Multi-Jurisdictional Hazard Mitigation Plan

Stark County, Ohio

Released 2022

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STARK COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN

RELEASED 2022

FOR THE COUNTY JURISDICTION OF STARK COUNTY, OHIO AND THE MUNICIPAL JURISDICTIONS THEREIN

STARK COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

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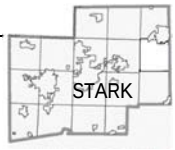


1.0 INTRODUCTION

Purpose

The purpose of this mitigation plan is to identify and evaluate risks and vulnerabilities from hazards that affect Stark County, Ohio and its various municipalities. With these risks and vulnerabilities identified, local officials can reduce loss of life, injuries, and limit future property and environmental damages by developing methods and strategies to mitigate, and where possible, eliminate such damages.

Scope

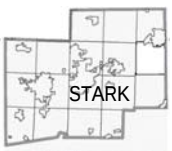
The *Stark County Multi-Jurisdictional Hazard Mitigation Plan* follows a planning methodology that includes public involvement, a risk assessment for various identified hazards, an inventory of critical facilities and at-risk areas, a mitigation strategy for high-risk hazards, and a method to maintain and update the plan. The provisions of this plan are applicable to all unincorporated areas of Stark County as well as the incorporated areas of all municipalities within the county. The plan addresses the natural, technological, and man-made hazards identified by the Federal Emergency Management Agency (FEMA), Ohio Emergency Management Agency (OEMA), and the Stark County mitigation planning team. All hazards that have, or can affect the residents of Stark County have been analyzed. Hazard mitigation goals, objectives, and projects are discussed, as are project lead agencies and potential funding sources.

Plan Authority

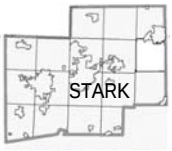
The *Stark County Hazard Mitigation Plan* is "multi-jurisdictional," meaning that it includes several jurisdictions. The Stark County Emergency Management Agency (SCEMA) acted as the lead coordinating agency for the completion of this plan at the local level. The OEMA further monitored the original planning as well as subsequent updating processes. Stark County stakeholders prepared this plan per federal requirements outlined in Section 104 of the Disaster Mitigation Act of 2000 (DMA2K), which requires communities to formulate a hazard mitigation plan to be eligible for mitigation funds made available through FEMA. Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act requires that local jurisdictions develop and submit plans meeting the criteria outlined in the Code of Federal Regulations (CFR); Title 44: Emergency Management and Assistance, Part 201.6: Local Mitigation Plans (44 CFR 201.6).

When the content of this plan corresponds to a requirement of 44 CFR 201.6, it will include a description of the relevant guidance. The following table lists the requirements of 44 CFR 201.6 and identifies the sections of the plan fulfilling the guidance.

44 CFR 201.6 REQUIREMENTS ADDRESSED		
Section	*Description*	*Section in Plan*
§ 201.6	The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the state to provide technical assistance and to prioritize project funding.	Section 1.0 Introduction
§ 201.6(a)(4)	Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.	Section 1.1 The Planning Process
§ 201.6(b)(1)	An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.	Section 1.1 The Planning Process Section 4.3 Continued Public Involvement
§ 201.6(b)(2)	An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and private and non-profit interests to be involved in the planning process.	Section 1.1 The Planning Process
§ 201.6(b)(3)	Review and incorporate, if appropriate, existing plans, studies, reports, and technical information.	Section 1.3 Capabilities Section 1.4 Trends & Predictions Section 4.2 Implementation Existing Programs
§ 201.6(c)(1)	Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.	Section 1.1 The Planning Process
§ 201.6(c)(2)	A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.	Section 2.0 Risk Assessment
§ 201.6(c)(2)(i)	The risk assessment shall include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.	Section 2.1 Hazards Identification Section 2.3 Hazard Profiles
§ 201.6(c)(2)(ii)	The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008, must also address NFIP insured structures that have been repetitively damaged by floods.	Section 2.3 Hazard Profiles Section 2.4 Hazard Rankings Section 2.2.5 Flooding Profile
§ 201.6(c)(2)(ii)(A)	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;	Section 2.3 Hazard Profiles
§ 201.6(c)(2)(ii)(B)	The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate;	Section 2.3 Hazard Profiles
§ 201.6(c)(2)(ii)(C)	The risk assessment shall provide a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.	Section 2.4 Development Trends & Complicating Variables



44 CFR 201.6 REQUIREMENTS ADDRESSED		
Section	*Description*	*Section in Plan*
§ 201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.	Section 2.3 Hazard Profiles
§ 201.6(c)(3)	A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.	Section 3.0 Mitigation Strategy
§ 201.6(c)(3)(i)	This section shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.	Section 3.1 Mitigation Goals
§ 201.6(c)(3)(ii)	This section shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.	Section 3.2 Mitigation Actions
§ 201.6(c)(3)(iii)	This section shall include an action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects and their associated costs.	Section 3.2 Mitigation Actions
§ 201.6(c)(3)(iv)	For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.	Section 3.2 Mitigation Actions
§ 201.6(c)(4)(i)	A plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.	Section 4.1 Monitoring, Evaluating & Updating the Plan
§ 201.6(c)(4)(ii)	A plan maintenance process that includes a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.	Section 4.2 Implementation Existing Programs
§ 201.6(c)(4)(iii)	A plan maintenance process that includes discussion on how the community will continue public participation in the plan maintenance process.	Section 4.3 Continued Public Involvement
§ 201.6(c)(5)	Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commission, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.	Section 5.0 Appendix 6
§ 201.6(d)(1)	Plans must be submitted to the State Hazard Mitigation Officer (SHMO) for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval. Where the State point of contact for the FMA program is different from the SHMO, the SHMO will be responsible for coordinating the local plan reviews between the FMA point of contact and FEMA.	Section 5.0 Appendix 7
§ 201.6(d)(3)	A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five years in order to continue to be eligible for mitigation project grant funding.	Section 3.1 Mitigation Goals Section 3.2 Mitigation Actions Section 5.0 Appendix 2



1.0 INTRODUCTION

1.1 Documentation of the Planning Process

§ 201.6(c)(1)	Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Stark County, through the direction of the Stark County Emergency Management Agency (SCEMA) began the process to update this plan in July of 2021; the SCEMA contracted the services of JH Consulting, LLC, of West Virginia, (the consultant) to aid in the process. The consultant met with SCEMA to layout the process and timeline for the update and determine the agency, department, organization, and jurisdictional representatives who would serve as steering committee members.

1.1.1 Planning Steering Committee

The following table outlines the steering committee members that actively participated in the update of this plan. Stark County utilized a "steering committee," and the SCEMA, its consultant, and steering committee members interfaced with the individual participating jurisdictions separately. The steering committee approach allowed for more interaction between committee members and enabled more strategic discussions regarding implementing hazard mitigation and risk reduction in Stark County. The committee was comprised of key officials representing county, municipal, and private entities with a stake in mitigation, and included the following.

STEERING COMMITTEE MEMBERS AND AFFILIATIONS		
Agency/Affiliation	*Name*	*Title*
City of Alliance	Jason Hunt	Fire Chief
City of Canal Fulton	Dan Bucher Jr.	City Manager
City of Canton	Andrea Perry	Director of Public Service
City of Louisville	Tom Pukys	City Manager
City of Massillon	Kathy Catacaro Perry	Mayor
City of Massillon	Barbara Sylvester	Safety & Service Director
City of North Canton	Patrick De Orio	Director of Administration
Village of Beach City	John Spivey	Village Administrator
Village of Brewster	Chuck Hawk	Mayor
Village of Brewster	Michael Miller	Administrator
Village of East Canton	Kathleen Almasy	Mayor
Village of East Canton	Ed Collins	Administrator
Village of East Sparta	Donald Stropki	Mayor
Village of Hartville	Cindy Billings	Mayor
Village of Hills & Dales	Brian Zeno	Chief of Police
Village of Magnolia	Todd Boyd	Mayor

STEERING COMMITTEE MEMBERS AND AFFILIATIONS		
Agency/Affiliation	*Name*	*Title*
Village of Meyers Lake	Joe Harrold	Clerk
Village of Minerva	Philip Turske	Administrator
Village of Navarre	Robert Benson	Mayor
Village of Waynesburg	Douglas Welsh	Mayor
Village of Wilmot	Christina Hysong	Mayor
Stark County EMA	Tim Warstler	Director
Stark County EMA	Doug Wood	Deputy Director
Stark County EMA	Matt Sweeney	Planner
Stark County Floodplain Coordinator	Angela Cavanaugh	Floodplain Coordinator
Stark County Engineer	Steve D. Gronow	Engineer
Stark County GIS Department	Cathy Klinger	GIS Manager
Stark County Health Department	Amy Ascani, R.S.	Emergency Planning Coordinator
Stark County Regional Planning Commission	Bob Nau	Executive Director
Stark Economic Development Board	Ray Hexamer	President
Stark County Sanitary Engineering Department	James Brandenburg	Sanitary Engineer
Stark County Soil and Water	John Sweedon	Storm Water Manager
Muskingum Watershed Conservancy District	Scott Tritt	Chief Engineer
Stark County – OSU Extension	Heather Neikirk	Area Leader
Stark County Park District	Sarah Buell	Projects Manager
Stark County Park District	Tiffanie Baumiller	Projects Assistant
Stark County Sheriff's Department	CJ Stantz	Sheriff's Deputy
Stark County Fire Chiefs Association	Rick Annon	President
Stark County Township Association	Mark Shaffer	President
SARTA	Mark Finnicum	Manager
Kent State University at Stark	James Biehl	Public Safety Manager
Stark State College	Greg Boudreaux	Emergency Planning Coordinator
Malone University	Gary Weed	Campus Safety
University of Mount Union	Bill	Campus Security
ODOT District 4	Brian Olson, Brian Hoover	District Engineers
Jackson Twp PO	Mark Brink	Police Department

The committee came together four times throughout the process, as described below. See Appendix 1 for agendas, meeting minutes, etc.

Committee Meeting 1

September 15, 2021 (Microsoft Teams Web Conference)

The first committee meeting gave members the opportunity to familiarize themselves with each other and with the 2017 plan. The county's consultant explained the requirements of the plan, the planning process through which the update would occur, as well as opportunities that would be created to allow for public involvement in the plan update. The consultant also laid out the expectations for committee members and the public to participate in the update. The primary action item for Meeting 1 was to generate the overall mitigation goals and objectives for the 2022 update, and to discuss and approve the hazards to be included in the 2022 plan update; as such,

committee members reviewed and decided to keep the goal and objectives from the previous edition.

The consultant shared his screen with the group and presented a comprehensive list of hazards (i.e., natural, technological, and human-caused) along with the number of occurrences of each hazard since 2017. The consultant and the steering committee evaluated the comprehensive list of hazards and determinations where made as to which hazards should be included in the plan update. As a result, all hazards included in the 2017 plan will remain in the 2022 plan. The only hazard that was added was hazardous materials release. The consultant noted a required revision per Ohio EMA (i.e., changing “dam failure” to “dam/levee failure”).

The consultant asked the committee several questions during this review. The first was whether to split the severe summer weather profile into severe thunderstorms, wind and tornados, hail, and lightning. The committee decided to keep these hazards under the umbrella of severe summer storms. The second questions regarded what would be included in the severe winter weather profile, it was determined that blizzards, heavy snow, and ice storms would be covered in this profile. The third question confirmed that the temperature extreme profile would include both extreme heat and cold.

The committee strongly considered adding the technological and human-caused hazards of cyberattack, and terrorism. The committee ultimately decided to look at those hazard more in-depth and reconsider adding them during future plan updates.

Committee Meeting 2

November 17, 2021 (Microsoft Teams Web Conference)

The second committee meeting was held online via a web conference as required for compliance with COVID-19 pandemic protocols. The meeting was held on Wednesday, November 17th, and lasted approximately one hour from 10:00am to 11:00am. There were two main agenda items for this meeting: discussion and updating of the 2017 Asset Inventory List, and updating and assigning status indicators to existing mitigation projects. Finally, the committee made suggestion regarding revisions to the on-line public survey prior to making the survey live to the public. The 2017 Asset Inventory List, existing mitigation projects and the on-line Public Survey were sent out to the committee via email one week prior to this meeting to allow them an opportunity to review the information prior to the meeting.

The discussion started with updating the 2017 Asset Inventory List. The consultant shared his screen with the group and presented the 2017 Asset Inventory List, which was also emailed to the committee a week prior to the meeting. The consultant and the steering committee

evaluated the list; as a result a few facilities were removed, a few were added, and some name changes and address changes were made. Committee members were also asked by the consultant to email any other revisions to the asset list that may be discovered after the meeting.

The discussion then turned to assigning status indicators to the 2017 mitigation projects. The consultant read each mitigation project, allowed the committee to discuss each project, then a status (i.e., completed, deleted, deferred, or on-going) was assigned to each project. It was discovered that several of the existing mitigation projects were on-going, and a few were deferred due to lack of available funding.

Finally, the committee worked with the consultant to finalize and approve the on-line Public Survey, which was made live to the public the next day.

Committee Meeting 3

May 6, 2022 (Microsoft Teams Web Conference)

The third committee meeting was held online via a web conference. The meeting was held on Friday, May 6th, and lasted approximately one hour from 10:00am to 11:15am. There were two main agenda items for this meeting: discuss and development of new mitigation projects for each hazard identified in the plan across all jurisdictions of Stark County, and to discuss the methodology that would be utilized to prioritize all mitigation projects included in this plan update.

The contractor provided several sample mitigation projects for all the hazards included in the plan in an effort to generate discussion amongst steering committee members. Steering committee members discussed the relevance of the sample mitigation projects presented, and utilized information from the samples to develop a few of their own mitigation projects. Several new mitigation projects where developed as a result of this meeting and are included in Section 3.2 of the plan.

The contractor presented the methodology that would be utilized for the prioritization of the newly identified mitigation projects. The steering committee discussed this methodology and agreed to utilize the scoring method proposed by the county which was focused around the STAPLEE method to prioritize the newly developed mitigation projects.

The consultant then advised all committee members to start thinking about changes they would like to see made to the Plan Maintenance section of the plan as this would be the main topic of discussion for the next committee meeting.

Committee Meeting 4

June 15, 2022 (Microsoft Teams Web Conference)

The fourth and final committee meeting was held online via a web conference. The meeting was held on Wednesday, June 15th, and lasted approximately one half hour from 10:00am to 10:30am. There were two main agenda items for this meeting: a discussion regarding the plan maintenance process to be utilized moving forward, and a discussion regarding the plan adoption process.

A draft of the updated plan was emailed to all committee members a week prior to this meeting for their review. Committee members were given an opportunity during this meeting the make any comments (i.e., additions, deletions, modifications, etc.) regarding the draft plan prior to final plan development. A draft of the plan was also uploaded unto the Stark County Emergency Management Agency's (SCEMA) website, and emails were sent to all the EMA Directors of neighboring counties so they could review the updated plan and make comments. Comments were received from Mahoning and Summit counties via email (see Appendix 4 – Public Participation)

The steering committee recognized the importance of a plan maintenance process as an opportunity to support networking amongst key stakeholders. Jurisdictional representatives on the steering committee often change, these discussions offer a prime opportunity to orient new members to what mitigation is, how the plan works, etc. The committee agreed to a maintenance process that involves each of the participating jurisdictions conducting an annual or bi-annual review of identified mitigation projects, a review of the asset inventory list for their specific jurisdiction, and making notes regarding the occurrence of any natural hazard events along with the impacts of those events on their jurisdiction.

The consultant also discussed the plan adoption process with committee members. The consultant informed committee members that they would be contacted regarding the adoption of the plan for their jurisdiction once the plan had received Approved Pending Adoption (APA) status. It was explained that all participating jurisdictions must officially adopt the plan to be covered by the plan. The consultant informed committee members that sample Adoption/Resolutions would be sent to each participating jurisdiction, and that they would be required to execute the Adoption/Resolution in the same manner as they would for any official document or proclamation for their jurisdiction.

1.1.2 Jurisdictional Involvement

All of the jurisdictions within Stark County participated in the update to this plan. All cities, villages, townships, and the county had the opportunity to provide input for the plan in the following ways.

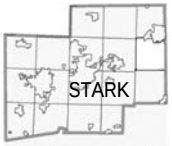
- Attending virtual meetings
- Completing the online capabilities survey and public survey
- Updating their mitigation project lists (which could include updating status of existing projects or adding new projects)
- Providing information for the plan to SCEMA or the consultant via phone or email

The following table identifies what activities jurisdictions completed.

STARK COUNTY HAZARD MITIGATION PLAN (2022 UPDATE) JURISDICTIONAL TASKS								
Community		*Attended Planning Meetings*	*Online Capability Survey*	*Projects Update*	*Added New Projects*	*Provided Info to SCEMA or Consultant*	*Promoted Public Involve*	*Overall Participation Assessment*
Stark County	County	YES	YES	YES	YES	YES	YES	YES
Alliance	City	NO	YES	YES	NO	YES	YES	YES
Canal Fulton	City	NO	NO	YES	NO	YES	YES	YES
Canton	City	YES	YES	YES	NO	YES	YES	YES
Louisville	City	YES	YES	YES	NO	YES	YES	YES
Massillon	City	YES	YES	YES	NO	YES	YES	YES
North Canton	City	NO	NO	YES	NO	YES	YES	YES
Beach City	Village	NO	YES	YES	YES	YES	YES	YES
Brewster	Village	YES	NO	YES	NO	YES	YES	YES
East Canton	Village	YES	YES	YES	NO	YES	YES	YES
East Sparta	Village	NO	YES	YES	NO	YES	YES	YES
Hartville	Village	NO	YES	YES	YES	YES	YES	YES
Hills and Dales	Village	NO	YES	YES	YES	YES	YES	YES
Magnolia	Village	YES	YES	YES	NO	YES	YES	YES
Meyers Lake	Village	NO	YES	YES	YES	YES	YES	YES
Minerva	Village	YES	YES	YES	NO	YES	YES	YES
Navarre	Village	NO	YES	YES	NO	YES	YES	YES
Waynesburg	Village	NO	NO	YES	NO	YES	YES	YES
Wilmot	Village	NO	YES	YES	NO	YES	YES	YES

1.1.3 Public Involvement

Stark County involved the public through the use of online surveys, in person public involvement was avoided due to the on-going Coronavirus pandemic. Online, partners promoted a survey that asked residents about their views on hazards, their support for various mitigation actions, and their level of personal preparedness. The steering committee and SCEMA began posting the survey in late-October 2021; the survey was open until June 1, 2022. In total, 172 individuals completed the survey. The public felt most concerned about pandemic, hazardous



materials release, and flooding (approximately 55% of respondents indicated they were "very concerned" about these three hazards). Residents also reported concern over severe winter and summer weather events (approximately 30% of respondents indicated they were "concerned" regarding severe weather events). Residents were the least concerned about earthquakes, dam failures, and wildfire. References to the results of the survey appear in subsequent sections below, as applicable to the topic of discussion.

1.1.4 Previous Versions

This section contains descriptions of the processes used to update previous versions of the plan (i.e., 2017, 2012, and the original development of the plan in 2005).

2017 Update

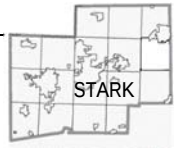
The 2017 plan update process began in June. The Stark County Emergency Management Agency (SCEMA) utilized the services of a planning consultant, JH Consulting, LLC (the consultant) to assist in the update. Four in-person meetings were held at the Emergency Operations Center (EOC).

- **Planning Committee Meeting:** June 8, 2017. Kick-off the project.
- **Steering Committee Meetings:** July 13, and August 1, 2017. Introduce the plan and solicit feedback, and ongoing maintenance, review and approval of the plan.
- **Public Meeting:** August 1, 2017. Present the plan to the public for review.

In addition to facilitating the meetings, the consultant maintained contact with the planning and steering committees throughout the planning period to solicit input from the jurisdictions such as project status updates, asset inventories, capabilities, and general plan information to update the plan. Information on meeting attendance, contacts made via phone and email with the jurisdictions, meeting presentations, agendas, and activities completed by the steering committee was included in an appendix to the plan. The following table lists all the plan stakeholders and identifies, by superscript, which of the ways they participated. The superscript corresponds to the number listed below.

1. Participated by completing the online capabilities survey sent by the consultant.
2. Attended at least one steering committee meeting.
3. Direct contact via email or phone with the consultant or SCEMA.
4. Published public surveys on their websites and social media.
5. Data provided by SCEMA.

STARK COUNTY HMP STAKEHOLDERS			
Stakeholders	*Representatives*	*Stakeholders*	*Representatives*
Alliance, City of [1,3]	Jason Hunt, Fire Chief	Canton Township [1, 3]	Christopher Nichols, Trustee
Canal Fulton, City of [3]	Joe Shultz, Mayor	Jackson Township [5]	Michael Vaccaro, Administrator
Canton, City of [1,3]	William Bartos, Director of Public Service	Lake Township [1, 2, 3]	Sophia Kapadia, Administrator Daniel Kamerer John Arnold
Louisville, City of [1,2, 3]	Tom Ault, City Manager	Lawrence Township [1, 2, 3]	Carol Blose, Trustee Les Kamph, Trustee
Massillon, City of [3]	Kathy Catacaro Perry, Mayor	Lexington Township [3]	James Mathews, Trustee
North Canton, City of [1,2,3]	Michael Grimes, Director of Admin.	Marlboro Township [5]	John Hagan, Trustee
Beach City, Village of [1,3]	John Thomas, Mayor	Nimishillen Township [1, 3]	Richard Peterson, Fire Chief
Brewster, Village of [1, 2, 3]	Michael Miller	Osnaburg Township [5]	Richard Pero, Trustee
East Canton, Village of [1, 2, 3]	Kathleen Almasy, Mayor Ed Collins	Paris Township [1, 5]	Rudy Evanich, Trustee
East Sparta, Village of [3]	Donald Stropki, Mayor	Perry Township [1, 3]	Joyce Fetzer, Administrator
Hartville, Village of [1, 3]	Cindy Billings, Mayor	Pike Township [1, 2]	Doug Baum, Trustee Don Chametzky Molly Murphy Mark Pahanish
Hills & Dales, Village of [1, 2, 3]	Brian Zeno, Chief of Police	Plain Township [1, 2, 3, 4]	Chuck Shalenberger, Fire Chief
Limaville, Village of [3]	Mark Johnston, Mayor	Sandy Township [5]	Robert Fallot, Trustee
Magnolia, Village of [1, 3]	Robert Leach, Mayor	Sugarcreek Township [5]	Patrick Bucher, Trustee
Meyers Lake, Village of [3]	Beth Williams, Mayor	Tuscarawas Township [1, 2]	Blake Brenner, Trustee John Speicher
Minerva, Village of [3]	David Harp, Administrator	Washington Township [1, 3]	Merrit Boyce, Trustee
Navarre, Village of [3]	Robert Benson, Mayor	Stark County EMA [2, 3, 4]	Tim Warstler, Director Andrew Jaspers, Deputy Director Steven Foss, Planner
Waynesburg, Village of [3]	Douglas Welsh, Mayor	Stark County Parks District [3, 5]	Sarah Buell, Project Manager
Wilmot, Village of [3]	Bobby Pulley, Mayor	Stark County Regional Planning [5]	Bob Nau, Executive Director
Bethlehem Township [5]	Ronald Wendling, Trustee		



2017 Engaging the Public and Neighboring Counties

The consultant created an online survey regarding hazards in the region that Stark County Emergency Management Agency (SCEMA) and few other jurisdictions distributed via their social media site. The public had an opportunity to complete the survey beginning on June 15, 2017. As of mid-August, the online survey had 128 responses. In addition, a public meeting was held on August 1, 2017 to solicit input from the community, at which attendance was minimal. The updated plan will be posted for review on SCEMA's website. The plan is scheduled to be available from August 11 through August 25, 2017 and there will also be a comment form to allow submission of formal public comments. Residents may also obtain copies of the survey or the plan by contacting the SCEMA directly.

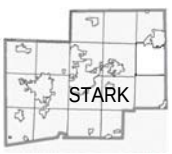
The SCEMA had a phone interview to talk about the HMP on WHBC 94.1 and 1740 AM radio stations on August 10, 2017. The ratio stations planned to air the interview over the following days.

The SCEMA reached out to neighboring counties' emergency managers to solicit information about hazards originating in their counties that could affect Stark County, and hazards originating in Stark County that could affect their jurisdictions. The email SCEMA sent, as well as responses received was in included in an appendix to the plan.

2017 Research Conducted

The research conducted for the risk assessment phase of this update included data from federal, state, higher education, and mass media sources. The research aim was primarily to validate and describe the hazards included for consideration in this plan. Specific sources relative to individual hazards were listed in an appendix to the plan.

