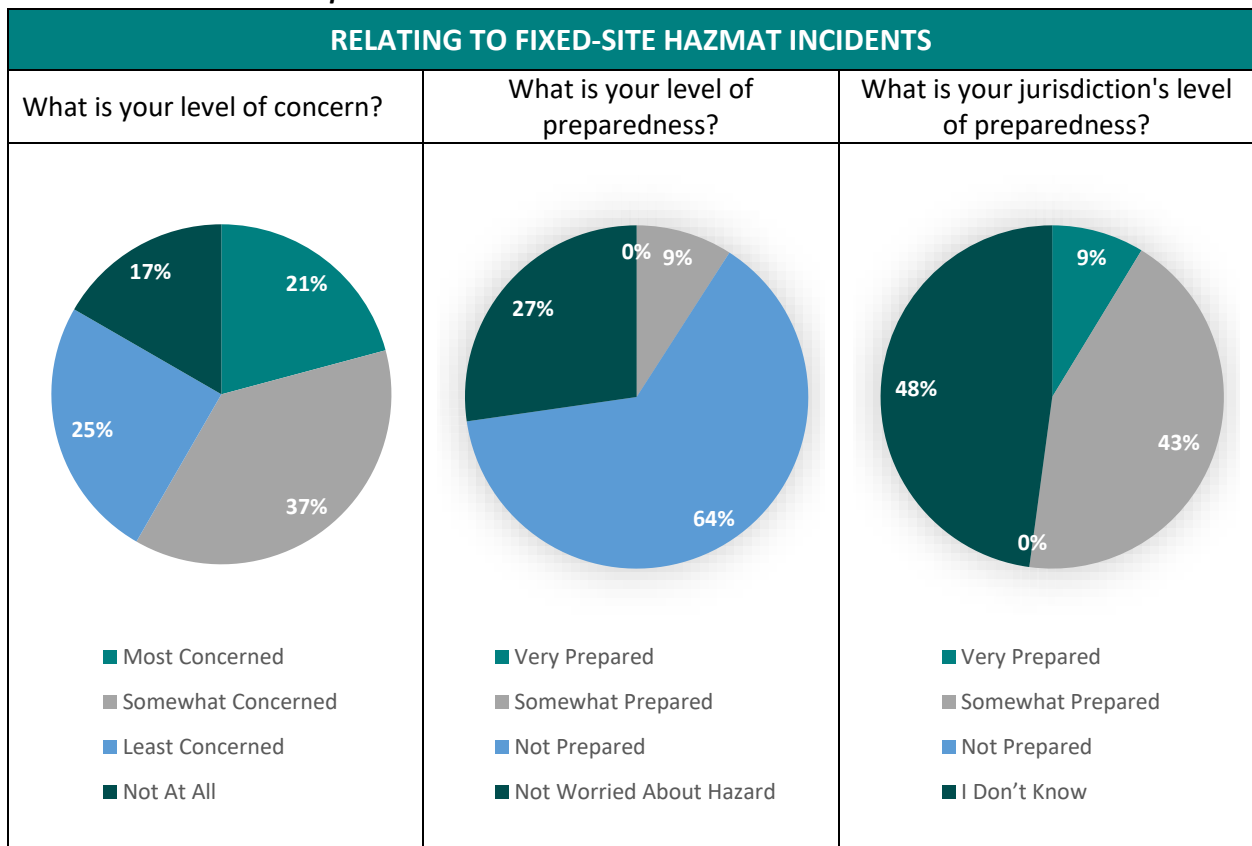
MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
3885	Winfield United - Oakley	OAKLEY	Chesaning-Brady FD

Most industrial, commercial, and agricultural sites store limited quantities of material; therefore, a spill or release would have little to no effect on the public. However, there are public and private sites in the County where large quantities of hazardous substances are stored and used daily. Therefore, significant incidents at these sites could have a widespread effect on the public and require large-scale evacuations and emergency response.

Public Input

Participants in the public survey were asked to assess and identify their level of concern for a Hazardous Material Incident involving a fixed site occurring in their community and to what level they felt they and their community were prepared.

Chart 11: Public Input – Hazardous Materials Fixed Site



Possible Mitigation Strategies

- Ensure updated response plans for 302 sites with EHS.
- Continue to equip and train the Saginaw County Tech & HazMat Team.

5.2.4 Hazardous Material Incident – Transportation Related

Area of Impact

With the amount of commercial traffic on major county roadways and many agricultural operations, all jurisdictions in Saginaw County are vulnerable.

Hazard Description

A transportation hazardous material incident is an uncontrolled release of hazardous materials during transport that pose a risk to health, safety, property, and the environment. All modes of transportation (e.g., highway, railroad, marine, air, and pipeline) carry thousands of hazardous material shipments daily through local communities. A transportation accident involving these hazardous material shipments could cause a local emergency affecting the immediate vicinity of the accident site or a portion of the surrounding community.

The Pipeline and Hazardous Materials Safety Administration of the U.S. The Department of Transportation regulates over 1 million daily shipments of hazardous materials in the United States. Michigan has had numerous hazardous material transportation incidents that affected the immediate area. Most incidents of these types are handled by local and state emergency responders and hazardous material response teams with little to no impact on the public.

More significant incidents, however, pose additional problems and concerns for the affected community. Large-scale or serious hazardous material transportation incidents involving a widespread release of harmful material can adversely impact the life safety and/or health and well-being of those in the immediate area of the accident site and those exposed to the hazardous material through an airborne plume. In addition, damage to property and the environment can also be severe. Statistics show that almost all hazardous material transportation incidents result from accidents or human errors. Rarely are they caused by mechanical failure of the carrying vessel.

Historical & Recent Events

The number of large-scale hazardous material events involving transportation modes has been limited. The only incident on record was the derailment of a CSX train in Tittabawassee Twp on July 22, 1989.

Numerous traffic crashes have occurred where hazardous substances have leaked onto the ground around the accident site. The vast majority, if not all, of these incidents, involved smaller quantities of material that leaked from vehicle components (fuel, oil, etc.) because of the accident as opposed to a more significant release of material being transported by a commercial vehicle. These smaller incidents are generally mitigated by wrecker crews or first responders with little to no impact on people or the environment.

Possibility & Impact of Future Events

As many shipments are not required to be placarded and with many transporters and users of hazardous substances in Saginaw County, it is difficult to determine the probability of occurrence. However, due to the number of federal and state highways and rail lines, large-scale fixed sites, and agricultural operations in Saginaw County, the possibility of a HazMat incident, of some level, during transportation is high.

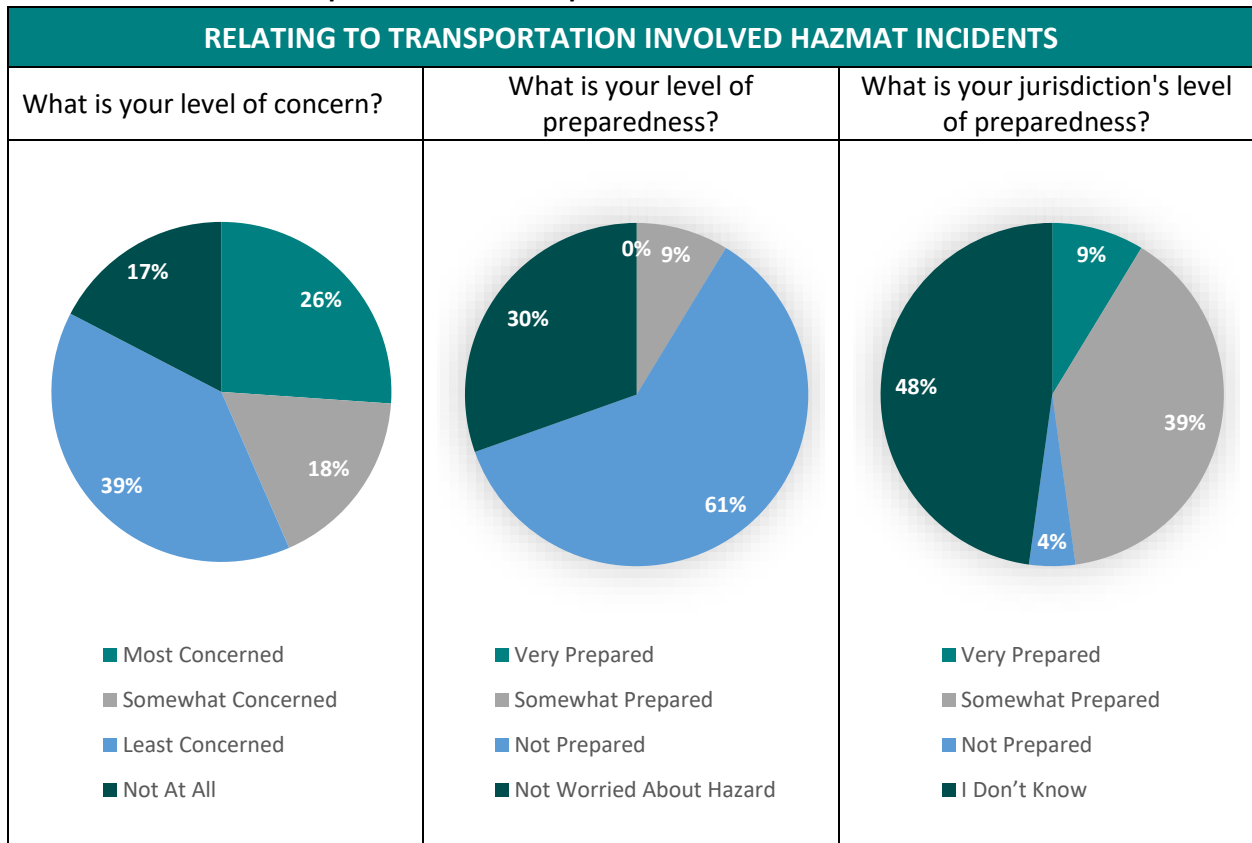
While the probability of a HazMat incident involving a mode of transportation is high, based on previous incidents, the risk of the incident involving a large area is relatively low.

Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Hazardous Material Incident – Fixed Site event as 26%.

Public Input

Participants in the public survey were asked to assess and identify their level of concern of a Hazardous Material Incident involving a mode of transportation incident occurring in their community and to what level they felt they and their community were prepared.

Chart 12: Public Input – HazMat Transportation Incident



Possible Mitigation Strategies

- Improve design, routing, and traffic control at problem roadways.
- Railroad inspections, maintenance, and improved designs at problem rail and roadway intersections (at grade crossings, rural signs/signals for RR crossings.)
- Proper planning, design, maintenance, and enhancements to designated truck routes.

5.2.5 INFRASTRUCTURE FAILURE

Note: The hazard analysis lists infrastructure and utility failures separately. As impacts and responses may be closely related, for this Plan, both hazards were combined into “Infrastructure Failure.”

Area of Impact

All jurisdictions in Saginaw County are vulnerable to infrastructure failure. However, jurisdictions with more public services provided to their residents are at a higher risk of occurrence.

Hazard Description

Public and private infrastructure provides essential life-support services such as electrical power, heating, and air conditions, water, sewage disposal and treatment, storm drainage, communication, and transportation. When one or more of these independent yet interrelated systems fail due to disaster, lack of maintenance, intentional human acts, or other causes – even for a short time – it can have devastating consequences. For example:

- If power is lost during extreme temperatures, people can die in their homes due to a lack of heat, air conditioning, or inability to power needed medical equipment.
- Interruption of water or wastewater systems in communities can cause serious public health problems.
- Failure of storm drainage systems can cause severe flooding and affect other types of infrastructure.

Historical & Recent Events

Except for the incident listed below and temporary weather-related events, large-scale or widespread infrastructure failure in Saginaw County has been limited.

Table 34: Historical Event – Infrastructure Failure

DATE	LOCATION	DESCRIPTION
May 2020	Tittabawassee Twp, Saginaw Twp, Thomas Twp, James Twp, St. Charles Twp, Saginaw City, Spaulding Twp	The Edenville and Sanford Dams north of Saginaw County suffered a catastrophic failure due to heavy rains, compounded by reported age and maintenance issues. The failure exacerbated the flooding issues caused by the heavy rains. Areas along tributaries in the affected communities suffered higher than normal flood levels, causing millions of dollars of damage.

Possibility & Impact of Future Events

As Saginaw County infrastructure ages faster than Municipal and State resources can update them, the frequency and severity of infrastructure failures will likely increase.

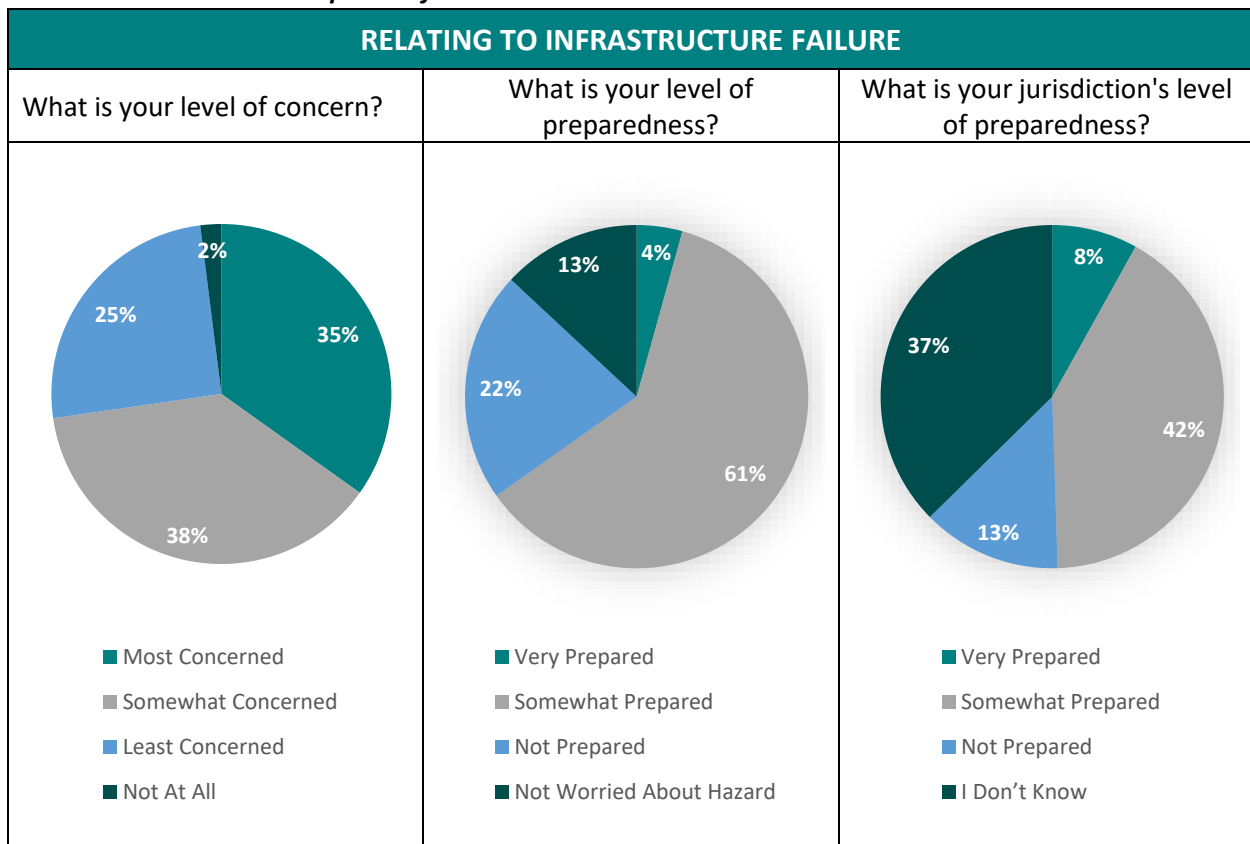
Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of an Infrastructure Failure as 32%.

Typically, the most vulnerable segments of society – the elderly, children, ill or frail individuals are the most heavily impacted by infrastructure failure.

Public Input

Participants in the public survey were asked to assess and identify their level of concern of an Infrastructure Failure occurring in their community and to what level they felt they and their community were prepared.

Chart 13: Public Input – Infrastructure Failure



Possible Mitigation Strategies

- Identify and map critical infrastructure and key resources.
- Conduct regular inspections and maintenance of critical infrastructure and key resources.
- Education and outreach to encourage residents to create emergency preparedness kits.

5.2.6 MAJOR STRUCTURE FIRE

Area of Impact

All jurisdictions in Saginaw County are vulnerable; however, urban areas with more buildings built close to each other have a greater risk.

Hazard Description

Structure fires occur when a fire ignites one or more structures of residential, commercial, industrial, institutional, or other types. While residential fires occur regularly in Saginaw County, their impact is usually limited to a single family. Fires in commercial structures such as hotels, entertainment venues, schools, hospitals, or large multi-family structures pose a greater risk due to the number of people involved.

According to the National Fire Protection Association, the US had 481,500 structure fires in 2019, with 2980 civilian deaths and 13,900 injuries. In Michigan, the US Fire Administration records 5.3 fatalities and 14.5 injuries per 1000 fires (2018 data.)

Historical & Recent Events

Large-scale commercial or multifamily fires are not common in Saginaw County; however, two very recent incidents occurred in the past year.

Table 35: Saginaw County Major Structure Fires

Date	Location	Incident
July 7, 2022	Thomas Township	A fire started in the attic area of the Swan Valley Condominiums. The fire required assistance from every fire department from Saginaw County and mutual aid units from Midland and Gratiot Counties. Up to 30 people were left homeless due to the total building loss.
December 18, 2022	Richland Township	A fire of unknown origin in a large grain elevator was discovered on the evening of the 18 th . The grain elevator was estimated to contain 3 million bushels of feed corn. The size of the fire and the limited water supply required assistance from most Saginaw County Fire Departments. Additional fire departments were requested through MABAS, ultimately bringing 78 different agencies from 16 counties.

Possibility & Impact of Future Events

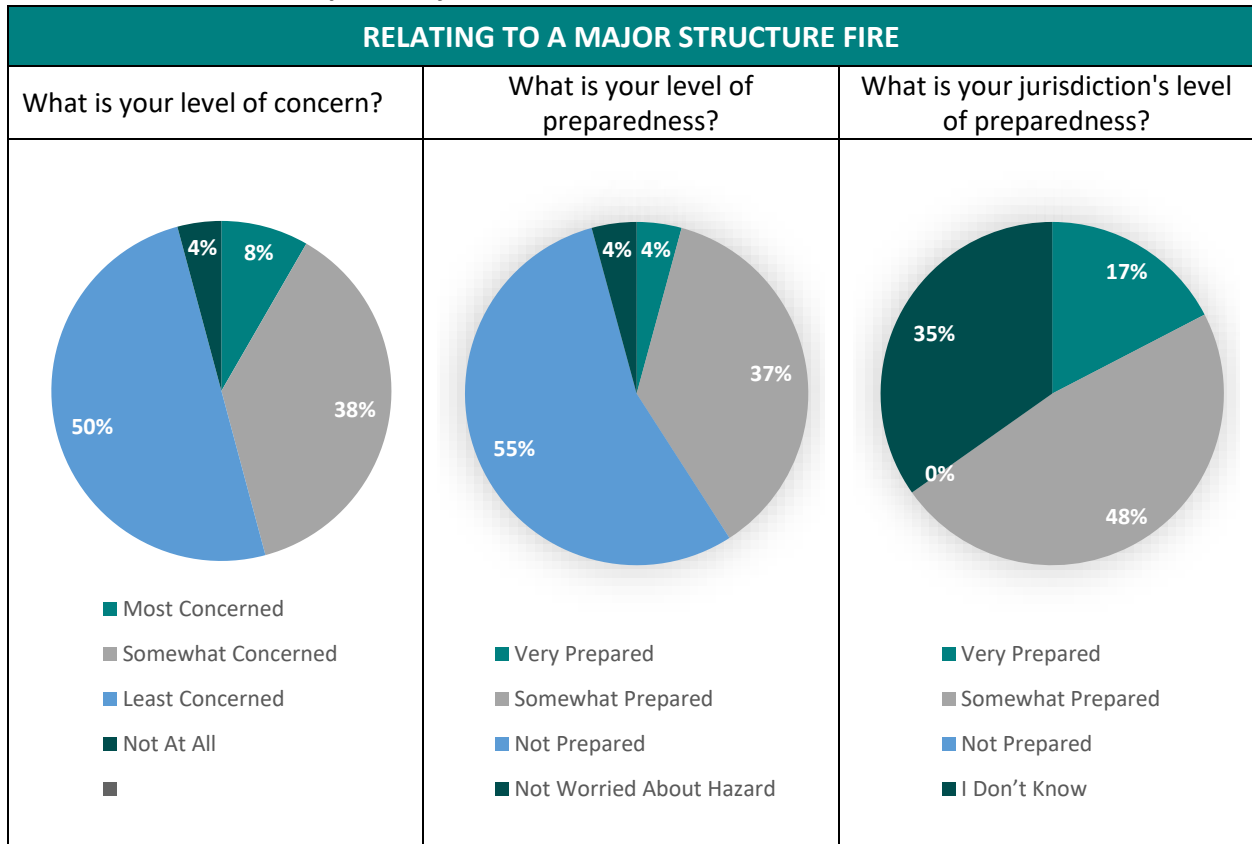
The chances of structure fires in Saginaw County are consistent with the rest of the State of Michigan. Because of current building practices and materials, fires burn faster and hotter than ever. The reduction of firefighters in Saginaw County hurts suppression capabilities, and major fires will require a response from more departments than before.

Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Major Structure Fire as 35%.

Public Input

Participants in the public survey were asked to assess and identify their level of concern of a Major Structure Fire occurring in their community and to what level they felt they and their community were prepared.

Chart 14: Public Input – Major Structure Fires



Possible Mitigation Strategies

- Public education and outreach activities about fire safety and prevention.
- Ensure building codes are updated and enforced.
- Building codes that require the use of sprinkler systems, especially in high occupancy, high-risk buildings.
- Measure to reduce urban blight and associated arson fires.
- Enforce fireworks regulations.

5.2.7 Mass Violence

Area of Impact

All jurisdictions in Saginaw County are vulnerable to this hazard.

Hazard Description

Mass violence attacks are generally relatively rare; however, the number of attacks across the county has steadily increased in the last decade. Mass violence events may be related to domestic or international terrorism, or a stand-alone event committed by a single individual. However, regardless of origin, they all have a common goal to kill as many people in an area as possible.

The methods used by mass attackers can vary; however, one of the most common is using a firearm, usually referred to as an Active Shooter, to kill a large number of people in an enclosed area, often a school or place of business.

Historical & Recent Events

Fortunately, there have not been any mass violence events in Saginaw County.

Possibility & Impact of Future Events

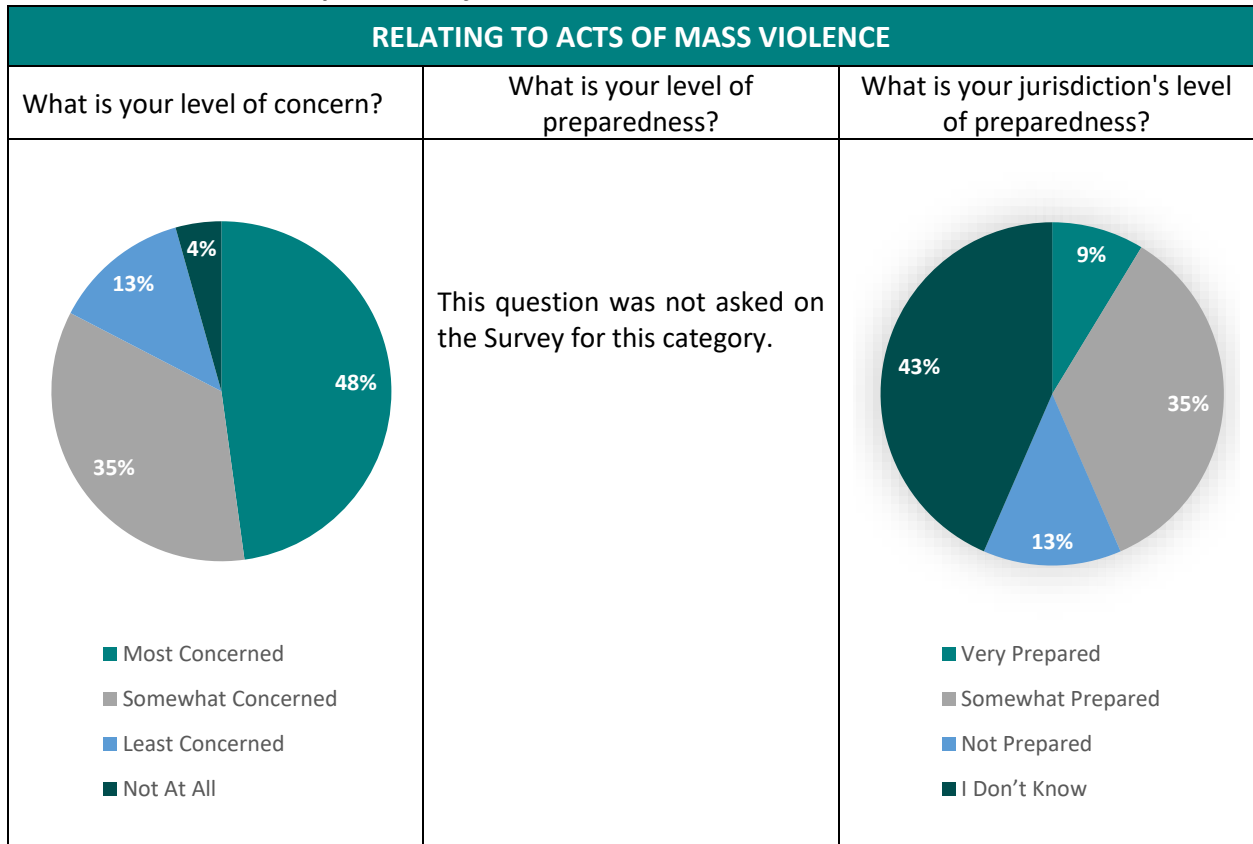
The relative chances of a mass violence event are relatively low. However, due to the significant impact it can have on the community, it must be prepared for.

Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Mass Violence Attack as 27%.

Public Input

Participants in the public survey were asked to assess and identify their level of concern about a Mass Violence incident occurring in their community and to what level they felt they and their community were prepared.

Chart 15: Public Input – Acts of Mass Violence



Possible Mitigation Strategies

- Public education and outreach on citizens’ response to an active attacker, See Something Say Something, and Stop the Bleed programs.
- Joint training with police, fire, and EMS on active attacker response.
- Encourage high-risk locations to develop response plans, create safe refuge areas, and conduct training and exercises on their organization’s response to an active attacker.

5.2.8 Long Term Power Outage

Area of Impact

All jurisdictions in Saginaw County are vulnerable to this hazard.

Hazard Description

A long-term power outage often called a “black sky event,” is defined by the Electrical Infrastructure Council as “a catastrophic event that severely disrupts the normal functioning of our critical infrastructure in multiple regions, for long durations.” Many other pieces of critical infrastructure are dependent on the electrical grid to operate efficiently, so a black sky event would have a domino effect on other critical infrastructure and key resources.

A long-term power outage could be related to a natural, technological, or human-caused event.

- Natural – While more common in other areas of the country, severe ice storms or other natural disasters that cause damage to major transmission lines, towers, or transmission substations could significantly impact power availability to a large area. In addition, major solar storms can cause sizeable power grid failures through a natural Electromagnetic Pulse (EMP) that can damage the electrical grid and other electronic infrastructure (e.g., GPS, computers, ATMs.)
- Technological – The U.S. Power Grid transmission and distribution systems are aging. Increased electrical uses due to increased consumption of electrical items such as vehicles and cell phones and stresses due to climate change can cause critical components to fail.
- Human-Caused – Damage to transmission and distribution infrastructure caused by intentional acts (e.g., domestic or international terrorism) can cause widespread outages.

Historical & Recent Events

There are weather or accident-related power outages throughout Saginaw County every year; however, historically, these outages have been neither widespread nor long-term.

Nationally, significant disruptions have steadily increased from fewer than two dozen in 2000 to more than 180 in 2020. Additionally, there have been recent incidents, in other parts of the county, of intentional damage to electrical substations, which have caused power outages for several days or longer.

Possibility & Impact of Future Events

There have been no long-term or widespread power outages in Saginaw County or the Region, so it is difficult to determine the probability of such an event. Saginaw County’s Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Long Term Power Outage as 29%.

The reliance on electricity for most aspects of daily life and critical infrastructure means that a long-term power outage could significantly impact the ability to provide access to essential lifelines.

Possible Mitigation Strategies

- Ensure critical infrastructure and key resource sites have sufficient stand-alone generator capacity.
- Provide educational outreach to encourage personal emergency kits.
- Create Local Energy Assurance Plans that address long-term power outages.

5.2.9 PUBLIC HEALTH EMERGENCY

Area of Impact

All jurisdictions in Saginaw County are vulnerable to this hazard. However, urban areas with higher populations that are closer together may have an increased risk.

Hazard Description

Public Health Emergencies can take many forms, including disease epidemics, large-scale food or water contamination incidents, extended periods without adequate water or sewer services, harmful exposure to chemical, radiological or biological agents, or large-scale infestations of disease-carrying insects or rodents. In addition, public Health Emergencies can occur as primary events by themselves or secondary events that occur because of another hazard. Public health emergencies can be world, national, statewide, or localized in scope and magnitude.

One of the most significant emerging public health hazards is the release of a radiological, chemical, or biological agent that would impact a large percentage of the population. Such a release, if intentional, would most likely be an act of terrorism intending to cause widespread injury and panic.

Historical & Recent Events

Like the rest of the United States and the world, Saginaw County has had severe outbreaks of diseases. There have been outbreaks of Severe Respiratory Syndrome (SARS), West Nile Virus, meningitis, and various influenza strains across Michigan. Recently diseases such as Pertussis, measles, E-Coli, MRSA, and Norovirus have become more of a threat with increased numbers. Annually, Saginaw County is impacted by the various strains of influenza that have strained the healthcare system but have not had widespread, serious repercussions.

In early 2020 Saginaw County had its first known positive COVID-19 case. COVID-19 is a respiratory illness caused by the SARS-CoV-2 virus. COVID-19 has impacted local, state, national, and international communities not seen since the 1918 Influenza pandemic. The impact of COVID-19 was felt in the number of fatalities, hospitalization, interruption of government services, and damage to the worldwide economy. As of 2022, Saginaw County and the world are still dealing with current and residual impacts from the COVID-19 pandemic.

Possibility & Impact of Future Events

The chance of another public health incident as a primary disaster or a secondary result of an unrelated event is a certainty. What is unknown is how severe and how widespread the impact will be.

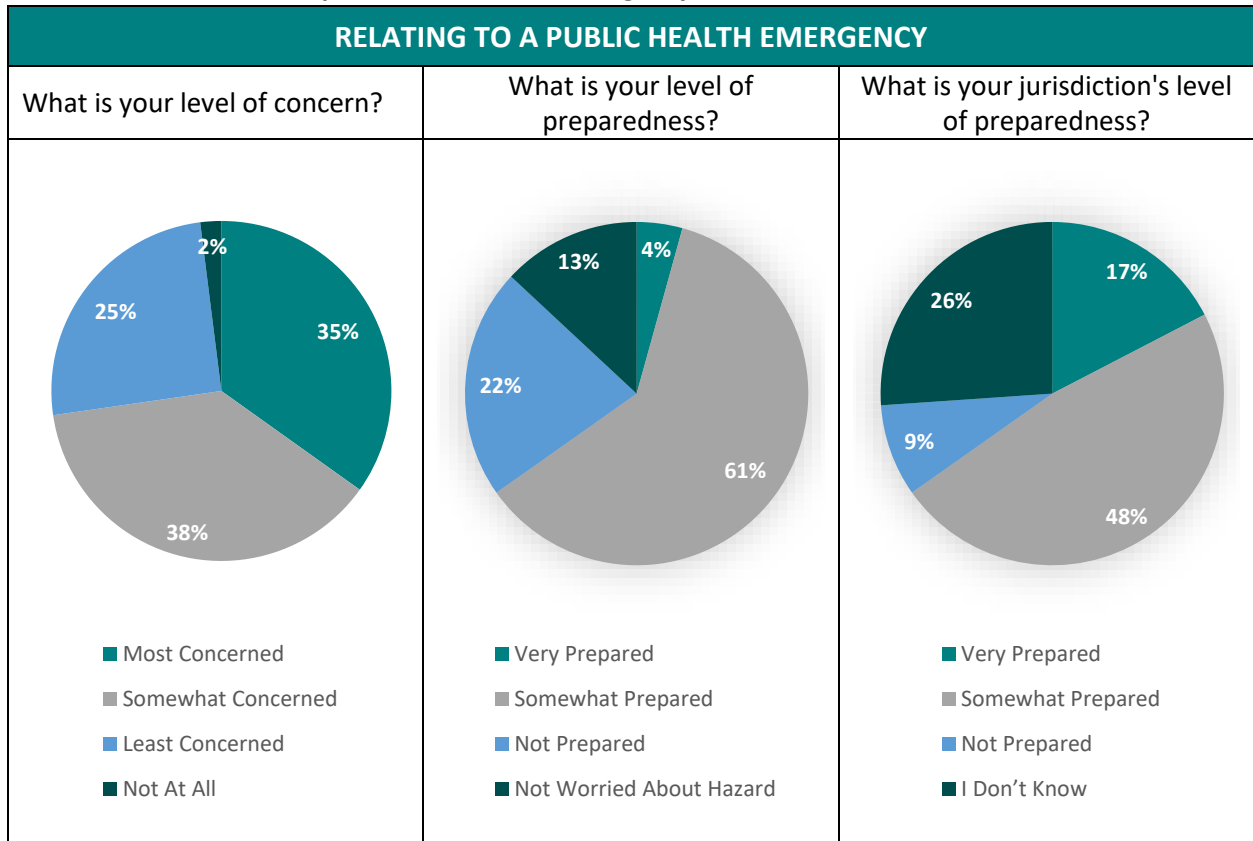
Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a public health emergency as 61%.

The costs and impact of public health emergencies include deaths (directly or indirectly), hospitalizations, lost wages, lost productivity, and, if severe enough, damage to the economy, and the ability to provide government and other everyday services.

Public Input

Participants in the public survey were asked to assess and identify their level of concern of a Public Health Emergency occurring in their community and to what level they felt they and their community were prepared.

Chart 16: Public Input – Public Health Emergency



5.2.10 Transportation Crashes (Mass Casualty Incidents)

Area of Impact

All jurisdictions in Saginaw County are vulnerable to Transportation Accidents; however, areas containing major highways, large amounts of traffic, or mass transportation systems are most at risk. These include communities around MBS Airport and along I-75 and other busy Michigan highways (M-46, M-81, etc.)

Hazard Description

There were 4,798 traffic crashes on Saginaw County roads in 2020, involving 14 fatalities and 834 injuries. While these events occur many times daily, this hazard type is related to Transportation Crash Events involving mass casualties.

For planning activities in Saginaw County, including this HMP update, a Mass Casualty Incident (MCI) overwhelms the healthcare system and other emergency resources. What constitutes an MCI may change daily and is based not on a single parameter but multiple ever-changing parameters like hospital capacity, EMS staffing and equipment availability, and the number and seriousness of the injuries.

Historical & Recent Events

No significant events have been recorded in the past 20+ years.

Probability & Impact of Future Events

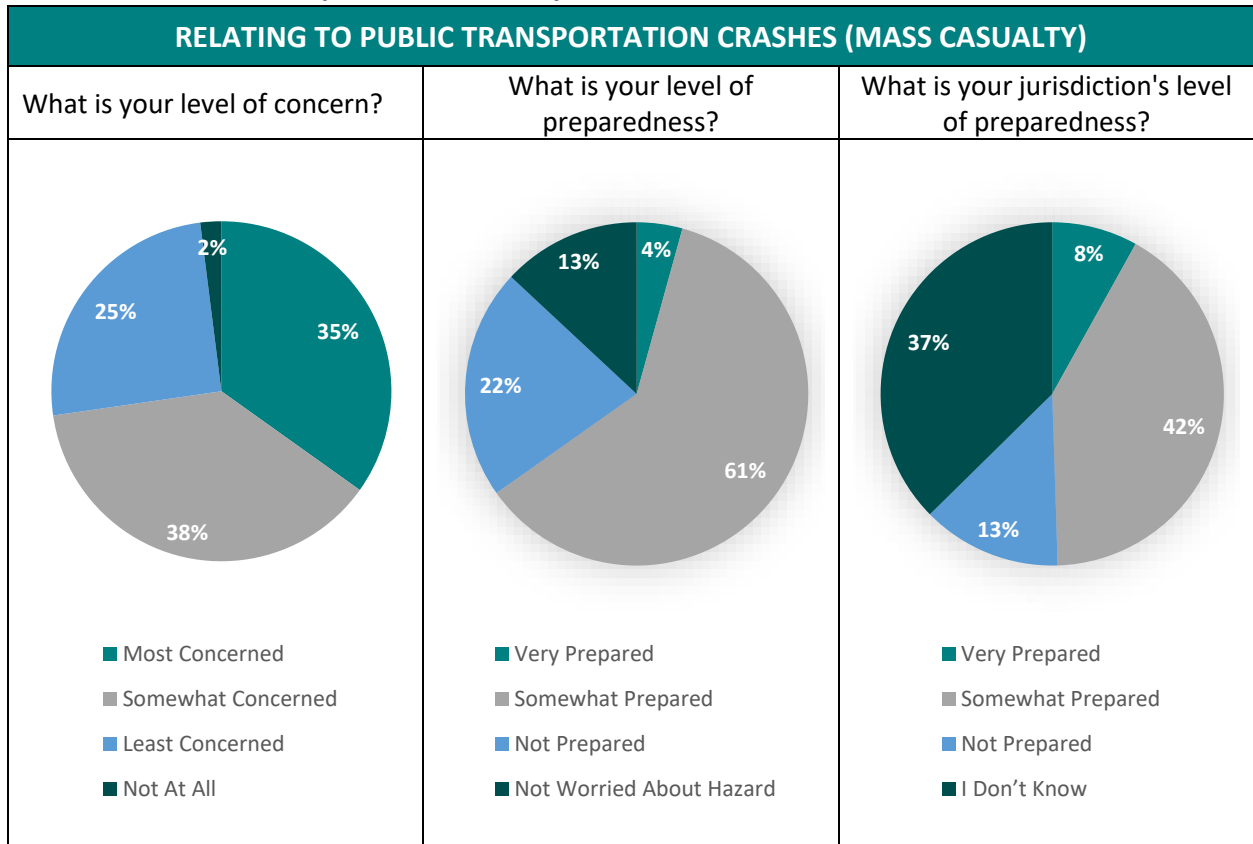
There have not been any transportation accidents resulting in MCI events; however, with MBS Airport and I-75 in the County, a single incident could easily overwhelm the EMS capabilities in Saginaw County.

Saginaw County's Vulnerability Assessment (Risk = Probability x Impact) completed for this HMP update lists the relative threat of a Transportation Crash – Mass Casualty Incident as 25%

Public Input

Participants in the public survey were asked to assess and identify their level of concern of a Mass Casualty incident occurring in their community and to what level they felt they and their community were prepared.

Chart 17: Public Input – Mass Casualty Incident



Possible Mitigation Strategies

- Create and exercise mass casualty plans

5.2.11 Climate Change

Study and documentation of climate change by local jurisdictions are minimal. The information below is taken directly from the State of Michigan Climate Change website. The original content with appropriate citations listed can be found at [Climate Change \(michigan.gov\)](https://climatechange.michigan.gov/).

Climate Change and Michigan

Along with the rest of the world, the Midwest's climate is changing. The region has gotten warmer and wetter since 1900.⁴ In Michigan, average yearly temperature has increased by two to three degrees Fahrenheit across most of the state.⁵ Climate change is also leading to shifting seasonal patterns and more extreme events.⁶ Current climate forecasts show extreme weather patterns will increase through the 21st century. Extreme weather like extreme heat and precipitation are influencing planning and response activities across sectors in Michigan.⁶

In Michigan, the greatest weather concerns are extreme heat and precipitation events.

The five priority weather-related health impacts of concern in Michigan are⁷:

- Heat-related illness
- Waterborne diseases
- Respiratory diseases
- Vector-borne diseases
- Injury and carbon monoxide poisoning

Health Concerns

Changing temperature and precipitation increases in extreme weather events can affect health in direct and indirect ways.⁸ Health effects such as heat cramps, heat exhaustion, heat syncope, and heat stroke can happen during high ambient temperatures. Extreme precipitation events can directly impact human health through injuries, drowning, hypothermia, infectious diseases and ongoing mental health, and indirectly impact infrastructure and economic vulnerability, water resources (i.e. pollution and scarcity), and agricultural loss. Increases in waterborne disease outbreaks have been reported following a heavy rainfall. Buildings that experience water intrusion can develop mold contamination, which can lead to indoor air quality problems.

Risk Factors

While climate change can affect everyone, some people and places will be affected more than others.

Those at a higher risk of experiencing health effects are^{1,9}:

The following groups:

- Children
- Outdoor workers
- Pregnant women

- Elderly

People with the following conditions:

- Chronic illness
- Allergies
- Disability
- Low income

Prevention

Extreme Heat

Even short periods of high temperature can cause serious, sometimes life-threatening, health problems. The heat index is a term the National Weather Service uses for a combination of temperature and humidity. It lets you know how hot it feels outside better than temperature alone.¹⁰

There are steps you can take to avoid heat illness when it's hot outside like¹¹:

- Stay out of the sun.
- Check your local weather.
- Never leave pets, children, or elderly in a closed, parked car.
- Drink plenty of water.

Extreme Precipitation

Heavy rain events can lead to floods. Floods can occur in a few ways. They can happen in areas with a history of flooding, for example, places near rivers or cities near sea level, like New Orleans. They can also happen when man-made systems like stormwater drains are clogged or overloaded with too much rain. The rate of flooding can be slow, happening over days or weeks, or there can be flash floods which can happen in hours. There are steps you can take to stay safe, healthy, and prepared like:

- Avoid floodwater.
- Make sure food and water are safe before you consume them.
- Know how to get rid of mold safely.
- Make an emergency plan

SECTION 6 – GOALS, ACTIONS, AND STRATEGIES

This section contains goals and strategy information from the 2017 plan update and the current (2023) plan update. The 2017 plan information provides information on the goals and strategies accomplished since the 2017 update. The identified mitigation strategies for Saginaw County are included within this section; however, individual jurisdiction strategies are included under the respective Jurisdiction Annex (Annex A.)

- Previous (2017) Mitigation Goals and Objectives
- Completed 2017 Goals and Projects
- Current (2023) Mitigation Goals and Strategies
- Current Mitigation Strategies

6.1 2017 MITIGATION GOALS AND OBJECTIVES

The 2017 Saginaw County Hazard Mitigation Plan (HMP) listed five goals:

- Protect public health and safety, and prevent loss of life
- Minimize damage to public and private property
- Maintain essential public services
- Enhance early warning systems
- Increase and expand public awareness

In addition to the above goals, the 2017 HMP listed 11 objectives that, if accomplished, would fulfill the previously mentioned goals.

- Enhance coordination between response agencies and jurisdictions.
- Continue to increase warning siren coverage and weather radio availability.
- Integrate hazard mitigation planning into local land use planning.
- Provide resources to ensure the provision of essential services.
- Provide opportunities for public education.
- Determine if additional storm shelters are needed.
- Enhance warning systems and notifications for special populations.
- Promote and encourage signing up for the Saginaw County Emergency Alert System.
- Host neighborhood meetings to include the public in the hazard mitigation process.
- Educate the public on what infrastructure is in place and what it means for emergencies.
- Work with telephone, cable, TV, internet service providers, and electric utility companies to encourage proper infrastructure maintenance.

6.2 2017 COMPLETED PROJECTS

While not exhaustive, below is a list of actions taken since the last HMP update that either completed or brought Saginaw County closer to accomplishing goals outlined in the 2017 Plan.

- Protect public health and safety, and prevent loss of life
 - All Saginaw County Fire Departments have become members of the Mutual Aid Box Alarm System (MiMABAS.) This ensures access to adequate resources regardless of the size or complexity of the incident.
 - Update the Saginaw County Emergency Operations Plan.
 - Saginaw County Sheriff's Office has established a UAV program with thermal imaging capability that will assist in locating lost persons.
 - Creating a GIS map layer showing AFC, schools, and churches within the 5-mile safety radius around Hemlock Semi-Conductor.
 - Creating a GIS map layer showing inundations areas in the event of a failure of the Mistequay Creek Structure No. 4.
 - Continued Fire and Police training, especially in new areas of concern such as tech rescue, large building fires, and active shooter events.
 - Bridgeport and Thomas Twp have identified sites for disaster debris collection.
 - Bridgeport Township acquired equipment and training to expand its water rescue capabilities.

- Hazard mitigation concepts are incorporated into local ordinances and comprehensive plans.
 - Birch Run Township
 - Updated Sewer Use Ordinance – January 2021
 - Zoning Ordinance Article 4 – February 2022
 - Bridgeport Charter Township
 - [Master Plan – July 2020](#)
 - Carrollton Township
 - [Master Plan – September 2020](#)
 - Chesaning Township
 - [Master Plan – August 2018](#)
 - Saginaw City
 - [Master Plan – October 2022](#)
 - James Township
 - [Master Plan – May 2022](#)
 - Richland Township
 - [Master Plan - 2022](#)
 - Saginaw Charter Township
 - [Master Plan - 2021](#)
 - Spaulding Township
 - [Zoning Ordinance – December 2019](#)
 - Taymouth Township
 - [Zoning Ordinance – March 2019](#)
 - Tittabawassee Township
 - [Master Plan – 2018](#)

- Minimize damage to public and private property
 - Aqueous Film Forming Foam (AFFF) containing PFAS collected from county fire departments through a state-sponsored program.
 - Consumers Energy has tree trimming programs to remove trees and vegetation around power lines.
 - Creating a GIS map layer showing the outfalls that drain into the major tributaries in Saginaw County to assist in tracing unknown spills that appear in the waterways.
 - Bridgeport Twp has updated local codes that require new building construction to meet elevation requirements in flood zones.
 - Spaulding Twp has improved the Cass River Dike System, providing flood protection to a portion of the Township.
 - Maintenance and upgrades ongoing to county drains.

- Maintain essential public services
 - Saginaw County Fire Departments improved alerting methods for responders by switching from alphanumeric pagers to the MPSCS paging system
 - Portable and mobile Saginaw County Public Safety Agency radios were replaced and updated.
 - Road and bridge maintenance programs throughout the county.
 - Development of the Merrill Village Water System providing municipal wells and elevated storage for the residents of Merrill Village to combat issues with privately owned wells in the area.
 - Update generators at Thomas Twp, St Charles Village,
 - Birch Run Twp has raised the lift station generator above the historic flood levels.
 - Upgrades to the radios and dispatch software at Saginaw County 911 to provide enhanced capability such as text to 911.
 - Replace pump and upgrade controls at one of the main drain outfalls into the Saginaw River—installation of a generator at this station.

- Enhance early warning systems
 - Saginaw County began using the Federal IPAWS for emergency public alerting, thereby increasing the ability to warn the public as compared to the previous EAS system.
 - Spaulding Township and James replaced outdoor warning sirens in their jurisdictions.
 - Saginaw County Fire Departments improved the reliability of their outdoor warning sirens by updating the activation method to the MPSCS paging system.
 - Update GIS map with preliminary FEMA 100-year flood zones.
 - Birch Run Village added IRIS alerting to their capabilities for community notification.

- Increase and expand public awareness
 - National Night Out event held in Saginaw Township with participation from fire, police, EMS, and other public health and safety organizations.
 - Many communities operate webpages and/or Social Media sites that provide preparedness and situational awareness information.

- Use of social media and infographics by the Saginaw County Health Department to provide updated information during health emergencies.

6.3 2023 MITIGATION GOALS AND OBJECTIVES

This plan was developed to mitigate the hazards Saginaw County faces and reduce their adverse effects on the residents and physical components of the county. Local units of government and individuals can often significantly impact risk reduction. However, in many instances, the County's role is limited to encouragement and technical assistance. Most importantly, through its Board and Subcommittees, the County can serve as a role model by incorporating hazard mitigation into its activities.

The following goals and objectives have been adopted for the 2023 plan update. These goals and objectives are intended to guide decision-making and promote the implementation of mitigation strategies by boards, commissions, and agencies throughout Saginaw County. Other units of government, businesses, and individuals are also encouraged to implement goals and objectives included in this plan update.

6.3.1 Goal 1: Reduce the risk of hazards to life and property

Objective 1: Continue to develop the capacity to prepare for, respond to, and recover from all hazards.

Objective 2: Efficiently manage all local disasters.

Objective 3: Ensure plans and development incorporate hazard mitigation strategies

Objective 4: Provide information to the public and elected officials about hazards and potential ways to mitigate and prepare for them.

6.3.2 Goal 2: Protect critical infrastructure and facilities

Objective 1: Retrofit existing and local facilities to withstand hazard impacts

Objective 2: Ensure new government facilities incorporate hazard mitigation strategies.

Objective 3: Continue identifying critical infrastructure and encouraging updates to mitigate hazard impacts.

Objective 4: Perform risk assessments for County and local government facilities.

6.3.3 Goal 3: Build community and public resiliency

Objective 1: Integrate hazard mitigation into the Community Planning Process.

Objective 2: Development and updating of County and local emergency response plans.

Objective 3: Encourage business continuity planning for government and local businesses.

6.3.4 Continue public education and preparedness

Objective 1: Enhance public awareness through social media and outreach activities to engage the public in mitigation and preparation activities.

6.4 2023 PLAN MITIGATION STRATEGIES

Mitigation strategies specific to Saginaw County or countywide strategies are listed in this section. If a municipality submitted a specific mitigation strategy not listed here, that strategy appears in the jurisdiction-specific information found in *Annex A*. Additionally, communities that submitted specific mitigation strategies are indicated in the table located in *Appendix B*:

Federal funding opportunities listed as “Federal Grants” in the sections below are located in *Section 1.3* of this plan. The strategies were prioritized by considering the cost-effectiveness, previous implementation status, survey results, community needs, and general feasibility.

Strategy subtitle key:

- Location: Information is provided on the general, or in some cases, a specific area the strategy could be completed.
- Lead Agency: Denotes that the agency that is primarily responsible for the strategy
- Support Agency: Lists agencies that may provide planning, financial, staffing, or subject matter expert help to the Lead Agency.
- Potential Funding: Provides a list of possible (not all) sources to fund the mitigation project.
- Priority: Lists the estimated importance of the strategy based on the priority definitions below.
- 2017 Strategy/Priority: Indicates if the strategy was included in the 2017 plan, the priority, and a brief explanation of any priority changes as needed.
- Explanation: Provide a brief, high-level description of the strategy or projects that could be completed.
- Expected Outcome: Provides a brief, high-level estimate of desired results.

The priority levels include:

- Low: a poor cost-to-benefit ratio for implementation within a 5-year timeframe
- Medium: a moderate cost-to-benefit ratio for implementation within a 5-year timeframe.
- High: a favorable cost-to-benefit ratio for implementation within a 5-year timeframe.

6.4.1 Strategy 1 – Clean and Improve County Drains

- **Location**: All Saginaw County jurisdictions (See Appendix B)
- **Lead Agency**: Saginaw County Drain Commission
- **Supporting Agencies**: Local units of government

- **Potential Funding:** County Operating Budget, Existing Staffing, Bond Issuance, Assessments, Federal Grants
- **Priority:** High
- **2017 Strategy/Priority:** Not included in the 2017 plan
- **Explanation:** This strategy was not included in the 2017 plan; however, there has been an increase in heavy rainfall events in recent years. Making drain maintenance a vital project.
- **Expected Benefit:** Reduces flood potential, damage to property, and closure of roadways

6.4.2 Strategy 2 – Dead Tree Removal & Tree Trimming

- **Location:** All Saginaw County jurisdictions
- **Lead Agency:** Private Utilities
- **Supporting Agency:** Property Owners
- **Potential Funding:** Operating Budget, Existing Staffing
- **Priority:** Medium
- **2017 Strategy/Priority:** Yes, low priority
- **Explanation:** Years of aggressive tree trimming by Consumer’s Energy generally has reduced the number and size of power outages; however, without continued and, in some cases, increased trimming, significant power outages could increase.
- **Expected Benefit:** Lowers repair costs for utility companies and limits power outages caused by downed trees.

6.4.3 Strategy 3 – Fire Prevention Measures

- **Location:** All Saginaw County jurisdictions
- **Lead Agencies:** Local Fire Departments
- **Supporting Agency:** N/A
- **Potential Funding:** Operations budgets, existing staffing, state or federal grants (e.g., FEMA Assistance to Firefighters and other federal grants.)
- **Priority:** Low
- **2017 Strategy and Priority:** No
- **Explanation:** With reduced staffing levels and the overall aging of structures in Saginaw County, outreach programs by fire departments are critical to reducing the impact of residential and commercial structure fires.
- **Expected Benefit:** Education and outreach programs will provide an informed community better able to respond to a fire incident. Updating and enforcing current building codes will improve fire prevention and survivability.

6.4.4 Strategy 4 – Add, Update, or Replace Aging Outdoor Warning Siren

- **Location:** All Saginaw County jurisdictions, especially Taymouth Township
- **Lead Agency:** Local Fire Departments, Saginaw County 911, Saginaw County OEM
- **Supporting Agencies:** Saginaw County 911, Saginaw County OEM

- **Potential Funding:** Operating Budgets, federal grants
- **Priority:** Medium
- **2017 Strategy and Priority:** Yes / Medium
- **Explanation:** Many Saginaw County jurisdictions have outdoor warning sirens over 50 years old. The priority remains the same, except for some jurisdictions, a lack of local funding has impeded the ability to complete this project since the 2017 plan.
- **Expected Benefit:** Replacing or adding sirens and standardizing activation methods will improve early warning capabilities.

6.4.5 Strategy 5 – Promote Flood Insurance Programs

- **Location:** All Saginaw County jurisdictions, especially those in the FEMA Flood Zones
- **Lead Agency:** Local jurisdictions
- **Supporting Agency:** Saginaw County OEM
- **Potential Funding:** Operating Budgets
- **Priority:** Medium
- **2017 Strategy and Priority:** This was not included in the 2017 plan.
- **Explanation:** Jurisdiction NFIP participation, overall, is good, although several jurisdictions have still not become participating communities. Recovery from the 2020 flooding showed the advantages of flood insurance. Education for jurisdictions and the public may increase participation.
- **Expected Benefit:** Increase residential and commercial flood resilience.

6.4.6 Strategy 6 – Prohibit Construction in Flood Zones

- **Location:** All Saginaw County jurisdictions
- **Lead Agency:** Local jurisdictions
- **Potential Funding:** Operating Budgets
- **Priority:** High
- **2017 Strategy and Priority:** Not included
- **Expected Benefit:** Limiting the types of development within flood zones limits the damage potential of future flooding.

6.4.7 Strategy 7 – Repetitive Flood Damage Mitigation

- **Location:** Tittabawassee, Thomas, Saginaw, James, and Spaulding Townships, the City of Saginaw, Village of St Charles, Zilwaukee Twp
- **Lead Agency:** Local Jurisdictions
- **Supporting Agency:** Saginaw County OEM
- **Potential Funding:** Federal Grants
- **Priority:** Low
- **2017 Strategy and Priority:** Yes – High

- **Explanation:** This strategy was a high priority in the 2017 plan. While such projects remain important, there was little interest from the repetitive loss property owners after the 2020 flooding disaster.
- **Expected Benefit:** Removal of repetitive flood-damaged structures will limit the impact of future flooding and increase safety by restricting occupancy in flood zones. While a proven mitigation method, the cost of implementation may be prohibitive, thus the low priority scoring.

6.4.8 Strategy 8 – Harden and Improve Resiliency of Critical Infrastructure

- **Location:** All Saginaw County jurisdictions
- **Lead Agency:** Saginaw County, Local Jurisdictions
- **Support Agency:** Saginaw County OEM
- **Potential Funding:** Operating Budgets, State and Federal Grants
- **Priority:** High
- **2017 Strategy and Priority:** This was not included in the 2017 plan
- **Expected Benefit:** Increased mitigation measures at critical and key infrastructure sites will enable greater resiliency and prevent or lessen the impact of hazards. More resilient infrastructure will reduce the time critical services are interrupted during a disaster.

6.4.9 Strategy 9 – Establish Sheltering Plans and Locations

- **Location:** All Saginaw County jurisdictions
- **Lead Agency:** Saginaw County OEM
- **Supporting Agencies:** Local Jurisdictions, Red Cross, other NGOs
- **Potential Funding:** Operating Budgets, Existing Staffing, State and Federal Grants
- **Priority:** High
- **2017 Strategy and Priority:** Yes – Medium
- **Explanation:** This was included in the 2017 plan but with a medium priority level. Experience during the 2020 flood and COVID disasters exposed deficiencies in the current sheltering plans, which rely heavily on volunteers from the Red Cross.
- **Expected Benefit:** Provide greater and quicker access to warming centers and congregate sheltering facilities used during a disaster.

6.4.10 Strategy 10 – Update and Expand the County Mass Notification System

- **Location:** All Saginaw County jurisdictions
- **Lead Agency:** Saginaw 911
- **Supporting Agency:** Saginaw County OEM, Local Jurisdictions
- **Potential Funding:** Operating Budgets
- **Priority:** High
- **2017 Strategy and Priority:** Not included in the 2017 plan

- **Explanation:** The existing Saginaw County Mass Notification System is underutilized and has limited subscribers. Recent events have shown the importance of timely and accurate information from a trusted source.
- **Expected Benefit:** Increasing the functionality of the County’s mass notification system and the number of residents registered will provide improved public warning, especially for incidents that don’t rise to the level of an IPAWS activation.

6.4.11 Strategy 11 – Improve Flood Protection Around the King Road Drain

- **Location:** Spaulding Township, City of Saginaw
- **Lead Agency:** Saginaw County Drain Commission
- **Supporting Agencies:** Spaulding Twp
- **Potential Funding:** State and Federal Grants, Local Capital Improvement Funds
- **Priority:** Medium
- **2017 Strategy and Priority:** Not included in the 2017 plan
- **Explanation:** Annual flooding has continued to impact the water levels in tributaries surrounding Spaulding Twp and the south end of the City of Saginaw. The area surrounding the King Rd Drain is susceptible to flooding during annual spring storms and high wind events. The high water often cuts off M-13, a main north-south roadway on the county's eastside. While an urgent project, the priority is listed as medium due to the size of the capital expenditure required. The project is not possible without extensive support from the Federal Government.
- **Expected Benefit:** Improvement of flood control measures around the King Road drain will limit recurring flooding in the Spaulding Twp area and prevent the closing of M-13 (a major north-south roadway) during flooding incidents.

6.4.12 Strategy 12 – Water Level Monitoring at the Mistequay Creek Flood Control Structure

- **Location:** Maple Grove and Albee Townships
- **Lead Agency:** Saginaw County Drain Commission
- **Supporting Agency:** Saginaw County OEM
- **Potential Funding:** Operating Budget, State and Federal Grants
- **Priority:** High
- **2017 Strategy and Priority:** Not included in the 2017 plan
- **Explanation:** Flood Control Structure No 4 on the Mistequay Creek reduces the impact of heavy rains and snow melt in the southeast of Saginaw County by slowing the flow from the Mistequay Creek. Currently, monitoring impounded water levels requires a visit to the site.
- **Expected Benefit:** Improvement or the addition of remote water level monitoring will provide real-time flood risk data based on the structure's water levels, allowing for early warning if conditions warrant.

6.4.13 Strategy 13 – Improve Plans and Training for Response to Active Attackers

- **Location:** County-wide
- **Lead Agency:** Saginaw County Law Enforcement Agencies
- **Supporting Agencies:** Saginaw County OEM, Saginaw County Fire agencies, Saginaw County 911, Saginaw County EMS agencies
- **Potential Funding:** Operating Budgets, Existing Staffing, Homeland Security Grants
- **Priority:** High
- **2017 Strategy and Priority:** Not included in the 2017 plan
- **Explanation:** Mass violence attacks have steadily increased nationwide in recent years. Equipping and training responders and developing and exercising plans are crucial to effectively responding to active attacker events.
- **Expected Benefit:** The development of standard operating procedures across all public safety agencies in Saginaw County will improve coordination, allowing for more effective responses and enhanced recovery during a mass violence incident.

6.4.14 Strategy 14 – Improve flood resiliency at the Saginaw City freshwater storage and pumping facility in Thomas Twp.

- **Location:** City of Saginaw and jurisdictions west of the Tittabawassee River that receive fresh water from the City of Saginaw.
- **Lead Agency:** City of Saginaw
- **Potential Funding:** Existing Staffing, State and Federal Grants
- **Priority:** High
- **Explanation:** The storage and pumping facility is on the floodplain beside the Tittabawassee River. While a protective berm surrounds much of the facility, recent high-water events have shown that this berm is insufficient to stop flood waters from impacting the facility's operation. Should the facility be shut down due to flood waters, the supply of fresh water for drinking and firefighting west of the Tittabawassee River would be impacted.
- **Expected Benefits:** Increasing the facility's ability to remain open during flood events would ensure a steady supply of fresh water for consumption and firefighting west of the Tittabawassee River, regardless of flood disasters.

6.4.15 Strategy 15 – Improve flood resiliency at the Saginaw Twp Waste Water Treatment Plant.

- **Location:** Saginaw Twp
- **Lead Agency:** Saginaw Twp DPW
- **Support Agency:** N/A
- **Potential Funding:** Operating Budget, Federal Grants

- **2017 Strategy and Priority:** Not included in the 2017 plan.
- **Priority:** High
- **Explanation:** The wastewater treatment plant receives wastewater from Saginaw Township and other communities. The facility is located near the Tittabawassee River and is impacted by flood water almost yearly. In addition, flood waters affect accessibility to the facility due to roadway and access drive flooding.
- **Expected Benefits:** By increasing the access drive height to a level above normal flood waters, DPW staff will more quickly and safely be able to access the facility to ensure wastewater functions remain in place during flood events.

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Appendix A – Full-Size Maps

Map 1 – Political Boundaries

Map 2 – Saginaw County Metropolitan & Out-County Areas

Map 3 – Saginaw County Waterways & County Drains

Map 4 – Saginaw County Population Density

Map 5 – Saginaw County Land Use

Map 6 – Saginaw County Fire Districts

Map 7 – Saginaw County Emergency Route Plan

Map 8 – Saginaw County Primary Road Traffic Counts

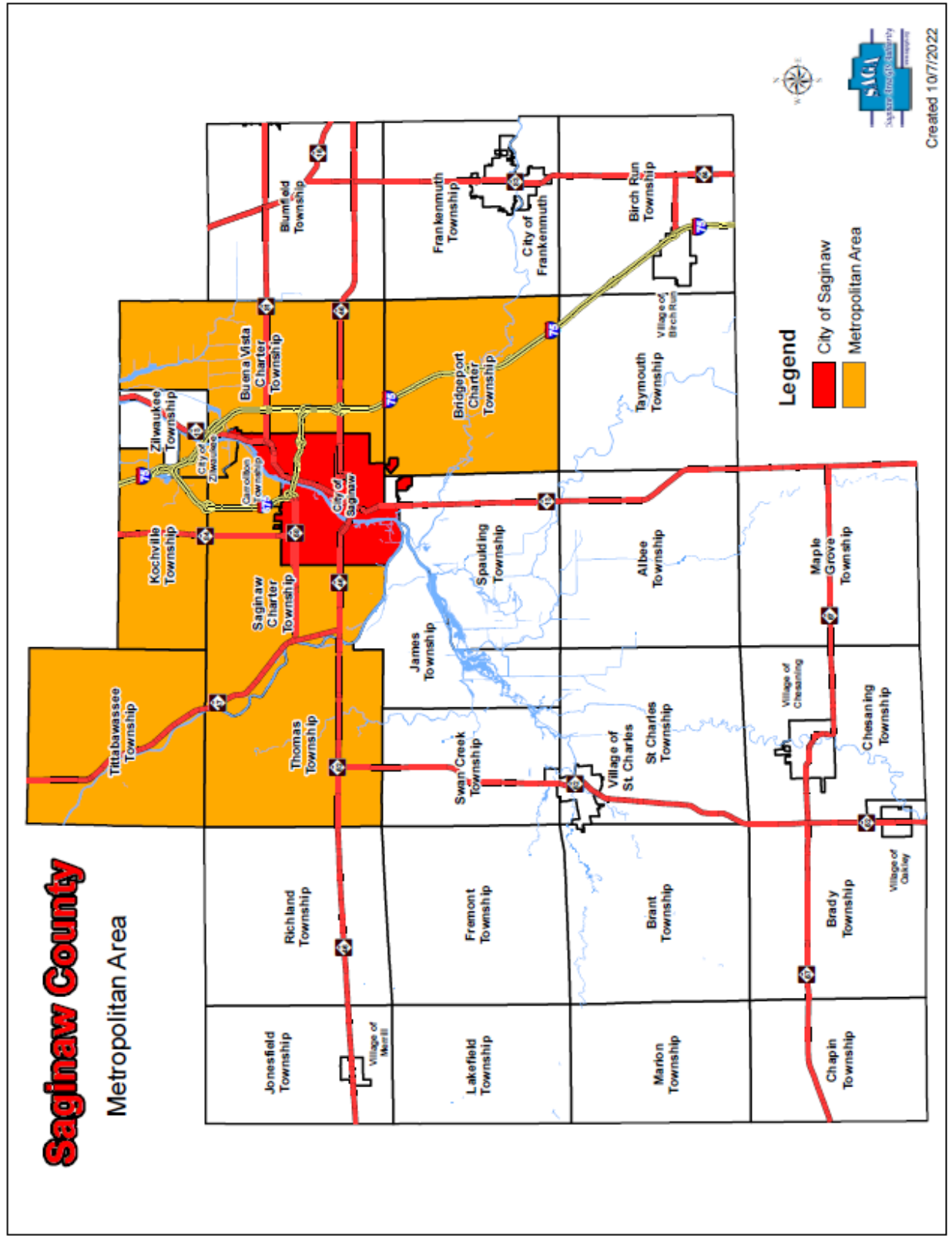
Map 9 – Saginaw County Water & Sewage Treatment Plants

Map 10 – Municipal & Water Well Locations

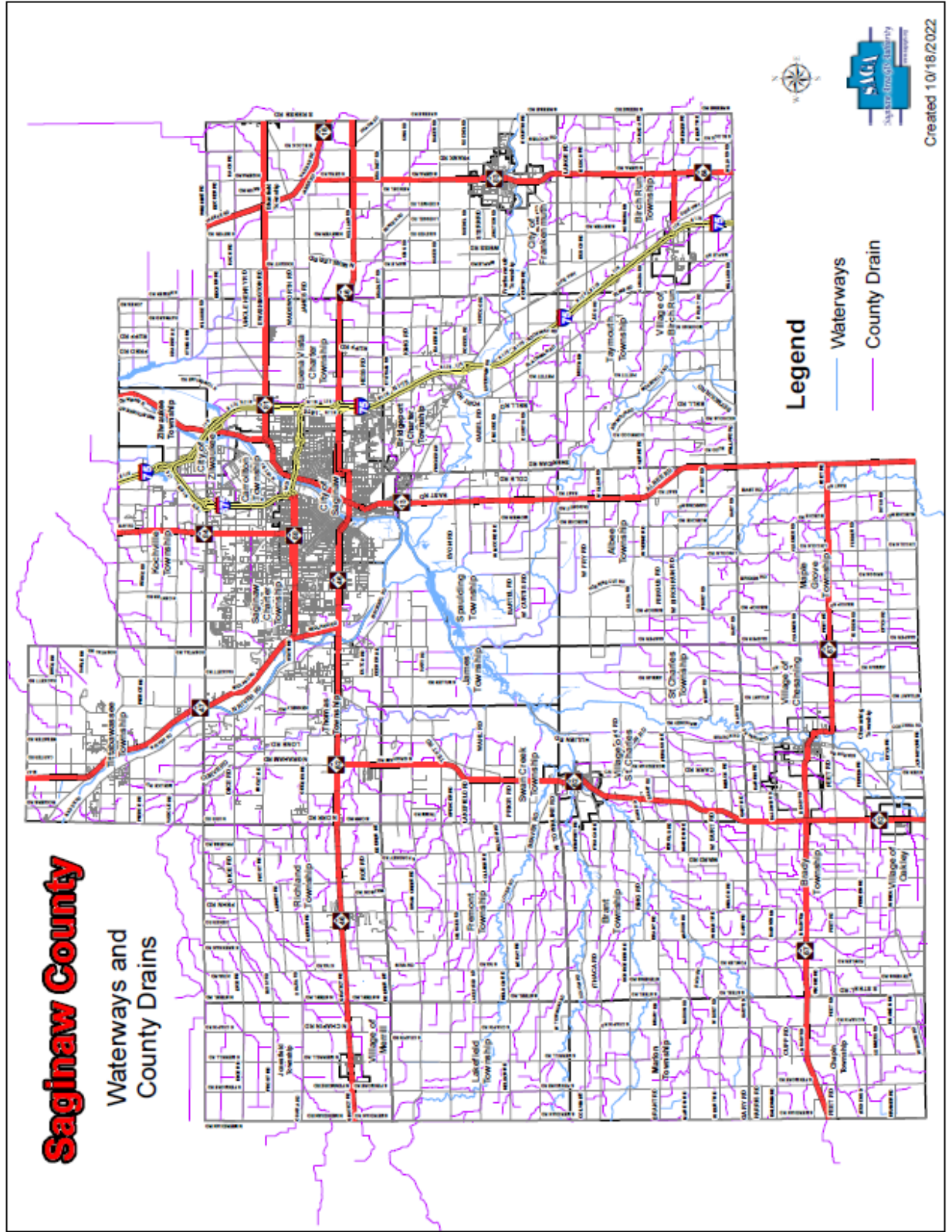
Map 11 – Saginaw County Tornado Paths and Strength

Map 12 – Saginaw County Closed Mineshafts

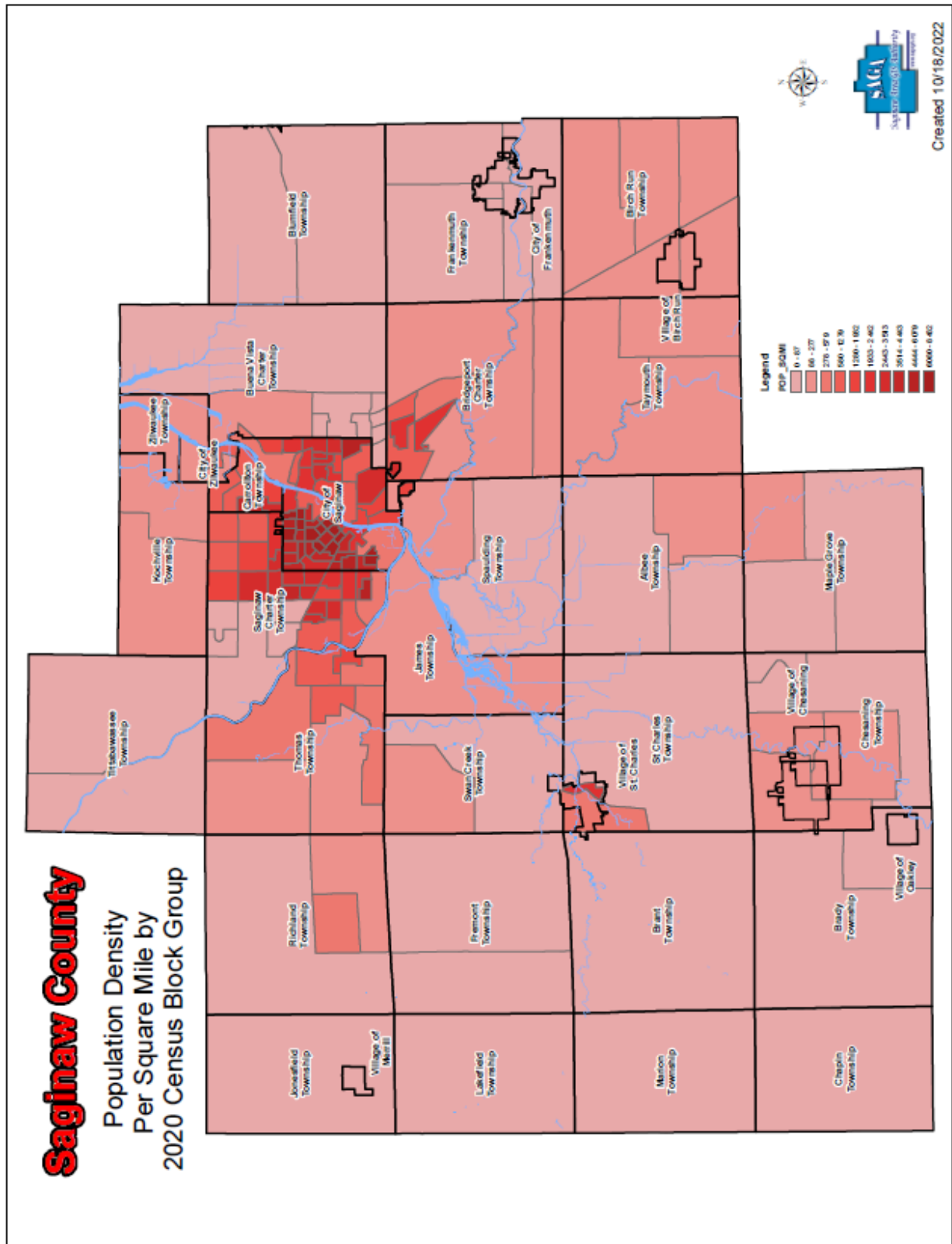
Map 2 – Saginaw County Metropolitan & Out-County Areas