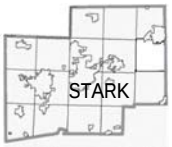
The consultant reviewed a number of existing plans and reports to (a) identify any obvious inconsistencies between other development and mitigation efforts, (b) as baseline information for such sections as Analyzing Development Trends, and (c) to support discussions surrounding mitigation projects. Those documents included the following.



REFERENCED DOCUMENTS		
Document type	*Document citation*	*How incorporated into plan*
Technical Information	USACE. (2014). *National inventory of dams*. Online.	Used to validate list of names and locations of dams in Stark County
Technical Information	USDHS FEMA. (January, 2013) *Mitigation Ideas.* Federal Government: Washington, DC	Used as general guidance for stakeholders and jurisdictions on mitigation ideas
Technical Information	USDHS FEMA. (June, 2016). *National Mitigation Framework.* Federal Government: Washington, DC	Used as general guidance on mitigation planning.
Technical Information	USDHS FEMA. (May, 2005). *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. Federal Government: Washington, D.C.	Used as general guidance for incorporating historic property and cultural protection.
Technical Information	USDHS FEMA. (March, 2013). *Local mitigation planning handbook.* Federal Government: Washington, D.C.	Used as general guidance on revised mitigation planning process
Technical Information	USDHS FEMA. (March, 2013). *Integrating Hazard Mitigation Into Local Planning.* Federal Government: Washington, D.C.	Used as general guidance on existing plan integration for hazard mitigation
Plan	State of Ohio (April, 2014). *Enhanced Hazard Mitigation Plan.* State Government: Columbus, OH	Used as general guidance on existing plan integration for hazard mitigation
Plan	City of Alliance (July, 2015). FY 2015 CDBG action plan HUD grantee. Local Government. Alliance, OH	Used as general guidance on existing plan integration and future development.
Plan	City of Canton (August, 2015). *Comprehensive Plan*. Local Government. Canton, OH.	Used as general guidance on existing plan integration and future development.
Plan	Village of Brewster (August, 2013) *Community Comprehensive Sustainability Plan*. Local Government Brewster, OH.	Used as general guidance on existing plan integration and future development.
Plan	Stark County Regional Planning Commission (June, 2015). *Village of East Canton and Osnaburg Townships' Joint Community Plan*. Local Government, East Canton, OH.	Used as general guidance on existing plan integration and future development.
Plan	City of Louisville (Feb, 2016). *Comprehensive Plan*. Local Government, Louisville, OH.	Used as general guidance on existing plan integration and future development.
Plan	Jackson Township (May, 2006). *Comprehensive Plan*. Local Government Jackson Township, OH.	Used as general guidance on existing plan integration and future development.
Plan	Stark County (March, 2013). *Stark County Excessive Temperature and Utility Disruption Emergency Annex*. Local Government: Stark County, OH.	Used as general guidance regarding risk situation on excessive heat and cold and utility disruption.

2017 Implementing the Plan and Monitoring Progress

Stark County's stakeholders realize that the plan must remain viable in order to appropriately guide mitigation in the region. To that end, plan implementation (i.e., the mitigation strategy and project prioritization) was presented in Section 3.0 Action Plan. The monitoring process was presented in Section 4.0 Plan Maintenance Process.



2012 Update

The planning process to complete the first five-year update of the plan was similar to the process used to originally develop the document. The update process was completed between October, 2011 and January, 2012. It was facilitated through a stakeholders/public meeting. The "stakeholders" portion of the meeting was a session with the Hazard Mitigation Core Planning Committee (HMC). The Stark County Emergency Management Agency (SCEMA) again utilized the services of a planning consultant (JH Consulting, LLC of West Virginia) to guide the update process. The consultant provided an objective perspective to ensure that the HMC was achieving the goals that the Mitigation Core Group had intended to achieve in 2005. The current HMC, also known as the EMA Advisory Board, had recently conducted meetings in both June and September of 2011, and was comprised of the following.

- Chief Deputy, Stark County Sheriff
- LEPC Chair, Stark County Local Emergency Planning Committee
- Stark County Fire Chiefs' Association President
- Chair Person, Stark County Emergency Healthcare Planning Committee
- Representative, Stark County Police Chiefs' Association
- County Administrator, Stark County Commissioners
- City Administrator, Stark County Large City Mayors and City of Massillon
- Trustee, Stark County Township Trustees' Association and Perry Township Trustees
- Health Commissioner, Stark County Health Departments and City of Canton Health Department
- Director, Stark County Emergency Management Agency

2005 Original Plan Development

At the direction of the Stark County Emergency Management Agency (EMA), Stark County and its municipalities developed a Multi-Jurisdictional Hazard Mitigation Plan in an effort to indicate probable hazard risks, profile future hazard events, estimate damage and losses as a result of future hazard events, and advocate mitigation projects to reduce the effects of the identified hazards on the communities within the county. The plan aims to create safer, more disaster-resistant communities.

The EMA compiled a Hazard Mitigation Core Planning Committee (HMC), known as project stakeholders, to be responsible for the development and implementation of the plan. The committee included representatives from the cities, villages, and the emergency services organizations within the county (fire, police, etc.). Other organizations that were involved in the

process were the Stark County Local Emergency Planning Committee (LEPC), local health departments, and R.D. Zande & Associates, Inc.

HMC members consistently reported the actions of the project stakeholders back to the participating jurisdictions. As such, participating jurisdictions and the public were continually updated as to the status of the plan's preparation. Further, with respect to the development of an Action Plan (AP), one special HMC meeting and two public review sessions were scheduled to discuss the formulation of the plan and ways in which the county could lessen its susceptibility to the identified hazards.

Feedback received from the HMC and the public proved valuable in the development of the plan. Several comments were received that resulted in the reevaluation of the prioritization of risks that were included in the plan. Several members of the public and other emergency services organizations showed a strong desire to be educated as to what they could do to assist mitigation. Further, all governmental jurisdictions in Stark County were polled in an effort to gather local opinion on prominent hazards and high-priority mitigative actions. As a result, the plan was tailored to Stark County's specific needs, and will prove to be a document county residents can feel ownership of and utilize to make educated decisions to reduce their vulnerability to hazards.

1.1.5 Implementing the Plan and Monitoring Progress

Stark County's stakeholders realized that the plan must remain viable in order to appropriately guide mitigation in the county. To that end, plan implementation (i.e., the mitigation strategy and project prioritization) are presented in Section 3.0: Action Plan. The monitoring process is presented in Section 4.0: Plan Maintenance Process.

1.1.6 Plan Maintenance and Continued Public Participation

See Section 4.0 Plan Maintenance Process for a detailed discussion of monitoring and evaluative efforts.

1.0 INTRODUCTION

1.2 Description of the Planning Area

The description of the planning area contextualizes the remainder of this document. It provides background information on the areas impacted by various hazards and serves as a foundation for mitigation decisions.

1.2.1 Stark County Details

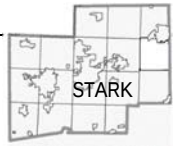
This first sub-section provides demographics and other details for Stark County. It includes unincorporated areas as well as municipal areas.

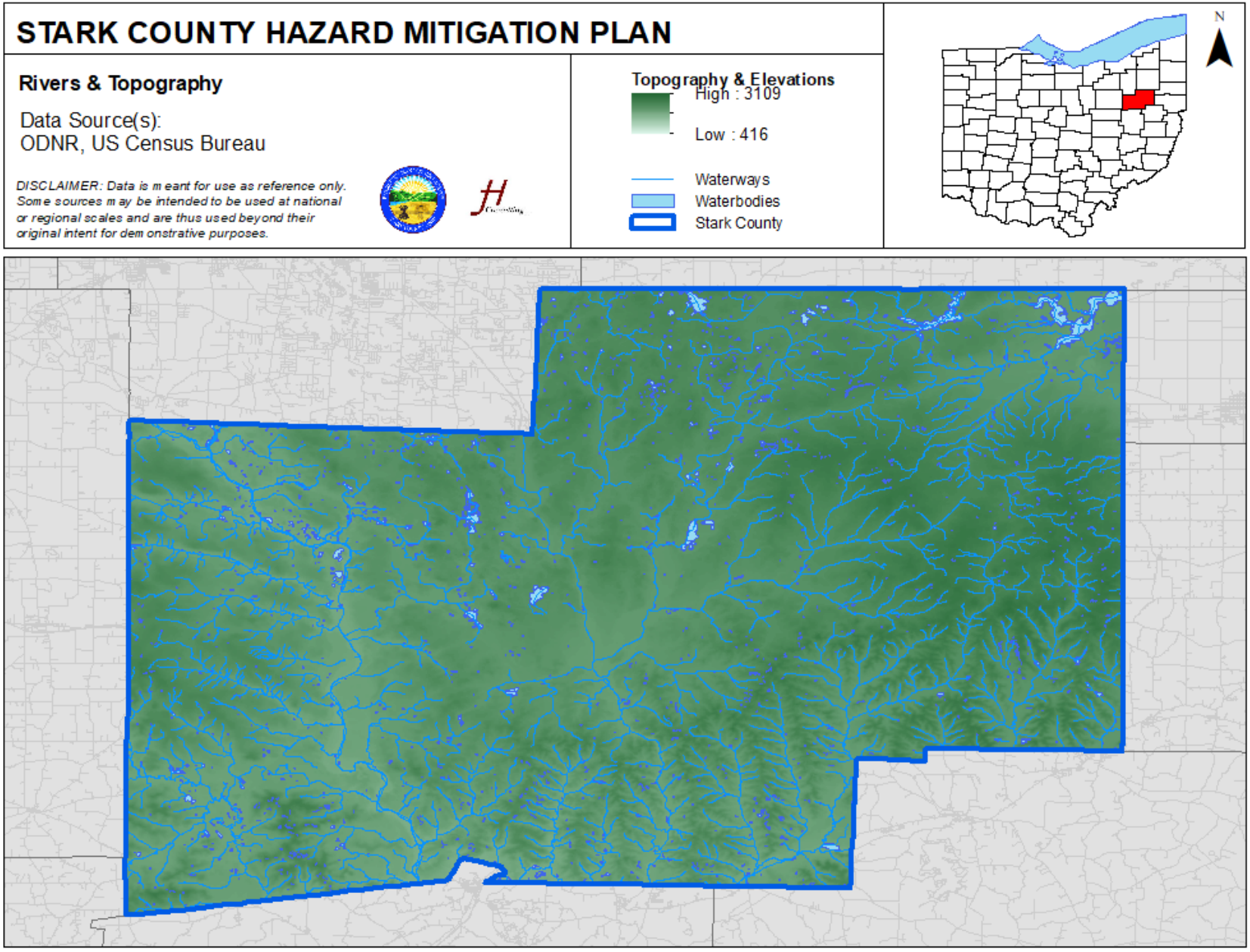
STARK COUNTY JURISDICTIONS	
Political Jurisdiction	*Type*
Alliance	City
Canal Fulton	City
Canton	City
Louisville	City
Massillon	City
North Canton	City
Beach City	Village
Brewster	Village
East Canton	Village
East Sparta	Village
Hartville	Village
Hills & Dales	Village
Magnolia	Village
Meyers Lake	Village
Minerva	Village
Navarre	Village
Waynesburg	Village
Wilmot	Village
Bethlehem	Township
Canton	Township
Jackson	Township
Lake	Township
Lawrence	Township
Lexington	Township
Marlboro	Township
Nimishillen	Township
Osnaburg	Township
Paris	Township
Perry	Township
Pike	Township
Plain	Township
Sandy	Township
Sugarcreek	Township
Tuscarawas	Township
Washington	Township

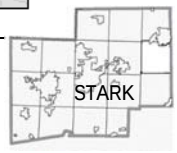
Geography

Stark County is located in the northeastern portion of Ohio. Clockwise, starting in the northwest corner of the county, it is surrounded by Summit, Portage, Mahoning, Columbiana, Carroll, Tuscarawas, Holmes, and Wayne Counties. The county seat is the City of Canton, the county contains five other cities, 12 villages, and 17 unincorporated townships shown in the table on the right, and displayed graphically in the map below. The jurisdictions of Greentown and Uniontown, located in the northern portion of the county, are considered to be part of Summit County for the purposes of this plan and therefore are not included in the jurisdictional list. The county was established in February of 1808 and named for John Stark, a Revolutionary War General. The county has a total area of 581 square miles, of which 575 square miles is land and 6 square miles is water (U.S. Census Bureau).

The Tuscarawas River is a principal tributary of the Muskingum River and flows from north to south through the western portion of the county, passing through Massillon City and the Villages of Canal Fulton and Navarre. Also, Nimishillen Creek flows north south through the central portion of the county. Both are part of the Mississippi River watershed.




STARK COUNTY HAZARD MITIGATION PLAN
Rivers & Topography
Data Source(s):
ODNR, US Census Bureau
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Topography & Elevations
High : 3109
Low : 416
Waterways
Waterbodies
Stark County
N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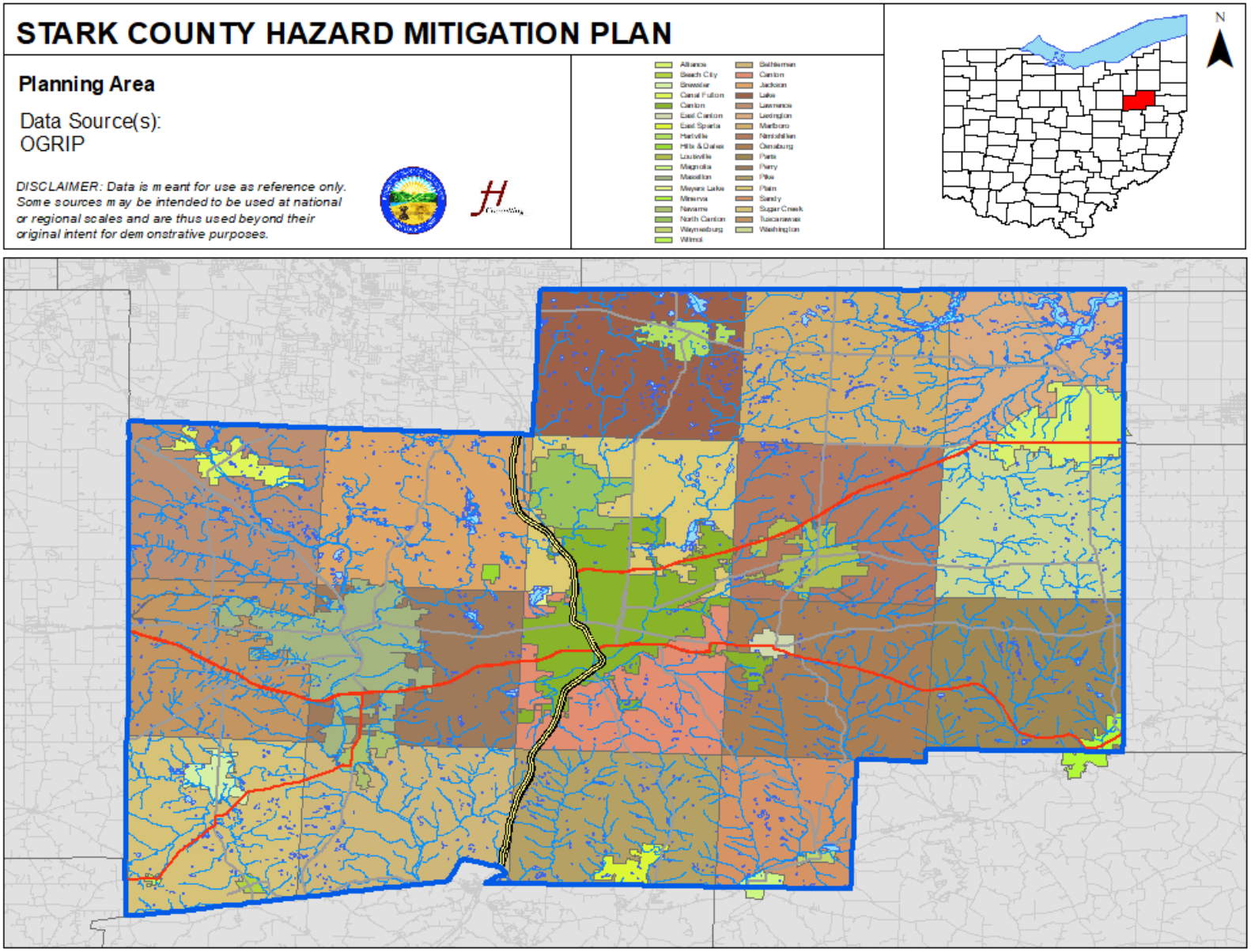
STARK COUNTY HAZARD MITIGATION PLAN
Planning Area
Data Source(s):
OGRIP
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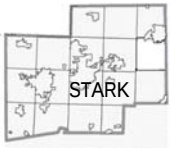

STARK

Demographics

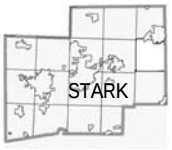
The total population of Stark County, according to the 2020 Census is 374,853, which is a decrease of just 733 over the past decade. Of that, 47% live within the 19 municipalities while 53% live in the unincorporated county. Census figures also indicate that there are 167,205 housing units in Stark County and an average of 2.24 persons per household. Stark County is included in the Canton-Massillon, Ohio Metropolitan Statistical Area (MSA), which is also included in the Cleveland-Akron-Canton, Ohio Combined Statistical Area. The median age in Stark County is 42, above the state median age of 39.4 (U.S. Census Bureau, 2019).

Approximately 92% of the population in Stark County has at least a high school diploma or GED, which is slightly better than the statewide percentage of 90.4%. The Median Household Income (MHI) is $53,860, below the state MHI and considerably below the national median. Approximately 13% of families are living below the poverty line. The table to the right shows this and other basic demographic data for Stark County (U.S. Census 2020, Ohio Development Services Agency, 2020).

Stark County Demographics	
Total Population (2020)	374,853
Male	182,179
Female	192,674
Total Housing Units	167,205
Percent high school diploma or higher	91.6%
Percent Bachelor's degree or higher	22.8%
Median Household Income	$53,860
Families below poverty level	13.0%
Unemployment Rate (June 2021)	6.3%

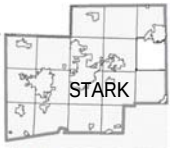
Source: U.S. Census, 2020

As stated prior, there are 19 municipalities in Stark County. The demographics for these municipalities are shown in the table below. All data are from the U.S. Census Bureau.



STARK COUNTY DEMOGRAPHICS														
	Population (2020 Est.)	*White*	*African American*	*American Indian & Alaska Native*	*Asian*	*Native Hawaiian*	*Hispanic or Latino*	*Veteran*	*65+ %*	*Under 18 %*	*Housing Units*	*MHI[1]*	*Persons in Poverty*	*Pop. Per Mile[2]*
Stark County (Total)	374,853	329,871	29,988	1,125	3,749	0	8,248	24,872	74,596	79,844	167,205	$53,860	13%	653
Alliance City	21,672	18,530	1,950	87	130	0	368	1,576	3,814	4,638	9,814	$35,718	24.4%	2,501
Canal Fulton City	5,325	5,293	11	0	0	0	80	261	1,113	1,060	2,340	$60,292	8.0%	1,682
Canton City	70,872	47,555	17,576	71	354	0	3,260	4,406	10,347	17,222	35,252	$32,287	30.8%	2,867
Louisville City	9,521	9,159	0	38	67	0	95	556	1,828	2,333	4,059	$60,180	9.2%	1,673
Massillon City	32,146	27,871	2,540	96	161	0	482	2,362	6,268	7,040	15,286	$45,809	17.3%	1,730
North Canton City	17,842	16,361	482	0	393	0	303	1,325	4,068	3,354	7,560	$62,128	6.7%	2,733
Beach City Village	915	867	0	3	17	0	12	74	184	188	420	$44,375	15.1%	2,118
Brewster Village	2,161	2,092	17	0	2	0	24	261	473	510	898	$44,353	13.1%	947
East Canton Village	1,464	1,401	32	0	0	0	4	107	253	351	679	$48,277	7.5%	1,314
East Sparta Village	937	925	3	0	0	0	0	86	170	223	393	$61,250	9.8%	435
Hartville Village	3,039	2,939	0	21	12	0	21	255	760	468	1,418	$45,978	8.1%	1,141
Hills & Dales Village	310	283	0	0	15	0	4	16	97	49	152	$145,625	1.6%	705
Magnolia Village	1,016	1,015	0	1	0	0	0	62	175	202	435	$68,167	4.8%	1,047
Meyers Lake Village	652	619	13	0	0	0	20	40	225	51	371	$84,750	4.9%	2,548
Minerva Village	3,504	3,357	35	0	0	0	28	291	764	736	1,681	$48,199	12.2%	1,668
Navarre Village	1,648	1,561	40	0	16	0	33	176	410	277	878	$45,240	17.3%	958
Waynesburg Village	970	895	9	0	5	0	16	108	141	220	401	$52,500	11.6%	1,836
Wilmot Village	313	301	9	0	0	0	0	17	27	59	146	$50,000	1.3%	1,796

Source: US Census Bureau (Annual Estimates of the Resident Population for Incorporated Places in Ohio: April 1, 2010 to July 1, 2019)
US Census Bureau (QuickFacts) & Census Designated Place (CDP) Search
Note: [1] – Median Household Income (MHI)



Transportation

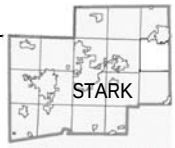
Stark County has a broad transportation network. Approximately 19 miles of Interstate highway, as well as approximately 72 miles of U.S. highway and 251 miles of state highway traverse the county. US Routes 30, 62, and State Routes 153, 172, 173, 212, and 619 cross the county east west (physical direction). Interstate 77 and State Routes 21, 43, 44, 93, 183, 241, and 800 run north south (physical direction). There are also 358 bridges and 2,700 culverts located within Stark County.

The Stark Area Regional Transit Authority (SARTA) operates 34 fixed bus routes in Alliance, Akron, Canton, Cleveland, Hartville, Jackson Township, Louisville, Massillon, North Canton and Uniontown (SARTA).

Another component of Stark County's transportation infrastructure is railways. According to the Stark County Engineer's Office, there are three major active railroads that traverse the county: the Conrail, CSX, and the Wheeling & Lake Erie (W&LE), which pass several communities throughout the county. Other railroads in Stark County include the Norfolk Southern, Ohio Central, and R.J. Corman. Amtrak has a stop in Alliance (station code ALC) on the Capitol Limited line.

Air transportation in Stark County consists of thirteen airfields including the Akron-Canton Regional Airport, a portion of which is located in northern Jackson Township. The Akron-Canton Airport (Airport code: CAK) is a regional air terminal serving both commercial and military aircraft. There are also three smaller air fields in the county, including Barber Field on the northeast side of the City of Alliance, Yoder Airfield on the northeast side of the City of Louisville, and Beach City Airfield along State Route 212 near the county border with Tuscarawas County. There is also a commercial heliport located in Stark County.

According to the latest economic impact study, the airport and its tenants contribute nearly $400 million in economic activity and employ more than 1,000 people (Discover Jackson, n.d., p. 16).