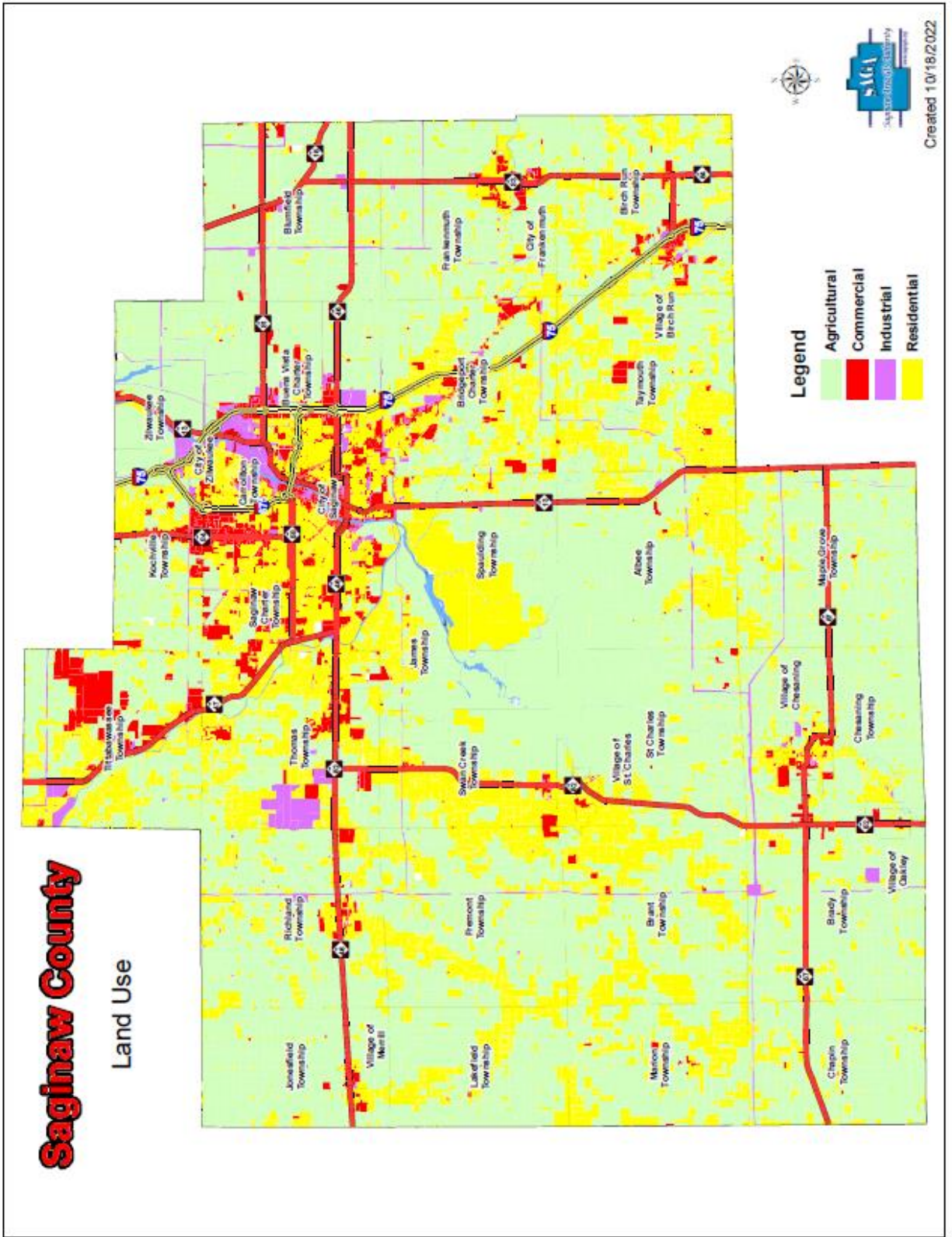
Map 3 – Saginaw County Waterways & County Drains



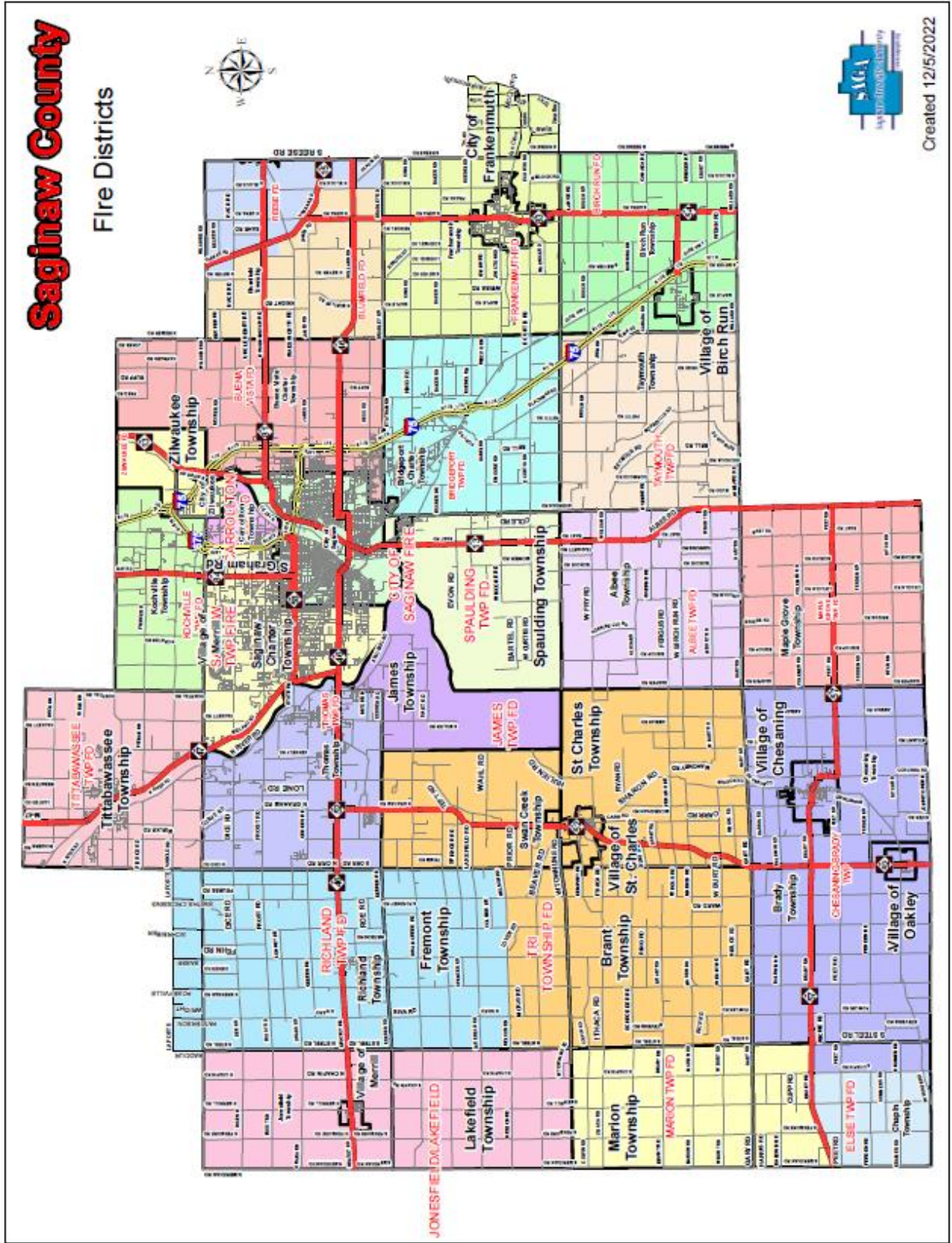
Map 4 – Saginaw County Population Density



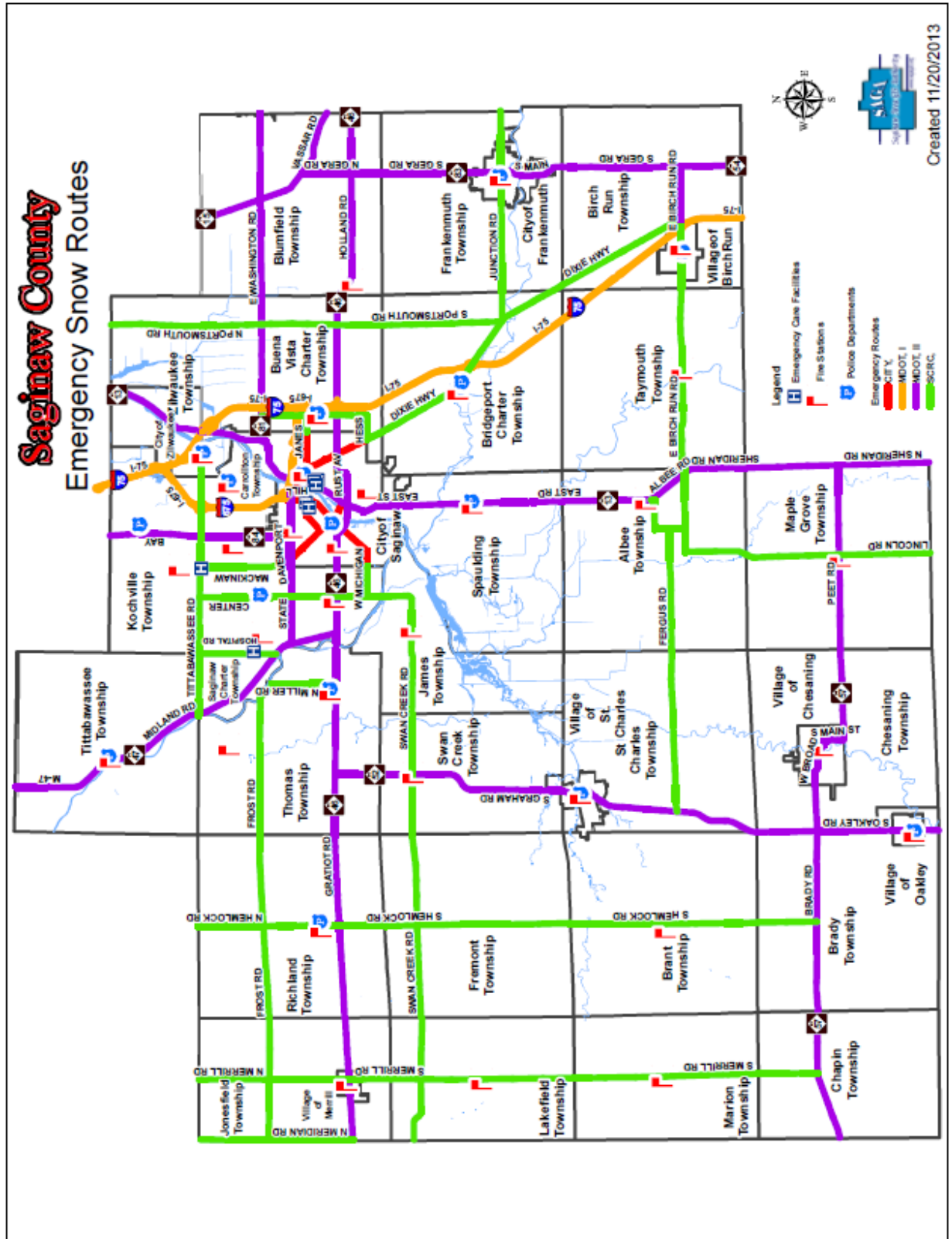
Map 5 – Saginaw County Land Use



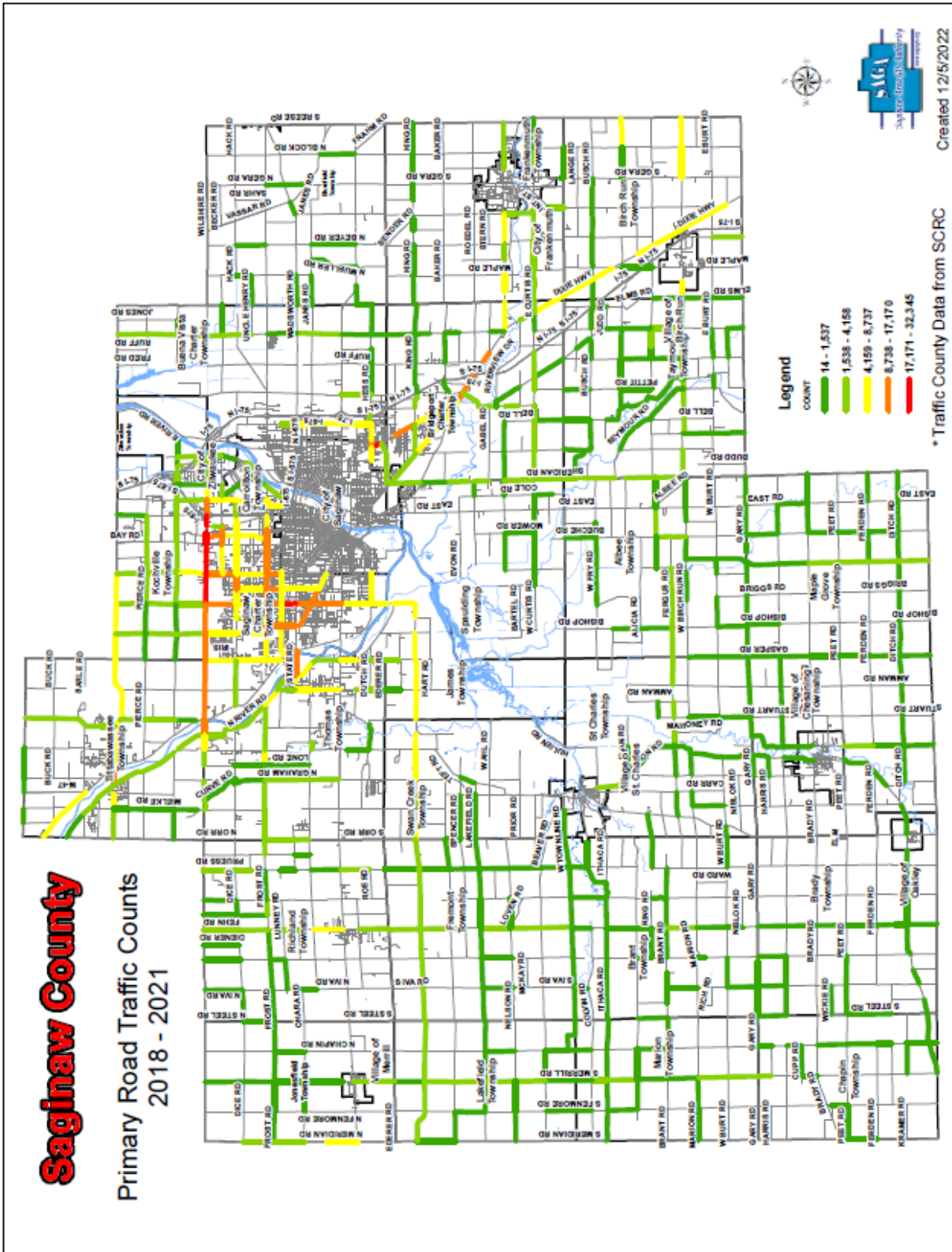
Map 6 – Saginaw County Fire Districts



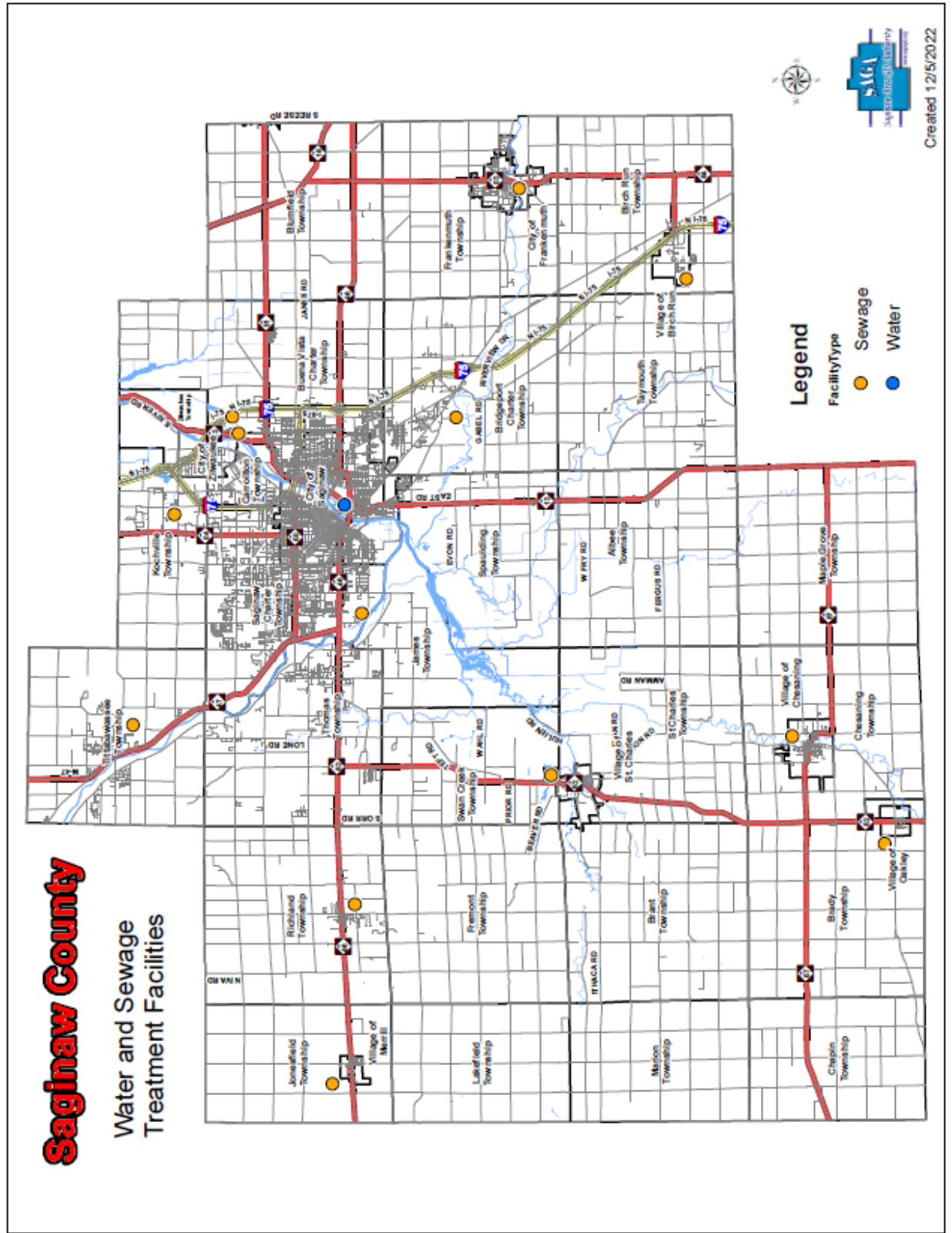
Map 7 – Saginaw County Emergency Route Plan



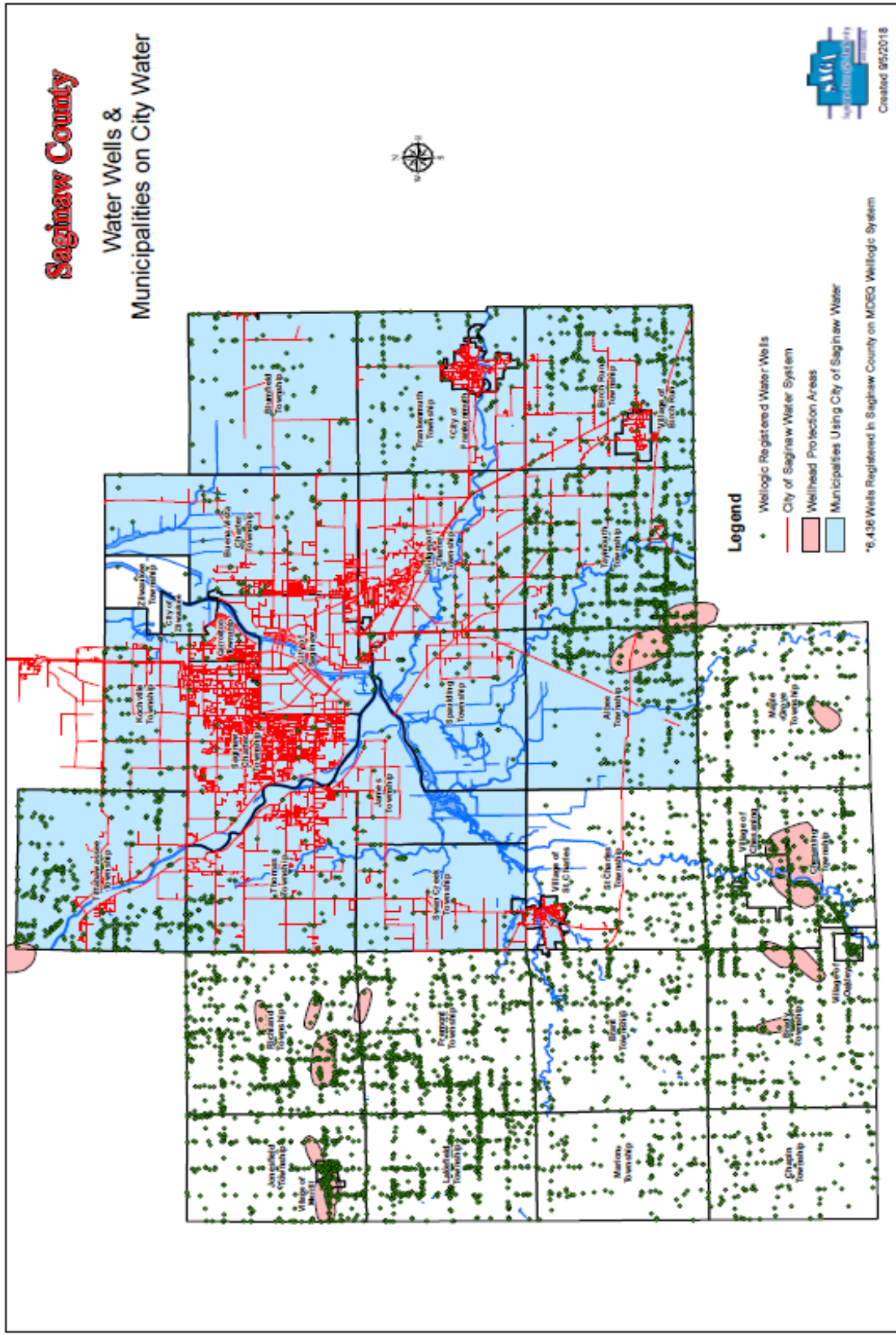
Map 8 – Saginaw County Primary Road Traffic Counts



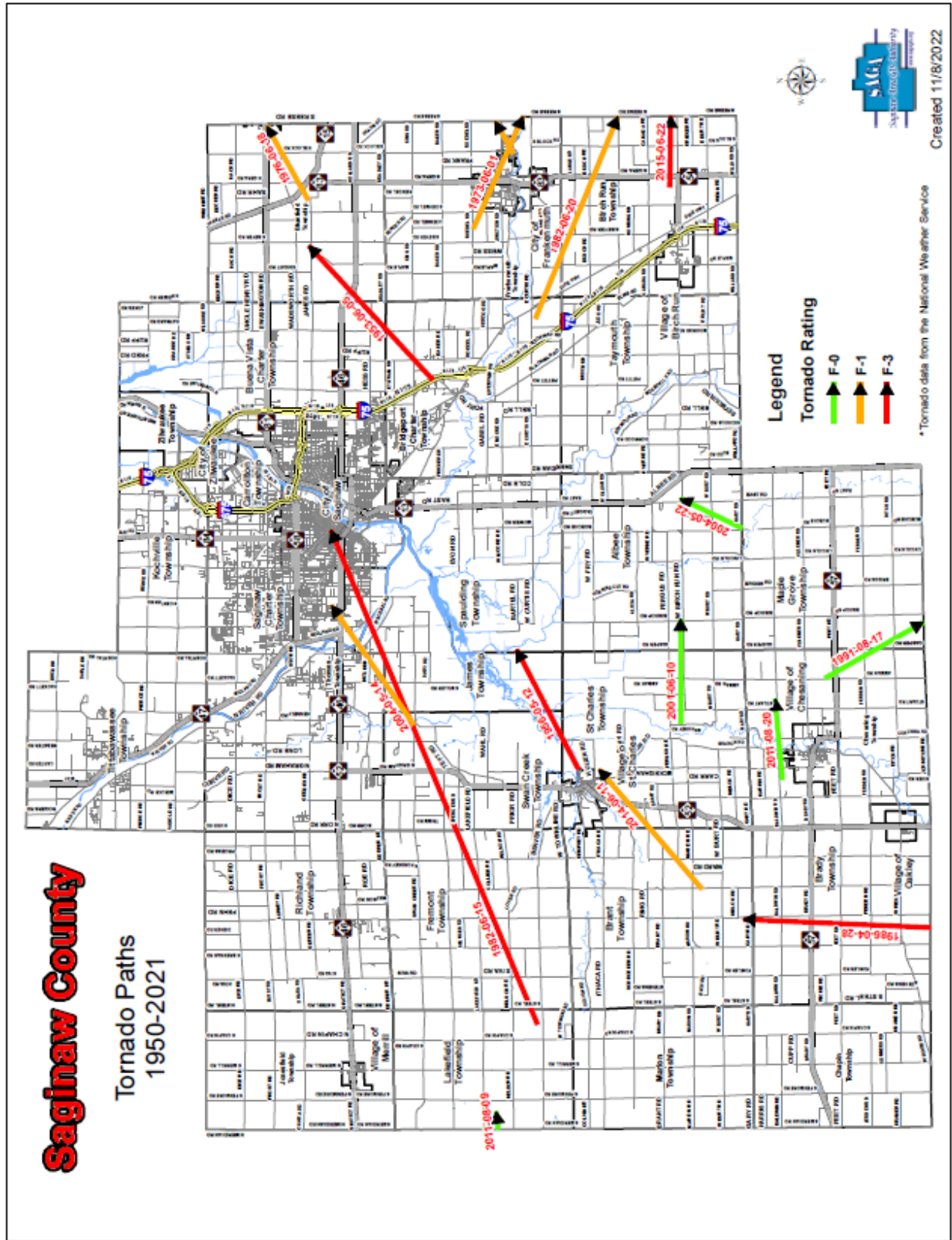
Map 9 – Saginaw County Water & Sewage Treatment Plants



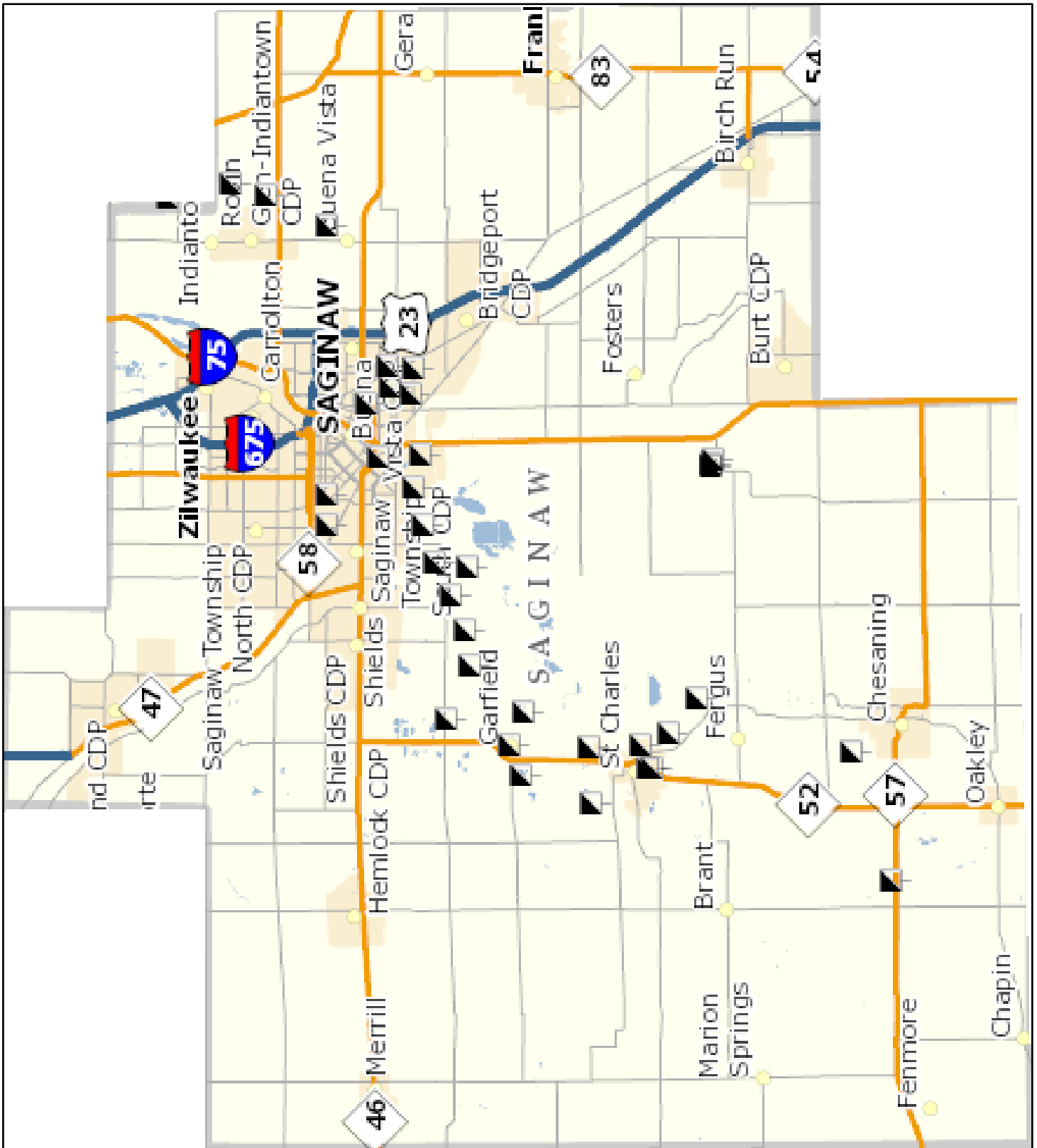
Map 10 – Municipal & Water Well Locations



Map 11 – Saginaw County Tornado Paths and Strength



Map 12 – Saginaw County Closed Mineshafts



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Appendix B – Participation Information, Mailing, Meeting Information

The table below shows the participation of all jurisdictions that initially indicated their desire to participate in the Hazard Mitigation Plan update. Some jurisdictions did not meet deadlines for submission of documents and, while not included in the existing update, will be added during annual or other updates if requirements are met.

Jurisdictions with an “X” in the Mitigation Strategies column submit strategies that were specific to that jurisdiction (*see Annex A*), while those with an “*” have jurisdiction mitigation strategies that were included in those listed in *Section 6* of this Plan.

Organization	Information Zoom	Kick Off Meeting	HVA	Cap Assess	Mitigation Strategies
Albee Twp			X	X	X
Birch Run Twp	X		X	X	X
Birch Run Village			X	X	*
Blumfield Twp		X	X	X	X
Brady Twp			X	X	*
Brant Twp			X	X	*
Bridgeport Twp			X	X	X
Buena Vista Twp			X	X	*
Carrollton Twp	X	X	X	X	X
Chesaning Twp		X	X	X	*
Chesaning Village					
City of Zilwaukee		X	X	X	*
Frankenmuth City	X	X	X	X	*
Frankenmuth Twp			X	X	*
Fremont Twp				X	
James Twp		X	X	X	X
Jonesfield Twp			X	X	*
Kochville Twp			X	X	*
Lakefield Twp		X	X	X	*
Maple Grove Twp		X	X	X	*
Merrill Village			X	X	*
Oakley Village			X	X	*
Richland Twp			X	X	*
Saginaw City		X	X	X	*
Saginaw County			X	X	*
Saginaw Twp		X	X	X	X
Spaulding Twp		X	X	X	X
St Charles Twp		X			
St Charles Village		X	X	X	X
Swan Creek Twp			X	X	*
Taymouth Twp			X	X	X

Organization	Information Zoom	Kick Off Meeting	HVA	Cap Assess	Mitigation Strategies
Thomas Twp		X	X	X	X
Tittabawassee Twp			X	X	
Zilwaukee Twp					
Chapin Twp			X	X	*

From: Przytycki, Mark
To: Emergency Manager
Cc: leonturmanski@hammer9.com; supervisor@birchruntp.com; hunsup@speednetllc.com; bradytwpsuper@gmail.com; fowlercontracting@yahoo.com; mschrisd1@gmail.com; pabney@carrollontwp.com; robbmaynard65@gmail.com; supervisor@chesaningtp.com; hmoore@saginaw-mi.com; mackerman@frankenmuthcity.com; t.hildner@yahoo.com; donclaire@ymail.com; edwardhek@jamestown.org; brownsj645@gmail.com; supervisor@kochvilletwp.com; tcrevia@gmail.com; kkrupp@memorialhealthcare.org; mariontwpsuper@yahoo.com; hfrichlandgovt@gmail.com; lbraun@saginawtownship.net; Ruth, Carl; smasters72@charter.net; stctownshipsuper@yahoo.com; townships@swancreektp.com; taysmouthsupervisor@gmail.com; robertweise750@yahoo.com; rick11789@hotmail.com; silvecreekmn@aol.com; merrillvillageclerk@hotmail.com; hycob@aol.com; richt@bridgeportmi.org; superintendent@buct.org; cmatton@carrollontwp.com; lmoales@saginaw-mi.com; mbourbina@zlwaukeemichigan.gov; slondon@kochvilletwp.com; grbishopmasonry@hotmail.com; manager@richlandtownshipmi.com; jwickman@saginawtownship.net; Belleman, Robert; manager@thomastwp.org; mmcull@iltabawessee.org; pmoores@villageofbirchrun.com; villageadmin@villageofchesaning.org; manager@stcmi.com; Thomas Matzke; Angie Thornton-Covenant; Mike Todd (michael.toddjr@cmsenergy.com)
Subject: 2022 Saginaw County Hazard Mitigation Plan Update
Date: Thursday, January 27, 2022 1:16:43 PM

Government and community partners,

It is time to begin the Saginaw County Hazard Mitigation Plan update, which expires later this year.

The purpose of a Hazard Mitigation Plan is to reduce loss of life and property by minimizing the impact of disasters. Through the planning process, hazards will be identified and prioritized. The plan will also identify possible mitigation strategies to reduce or eliminate the hazard's impact on our community. FEMA does not require this plan for a community to apply for post-disaster assistance; however, the plan is required for communities to be eligible for any number of pre-disaster mitigation grants.

During the 2017 plan update, we held several in-person meetings. To be respectful of everyone's time and comfort level of in-person meetings in the current environment, I will attempt to accomplish many of the information gathering portions of the planning process through online surveys or Zoom calls.

The first of these surveys can be taken by following the link below. This survey will identify your organization's desire to participate in the plan update and identify the primary contact person for your organization during the planning process. This contact person will provide needed information for your jurisdiction but also, as needed, forward future correspondences or requests for information within your organization.

<https://www.surveymonkey.com/r/SGGL5HV>

If you are not the appropriate person to complete this survey, please forward this email to whoever is. In jurisdictions with a Chief Operating Officer (i.e., manager, controller, etc.), this email was sent to them along with the Chief Elected Official of the jurisdiction. For those jurisdictions, please coordinate your response as this survey should only be completed once per organization/jurisdiction.

Feel free to contact me if you have any questions.

From: Przytylski, Mark
To: Emergency Manager
Bcc: leonhurmwid@hammer9.com; albeetownship@att.net; supervisor@birchruntp.com; building@birchruntp.com; bradytwpsuper@gmail.com; mschrid1@gmail.com; supervisor@tyct.org; psibney@carrolltp.com; rj@carrolltp.com; robbmaynard65@gmail.com; supervisor@chesaningtp.org; clerk@chesaningtp.org; hmoore@saginaw-mi.com; mackerman@frankenmuthcity.com; donleclair@gmail.com; brownsj645@gmail.com; tceyle@gmail.com; mariontwpuper@yahoo.com; supervisor@mariontownship.com; smasters72@charter.net; super@spauldingtp.com; stc-townshipuper@yahoo.com; township@swancreektwp.com; robertwise750@yahoo.com; silvercreeksmn@aol.com; hycvfh@aol.com; patradit@aol.com; rlicht@bridgeportmi.org; information@bridgeportmi.org; superintendent@tyct.org; manager@thomastwp.com; pmoores@villageofbirchrun.com; clerk@birchruntp.com; lmoore@saginaw-mi.com; citymanager@saginaw-mi.com; bsmith@frankenmuthcity.com

Subject: Saginaw County Hazard Mitigation Plan Update
Date: Friday, February 18, 2022 6:42:00 AM

At the end of January, I sent an email to the Chief Elected Official and Chief Operating Officer (if applicable) of each jurisdiction in Saginaw County. This email was related to the Saginaw County Hazard Mitigation Plan update. I know how full email boxes can be and wanted to reach out to you again as I had not heard back from your jurisdiction on whether you wanted to participate in the plan's update.