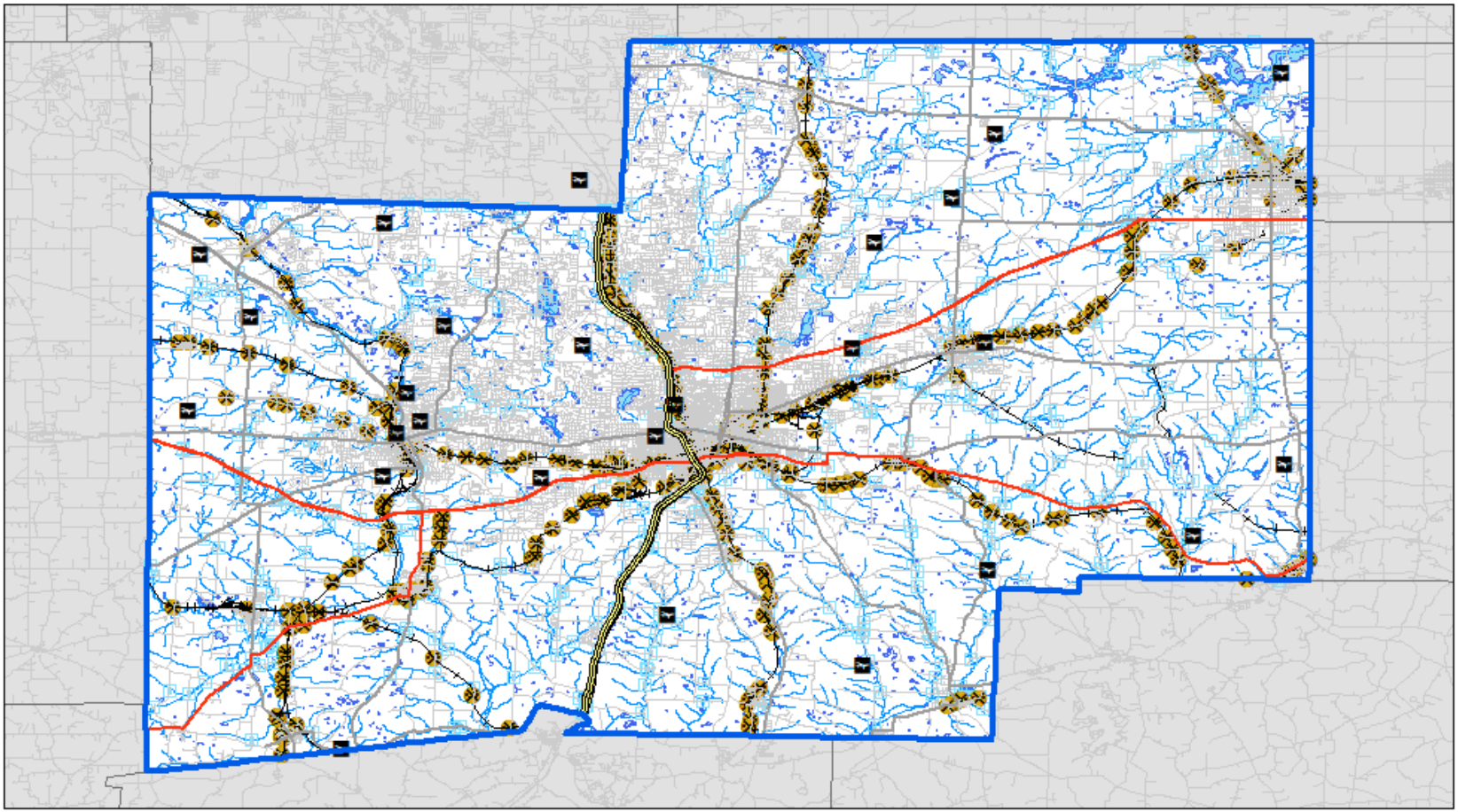
STARK COUNTY HAZARD MITIGATION PLAN

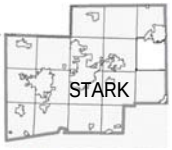
Transportation Infrastructure

Data Source(s):
ODOT, Stark Co. GIS, US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Airfields / Helipads
- Bridges
- Rail Crossings
- Railroads
- Roads
- Interstate 77
- US Routes
- State Routes





Utilities

The table below outlies the major utility providers serving Stark County and its municipalities.

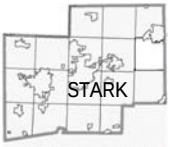
STARK COUNTY UTILITY PROVIDERS	
Utility	*Name*
Electric	AEP Ohio FirstEnergy Ohio Power Ohio Edison
Natural Gas	All American Energy Columbia Gas of Ohio Consumers Gas Cooperative Dominion East Ohio Knox Energy Cooperative Association, Inc. Northeast Ohio Natural Gas Northern Industrial Energy Development
Solid Waste	Stark-Tuscarawas-Wayne
Telecommunications	AT&T Ohio Frontier North Massillon Cable TV Time Warner Cable Spectrum Windstream
Water	Aqua Ohio Stark Regional Local Water Departments

Source: Ohio Public Utilities Commission

Economy

Stark County has a primarily service-based economy. The service industry is the largest employer in Stark County, making up over 83% of all private sector employment. According to the Canton Regional Chamber of Commerce, the Alliance Community Hospital is the largest employer in the county. Stark County is the home of several tourist attractions. The National Football League (NFL) was founded in 1920 in Canton Ohio. In the early 1960's, the city was chosen as the site for the Professional Football Hall of Fame. Twin Enshrinement Halls honor the greats of professional football. Stark County's population swells during induction ceremonies at the hall of fame. The top ten employers are shown in the table to the right (Canton Regional Chamber of Commerce, 2020).

Top 10 Employers
Alliance Community Hospital
Aultman Hospital
Diebold Nixdorf, Inc.
Fisher Food, Inc.
Synchrony
Mercy Medical Center
PCC Airfoils
Republic Engineered Products
Stark State College
TimkenSteel Company



The unemployment rate in Stark County has been steadily falling for the past several years, from a high of 5.5% in 2016 to 4.5% in 2019 (Ohio Development Services Agency, 2020). According to 2020 data from the Ohio Department of Development, the largest sectors of employment include trade, transportation and utilities as well as professional and business services, which employ 1,895, and 1,324 people, respectively. Portions of the economy in Stark County have changed significantly since 2013. The Education and Health Services Sector has seen a 4% increase in the number of establishments, and a 1.2% increase in average employment since 2013. The Construction Sector saw the largest percent increase in average employment (i.e., 16.1%). The Natural Resources and Mining Sector suffered a 26.2% decline in average employment during the same timeframe, the largest of any sector. The Median Household Income (MHI) in Stark County in 2020 was $53,860.

Year	Unemployment Rate
2015	5.3%
2016	5.5%
2017	5.2%
2018	4.9%
2019	4.5%

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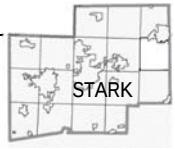
Education

The education system in Stark County consists of 92 public schools with 54,016 students and 3,654 teachers, five community/charter schools with 832 students and 66 teachers, and 23 private schools at which another 4,043 students attend (Ohio Development Services Agency, 2020). There are 17 public school districts that operate 49 elementary, 26 middle, and 17 high schools throughout Stark County.

STARK COUNTY PUBLIC SCHOOL DISTRICTS			
School Districts	*Elementary Schools*	*Middle Schools*	*High Schools*
Alliance City School District	1	2	1
Canton City School District	8	4	1
Canton Local School District	1	1	1
Fairless Local School District	1	1	1
Jackson Local School District	4	1	1
Lake Local School District	3	1	1
Louisville City School District	3	1	1
Marlington Local School District	3	1	1
Massillon City School District	4	2	1
Minerva Local School District	1	1	1
North Canton City School District	3	3	1
Northwest Local School District	2	1	1
Osnaburg Local School District	1	1	1
Perry Local School District	6	2	1
Plain Local School District	6	2	1
Sandy Valley Local School District	1	1	1
Tuslaw Local School District	1	1	1



Five post-secondary education institutions serve Stark County and the surrounding area, one 2-year public college, one 4-year public college, and three private universities, which include Kent State University at Stark, Malone University, Stark State College, University of Mount Union, and Walsh University. There are also two Ohio technical centers located in stark county, Alliance Career Center and RG Drage.

Healthcare

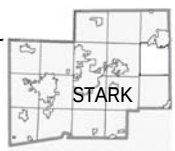
Several health care facilities are located in Stark County. Currently, there are six registered hospitals with 1,531 available beds, 35 licensed residential care facilities with 2,287 available beds, and 38 licensed nursing homes with 3,566 available beds. Evacuation of these facilities during an emergency situation could be a concern due to the large number of vulnerable populations that fill them.

The cities of Alliance, Canton, and Massillon have municipal health department which serve the residents of each city and surrounding areas. These municipal health departments offers adult and child immunizations, nursing services, general health screenings, infectious/communicable disease reporting and surveillance, vital (birth and death) records, and environmental health services. The Stark County Health Department serves villages and townships of Stark County, and provides immunizations, vital records, plumbing inspections, and wellness classes, among other services.

There are 991 physicians in Stark County, for an average of one physician per 380 residents. Residents of Stark County are slightly less likely to be insured compared to Ohio residents as a whole. 8.2% of Stark County residents are uninsured, compared to 6.3% of Ohio residents overall. Compared to the United States as a whole, both Stark County and Ohio are more likely to have insurance, as 8.8% of U.S. residents do not have health insurance.

Land Cover / Climate

The majority of Stark County's land cover is agriculture or open urban areas, which account for nearly 54 percent (54%) of the total land cover, or 137,000 acres. Wooded areas make up another 39% of the total land cover. Approximately 1,547 individual farms operate in Stark County, with an average size of 86 acres per farm (Ohio Development Services Agency, 2018). Stark County's topography is that of flat and open to gently sloping, offering limited protection against strong straight-line winds or tornadoes that may form and touchdown. These high winds are damaging to both structural and agricultural assets. The highest point in Stark County is located approximately one mile north and east of the community of Paris at 1,354 feet



above sea level. The lowest point in the county is the portion of the Tuscarawas River that flows through Bethlehem Township, at 880 feet above sea level. Stark County has an elevation change of only 474 feet from the highest point to the lowest point in the county.

Stark County has a continental-type climate, predominantly influenced by air from the west. There is considerable variation in seasonal temperatures, with none of the temperatures being considered severe. The climate of Stark County is seasonal in nature, with wet stormy springs, warm summers, colorful falls, and cold snowy winters. The winter low temperature in January is 20°F; the summer high temperature in July is 83°F. The county experiences an average of 167 sunny days per year, and receives some kind of precipitation, on average, 145 days per year. The county averages 39 inches of rain per year, and 37 inches of snow per year (National Weather Service).

The Tuscarawas River and Nimishillen Creek are the two (2) major water ways servicing the county. The Tuscarawas River flows north to south through the western portion of the county and is a principal tributary of the Muskingum River. The Tuscarawas River passes through Massillon City and the Villages of Canal Fulton and Navarre. Nimishillen Creek flows north to south through the central portion of the county. Both the Tuscarawas River and Nimishillen Creek are part of the Mississippi River Watershed.

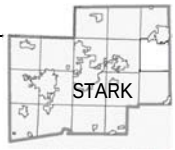
Attractions

Attractions in Stark County include Quail Hollow State Park, President William McKinley National Memorial, McKinley Museum of History, Science, and Industry, Canton Museum of Art, 1st Ladies Museum in Canton, Classic Car Museum, Hoover Historical Center-Vacuum Cleaner Museum, Ohio Military Museum at Massillon, Spring Hill Historic Home, St. Helena III Canal Boat at Canal Fulton, and the Pro Football Hall of Fame.

There are five areas/facilities associated with state parks, forests, nature preserves, scenic waterways and wildlife areas. These areas account for 4,391 acres.

Stark Parks

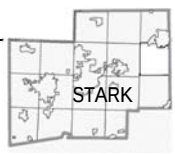
The Stark Park District is an independent political subdivision created and governed by Section 1545 of the Ohio Revised Code (ORC). A volunteer five-member Park Commission is appointed by the Probate Court and governs the Park District. Stark Parks' mission is to preserve, manage, and connect natural areas to serve the community through recreation, conservation and education. Stark Parks employees approximately 60 personnel that manages 19 trail systems (i.e., over 120 miles of hiking, biking and equestrian trails), 15 parks, 9 rental



facilities, 2 reservoirs (i.e., Deer Creek Reservoir and Walborn Reservoir), and the Joseph J. and Helen M. Sommer Wildlife Conservation Center, totaling over 8,000 acres of land.

The *Stark County Trail and Greenway Plan* was adopted in 1999 to connect people, places, and communities with 300 miles of interconnected, recreational trails. This plan drives the continued development of Stark Parks green space and trail expansion today.

Stark Parks has its own Public Safety Department, the Stark County Park Rangers exist not only to protect parkland and wildlife, but also thousands of park visitors. The park rangers are certified peace officers through the Ohio Peace Officer Training Academy. They are sworn and commissioned officers with full powers of arrest, they have the ability to enforce state laws, including wildlife, watercraft, and traffic laws. Park rangers are also trained in ice water rescue.



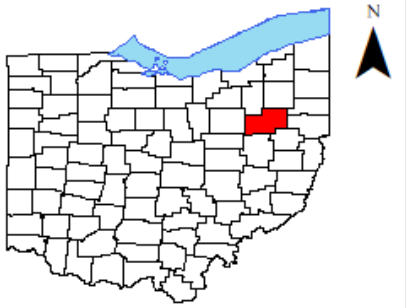
STARK COUNTY HAZARD MITIGATION PLAN

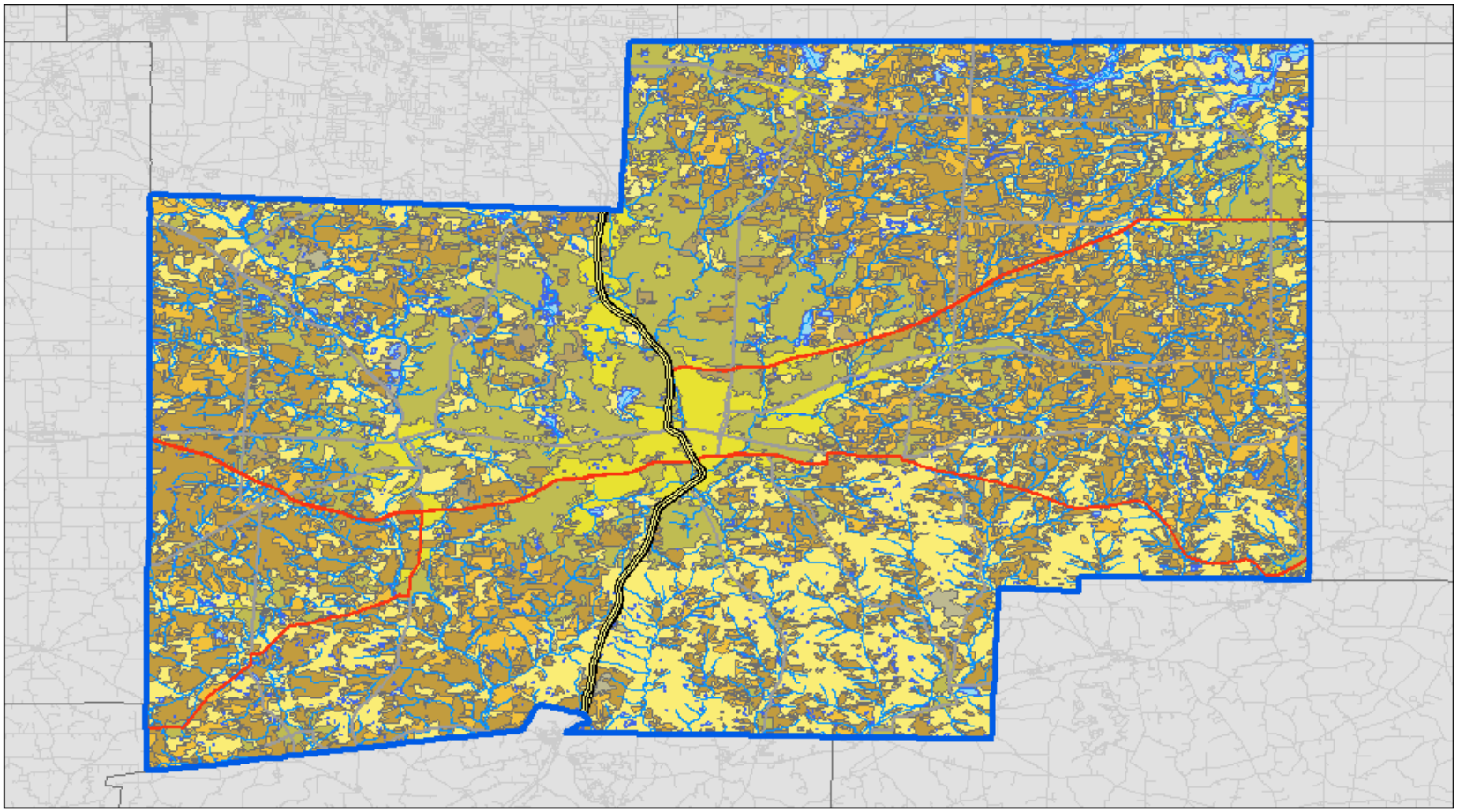
Land Use Map

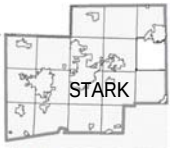
Data Source(s):
Stark Co. GIS, US Census Bureau, USGS NLCD

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Bare/Mines
- Commercial/Industrial/Transportation
- Crop
- Deciduous Forest
- Evergreen Forest
- Herbaceous Wetlands
- Open Water
- Pasture
- Residential
- Urban/Recreational Grasses
- Woody Wetlands







Social Vulnerability Indicators

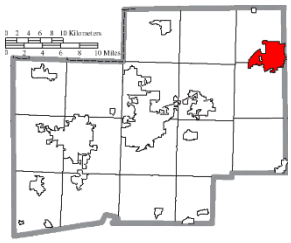
Stark County has a diverse population. Of its 374,853 residents, 51.4% are female. Approximately 79,844 are under the age of eighteen, and 74,596 more are over the age of 65. While most residents have a diploma, there are 31,488 who do not. The Median Household Income (MHI) for the county is $53,860, and the poverty rate is 13%. This exceeds the national poverty rate of 10.5%. Most of the population is white, but there are nearly 30,000 who identify as black or African American, and 10,121 who are two or more races. There are approximately 13,900 residents who primarily speak a language other than English, and there are nearly 34,000 individuals under the age of 65 with a disability.

1.2.2 Municipalities

This section provides demographics and other general details for each of the cities and villages in Stark County.

Alliance City

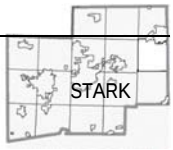
The City of Alliance is located in the northeastern portion of Stark County in Lexington and Washington Townships along the Mahoning County line. Alliance was founded in 1854 by the merger of three smaller communities called Williamsport (formed in 1827), Freedom (formed in 1838), and Liberty (formed in 1850). A fourth community, Mount Union, was added in 1888, and Alliance was incorporated as a city in 1889. The city is the third largest in the county in terms of land area at 8.52 square miles. Alliance City is located approximately 16 miles northeast of Canton and 27 miles southwest of Youngstown.



The major highways accessing the city include State Routes 183 and 225 running north south and US Route 62 and State Route 173 running east west. The Norfolk Southern railroad also traverses the city. The Barber Airfield is located north of Alliance. There are two large creeks that flow through the city: Beech Creek and Mahoning Creek. The Berlin Reservoir is located just to the north of the city. The aforementioned creeks have prompted past flooding in the city.


Glamorgan Castle

The city was a manufacturing and railroad hub for much of the 20th century and is also associated with the state flower of Ohio, the scarlet carnation, and is known as “The Carnation City”. Most of the city is part of the Canton-Massillon, OH Metropolitan Statistical Area, while the small portion of the city in



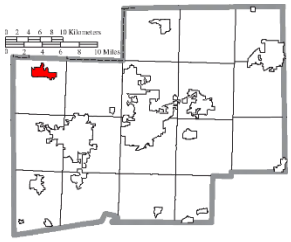
Mahoning County is within the Youngstown –Warren-Boardman, OH-PA Metropolitan Statistical Area.

Students in Alliance City are served by the Alliance City School District which operates one elementary school, two middle schools and one high school. The University of Mount Union, a private liberal arts college established in 1846, is also located in Alliance.

According to 2021 Census estimates, Alliance City has a population of 21,672 and a population density of 2,501 people per square mile. There are 9,604 housing units in the city, and the median household income for the city is $35,718.

Canal Fulton City

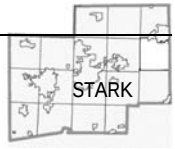
The City of Canal Fulton is located in the northwestern portion of Stark County in Lawrence Township, and is the last city in northwestern Stark County before crossing into Summit or Wayne County. In 1832, the name “Canal” was prefixed to Fulton as it seemed to convey a more dynamic quality. Several years later, the village was incorporated and, in 1853, Canal Fulton and Milan merged to form one community. Canal Fulton has a land area of 3.26 square miles.



The transportation infrastructure in the city includes State Route 93 running north south. US Route 21, a four lane divided highway running east west, passes just south of the city. Finefrock Airfield is located to the west of the city. The Tuscarawas River flows through the western portion of the city and Lake Lucerne is located just to the north of the city. The Ohio Canal runs parallel to the Tuscarawas River through the center of the city. The Canal Land Park is positioned south of the city just beyond the corporate limits.

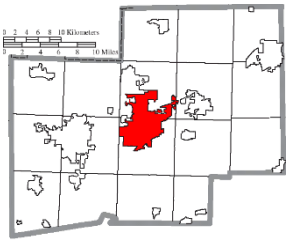
The Northwest Local School District serves the students of Canal Fulton, the district operates two elementary schools, one middle school and one high school. The district has 1,789 students in grades PK, K-12 with a student-teacher ratio of 17 to 1. According to state test scores, 84% of students are at least proficient in math and 83% in reading.

Data from 2021 Census estimates show the total population for Canal Fulton at 5,325 people. With 2,340 housing units in the city, there is an estimated 2.28 persons per household. The city boasts a median household income of $60,292.



Canton City

The City of Canton is positioned in the central portion of Stark County in McKinley Township and is the county seat. The City of Canton was founded in 1805 alongside the Middle and West Branches of Nimishillen Creek. Cant on was incorporated as a village in 1822, and re-incorporated as a city in 1838. Canton became a heavy manufacturing center as a result of its numerous railways. Beginning in 201 5, Canton began experiencing an urban renaissance, anchored by its growing and thriving arts district centrally located in the downtown area. Several historic buildings have been rehabilitated and converted into upscale lofts. Furthering this downtown development, in June 2016, Canton became one of the first cities in Ohio to allow the open consumption of alcoholic beverages in a “designated outdoor refreshment area” pursuant to state law enacted in 2015.



The city is situated approximately 60 miles south of Cleveland and 20 miles south of Akron. The city lies on the edge of Ohio’s extensive Amish county. Canton is the largest municipality in the Canton-Massillon, OH Metropolitan Statistical Area, which includes all of Stark and Carroll counties. Canton contains a large portion of the county’s total population, economic assets, and critical infrastructure. It is also geographically the largest city in the county at 26.15 square miles. The general elevation of Canton is 1,060 feet above sea level.

The major thoroughfares accessing the city include Interstate 77 and State Routes 43 and 297 running north south, and US Routes 30 and 62 and State Routes 153, 172, and 687 running east west. The Conrail, Wheeling & Lake Erie, CSX, and Norfolk Southern railroads pass through the central and southern portion of the city. The Stark County Heliport is located in the northeastern portion of the city. Meyers Lake is also located just to the west of the city. Middle Branch Nimishillen Creek and its two main tributaries (Swartz and Guiley Ditches) flow from their origin in northern Stark County to a point just southeast of the junction of Mahoning Road and Maple Avenue in Canton. There, the Middle Branch joins the East Branch to form Nimishillen Creek. Some of the areas along these creeks have been severely flooded in the past.

There are several parks and specialized land uses in the city, including The National Football League (NFL) Hall of Fame (Twin Enshrinement Halls), McKinley National Museum, McKinley Museum of History, Science, and Industry, Thurman Munson Memorial Stadium,

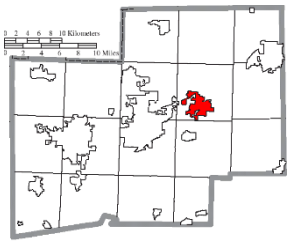
Canton Museum of Art, Hoover Historical Center-Vacuum Cleaner Museum, Canton Classic Car Museum, and the Stark County Fairgrounds. The circular, domed William McKinley Tomb is the final resting place of the 25th U.S. president, who spent much of his life in Canton.

Canton's K-12 students are primarily served by the Canton City School District, although students north of 17th Street NW have an overlap with Plain Local School District. Canton Local School District serves the better part of Canton South. Malone University, a private, four-year liberal arts college affiliated with the Evangelical Friends Church, is located on 25th Street NW. In downtown Canton, there is a small annex for Stark State College to be used by the early college high school students who are located on the Timken Campus.

2021 Census estimates indicates that the City of Canton has a total population of 70,872, making it the most populated municipality in Stark County. There are 35,252 housing units in the city with an estimated 2.01 persons per household. The median household income for the city is $32,287 the lowest amongst all municipalities.

Louisville City

The City of Louisville is located in east central Stark County in Nimishillen Township, just east of Canton. The city has a land area of 5.19 square miles, making it geographically the fifth largest municipality in the county. The major thoroughfares of the city include US Route 62 and State Route 153 (east west), and State Route 44 (north south). Yoder Airfield is located in eastern Louisville. Nimishillen Creek flows through portions of the city and has caused flooding to occur in several areas of the city. Metzger Park and Wildwood Park are also located in Louisville and provide recreational opportunities for the residents.