The contents of the original email are included at the end of this email. I will have two Zoom sessions to provide information on the Hazard Mitigation Plan, specifically, what it is, what it does, and why it may be important to your jurisdiction. I hope you will attend and get any of your questions answered. Log-in information for the Zoom sessions is below.

If you missed the first email and would like to fill out the survey, please follow this link:
<https://www.surveymonkey.com/r/SGGL5HV>

I hope to "see" you on one of the Zoom calls. Please let me know if you plan to attend and which particular session I can expect you to.

AM Meeting

Topic: Saginaw County Hazard Mitigation Plan Informational Meeting

Time: Feb 28, 2022 11:00 Eastern Time (US and Canada)

Join Zoom Meeting

<https://us06web.zoom.us/j/2709720501?pwd=UWFYUjXNIT2tieC90c3V5VmhmMmHdhZz09>

Meeting ID: 270 972 0501

Passcode: Rb9b40

One tap mobile

+13017158592,,2709720501#,,,,*266414# US (Washington DC)

+13126266799,,2709720501#,,,,*266414# US (Chicago)

Dial by your location

+1 301 715 8592 US (Washington DC)

+1 312 626 6799 US (Chicago)

+1 646 558 8656 US (New York)

Saginaw County Emergency Management 2022 Hazard Mitigation Plan Update

Hazard Mitigation Planning

What is it?

- Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of a disaster.
- 2nd Update to the original 2008 plan.
- Saginaw County – multijurisdictional
 - Communities could create their own
- Discussed in the Disaster Mitigation Act of 2000
- Would ideally integrate with the community's master plan.

What does it do?

- It is more about the process than the plan.
- Identifies and ranks hazards.
- Identifies strategies to mitigate the identified hazards.
- Makes jurisdiction eligible for certain non-emergency disaster mitigation grants.

Hazard Mitigation Planning

Benefits of Mitigation Planning

- Increase hazard awareness
- Identify actions for risk reduction
- Prioritize limited resources
- Save lives & reduce property damage
- Reduce response costs

National Benefit-Cost Ratio (BCR) Per Period		Beyond Code Requirements	Federally Funded
<small>*BCR numbers in this study have been rounded</small>			
Overall Hazard Benefit-Cost Ratio		\$4:1	\$6:1
 Riverine Flood		\$5:1	\$7:1
 Hurricane Surge		\$7:1	Too few grants
 Wind		\$5:1	\$5:1
 Earthquake		\$4:1	\$3:1
 Wildland-Urban Interface Fire		\$4:1	\$3:1

Hazard Mitigation Planning

Jurisdiction Requirements

- Participate in the process
 - Meetings (limited)
 - Surveys
- Identify "real" mitigation strategies for hazards
- Adopt the County plan
 - Board Resolution
- Support the planning process in your community

Next Steps

- Indicate willingness to participate
- Identify a liaison
- Planned start early March
- Planned adoption by December 2022
 - Pending state and Federal approval



Questions?

From: [Przybylski, Mark](#)
Bcc: [brantownship@gmail.com](#); [supervisor@maplegrovetownship.org](#); [edwardhak@jameswp.org](#); [blumsun@speednetllc.com](#); [leonturnwald@hammer9.com](#); [supervisor@birchcreekwp.com](#); [bradywpsuper@gmail.com](#); [robbynayard65@gmail.com](#); [supervisor@chesaningwp.org](#); [donlaclair@gmail.com](#); [krownsj645@gmail.com](#); [toreja@gmail.com](#); [supervisor@bect.org](#); [marionbepsuper@yahoo.com](#); [smasters72@charter.net](#); [stctownshipsuper@yahoo.com](#); [township@swancreekwp.com](#); [pekley318@gmail.com](#); [lvbcvb@aol.com](#); [manager@stcmi.com](#)
Subject: 2022 Saginaw County Hazard Mitigation Plan Update
Date: Tuesday, March 29, 2022 1:16:00 PM
Attachments: [local-hazard-mitigation-planning-factsheet.pdf](#)

Saginaw County Partners,

As mentioned in a previous email, Saginaw County Emergency Management is beginning the process of updating the Saginaw County Hazard Mitigation Plan. You are receiving this email as I have either not heard from your jurisdiction, or you had indicated you needed more information before deciding whether to take part in the update.

I had previously held a virtual meeting to provide information on the Plan and the responsibilities of the local jurisdictions for the update.

To adopt the updated Plan, your jurisdiction must take part in the planning process. This will involve answering surveys and providing jurisdiction-specific information as needed.

I am planning on starting the planning process in mid-April. Please complete the survey information at the link below by April 8th if you plan on taking part. Once the planning process starts, it may not be possible to add you to the plan.

I have attached a FEMA Hazard Mitigation Plan Fact Sheet to this document, and if interested, you can find the current Saginaw County Plan on the Saginaw County website at this link: [saginaw-county-hazard-mitigation-plan.pdf \(saginawcounty.com\)](#)

[Hazard Mitigation Plan Participation Link](#)

Please feel free to contact me by email or phone if you have any questions that I may answer for you.

Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przybylski, Mark](mailto:Przybylski_Mark)
To: athornton@chs-mi.com; mbourbina@tlwaukeemichigan.gov; supervisor@maplegrovetownship.org; manager@richlandtownship.com; brombalski@saginawtownship.com; firedept@tittabawassee.org; danielpel@bridgeportmi.org; l.hildner@yahoo.com; firechief@kochvilletpw.com; rshort@villageofchesaning.org; clerk@merrillvillage.com; faymouthsupervisor@gmail.com; traines@saginaw-mi.com; pmoore@villageofbirchrun.com; bsmith@frankenmuthcity.com; chief@atten@carrolltownship.com; super@spauldingwp.com; mcousins@thomastwp.org; edwardbaker@jameswp.org
Cc: [Ruth, Carl](mailto:Ruth_Carl); [Belleman, Robert](mailto:Belleman_Robert); [Charles Baker-MSP_3rd DC](mailto:Charles_Baker-MSP_3rd_DC)
Subject: Saginaw County Hazard Mitigation Plan Update
Date: Tuesday, May 24, 2022 1:31:00 PM
Attachments: [2022.06 Hazard Mitigation Plan Update Meeting 1.pdf](#)

Saginaw County Partners,

As you know, Saginaw County is updating its Hazard Mitigation Plan, which will expire later this year. As part of the plan update, a planning meeting will be held on June 21, 2022, at 10:00 AM at the Thomas Twp Public Safety Building, 8215 Shields Ct.

You are receiving this email because your jurisdiction has chosen to participate in the planning process and provided your name as the local point of contact during this plan update. Ideally, each jurisdiction's liaison or an alternate will attend the meeting. While not required, you are welcome to bring along other representatives from your jurisdiction who may be helpful to you during the plan update, but due to space limitations, please limit the number of participants to three total (including yourself.)

Please RSVP via email with the number of people planning to attend.

As always, contact me with any questions. I look forward to seeing you all on the 21st.

Lt. Mark Przybylski

Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przybylski, Mark](mailto:Przybylski_Mark)
To: leonturnwald@hammer9.com; supervisor@birchruntp.com; blumsup@speednetllc.com; bradytwpuper@gmail.com; branitownship@gmail.com; supervisor@bvt.org; robmaynard65@gmail.com; supervisor@chesaningtwp.org; donclair@gmail.com; brownsj645@gmail.com; jcrevda@gmail.com; supervisor@maplecresttownship.org; supervisor@mariontownship.com; stctownshipsuper@yahoo.com; townships@swancreektwp.com; pekley318@gmail.com; manager@stcom.com; lybcvb@aol.com; albeetownship@att.net; bulding@birchruntp.com; blumclerk@speednetllc.com; superintendent@bvt.org; clerk@chesaningtwp.org; mariontwpuper@yahoo.com
Subject: 2022 Saginaw County Hazard Mitigation Plan Update
Date: Tuesday, May 24, 2022 1:52:00 PM
Attachments: [2022.06 Hazard Mitigation Plan Update Meeting 1.pdf](#)

Saginaw County Partners,

You are receiving this email as I have previously reached out to your jurisdiction with information on the Saginaw County Hazard Mitigation Plan Update but had not received a response as to whether your jurisdiction wished to participate update process.

Having a current Hazard Mitigation Plan opens funding opportunities for municipalities to address identified hazards in their community. During this update, Saginaw County Emergency Management will carry the bulk of the workload. However, we will still need some assistance and input from your jurisdiction if you wish to adopt the updated plan.

A planning meeting will be held on June 21st at 10:00 AM at the Thomas Twp Public Safety Building, 8215 Shields Ct. I have attached an agenda for that meeting to this email. Please RSVP if you are planning to attend.

According to FEMA rules, jurisdictions that don't participate in the planning process are not allowed to adopt the plan. At least not without working through tasks in the planning process that currently will be completed by Saginaw County Emergency Management.

I hope to see a representative of your jurisdiction at the meeting. As always, contact me if you have any questions.

Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852



**County of Saginaw
2022 Hazard Mitigation Plan Update
Planning Meeting**

Date: June 21, 2022 **Time:** 10:00 AM **Location:** Thomas Twp Public Safety Building
8215 Shields Ct.

- I. **Introductions**

- II. **Hazard Mitigation Planning**
 - a. **Benefits**
 - b. **Process**

- III. **Review of 2017 Hazard Mitigation Plan**
 - a. **Hazards**
 - b. **Mitigation Strategies**

- IV. **Required local participation**
 - a. **Hazard Vulnerability Assessment**
 - b. **Mitigation Strategies**
 - c. **Implementation of Strategies**

- V. **Next Steps**

- VI. **Questions**

Saginaw Co Haz Mit Plan Update - Initial Meeting 6/21/22

Name	Organization	Email	Phone Number
Mike Cousins	Thomas Township	MCousins@ThomasTwp.org	781-4141
Carol Barker	MSP- EMHSO	barkerc@michigan.gov	616-223-2446
Sharon Bierlein	Blumfield Township	blumtrust2@spectrac116.com	989-522-0444
Ed MASTERS	SPaulding Twp	SPauldingTwp@gmail.com	989-772-0632
Ed HAK	JAMES TWP	edwardhak@jamestwp.org	989-860-2417
John Schmidt	Lakefield Twp	Johnschmidt@gmail.com	989-326-1354
Herman H.	Village of St. Charles	manager@stchar.com	989-865-8287
Brian Ackerman	St. Charles Twp	StCharlesTwpSuper@ymail.com	989-578-0022
Joe RUTHIG	CHESAWARE TWP	SRUTHIG@CHESAWARETWP.org	989-845-2341
Craig OATEN	CARROLLTON Twp	chiefoaten@carrolltontwp.com	989-239-1360
Brian Bromalski	Saginaw Township	bromalski@saginawtownship.net	989-791-9800

Saginaw Co Haz Mit Plan Update - Initial Meeting 6/21/22

Name	Organization	Email	Phone Number
Angela Thornton	Covenant	athornton@chs-mi.com	583-2756
Dannelle Massard	covenant	dannelle.massard@chs-mi.com	583-7909
Chris Izowski	9-1-1	Cizowski@saginawcounty.com	
Ryan Ludwick	Hemlock Semiconductor	r.ludwick@hscpol.com	859-9339
Dan Suneman	City of Zilwaukee	dsuneman@zilwaukee-mi.org	545-0753
Bridget Smith	City of Frankenmuth	bsmith@frankenmuthcity.com	989-652-901
Thomas Raines	City of Saginaw	traines@saginaw-mi.com	989-295-0219

SAGINAW COUNTY HAZARD MITIGATION PLAN 2022 UPDATE

1ST PLANNING GROUP MEETING

JUNE 21, 2022

HAZARD MITIGATION PLANNING WHAT IS IT?

The process of identifying hazards and mitigation strategies in an effort to reduce loss of life and property by lessening the impact of a disaster.

DEFINITIONS

- Hazard – a source of potential danger (natural, technological, human-caused)
- Vulnerability – the susceptibility to a particular hazard
- Risk – the probability of a hazard occurring

HAZARD MITIGATION PLANNING WHAT ARE THE BENEFITS?

- Reduce harm to existing and future development
- Prevent damage to economic, cultural, and environmental assets
- Minimize operations downtime and accelerate recovery after a disaster
- Reduce the costs of disaster response and recovery



SAGINAW COUNTY EVENTS

SIGNIFICANT WEATHER PHENOMENA





RARE, UNUSUAL WEATHER

Since Last Plan Update (through March)	
Number of Days with Storm Events	46
Number of Days with Injuries	0
Number of Days with Property Damage	14
Number of Days with Crop Damage	0
Number of Event Types	9
Total Property Damage	38.6 Million

Since 2000	
Number of Days with Storm Events	254
Number of Days with Injuries	10
Number of Days with Property Damage	78
Number of Days with Crop Damage	3
Number of Event Types	22
Total Property Damage	52.6 Million

2005 NBS STUDY

- Some benefits can be hard to quantify.

National Benefit-Cost Ratio (BCR) Per Peril		Beyond Code Requirements	Federally Funded
<i>*BCR numbers in this study have been rounded</i>			
Overall Hazard Benefit-Cost Ratio		\$4:1	\$6:1
 Riverine Flood		\$5:1	\$7:1
 Hurricane Surge		\$7:1	Too few grants
 Wind		\$5:1	\$5:1
 Earthquake		\$4:1	\$3:1
 Wildland-Urban Interface Fire		\$4:1	\$3:1

2017 PLAN UPDATE INFORMATION

Adopted September 11, 2017

Completed by Spicer

- 1.5+ year process
- Cost of just under \$30,000 partially covered by grant funds

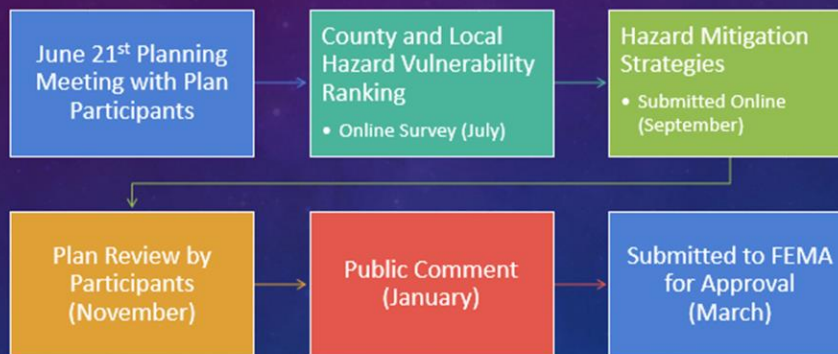
Top Four Identified Hazards

- Inclement Weather
- Flooding
- Tornado
- Transportation Accidents

Mitigation Strategies

- Not specific, a carbon copy of each other and the previous plan

2022 PLAN UPDATE SCHEDULE



HAZARD ANALYSIS AND RANKING

Completed by an online survey

- Share with anyone within your organization, not for public use
- Rank for YOUR jurisdiction

Local hazards will be identified and ranked based on surveys from your jurisdiction (more = better results)

Saginaw County HVA will be based on the local jurisdiction HVAs

- They may be ranked differently

Identify additional specific hazards (especially if you may request Hazard Mitigation Funding)

- e.g., the potable water storage tank and pump at M-46 near River is within the flood plain and susceptible to service interruption during a flood.

HAZARD MITIGATION STRATEGIES

An online form will be sent out later

- But you can start thinking about them now

Each jurisdiction must create their own

Only include strategies that you have intentions of working toward

- Not guaranteeing you will complete them, but they should be realistic to attempt

Be sure to include strategies for specifically identified hazards

- e.g., increase the berm height and install flood barriers at M-46 Pumping Station

IDENTIFIED HAZARD & MITIGATION EXAMPLES

Low Registration for the Community Notification System

- Provide a registration link on the township website
- Advertise in the quarterly community newsletter

The culvert at _ washes out with heavy rains

- Replace with a larger culvert to increase capacity

Storm Runoff Overwhelms Systems Causing Flooding

- Require developers to plan for on-site retention.
- Encourage the use of permeable driveways and surfaces to reduce runoff

Vulnerable Populations Susceptible to Temperature Extremes

- Organize outreach to vulnerable populations promoting heating or cooling center locations

CURRENT HAZARD MITIGATION PROJECTS

Thomas Township

- Relocation a pump station
 - \$500,000 – project approved

Saginaw County Road Commission

- Flood mitigation Tittabawassee Rd between M-47 & River
 - NOI Submitted

Freeland School District

- Tornado Shelter Saferoom
 - NOI Submitted

NEXT STEPS FOR JURISDICTIONS AND STAKEHOLDERS

Review 2017 Plan

- Hazard Analysis
- Mitigation Strategies
 - Were any completed

Complete Hazard Vulnerability Analysis

- Distribute widely in your organization only
- Identify general and specific hazards

Identify Mitigation Strategies

- Determine strategies to mitigate identified hazards

Adopt Plan

- Must be adopted by county and each jurisdiction

QUESTIONS?

MARK PRZYBYLSKI

MPRZYBYLSKI@SAGINAWCOUNTY.COM

989-790-5434



From: [Przytycki, Mark](#)
To: [Albee Tom Chief Kisser](#)
Subject: Saginaw County Hazard Mitigation Plan Update - Vulnerability Analysis
Date: Thursday, July 21, 2022 1:39:00 PM
Attachments: [HVA Template - 2022 Plan Update.xls](#)

READ THROUGH THE ENTIRE EMAIL BEFORE COMPLETING THE HVA

-

THIS EMAIL IS BEING DISTRIBUTED TO A LARGE AUDIENCE; PLEASE DO NOT USE REPLY ALL

Saginaw County Partners,

I have attached the Hazard Vulnerability Analysis (HVA) Survey for our Hazard Mitigation Plan update to this email.

There are four different worksheets within the document. The specific worksheet is identified by the tab at the bottom of the document. Below is a brief synopsis of each worksheet.

Instructions – provides an overall view of the HVA.

Tool HVA – this section is where you will identify and rank your jurisdiction’s hazards. This and the Mitigation tab are the core portions of this survey that will be used in the Hazard Mitigation Plan update. While this tab is second in order, it is important that you read through the “Scoring Scale” tab first, as information in this tab will be helpful when completing the HVA Tool. I have prefilled this with a list of common hazards each jurisdiction should “rank.” Please feel free to add any jurisdiction-specific hazards that may not be listed.

*A hazard may also sometimes be called a “threat.” Generally speaking, a hazard is a natural (unintentional) event that has or could potentially harm life, operations, the environment, or property, whereas a threat is a human-caused (intentional) event.

Scoring Scale – this section provides an in-depth look at the impact categories and specific scores. It also lists Community Life Lines, which will be used when completing the HVA Tool.

Specific Hazard ID & Mitigation – in this section, you will identify a particular vulnerability that most likely will fall under one of the hazard categories listed in the HVA Tool. This section aims to identify some realistic and specific mitigation strategies to reduce the impact of a particular hazard in your jurisdiction. The intent is not to list every possible mitigation strategy for every hazard or threat but to identify mitigation strategies for high-risk events that are realistic. A lack of funds alone should not be a reason to keep a mitigation strategy

from this list, as depending on circumstances, your jurisdiction could be eligible for mitigation grants.

*Vulnerability is a physical feature or operational attribute that renders an entity open to consequences from a hazard.

Please return the completed HVA to me at emgmgr@saginawcounty.com with the subject line Completed HVA. I will accept HVA submissions through **August 3, 2022**.

ENSURE YOUR JURISDICTION, NAME, AND ROLE OR TITLE ARE COMPLETED ON THE TOP OF THE HVA TOOL TAB (BRIGHT YELLOW SECTION)

For those in a municipality, please feel free to share and have anyone within your organization complete this. The intent is to answer questions for your jurisdiction only.

For private industry partners, please limit your sharing to personnel in a safety or facilities management position. The HVA should be completed for your facility, not the whole jurisdiction.

This survey is not for nor intended to be completed by the general public.

-

If you have any questions, don't hesitate to contact me.

I appreciate your help!

Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przybylski, Mark](mailto:Przybylski_Mark)
To: silvefire@yahoo.com; clerk@birchmtwp.com; pmoore@villageofbirchrun.com; sharonbeer4@aol.com; bradytwpuper@gmail.com; hrantownshis@gmail.com; dsinglet@bridgeportmi.org; ahosepner@bact.org; chiefotien@camilliontwp.com; supervisor@chesaningtwn.org; [rsshort@villageofchesaning.org](mailto:rshort@villageofchesaning.org); mbourbina@tlawaukeemichigan.gov; athornton@chs-mi.com; hsmith@frankenmuthcity.com; l.hildner@yahoo.com; dorladair@gmail.com; r.d.ludwic@hscopol.com; edwardhak@jamestwp.org; brownj645@gmail.com; firechief@sochvilletp.com; 77johnschmidt@gmail.com; supervisor@mapleprovetownship.org; delong@mbairport.org; clerk@merrillville.com; barkerc@michigan.gov; qaidley318@gmail.com; manager@richlandtownshipmi.com; Joworski_Chris@trines@saginaw-mi.com; Brian.Wendling@sherpherd@scr-mi.org; Robert.V.Belleman@brombalski@saginawtownship.net; super@paukdingtwp.com; stctownshipsuper@yahoo.com; manager@stcmi.com; supervisor@swancreektwp.com; taymouh@supervisor@gmail.com; mrcousins@thomastwp.org; fredent@tittabawassee.org; hvcb@aol.com; patbrat@aol.com
Subject: Hazard Mitigation Plan Update - Vulnerability Analysis
Date: Friday, September 2, 2022 3:09:00 PM
Attachments: [HVA Template - 2022.1 Plan Update.xls](#)

Saginaw County Partners,

I have received some feedback about the complexity of the previous Hazard Vulnerability Form I sent in July. With only a 26% completion rate, it would appear (or at least I hope) that was the case. I tried to put all the information and questions needed in one document, but after some discussion, it may be better to take the process in smaller bites.

To that end, I have attached a more basic form of a Hazard Vulnerability Analysis to this email. If you had completed the previous HVA, there is no need to complete this one, as I will carry your last scores over. Of course, if you want to make my life easier, please feel free to complete the attached HVA as well. There is no ability to add hazards, but I think the list of hazards is complete. Still, if you feel there is a hazard you would like listed for your jurisdiction, please let me know.

Two items to remember:

1. I must receive at least one HVA from your jurisdiction to show that you participated in the process.
2. While I only need one per jurisdiction, ideally, you would share the HVA with other municipal employees for them to complete as well. I think this will provide a more accurate HVA than simply one person completing it.

Please have this HVA back to me by September 16th.

As always, contact me with any questions.

Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave

From: [Przytycki, Mark](#)
To: [alkeefre@yahoo.com](#); [clerk@birchmtwp.com](#); [smoore@villageofbirchm.com](#); [sharonbeer4@aol.com](#); [bradytwpuper@gmail.com](#); [transitwshis@gmail.com](#); [dsingiel@bridgeportmi.org](#); [ahseppner@bact.org](#); [chiefcatten@camilliontwp.com](#); [supervisor@chesaningtwn.org](#); [rshort@villageofchesaning.org](#); [mbourbina@xlwaukeemichigan.gov](#); [athornton@chs-mi.com](#); [hsmith@frankenmuthcity.com](#); [l.hildner@yahoo.com](#); [donladair@gmail.com](#); [edwardhak@jamestown.org](#); [brownstf45@gmail.com](#); [freschie@kochvilletp.com](#); [77johnschmidt@gmail.com](#); [supervisor@mapleomvstowship.org](#); [clerk@merrillvillage.com](#); [barkerc@michigan.gov](#); [manager@richlandtownshipmi.com](#); [traines@saginaw-mi.com](#); [Robert V. Belleman](#); [brombelski@saginawtownship.net](#); [super@spauldingtwp.com](#); [sttownshipuper@yahoo.com](#); [manager@stcmi.com](#); [supervisor@swancreektwp.com](#); [taymouthsupervisor@gmail.com](#); [mooalms@thomastwp.org](#); [fredent@tttabawassee.org](#); [patbrat@aol.com](#)
Subject: Hazard Mitigation Plan Update - Capability Assessment
Date: Friday, September 2, 2022 3:21:00 PM
Importance: High

A Capability Assessment for each jurisdiction must be completed as part of the Hazard Mitigation Plan update process. The link below will take you to a survey that should not take long to complete. While you may collaborate with others to get the answers, there should only be one Capability Assessment Survey completed for each jurisdiction.

<https://www.surveymonkey.com/r/LocalCapabilityAssessment>

Just a reminder, each jurisdiction must show participation in the process to adopt the plan. Participation in this step requires one survey to be completed per jurisdiction.

Please complete the survey by Monday, September 12th.

Let me know if you have any questions.

Have a great weekend,
Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852



COUNTY OF SAGINAW Office of Emergency Management



111 SOUTH MICHIGAN AVENUE
SAGINAW, MICHIGAN 48602
PHONE (989) 790-5434 FAX (989) 792-6862

MEDIA RELEASE

Re: Saginaw County Hazard Mitigation Plan Update

The Saginaw County Office of Emergency Management is currently updating the Saginaw County Hazard Mitigation Plan. This plan is updated every five years and is required by FEMA for Saginaw County jurisdictions to qualify for certain Federal Disaster Grants.

Disasters can cause loss of life; damage buildings and infrastructure; and have devastating consequences for a community's economic, social, and environmental well-being. Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters.

The intent of the Hazard Mitigation Plan, and more specifically, the planning process, is to identify and rank hazards that Saginaw County is susceptible to. Once identified, Saginaw County and its local jurisdictions can identify possible mitigation strategies that may reduce the impact of future incidents on people, property, and the environment.

To assist with the update process, the Office of Emergency Management is asking people who live or work in Saginaw County to complete a brief survey.

Additional information on the Saginaw County Hazard Mitigation Plan and a link to the survey can be found on the Office of Emergency Management's webpage at www.saginawcounty.com/oem.

###END###

Contact Information

Lt. Mark Przybylski
Saginaw County Emergency Management Coordinator
989-790-5434
mprzybylski@saginawcounty.com

From: [Przytylski, Mark](#)
To: [albee@fire@yahoo.com](#); [pmoore@villageofhirschrun.com](#); [bradybw@super@gmail.com](#); [brantownship@gmail.com](#); [dmi@glie@bridgeportmi.org](#); [BVPD_DC_Hoeppner](#); [rshort@villageofchesaning.org](#); [dbricci@trf@gmail.com](#); [fremont.saginaw.clerk@gmail.com](#); [77johnschmidt@gmail.com](#); [clerk@merillvillage.com](#); [oakley318@gmail.com](#); [manager@richlandtownshipmi.com](#); [supervisor@swancreestwp.com](#); [laymouthsupervisor@gmail.com](#); [lybcb@lanj.com](#); [patbrat@soil.com](#); [Craig Oatten](#)
Subject: Saginaw County Hazard Mitigation Plan Update
Date: Tuesday, September 20, 2022 10:29:00 AM
Attachments: [HVA Template - 2022.1 Plan Update.xls](#)
Importance: High

Saginaw County Partners,

You are receiving this email as I don't have a record of receiving any Hazard Vulnerability Analysis from your jurisdiction. I am preparing to begin the next steps of the plan update process and will require an HVA from any jurisdiction that would like to be part of the updated plan.

I have included a copy of the HVA form with this email. Please complete and return it to me by **September 27th**.

I apologize if you had previously returned an HVA; it may have been caught in our email filters. If you could resend it as a reply to this email, it should get through to me.

Please let me know if you have any questions or need assistance completing the HVA.

Regards,
Mark

Lt. Mark Przytylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: Przytylski, Mark
To: albee@fire@yahoo.com; pnoone@villageofbirchrun.com; brady@wpsuper@gmail.com; dsmiguel@bridgeportmi.org; BYFD-DC.Hoepfner@supervisor@chesaningtwp.org; ChesPD Chief Shod; dankladin@gmail.com; freemont.saginaw.clerk@gmail.com; brownsj645@gmail.com; osbley318@gmail.com; Robert V. Belleman; brombalski@saginawtownship.net; super@spauldingtwp.com; stctownshipsuper@yahoo.com; manager@stcmi.com; taymouthsupervisor@gmail.com; mccouins@thomastwp.org; patbrat@aol.com; robbinaynard65@gmail.com; cross07@yahoo.com
Subject: Hazard Mitigation Plan Update - Capability Assessment
Date: Tuesday, September 20, 2022 10:49:00 AM
Importance: High

Saginaw County Partners,

You are receiving this email because there is no record of a representative from your jurisdiction completing the Capability Assessment Survey sent at the beginning of the month.

This assessment is needed if your jurisdiction intends to adopt the Saginaw County Hazard Mitigation Plan once it is updated.

The assessment is completed via Survey Monkey and can be found at the following link: <https://www.surveymonkey.com/r/LocalCapabilityAssessment>. I will be starting the next phase of the plan update at the end of this month and will need the Capability Assessments by September 27th to do so.

Please let me know if you have any questions or issues accessing the assessment.

Thanks,
Mark

Lt. Mark Przytylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przybylski, Mark](#)
To: [SCEPC Group](#)
Subject: Saginaw County Hazard Mitigation Plan
Date: Tuesday, September 20, 2022 10:58:00 AM
Attachments: [HVA Template - 2022.1 Plan Update.xls](#)

As many of you know, Saginaw County is updating its hazard mitigation plan. Each jurisdiction will be completing a hazard vulnerability analysis. Those individual HVAs will be used to complete the overall county HVA, but I would also like your input. To that end, could you please complete the attached HVA form relating to Saginaw County as a whole? If you can return the HVA by next week, it would be appreciated.

If you have any questions, please let me know.

Thanks,
Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przytycki, Mark](mailto:Przytycki_Mark)
To: pmoore@villageofbirchrun.com; bradytapsuper@gmail.com; branttownship@gmail.com; dmi@leis@bridgeportmi.org; ahospner@bvt.org; chiefofthen@carrolltownship.com; nhort@villageofthesaning.org; dontclair@yahoo.com; ZJohnschmidt@gmail.com; manager@richlandtownshipmi.com; stctownshipsuper@yahoo.com; manager@stcmi.com; supervisor@swancreekwp.com; nathrat@aol.com; robbsaynard65@gmail.com; cpmess07@yahoo.com
Subject: Hazard Mitigation Plan Update - Missing Documents
Date: Thursday, October 6, 2022 1:33:00 PM
Attachments: [HVA Template - 2022.1 Plan Update.xls](#)

Good afternoon,

You are receiving this email as your jurisdiction had previously expressed interest in participating in the Saginaw County Hazard Mitigation Plan Update. As of today, I can not locate a completed Hazard Vulnerability Analysis for your jurisdiction. I apologize if you had previously sent it, but I would ask you to resend the document.

The goal is to submit a completed plan to the State by the end of this year, and I can't move forward without the HVAs from every jurisdiction that wishes to participate. If you have yet to complete an HVA for your jurisdiction, I am setting a **deadline of October 20th** to receive the documents. If documents are not received by the 20th, the process will move forward without your jurisdiction, which means you will not be able to adopt the plan without a large amount of work on your part.

If you need any amount of help in filling out the HVA, please let me know. We can talk over the phone, do a virtual meeting, or I can drive to your location to go over the HVA with you. I have attached a blank HVA to this email in case it has been misplaced.

Regards,
Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przytycki, Mark](#)
To: bradybwpuper@gmail.com; dsmigiel@bridgeportmi.org; shoepner@bact.org; rshort@villageofchesaning.org; brombalski@saginawtownship.net; stctownshipsuper@yahoo.com; patbrat@aol.com
Subject: Hazard Mitigation Plan - Capability Assessment
Date: Thursday, October 6, 2022 1:42:00 PM

You are receiving this email as your jurisdiction had previously indicated its desire to participate in the update of the Saginaw County Hazard Mitigation Plan, and as of today, I have not received a completed Capability Assessment Survey from your jurisdiction.

The goal is to submit a completed plan to the State by the end of this year, and I can't move forward without the Capability Assessment from every jurisdiction that wishes to participate. If you have yet to complete an assessment for your jurisdiction, I am setting a **deadline of October 20th** to do so. If documents are not received by the 20th, the process will move forward without your jurisdiction, which means you will not be able to adopt the plan without a large amount of work on your part.

The assessment is completed through SurveyMonkey and contains simple questions you are likely to have with little to no research. The link to the survey is:

<https://www.surveymonkey.com/r/LocalCapabilityAssessment>

Contact me if you have any questions or difficulty with the survey or if your jurisdiction no longer wishes to participate in the process.

Thanks,
Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave
Saginaw, MI 48602
O: 989-790-5434
F: 989-792-6852

From: [Przytycki, Mark](#)
To: [Albee Twp Chief Kisser](#)
Subject: Saginaw County Hazard Mitigation Plan Update
Date: Thursday, November 3, 2022 12:12:00 PM
Attachments: [Hazard Mitigation Strategy Cover Letter.pdf](#)
[Mitigation Strategies Instructions.pdf](#)
[2017 HMP Goals.pdf](#)
[Mitigation Strategies - Examples.pdf](#)
[fema-mitigation-ideas_02-13-2013.pdf](#)
[Albee Township HVA - Compiled.xlsx](#)
[Mitigation Strategies Table - Blank.xlsx](#)

The next steps in the Hazard Mitigation Plan (HMP) update are to review mitigation strategies from the 2017 HMP, identify strategies from the 2017 HMP that were completed, and identify other activities completed since 2017 that fit within the 2017 HMP Goals. Finally, identify mitigation strategies based on the 2022 Vulnerability Analysis submitted by your jurisdiction.

While not complicated, this step has a couple of moving pieces, so please review all the attached material before starting the process.

The deadline to submit this information is December 2nd.

An optional in-person meeting is scheduled on Monday, November 14th at Saginaw Twp FD Station #3, 155 N Center Rd. I will be there from 3:00 – 6:00 PM to answer any questions or provide assistance. As always, please feel free to reach out to me by email or phone with any questions.

The following items are attached to this email:

- HMP Mitigation Strategies Cover Letter
- Instruction on completing this step
- 2017 HMP Mitigation Strategies by jurisdiction
- 2017 HMP Goals (NOTE: ALBEE TWP DID NOT HAVE ANY 2017 STRATEGIES IDENTIFIED)
- 2022 Vulnerability Analysis (scored) by jurisdiction
- Blank 2022 Mitigation Strategy table
- Hazard Mitigation Strategy Examples (two documents)

In addition to the mitigation strategies included as attachments, you can also find mitigation strategy information and suggestions at [Beyond the Basics | Types of Mitigation Actions \(mitigationguide.org\)](#).

Regards,
Mark

Lt. Mark Przytycki
Saginaw County Sheriff's Office
Emergency Management Division
111 S. Michigan Ave

From: [Przytycki, Mark](#)
To: [alkeefire@yahoo.com](#); [clerk@birchmtwp.com](#); [pmoore@villageofbirchmtn.com](#); [sharonbeer4@aol.com](#); [bradytwpuper@gmail.com](#); [hantownships@gmail.com](#); [dmgielef@bridgeportmi.org](#); [ahosepner@bact.org](#); [chiefatien@camilliontwp.com](#); [supervisor@chesaningtwp.org](#); [rshort@villageofchesaning.org](#); [mbourbina@xlwaukeemichigan.gov](#); [hsmith@frankenmuthcity.com](#); [l.hildner@yahoo.com](#); [donclair@ymail.com](#); [edwardhak@jamestwp.org](#); [brownsj645@gmail.com](#); [firechief@kochvilletp.com](#); [77johnschmidt@gmail.com](#); [supervisor@maplegrovetownship.org](#); [clerk@merivillage.com](#); [oaidley318@gmail.com](#); [manager@richlandtownship.com](#); [traines@saginaw-mi.com](#); [Wendling, Brian](#); [Robert V. Belleman](#); [hrombelski@saginawtownship.net](#); [super@speauldingtwp.com](#); [stctownshipsuper@yahoo.com](#); [manager@stcmi.com](#); [supervisor@sawancreektwp.com](#); [kaymou@supervisor@gmail.com](#); [mcousins@thomastwp.org](#); [fredert@tittabawassee.org](#); [robbmaynard65@gmail.com](#); [hlmsup@speednetllc.com](#); [jscott@richlandtownship.com](#); [Usms2909@chartermi.net](#); [patbrat@aol.com](#); [qms07@yahoo.com](#); [bradytwpclerk@centurytel.com](#); [Charles Levens](#)
Cc: [villageadmin@villageofchesaning.org](#); [Charles Baker-MSP 3rd DC](#)
Subject: HMP Update Deadline
Date: Wednesday, November 23, 2022 3:40:00 PM
Importance: High

Community stakeholders,

I realize this has been challenging, and I appreciate your patience through this lengthy process. The good news is the hard part is almost over! As you know, the deadline to submit the mitigation strategies and other information outlined in my November 3rd email is rapidly approaching. . If you have already submitted your Mitigation Strategy information, thank you!

December 2nd is a hard deadline as I will begin to finalize the plan for submission to the state by the end of December. Those jurisdictions that have not submitted the needed information to me by that date will not be included in the initial plan update. There may be an opportunity to add you to the plan sometime after the 1st of the year; however, this is not guaranteed.

I will be at the Thomas Twp Public Safety Building, 8215 Shields Drive, on November 30th from 2:30 until 6 pm to answer any questions and help anyone having difficulty.