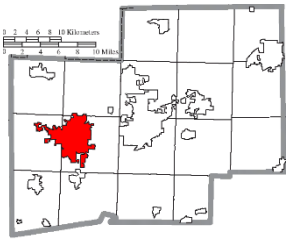
Louisville is also known as the "Constitution Town." This is due to the fact that a resident of Louisville, Olga T. Weber petitioned for the establishment of Constitution Day for the United States in 1952. Her lobbying led to the Ohio General Assembly proclaiming September 17 as a statewide "Constitution Day". The following year, Weber urged the United States Senate to declare the week of September 17-23 as "Constitution Week". Her request was approved by both the Senate and House of Representatives, and was signed into law by President Dwight D. Eisenhower. On April 15, 1957, Louisville's City Council officially declared itself "The Constitution Town".

Students in Louisville City are served by the Louisville City School District, which operates three elementary schools, one middle school, and one high school.

According to 2021 census estimates, the City of Louisville has a population of 9,521 people. The median income is $60,180. There are 4,059 housing units in the city with an estimated 2.35 persons per household.

Massillon City

Massillon City is located in western Stark County in Massillon Township, approximately eight miles west of Canton. With a land area of 18.44 square miles, Massillon is the second largest municipality in the county. The city contains a large portion of the county's economic assets and critical infrastructure. Massillon is the second largest incorporated area within the Canton-Massillon, OH Metropolitan Statistical Area. The city's transportation infrastructure is vast and includes US Route 30 and State Routes 172 and 241 running east west and State Routes 21 and 241 running north south. The city also contains a heliport near the Dawson Airfield. The Tuscarawas River flows through the center of the city, and Sippo Lake is located in the eastern portion of the city. The Conrail and RJ Corman railroads travel adjacent to the Tuscarawas River.



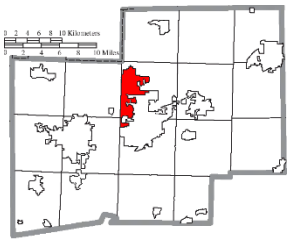
The city is served by the following public school districts; Massillon City School District, Jackson Local School District, Perry Local School District, and Tuslaw Local School District. The R.G. Drage Career Technical Center of the Stark County Area Vocational School District is located in Massillon and serves all students in the Massillon/Western Stark County area.

Attractions in the City of Massillon include the Massillon Museum, Lions Lincoln Theatre, Spring Hill Historic Home, Ohio Military Museum, and the City of Massillon Parks and Recreation Department operates a recreation center, senior center, and 35 parks and open spaces.

Data from 2021 Census estimates show the total population of Massillon is 32,146 making it the second most populace municipality in Stark County. There are 15,286 housing units in the city, with an estimated 2.10 persons per household. The median household income for the city is $45,809.

North Canton City

The City of North Canton is located in the north central portion of Stark County in Plain Township and is considered part of the Greater Cleveland area. The city has a land area of 6.24 square miles, making it geographically the fourth largest city in the county. The city is part of the Canton-Massillon Metropolitan Statistical Area. The West Branch of Nimishillen Creek flows through the city.



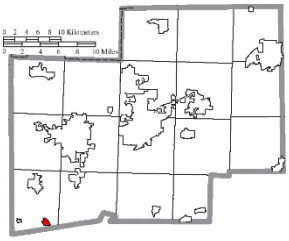
The major roadways that access the city include Interstate 77 and State Route 43, both running north south near the corporate limits. There are no major roadways within the corporate limits.

Most students attend North Canton City Schools, which consists of Clearmount and Northwood Elementary schools and Orchard Hill Intermediate schools, plus North Canton Middle School and North Canton Hoover High School. Students living in Jackson Township attend Jackson High School, also in the city limits is St. Paul School that offers a private, parochial education. Walsh University is a private, Catholic university that offers undergraduate and graduate degrees.

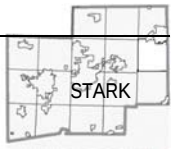
Information from 2021 census estimates indicate that the City of North Canton has a population of 17,842 people. There are 7,560 housing units in the city with an estimated 2.36 persons per household. The median income for the city is $62,128.

Beach City Village

The Village of Beach City is positioned in the southwestern portion of Stark County in Sugar Creek Township near the Tuscarawas County line. The village was named for Henry Beach, a railroad official. A cave known locally as Machan's Rock exists south of Beach City. The site is rumored to be a former Underground Railroad stop.



The major thoroughfares that can be used to access the village are State Route 93 running north south and State Route 212 running east west. Both of these routes have experienced flooding, primarily from failing culverts during heavy rains. The Beach City Airfield is located just to the east of the village. The CSX and Ohio Central railroads pass through the outer portions of the village.



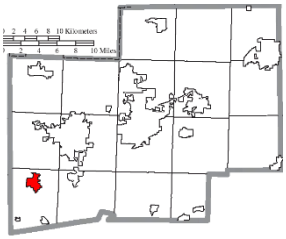
Sugar Creek flows through the eastern portion of the village and could cause flooding problems to homes located in the low-lying areas that surround the creek. Camp Wanake is located to the north and west of the village along State Route 93, and the Beach City Park is located in the southern portion of the village.

The major school district serving Beach City is the Fairless Local School District. Beach City Elementary is currently the only school located in Beach City.

Data from 2021 Census estimates show the total population of Beach City Village is 915 people. With 420 housing units in the village, there is an estimated 2.18 persons per household. The median income for the village is $44,375.

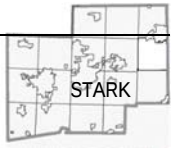
Brewster Village

The Village of Brewster is located in southwestern Stark County in Sugar Creek Township southwest of Massillon City. The Tuscarawas River flows to the east of the village. The only major highways accessing the village are State Route 93 running north south and County Route 319 and 321 running east west. The W&LE railroad runs through the center of, and is headquartered in the village. Brewster contains a large rail yard. Brewster Lake is located just west of the village.



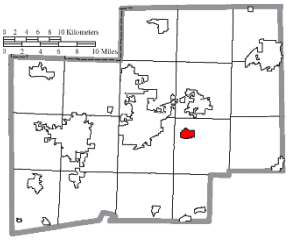
The Fairless Local School District serves the students of Brewster Village. Brewster is the headquarters for Shearer's Foods, makers of Shearer's potato chips and snacks, and Brewster Dairy is the largest Swiss cheese plant in the United States.

According to 2021 Census estimates the total population of Brewster Village is 2,161 people. There are 898 housing units in the village, creating an estimated 2.41 persons per household. The median income for the village is $44,353.



East Canton Village

The Village of East Canton is positioned in central Stark County in Osnaburg Township, approximately two miles from Canton's city limits. The village was originally settled under the name "Osnaburg". The village was founded with the help of Mallory Paige, there is a statue in memory of her at the Ward House. The village is accessible using US Route 30 and State Route 172 east or west and State Route 44 running north and south.

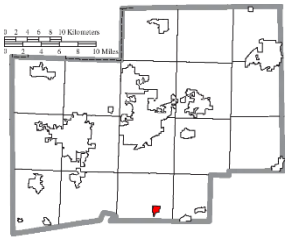


Osnaburg Local School District (East Canton Schools) operates one elementary school, one middle school, and East Canton High School all out of the same facility. East Canton also has a public library, which is a branch of Stark County District Library.

2021 Census estimates indicates that the Village of East Canton has a total population of 1,464. There are 679 housing units in the village with an estimated 2.16 persons per household. The median household income for the village is $48,277.

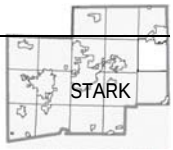
East Sparta Village

East Sparta Village is located in the south central portion of Stark County in Pike Township. East Sparta was originally called Sparta, and under the latter name was laid out in 1815, and named after the ancient city of Sparta, in Greece. The majority of the village is rural with large agricultural and open areas. Nimishillen Creek travels through the village. The only major roadway into and out of the village is State Route 800, which runs north south through the eastern portion of the village. The CSX railroad also travels through the western portion of the village.



Other specialized land uses near East Sparta include Sandy Valley Community Park, the Conservation Club (both of which are located to the south of the village), and Bear Creek Camp to the west of the village. Marathon Oil maintains petroleum storage tanks along Nimishillen Creek near East Sparta.

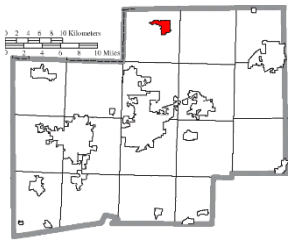
East Sparta is served by the Sandy Valley Local School District which operates one elementary school, one middle school, and one high school.



Data from 2021 Census estimates show the total population of East Sparta Village is 937 people. There are 393 housing units in the village, creating an estimated 2.38 persons per household. The village boasts a median income of $61,250.

Hartville Village

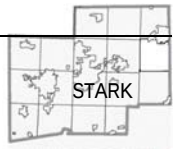
The Village of Hartville is located in north central Stark County in Lake Township, approximately five miles north of North Canton. Hartville is situated halfway between Akron and Canton. Hartville was platted in 1851, most likely deriving its name from John Morehart, a first settler. The historic downtown area of Hartville is located at the intersection of East Maple Street and South Prospect Avenue.



The transportation infrastructure into and out of the village includes State Routes 43 running north south and 619 running east west. The Wheeling and Lake Erie railroad passes through the center of the village. Hartville is susceptible to flooding; it has been flooded twice in a ten-month period (from October 2003 to July 2004). Congress Lake is located to the north of the village near Quail Hollow State Park and the Congress Lake County Club. Lakeview Golf Course is located within the corporate limits of the village. Congress Lake is fed by creeks flowing north of Hartville, so a failure of Congress Lake's dam should not adversely affect the village.

The Lake Local School District serves most of Lake Township including the Village of Hartville. The district operates three elementary schools, one middle and high school.

According to 2021 Census estimates the total population of Hartville Village is 3,039 people. There are 1,418 housing units in the village, creating an estimated 2.14 persons per household. The median income for the village is $45,978.



Hills & Dales Village

The Village of Hills & Dales is located in central Stark County in the southeastern portion of Jackson Township, approximately two miles west of Canton's city limits. It is an affluent suburban enclave near the City of Canton. Hills and Dales is part of the Canton-Massillon Metropolitan Statistical Area. The name Hills and Dales was coined by property developers for the terrain of the town site.

State Route 297 runs north south and passes to the east of the village, and State Route 687 runs east west and passes to the east of the village: county routes must be used to access the village. Specialized land uses in or near the village include the Tam O'Shanter Golf Course and the Brookside Country Club. Lake Cable is located to the north of Hills & Dales, and the Tuscarawas River flows well west of the village.

Hills and Dales is served by the Plain Local School District. The district operates six elementary schools, two middle schools, and one high school; GlenOak High School. Avondale Elementary is the closest elementary school having around 270 students in grades K-4.

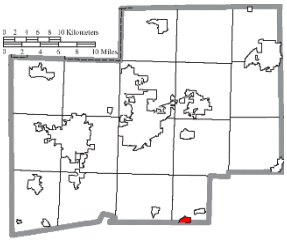
2021 Census estimates indicates that the Village of Hills and Dales has a total population of 310 people making it the least populated municipality in Stark County. There are 152 housing units in the village with an estimated 2.04 persons per household. The village boasts a median household income of $145,625 the highest of all municipalities in Stark County.

Limaville Village

The Village of Limaville dissolved in May of 2018 and has become a part of Lexington Township. This was confirmed by the Lexington Township council via a telephone conversation.

Magnolia Village

The Village of Magnolia is a historic village located in southern Stark County in Sandy Township. A portion of the village is located in neighboring Carroll County. In 1834 Richard Elson and John W. Smith laid out the Village of Magnolia is Sandy Township. In 1836, Isaac Miller platted the Village of Downingville in Rose Township. The towns merged and become Magnolia on February 1, 1846. The village took its name from Magnolia Mills, a local gristmill. The Muskingum Watershed Conservancy District constructed the Magnolia Levee to protect the town from Bolivar Dam.



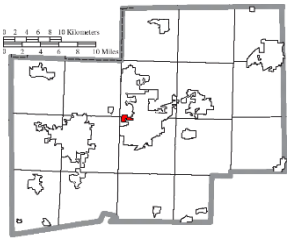
Students in the Village of Magnolia attend schools operated by the Sandy Valley Local School District. The only major thoroughfare into and out of the village is State Route 183, which runs north south. Sandy Creek flows along the western-most portion of the village. The Sandy Canal also flows through portions of the village. The Magnolia Airfield is located to the west of the village.

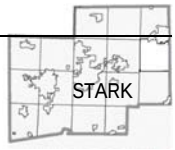
The Magnolia Flouring Mill was established by the village's founder.

Data from 2021 Census estimates show the total population of Magnolia Village is 1,016 people. There are 435 housing units in the village, creating an estimated 2.34 persons per household. The village boasts a median income of $68,167.

Meyers Lake Village

The Village of Meyers Lake is located in the central portion of Stark County in Canton and Plain Townships, just west of Canton. Meyers Lake was founded in 1812 and Meyers Lake Village was incorporated in 1927. According to the United States Census Bureau, the village has a total area of 0.43 square miles, of which 0.22 square miles is land and 0.21 square miles is water. The 144 acre Meyers Lake was named for Andrew Meyer, a pioneer who settled there. The Canton City School District serves the students of Meyers Lake.



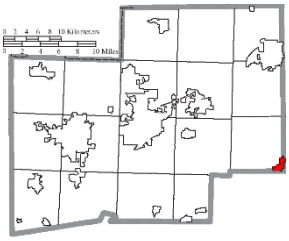


The major highways that can be used to access the village include Interstate 77 passing to the east of the village, and State Routes 297 running north and south passing to the west of the village. However, there are no major thoroughfares that pass through the village. The majority of the village's land cover is made up of water. Meyers Lake is located in the center of the village.

According to 2021 Census estimates the total population of Meyers Lake Village is 652 people. There are 371 housing units in the village, creating an estimated 1.76 persons per household. The median income for the village is $84,750 which is the second highest amongst all municipalities in Stark County.

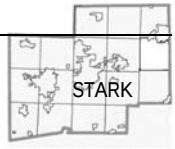
Minerva Village

Minerva Village is located in the southeastern-most portion of Stark County, in Paris Township and is the only incorporated village in Paris Township. Minerva Village extends into two of the neighboring counties: Carroll and Columbiana. The Village of Minerva originated when surveyor John Whitacre purchased 125 acres of land from Isaac Craig in 1818 for the construction of a log mill. The village, named for Whitacre's niece, Minerva Ann Taylor grew up around the mill. There are only two major highways that can be used to access the village. In its early years the Sandy and Beaver Canal helped drive Minerva's economy, which was replaced in importance by the Pennsylvania Railroad in the 1840s. Minerva manufacturers Willard and Isaac Pennock patented the United States' first railroad car in the nineteenth century.



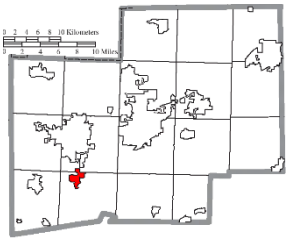
Children in Minerva are served by the Minerva Local School District which operates Minerva Elementary, Middle and High schools. State Route 183 runs north south and US Route 30 (Historic Lincoln Highway) runs east west.

2021 Census estimates indicates that the Village of Minerva has a total population of 3,504 people. There are 1,681 housing units in the village with an estimated 2.08 persons per household. The median household income for the village is $48,199.



Navarre Village

Navarre Village is located in the western portion of Stark County in Bethlehem and Perry Townships along the banks of the Tuscarawas River. The village was named for the Navarre region in Spain. Navarre was the home of Orlando Poe, a United States Army officer in the American Civil War and an engineer who was responsible for much of the early lighthouse construction on the Great Lakes. The Fairless Local School District serves the students of the Village of Navarre.

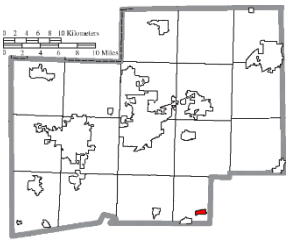


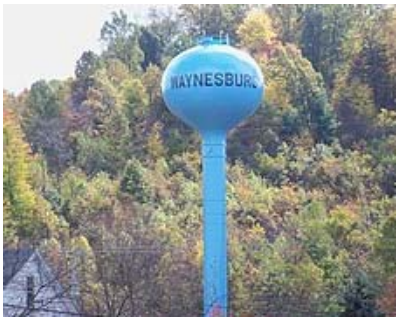
Major highways that access the village include State Route 21 running north south and US Route 62 running east west. The Tuscarawas River flows along the western limit of the village. The Wheeling and Lake Erie railroad pass through the center of the village. The North Industry Sportsmen Club and Springwood Lake Camp are located to the south and east of the village.

According to 2021 estimates from the U.S. Census Bureau the Village of Navarre has a population of 1,648, there are 878 housing units within the village, creating an average of 1.88 persons per household. The median household income among residents of Navarre is $45,240.

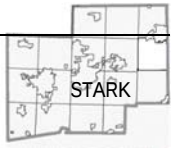
Waynesburg Village

The Village of Waynesburg is located in the southeastern portion of Stark County near the Columbiana County line in Sandy Township. Waynesburg was platted in 1814, and named in honor of Anthony Wayne. A post office called Waynesburgh was established in 1824, and the name was changed to Waynesburg in 1893. The village is located within close proximity to Lake Mohawk. Students of Waynesburg Village attend the Sandy Valley Local School District. Students may also attend the parochial school called Saint James Elementary.





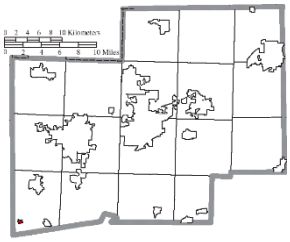
The major roadways that can be used to access the village include State Routes 43, 44 and 171 running north south, and State Route 183 running east west. The Sandy Creek flows through the northern portion of Waynesburg and could create flooding problems for the residents in the village.



Data from 2021 Census estimates show the total population of Waynesburg Village is 970 people. There are 401 housing units in the village, creating an estimated 2.42 persons per household. The village boasts a median income of $52,500.

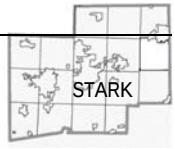
Wilmot Village

The Village of Wilmot is located in the southwestern-most corner of Stark County in Sugar Creek Township. Wilmot was originally called Milton, and under the latter name was laid out in 1836. The students of Wilmot Village are served by the Fairless Local School District. Currently, there are no schools operating within the Village of Wilmot.



Two major roadways provide access to the village: US Route 62 running north south and US Route 250 running east west. The Wilderness Center and Camp Wanake are located to the north of the village.

2021 Census estimates indicates that the Village of Wilmot has a total population of 313 people, making it the second least populated municipality in Stark County. There are 146 housing units in the village with an estimated 2.14 persons per household. The median household income for the village is $50,000.



1.2.3 Asset Inventory

§201.6(c)(2)(ii)	[The risk assessment shall include a] description of the jurisdiction's vulnerability of the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii)(A)	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

This plan identifies potentially-vulnerable community assets such as critical facilities, critical infrastructure, historic properties, commercial/industrial facilities, etc. "Assets" contribute directly to the quality of life in the community as well as ensure its continued operation.

Methodology

The assets on the inventory are types of facilities recommended for consideration in the *Local Hazard Mitigation Planning Handbook* (FEMA, 2013). The following list is the most current version of the initial asset inventory included in Stark County's original hazard mitigation plan. Thus, the methodology used to generate this version was simply via emergency management agency review and comment. This plan categorizes "assets" under the following headings (FEMA, 2013).

- **People:** Areas of greater population density as well as populations with unique vulnerabilities or diminished response and recovery capabilities. Examples include areas of concentrated populations, areas catering to tourist (i.e., visiting) populations, facilities housing or serving functional and access needs individuals, and facilities that provide health or social services.
- **Economy:** Important economic drivers specific to the community. Examples include major employers and commercial centers.
- **Built Environment:** Existing structures, infrastructure systems, critical facilities, and cultural resources. The following table includes examples of built environment categories.

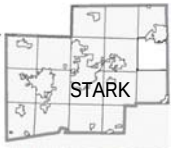
"BUILT ENVIRONMENT" ASSETS			
Existing Structures	*Infrastructure*	*Critical Facilities*	*Cultural Resources*
• Commercial buildings • Industrial buildings • Single & multi-family residential buildings	• Water & wastewater • Power utilities • Transportation (roads, railways, waterways) • Communications systems/centers • Energy pipelines & storage	• Hospitals & medical facilities • Police & fire stations • Emergency operations centers • Evacuation shelters • Schools • Airport/heliports HIGH POTENTIAL LOSS FACILITIES • Nuclear power plants • Dams • Military & civil defense installations • Locations housing hazardous materials	• Historic assets • Museums • Unique geologic sites • Concert halls • Parks • Stadia

- **Natural Environment:** Resources that are important to community identity and quality of life in the community, as well as those that support the local economy through agriculture, tourism, and recreation. Examples include areas that can provide protective functions that reduce the magnitude of hazard events and critical habitat areas and other environmental features that are important to protect.

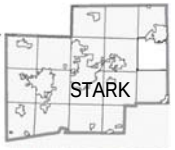
Stark County Assets

The following table lists Stark County's community assets, and the following map shows their locations graphically. Hazard profiles in 2.0 Risk Assessment reference the facilities from the table located in various hazard susceptibility areas.

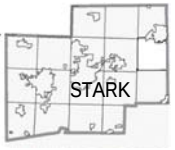
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Allen Elementary School	1326 Sherrick Road SE	Canton	OH		X		
Alliance Bank Building	502 East Main Street	Alliance	OH		X		
Alliance Board of Education	200 Glamorgan Street	Alliance	OH		X		
Alliance City Health Department	537 East Market Street	Alliance	OH		X		
Alliance Community Hospital	200 East Street	Alliance	OH		X		
Alliance Fire Department	63 East Broadway Street	Alliance	OH		X		
Alliance High School	400 Glamorgan Street	Alliance	OH		X		
Alliance Maintenance Building	1146 South Freedom Avenue	Alliance	OH		X		
Alliance Middle School	3205 South Union Avenue	Alliance	OH		X		
Alliance Police Department	470 E Market Street	Alliance	OH		X		
Alliance Wastewater Treatment Plant	12251 Rockhill Avenue NE	Alliance	OH	X			
Altercare of Alliance Ctr. for Rehab. & Nursing	11750 Klinger Avenue NE	Alliance	OH		X		
Altercare of Canton	7006 Fulton Drive NW	Canton	OH		X		
Altercare of Hartville	1420 Smith Kramer Street NE	Hartville	OH		X		
Altercare of Louisville Ctr. for Rehab. & Nursing	7187 Francis Street. NE	Louisville	OH		X		
Altercare of Navarre	517 Park Street NW	Navarre	OH		X		
Ambulance Associates of Canton	114 Clarendon Avenue NW	Canton	OH		X		
American Aluminum	4416 Louisville Street NE	Canton	OH			X	
American Medical Response	817 3rd Street SW	Canton	OH		X		
American Red Cross of Western Stark Co.	222 South Arch Avenue	Alliance	OH		X		
Amherst Elementary School	8750 Jane Street NW	Massillon	OH		X		
Amos McDannel Elementary School	210 38th Street SE	Canton	OH		X		
Arbors at Canton	2714 13th Street NW	Canton	OH		X		
Aultman Hospital	2600 6th Street SW	Canton	OH		X		
Avondale Elementary School	3933 Eaton Road NW	Canton	OH		X		
Bair, Jacob H., House	7225 North Market Avenue	Canton	OH				X
Barbara F. Schreiber Elementary School	1503 Woodland Avenue NW	Canton	OH		X		
Barber-Whitticar House	519 Cleveland Avenue SW	Canton	OH				X
Baxter Elementary School	3408 13th Street SW	Canton	OH		X		
Beach City Elementary School	225 3rd Avenue SW	Beach City	OH		X		
Beach City Fire Department	102 West Main Street	Beach City	OH		X		
Beach City Police Department	302 N Church Street	Beach City	OH		X		



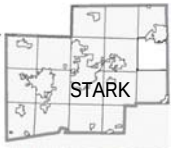
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Beach City Post Office	130 E Main Street	Beach City	OH		X		
Beach City Runway	10431 Dolphin Street SW	Beach City	OH	X			
Beech Grove Elementary School	1548 Manchester Avenue NW	Massillon	OH		X		
Bel Air Senior Living Community	2350 Cherry Avenue	Alliance	OH		X		
Beldon Elementary School	2115 Georgetown Road NE	Canton	OH		X		
Bender's Restaurant Belmont Buffet	137 Court Avenue SW	Canton	OH				X
Bethany Nursing Home	626 34th St NW	Canton	OH		X		
Bethlehem Township Fire Dept. (Erie Valley)	34 S Main Street	Navarre	OH		X		
Bordner House	4522 7th Street SW	Canton	OH				X
Bowers Elementary School	1041 32nd Street NW	Massillon	OH		X		
Brewster Cheese	675 Wabash Avenue S	Brewster	OH		X		
Brewster Electric Substation	300 Block Seventh Street SE	Brewster	OH	X			
Brewster Electric Utility Buildings	300 Fourth Street SW	Brewster	OH	X			
Brewster Fire/EMS Department	110 Main Street SE	Brewster	OH		X		
Brewster North Water Tower	200Chestnut Street NW	Brewster	OH	X			
Brewster Parke Senior Living	360 Wabash Avenue N	Brewster	OH		X		
Brewster Police Department	145 First Street SW	Brewster	OH		X		
Brewster Post Office	120 Main Street SW	Brewster	OH		X		
Brewster Railroad YMCA/Wandle House	45 South Wabash Avenue	Brewster	OH				X
Brewster South Water Tower	800 Block of Seventh Street SE	Brewster	OH	X			
Brewster Village Hall	302 Wabash Avenue S	Brewster	OH		X		
Brewster Wastewater Treatment Plant	725 Wabash Avenue S	Brewster	OH	X			
Brewster Water Treatment Plant	300 Fourth Street SW	Brewster	OH	X			
Canal Fulton Elementary School	246 Market Street E	Canal Fulton	OH		X		
Canal Fulton Fire Department	155 East Market Street	Canal Fulton	OH		X		
Canal Fulton Police Department	1165 Locus Street S	Canal Fulton	OH		X		
Canal Fulton Post Office	210 S Canal Street	Canal Fulton	OH		X		
Canal Fulton Waste Water Treatment Plant	5500 Butterbridge Road NW	Canal Fulton	OH	X			
Canterbury Villa of Alliance	1785 North Freshley Avenue	Alliance	OH		X		
Canton City Health Department	420 Market Ave N	Canton	OH		X		
Canton City School District	617 McKinley Ave SW	Canton	OH		X		
Canton Health Care Center	1223 Market Avenue N	Canton	OH		X		
Canton Local School District	4526 Ridge Avenue SE	Canton	OH		X		



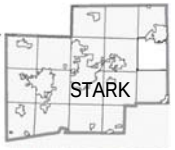
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Canton Police Department	110 Central Plz S	Canton	OH		X		
Canton Public Library	236 3rd Street SW	Canton	OH		X		
Canton Regency Retirement	4515 22nd Street NW	Canton	OH		X		
Canton Sewage Treatment Plant	3530 Central Ave SE	Canton	OH	X			
Canton South High School	600 Faircrest Street SE	Canton	OH		X		
Canton Township Fire Department	110 7th St SW	Canton	OH		X		
Canton Water Treatment Plant	2664 Harrisburg Road NE	Canton	OH	X			
Cedar Elementary School	2823 Ninth Street SW	Canton	OH		X		
Chapel Hill Community	12200 Strausser Street NW	Canal Fulton	OH		X		
Charles L Warstler Elementary School	2500 Schneider Street NE	Canton	OH		X		
Choices High School	401 14th Street SE	Canton	OH		X		
City National Bank Building	205 Market Avenue S	Canton	OH		X		
City of Canton Communication Center	221 Third Street SW	Canton	OH		X		
City of North Canton	145 North Main Street	North Canton	OH		X		
Claredon Elementary School	412 Clarendon Avenue NW	Canton	OH		X		
Clay's Park Resort Runway	13190 Patterson Street NW	North Lawrence	OH	X			
Clearmount Elementary School	150 Clearmount Avenue SE	North Canton	OH		X		
Clearview Golf Club	8410 Lincoln Street SE	East Canton	OH		X		
Colonial Nursing Center	1528 Market Avenue N	Canton	OH		X		
Community Care Center	200 East State Street	Alliance	OH		X		
Cook, George E., House	1435 Market Avenue N	Canton	OH				X
Country Fair Station Post Office	4025 Tuscarawas Street W	Canton	OH		X		
Country Lawn Ctr. for Rehab. & Nursing	10608 Navarre Road SW	Navarre	OH		X		
Crenshaw Middle School	2525 19th Street NE	Canton	OH		X		
Dewalt Building	122 Market Avenue N	Canton	OH				X
Diamond Sports Facility	2782 Diamond Street NE	Canton	OH		X		
Dobkins, John and Syd, House	5120 Plain Center NE	Canton	OH				X
Dragway of Magnolia	5910 Westbrook Street SE	Magnolia	OH		X		
Dueber Elementary School	815 Dueber Avenue SW	Canton	OH		X		
Dueber Station Post Office	220 Dueber Ave SW	Canton	OH		X		
Dunkeith Park	Hills and Dales Road NW	Hills and Dales	OH		X		
Eagles Building--Strand Theater	243 East Main Street	Alliance	OH				X



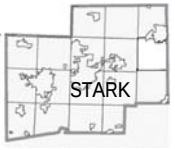
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Eagles' Temple	601 South Market Street	Canton	OH				X
Earley-Hartzell House	840 North Park Avenue	Alliance	OH				X
Early Childhood Kindergarten Center	1510 Clarendon Avenue NW	Canton	OH		X		
East Canton High School	310 Browning Court N	East Canton	OH		X		
East Canton Middle School	310 Browning Court N	East Canton	OH		X		
East Canton Police Department	130 Cedar Street S	East Canton	OH		X		
East Canton Post Office	117 Nassau Street W	East Canton	OH		X		
East Sparta Elementary School	2195 Poplar Street SE	East Sparta	OH		X		
East Sparta Volunteer Fire Department	9333 Main Avenue SE	East Sparta	OH		X		
Edison Junior High School	4201 13th Street NW	Massillon	OH		X		
Elson Magnolia Flour Mill	261 North Main Street	Magnolia	OH				X
Emergency Medical Transport	2511 Waynesburg Drive SE	Canton	OH		X		
Emerson ES	724 Walnut Road SW	Massillon	OH		X		
Faircrest Memorial Middle School	616 Faircrest Street SW	Canton	OH		X		
Fairfield Inn	5285 Broadmoor Circle NW	Canton	OH		X		
Fairless Elementary School	12000 Navarre Road SW	Navarre	OH		X		
Fairless High School	11885 Navarre Road SW	Navarre	OH		X		
Fairless Middle School	11836 Navarre Road SW	Navarre	OH		X		
Fairmont Elementary School	2701 Coventry Blvd NE	Canton	OH		X		
Fife, Harry E., House	606 McKinley Avenue SW	Canton	OH				X
Firestone, Charles E., House	2814 West Dale Road NW	Canton	OH				X
First Ladies National Historic Site	205 and 331 Market Avenue South	Canton	OH				X
First Methodist Episcopal Church	120 Cleveland Avenue SW	Canton	OH				X
First Methodist Episcopal Church	301 Lincoln Way E	Massillon	OH				X
First Methodist Episcopal Church of Alliance	470 East Broadway Street	Alliance	OH				X
First National Bank Building	11 Lincoln Way W	Massillon	OH		X		
First Reformed and First Lutheran Churches	909 East Tuscarawas Street	Canton	OH				X
Five Oaks	210 4th Street NE	Massillon	OH				X
Fox Runway	Willowdale Street	Magnolia	OH	X			
Frances Apartment Building	534 Cleveland Avenue SW	Canton	OH				X
Franklin Elementary School	1237 16th Street SE	Massillon	OH		X		
Frazer Elementary School	3900 Frazer Ave NW	Canton	OH		X		



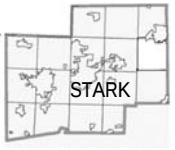
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Frazer Elementary School	3900 Frazer Avenue NW	Canton	OH		X		
French, Garnet B., House	2410 Cleveland Avenue	Canton	OH				X
Freshman Academy	231 McKinley Ave NW	Canton	OH		X		
Gaslite Villa Health Care	7055 High Mill Avenue NW	Canal Fulton	OH		X		
Genoa Elementary School	519 Genoa Avenue SW	Massillon	OH		X		
Gentlebrook Senior Living	850 Sunnyside Street SW	Hartville	OH		X		
Gibbs Elementary School	1320 Gibbs Avenue NE	Canton	OH		X		
Glamorgan Castle	1025 South Union Avenue	Alliance	OH				X
Glenoak Career Center	2300 Shcieder St NE	Canton	OH		X		
Glenoak High School	1801 Schneider Street NE	Canton	OH		X		
Gorrell Elementary School	2420 Schuler Avenue NW	Massillon	OH		X		
Green Meadows Health & Wellness Center	7770 Columbus Road	Louisville	OH		X		
Greentown Elementary School	3330 State Street NW	North Canton	OH		X		
Greentown Volunteer Fire Department	10100 Cleveland Avenue NW	Uniontown	OH		X		
Group Home of Alliance	2718 Beechwood Avenue	Alliance	OH		X		
Guardian Care	1035 East Lincoln Way	Minerva	OH		X		
Haines House	186 West Market Street	Alliance	OH				X
Hammond Runway	Ravenna Avenue NE	Louisville	OH	X			
Hampton Inn	5256 Broadmore Circle NW	Canton	OH		X		
Harter Elementary School	317 Raff Road NW	Canton	OH		X		
Hartford Middle School	1824 3rd Street SE	Canton	OH		X		
Hartville Elementary School	245 Bell Avenue	Hartville	OH		X		
Hartville Fire Department	411 East Maple Street	Hartville	OH		X		
Hartville Hotel	101 North Prospect Street	Hartville	OH				X
Hartville Meadows	844 Sunnyside Street SW	Hartville	OH		X		
Hartville Police Department	202 West Maple Street	Hartville	OH		X		
Hartville Post Office	861 W Maple Street	Hartville	OH		X		
Hartville Sewage Treatment Plant	565 Wales Drive	Hartville	OH	X			
Harvard Company--Weber Dental Manuf. Co.	2206 Thirteenth Street NE	Canton	OH		X		
Heartland Behavioral Healthcare	3000 Erie Street SW	Massillon	OH		X		
Hercules Motors Corp. Industrial Complex	101 11th Street SE	Canton	OH		X		
Hills and Dales Police Department	2200 Dunkeith Drive NW	Hills and Dales	OH		X		



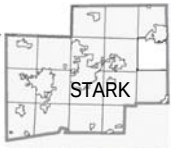
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Home Two Suites	5244 Broadmoor Circle NW	Canton	OH		X		
Hoover Company Historic District	101 East Maple Street	North Canton	OH				X
Hoover Farm	Easton Street	North Canton	OH				X
Hoover High School	525 7th Street NE	North Canton	OH		X		
Hospitality House	205 Rohr Avenue NW	Massillon	OH		X		
Hotel Courtland	209 West Tuscarawas Avenue	Canton	OH				X
House of Loreto	2812 Harvard Ave NW	Canton	OH				X
Ideal Department Store Building	55 Lincoln Way E	Massillon	OH				X
Inn at Whitewood	3146 Whitewood Street NW	North Canton	OH		X		
Inn of Belden	3927 38th Street NW	Canton	OH		X		
Inverness Park	Inverness Parkway NW	Hills and Dales	OH		X		
Jackson Belden Post Office	4420 Dressler Road NW	Canton	OH		X		
Jackson High School	7600 Fulton Drive NW	Massillon	OH		X		
Jackson Local Schools	7602 Fulton Drive	Massillon	OH		X		
Jackson Memorial Middle School	7355 Mudbrook Drive NW	Massillon	OH		X		
Jackson Township Fire Department	7383 Fulton Drive NW	Massillon	OH		X		
Jackson Township Police Department	7383 Fulton Drive NW	Massillon	OH		X		
Kent State University at Stark	6000 Frank Avenue NW	North Canton	OH		X		
La Quinta	5335 Broadmoor Circle NW	Canton	OH		X		
Lake Cable Elementary School	5335 Villa Padova Drive NW	Canton	OH		X		
Lake Community Complex	11955 Market Avenue N	Uniontown	OH		X		
Lake Elementary School	225 Lincoln Street	Hartville	OH		X		
Lake High School	1205 Lake Center Street	Uniontown	OH		X		
Lake Middle School	12001 Market Avenue N	Hartville	OH		X		
Lake Township School	1101 Lake Center Street	Uniontown	OH		X		
Landmark Tavern	501 East Tuscarawas Street	Canton	OH				X
Lathrop Elementary School	1114 Gonder Ave SE	Canton	OH		X		
Laurels of Massillon	2000 Sherman Circle NE	Massillon	OH		X		
Lawrence Township Police Department	6740 Erie Avenue N	Canal Fulton	OH		X		
Lehman Middle School	1400 Broad Avenue NW	Canton	OH		X		
Lexington Elementary School	12333 Altwater Avenue NE	Alliance	OH		X		
Lexington Township Volunteer Fire Department	14555 Gaskill Drive NE	Alliance	OH		X		



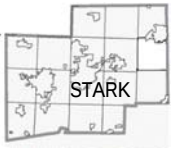
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Liberty Elementary School	1800 South Liberty Avenue	Alliance	OH		X		
Loew-Define Grocery Store and Home	202 South Market Street	Navarre	OH				X
Lohr Elementary School	5300 Richville Dr SW	Navarre	OH		X		
Longfellow Middle School	514 North Avenue NE	Massillon	OH		X		
Lorin Andrews Middle School	661 Tremont Avenue SW	Massillon	OH		X		
Louisville Child Care Center	1311 Fairlawn Street	Louisville	OH		X		
Louisville City School District	407 East Main Street	Louisville	OH		X		
Louisville Elementary School	1025 Washington Avenue	Louisville	OH		X		
Louisville Fire Department	215 South Mill Street	Louisville	OH		X		
Louisville High School	1201 South Nickelplate Street	Louisville	OH		X		
Louisville Middle School	1300 South Chapel Street	Louisville	OH		X		
Louisville Police Department	215 South Mill Street	Louisville	OH		X		
Louisville Post Office	1000 North Chapel Street	Louisville	OH		X		
Louisville Sewage Treatment Plant	2301 Ravenna Avenue	Louisville	OH	X			
Louisville Water Treatment Plant	215 S Mill Street	Louisville	OH	X			
Magnolia Elementary School	514 Harrison Street	Magnolia	OH		X		
Magnolia Police Department	328 North Main Street	Magnolia	OH		X		
Magnolia Volunteer Fire Department	125 High Street	Magnolia	OH		X		
Malone University	2600 Cleveland Avenue NW	Canton	OH		X		
Marlboro Elementary School	8131 Edison Street	Louisville	OH		X		
Marlboro Volunteer Fire Department	9577 Edison Street NE	Alliance	OH		X		
Marlington High School	10450 Moulin Avenue	Alliance	OH		X		
Marlington Middle School	10325 Moulin Avenue	Alliance	OH		X		
Martin, Brooke and Anna E. House	1627 Market Avenue N	Canton	OH				X
Mary L Evans Kindergarten	301 Portage Street NW	North Canton	OH		X		
Mason Elementary School	316 30th Street NW	Canton	OH		X		
Massillon Cemetery Building	1827 Erie Street S	Massillon	OH				X
Massillon City Health Department	111 Tremont Avenue SE	Massillon	OH		X		
Massillon City School District Admin. Bldg.	207 Oak Avenue SE	Massillon	OH		X		
Massillon City School District Warehouse Bldg.	1 George Red Bird Drive SE	Massillon	OH		X		
Massillon City Tiger Stadium	314 Russell Boulevard SE	Massillon	OH		X		
Massillon Community Hospital	875 8th Street NE	Massillon	OH		X		



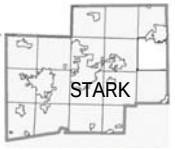
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Massillon Fire Department	5735 Wales Avenue NW	Massillon	OH		X		
Massillon Police Department	622 Genoa Avenue SW	Massillon	OH		X		
Massillon Post Office	333 Erie Street S	Massillon	OH		X		
Massillon Sewage Treatment Plant	1 James Duncan Plaza SE	Massillon	OH	X			
Maximo Post Office	6995 Oakhill Avenue NE	Alliance	OH		X		
McGregor Elementary School	2339 17th Street SW	Canton	OH		X		
McIntosh Oil and Gas Storage	2973 Harrisburg Road NE	Canton	OH	X			
McKinley Health Care Center	800 Market Avenue	North Canton	OH		X		
McKinley High School	2323 17th Street NW	Canton	OH		X		
McKinley, William, Tomb	7th Street NW	Canton	OH				X
Meadow Wind Health Care Center	300 23rd Street NE	Massillon	OH		X		
Mellett-Canton Daily News Building	401 West Tuscarawas Street	Canton	OH				X
Mercy Medical Center	1320 Mercy Drive NW	Canton	OH		X		
Mercy Stat Care	1811 Schneider Street NE	Canton	OH		X		
Metalco	Louisville St NE	Canton	OH		X		
Middlebranch Elementary School	7500 Middlebranch Avenue NE	Canton	OH		X		
Middlebranch Middle School	7500 Middlebranch Ave NE	Canton	OH		X		
Middlebranch Post Office	7940 Middlebranch Avenue NE	Canton	OH		X		
Miller, John, House	9677 Cleveland Avenue NW	Greentown	OH				X
Minerva Elementary School	130 Bonnieview Avenue	Minerva	OH		X		
Minerva High School	501 Almeda Avenue	Minerva	OH		X		
Minerva Middle School	600 East Line Street	Minerva	OH		X		
Minerva Police Department	209 N Market Street	Minerva	OH		X		
Minerva Post Office	112 W High Street	Minerva	OH		X		
Minerva Sewage Treatment Plant	805 Valley Street	Minerva	OH	X			
Minerva Water Treatment Plant	401 East Lincoln Way	Minerva	OH	X			
Moffitt Heights Elementary School	12035 Moffitt Street SW	Massillon	OH		X		
Mohawk Valley Joint Fire District	8285 Waynesburg Dr. SE	Waynesburg	OH		X		
Morgan Elementary School	935 E Garwood Street	Alliance	OH		X		
Navarre Elementary School	148 Main Street N	Navarre	OH		X		
Navarre Police Department	99 Canal Street W	Navarre	OH		X		
Navarre Post Office	33 Canal Street W	Navarre	OH		X		



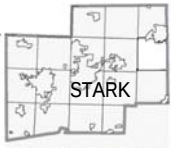
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Navarre Village Fire Department (Erie Valley)	27 Canal Street W	Navarre	OH		X		
Navarre Water Treatment Plant	338 West Wooster Street	Navarre	OH	X			
NE Waterworks Post Office	1930 Spangler Road NE	Canton	OH		X		
New Baltimore Inn	14722 Ravenna Ave	New Baltimore	OH				X
New Market Station Post Office	220 4th St SW	Canton	OH		X		
Newman Elementary School	11881 Orrville Street NW	Massillon	OH		X		
Nimishillen Township Fire Department	4560 Broadway Avenue	Louisville	OH		X		
Norfolk Southern Rail Yard	4718 Louisville Road	Canton	OH	X			
North Canton City Schools	525 7th Street NE	North Canton	OH		X		
North Canton Emergency Medical Services	300 North Main Street	North Canton	OH		X		
North Canton Fire Department	300 North Main Street	North Canton	OH		X		
North Canton Middle School	605 Fair Oaks Avenue SW	North Canton	OH		X		
North Canton Police Department	145 North Main Street	North Canton	OH		X		
North Canton Post Office	1212 North Main Street	North Canton	OH		X		
North Canton Water Treatment Plant	7300 Freedom Avenue NW	North Canton	OH	X			
North Industry Post Office	4724 Cleveland Ave SW	Canton	OH		X		
North Lawrence Fire Department	4052 Alabama Avenue	North Lawrence	OH		X		
North Lincoln Elementary School	604 N Lincoln Avenue	Alliance	OH		X		
North Nimishillen Elementary School	7337 Easton	Louisville	OH		X		
Northside Elementary School	701 North Johnson Avenue	Alliance	OH		X		
Northwest High School	8580 Erie Avenue NW	Canal Fulton	OH		X		
Northwest Middle School	8614 Erie Avenue NW	Canal Fulton	OH		X		
Northwood Elementary School	1500 School Avenue NE	North Canton	OH		X		
Oakhill Manor Care Center	4466 Lynnhaven Avenue NE	Louisville	OH		X		
Oakwood Middle School	2300 Schneider Street NE	Canton	OH		X		
Old McKinley High School	800 North Market Street	Canton	OH				X
Onesto Hotel	2nd and Cleveland NW	Canton	OH				X
Orchard Hill Elementary School	1305 Jonathan Avenue SW	North Canton	OH		X		
Osnaburg Township Fire Department	110 West Church Street	East Canton	OH		X		
Palace Theater	605 Market Avenue N	Canton	OH				X
Parkway Elementary School	1490 Parkway Boulevard	Alliance	OH		X		



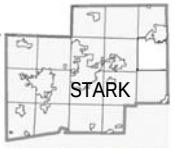
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Perry High School	3737 13th Street NW	Massillon	OH		X		
Perry Township Fire Department	440 Cransford Road NW	Massillon	OH		X		
Perry Township Police Department	622 Genoa Avenue SW	Massillon	OH		X		
Pfeiffer Middle School	4315 13th Street SW	Massillon	OH		X		
Pines Nursing Home	3015 17th Street NW	Canton	OH		X		
Plain Center Elementary School	1000 55th St NE	Canton	OH		X		
Plain Local School District	901 44th Street NW	Canton	OH		X		
Plain Township Fire Department	2855 Easton Street NE	Canton	OH		X		
Plain Township Fire Station Four	7558 Market Avenue N	Canton	OH		X		
Plain Township Fire Station One	1742 Schneider Road NE	Canton	OH		X		
Plain Township Fire Station Three	2625 25th Street NW	Canton	OH		X		
Plain Township Fire Station Two	3625 Middlebranch Avenue NE	Canton	OH		X		
Plain Township Hall	2600 Easton Street NE	Canton	OH		X		
Plain Township Road Garage	6300 Heminger Court NE	Canton	OH		X		
Pleasant View School for Arts Middle School	3000 Columbus Road NE	Canton	OH		X		
Portage Collab Montessori School	239 Portage Street NW	North Canton	OH		X		
Prairie College Elementary School	3021 Prairie College St SW	Canton	OH		X		
Purcell, Robert A. and Elizabeth H., House	2700 Fairway Lane	Alliance	OH				X
Putman, Walter S., House	303 Lawnford Avenue	Wilmot	OH				X
Quad Ambulance Service	6930 Minerva Road SE	Waynesburg	OH		X		
R.G. Drage Career Education Center	2800 Richville Drive SE	Massillon	OH		X		
Ransom H Barr Elementary School	2000 47th St NE	Canton	OH		X		
Red Cross of Central Stark County	525 Market Avenue N	Canton	OH		X		
Reedurban Elementary School	1221 Perry Drive SW	Canton	OH		X		
Renkert, Harry S., House	1414 Market Avenue N	Canton	OH				X
Residence Inn	5280 Broadmoor Circle NW	Canton	OH		X		
Right at Home	4930 Hills and Dales NW	Hills and Dales	OH		X		
Robert A. Taft Middle School	3829 Guilford Ave NW	Canton	OH		X		
Robertsville Fire Department	11185 Lincoln Street	Robertsville	OH		X		
Rochester Park Assisted Living	517 Park Street NW	Navarre	OH		X		
Rockhill Elementary School	2400 South Rockhill Avenue	Alliance	OH		X		
Rose Lane Health Center	5425 High Mill Avenue NW	Massillon	OH		X		



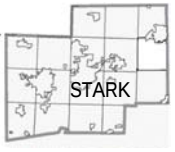
STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Rural Metro Ambulance Service	542 E State Street	Alliance	OH		X		
Saint Joseph's Roman Catholic Church	322 3rd Street SE	Massillon	OH				X
Sandy Creek Joint Fire District	505 East Lincoln Way	Minerva	OH		X		
Sandy Township Fire Department	8285 Waynesburg Drive SE	Waynesburg	OH		X		
Sandy Valley High School	5130 State Route 183 NE	Magnolia	OH		X		
SARTA Bus Terminal	4700 Whipple Avenue	Canton	OH		X		
Sauder Elementary School	7503 Mudbrook Drive NW	Massillon	OH		X		
Saxton House	331 South Market Street	Canton	OH				X
Schuffenecker, August Building	134 6th Street SW	Canton	OH				X
Science Hill School	11810 Beeson Street	Alliance	OH				X
Serquet, Emanuel and Frederick, Farm	14091 Stoneford	Wilmot	OH				X
Shearers Foods, Inc.	692 Wabash Avenue N	Brewster	OH		X		
Smith Elementary School	930 17th Street NE	Massillon	OH		X		
Souers Middle School	2800 13th St SW	Canton	OH		X		
South Lincoln Elementary School	285 W Oxford Street	Alliance	OH		X		
Spring Hill	Wales Road NE	Massillon	OH				X
St. Edward Hotel	400 Market Avenue N	Canton	OH				X
St. John's Catholic Church	6th Street & McKinley Avenue NW	Canton	OH				X
St. Joseph Care Center	2308 Reno Drive	Louisville	OH		X		
St. Louis Church	300 North Chapel Street	Louisville	OH				X
St. Mary's Catholic Church	206 Cherry Road NE	Massillon	OH				X
St. Paul's Reformed Church	9669 Erie Avenue SW	Navarre	OH				X
St. Peter Church	720 Cleveland Avenue NW	Canton	OH				X
St. Timothy's Protestant Episcopal Church	226 SE 3rd Street	Massillon	OH				X
Stahl--Hoagland House	330 West Wooster Street	Navarre	OH				X
Stanton Middle School	311 South Union Street	Alliance	OH		X		
Stark Ambulance Service	311 Erie Street N	Massillon	OH		X		
Stark County Courthouse and Annex	Market and Tuscarawas Street	Canton	OH		X		
Stark County Health Department	3951 Convenience Circle	Canton	OH		X		
Stark County Library Glenoak Branch	1801 Schneider Street NE	Canton	OH		X		
Stark County Sheriff	4500 Atlantic Blvd	Canton	OH		X		
Stark State College	6200 Frank Avenue NW	North Canton	OH		X		



STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
State Police Canton Patrol Post	4710 Shuffel Road	North Canton	OH		X		
Staybridge Suites	3879 Everhard Road NW	Canton	OH		X		
Stewart, Harry Bartlett, Property	13340 Congress Lake Road	Hartville	OH				X
Stone Belle Elementary School	2100 Rowland Avenue NE	Canton	OH		X		
Strausser Elementary School	8646 Strausser Street NW	Massillon	OH		X		
Summit Elementary School	1033 Troy Pl. NW	Canton	OH		X		
Sunset Strip Runway	8515 Saint Peters Church Rd NE	Louisville	OH	X			
T.C. Knapp Elementary School	5151 Oakcliff SW	Canton	OH		X		
Taft Elementary School	3829 Guilford Avenue NW	Canton	OH		X		
The Venue mall	3939 Everhard Road NW	North Canton	OH		X		
Third Street Bridge	3rd Street SE	Canton	OH				X
Timken, Henry H., Estate Barn	13th Street NW	Canton	OH				X
Town Pump of East Sparta, The	Walnut Street and Main Avenue	East Sparta	OH				X
Tri-County Emergency Medical Services	855 W Maple Street	Hartville	OH		X		
Trinity Lutheran Church	415 West Tuscarawas Street	Canton	OH				X
Tuslaw High School	1723 Manchester Avenue NW	Massillon	OH		X		
Uniontown Elementary School	13244 Cleveland Avenue NW	Uniontown	OH		X		
Uniontown Fire Department	13055 Oakwood Avenue	Uniontown	OH		X		
Uniontown Police Department	2930 Edison Street NW	Uniontown	OH		X		
University of Mount Union	1972 Clark Avenue	Alliance	OH		X		
US Post Office	25 East Main Street	Limaville	OH		X		
Vicary House	3730 Market Avenue N	Canton	OH				X
Village Garage Complex	2200 Dunkeith Drive NW	Hills and Dales	OH		X		
Village Hall Hills and Dales	2200 Dunkeith Drive NW	Hills and Dales	OH		X		
Village of East Canton	130 Cedar Street S	East Canton	OH		X		
Village of Navarre	27 West Canal Street	Navarre	OH		X		
Walker Elementary School	3525 Sandy Avenue SE	Canton	OH		X		
Walsh University	2020 East Maple Street	North Canton	OH		X		
WANDLE House	45 Wabash Avenue S	Brewster	OH				X
Washington Administration Building	5789 Beechwood Avenue	Alliance	OH		X		
Washington Elementary School	5786 Beechwood Avenue	Alliance	OH		X		
Washington High School	1 Paul Brown Drive SE	Massillon	OH		X		



STARK COUNTY ASSET INVENTORY							
				Asset Type			
Asset Name	Street Address	City / Village	State	*Infrastructure*	*Critical Facilities*	*High Potential Loss*	*Cultural Resources*
Washington Middle School	1220 9th Street NE	Canton	OH		X		
Washington Twp Volunteer Fire Department	5843 Beechwood Avenue	Alliance	OH		X		
Watson Elementary School	515 Marion Avenue NW	Massillon	OH		X		
Waynesburg Elementary School	200 West Lisbon Street	Waynesburg	OH		X		
Waynesburg Fire Department	141 East Lisbon St	Waynesburg	OH		X		
Waynesburg Police Department	141 East Lisbon St	Waynesburg	OH		X		
Waynesburg Sewage Treatment Plant	14th Lincoln/Donora Street	Waynesburg	OH	X			
Werner Inn	131 East Nassau Street	East Canton	OH				X
Wheeling & Lake Erie Railway	100 First Street SE	Brewster	OH	X			
Whipple Heights Elementary School	4800 12th Street NW	Canton	OH		X		
White Oak Convalescent Home	3516 White Oak Dr SW	Canton	OH		X		
Whittier Elementary School	1212 10th Street NE	Massillon	OH		X		
William R Day Elementary School	3101 38th Street NW	Canton	OH		X		
William S Stinson ES	8454 Erie Avenue NW	Canal Fulton	OH		X		
Wilmot Fire Department	204 Mill Street	Wilmot	OH		X		
Wilmot Police Department	300 Massillon Street	Wilmot	OH		X		
Wilmot United Brethren Church	Massillon St. (OM 62)	Wilmot	OH				X
Windsor Medical Center	1454 East Maple Street	North Canton	OH		X		
Worley Elementary School	1340 23rd Street NW	Canton	OH		X		
YMCA	205 South Union Street	Alliance	OH		X		
YMCA of Central Stark County	1201 30th Street NW	Canton	OH		X		
YMCA of Central Stark County North Canton	200 South Main Street	North Canton	OH		X		
York Elementary School	2219 Massachusetts Avenue SE	Massillon	OH		X		
Youtz Elementary School	1901 Midway Avenue NE	Canton	OH		X		



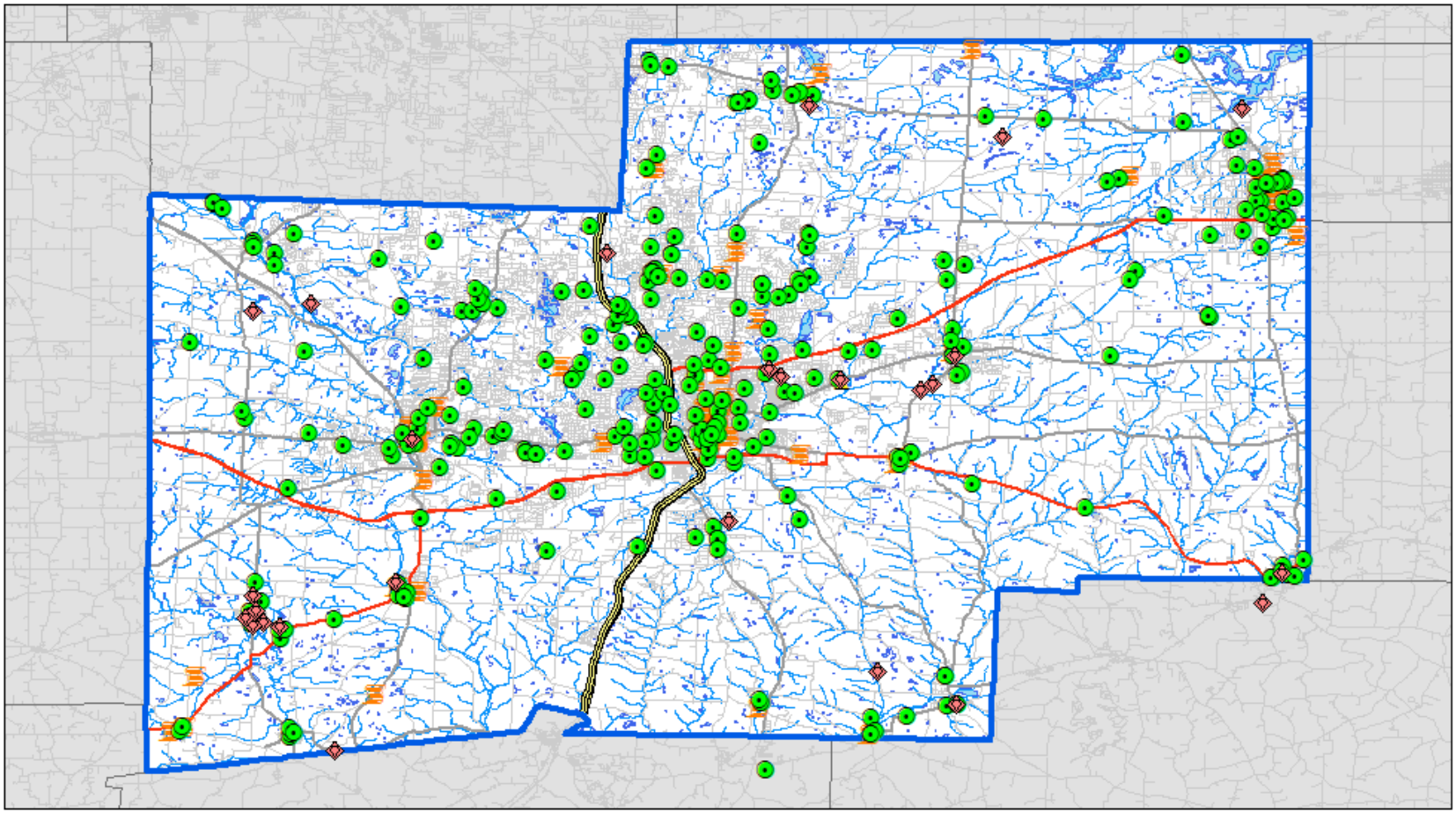
STARK COUNTY HAZARD MITIGATION PLAN

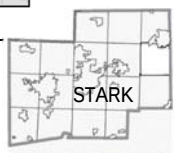
Asset Inventory

Data Source(s):
Stark Co. HMP Steering Committee

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources





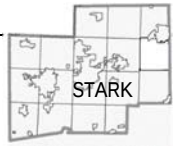
1.0 INTRODUCTION

1.3 Capabilities

§201.6(b)(3)	Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

This section examines the existing capabilities of Stark County and the participating jurisdictions. Specifically, this section looks at those capabilities that can support the implementation of hazard mitigation efforts. The county's consultant hosted an online survey of jurisdictional representatives to complete a "capabilities assessment." Representatives answered questions about various plans, codes, and ordinances from the perspectives of their home jurisdictions. The following table summarizes jurisdictional capabilities.

JURISDICTIONAL CAPABILITIES							
Jurisdiction	*Planning Commission*	*Comprehensive Plan*	*Building Codes**	*Zoning Ordinance*	*Floodplain Regulations*	*Capital Budget Funds Mitigation Projects***	*Public Works Budget Mitigation projects***
Stark County	YES	YES	YES	YES	YES	YES	UNKNOWN
Alliance City	YES	YES	YES	YES	YES	YES	YES
Canal Fulton City	YES	NO	NO	YES	YES	YES	YES
Canton City	YES	YES	YES	YES	YES	YES	YES
Louisville City	YES	YES	YES	YES	YES	UNKNOWN	UNKNOWN
Massillon City	YES	YES	YES	YES	YES	NO	NO
North Canton City	YES	YES	YES	YES	YES	YES	YES
Beach City Village	YES	UNKNOWN	NO	NO	YES	NO	NO
Brewster Village	YES	YES	NO	YES	YES	YES	YES
East Canton Village	YES	YES	NO	YES	YES	NO	NO
East Sparta Village	YES	UNKNOWN	YES	YES	YES	UNKNOWN	UNKNOWN
Hartville Village	YES	NO	YES	YES	NO	NO	NO
Hills & Dales Village	YES	YES	YES	YES	NO	NO	NO
Magnolia Village	YES	NO	YES	YES	YES	NO	NO
Meyers Lake Village	YES	NO	NO	YES	NO	NO	NO
Minerva Village	YES	UNKNOWN	YES	YES	YES	NO	NO
Navarre Village	YES	YES	YES	YES	YES	NO	NO
Waynesburg Village	YES	NO	YES	YES	YES	YES	YES
Wilmot Village	YES	NO	NO	NO	NO	UNKNOWN	UNKNOWN
Bethlehem Township	--	--	--	--	--	--	--
Canton Township	--	--	--	--	--	--	--
Jackson Township	--	--	--	--	--	--	--
Lake Township	--	--	--	--	--	--	--
Lawrence Township	YES	NO	NO	YES	YES	UNKNOWN	UNKNOWN
Lexington Township	--	--	--	--	--	--	--
Marlboro Township	YES	NO	NO	YES	NO	UNKNOWN	UNKNOWN



JURISDICTIONAL CAPABILITIES							
Jurisdiction	*Planning Commission*	*Comprehensive Plan*	*Building Codes**	*Zoning Ordinance*	*Floodplain Regulations*	*Capital Budget Funds Mitigation Projects***	*Public Works Budget Mitigation projects***
Nimishillen Township	--	--	--	--	--	--	--
Osnaburg Township	--	--	--	--	--	--	--
Paris Township	YES	NO	NO	NO	NO	NO	NO
Perry Township	--	--	--	--	--	--	--
Pike Township	YES	YES	NO	YES	NO	NO	NO
Plain Township	--	--	--	--	--	--	--
Sandy Township	YES	UNKNOWN	NO	NO	NO	NO	NO
Sugarcreek Township	--	--	--	--	--	--	--
Tuscarawas Township	YES	NO	NO	NO	NO	UNKNOWN	UNKNOWN
Washington Township	--	--	--	--	--	--	--

* All jurisdictions in the State of Ohio now follow the State Building Code (Ohio Administrative Code 4101:1)
** The budget area refers to budgets that would allow the jurisdiction to devote some resources towards mitigation activities
-- Municipality that did not complete Capability Survey (this survey was optional for Townships)

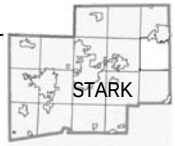
1.3.1 Existing Plans and Ordinances

Stark County itself and the municipalities therein have many capabilities that can support mitigation efforts, including comprehensive plans, building codes, subdivision and land use ordinances, zoning ordinances, and floodplain regulations. In summary, Stark County and the municipalities therein appear to have a "moderate" planning and regulatory capability; however, lack capital budgets or public works budgets that would allow for the funding of mitigation projects.

Comprehensive Plans

Comprehensive plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type, and extent of future development by establishing the basic decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities, and housing needs over time.

Nearly half of the jurisdictions in Stark County maintain comprehensive plans. Eleven of the 23 respondents reported the presence of a comprehensive plan. Eight of the respondents answered "no" to the question; the remaining four respondents answered "unknown". Additionally, the Stark County Regional Planning Commission serves as a regional planning and development council representing the governments in Stark County. The Northeast Ohio Four County Regional



Planning and Development Organization (NEFCO) supports a variety of community, economic, and transportation development planning efforts.

Building Codes

Building codes regulate construction standards for new construction and substantially renovated buildings. Standards can require resistant or resilient building design practices to address hazard impacts common to a given community. Building codes can contribute substantially to hazard mitigation, even if a jurisdiction only adopts codes to the level of the recommended International Building Code (IBC). Over half (56.5%) of the jurisdictional respondents reported having building codes in place, while 10 (43.5%) did not.

Subdivision and Land Use Development Ordinances

Subdivision and land development ordinances (SALDOs) regulate the development of housing, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how to divide the land, the placement and size of roads, and the location of infrastructure can reduce exposure of development to hazard events.

Over half, 13 (56.5%) of the respondents reported having SALDOs, while 10 (43.5%) indicated that they did not have SALDOs.

Zoning Ordinances

Zoning ordinances allow for local communities to regulate the use of land to protect the interests and safety of the general public. Zoning ordinances can address unique conditions or concerns within a given community. They may be used to create buffers between structures and high-risk areas, limit the type or density of development, or require land development to consider specific hazard vulnerabilities. The vast majority of Stark County's respondents reported having zoning ordinances in place (18 "yes" responses [78.3%] with 5 "no" responses [21.7%]).

National Flood Insurance Program (NFIP) Participation and Floodplain Management Ordinances

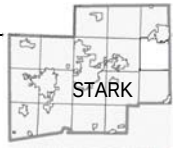
Through the administration of floodplain ordinances, local governments can ensure that all new construction or substantial improvements to existing structures located in the floodplain are flood-proofed, dry-floodproofed, or built above anticipated flood elevations. Floodplain ordinances may also prohibit development in certain areas altogether. The NFIP establishes minimum ordinance requirements in order for that community to participate in the program.

However, a community is permitted and encouraged to adopt standards that exceed NFIP requirements. Stark County enrolled into the NFIP on January 13, 1978.

FEMA's *Community Status Book* indicates that all but four jurisdictions in Stark County participate in the NFIP. The primary program coordinator for the county is the Stark County Chief Building Official. Participants manage their participation in the program in similar ways. Many municipalities refer residents to the planning commission or other entities like their municipal building or zoning officers, the county engineer, etc. for general information on floodplain development compliance. The Stark County Emergency Management Agency (SCEMA), Stark County Soil and Water Conservation Agency, and the U.S. Army Corps of Engineers (US ACE) also maintain and provide information on local FIRMs. Monitoring for compliance, particularly at the municipal and township levels, is via building and zoning officers.

COMMUNITIES PARTICIPATING IN THE NFIP						
CID	Name	County	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Reg- Emer Date
390780	Stark County	Stark	1/13/1978	9/01/1983	9/14/2018	9/01/1983
390508	City of Alliance	Stark	6/07/1974	7/05/1982	9/29/2011	7/05/1982
390511	City of Canal Fulton	Stark	1/09/1974	7/05/1982	9/29/2011	7/05/1982
390512	City of Canton	Stark	12/14/1973	1/06/1983	9/14/2018	1/06/1983
390516	City of Louisville	Stark	5/17/1974	8/15/1978	9/29/2011	8/15/1978
390517	City of Massillon	Stark	12/28/1973	7/05/1982	9/14/2018	7/05/1982
390521	City of North Canton	Stark	5/17/1974	11/03/1982	9/29/2011	11/03/1982
390509	Village of Beach City	Stark	7/30/1976	12/19/1980	9/29/2011	12/19/1980
390510	Village of Brewster	Stark	2/08/1974	7/31/1981	2/16/2012	7/31/1981
390513	Village of East Canton	Stark	7/18/1975	2/16/1979	9/29/2011	2/16/1979
390655	Village of East Sparta	Stark	4/05/1974	5/01/1981	9/14/2018	5/01/1981
N/A	Village of Hartville	Stark	Currently not participating*			
N/A	Village of Hills & Dales	Stark	Currently not participating*			
390051	Village of Magnolia	Stark	5/03/1974	9/01/1986	9/14/2018	9/01/1986
N/A	Village of Meyers Lake	Stark	Currently not participating*			
390518	Village of Minerva	Stark	7/23/1976	7/05/1982	9/29/2011	7/05/1982
390520	Village of Navarre	Stark	1/16/1974	7/05/1982	9/29/2011	7/05/1982
390667	Village of Waynesburg	Stark	3/29/1974	7/05/1982	9/14/2018	7/05/1982
N/A	Village of Wilmot	Stark	Currently not participating*			

Source: FEMA NFIP Community Status Book Report
* No special flood hazard areas in the corporate limits (see maps in Section 2.2.5)



Notification to residents about flood insurance and other flooding issues is typically through websites. Public service announcements about the benefits of flood insurance appear regularly. Some local governments in Stark County publish this information via social media accounts. A small number of townships reported providing information directly to builders and landowners (particularly those in flood-prone areas).

1.3.2 Capability Assessment

All jurisdictions in the county (i.e., the county, municipalities, and townships) had an opportunity to complete a "capability self-assessment" via an online survey, this survey was optional for the townships. Representative members of 23 jurisdictions completed a self-assessment for their jurisdiction. In response to the survey questionnaire, local officials classified each of the capabilities as high, moderate, or limited.

Administrative and Technical Capability

Administrative capability is adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise to effectively execute mitigation activities. Respondent jurisdictions reported having a variety of technical specialists available to them to support hazard mitigation activities. The following table depicts the results.

Administrative and technical capabilities possessed by Starks Parks include in-house and contracted planners with knowledge of local land development and management practices as well as an understanding or natural and human-caused hazards that impact the area, contracted engineers with intimate local knowledge of the area, in-house natural resource managers which establish floodplain, delineate wetlands and establish habitat boundaries, in-house GIS mappers, and can provide assistance with the monitoring or hazardous materials released into waterways.

Technical Specialists	% of Respondents
In-house planners with knowledge of land development/management practices	21.7
Contracted planners with knowledge of LOCAL land development/management practices	13
In-house engineers	13
Contracted engineers with intimate LOCAL knowledge	26
In-house building inspectors	30.4
In-house planners with an understanding of natural and human-caused hazards	13
Contracted planners with an understanding of LOCAL natural and human-caused hazards	17.4
Emergency manager(s)	8.7
Floodplain manager(s	17.4
In-house land surveyor(s)	4.3
Local scientists familiar with hazards in your community (e.g., staff at a nearby/local university)	0
In-house staff with education or expertise to assess vulnerability to hazards	13
In-house GIS mappers	21.7
Other:	8.7

Fiscal Capability

The decision and capacity to implement mitigation-related activities is often strongly dependent on the presence of local financial resources. While some mitigation actions are less costly than others, it is important that money is available locally to implement policies and projects. Financial resources are particularly important if communities are trying to take advantage of state or federal mitigation grant funding opportunities that require local-match contributions. Federal programs which may provide financial support for mitigation activities include, but are not limited to:

- Community Development Block Grant (CDBG),
- Disaster Housing Program,
- Emergency Conservation Program,
- Emergency Management Performance Grants (EMPG),
- Emergency Watershed Protection Program,
- Hazard Mitigation Grant Program (HMGP),
- Flood Mitigation Assistance Program,
- Non-Insured Crop Disaster Assistance Program,
- Pre-Disaster Mitigation Program,
- Repetitive Flood Claims Program (RFC),
- Section 108 Loan Guarantee Programs,
- Severe Repetitive Loss (SRL) Program, and
- Weatherization Assistance Program.

State programs that may support mitigation include (but are not limited to):

- Ohio Department of Development (job-ready sites and CDBG funds for economic development),
- Ohio Department of Natural Resources (land and water conservation efforts),
- Ohio Environmental Protection Agency (loans and capital improvements), and
- Ohio Emergency Management Agency (funds to support emergency preparedness, response, and overall resilience).

One jurisdiction (Stark County) reported having a grants specialist on their payroll. Three of the jurisdictions (i.e., Alliance City, Canton City, and North Canton City) indicated that their capital budget or public works budget could support mitigation projects.

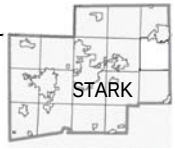
Stark Parks personnel are familiar with and have successfully acquired grants from the following programs, Community Development Block Grant, Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and the Severe Repetitive Loss Program. Stark Parks was instrumental in obtaining matching grant funds to conduct approximately 20 acquisition/relocation projects with the City of North Canton.

Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to mitigate hazard events. The adoption of hazard mitigation measures may be seen as an impediment to growth and economic development. In many cases, mitigation may not generate interest among local officials when compared with competing priorities. Therefore, the local political climate must be considered when designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions.

The following table summarizes the results of the self-assessment survey as a percentage of the responses received.

CAPABILITY SELF-ASSESSMENT			
Capability	*High*	*Moderate*	*Limited*
Administrative & Technical	17.4%	17.4%	65.2%
Fiscal	4.3%	21.7%	73.9%
Political	17.4%	21.7%	60.9%



The 2022 self-assessment also included four questions to gauge community receptiveness to several types of mitigation strategies. The following table details the results.

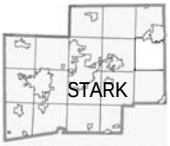
SELF-ASSESSMENT: PROJECT CONSIDERATIONS					
Sample Mitigation Strategy	*Very Willing*	*Willing*	*Neutral*	*Unwilling*	*Very Much Unwilling*
XYZ community guides development away from known hazard areas.	8.7%	30.4%	52.2%	8.7%	0.00%
XYZ community restricts public investments or capital improvements within hazard areas.	0.00%	34.8%	60.9%	4.3%	0.00%
XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.	0.00%	34.8%	52.2%	4.3%	8.7%
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ resilient construction techniques (e.g., voluntarily elevate structures, employ landscape designs to establish buffers, etc.).	0.00%	17.4%	73.9%	0.00%	8.7%
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ green infrastructure techniques (e.g., pave sidewalks and driveways utilizing permeable materials, install drought tolerant plants to capture, clean and/or infiltrate rain water, increase green space in urban areas, etc.).	0.00%	26.1%	65.2%	0.00%	8.7%

1.3.3 Studies, Reports, and Technical Information

The research conducted for the development of this plan included data from federal, state, and higher education studies, reports, and technical information. Specific sources relative to individual hazards appear in Appendix 5: Citations. Stark County's consultant reviewed a number of existing plans and reports to (a) identify any obvious inconsistencies between other development and mitigation efforts, (b) as baseline information for such sections as trends and predictions, and (c) to support discussions surrounding mitigation projects. Those documents included the following.