Please submit the paperwork by the deadline if you intend to be part of the initial plan update.

A few jurisdictions are missing additional requirements – the Hazard Vulnerability Assessment and/or Capability Assessment Survey. If you have not completed these and need help, please get in touch with me or come to the November 30th meeting. If I am missing something from you, I will send you a separate email to let you know.

I hope you all have a Happy Thanksgiving!

Regards,
Mark

Lt. Mark Przybylski
Saginaw County Sheriff's Office

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Appendix C – Active Saginaw County SARA III Sites

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
3948	Healthcare Industries Materials Site (HIMS)	Hemlock	Thomas Township FD
10373	City of Saginaw - 14TH ST. RETENTION BASIN	SAGINAW	Saginaw FD
3880	4637 BAY ROAD EXPRESS SHOP	SAGINAW	Saginaw Township FD
3953	Admiral Gas Station 5792	Saginaw	Saginaw FD
4847	Advanced Micronutrient Products, Inc.	REESE	Blumfield Township FD
3934	Air Products and Chemicals, Inc. - Saginaw N2 Plt	SAGINAW	Buena Vista FD
19994	Alamo Rent-A-Car/National Car Rental	Freeland	Saginaw FD
18344	ALEDA E. LUTZ VAMC	SAGINAW	Saginaw FD
15268	Aleris Specification Alloys, Inc.	SAGINAW	Buena Vista FD
3925	AMERIGAS PROPANE COMPANY	SAGINAW	Spaulding Township FD
3935	AT&T - M25074	SAGINAW	Saginaw FD
12629	AVIS RENT A CAR SYSTEM, LLC -MBS Int'l Airport	FREELAND	Tittabawassee Twp FD
3910	AT&T BIRCH RUN CDO - M25515	BIRCH RUN	Birch Run Township FD
3911	AT&T BRIDGEPORT #3 ESS - M25562	BURT	Albee Township FD
5996	AT&T Bridgeport Co - M25560	SAGINAW	Bridgeport FD
7450	BRIDGEPORT WWTP	SAGINAW	Bridgeport FD
10648	BUENA VISTA WWTP	SAGINAW	Buena Vista FD
23570	Central Metallizing and Machine	Saginaw	Buena Vista FD
14755	CENTRAL WAREHOUSE SAGINAW	SAGINAW	Saginaw FD
23358	Parkers Propane - Chesaning (2)	Chesaning	Chesaning-Brady FD
11287	CINDERELLA INC	SAGINAW	Saginaw FD
20190	CMI Schneible, Inc. - Plant 3	Saginaw	Saginaw FD
19686	Covenant Health Care - Cooper Facility	Saginaw	Saginaw FD
6285	DARLING INGREDIENTS INC.	CARROLLTON	Carrollton Township FD
4869	Beacon & Bridge Market #11	REESE	Blumfield Township FD
21589	DHT Logistics	Reese	Blumfield Township FD
22603	Distribution International	Freeland	Saginaw FD
4876	EMERSON PUMPING STATION	SAGINAW	Saginaw FD
8129	ESTERLINE INTERFACE TECHNOLOGIES/MEMTRON	Frankenmuth	Frankenmuth FD
22166	FedEx Ground - Saginaw	Saginaw	Saginaw FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
23611	Ferguson Enterprises Midwest, Inc.	Saginaw	Saginaw FD
11290	FERRELLGAS	SAGINAW	Thomas Township FD
12633	FITZHUGH ST RETENTION BASIN	SAGINAW	Saginaw FD
21262	Flying J 668	Saginaw	Saginaw Township FD
23335	Forward Energy	Reese	Blumfield Township FD
3875	Star of the West - Frankenmuth	FRANKENMUTH	Frankenmuth FD
3912	AT&T FRANKENMUTH #5 BRSM - M25521	FRANKENMUTH	Frankenmuth FD
21856	FRANKENMUTH BLUE FLAME BULK PLANT	BRIDGEPORT	Bridgeport FD
10681	FRANKENMUTH CITY OF WRRF	FRANKENMUTH	Frankenmuth FD
21529	FRANKENMUTH PAC-PRIDE	FRANKENMUTH	Frankenmuth FD
16559	Fraza	Bridgeport	Bridgeport FD
5997	AT&T Freeland #3 ESS - M25527	FREELAND	Tittabawassee Twp FD
4851	Freeland Bean & Grain inc.	Freeland	Tittabawassee Twp FD
3933	FRONTIER HEMLOCK C O- 943-50909-82545	HEMLOCK	Richland Township FD
19718	GEORGETOWN LOGISTICS	SAGINAW	Buena Vista FD
21041	Star of the West Gera	Frankenmuth	Frankenmuth FD
12463	Glastender, Inc.	Saginaw	Kochville Township FD
3888	GM - SAGINAW METAL CASTING OPERATIONS	SAGINAW	Saginaw FD
20093	GM Property Dock	Saginaw	Saginaw FD
4875	Saginaw City - HANCOCK RETENTION BASIN	SAGINAW	Saginaw FD
22370	Hangar 4	FREELAND	Tittabawassee Twp FD
19724	Harrison Facility	Saginaw	Saginaw FD
3928	HELENA	SAGINAW	Tri-Township FD
21471	Coyne Oil - HEMLOCK	HEMLOCK	Richland Township FD
3896	HEMLOCK ELEVATOR	HEMLOCK	Richland Township FD
3897	Hemlock Semiconductor Operations LLC	Hemlock	Thomas Township FD
20279	Linde Hemlock, MI #318	Hemlock	Saginaw FD
3898	HI-TECH STEEL TREATING, INC.	SAGINAW	Saginaw FD
21668	Hirschman Oil Supply Inc	Reese	Blumfield Township FD
19452	LAFARGE NORTH AMERICA	ZILWAUKEE	Zilwaukee City FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
11288	Lake State Railway Company	Saginaw	Saginaw FD
22669	Leonard's Syrups Saginaw	Saginaw	Saginaw FD
23524	Love's Travel Stop #743	Bridgeport	Bridgeport FD
19790	LOWE'S OF SAGINAW, MI (#562)	SAGINAW	Kochville Township FD
22153	Means Industries, Inc.	Saginaw	Buena Vista FD
4861	Means Industries, Inc.	Saginaw	Buena Vista FD
22410	Med-Trans MTC 242	Saginaw	Saginaw FD
20220	MEIJER STORE #213	BIRCH RUN	Birch Run Township FD
10370	MEIJER STORE #42	SAGINAW	Thomas Township FD
3905	MEIJER STORE #43	SAGINAW	Kochville Township FD
19823	METC CLAREMONT SUBSTATION	SAGINAW	Saginaw FD
22991	METC GREY IRON STATION	SAGINAW	Saginaw FD
22985	METC HOLLAND ROAD SUBSTATION	Saginaw	Buena Vista FD
19507	METC MANNING SUBSTATION	SAGINAW	Saginaw FD
21375	METC MURPHY SUBSTATION	Hemlock	Richland Township FD
21276	METC ORR ROAD	HEMLOCK	Richland Township FD
19847	METC SAGINAW RIVER SUBSTATION	ZILWAUKEE	Zilwaukee City FD
21795	Charter Communications MI-0048_Frankenmuth	Frankenmuth	Frankenmuth FD
21363	MI-0332X_Charter Communications	Zilwaukee	Zilwaukee City FD
20373	MI-25662_Charter Communications	Saginaw	Saginaw FD
18246	Michigan Premier Laundry	SAGINAW	Buena Vista FD
3914	MICHIGAN SUGAR COMPANY - CARROLLTON FACILITY	CARROLLTON	
4862	MILLER MOLD CO.	SAGINAW	Saginaw Township FD
21238	MORLEY BUILDING - M25049	Saginaw	Saginaw FD
21946	Morrison Industrial Equipment	Saginaw	Buena Vista FD
3931	Nexteer Automotive	SAGINAW	Buena Vista FD
20726	Nutrien Ag Solutions 896	Saginaw	Saginaw FD
22226	Oakley Corn	Oakley	Richland Township FD
17144	Oldcastle Lawn & Garden - Bridgeport	Bridgeport	Bridgeport FD
6287	PARKER'S PROPANE-BRIDGEPORT	BRIDGEPORT	Bridgeport FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
6288	PARKERS PROPANE-CHESANING	CHESANING	Chesaning-Brady FD
7454	PBG Saginaw	Saginaw	Buena Vista FD
22738	Pegasus Wind	Reese	Blumfield Township FD
13240	People's Landfill, Inc.	BIRCH RUN	Taymouth FD
19222	Lipert Component Plant 96W	Chesaning	Chesaning-Brady FD
4867	PLASTATECH ENGINEERING LTD	SAGINAW	Buena Vista FD
4872	City of Saginaw Public Services Building	Saginaw	Saginaw FD
23057	Miller Energy Companty - Ralph Schoonmaker #1	Merrill	Jonesfield-Lakefield FD
7455	Ryder Trans Svc #0531	Saginaw	Saginaw FD
11289	S MICHIGAN EXPRESS STOP	SAGINAW	Saginaw FD
3927	SAFETY-KLEEN SYSTEMS, INC. (405901)	SAGINAW	Buena Vista FD
22462	Farhner Asphalt Sealers - Saginaw	Saginaw	Saginaw FD
20217	Alta Equipment - SAGINAW	SAGINAW	Kochville Township FD
21354	Blue Water Thermal Solutions Saginaw	Saginaw	Saginaw FD
5999	AT&T Saginaw - Shields #2 - M25590	SAGINAW	Saginaw FD
22114	Skywest Airlines - Saginaw Airport	Freeland	MBS International Airport FD
17241	SAGINAW ASPHALT - PLANT 9-CROW ISLAND	SAGINAW	Buena Vista FD
15907	SAGINAW ASPHALT- MAIN GARAGE & OFFICE	SAGINAW	Carrollton Township FD
17238	SAGINAW ASPHALT-PLANT 2- CARROLLTON RD PLANT	SAGINAW	Carrollton Township FD
22463	Saginaw Central Oil	Saginaw	Saginaw FD
9810	SAGINAW CHARTER TOWNSHIP GOV'T	SAGINAW	Saginaw Township FD
11845	SAGINAW CHARTER TOWNSHIP RETENTION BASIN	SAGINAW	Saginaw Township FD
12632	SAGINAW CHARTER TOWNSHIP WWTP	SAGINAW	Saginaw Township FD
6885	SAGINAW CONTROL & ENG., INC.	SAGINAW	Saginaw Township FD
4853	SAGINAW COUNTY HW. BROWN AIRPORT	SAGINAW	Buena Vista FD
22464	NuCo2 Supply LLC - Saginaw Depot	Saginaw	Saginaw Township FD
22465	Century Link - Saginaw Lightcore Hut	Saginaw	Saginaw FD
8130	AT&T SAGINAW MAIN & 4A - M25540	SAGINAW	Saginaw FD
3944	Consumers Energy Saginaw SC	Saginaw	Saginaw Township FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
3907	Airgas Great Lakes - Saginaw Stoker Drive	SAGINAW	Saginaw FD
11846	SAGINAW TRANSIT AUTHORITY REGIONAL	SAGINAW	Saginaw FD
10374	SAGINAW WELDING SUPPLY	SAGINAW	Kochville Township FD
6001	AT&T Saginaw West Co - M25541	SAGINAW	Saginaw Township FD
12634	Saginaw City SALT-FRASER RETENTION BASIN	SAGINAW	Saginaw FD
17311	SAM'S CLUB #6663	SAGINAW	Saginaw FD
23565	Six Labs	Chesaning	Chesaning-Brady FD
3960	Speedway 2242	SAGINAW	Saginaw FD
3957	Speedway 2321	Saginaw	Buena Vista FD
3954	Speedway 7496	Saginaw	Saginaw Township FD
3951	Speedway 7719	Saginaw	Saginaw Township FD
13361	Speedway 8723	Bridgeport	Bridgeport FD
3908	AT&T ST CHARLES CDO - M25580	ST CHARLES	Tri-Township FD
7456	ST MARYS OF MICHIGAN	SAGINAW	Saginaw FD
13672	Porex Technologies - STC	ST CHARLES	Tri-Township FD
23055	Miller Energy Steven J. Vrable #2	Chesaning	Chesaning-Brady FD
17352	SUBURBAN PROPANE-CHESANING	CHESANING	Chesaning-Brady FD
20743	SWS-Trimac	Saginaw	Kochville Township FD
4817	TA Saginaw	Bridgeport	Bridgeport FD
22230	Target Store T0347	Saginaw	Kochville Township FD
21881	The Andersons - Hemlock	Hemlock	Richland Township FD
22225	The Andersons Inc. - Oakley Bean	Oakley	Chesaning-Brady FD
19732	The Home Depot Store #2714	Saginaw	Kochville Township FD
19379	The Home Depot Store #2779	Saginaw	Thomas Township FD
23056	Thomas Hedrich 1-20	Chesaning	Chesaning-Brady FD
6003	TRUGREEN	FREELAND	Tittabawassee Twp FD
20991	Tuscola Bay Wind Energy Center	Reese	Blumfield Township FD
8745	UMBRA GROUP, Linear Motion, LLC	SAGINAW	Saginaw FD
16681	Unique Instruments, Inc. DBA Orchid Orthopedic Solutions	BRIDGEPORT	Bridgeport FD
10376	UPS Saginaw	SAGINAW	Saginaw Township FD

MI SARA ID	Facility/Site Name	FacilityCity	Fire Department
19250	USF Holland LLC d/b/a Holland (227)	BIRCH RUN	Birch Run Township FD
14892	Verizon Business - - XOGLMI (MIXOGLMI)	SAGINAW	Carrollton Township FD
16705	VESCO OIL CORPORATION	SAGINAW	Zilwaukee City FD
4874	Saginaw WASTEWATER TREATMENT PLANT	SAGINAW	Saginaw FD
4878	Saginaw WATER TREATMENT PLANT, SAGINAW	SAGINAW	Saginaw FD
11847	Saginaw City WEBBER ST RETENTION BASIN	SAGINAW	Saginaw FD
10835	Saginaw City WEISS STREET RETENTION BASIN	SAGINAW	Saginaw FD
3885	Winfield United - Oakley	OAKLEY	Chesaning-Brady FD
10756	Waste Management-SAGINAW	SAGINAW	Saginaw FD
20516	Wright & Filippis, Inc.	Saginaw	Saginaw Township FD
10817	XPO Logistics Freight, Inc. - XSG	Saginaw	Buena Vista FD

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Appendix D – Adoption Documents



FEMA

June 1, 2023

Mr. Matt Schnepf
State Hazard Mitigation Officer
Michigan State Police
Emergency Management and Homeland Security Division
P.O. Box 30634
Lansing, MI 48909

Dear Mr. Schnepf:

Thank you for submitting adoption documentation for the 2023 Saginaw County Multi-Jurisdictional Hazard Mitigation Plan Update. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. The plan met the required criteria for a multi-jurisdictional hazard mitigation plan and is now approved for Saginaw County. Please submit adoption resolutions for any remaining jurisdictions who participated in the planning process.

The approval of this plan ensures continued availability of the full complement of Hazard Mitigation Assistance (HMA) Grants. All requests for funding, however, will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted.

We encourage the communities to follow the plan's schedule for monitoring and updating the plan and to continue their efforts to implement the mitigation measures. The expiration date of the 2023 Saginaw County Multi-Jurisdictional Hazard Mitigation Plan Update is May 25th, 2028. The plan must be reviewed, revised as appropriate, resubmitted, and approved no later than the plan expiration date.

Please pass on our congratulations to these communities for completing this significant action. If you or the communities have any questions, please contact Meghan Cuneo at (202) 615-5294 or meghan.cuneo@fema.dhs.gov.

Sincerely,

John Wethington
Chief (acting), Risk Analysis Branch
Mitigation Division

**U.S. Department of Homeland
Security**

FEMA Region 5
536 S. Clark St., Floor 6
Chicago, IL 60605-1509



FEMA

April 4, 2023

Mr. Matt Schnepf
State Hazard Mitigation Officer
Michigan State Police
Emergency Management and Homeland Security Division
P.O. Box 30634
Lansing, MI 48909

Dear Mr. Schnepf:

Thank you for submitting the 2023 Saginaw County Multi-Jurisdictional Hazard Mitigation Plan Update for our review. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. The plan met the required criteria for a multi-jurisdiction hazard mitigation plan. Formal approval of this plan is contingent upon the adoption by the participating jurisdictions of this plan. Once FEMA Region 5 receives documentation of adoption from the participating jurisdictions, we will send a letter of official approval to your office.

We look forward to receiving the adoption documentation and completing the approval process for the 2023 Saginaw County Multi-Jurisdictional Hazard Mitigation Plan Update.

If there are any questions from either you or the communities, please contact Meghan Cuneo, at (202) 615-5294 or email at Meghan.Cuneo@fema.dhs.gov.

Sincerely,

John Wethington
Chief (acting), Risk Analysis Branch
Mitigation Division

**SAGINAW COUNTY
RESOLUTION 2023 - 10
MULTIJURISDICTIONAL HAZARD MITIGATION PLAN
2023 - 2028**

At a regular meeting of the Board of Commissioners of the County of Saginaw, Michigan, held
on May 16, 2023.

**The following resolution was offered by Commissioner Webster and
seconded by Commissioner Krafft:**

WHEREAS the Saginaw County Board recognizes the threat that natural hazards pose to people and property within Saginaw County; and

WHEREAS Saginaw County has prepared a multi-hazard mitigation plan, hereby known as the Saginaw County Hazard Mitigation Plan – April 2023 - 2028 in accordance with federal laws, including the Robert T Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the Saginaw County Hazard Mitigation Plan – April 2023 - 2028 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Saginaw County from the impacts of future hazards and disasters; and

WHEREAS adoption by the Saginaw County Board demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Saginaw County Hazard Mitigation Plan – 2023 - 2028.

NOW, THEREFORE, BE IT RESOLVED by the County of Saginaw, Michigan, that:

In accordance with Board Rules, the Saginaw County Board adopts the Saginaw County Multijurisdictional Hazard Mitigation Plan – 2023 - 2028. While content related to Saginaw County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require Saginaw County to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan (2023-2028) will require separate adoption resolutions.

Yeas: Boyd, Coney, Harris, Krafft, Matthews, Piotrowski, Slodowski, Spitzer, Webster - 9

Nays: - 0

Absent: Little, Tany - 2

Total: - 11

RESOLUTION DECLARED ADOPTED.

STATE OF MICHIGAN)
) SS
COUNTY OF SAGINAW)

I, the undersigned, the duly qualified and acting County Clerk of the County of Saginaw, do hereby certify that the foregoing is a true and complete copy of a resolution adopted by a majority vote of the members-elect at a regular meeting of the Saginaw County Board of Commissioners, held on May 16, 2023, the original of which is on file in my office.

I further certify that notice of the meeting was given in accordance with the Open Meetings Act.



Vanessa Guerra, County Clerk
Saginaw County





**COUNTY OF SAGINAW
NOTICE OF PUBLIC HEARING
FOR ADOPTION OF HAZARD MITIGATION PLAN**

County of Saginaw will conduct a Public Hearing on Tuesday, May 2, 2023 at 4:00 p.m. at Saginaw County Governmental Center, 111 S. Michigan Ave., Room 200, Saginaw, MI 48602 during the Courts & Public Safety Committee meeting for the purpose of affording citizens an opportunity to submit comments on the Saginaw County Multijurisdictional Hazard Mitigation Plan.

The Hazard Mitigation Plan (HMP) identifies natural, technological, and human-caused hazards to which the County and its jurisdictions are vulnerable. The Plan's geographic scope includes all locations within the political boundaries of Saginaw County. In addition, other entities such as Covenant and Ascension St. Mary's Hospitals, Saginaw County 911, Saginaw County Road Commission, and other business or NGO stakeholders participated in the planning process.

Interested parties are invited to comment on the proposed Hazard Mitigation Plan at the public hearing or in writing through Tuesday, May 2, 2023 at 4:00 p.m. **at the Board of Commissioners Office, 111 S. Michigan Avenue, Saginaw MI 48602 or by email to BOC@saginawcounty.com or in person at the public hearing on Tuesday, May 2, 2023 at 4:00 p.m.**

County of Saginaw
Lt. Mark Przybylski, Emergency Management Coordinator
(989) 790-5434

AGENDA
COURTS & PUBLIC SAFETY COMMITTEE
111 S. Michigan Ave., Room 200, Saginaw MI 48602
Tuesday, May 2, 2023 – 4:00 p.m.

Members: Jack Tany - Chair, Sheldon Matthews – Vice-Chair, Rich Spitzer, Mark Piotrowski, Christopher Boyd

Others: Vanessa Guerra, Robert Belleman, Civil Counsel, Koren Thurston, Jennifer Broadfoot, Board Staff, *Media*

- I. Call to order
- II. Welcome/Roll-call
- III. Correction/Approval of Minutes (***Feb. 7, 2023 –Attached***) *Note: March & April meetings cancelled*
- IV. Public comment
 - *Speakers limited to 3 minutes*
- V. Agenda

PUBLIC HEARING
SAGINAW COUNTY MULTIJURISDICTIONAL HAZARD MITIGATION PLAN

1. **Lt. Mark Przybylski, Emergency Management Coordinator, re:**

- **5-16-1** Submitting the Saginaw County Multijurisdictional Hazard Mitigation Plan for adoption, along with a request for a Public Hearing and approval of a Resolution

2. **Mary McLaughlin, Community Corrections Manager, re:**

- **5-16-2** Requesting approval of the FY 2024 Saginaw County Community Corrections Grant in the amount of \$761,886

- VI. Miscellaneous
- VII. Adjournment



COUNTY OF SAGINAW
Office of Emergency Management

111 SOUTH MICHIGAN AVENUE
SAGINAW, MICHIGAN 48602
PHONE (989) 790-5434 FAX (989) 792-6862

**COURTS &
PUBLIC SAFETY**



5-16-1

April 12, 2023

Christopher Boyd, Chairman
Saginaw County Board of Commissioners
111 S Michigan Ave
Saginaw, MI 48602

RECEIVED
SAGINAW COUNTY
BOARD OF COMMISSIONERS
2023 APR 12 PM 3:43

Dear Chairman Boyd,

FEMA has tentatively approved the update for the Saginaw County Hazard Mitigation Plan. However, to be fully approved by FEMA, the Saginaw County Board of Commissioners must adopt the plan. Historically, the Board has held a public meeting to provide an opportunity for public comments.

I am requesting to be placed on the May 2, 2023, Courts & Public Safety Committee agenda to provide information to Commissioners and hold the Public Hearing. The FEMA-approved plan is available on the Saginaw County Office of Emergency Management webpage for review by interested parties. The web address is www.saginawcounty.com/emhsd.

I have included sample resolution language for the adoption and a PDF copy of the plan with this letter for use as needed.

I look forward to discussing the updated plan with the CPS Committee members.

Respectfully submitted,

Lt. Mark Przybylski
Emergency Management Coordinator

Saginaw County Hazard Mitigation Plan

[HOME](#) / [COURTS & PUBLIC SAFETY](#) / [OFFICE OF EMERGENCY MANAGEMENT](#) / HAZARD MITIGATION PLAN

The Saginaw County Multijurisdictional Hazard Mitigation Plan has been updated and is currently being prepared for the adoption process.

The updated version can be found [here](#). The plan will be placed before the Saginaw County Board for adoption in May of 2023. Should you have any questions or comments on the plan, please contact the Saginaw County OEM at emgmgr@saginawcounty.com

FAQ

What is the Saginaw County Hazard Mitigation Plan?

A Hazard Mitigation Plan identifies and ranks hazards that a jurisdiction may be vulnerable to and is required by FEMA for jurisdictions to be eligible for certain Federal Grants. In addition to hazard identification, the plan may provide mitigation strategies for high-risk hazards. Risk = probability x impact.

While each jurisdiction can create its plan, historically, Saginaw County Emergency Management has created a multijurisdictional plan that covers every Saginaw County jurisdiction that wishes to participate. FEMA requires this plan to be updated every five years.

What is Hazard Mitigation?

Hazard mitigation is the work done before a disaster occurs to lessen the severity of future disasters and make the community more resilient.

Successful hazard mitigation projects protect lives and property and save the community money in the long run. [FEMA estimated](#) that for every dollar spent on hazard mitigation, up to six dollars are saved when disaster strikes.

What Hazards Are Covered in This Plan?

While FEMA only requires the plan to cover natural hazards, Saginaw County Emergency Management, with input from the [Saginaw County Emergency Preparedness Council](#), has historically included natural, technological, and human-caused hazards in the plan.

Related Information

[Office of Emergency Management](#)

More in this Section

[Hazard Mitigation Plan](#)

[Education & Training Opportunities](#)

[Emergency Preparedness](#)

[LEPC / EPCRA / SARA III](#)

[Saginaw County Emergency Preparedness Council](#)

[Resource Request Form](#)

Site Reference

- [Departments](#)
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- [Services & Information](#)
- [Community Resources](#)

Additional Information

- [County Calendar](#)
- [County Holidays](#)
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- [Employee Portal](#)



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Contact Us

111 S. Michigan Ave
Saginaw, MI 48602

[Additional County Office Locations](#)

Hours

Courthouse: 8am-5pm
Clerk: 8am-4:30pm
Traffic: 8am-4:30pm

Annex A - Jurisdiction Specific HVA, Flood Zone, and Mitigation Strategies

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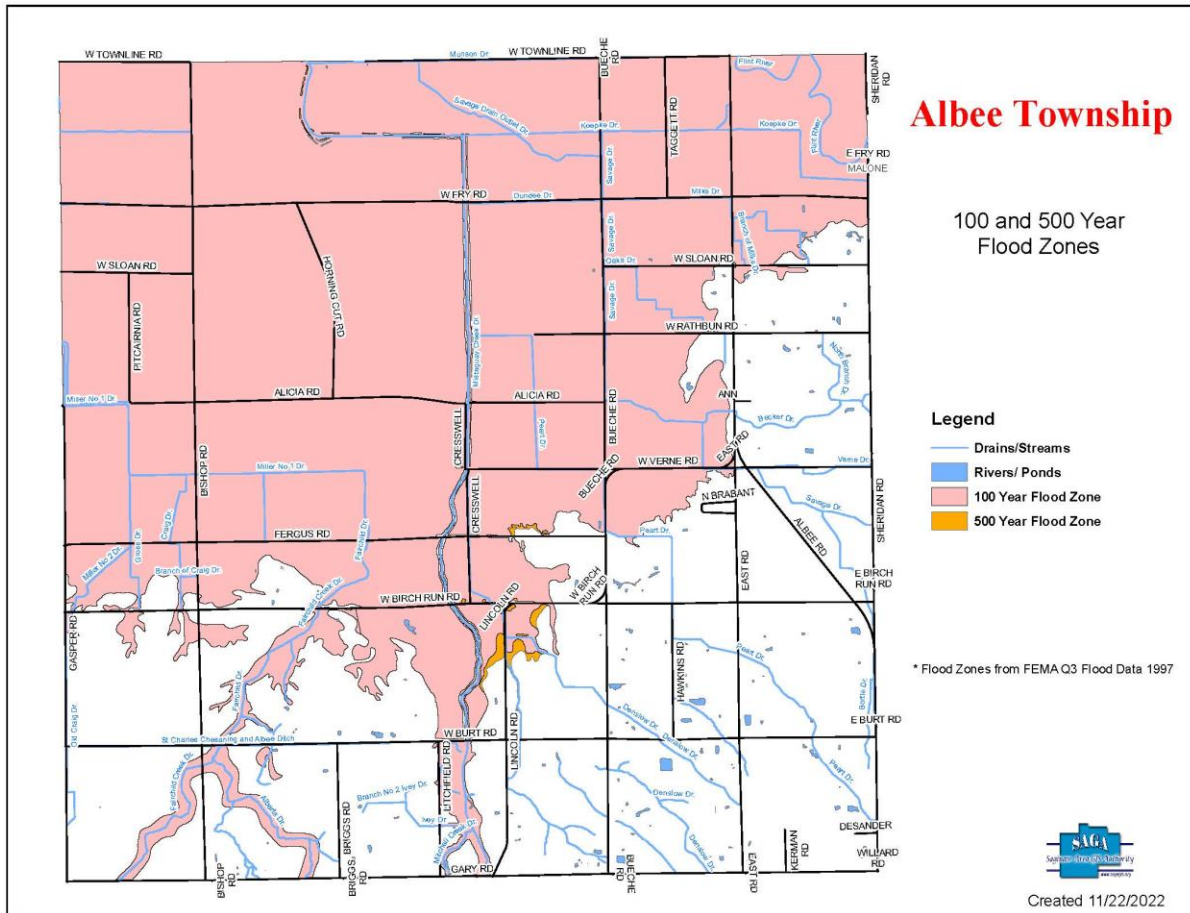
Annex A.30 Zilwaukee City _____ **65**

ANNEX A.1 ALBEE TOWNSHIP

Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - ALBEE TOWNSHIP						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
		INCIDENT SIZE	HUMAN	PROPERTY DAMAGE	COMMUNITY IMPACT	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	4	17%
Flooding - Areal	1	2	0	3	4	19%
Flooding - Riverene	1	2	0	3	4	19%
Wildfire	1	1	0	2	4	15%
Drought	1	4	0	0	0	8%
Severe Winter Weather	1	4	1	2	3	21%
Severe Thunderstorms/Wind Event	2	3	1	2	1	29%
HazMat Incident - Fixed Site	1	1	1	2	3	15%
HazMat Incident - Transportation	1	1	3	2	3	19%
Public Health Emergency	1	4	3	0	2	19%
Power Outage - Long Term	1	3	1	1	3	17%
Subsidence (e.g., Sink Hole)	1	1	3	2	0	13%
Earthquakes	0	1	1	1	0	0%
Mass Violence	1	1	3	1	1	13%
Civil Unrest	1	1	1	3	3	17%
Major Structure Fire	1	1	1	2	0	8%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	1	3	3	2	19%
Infrastructure Failure	1	4	3	1	3	23%
Extreme Temperatures	1	4	2	1	3	21%
Nuclear Attack	0	4	4	4	4	0%
Nuclear Power Plant Accident	0	1	0	1	2	0%
Utility Failure - Water/Sewer	1	2	1	1	3	15%
Average Score	0.91	2.09	1.48	1.74	2.30	14%

Albee Township Flood Zones



Albee Twp Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Installation of a backup generator to power the Township Hall & Fire station (They are next to each other). The hall could be used as a shelter.	Local Jurisdiction	State or Federal Grants	Medium

ANNEX A.2 BIRCH RUN TOWNSHIP

Birch Run Township Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Birch Run Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	3	1	3	4	23%
Flooding - Areal or Riverine	1	1	0	1	1	6%
Wildfire	1	0	0	0	1	2%
Drought	1	4	0	0	0	8%
Severe Winter Weather	1	4	1	2	3	21%
Severe Thunderstorms/Wind Event	2	3	1	2	1	29%
HazMat Incident - Fixed Site	1	1	1	2	3	15%
HazMat Incident - Transportation	1	1	3	2	3	19%
Public Health Emergency	1	4	3	0	2	19%
Power Outage - Long Term	1	3	1	1	3	17%
Subsidence (e.g., Sink Hole)	1	1	3	2	0	13%
Earthquakes	0	1	1	1	0	0%
Mass Violence	1	1	3	1	1	13%
Civil Unrest	1	1	1	3	3	17%
Major Structure Fire	1	1	1	2	0	8%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	1	3	3	2	19%
Infrastructure Failure	1	4	3	1	3	23%
Extreme Temperatures	1	4	2	1	3	21%
Nuclear Attack	0	4	4	4	4	0%
Nuclear Power Plant Accident	0	1	0	1	2	0%
Utility Failure - Water/Sewer	1	2	1	1	3	15%
Average Score	0.91	2.09	1.55	1.55	1.95	14%

Birch Run Township Flood Zones

There are no identified 100 or 500-year flood zones in Birch Run Township

Birch Run Township Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Severe Thunderstorm/Tornado	Install a new warning siren that would be located more in the center of our township	Local Jurisdiction	State or Federal Grants	High
Flooding	Improve drainage around Generator and sewer lift station	Local Jurisdiction	Local Government	Medium

ANNEX A.3 BIRCH RUN VILLAGE

Birch Run Village Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Birch Run Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	2	2	3	4	23%
Flooding - Areal or Riverine	0	1	0	2	1	0%
Wildfire	0	1	0	1	1	0%
Drought	1	1	0	4	0	10%
Severe Winter Weather	4	3	1	2	3	75%
Event	4	3	1	2	1	58%
HazMat Incident - Fixed Site	1	2	3	2	3	21%
HazMat Incident - Transportation	2	3	4	3	3	54%
Public Health Emergency	2	2	3	0	2	29%
Power Outage - Long Term	1	3	1	1	3	17%
Subsidence (e.g., Sink Hole)	0	1	1	1	0	0%
Earthquakes	0	1	1	1	0	0%
Mass Violence	1	1	4	0	1	13%
Civil Unrest	1	1	3	3	3	21%
Major Structure Fire	1	1	3	4	0	17%
Transportation Incidents (MCI)	1	1	4	2	1	17%
Oil or gas Pipeline Accident	2	2	4	2	2	42%
Infrastructure Failure	1	2	0	0	3	10%
Extreme Temperatures	2	4	3	2	3	50%
Nuclear Attack	1	1	4	4	4	27%
Nuclear Power Plant Accident	0	1	4	4	2	0%
Utility Failure - Water/Sewer	1	4	0	1	3	17%
Interruption of Gov. Services	1	1	0	0	3	8%
Average Score	1.22	1.83	2.00	1.91	2.00	20%

Birch Run Village Flood Zones

There are no 100 or 500-year flood zones identified in Birch Run Village.