REFERENCED DOCUMENTS		
Document Type	*Document Citation*	*How Incorporated into Plan*
Technical Information	ODNR Division of Soil and Water Conservation. (2014). *Rainwater and land development: Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection,* 3rd Ed. State Government: Columbus, OH.	Used to support discussions of site-specific flood mitigation.
Technical Information	USDHS FEMA. (2005). *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. Federal Government: Washington, DC.	Used as general guidance for incorporating historical property and cultural protection.
Technical Information	USDHS FEMA. (2010). *Flood Insurance Study: Stark County Ohio and Unincorporated Areas.* Federal Government: Washington, DC.	Used as a resource for identifying flood-prone areas in the flooding profile.

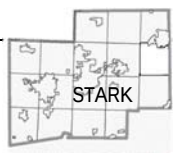
REFERENCED DOCUMENTS		
Document Type	*Document Citation*	*How Incorporated into Plan*
Technical Information	USDHS FEMA. (2013). *Integrating Hazard Mitigation Into Local Planning.* Federal Government: Washington, DC.	Used as general guidance on existing plan integration for hazard mitigation
Technical Information	USDHS FEMA. (2013). *Local Mitigation Planning Handbook.* Federal Government: Washington, DC.	Used as general guidance on revised mitigation planning process
Technical Information	USDHS FEMA. (2013) *Mitigation Ideas.* Federal Government: Washington, DC.	Used as general guidance for stakeholders and jurisdictions on mitigation ideas
Technical Information	USDHS FEMA. (2016). *National Mitigation Framework.* Federal Government: Washington, DC.	Used as general guidance on mitigation planning.
Technical Information	USEPA. (2018). *Storm Smart Cities: Integrating Green Infrastructure into Local Hazard Mitigation Plans.* Federal Government: Philadelphia, PA.	Outlines ways low-impact development and green infrastructure can support mitigation planning.
Plan	State of Ohio (2019). *Enhanced Hazard Mitigation Plan.* State Government: Columbus, OH.	Used as general guidance on existing plan integration for hazard mitigation
Plan	Stark County Emergency Management Agency (2020). *Emergency Operations Plan*. Local Government: Canton, OH.	Used as a resource for the development of an overall updated hazards list.
Assessment	Stark County Emergency Management Agency (2019). *Stark County Hazard Identification & Risk Assessment (HIRA)*. Local Government: Canton, OH	Used as a resource for the development of several hazard profiles.
Plan	Stark County Local Emergency Planning Committee (2019). *Commodity Flow Study*. Local Government: Canton, OH	Used as a resource for the development of the Hazardous Materials Release profile.
Plan	Stark County Emergency Management Agency. Class I Dams or HHPDs *Emergency Action Plans (EAPs)*. Local Government: Canton, OH	Used as a resource for the development of the Dam & Levee Failure hazard profile. Also used to develop loss estimates for dam failure hazards.
Plan	Stark County Health Department. (2020). *Stark County All Hazard Emergency Response Plan.* Local Government: Stark, OH.	Used as a resource for the epidemic profile; also informed potential project updates for public health emergencies. As a document covering Stark County, the document informed project considerations for all jurisdictions within the county.
Plan	Stark County Health Department. (n.d.). (2017*). Pandemic Influenza Preparedness Plan.* Local Government: Canton, OH.	Used as a resource for the epidemic profile, and to generate newly developed mitigation projects to reduce the effects of epidemics / pandemics in Stark County.
Plan	Stark County Health Department. (2017). *Ebola and Other Special Pathogens.* Local Government: Canton, OH.	Used to frame epidemic profile information; also used as a resource for identifying sources of disease information.
Plan	Stark County Health Department. (2019). *Medical Countermeasure Dispensing.* Local Government: Canton, OH.	Used as a resource for the epidemic profile.
Plan	Stark County Health Department. (2019). *Excessive Temperature & Utility Disruption Annex*. Local Government: Canton, OH	Used as a resource for the Temperature Extreme Profile.
Plan	Stark County Regional Planning Commission's (2017). *Comprehensive Plan*: Local Government, Canton, OH	Used to obtain information regarding future development areas planned for Stark County.
Study	Stark County Regional Planning Commission. (2022). *Stark County Area Transportation Study (SCATS)*. Local Government, Canton, OH	Used to obtain information for inclusion into Section 2.4 Development Trends & Complicating Variables.



REFERENCED DOCUMENTS		
Document Type	*Document Citation*	*How Incorporated into Plan*
Plan	Ohio Department of Agriculture. (2021). *Farmland Preservation Report*. State Government: Columbus, OH.	Used as a resource for the description of the planning area and drought profile.
Assessment	USDA Natural Resources Conservation Service. (n.d.). *Soil Survey of Stark County, Ohio.* Federal Government: Washington, DC.	Used to support consideration of subsidence and other geologic hazards.

2.0 RISK ASSESSMENT

A risk assessment analyzes, "the potential for damage, loss, or other impacts created by the interaction of hazards with community assets" (FEMA, 2013). This risk assessment section contains information on identified hazards that threaten Stark County and the surrounding region, and the vulnerability of the area as it relates to the county's assets.



2.0 RISK ASSESSMENT

2.1 Hazard Identification

§201.6(c)(2)(i)	[The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The committee spent much of the first meeting discussing the hazards to include in the plan update. The discussion started with a list of the hazards from the previous version of the plan. The committee recognized and agreed to the required revision per the Ohio Emergency Management Agency (OEMA) changing "dam failure" to "dam & levee failure". A comprehensive list of hazards (i.e., natural, technological, and human-caused) was then evaluated by the committee along with the number of occurrences of each hazard since 2017. The county's consultant specifically asked several questions per hazard inclusions. During the evaluation of hazards on the comprehensive list a lengthy discussion was had with regards to hazardous materials releases, specifically with regards to number of occurrences and impacts resulting from hazardous materials releases in different areas of the county.

The first question regarded splitting the severe summer storms profile into two separate profiles, severe thunderstorms and severe wind and tornadoes. The comment decided to keep both issues under the umbrella of severe summer storms with subheadings for each issue rather than creating multiple profiles.

The second question regarded what should be included in the severe winter storms profile, it was determined that blizzards, heavy snow, and ice storms would be covered in this profile.

The third question was centered on the temperature extremes profile, whether or not the profile should include both extreme heat and extreme cold, or only extreme heat, and extreme cold would be covered in the severe winter storms profile. The committee indicated that they would like the temperature extremes profile to discuss both extreme heat and extreme cold.

The committee strongly considered adding the technological and human-caused hazards of cyberattack, and terrorism. The committee ultimately decided to look at those hazard more in-depth and reconsider adding them during future plan updates.

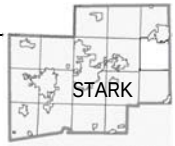
As a result, all hazards included in the 2017 plan will remain in the 2022 plan and hazardous materials release was added as a new hazard during this plan update.

The following table lists the hazards considered by the remainder of this risk assessment.

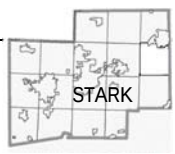
HAZARDS IDENTIFICATION	
Hazard	*Description*
Natural Hazards	
Drought	Existing. This profile includes meteorological, agricultural, hydrological, and socioeconomic droughts.
Earthquake	Existing.
Epidemic	Existing. This profile will include information regarding COVID-19 (SARS CoV2)
Flooding	Existing. This profile includes both riverine and flash flooding.
Land Subsidence	Existing.
Severe Summer Storms	Existing. This profile includes thunderstorms, hail, lightning, and tornados.
Severe Winter Storms	Existing. This profile includes blizzards, heavy snow, and ice storms
Temperature Extremes	Existing. This profile includes extreme heat and cold.
Wildfire	Existing.
Technological Hazards	
Dam & Levee Failure	Revised. Levee failure has been added to this profile.
Hazardous Materials Release	Added. Committee added this hazard as a result of multiple incidents occurring in recent years.

In addition to these 11 hazards, there exist other potential natural hazards this plan does not address. The following list presents those natural hazards with an explanation as to why those hazards were not included in this plan update.

- **Avalanche:** Avalanches happen mainly in the western United States and Canada. The terrain and geography of Stark County are not rugged or severe enough to have avalanches. Stark County does not contain elevations that are snowcap for extended periods, no historical occurrences.
- **Coastal Storm / Erosion:** Stark County is not located near a coast and does not contain any coast-lines, (i.e., approximately 367 miles inland from the Atlantic coast).
- **Hurricanes:** The Atlantic east coast, where hurricane paths are nearest, is approximately 367 miles away, and the Gulf of Mexico is approximately 825 miles away. Neither would affect Stark County. The county may experience wet weather as the remnants of Atlantic hurricanes pass through the area; however, winds would not likely be near a hurricane or tropical storm levels.
- **Infestation/Invasive Species:** While there have been sporadic and mild infestations, most notably involving the emerald ash borer and the Asian long horned beetle, none of these infestations have been of a magnitude to impact the limited agricultural assets of Stark County. These infestations have had a limited effect on the forested areas of the county which make up only 39% of the total land cover.



- **Storm Surge:** Storm surge occurs along the shorelines of large water bodies such as oceans and the great lakes; the Atlantic east coast is approximately 367 miles away, and the Gulf of Mexico is approximately 825 miles away from Stark County. Neither would affect Stark County.
- **Tsunami:** Tsunamis occur in oceans; the Atlantic east coast is approximately 367 miles away, and the Gulf of Mexico is approximately 825 miles away. Neither would affect Stark County.
- **Volcano:** The closest active volcano is the Dotsero Volcano in western Eagle County in the state of Colorado, approximately 1,345 miles west. It would not affect Stark County. The volcano last erupted 4,200 years ago, but a 2018 report from the United States Geological Survey lists it as a moderate threat to human activity.



2.0 RISK ASSESSMENT

2.2 Hazard Profiles

The following profiles detail each hazard considered by this plan, which includes discussion on how the hazard impacts the area. Within each profile, research and historical data inform the following elements.

- **Hazard Introduction & Overview:** Defines the hazard and presents a summary table of the hazard.
- **Location and Extent:** Identifies the physical places in the county that are vulnerable to the hazard and the severity of a hazard in a given location.

§201.6(c)(2)(i)	A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

- **Historical Occurrences:** Summarizes significant past events related to the hazard.

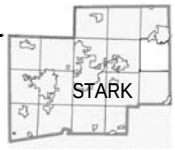
§201.6(c)(2)(i)	A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

- **Vulnerability and Impact:** Describes impacts on different topics such as health, the environment, or infrastructure that may result from the hazard as well as specific populations that may be vulnerable.

§201.6(c)(2)(ii)	A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008, must also address NFIP-insured structures that have been repetitively damaged by floods.

- **Loss and Damages:** Outlines the methods used for loss amounts (of deaths, injury, and property damage depending on available information) and estimates based on historical information and vulnerable populations, structures, and infrastructure.

§201.6 (c)(2)(ii)(B)	An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.



- **Risk Assessment:** Details methods for calculating the probability and severity of each hazard.

§201.6(c)(2)(ii)(A)	The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.
§201.6(c)(2)(iii)	For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

- **Maps and Assets:** Graphically shows the geographic locations or populations in the county that are vulnerable to each hazard. This subsection also identifies the assets that fall under the hazard risk area. Although there is not a defined title for this subsection in the profiles, assets and maps appear where they are most fitting within the narrative.

Hazard profiles appear in the following alphabetical order.

- 2.2.1 Dam and Levee Failure
- 2.2.2 Drought
- 2.2.3 Earthquake
- 2.2.4 Epidemic
- 2.2.5 Flooding
- 2.2.6 Hazardous Materials Release
- 2.2.7 Land Subsidence
- 2.2.8 Severe Summer Storms
- 2.2.9 Severe Winter Storms
- 2.2.10 Temperature Extremes
- 2.2.11 Wildfire

Dam / Levee Failure

A dam failure occurs when the barrier constructed across a waterway does not obstruct or restrain water as designed, which can rapidly result in a large area of completely inundated land. Levees, though similar, are embankments built to prevent the overflow of a river.

Beach City Dam

Massillon Levee

2.0 RISK ASSESSMENT

2.2.1 Dam and Levee Failure

A dam is a barrier built across a waterway to control the flow or raise the water level. A dam failure occurs when the barrier constructed does not obstruct or restrain water as designed, which can rapidly result in a large area of completely inundated land. Levees, though similar, are embankments built to prevent the overflow of a body of water.				
VULNERABILITY HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	Dam / levee failure can occur at any time, typically following a period of prolonged precipitation.	Hazard Index Ranking:	Medium
	Warning Time:	Over 24 hours	State Risk Ranking:	7
	Probability:	Remote (unlikely to occur on an annual basis)	Severity:	Minor (localized, less than 10% of land area affected)
	Type of Hazard:	Technological	Disaster Declarations:	None

Hazard Introduction and Overview

Dams are man-made structures generally made with concrete or earthen materials built across a stream or river to hold water for storage, flood control, or electricity generation (National Geographic, n.d.). There are 91,457 dams in the United States, the average age of which is 57 years old (NID, 2020). The majority of these dams are privately owned. State and local authorities, public utilities, and federal agencies own others. Most of the dams in Ohio were constructed by farmers and other individuals and are small dams. The State of Ohio operates more than 100 dams in the state, while the federal government operates over 30. There are 402 Class I dams, 1,089 Class II and III dams, and 1,049 Class IV dams in Ohio. As populations grow and development continues, the overall number of high-hazard potential dams is increasing. The number of high-hazard potential dams with noted deficiencies has also increased, with an estimated 2,330 in 2020 (Association of State Dam Safety Officials).

Dams are an integral component of infrastructure in the United States, the benefits of dams are numerous: they provide drinking water supplies, navigation and recreation opportunities, renewable energy through hydropower, agricultural irrigation, and save lives by preventing or reducing floods.

The failure of a large dam, although a man-made structure, may result in the natural event of flooding. A dam failure is defined as any malfunction or abnormality outside the design assumptions and parameters that adversely affect a dam's primary function of impounding water (FEMA, 2017).

Typically, dam failures are most likely to happen due to one of the following reasons:

- **Overtopping** occurs when water spills over the top of the dam. Overtopping failures result from the erosive action of water on the embankment. Erosion is due to uncontrolled flow of water over, around, and adjacent to the dam. Earthen embankments are not designed to be overtopped and therefore are particularly susceptible to erosion. Once erosion has begun during overtopping, it is almost impossible to stop. Overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for approximately 34% of all dam failures in the U.S.
- **Foundation Defects, Slope Instability, and Structural Failures** can occur in either the embankment or the appurtenances. Structural failure of a spillway, lake drain, or other appurtenance may lead to failure of the embankment. Cracking, settlement, and slides are the more common signs of embankment structural failure. Large cracks in either an appurtenance or the embankment, major settlement, and major slides will require emergency measures to ensure safety, especially if the problems occur suddenly. These types of failures cause approximately 30% of all dam failures.
- **Piping** is the internal erosion caused by seepage. Seepage occurs around hydraulic structures, such as pipes and spillways, through animal burrows, around roots of vegetation, and through cracks in the dam. All earthen dams have seepage resulting from water percolating slowly through the dam and its foundation. Seepage must, however, be controlled in both velocity and quantity. If uncontrolled, it can progressively erode soil from the embankment, resulting in the rapid failure of the dam. Erosion of the soil begins at the downstream side of the embankment, either in the dam proper or the foundation, progressively works toward the reservoir, and eventually develops a “pipe” or direct conduit into the reservoir. Seepage can cause slope failure by creating high pressures in the soil pores or by saturating the slope. Piping accounts for another 20% of dam failures in the U.S.

The three (3) types of failures described above are often interrelated in a complex manner. For example, uncontrolled seepage may weaken the soil and lead to a structural failure. A structural failure may shorten the seepage path and lead to a piping failure. Surface erosion may result in structural failure, and so on. Minor defects such as cracks in the embankment may be the first visual sign of a major problem, which could lead to failure of the structure. Someone experienced in dam design and construction should evaluate the seriousness of all deficiencies as soon as they are detected.

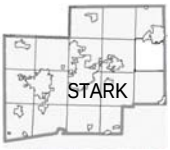
Additionally, the Ohio Department of Natural Resources (ODNR), Division of Water Resources – Dam Safety Program classifies dam failures as either "sunny day" failures or "rainy day" failures. "Sunny day" failures are those that occur during non-flooding conditions, in which the reservoir is at or near a normal level. "Rainy day" failures are those that involve periods of flooding or rainfall and can exacerbate inadequate spillway capacity. It can be assumed that sunny day failures are more catastrophic due to their unpredictable nature and lack of warning time for populations downstream.

Dams are not the only structures that can fail. Levees, barriers, and other structures that retain water can fail and cause flood damage and loss of life. The ODNR is the agency responsible for the regulation of levees in Ohio. According to the ODNR, "a levee is any artificial barrier together with appurtenant works that will divert or restrain the flow of a stream of other body of water for the purpose of protection an area from inundation by flood water" (ODNR, 2016). While dams constantly control the flow of water, most levees are built purely for flood control and protection and are subjected to water loading during a few days or weeks in a given year.

Though levees are designed to a certain level of potential flood, the U.S. Army Corps of Engineers (USACE) notes that levees are not subject to consistent design, construction, operations, and maintenance standards. Those under the auspices of the USACE receive regular inspections, but this represents an estimated 15% of the levees in the country (USACE, n.d.). Levees function as part of a system. In other words, a levee in one area may overtop by design to protect larger populations downstream (USACE, n.d.). "'Levee failure' implies that something about the levee failed to prevent flooding on the land side of the levee" (USACE, n.d.). Levee failures can result from overtopping, water flow through or under a levee, erosion, by an object hitting the levee, or by an object on the levee (e.g., tree or building) falling and taking a portion of the structure with it (USACE, n.d.). The USACE also maintains the National Levee Database (NLD).

Location and Extent

The (ODNR), Division of Water Resources – Dam Safety Program provides a map of all dams in Stark County. According to ODNR, there are dams in 12 Stark County townships: Bethlehem, Canton, Jackson, Lawrence, Lexington, Marlboro, Nimishillon, Osnaburg, Paris, Perry, Pike, and Sugar Creek. The following map depicts the locations of dams throughout the county. As can been seen, these dams are sporadically located over much of the county, with most being located in Jackson and Paris Townships.



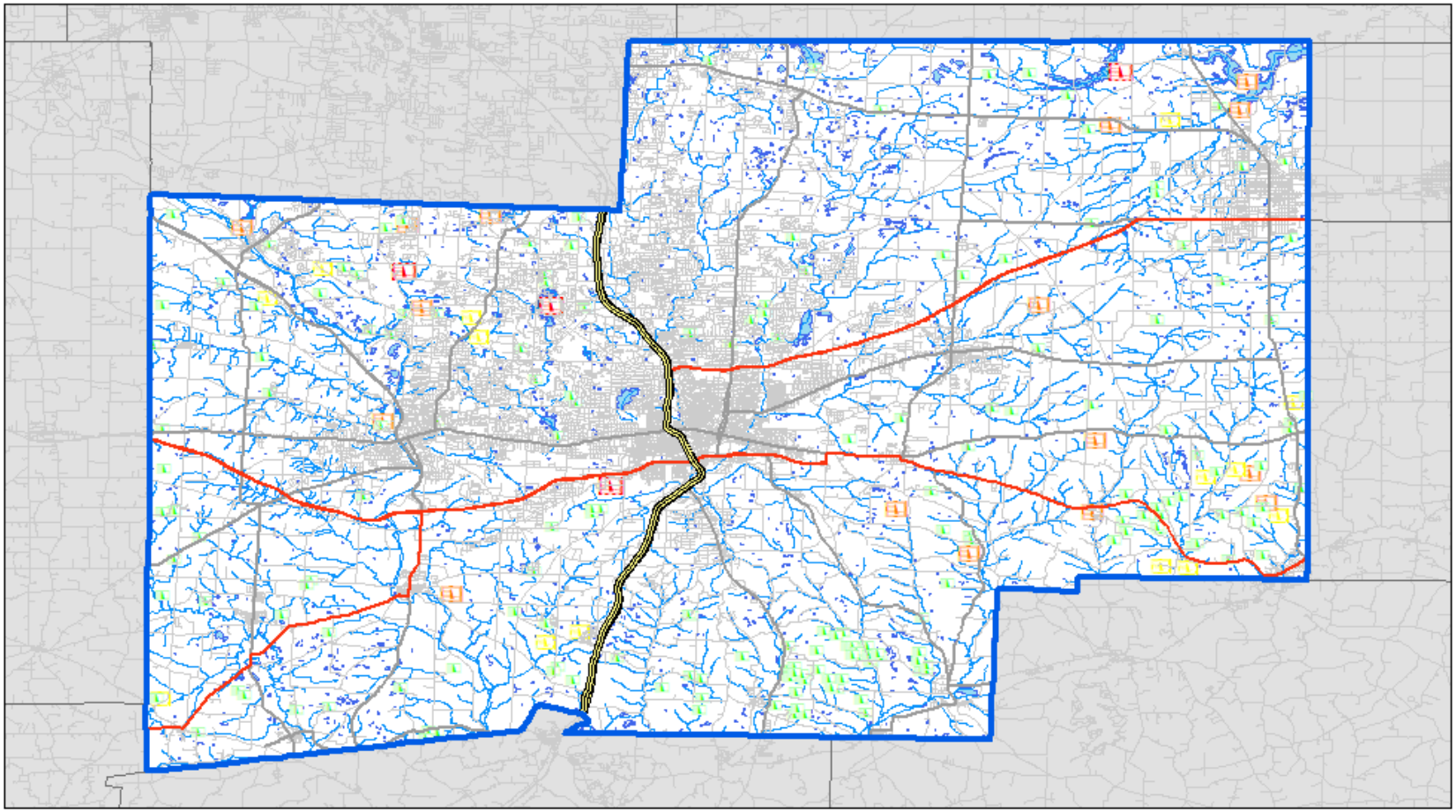
STARK COUNTY HAZARD MITIGATION PLAN

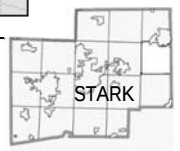
Dam Locations (by Hazard Class)

Data Source(s):
ODNR, USACE NID

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

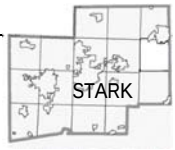
- Class I
- Class II
- Class III
- Other (or Not Specified)





Ohio's Region 2, which includes Stark County, contains 169 Class I, 454 Class II and III, 491 Class IV Dams, and 1,454 "other" dams (i.e., proposed, unclassified, exempt, or abandoned structures). The U.S. Army Corps of Engineers (UCACE) maintains the National Inventory of Dams (NID), according to which there are 36 dams in Stark County. The Ohio Department of Natural Resources (ODNR), Division of Water Resources also maintains a database of dams in the state. Stark County is home to 221 total dams, per ODNR's listing, of with five are Class I, 16 are Class II, and 15 are Class III dams. The 38 "classed" dams in Stark County include all of the dams contained in the NID listing. The remaining on the ODNR list (not listed below) are "Other Dams" (ODNR). The following table presents the NID, and ODNR Class I-III dams in Stark County.