Birch Run Village Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.4 BLUMFIELD TOWNSHIP

Blumfield Township Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Blumfield Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	1	3	2	2	33%
Flooding - Areal or Riverine	2	1	2	1	1	21%
Wildfire	0	1	0	1	0	0%
Drought	1	1	0	2	2	10%
Severe Winter Weather	2	3	2	2	3	42%
Severe Thunderstorms/Wind Event	3	2	3	2	3	63%
HazMat Incident - Fixed Site	1	1	3	2	1	15%
HazMat Incident - Transportation	2	1	3	1	1	25%
Public Health Emergency	1	1	1	0	3	10%
Power Outage - Long Term	2	3	1	1	3	33%
Subsidence (e.g., Sink Hole)	0	1	1	1	0	0%
Earthquakes	0	1	1	1	2	0%
Mass Violence	1	1	3	0	1	10%
Civil Unrest	1	1	1	1	3	13%
Major Structure Fire	2	1	1	2	0	17%
Transportation Incidents (MCI)	2	1	3	2	1	29%
Oil or gas Pipeline Accident	1	2	3	1	2	17%
Infrastructure Failure	2	2	1	1	3	29%
Extreme Temperatures	2	4	1	0	3	33%
Nuclear Attack	1	1	3	3	4	23%
Nuclear Power Plant Accident	0	1	0	0	2	0%
Utility Failure - Water/Sewer	1	4	1	1	3	19%
Interruption of Gov. Services	1	1	1	1	3	13%
Average Score	1.30	1.57	1.65	1.22	2.00	17%

Blumfield Township Flood Zones

There are no 100 or 500-year flood zones identified in Blumfield Township

Blumfield Township Mitigation Strategies

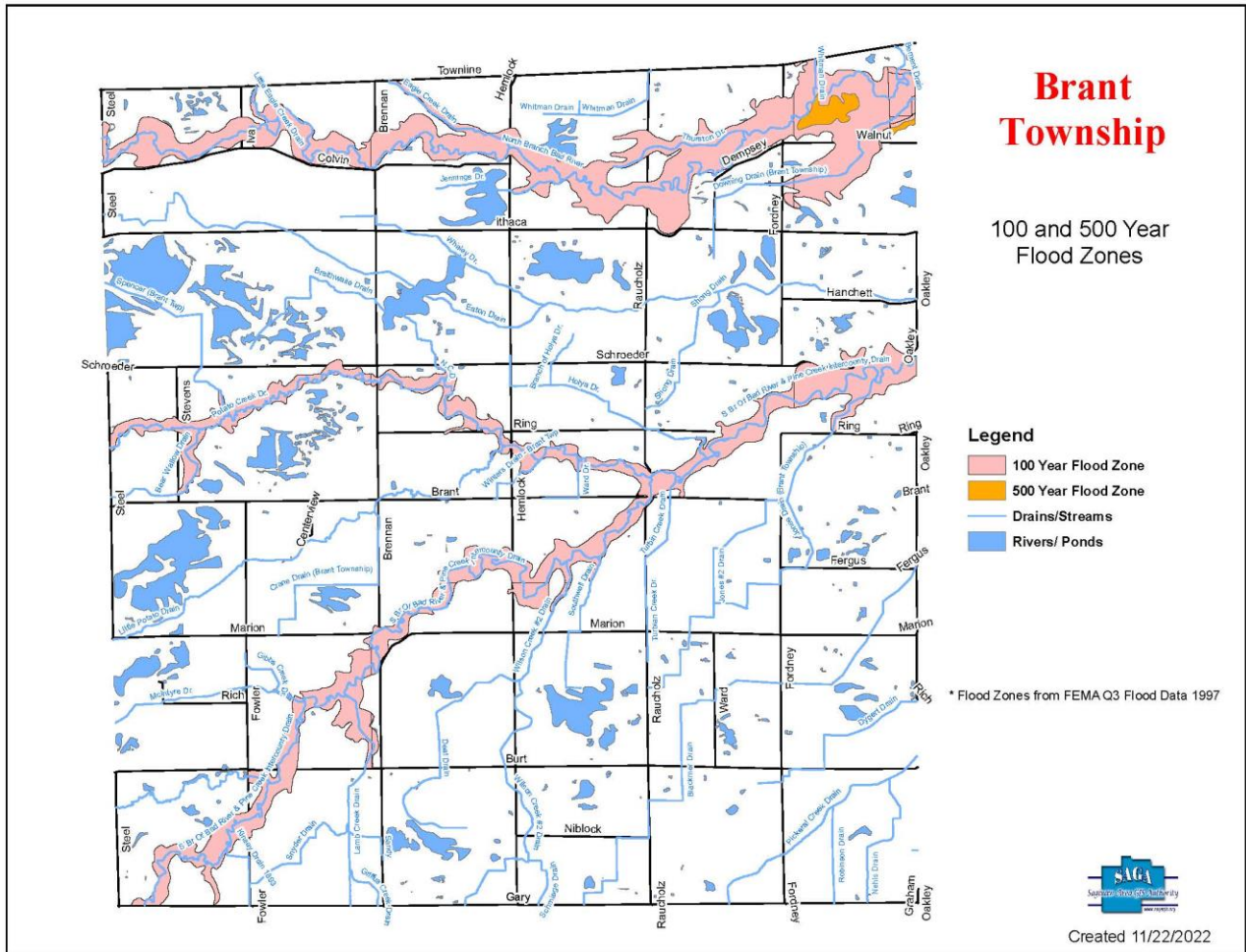
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Ill Hazards	Establish sheltering locations at the Township Hall and encourage people to shelter at the fire station or township hall to make use of.	Local Jurisdiction	Local	High
Infrastructure Failure, Interruption of Government Services	Develop plans to coordinate efforts with the local, county, and state agencies to ensure vital services are provided.	Township, County, State	Operating Budget	Medium
Extreme Temperatures	Encourage the establishment of heating and cooling shelters for vulnerable populations.	Local Jurisdiction	Operating Budget	Medium

ANNEX A.5 BRANT TOWNSHIP

Brant Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Brant Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	3	15%
Flooding - Areal or Riverine	2	1	1	2	1	21%
Wildfire	1	1	1	2	0	8%
Drought	2	1	1	1	2	21%
Severe Winter Weather	2	4	2	2	3	46%
Event	2	1	1	2	3	29%
HazMat Incident - Fixed Site	1	1	3	2	1	15%
HazMat Incident - Transportation	1	1	1	3	1	13%
Public Health Emergency	1	1	1	0	3	10%
Power Outage - Long Term	1	2	2	2	3	19%
Subsidence (e.g., Sink Hole)	1	1	0	0	0	2%
Earthquakes	1	3	2	2	2	19%
Mass Violence	1	1	3	1	1	13%
Civil Unrest	1	1	1	1	3	13%
Major Structure Fire	2	1	1	1	0	13%
Transportation Incidents (MCI)	1	1	4	2	1	17%
Oil or gas Pipeline Accident	1	1	1	1	2	10%
Infrastructure Failure	1	1	2	2	3	17%
Extreme Temperatures	1	2	2	0	3	15%
Nuclear Attack	0	4	4	4	4	0%
Nuclear Power Plant Accident	0	4	4	2	2	0%
Utility Failure - Water/Sewer	0	1	0	0	3	0%
Interruption of Gov. Services	1	1	0	0	3	8%
Average Score	1.09	1.57	1.65	1.48	2.04	15%

Brant Township Flood Zones



Brant Township Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.6 BRADY TOWNSHIP

Brady Township HVA

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Brady Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
		INCIDENT SIZE	HUMAN IMPACT	PROPERTY DAMAGE IMPACT	COMMUNITY IMPACT	
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	1	1	2	1	21%
Flooding - Areal or Riverine	1	1	1	1	0	6%
Wildfire	0	0	0	0	0	0%
Drought	1	1	1	1	1	8%
Severe Winter Weather	3	2	1	1	1	31%
Event	2	1	1	1	1	17%
HazMat Incident - Fixed Site	1	1	1	1	1	8%
HazMat Incident - Transportation	2	1	1	1	1	17%
Public Health Emergency	0	0	0	0	0	0%
Power Outage - Long Term	1	1	1	1	2	10%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	0	0	0	0	0	0%
Mass Violence	0	0	0	0	0	0%
Civil Unrest	0	0	0	0	0	0%
Major Structure Fire	0	0	0	0	0	0%
Transportation Incidents (MCI)	0	0	0	0	0	0%
Oil or gas Pipeline Accident	0	0	0	0	0	0%
Infrastructure Failure	0	0	0	0	0	0%
Extreme Temperatures	0	0	0	0	0	0%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	0	0	0	0	0	0%
Interruption of Gov. Services	0	0	0	0	0	0%
Average Score	0.57	0.39	0.35	0.39	0.35	2%

Brady Township Flood Zones

There are no 100 or 500-year flood zones identified in Blumfield Township

Brady Township Mitigation Strategies

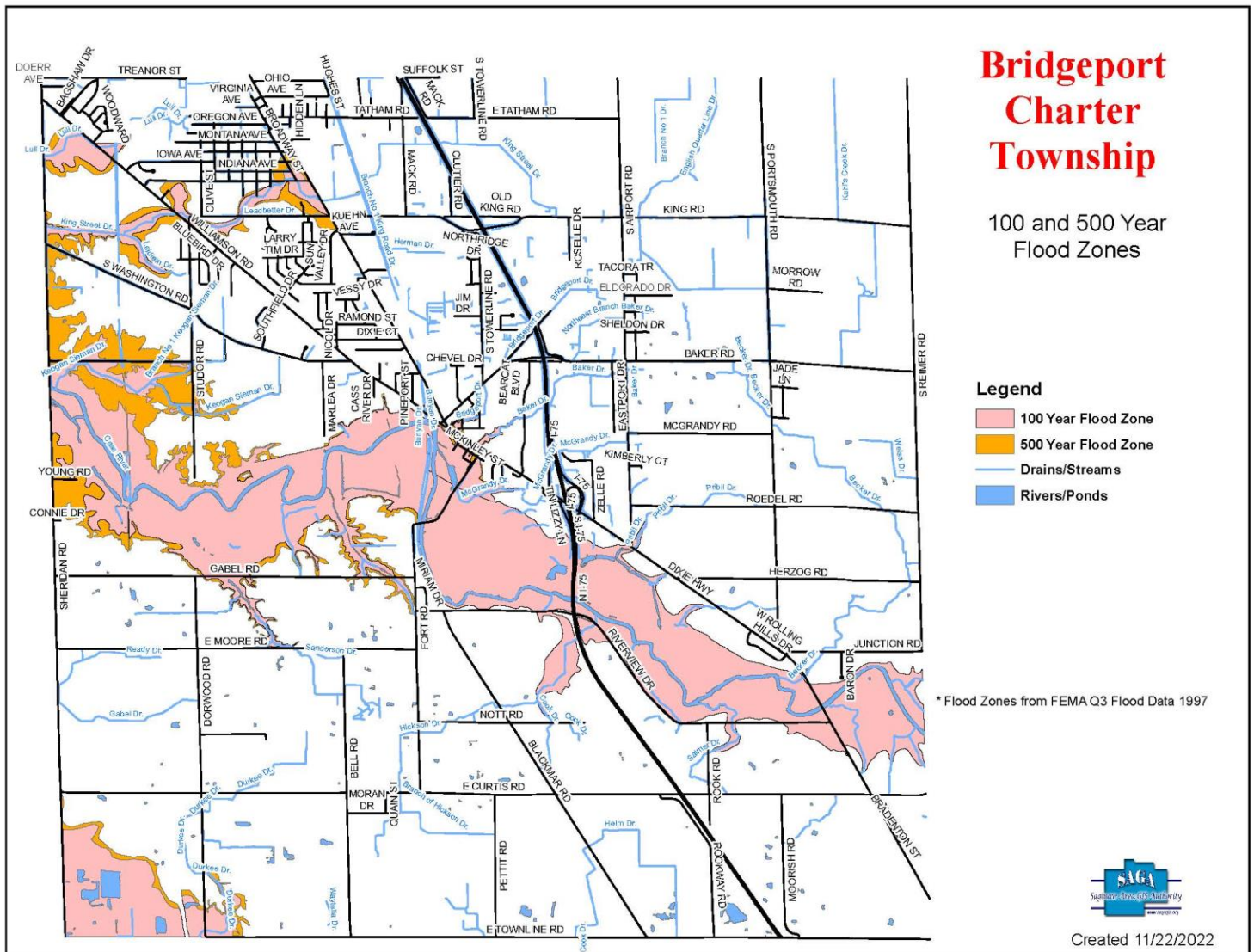
Hazard Covered	Mitigation Action	Responsible Agency	Financial & Technical Resources
All Hazards	Installation of generator at the township hall to ensure continuity of operations.	Local Jurisdictions	State and Federal Grant
All Hazards	Establish the townhsip hall as a possible shelter site.	Local Jurisdictions	Operating Budget

ANNEX A.7 BRIDGEPORT TOWNSHIP

Bridgeport Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Bridgeport Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	1	3	3	2	38%
Flooding - Areal or Riverine	2	1	1	2	1	21%
Wildfire	1	1	3	2	1	15%
Drought	2	4	1	1	3	38%
Severe Winter Weather	3	4	1	2	1	50%
Event	3	4	3	3	1	69%
HazMat Incident - Fixed Site	1	2	3	2	1	17%
HazMat Incident - Transportation	3	2	4	2	1	56%
Public Health Emergency	2	3	2	0	4	38%
Power Outage - Long Term	4	4	1	0	1	50%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	1	4	1	1	1	15%
Mass Violence	2	1	3	1	1	25%
Civil Unrest	1	2	4	3	1	21%
Major Structure Fire	3	1	3	2	0	38%
Transportation Incidents (MCI)	3	1	4	2	1	50%
Oil or gas Pipeline Accident	1	2	4	2	1	19%
Infrastructure Failure	3	1	1	1	3	38%
Extreme Temperatures	2	4	2	0	0	25%
Nuclear Attack	2	4	4	3	4	63%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	2	4	1	1	1	29%
Interruption of Gov. Services	2	4	2	2	3	46%
Average Score	1.96	1.00	2.22	1.52	1.39	25%

Bridgeport Township Flood Zones



Bridgeport Township Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Flooding	Identify structures in the floodplain	Local Jurisdiction	Local Unit of Government, State of Federal Grants	High
All Hazards	Ensure Key agencies have emergency generators	Local Jurisdiction	Local Unit of Government,	High

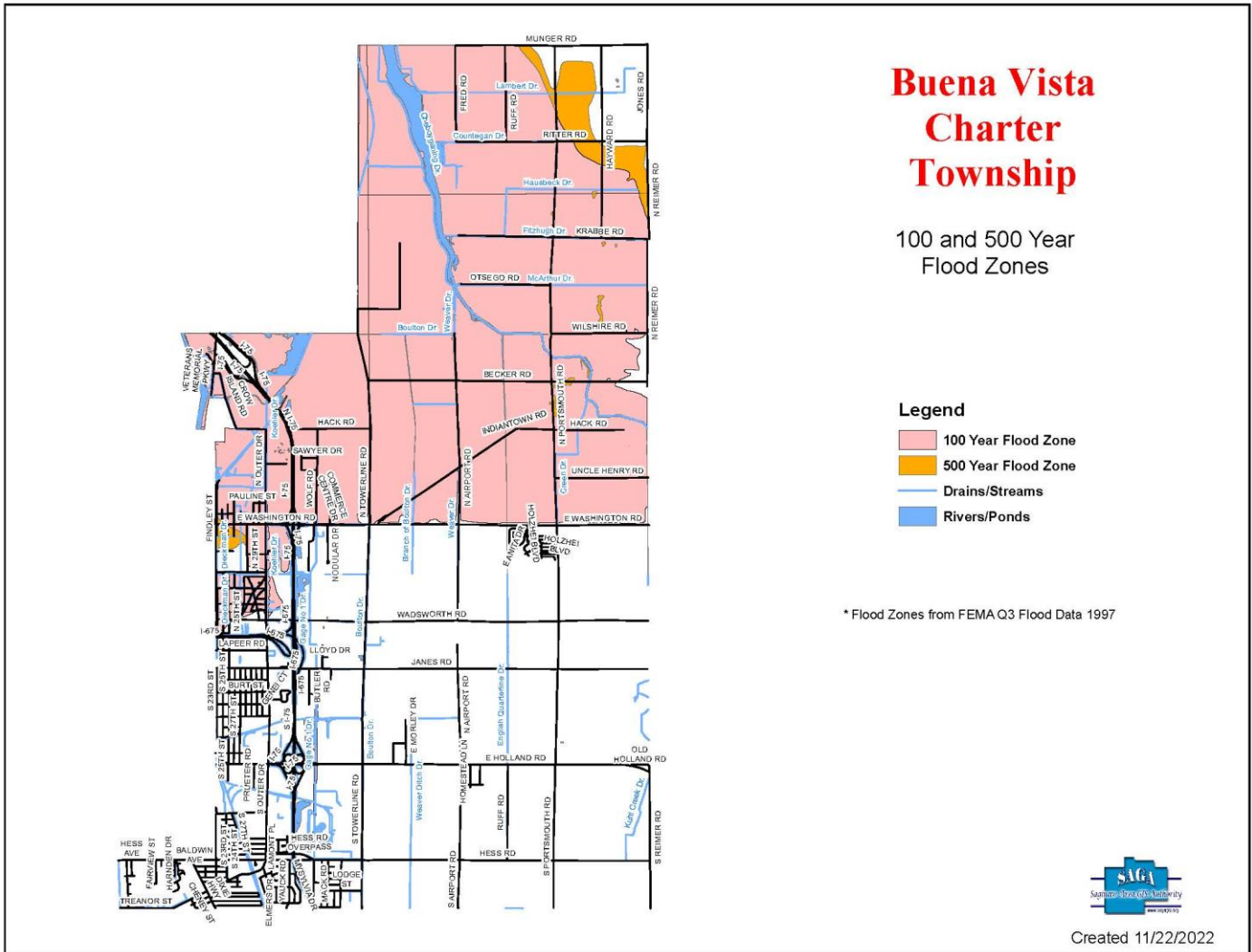
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
			State of Federal Grants	
Tornado	Add a warning siren to increase coverage in the most populated areas of the community.	Local Jurisdiction, Emergency Management	Local Unit of Government, State of Federal Grants	High
Flooding	Inspect and repair, as needed, existing dike and other flood control apparatus.	Federal Government, Local Government, Emergency Management	State or Federal Grants	High
All Hazards	Increase use of social media platforms, apps, and other electronic media for conveying emergency information and instructions.	Local Government, Emergency Management	Local Unit of Government, State of Federal Grants	High
All Hazards	Increase public knowledge of risk levels, where to find notifications, their role in preparations, evacuation plans, shelter-in-place plans, and general safety.	Local Jurisdiction	Local Unit of Government, State of Federal Grants	Medium
Public Health Emergencies	Develop long-term policies and protocols for pandemics.	Local Jurisdiction	Local Unit of Government	Medium
Droughts, Wildfires, Severe Weather, Transportation Incidents	Acquire a quick response vehicle with offroad capability that can access areas not accessible by typical fire apparatus.	Local Jurisdiction	Local Unit of Government, State of Federal Grants	Medium
Hazmat Incident - Transportation, Civil Unrest, Mass Violence	Replace aging Infrared Spectrometer (HazMatID) to assist in identifying unknown potentially dangerous substances.	Local Jurisdiction, County Hazmat Team, Emergency Management	State or Federal Grants	Medium
Transportation Accidents	Modify retired response vehicle to be a dedicated blocking vehicle for interstate highway operations.	Local Jurisdiction	Local Unit of Government	Medium
Nuclear Attack	Update Geiger counter/radiation detection.	Local Jurisdiction, Emergency Management	Local Unit of Government, State of Federal Grants	High

ANNEX A.8 BUENA VISTA TOWNSHIP

Buena Vista Township Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Buena Vista Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	2	2	2	3	38%
Flooding - Areal or Riverine	3	1	1	1	2	31%
Wildfire	2	1	1	1	0	13%
Drought	3	1	1	1	0	19%
Severe Winter Weather	4	4	2	2	2	83%
Event	4	4	2	2	2	83%
HazMat Incident - Fixed Site	2	1	3	1	1	25%
HazMat Incident - Transportation	3	1	3	1	1	38%
Public Health Emergency	1	4	2	0	3	19%
Power Outage - Long Term	1	2	1	1	2	13%
Subsidence (e.g., Sink Hole)	1	1	1	1	0	6%
Earthquakes	0	1	0	0	1	0%
Mass Violence	2	1	3	0	1	21%
Civil Unrest	1	1	3	2	2	17%
Major Structure Fire	3	1	3	2	1	44%
Transportation Incidents (MCI)	2	1	3	2	1	29%
Oil or gas Pipeline Accident	1	2	3	2	1	17%
Infrastructure Failure	1	3	1	2	2	17%
Extreme Temperatures	1	2	2	0	1	10%
Nuclear Attack	1	4	4	3	4	31%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	2	1	2	2	15%
Interruption of Gov. Services	1	4	0	0	4	17%
Average Score	1.74	1.00	1.83	1.22	1.57	20%

Buena Vista Township Flood Zone Map



Buena Vista Township Mitigation Strategies

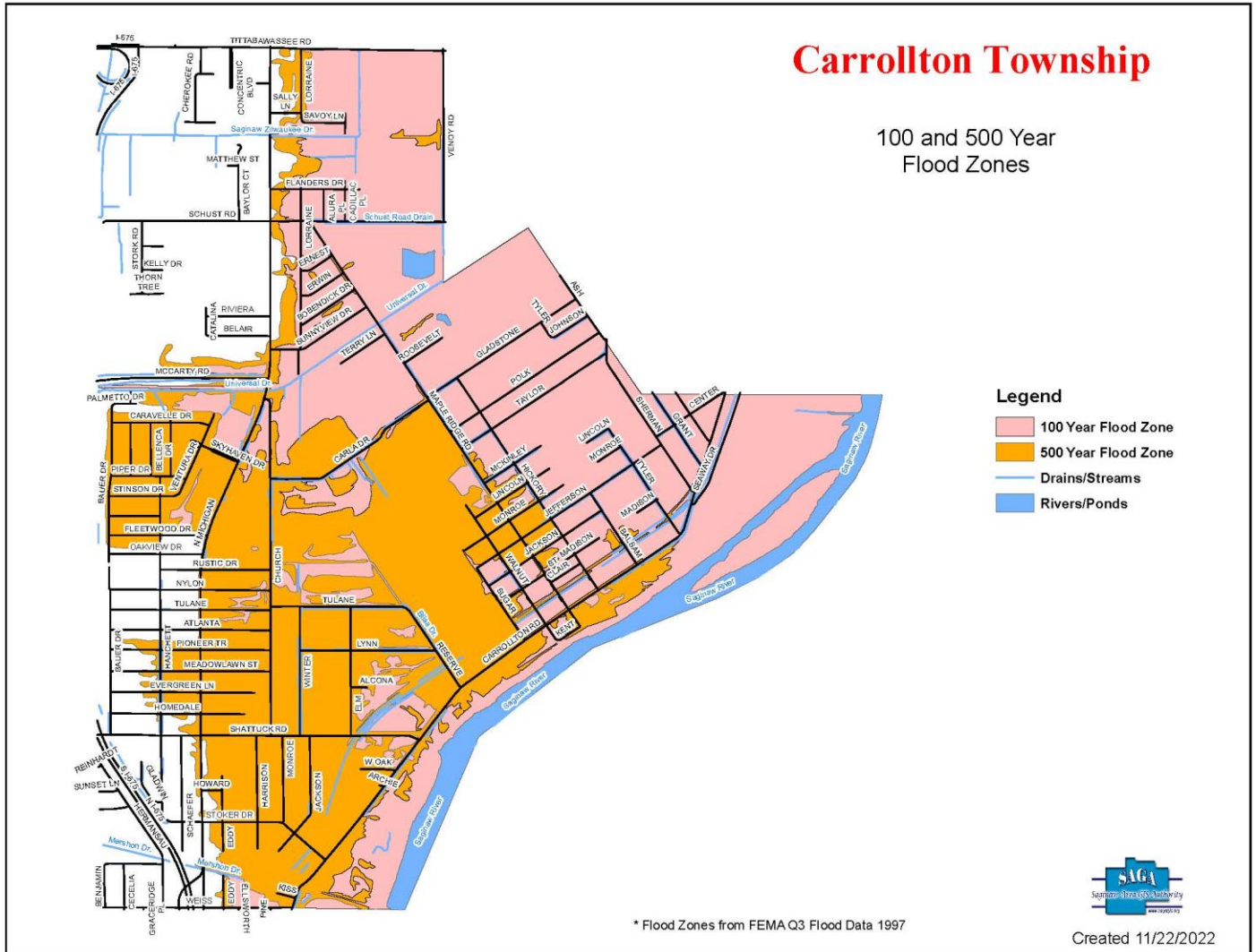
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.9 CARROLLTON TOWNSHIP

Carrollton Township Hazard Vulnerability Assessment

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Carrollton Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	2	3	2	4	46%
Flooding - Areal or Riverine	2	1	1	1	1	17%
Wildfire	0	1	0	0	0	0%
Drought	1	1	0	1	0	4%
Severe Winter Weather	3	3	1	1	2	44%
Event	4	3	1	2	2	67%
HazMat Incident - Fixed Site	1	1	1	1	0	6%
HazMat Incident - Transportation	1	1	1	1	0	6%
Public Health Emergency	2	1	1	0	0	8%
Power Outage - Long Term	2	2	1	0	2	21%
Subsidence (e.g., Sink Hole)	0	1	0	0	0	0%
Earthquakes	0	1	0	0	0	0%
Mass Violence	1	1	1	1	1	8%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	1	1	1	1	0	6%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	1	1	1	1	8%
Infrastructure Failure	1	2	2	0	2	13%
Extreme Temperatures	1	1	1	0	0	4%
Nuclear Attack	0	1	0	0	0	0%
Nuclear Power Plant Accident	0	1	0	0	0	0%
Utility Failure - Water/Sewer	1	2	1	1	4	17%
Interruption of Gov. Services	2	4	2	2	3	46%
Average Score	1.22	1.00	0.91	0.74	1.04	9%

Carrollton Township Flood Zone Map



Carrollton Township Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Installation of a generator at the Carrollton Township Municipal Building.	Local Jurisdiction	Operating Budget, State and Federal Grants	High

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Upgrade the pump at 1 of 6 sewer pumping stations and installation of a generator at the site.	Local and the Northwest Utility Authority.	Local.	High
Public Health	Identify and replace water service lines made from materials other than copper (lead).	Local Jurisdiction	Operating Budget, State or Federal Grants	High

ANNEX A.10 CHAPIN TOWNSHIP

Chapin Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Chapin Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	1	10%
Flooding - Areal or Riverine	1	1	0	1	1	6%
Wildfire	3	1	0	1	0	13%
Drought	1	1	1	0	0	4%
Severe Winter Weather	4	4	1	1	1	58%
Severe Thunderstorms/Wind Event	3	4	1	1	0	38%
HazMat Incident - Fixed Site	0	1	0	0	0	0%
HazMat Incident - Transportation	1	1	0	0	1	4%
Public Health Emergency	2	2	0	0	1	13%
Power Outage - Long Term	1	2	0	0	2	8%
Subsidence (e.g., Sink Hole)	0	0	0	0	1	0%
Earthquakes	0	0	0	0	1	0%
Mass Violence	1	2	3	0	1	13%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	1	1	3	2	0	13%
Transportation Incidents (MCI)	1	1	2	0	1	8%
Oil or gas Pipeline Accident	1	1	1	1	0	6%
Infrastructure Failure	1	2	1	1	2	13%
Extreme Temperatures	3	4	0	0	0	25%
Nuclear Attack	0	0	0	0	4	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	0	0	0	0	0	0%
Interruption of Gov. Services	1	1	0	0	1	4%
Average Score	1.17	1.00	0.65	0.48	0.83	7%

Chapin Township Flood Zone Map

There are no 100 or 500-year flood zones identified in Blumfield Township

Chapin Township Mitigation Strategies

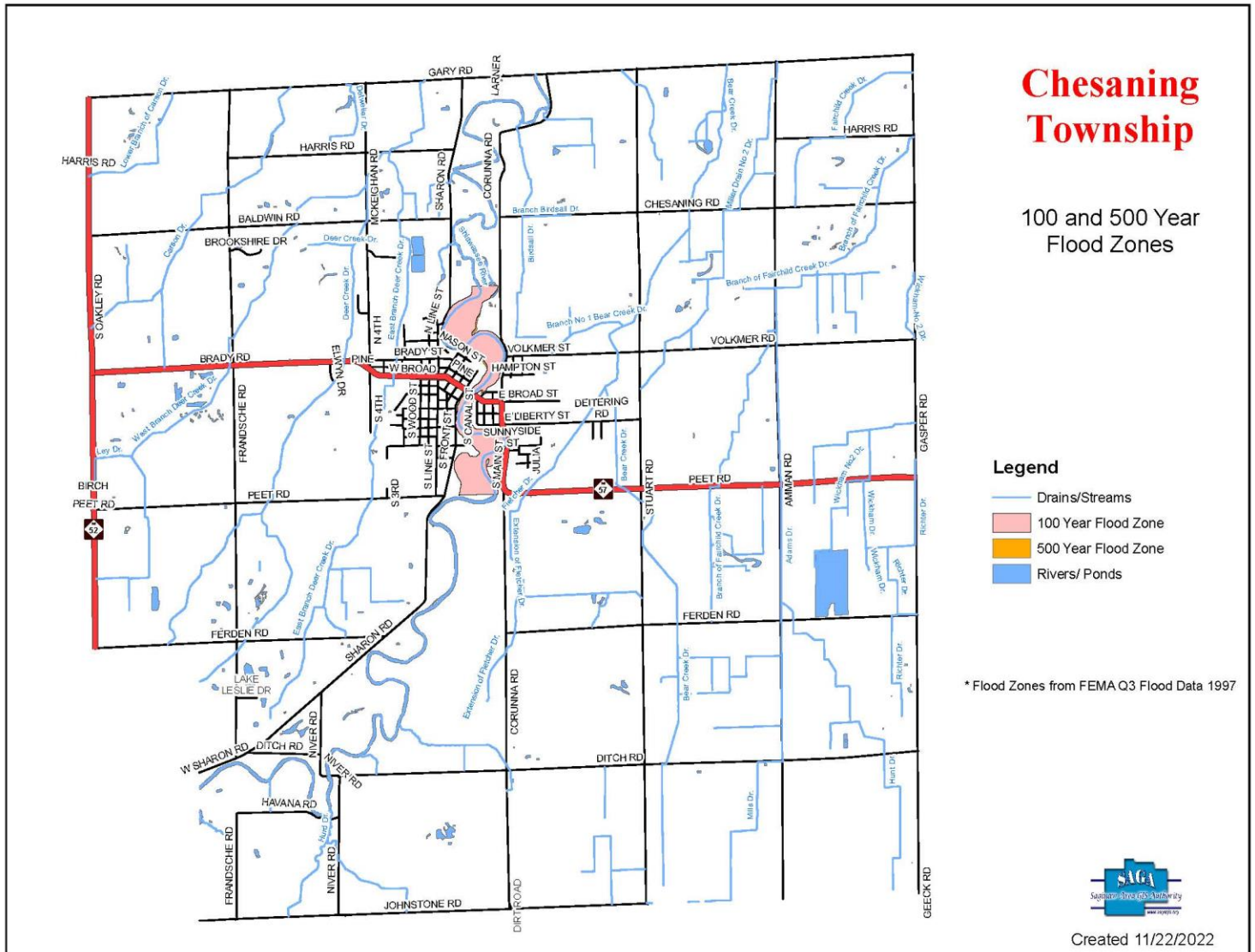
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.11 CHESANING TOWNSHIP

Chesaning Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Chesaning Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	3	15%
Flooding - Areal or Riverine	4	2	2	2	1	58%
Wildfire	1	1	0	1	0	4%
Drought	1	4	0	1	2	15%
Severe Winter Weather	2	4	0	2	3	38%
Event	3	3	0	2	3	50%
HazMat Incident - Fixed Site	1	1	0	0	1	4%
HazMat Incident - Transportation	1	1	0	0	1	4%
Public Health Emergency	2	4	1	0	3	33%
Power Outage - Long Term	2	3	0	0	3	25%
Subsidence (e.g., Sink Hole)	1	1	0	0	0	2%
Earthquakes	1	1	0	0	2	6%
Mass Violence	1	1	1	1	1	8%
Civil Unrest	1	2	1	1	3	15%
Major Structure Fire	1	1	1	1	0	6%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	1	0	0	2	6%
Infrastructure Failure	1	1	0	0	3	8%
Extreme Temperatures	1	4	0	0	3	15%
Nuclear Attack	1	4	4	4	4	33%
Nuclear Power Plant Accident	0	1	0	0	2	0%
Utility Failure - Water/Sewer	0	1	0	0	3	0%
Interruption of Gov. Services	1	1	0	0	3	8%
Average Score	1.26	1.91	0.52	0.78	2.04	14%

Chesaning Township Flood Zone Map



Chesaning Township Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.12 FRANKENMUTH CITY

City of Frankenmuth Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - City of Frankenmuth						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	2	3	3	3	46%
Flooding - Areal or Riverine	3	3	2	2	1	50%
Wildfire	1	1	1	1	0	6%
Drought	2	1	1	1	2	21%
Severe Winter Weather	3	3	2	2	3	63%
Event	3	3	2	2	3	63%
HazMat Incident - Fixed Site	2	2	4	2	1	38%
HazMat Incident - Transportation	2	2	4	1	1	33%
Public Health Emergency	1	1	2	2	3	17%
Power Outage - Long Term	2	1	2	1	3	29%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	0	0	0	0	2	0%
Mass Violence	2	2	4	4	1	46%
Civil Unrest	2	2	4	4	3	54%
Major Structure Fire	2	2	3	3	0	33%
Transportation Incidents (MCI)	2	2	2	2	1	29%
Oil or gas Pipeline Accident	1	1	1	1	2	10%
Infrastructure Failure	1	2	2	2	3	19%
Extreme Temperatures	2	2	2	2	3	38%
Nuclear Attack	0	0	0	0	4	0%
Nuclear Power Plant Accident	0	0	0	0	2	0%
Utility Failure - Water/Sewer	1	3	2	1	3	19%
Interruption of Gov. Services	0	0	0	0	3	0%
Average Score	1.48	1.52	1.87	1.57	2.04	22%

Frankenmuth City Flood Zone map

The Flood Map for the City of Frankenmuth is included within the Frankenmuth Twp Flood Map.

Frankenmuth City Specific Mitigation Strategies

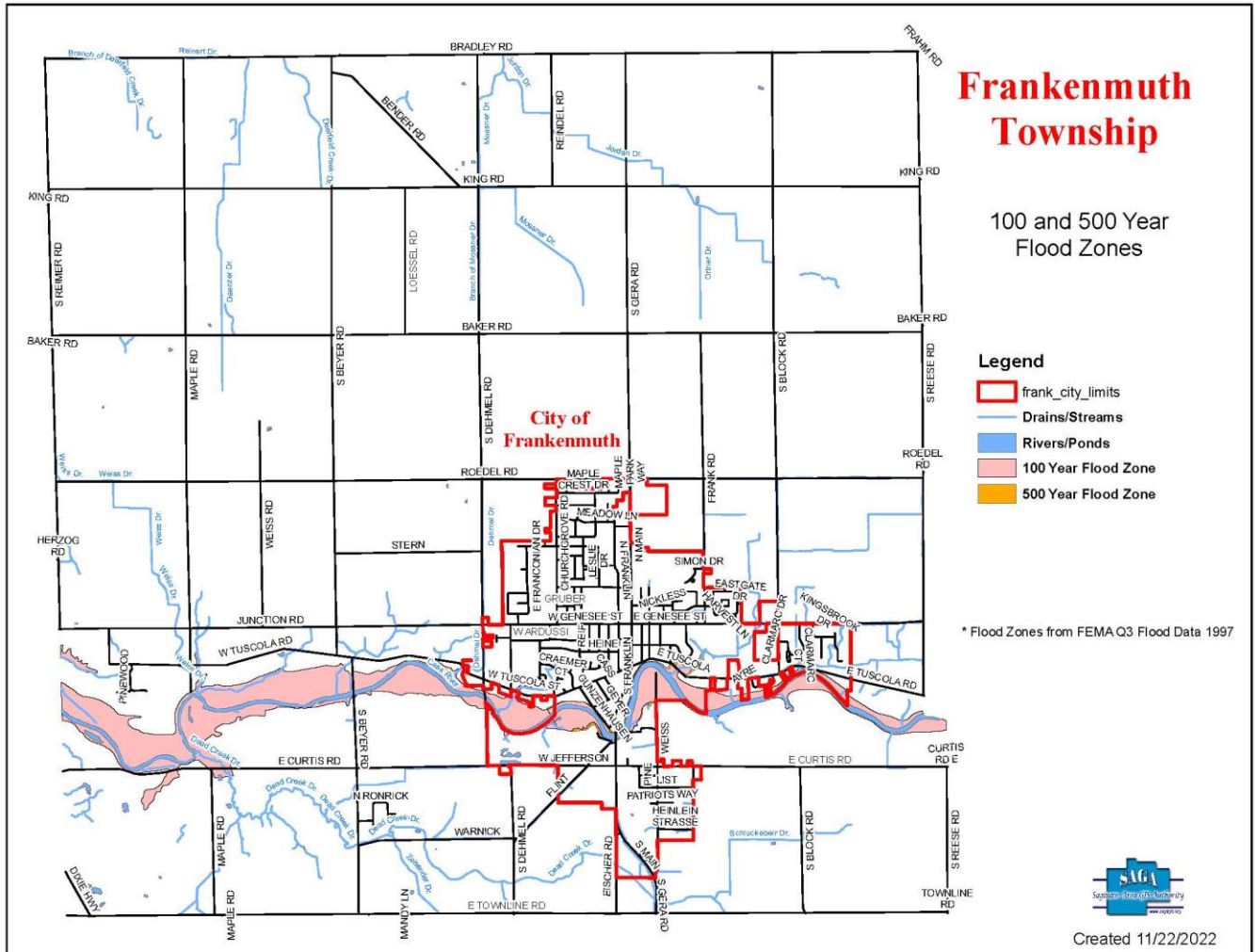
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.13 FRANKENMUTH TOWNSHIP

Frankenmuth Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - City of Frankenmuth						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1.5	1.5	3	3	3	33%
Flooding - Areal or Riverine	2	1.5	2	2	1	27%
Wildfire	1	1	1	1	0	6%
Drought	1.5	3	2.5	2.5	2	31%
Severe Winter Weather	3.5	3	2.5	2	3	77%
Event	3.5	3.5	2	1.5	3	73%
HazMat Incident - Fixed Site	1	1	1	1	1	8%
HazMat Incident - Transportation	2	1.5	2.5	1.5	1	27%
Public Health Emergency	2.5	2.5	2.5	0.5	3	44%
Power Outage - Long Term	2	1.5	3	1	3	35%
Subsidence (e.g., Sink Hole)	1	1	1	1	0	6%
Earthquakes	0	0	0	0	2	0%
Mass Violence	1	1	2	1	1	10%
Civil Unrest	1	1	2	1.5	3	16%
Major Structure Fire	2	1	2	2	0	21%
Transportation Incidents (MCI)	1	1	2	1	1	10%
Oil or gas Pipeline Accident	1	1	1	1	2	10%
Infrastructure Failure	1	1.5	2.5	2.5	3	20%
Extreme Temperatures	2.5	3	1.5	1.5	3	47%
Nuclear Attack	0.5	2	2	2	4	10%
Nuclear Power Plant Accident	0	0	0	0	2	0%
Utility Failure - Water/Sewer	1	2	1	1	3	15%
Interruption of Gov. Services	1	4	2	0	3	19%
Average Score	1.46	1.67	1.78	1.33	2.04	21%

Frankenmuth Township Flood Zone Map



Frankenmuth Township Specific Mitigation Strategies

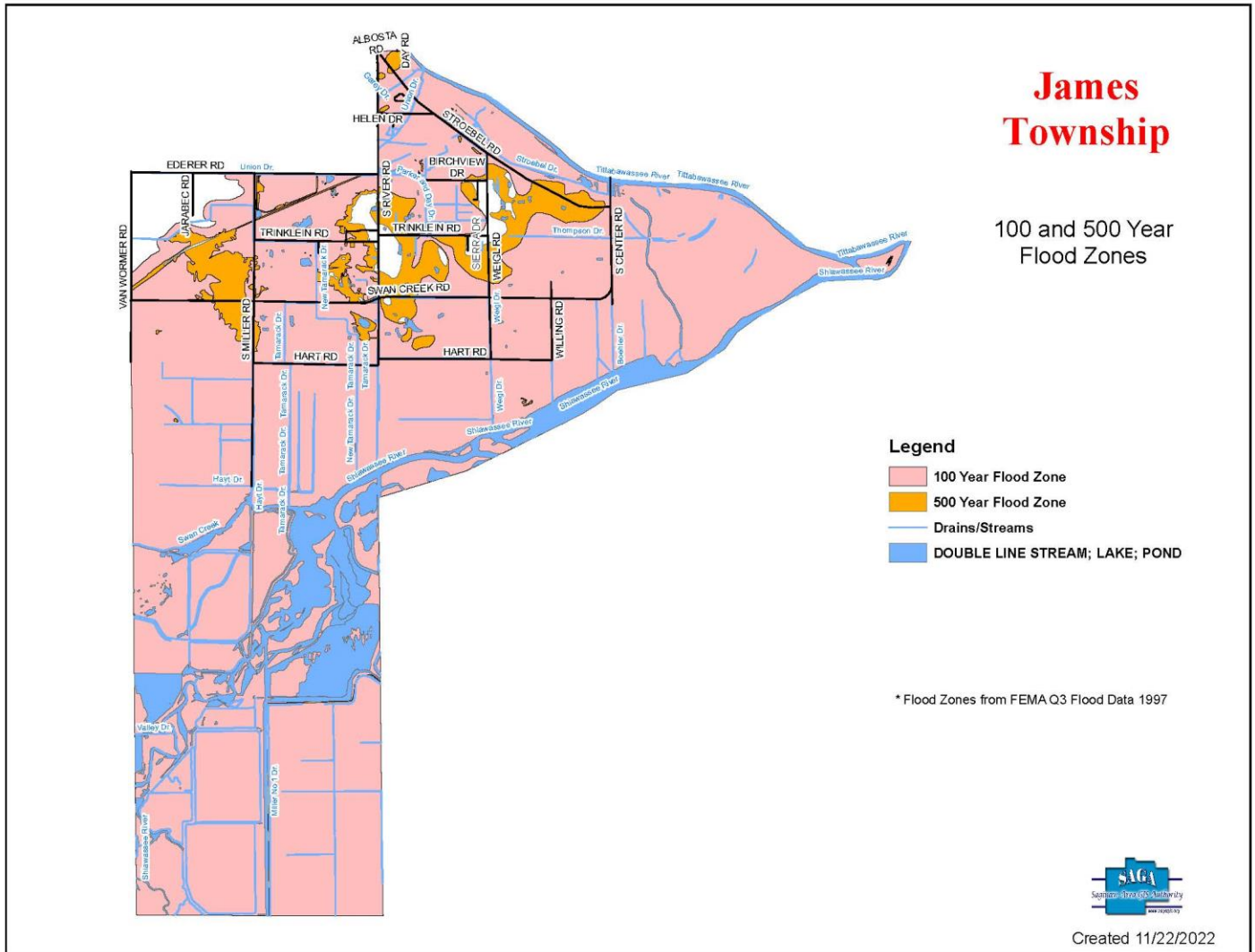
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.14 JAMES TOWNSHIP

James Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - James Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	3	2	3	19%
Flooding - Areal or Riverine	3	2	2	2	1	44%
Wildfire	1	1	1	1	0	6%
Drought	1	1	1	1	2	10%
Severe Winter Weather	1	1	1	1	3	13%
Event	2	2	1	2	3	33%
HazMat Incident - Fixed Site	1	1	1	1	1	8%
HazMat Incident - Transportation	1	1	1	1	1	8%
Public Health Emergency	1	1	1	1	3	13%
Power Outage - Long Term	0	1	2	2	3	0%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	0	0	0	0	2	0%
Mass Violence	0	0	0	0	1	0%
Civil Unrest	0	0	0	0	3	0%
Major Structure Fire	1	1	1	1	0	6%
Transportation Incidents (MCI)	3	1	1	1	1	25%
Oil or gas Pipeline Accident	1	1	1	1	2	10%
Infrastructure Failure	0	0	0	0	3	0%
Extreme Temperatures	0	0	0	0	3	0%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	2	0%
Utility Failure - Water/Sewer	0	1	2	1	3	0%
Interruption of Gov. Services	1	4	2	0	3	19%
Average Score	0.78	0.87	0.91	0.78	1.87	7%

James Township Flood Zone Map



James Township Specific Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Install a generator at the James Township Municipal Building for continuity of government operations and use as a sheltering site.	Local Jurisdiction	Operating Budget, State and Federal Grants	High

ANNEX A.15 JONESFIELD TOWNSHIP

Jonesfield Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Jonesfield Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	3	3	2	19%
Flooding - Areal or Riverine	1	1	0	1	0	4%
Wildfire	1	1	0	1	0	4%
Drought	2	2	0	2	0	17%
Severe Winter Weather	4	4	1	0	1	50%
Event	4	4	3	3	2	100%
HazMat Incident - Fixed Site	1	1	1	1	0	6%
HazMat Incident - Transportation	2	2	2	2	1	29%
Public Health Emergency	2	2	1	1	0	17%
Power Outage - Long Term	2	2	0	0	2	17%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	0	0	0	0	0	0%
Mass Violence	1	1	1	1	0	6%
Civil Unrest	0	0	0	0	0	0%
Major Structure Fire	1	1	0	0	0	2%
Transportation Incidents (MCI)	2	2	1	1	1	21%
Oil or gas Pipeline Accident	2	2	2	2	1	29%
Infrastructure Failure	3	1	0	0	0	6%
Extreme Temperatures	3	3	0	0	0	19%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	1	0	0	2	6%
Interruption of Gov. Services	1	4	2	0	3	19%
Average Score	1.48	1.52	0.74	0.78	0.65	11%

Jonesfield Township Flood Zone Map

No parts of Jonesfield Township are included in the 100 or 500-year Flood Zones.

Jonesfield Township Mitigation Strategies

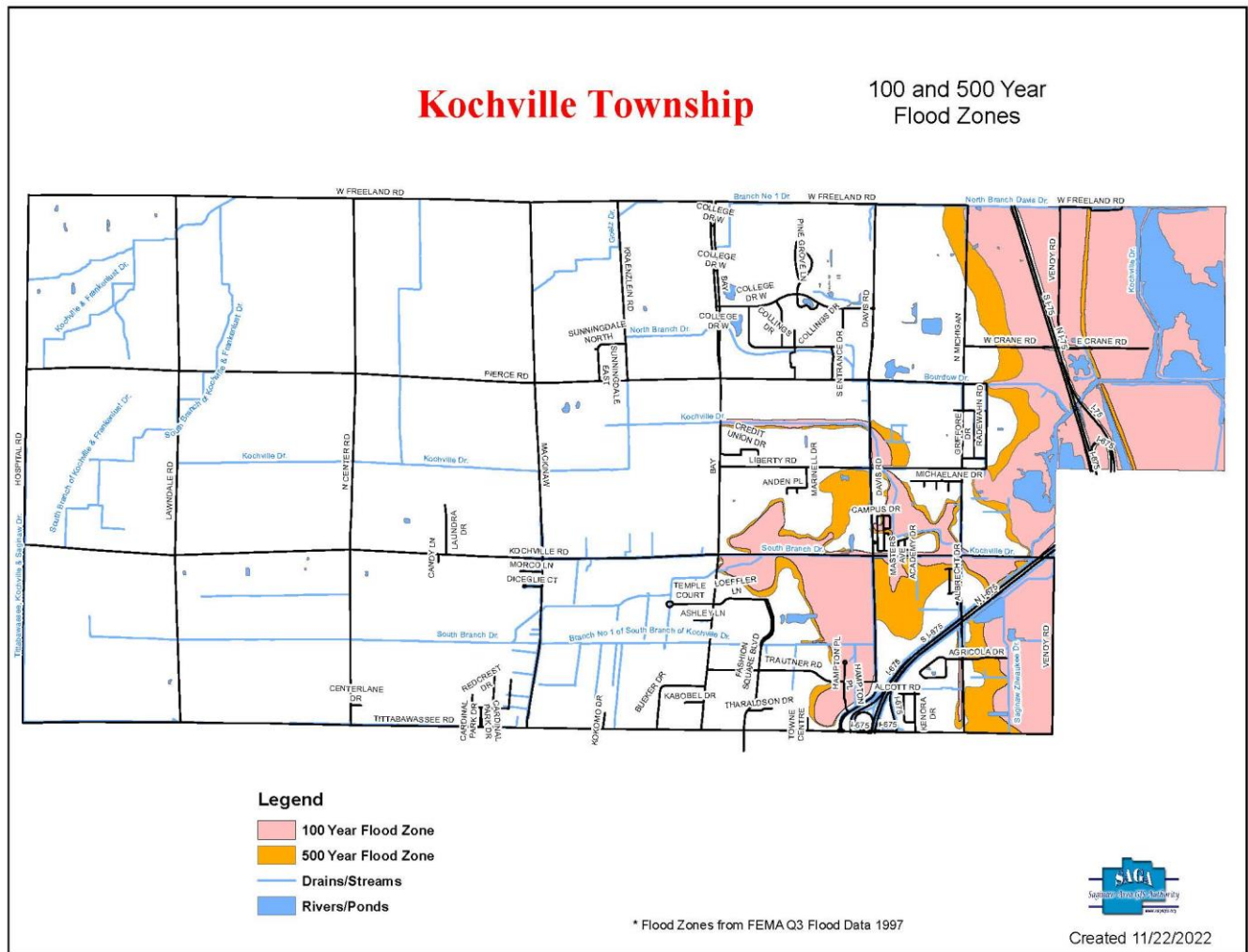
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.16 KOCHVILLE TOWNSHIP

Kochville Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Kochville Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	3	3	4	3	2	75%
Flooding - Areal or Riverine	1	1	3	2	0	13%
Wildfire	2	1	3	3	0	29%
Drought	2	4	4	1	0	38%
Severe Winter Weather	4	4	4	2	1	92%
Event	2	1	1	1	2	21%
HazMat Incident - Fixed Site	3	1	1	1	0	19%
Transportation	3	2	1	1	1	31%
Public Health Emergency	1	4	1	0	0	10%
Power Outage - Long Term	4	4	2	1	2	75%
Subsidence (e.g., Sink Hole)	1	1	1	1	0	6%
Earthquakes	0	4	3	1	0	0%
Mass Violence	2	1	3	0	0	17%
Civil Unrest	2	2	3	2	0	29%
Major Structure Fire	3	1	3	1	0	31%
Transportation Incidents (MCI)	4	1	3	1	1	50%
Oil or gas Pipeline Accident	3	2	3	2	1	50%
Infrastructure Failure	2	4	3	1	0	33%
Extreme Temperatures	4	4	4	0	0	67%
Nuclear Attack	0	4	3	0	0	0%
Nuclear Power Plant Accident	0	0	3	0	0	0%
Utility Failure - Water/Sewer	2	2	1	0	2	21%
Interruption of Gov. Services	1	4	2	0	3	19%
Average Score	2.13	2.39	2.57	1.04	0.65	30%

Kochville Township Flood Zone Map



Kochville Township Specific Hazard Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.17 LAKEFIELD TOWNSHIP

Lakefield Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Lakefield Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property. Threats are intentional human-caused events. While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	3	3	2	19%
Flooding - Areal or Riverine	1	1	0	1	0	4%
Wildfire	1	1	0	1	0	4%
Drought	2	2	0	2	0	17%
Severe Winter Weather	4	4	1	0	1	50%
Severe Thunderstorms/Wind Event	4	3	1	1	0	42%
HazMat Incident - Fixed Site	1	1	1	1	0	6%
HazMat Incident - Transportation	1	1	1	0	0	4%
Public Health Emergency	2	2	1	1	0	17%
Power Outage - Long Term	2	2	0	0	2	17%
Subsidence (e.g., Sink Hole)	0	0	0	0	0	0%
Earthquakes	0	0	0	0	0	0%
Mass Violence	1	1	1	1	0	6%
Civil Unrest	0	0	0	0	0	0%
Major Structure Fire	1	1	0	0	0	2%
Transportation Incidents (MCI)	2	2	1	1	1	21%
Oil or gas Pipeline Accident	1	2	2	2	1	15%
Infrastructure Failure	2	1	0	0	0	4%
Extreme Temperatures	3	3	0	0	0	19%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	1	0	0	2	6%
Interruption of Gov. Services	1	3	2	0	3	17%
Average Score	1.35	1.39	0.61	0.61	0.52	9%

Lakefield Township Flood Zone Map

No parts of Merrill Village are included in the 100 or 500-year flood zones.

Lakefield Township Specific Mitigation Strategies

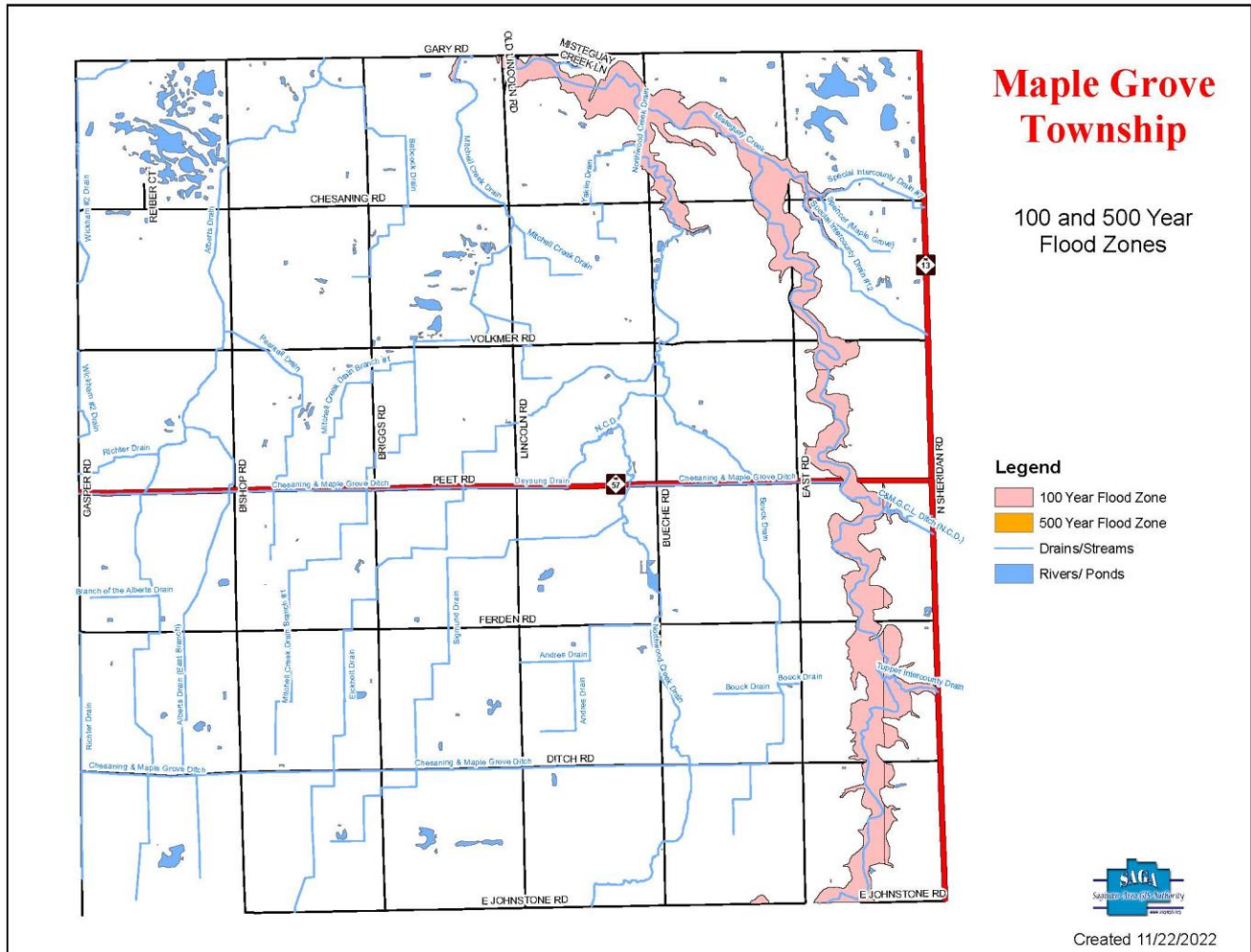
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.18 MAPLE GROVE TOWNSHIP

Maple Grove Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Maple Grove Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	2	13%
Flooding - Areal or Riverine	1	0	0	1	1	4%
Wildfire	0	0	1	1	0	0%
Drought	1	0	0	1	0	2%
Severe Winter Weather	2	2	1	1	3	29%
Event	2	2	1	2	2	29%
HazMat Incident - Fixed Site	1	0	1	0	0	2%
Transportation	2	0	1	1	1	13%
Public Health Emergency	1	1	1	1	1	8%
Power Outage - Long Term	2	2	2	2	2	33%
Subsidence (e.g., Sink Hole)	1	0	1	1	1	6%
Earthquakes	1	0	1	1	1	6%
Mass Violence	1	0	1	1	1	6%
Civil Unrest	1	0	1	1	1	6%
Major Structure Fire	1	1	1	1	1	8%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	0	1	1	1	6%
Infrastructure Failure	1	1	1	1	1	8%
Extreme Temperatures	1	1	1	1	1	8%
Nuclear Attack	1	0	4	4	4	25%
Nuclear Power Plant Accident	0	0	0	0	1	0%
Utility Failure - Water/Sewer	0	0	0	0	0	0%
Interruption of Gov. Services						0%
Average Score	1.05	0.55	1.00	1.14	1.18	8%

Maple Grove Township Flood Zone Map



Maple Grove Township Specific Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.19 MERRILL VILLAGE

Merrill Village Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Merrill Village						
TYPE OF EVENT	PROBABILITY Likelihood this will occur	INCIDENT EFFECT				RISK
		Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	1	10%
Flooding - Areal or Riverine	1	1	1	1	1	8%
Wildfire	1	1	1	1	1	8%
Drought	1	1	1	1	1	8%
Severe Winter Weather	1	1	1	1	1	8%
Event	2	2	2	2	2	33%
HazMat Incident - Fixed Site	1	1	1	0	1	6%
Transportation	1	1	1	1	1	8%
Public Health Emergency	1	1	1	1	1	8%
Power Outage - Long Term	1	1	1	2	1	10%
Subsidence (e.g., Sink Hole)	0	0	0	1	0	0%
Earthquakes	0	0	0	1	0	0%
Mass Violence	1	1	1	1	1	8%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	1	1	1	1	1	8%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	1	1	1	1	8%
Infrastructure Failure	1	1	1	1	1	8%
Extreme Temperatures	1	1	1	1	1	8%
Nuclear Attack	1	1	1	4	1	15%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	1	1	0	1	6%
Interruption of Gov. Services	1	1	1	1	1	8%
Average Score	0.91	1.00	0.91	1.13	0.91	8%

Merrill Village Flood Zone Map

No parts of Merrill Village are included in the 100 or 500-year flood zones.

Merrill Village Specific Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.20 OAKLEY VILLAGE

Oakley Village Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Kochville Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	4	4	4	2	29%
Flooding - Areal or Riverine	2	3	3	3	2	46%
Wildfire	1	3	2	3	2	21%
Drought	2	3	3	2	2	42%
Severe Winter Weather	3	4	2	1	2	56%
Event	3	4	2	2	2	63%
HazMat Incident - Fixed Site	1	2	2	1	0	10%
Transportation	0	3	1	0	0	0%
Public Health Emergency	1	4	3	3	1	23%
Power Outage - Long Term	2	4	4	4	2	58%
Subsidence (e.g., Sink Hole)	1	4	2	2	2	21%
Earthquakes	0	4	4	4	2	0%
Mass Violence	1	3	3	1	2	19%
Civil Unrest	1	2	2	1	1	13%
Major Structure Fire	1	2	3	1	1	15%
Transportation Incidents (MCI)	1	2	1	0	0	6%
Oil or gas Pipeline Accident	1	4	2	2	2	21%
Infrastructure Failure	1	4	2	2	2	21%
Extreme Temperatures	3	3	2	2	2	56%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	3	4	4	2	27%
Interruption of Gov. Services						0%
Average Score	1.23	2.95	2.32	1.91	1.41	22%

Oakley Village Flood Zone Map

No parts of Oakley Village are included in the 100 or 500-year flood zones.

Oakley Village Specific Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.21 RICHLAND TOWNSHIP

Richland Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Kochville Township						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	3	2	3	3	2	63%
Flooding - Areal or Riverine	2	1	0	1	1	13%
Wildfire	3	1	1	2	0	25%
Drought	2	4	1	3	0	33%
Severe Winter Weather	4	4	1	1	3	75%
Event	4	4	1	3	3	92%
HazMat Incident - Fixed Site	1	1	1	1	1	8%
Transportation	2	1	1	1	1	17%
Public Health Emergency	3	4	2	0	0	38%
Power Outage - Long Term	2	2	0	1	1	17%
Subsidence (e.g., Sink Hole)	0	1	0	0	0	0%
Earthquakes	0	2	1	1	2	0%
Mass Violence	1	2	1	2	0	10%
Civil Unrest	1	1	1	2	0	8%
Major Structure Fire	3	1	3	2	0	38%
Transportation Incidents (MCI)	4	1	1	1	1	33%
Oil or gas Pipeline Accident	1	1	1	2	2	13%
Infrastructure Failure	2	2	1	1	2	25%
Extreme Temperatures	3	4	1	1	0	38%
Nuclear Attack	0	4	4	4	4	0%
Nuclear Power Plant Accident	0	1	0	0	0	0%
Utility Failure - Water/Sewer	2	2	1	1	1	21%
Interruption of Gov. Services						0%
Average Score	1.95	2.09	1.18	1.50	1.09	24%

Richland Township Flood Zone Map

No parts of Richland Township are included in the 100 or 500-year flood zones.

Richland Township Specific Mitigation Strategies

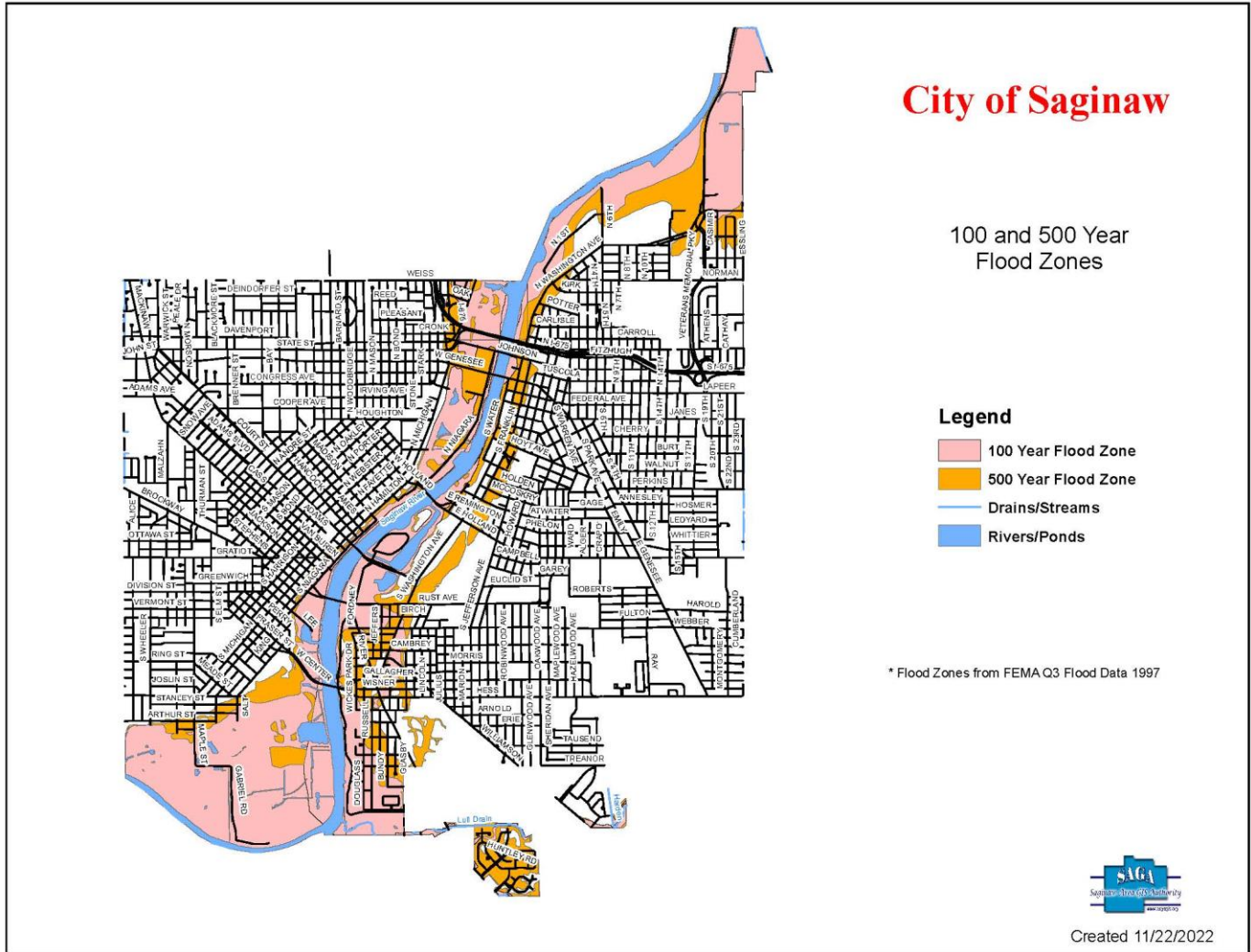
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.22 SAGINAW CITY

Saginaw City Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - City of Saginaw						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property. Threats are intentional human-caused events. While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 - Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	1	1	2	2	25%
Flooding - Areal or Riverine	3.5	1.5	1	1	1	33%
Wildfire	1	1	0.5	0.5	1	6%
Drought	2	1.5	1	1	0	15%
Severe Winter Weather	4	4	2	2	2	83%
Event	4	2.5	1.5	2.5	2	71%
HazMat Incident - Fixed Site	1.5	1	1	1	1	13%
Transportation	2	1	1	1	1	17%
Public Health Emergency	3.5	4	3	2	1	73%
Power Outage - Long Term	2	2	1	0.5	2	23%
Subsidence (e.g., Sink Hole)	1	1	0.5	0.5	0	4%
Earthquakes	0.5	1	0	0	2	3%
Mass Violence	3	1	3	1.5	2	47%
Civil Unrest	2	2	2.5	2.5	2	38%
Major Structure Fire	3.5	1	1	1.5	1	33%
Transportation Incidents (MCI)	1.5	1	2.5	1.5	2	22%
Oil or gas Pipeline Accident	1.5	2	1	1	2	19%
Infrastructure Failure	2.5	1.5	1	2	1	29%
Extreme Temperatures	2.5	3.5	2	1	1	39%
Nuclear Attack	0	1	2	2	4	0%
Nuclear Power Plant Accident	0	1	0	0	1	0%
Utility Failure - Water/Sewer	2.5	3	1.5	1.5	1	36%
Interruption of Gov. Services	1	4	0	0	4	17%
Average Score	2.04	1.00	1.30	1.24	1.57	22%

Saginaw City Flood Zone Map



Saginaw City Specific Mitigation Strategies

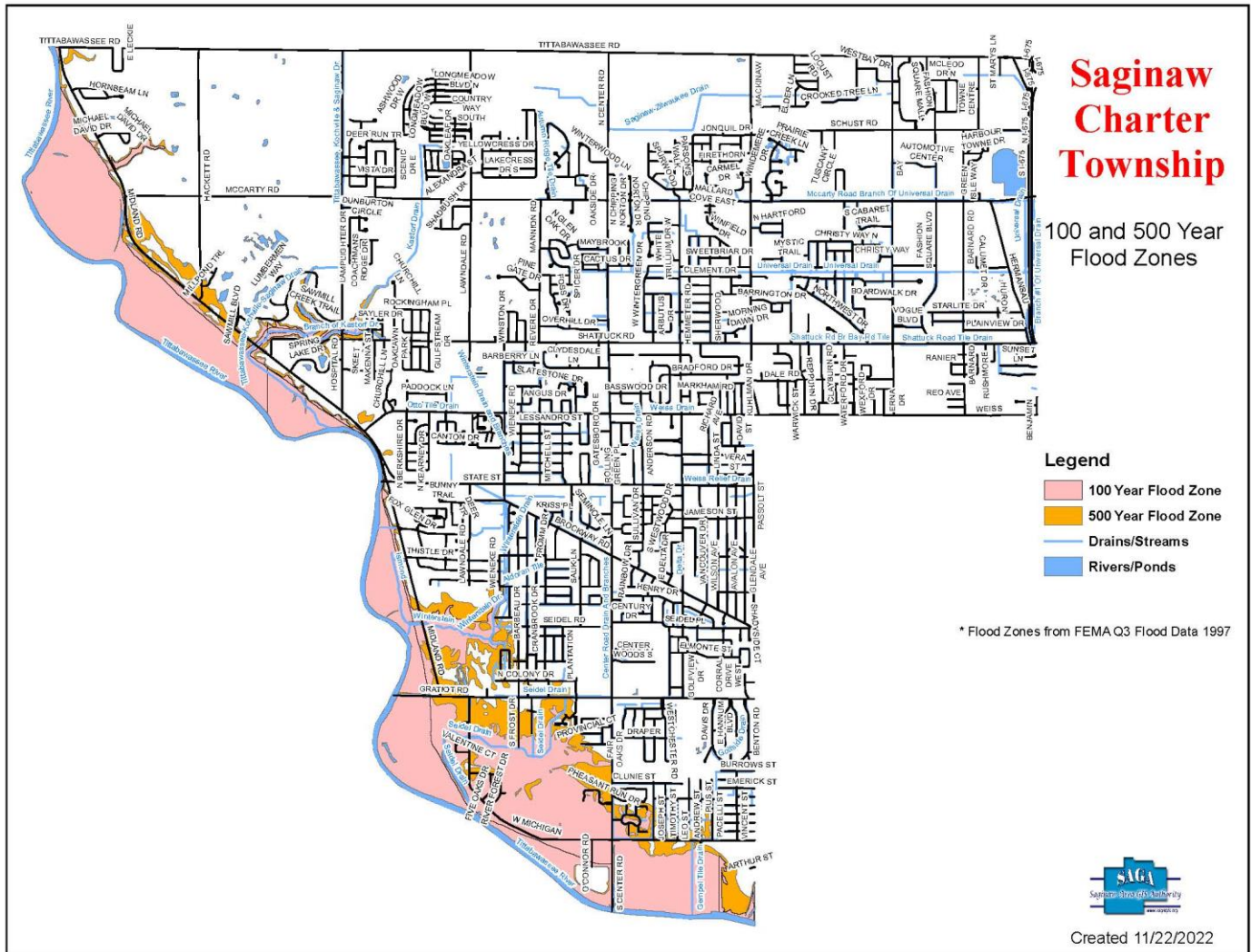
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.23 SAGINAW TOWNSHIP

Saginaw Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Saginaw Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	1	1	3	3	33%
Flooding - Areal or Riverine	4	2	1	2	2	58%
Wildfire	1	1	1	3	2	15%
Drought	1	3	1	2	1	15%
Severe Winter Weather	4	4	2	1	2	75%
Event	4	4	1	2	2	75%
HazMat Incident - Fixed Site	1	1	1	2	2	13%
Transportation	3	1	3	1	1	38%
Public Health Emergency	4	4	4	0	4	100%
Power Outage - Long Term	1	3	1	1	4	19%
Subsidence (e.g., Sink Hole)	2	1	1	3	1	25%
Earthquakes	1	2	1	2	1	13%
Mass Violence	3	4	3	1	4	75%
Civil Unrest	2	3	1	2	1	29%
Major Structure Fire	4	1	3	3	1	67%
Transportation Incidents (MCI)	3	1	4	2	1	50%
Oil or gas Pipeline Accident	0	0	0	0	0	0%
Infrastructure Failure	1	3	2	2	4	23%
Extreme Temperatures	4	4	1	1	1	58%
Nuclear Attack	1	4	4	4	4	33%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	2	4	4	1	4	54%
Interruption of Gov. Services	2	4	4	1	4	54%
Average Score	2.17	1.00	1.91	1.70	2.13	31%

Saginaw Township Flood Zone Map



Saginaw Township Specific Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Public Health Emergency	Develop partnerships with Saginaw County Health Department and local hospitals in the lead-up to emergencies.	County, Local Jurisdiction, public health agencies, local/regional hospitals	Operating Budget	Medium
Severe Thunderstorms / Wind Event	Develop of list of shelters for residents to take refuge if needed. Have Consumers Energy contact info available to update power status if lost. Provide proper cleanup measures to residents for debris.	Local Jurisdiction	Local Funding / County Funding	Medium

2022 SAGINAW COUNTY MULTI JURISDICTIONAL HAZARD MITIGATION PLAN
ANNEX A – JURISDICTION SPECIFIC INFORMATION

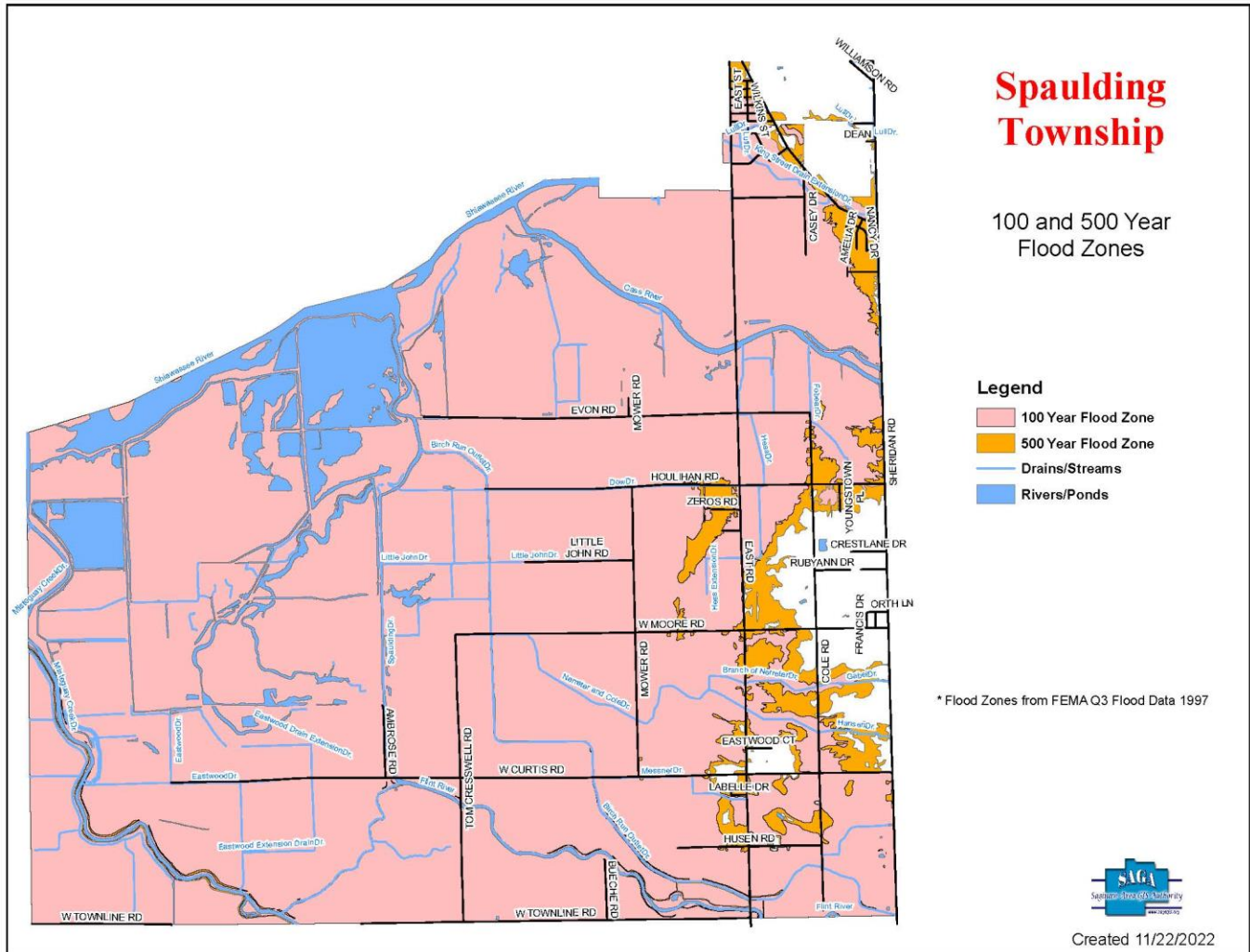
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Severe Winter Weather	Provide updates on social media platforms for road conditions and updates from SCRC. Provide heated shelters to residents as needed.	Local Jurisdiction	Local Funding / County Funding	High
Major Structure Fire	Utilize Mutual Aid Agreements with County-wide fire agencies to provide total coverage for all communities.	Local / County	Local Funding / County Funding	Medium
Flooding - Areal or Riverine	2020 Flood set several guidelines for the Township and its communication in significant flood situations. Shelter, infrastructure, and food are all taken care of properly – The same plan is to be implemented in the future.	Local Unit of Government	Local / State / Federal	High
Extreme Temperatures	Provide shelter areas for heating/cooling for extreme temperatures. Utilize STCS facilities when needed.	Civic Groups, Churches, Local Units of Government, Emergency Management	Local / State / Federal	Medium
Interruption of Gov. Services	Develop and maintain Continuity of Government Plans to continue essential government services during disasters.	Local Unit of Government	Local	Medium
HazMat Incident - Transportation	Continue to equip and train existing HazMat/Tech Response Units.	Local / County	Local	Medium
Tornado	Continue school and community outreach for education n signs and appropriate responses to a tornado.	Local Unit of Government	Local / County	Medium
Civil Unrest	Develop and continue community partnerships to ensure open communication channels to avoid misinformation spread.	Local Unit of Government	Local / County	Low

ANNEX A.24 SPAULDING TOWNSHIP

Spaulding Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Spaulding Township						
TYPE OF EVENT	PROBABIL Likelihood this will occur	INCIDENT EFFECT				RISK
		Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	0				3	0%
Flooding - Areal or Riverine	3	1	1	2	2	38%
Wildfire	1	1	0	0	2	6%
Drought	1	1	0	0	1	4%
Severe Winter Weather	3	4	1	1	2	50%
Event	4	3	1	1	2	58%
HazMat Incident - Fixed Site	1	1	0	1	2	8%
Transportation	1	1	0	0	1	4%
Public Health Emergency	1	2	2	0	4	17%
Power Outage - Long Term	0				4	0%
Subsidence (e.g., Sink Hole)	0				1	0%
Earthquakes	1	1	1	1	1	8%
Mass Violence	1	1	3	0	4	17%
Civil Unrest	1	1	3	1	1	13%
Major Structure Fire	0				1	0%
Transportation Incidents (MCI)	1	1	1	0	1	6%
Oil or gas Pipeline Accident	1	1	0	1	0	4%
Infrastructure Failure	0				4	0%
Extreme Temperatures	1	4	1	0	1	13%
Nuclear Attack	0				4	0%
Nuclear Power Plant Accident	0				0	0%
Utility Failure - Water/Sewer	1	3	0	0	4	15%
Interruption of Gov. Services	0				4	0%
Average Score	0.96	1.00	0.93	0.53	2.13	9%

Spaulding Township Flood Zone



Spaulding Township Specific Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Develop Township Hall for use as a shelter site.	Local Jurisdiction	Operating Budget, State and Federal Grants	Medium
Flooding	Work with County, State, and Federal agencies to improve and expand existing dike systems throughout Spaulding Twp, especially those on and bordering the National Refuge.	Local, State, and Federal Agencies	Operating Budget, County Funds, State	High

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
			and Federal Grant	

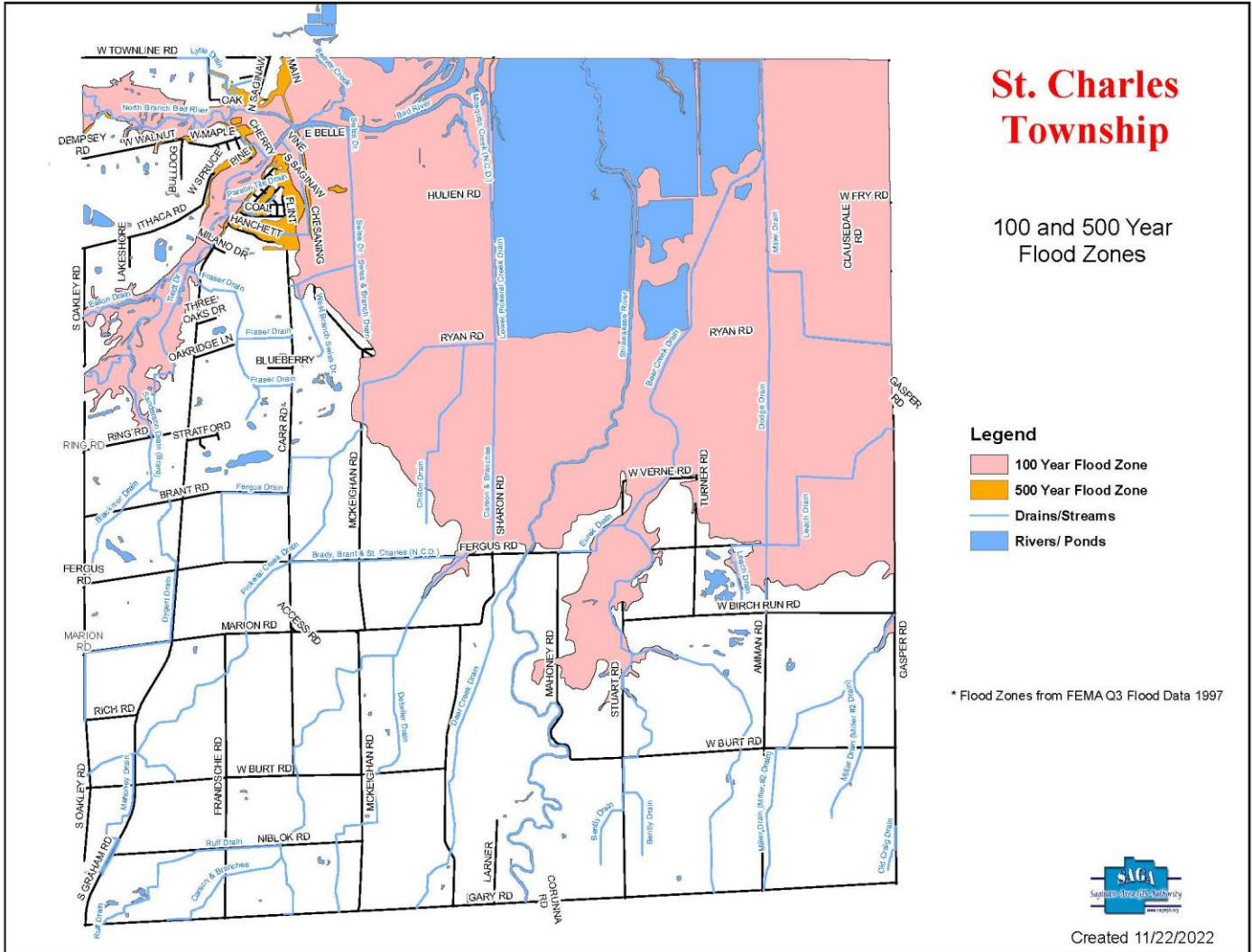
ANNEX A.25 ST. CHARLES VILLAGE

St. Charles Village Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - St Charles Village						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	2	1	1	3	15%
Flooding - Areal or Riverine	3	1	1	2	2	38%
Wildfire	1	1	1	1	2	10%
Drought	2	0	0	0	1	4%
Severe Winter Weather	3	1	1	1	2	31%
Event	2	1	1	1	2	21%
HazMat Incident - Fixed Site	1	1	1	1	2	10%
Transportation	2	1	0	0	1	8%
Public Health Emergency	4	3	2	2	4	92%
Power Outage - Long Term	1	2	1	0	4	15%
Subsidence (e.g., Sink Hole)	3	1	1	2	1	31%
Earthquakes	1	1	0	0	1	4%
Mass Violence	3	1	4	1	4	63%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	3	1	3	1	1	38%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident		1	1	1	0	0%
Infrastructure Failure	4	4	4	4	4	100%
Extreme Temperatures	2	1	1	1	1	17%
Nuclear Attack	3	4	4	4	4	100%
Nuclear Power Plant Accident	2	3	3	1	0	29%
Utility Failure - Water/Sewer	3	3	3	3	4	81%
Interruption of Gov. Services	1	1	1	1	4	15%
Average Score	2.14	1.00	1.57	1.30	2.13	27%

St Charles Village Flood Zone Map

The Village of St Charles is included in the St Charles Township Flood Zone Map.



St Charles Village Specific Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Severe Winter Weather	Improve internal communications with a Chain of Command, on-call communication system.	Local Jurisdiction	Local Unit of Government	High
Public Health Emergency	Develop education and outreach methods to ensure the public and employees have	Local Jurisdiction	Local Unit of Government	High

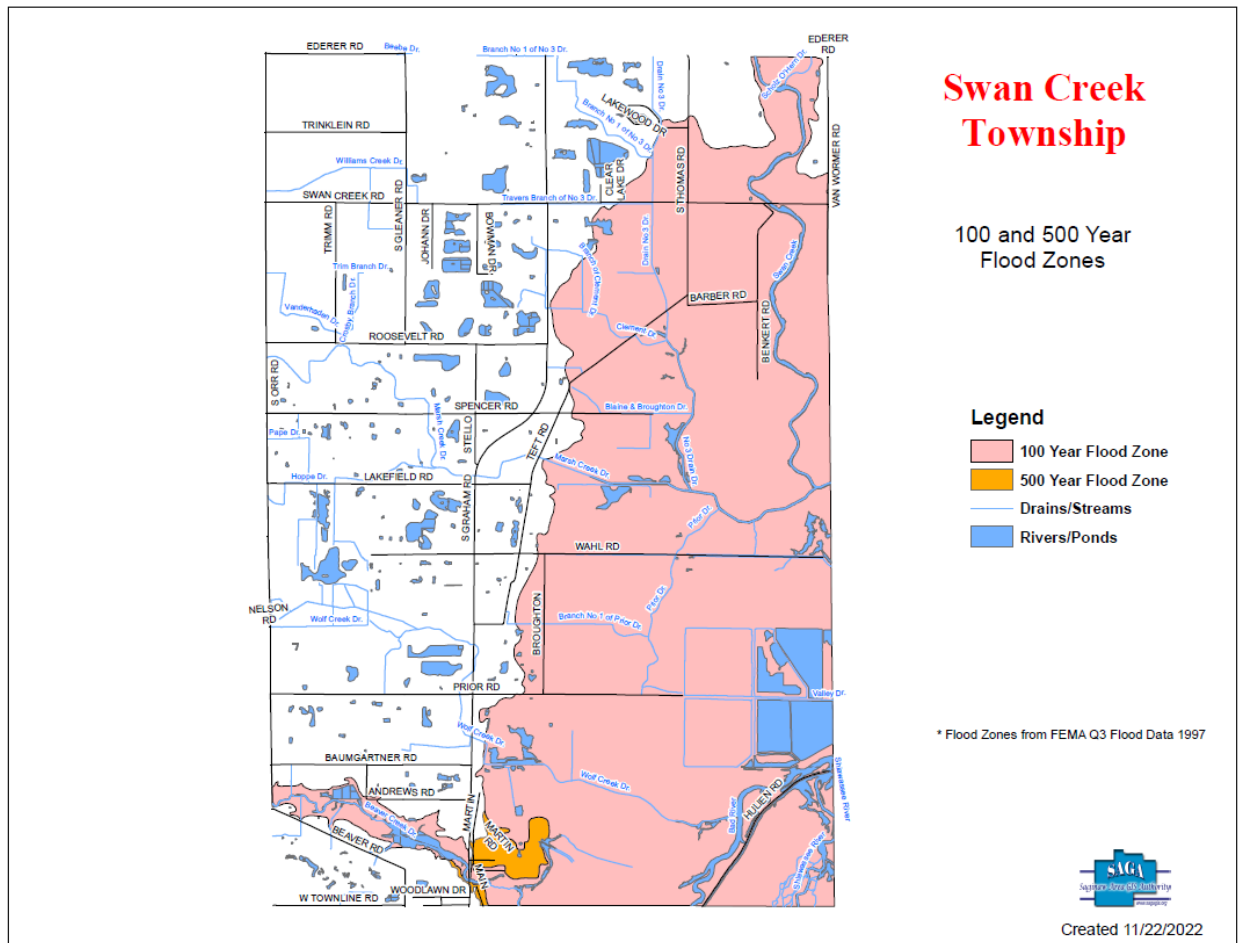
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
	current information on policies and procedures and action plans for public health emergency incidents.			
Infrastructure Failure, Interruption of Government Services	Continue water main, service line, and sewer repair and replacement projects	Local Jurisdiction	Local Unit of Government, County	Medium
All Hazards	Update Planning and Zoning Ordinances.	Local Jurisdiction	Local Unit of Government	Low

ANNEX A.26 SWAN CREEK TOWNSHIP

Swan Creek Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Swan Creek Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	1	1	2	3	15%
Flooding - Areal or Riverine	2	2	2	2	2	33%
Wildfire	1	1	1	1	2	10%
Drought	2	1	1	1	1	17%
Severe Winter Weather	2	1	2	1	2	25%
Event	2	2	2	2	2	33%
HazMat Incident - Fixed Site	1	1	1	1	2	10%
Transportation	1	1	1	1	1	8%
Public Health Emergency	1	1	1	1	4	15%
Power Outage - Long Term	1	1	1	1	4	15%
Subsidence (e.g., Sink Hole)	1	1	1	1	1	8%
Earthquakes	1	1	1	1	1	8%
Mass Violence	1	1	1	1	4	15%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	1	1	1	1	1	8%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	1	2	2	1	0	10%
Infrastructure Failure	1	1	1	1	4	15%
Extreme Temperatures	1	1	1	1	1	8%
Nuclear Attack	1	1	1	1	4	15%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	1	1	1	4	15%
Interruption of Gov. Services	1	1	1	1	4	15%
Average Score	1.13	1.00	1.13	1.09	2.13	13%

Swan Creek Township Flood Zone Map



Swan Creek Township Specific Mitigation Strategies

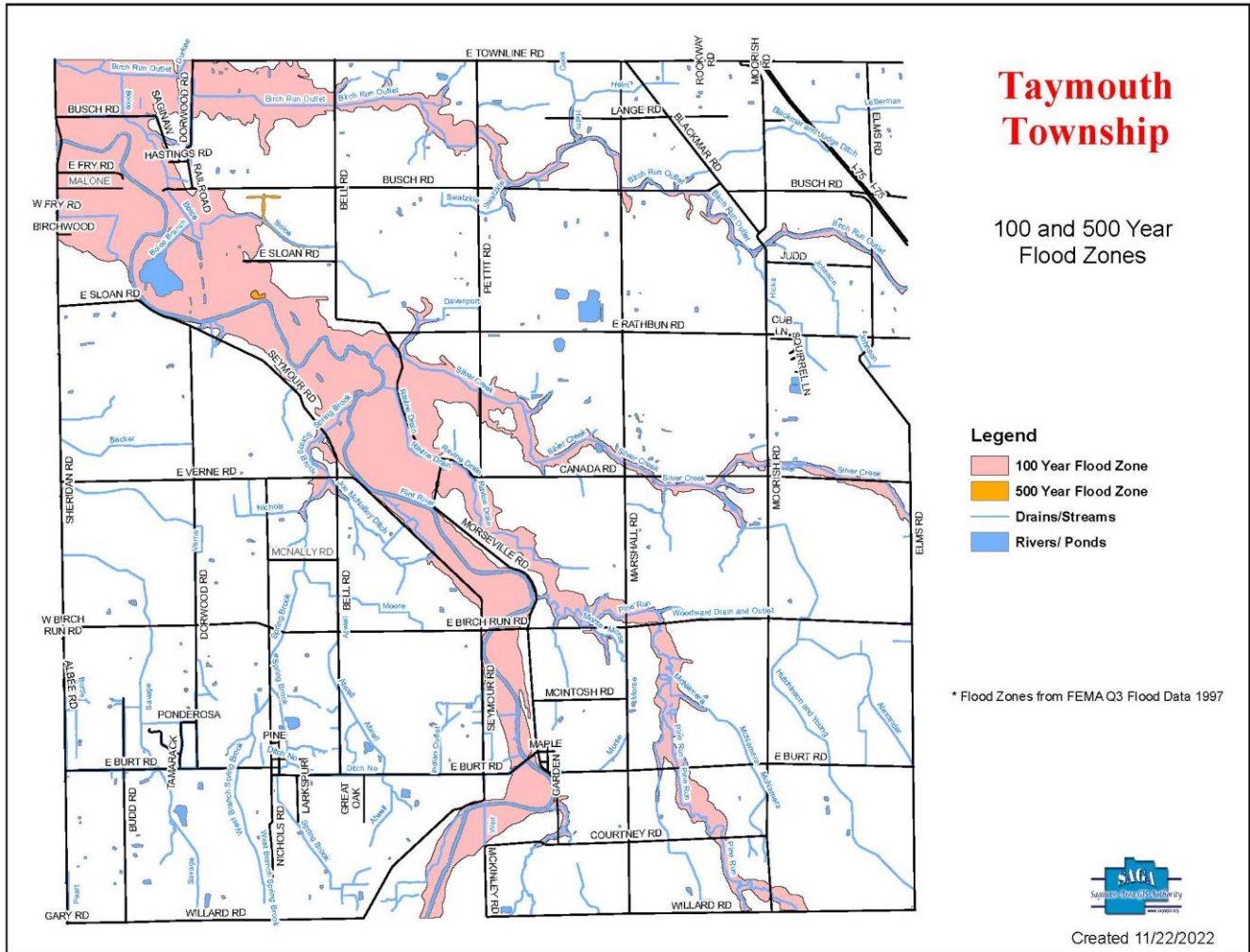
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.27 TAYMOUTH TOWNSHIP

Taymouth Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Taymouth Township						
TYPE OF EVENT	PROBABILITY	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	2	1	2	2	15%
Flooding - Areal or Riverine	3	2	1	2	1	38%
Wildfire	4	1	0	1	0	17%
Drought	1	1	1	0	0	4%
Severe Winter Weather	4	4	3	1	2	83%
Severe Thunderstorms/Wind Event	3	4	1	1	1	44%
HazMat Incident - Fixed Site	1	1	0	0	0	2%
HazMat Incident - Transportation	1	1	1	2	1	10%
Public Health Emergency	2	2	0	0	2	17%
Power Outage - Long Term	1	2	0	0	2	8%
Subsidence (e.g., Sink Hole)	0	0	0	0	1	0%
Earthquakes	0	0	0	0	1	0%
Mass Violence	2	2	3	0	1	25%
Civil Unrest	2	1	1	1	1	17%
Major Structure Fire	2	1	3	2	0	25%
Transportation Incidents (MCI)	1	1	4	0	1	13%
Oil or gas Pipeline Accident	1	1	1	1	0	6%
Infrastructure Failure	2	3	1	1	3	33%
Extreme Temperatures	1	4	1	0	1	13%
Nuclear Attack	0	0	0	0	4	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	1	3	1	0	4	17%
Interruption of Gov. Services	1	4	1	1	4	21%
Average Score	1.48	1.00	1.04	0.65	1.39	13%

Taymouth Township Flood Zone Map



Taymouth Township Specific Mitigation Strategies

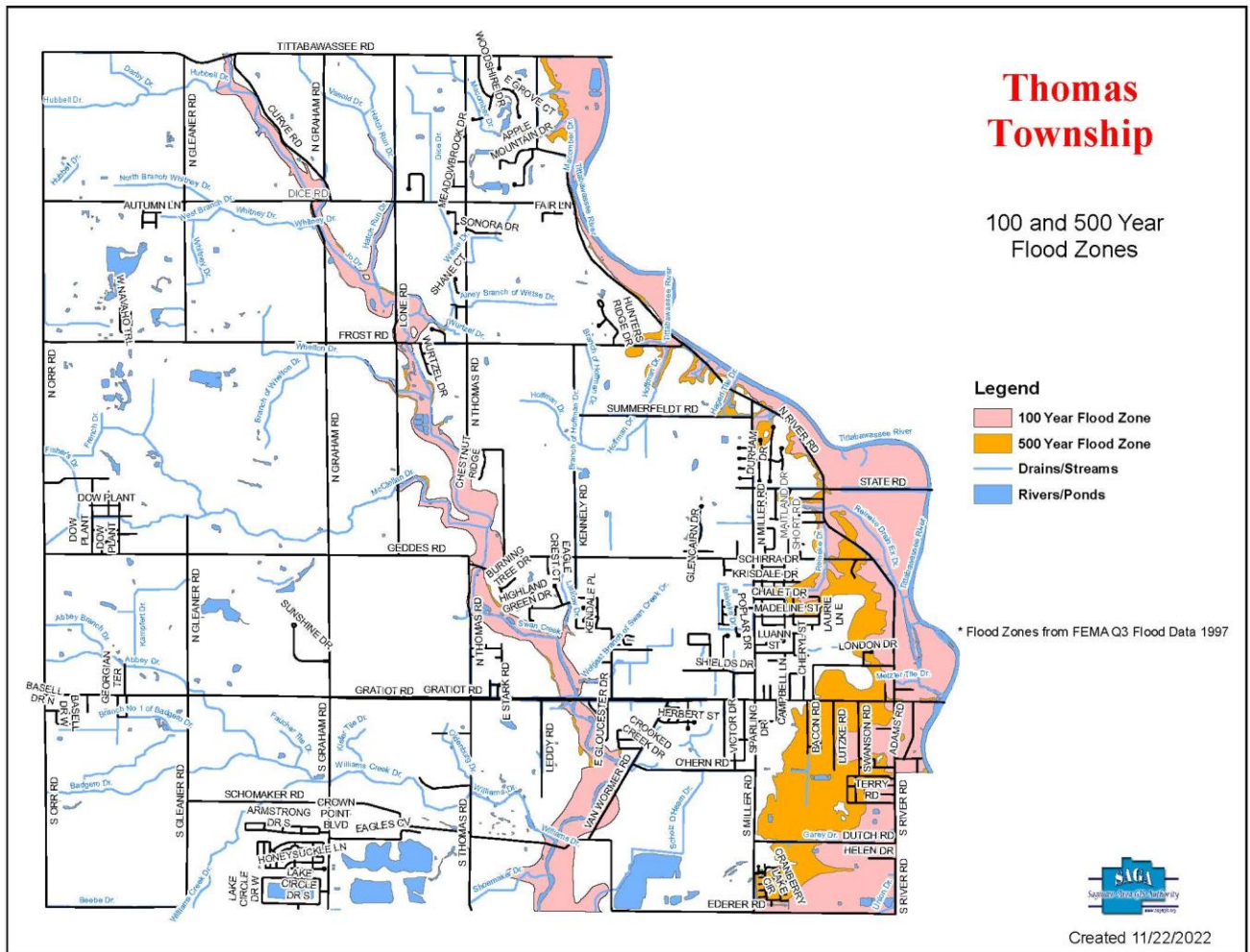
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Tornado, Severe Thunderstorm/Wind Event	Replace an obsolete outdoor warning siren to improve early warning reliability and effectiveness.	Local Jurisdiction	Operating Budget, State and Federal Grants	High

ANNEX A.28 THOMAS TOWNSHIP

Thomas Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Thomas Township						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	2	3	3	3	3	50%
Flooding - Areal or Riverine	4	3	3	2	2	83%
Wildfire	1	1	1	2	0	8%
Drought	1	3	1	2	0	13%
Severe Winter Weather	4	3	3	2	2	83%
Event	4	3	2	3	2	83%
HazMat Incident - Fixed Site	3	1	1	1	2	31%
Transportation	2	1	2	1	2	25%
Public Health Emergency	4	4	3	0	1	67%
Power Outage - Long Term	3	3	2	1	1	44%
Subsidence (e.g., Sink Hole)	1	1	1	1	1	8%
Earthquakes	0	0	0	0	0	0%
Mass Violence	1	1	1	1	1	8%
Civil Unrest	1	1	1	1	1	8%
Major Structure Fire	3	1	1	2	1	31%
Transportation Incidents (MCI)	3	1	3	2	1	44%
Oil or gas Pipeline Accident	1	1	1	1	1	8%
Infrastructure Failure	1	1	1	1	1	8%
Extreme Temperatures	2	4	1	0	1	25%
Nuclear Attack	0	0	0	0	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	0	0	0	0	0	0%
Interruption of Gov. Services	1	1	1	1	4	15%
Average Score	1.83	1.00	1.39	1.17	1.17	18%

Thomas Township Flood Zone Map



Thomas Township Specific Mitigation Strategies

Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
Flooding	Relocate Sewer Pump Stations six and eight out of the flood zones to prevent service interruption during high water levels	Local Jurisdictions	Operating Budget, State and Federal Grant	High
All Hazards	Expansion of Fire Station #1 to accommodate an Emergency Operations Center	Local Jurisdiction	Local, State, and Federal Funds	High

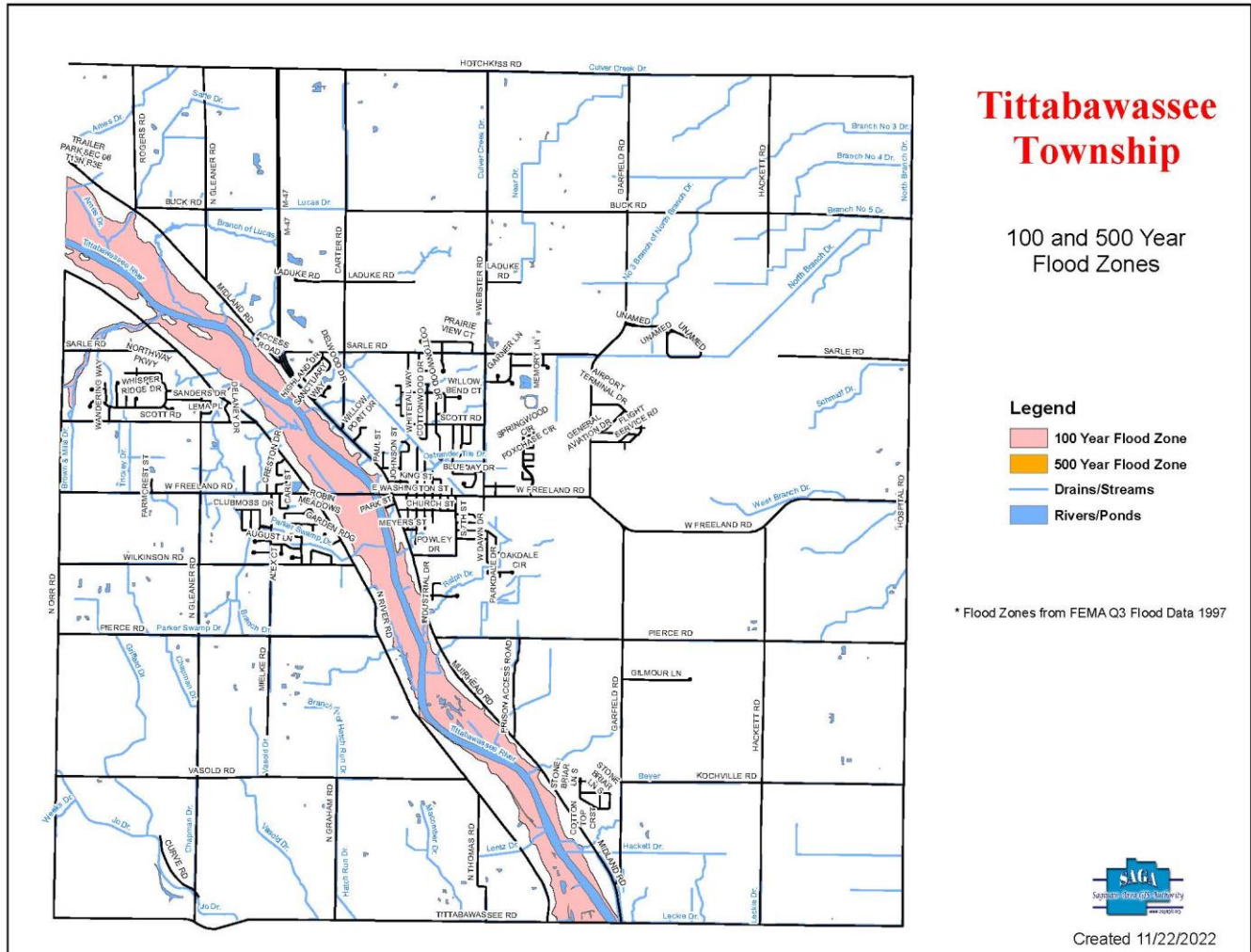
Hazard	Mitigation Action	Responsible Agency	Funding Source	Priority Level
All Hazards	Encourage public participation and increase the use of the existing mass notification system.	Local Jurisdiction	Operating Budget	Medium
All Hazards	Use existing Township websites and social media accounts to provide emergency preparedness education to residents.	Local Jurisdiction	Operating Budget	High

ANNEX A.29 TITTABAWASSEE TOWNSHIP

Tittabawassee Township Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - Tittabawassee Township						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT				RISK
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility	Interruption of Community Lifelines	
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted >72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted <72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	3	1	3	2	2	50%
Flooding - Areal or Riverine	2	1	3	2	2	33%
Wildfire	1	1	1	1	0	6%
Drought	1	3	2	2	0	15%
Severe Winter Weather	3	2	3	3	2	63%
Event	4	2	3	3	2	83%
HazMat Incident - Fixed Site	1	1	1	1	2	10%
Transportation	1	1	1	1	2	10%
Public Health Emergency	2	2	2	2	1	29%
Power Outage - Long Term	2	3	2	2	1	33%
Subsidence (e.g., Sink Hole)	0	1	1	1	1	0%
Earthquakes	0	1	3	1	0	0%
Mass Violence	3	1	3	1	1	38%
Civil Unrest	4	1	1	1	1	33%
Major Structure Fire	4	1	3	1	1	50%
Transportation Incidents (MCI)	3	1	1	1	1	25%
Oil or gas Pipeline Accident	2	1	1	1	1	17%
Infrastructure Failure	2	1	1	1	1	17%
Extreme Temperatures	2	1	1	1	1	17%
Nuclear Attack	0	0	4	4	0	0%
Nuclear Power Plant Accident	0	0	0	0	0	0%
Utility Failure - Water/Sewer	3	1	1	1	0	19%
Interruption of Gov. Services	1	1	1	1	4	15%
Average Score	1.91	1.00	1.83	1.48	1.13	22%

Tittabawassee Township Flood Zone Map



Tittabawassee Township Specific Mitigation Strategies

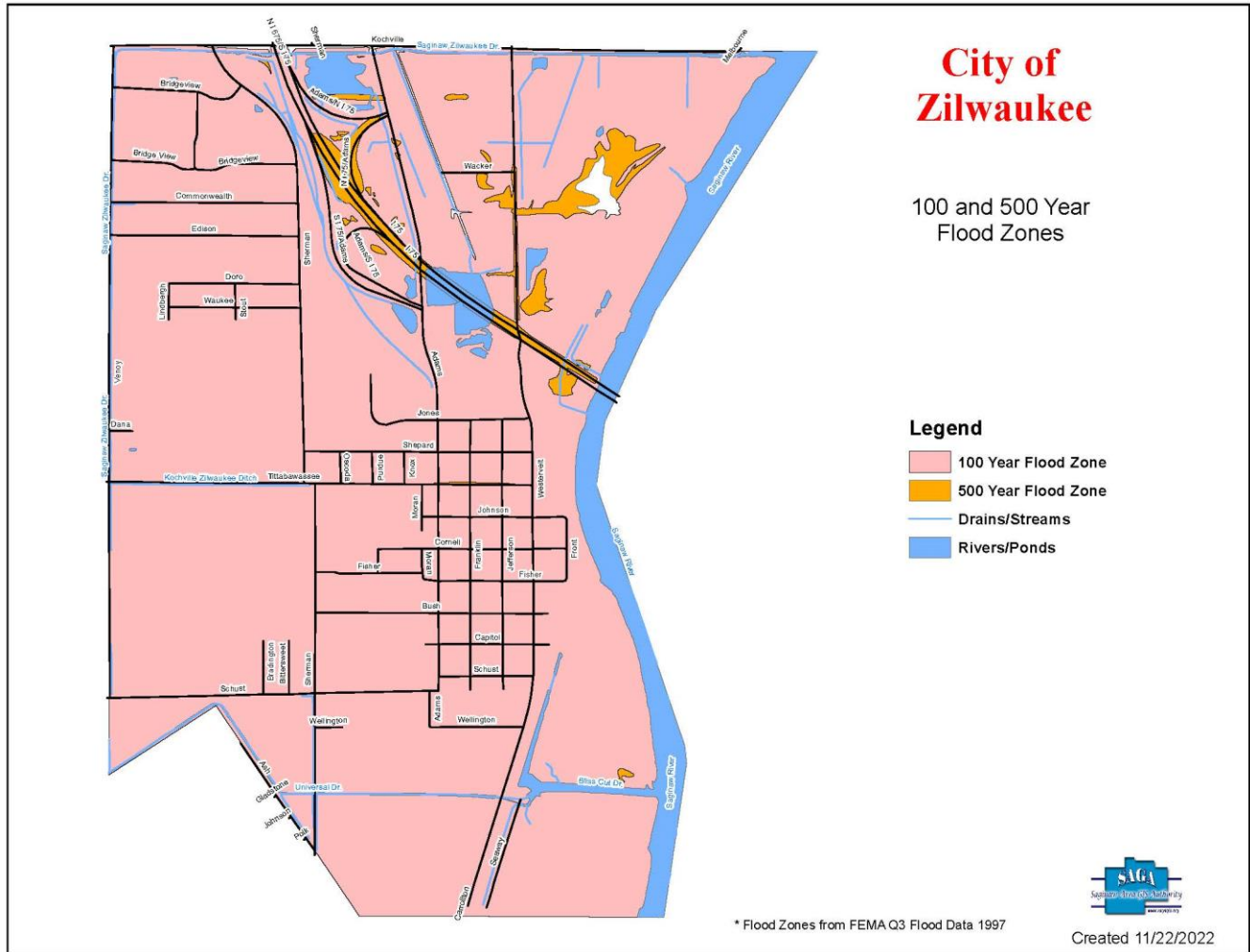
No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.

ANNEX A.30 ZILWAUKEE CITY

City of Zilwaukee Hazard Vulnerability Analysis

LOCAL JURISDICTION HAZARD VULNERABILITY ANALYSIS						
Compiled HVA for - City of Zilwaukee						
TYPE OF EVENT	PROBABIL	INCIDENT EFFECT			RISK	
	Likelihood this will occur	Percentage of population or property impacted	Severity and number of injuries	Extent of damage to the facility		Interruption of Community Lifelines
<p>Hazards are unintentional natural caused events that would or potentially would cause harm to life, operations, the environment, or property.</p> <p>Threats are intentional human-caused events.</p> <p>While FEMA doesn't require threats to be included in our plan, we will include natural, human-caused, and technological threats and hazards.</p>	4 = Highly Likely (will occur frequently)	4 = 76-100%	4 = High Severity/High Volume	4 = Widespread Areas of Destroyed	4 = 1 or more Tier 1 Lifelines Impacted > 72 hrs	Relative Threat is Higher as Percentage Increases
	3 = Likely (probable within 3 years)	3 = 51-75%	3 = High Severity/Low Volume	3 = Widespread Major Damage and/or Localized Destroyed	3 = 1 or more Tier 1 Lifelines impacted < 72 hrs	
	2 = Possible (probable within 5 years)	2 = 26-50%	2 = Low Severity/High Volume	2 = Widespread Minor Damage and/or Localized Major Damage	2 = 1 or more Tier 2 Lifelines impacted > 72 hrs	
	1 = Unlikely (but, possible within 10 years)	1 = 0-25%	1 = Low Severity/Low Volume	1 = Localized Minor Damage	1 = 1 or more Tier 2 Lifelines impacted < 72 hrs.	
	0 = No Probability to occur		0 = Injuries not likely to occur	0 = No property damage likely	0 = No Community Lifelines Impacted	
Tornado	1	3	2	1	2	17%
Flooding - Areal or Riverine	2	3	2	1	1	29%
Wildfire	0	1	1	0	1	0%
Drought	1	4	2	0	3	19%
Severe Winter Weather	2	4	1	1	1	29%
Event	3	2	2	2	1	44%
HazMat Incident - Fixed Site	1	2	1	1	1	10%
Transportation	1	2	2	1	1	13%
Public Health Emergency	2	4	3	0		29%
Power Outage - Long Term	3	2	1	0	1	25%
Subsidence (e.g., Sink Hole)	0	1	0	1	0	0%
Earthquakes	0	1	1	1	1	0%
Mass Violence	0	1	0	0	0	0%
Civil Unrest	0	1	0	0	0	0%
Major Structure Fire	1	1	0	1	0	4%
Transportation Incidents (MCI)	1	1	1	1	1	8%
Oil or gas Pipeline Accident	2	2	1	2		21%
Infrastructure Failure	1	1	1	1	3	13%
Extreme Temperatures	1	4	1	0	0	10%
Nuclear Attack	0	4	4	4	4	0%
Nuclear Power Plant Accident	0	1	0	0	0	0%
Utility Failure - Water/Sewer	2	4	1	1	1	29%
Interruption of Gov. Services						0%
Average Score	1.09	1.00	1.23	0.86	1.10	10%

City of Zilwaukee Flood Zone Map



City of Zilwaukee Specific Mitigation Strategies

No specific Mitigation Strategies beyond those listed in Section 6.3 of this plan were identified at this time.