LIST OF CLASS I-III DAMS IN STARK COUNTY OHIO								
Dam Name	*ODNR Hazard Class*	*Owner Type*	*Location*	*Type*	*Dam Height (ft)*	*Storage (acre-ft)*	*EAP*	*Also in NID*
Bolivar Dam	High (1)	Federal	Pike Twp	Earthfill	87	149,600	✓	✓
Dale Walborn Reservoir Dam	High (1)	Public, Local	Lexington Twp	Earthfill	37.2	13,513	✓	✓
Lake Cable Dam	High (1)	Private	Jackson Twp	Earthfill	24.9	1,499	✓	✓
Lords Lake Dam	High (1)	Private	Jackson Twp	Earthfill	22	200		✓
Marathon Brine Pond Dam	High (1)	Industrial	Canton Twp	Earthfill	23.3	53	✓	✓
Alliance Sludge Lagoons	Significant (2)	Public, Local	Lexington Twp	Earthfill	12	75		✓
Beck Pond Dam	Significant (2)	Private	Paris Twp	Earthfill	24.9	44.6	✓	✓
Clapper Lake Dam	Significant (2)	Private	Osnaburg Twp	Earthfill	16.8	73.8		✓
Crystal Lake Dam	Significant (2)	Private	Paris Twp	Earthfill	10.4	51.8		✓
Deer Creek Reservoir Dam	Significant (2)	Public, Local	Lexington Twp	Earthfill	34	3,967		✓
Fieldstone Lake Dam	Significant (2)	Private	Lexington Twp	Earthfill	34.5	75	✓	✓
Huber Lake Dam	Significant (2)	Private	Paris Twp	Earthfill	23.4	238	✓	✓
Lake Lucern Dam	Significant (2)	Private	Lawrence Twp	Earthfill	10	3,214		✓
Marko Lake Dam	Significant (2)	Private	Paris Twp	Earthfill	20.3	31.1		✓
Meadow Lake Dam	Significant (2)	Private	Nimishillen	Earthfill	18.8	28.9		✓
Morelli Pond Dam	Significant (2)	Private	Jackson Twp	Earthfill	18.6	139.7	✓	✓
Poth Lake Dam	Significant (2)	Private	Bethlehem Twp	Earthfill	21.8	37.1		✓
Stark Lime Sludge Lagoon	Significant (2)	Utility	Unknown	Earthfill	34	119.4		✓
Varian Lake Dam	Significant (2)	Private	Osnaburg Twp	Earthfill	32	61.6	✓	✓
Willowdale Lake Dam	Significant (2)	Private	Jackson Twp	Earth & Concrete	27.3	563		✓
Woodmoor Dam #1	Significant (2)	Private	Jackson Twp	Earthfill	16.8	60		✓
Clay's Park Lake Dam	Low (3)	Private	Lawrence Twp	Earthfill	14.5	199.7		✓
Cooper Pond Dam	Low (3)	Private	Paris Twp	Earthfill	23.5	84	✓	✓
Gonzalez Lake Dam	Low (3)	Private	Paris Twp	Earthfill	12.9	87		✓
Lake Kayla Dam	Low (3)	Private	Bethlehem Twp	Earthfill	31.4	24.1		✓
Lake Louise Dam	Low (3)	Private	Paris Twp	Earthfill	25.4	29	✓	✓



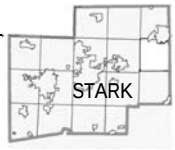
Dam Name	*ODNR Hazard Class*	*Owner Type*	*Location*	*Type*	*Dam Height (ft)*	*Storage (acre-ft)*	*EAP*	*Also in NID*
Peterson Lake Dam	Low (3)	Private	Lexington Twp	Earthfill	18.1	85.6		✓
Rogers Lake Dam	Low (3)	Private	Lawrence Twp	Earthfill	12.5	64		✓
Shady Hollow Pond Dam	Low (3)	Private	Jackson Twp	Earthfill	14.3	72.7		✓
Springwood Lake Dam	Low (3)	Private	Bethlehem Twp	Earthfill	23.8	150		✓
Squaw Valley Lake Dam	Low (3)	Private	Paris Twp	Earthfill	18.2	68		✓
Stout Lake Dam	Low (3)	Private	Paris Twp	Earthfill	16.2	133.2		✓
Syler Lake Dam	Low (3)	Private	Marlboro Twp	Earthfill	18	112		
The Wilderness Lake Dam	Low (3)	Private	Sugar Creek	Earthfill	21.8	63.4	✓	✓
Timken Lake Dam	Low (3)	Private	Jackson Twp	Earthfill	17.4	133		✓
Turner-Jordan Lake Dam	Low (3)	Private	Paris Twp	Earthfill	8	242	✓	✓

Source: ODNR-Division of Water Resources-Dam Safety Program / National Inventory of Dams

The Sippo Creek Reservoir Dam was lowered as part of the Massillon Levee upgrade project in April of 2017. The lake was once again lowered reducing the lake water level another 4 feet. The Ohio Department of Natural Resources indicated that public safety and limiting the risk of the dam overflowing during a major rainstorm were the main reasons for mandating the reduction in water levels. As a result of this action the Sippo Creek Reservoir Dam's classification has been changed from Class I to Other by the ODNR-Division of Water, Dam Safety (The Repository, 2017).

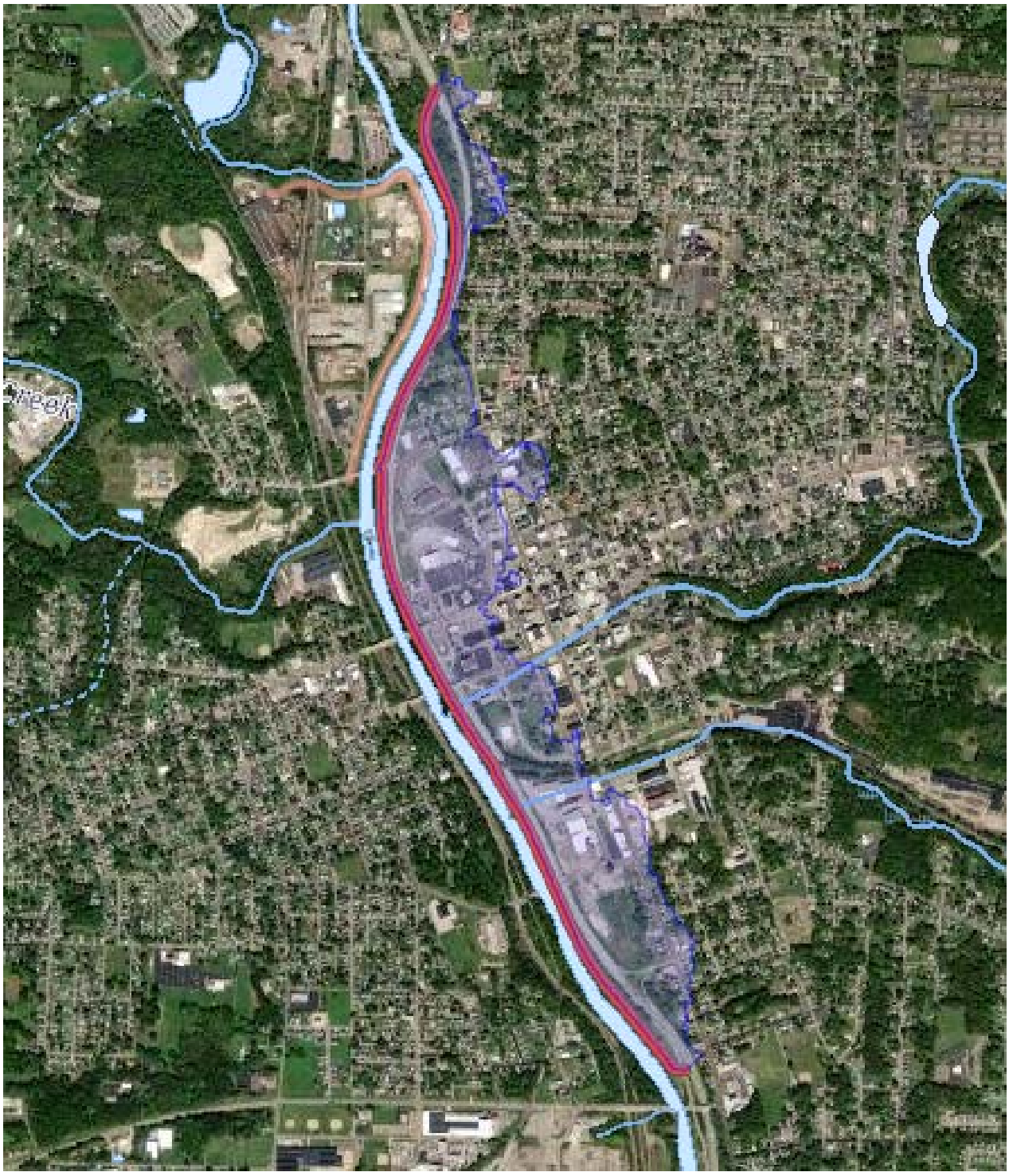
Publication of Emergency Actions Plans (EAPs) are limited by regulations set by the Ohio Department of Natural Resources (ODNR). EAPs are held by the Stark County Emergency Management Agency (SCEMA) and the ODNR, Division of Water Resources – Dam Safety Program.

Two primary sources were utilized to obtain levee data for Stark County, The US Army Corp of Engineers' National Levee Database (NLD) and the ODNR, Division of Water Resources – Dam Safety Program. The National Levee Database is dynamic in nature, it does provide static information regarding levee location and attributes, which can aid in decision making and better flood risk management. According to the NLD, there are six levee systems located in Stark County. The Magnolia Levee system extends across portions of Carroll and Stark Counties. There are two levee systems located near the City of Massillon and three levee systems located near the Village of Brewster. Maps of each levee system are provided on the following pages.

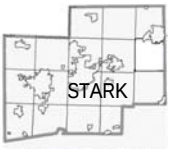


MAGNOLIA LEVEE

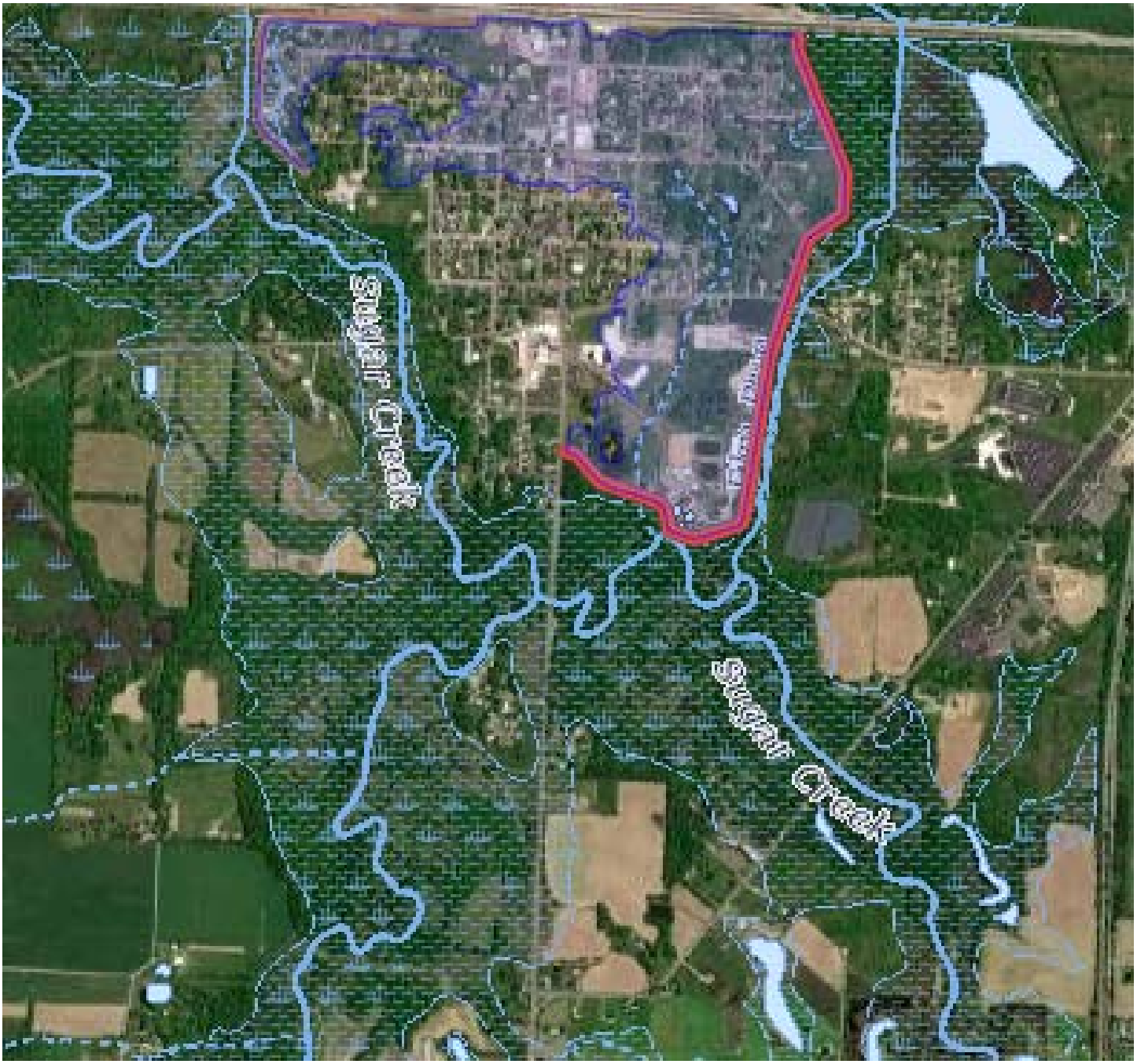
MASSILLON LOCAL PROTECTION PROJECT EAST LEVEE



MASSILLON LOCAL PROTECTION PROJECT WEST LEVEE



VILLAGE OF BREWSTER LEVEE #2



VILLAGE OF BREWSTER NORTH LEVEE

VILLAGE OF BREWSTER WEST LEVEE

The National Levee Database indicates that there are five levee systems located entirely within Stark County, and the Magnolia Levee system extends across Stark and Carroll Counties. These Levees create a total of 0.78 square miles of leveed area. The following table presents the levees in Stark County and includes data on the Magnolia Levee.

LIST OF LEVEES IN STARK COUNTY OHIO						
Levee Name	*What is Behind the Levee*			*Length (Miles)*	*Risk*	*NFIP/FIRM Status*
	Population	*Buildings*	*Property Value*			
Magnolia Levee	302	137	$60.9M	0.91	NS[1]	Accredited Levee System
Massillon, OH, LPP - East	1,166	349	$170M	2.18	Moderate	Accredited Levee System
Massillon, OH, LPP - West	207	10	$65.5M	0.94	Low	Accredited Levee System
Village of Brewster Levee #2	534	230	$82.3M	1.16	NS[1]	Accredited Levee System
Village of Brewster Levee - North	N/A	N/A	N/A	0.24	NS[1]	Accredited Levee System
Village of Brewster Levee - West	270	99	$34.1M	0.61	NS[1]	Accredited Levee System

Source: USACE National Levee Database
[1] – NS = Not Screened

Hazard Impacts

Uncontrolled floodwaters are one of the most powerful and destructive forces in nature. Dams that are not designed to withstand major storms may be destroyed, increasing flood damage downstream. Dams may also be destroyed as a cascading effect of an earthquake.

The potential for damage due to dam failure is increasing along with the increased number of residential and commercial development located within the hydrological shadow of dams. In many cases, existing dams will need to be modified to keep downstream areas safe from catastrophic flooding. Stark County contains dams that could present the possibility of significant flood damage to the residents and businesses located near or downstream from the dams. In many cases the dams are less than five miles away from the nearest community.

According to flood studies on file with the Stark County Emergency Management Agency (SCEMA), many communities in the county could be affected by a dam failure event. In the event that the Dover and Bolivar dams are at the emergency spillway, back up flooding along the Tuscarawas Rive through Stark County would significantly impact the Village of Navarre, as well as the cities of Massillon and Canal Fulton. Flooding in Navarre would far surpass 500-year flood levels, placing much of the village's downtown under water. Similar studies on file with SCEMA for Atwood Lake and the Beach City Dam, indicate similar concerns. After an extensive examination of spreadsheet calculations, vulnerability assessments show that 28,288 structures could be damaged with an estimated loss of $1,019,132,000 (State of Ohio Enhanced Hazard Mitigation Plan, 2019).

The National Performance of Dams Program (NPDP) was founded in 1994 at Stanford University to collect current and historical information on the performance of dams in the United States.

The NPDP defines "incident" as any event that provides insight to the structural and operational integrity of a dam", thus incidents can be either positive (such as implementation of emergency action plans) or negative (dam failure). The following table presents potential incidents defined by the NPDP.

DAM INCIDENTS	
Event	*Description*
Inspection Findings	The findings of a dam safety inspection that identify unsatisfactory or unsafe conditions at a dam. These might include observations of deterioration, signs of distress or instability of a dam or appurtenant structures.
Dam Failure	Any event resulting in the breach of a dam (partial or complete) and the uncontrolled release of the reservoir.
Controlled Breach	A planned (non-emergency, non-incident initiated) breach of a dam; possibly carried out to remove the dam from service or to make major repairs.
Downstream Release-Controlled or Uncontrolled	Uncontrolled release of the reservoir (e.g., appurtenant structure misoperation), or controlled release with damage.
Inflow Floods, Earthquakes	The performance of a dam (satisfactory or unsatisfactory; anticipated or unanticipated) generated by a nearby seismic event or inflow flood.
Misoperation, Operator Error	Misoperation of appurtenant structures such as failing to comply with the project rule curve.
Equipment Failure	Failure of mechanical or electrical equipment to perform the functions for which they were intended.
Deterioration	Deterioration of concrete, steel, or timber structures that jeopardizes the structural/functional integrity of a dam or appurtenant structures.
Dam Safety Modification	Modifications to improve the safety of a dam or appurtenant structures such as might be required due to changes in design criteria. Note, repairs following an incident are reported as part of a follow-up to an incident.
Reservoir Incidents	Events that occur in the reservoir (e.g., landslides, waves) that may impact the safety of the dam.
Emergency Action Plans	Implementation of an Emergency Action Plan (or emergency actions) in part or whole.
Regulatory Action	The regulator has determined an unsafe condition exists, or the dam does not meet applicable design criteria (e.g., inadequate spillway capacity), and requires action to be taken by the owner (e.g., reservoir restriction, safety modification).

Source: National Performance of Dams Program

In addition to national classifications, states can implement custom classification systems for dams. According to Ohio Administrative Code Rule 1501:21-13-01, dams fall under one of four classes, which are described below. The four classes are based on height, storage capacity, and downstream hazard potential. The height of a dam is defined as the vertical dimension measured from the natural streambed at the downstream toe of a dam to the low point along the top of the dam. The storage volume of a dam is defined as the total volume impounded when the pool level is at the top of the dam immediately before it is overtopped. According to the Ohio Department of Natural Resources (ODNR), the damage predicted by a

dam failure coincides with the class of the dam. The potential downstream hazard is defined as the resultant downstream damage should the dam fail, including probable future development.

The ODNR, Division of Water Resources – Dam Safety Program classifies the hazard potential for levees as Class I, Class II, and Class III levees, depending on what is identified as the landward risk. The classification of levees is determined by the Chief of the Division of Water Resources during the preliminary design review for a new levee or during the periodic inspection of an existing levee.

OHIO & FEDERAL DAM CLASSIFICATION SYSTEMS			
Ohio Dam Classification	*Corresponding Federal Dam Classification*	*Dam Characteristics*	*Impact Description*
Class I	High	Total Storage Volume > 5,000 acre-feet or height > 60 feet	Probable loss of life, serious hazard to health, structural damage to high value property (i.e., homes, industries, major public utilities)
Class II	Significant	Total Storage Volume > 500 acre-feet or height > 40 feet	Flood damage to homes, businesses, industrial structures (no loss of life envisioned), damage to state and interstate highways, railroads, water utilities, only access to residential areas.
Class III	Significant	Total Storage Volume > 50 acre-feet or height > 25 feet	Flood damage to low value non-residential structures, local roads, agricultural crops and livestock.
Class IV	Low	Total Storage Volume $\leq$ 50 acre-feet or height $\leq$ 25 feet	Losses confined mainly to the dam itself.

OHIO LEVEE CLASSIFICATION SYSTEM	
Hazard Classification	*Impact Description*
Class I	Probable loss of human life, structural collapse of at least one residence or one commercial or industrial business.
Class II	Disruption of a public water supply or wastewater treatment facility, or other health hazards; flooding of residential, commercial, industrial or publically owned structures; flooding of high-value property; damage or disruption to major roads including but not limited to interstate and state highways, and the only access to residential or other critical areas such as hospitals, nursing homes, or correctional facilities; damage or disruption to railroads or public utilities.
Class III	Property losses including but not limited to, rural buildings, damage or disruption to local roads including but not limited to state, county and township routes.

Source: ODNR-Division of Water Resources-Dam Safety Program

The U.S. Army Corps of Engineers' National Inventory of Dams (NID) maintains a database of dams in the United States that meet one of the following criteria:

1. High hazard potential classification – loss of human life is likely if the dam fails
2. Significant hazard potential classification – no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns
3. Equal or exceed 25 feet in height and exceed 15 acre-feet in storage
4. Equal or exceed 50 acre-feet storage and six feet in height.

The NID's goal is to include all dams in the U.S. that meet those criteria, and reconciles conflicting and duplicative data from 68 data sources. Historically, the NID was published every two years, but in 2019 began updating the database yearly. According to the NID, there are 36 dams in Stark County. Of those, seven are high hazard potential, 16 are significant hazard potential, and 15 are low hazard potential.

Historical Occurrences

No one knows exactly how many dam failures have occurred in the U.S., but they have been documented in every state. From 2005-2013, there were 173 dam failures and 587 incidents nationwide. The National Performance of Dams Program (NPDP) at Stanford University maintains records of all modifications, repairs, incidents and their consequence, and inspections for dams in the U.S. and worldwide. According to the NPDP there have been no dam failures; however, there have been six incidents involving dams within Stark County in the last 26 years. None of these incidents resulted in damage to any property other than the dam. Four of these events involved inadequate spillway capacity issues.

HISTORICAL DAM FAILURE OCCURRENCES – STARK COUNTY			
Dam Name	*Incident Type*	*Incident Date*	*Purpose*
Morelli Pond Dam – Class II	Causeway Breach	2003	Recreation
Rogers Lake Dam – Class III	Inadequate Spillway Capacity	2000	Recreation
Timken Lake Dam – Class III	Inadequate Spillway Capacity	2000	Recreation
Shady Hollow Pond Dam – Class III	Seepage	1997	Recreation
Clapper Lake Dam – Class II	Inadequate Spillway Capacity	1996	Recreation
Squaw Valley Lake Dam – Class III	Inadequate Spillway Capacity	1996	Recreation
Willowdale Lake Dam – Class II	Dam failed 1924, multiple repairs to present day	1924	Water Supply

Source: National Performance of Dams Program

Morelli Pond Dam – 2003

In 2003, the Morelli Pond Dam causeway breached due to a compromise in the left end of the dam; no damage downstream was reported (State of Ohio, 2014 p. 197). Several other dams in the region were damaged or overtopped during severe weather in the month of August.

Smith Mill Pond Dam –2000

According to a *NOAA Event Record* dated July 14, 2000, thunderstorms dumped three to five inches of rain on Stark County during the evening hours. Spotters measured two and a half inches of rain in a 35-minute period. Approximately 100 people downstream of the Smith Mill Pond earthen dam were evacuated because of a possible failure. The dam developed a three-foot diameter hole and came close to failing completely.

Shady Hollow Pond Dam – 1997

During a periodic safety inspection of the dam, deterioration of the concrete in the spillway chute was noted. Erosion of the embankment alongside the chute was also noted, due to flow leaking out of the deteriorated chute. Seepage was also noted at the toe and right downstream groin. The reservoir status was approximately two inches above normal pool at the time of the inspection.

Willowdale Lake Dam – 1924

According to the State of Ohio *Hazard Mitigation Plan* of 2014, the original Willowdale Lake Dam failed in 1923 and was rebuilt in 1924, with multiple repairs through the present (State of Ohio, 2014 p. 197).

According the State of Ohio Enhanced Hazard Mitigation Plan, 2019, there are no documented instances of levee breaches whereby structures or properties were damaged in Ohio. This does not mean that there is a zero percent change of a levee failure occurring with the state. The probability of future occurrence is reduced due to proactive preventative action on the part of the ODNR, Division of Water Resources – Dam Safety Program, and individual levee owners.

Loss and Damages

The owners of two of the Class I dams in Stark County submitted Emergency Actions Plans (EAPs) to the Stark County Emergency Management Agency (SCEMA). For these two dams, losses were estimated using the number of people and structures that could be at risk from a dam failure, as specified in the EAPs, and utilizing inundation mapping. Where the estimated persons exposed was not specified in the EAP, the average persons per household in Stark County (2.24 per the 2020 U.S. Census) was multiplied by the number of exposed structures. Where the number of exposed structures was not specified in the EAP, inundation mapping was utilized in concert with GIS to determine the number of structures within the inundation area. HAZUS replacement valves by percent of expected damage were applied to the total number of exposed structures by type (i.e., residential, non-residential and critical facility) to determine the estimated losses below for each Class I dam.

Loss estimates for the Lords Lake Dam were calculated utilizing the slope from the dam to the Tuscarawas River (approximately 2 miles), which is a slope of 0.014, and the storage volume of the dam 200 acre-feet (ODNR, n.d.). According to British Columbia's Ministry of

Forests, Lands and Natural Resource Operations (2016), an impoundment of 250 acre-feet that fails into a creek with a 0.1% average channel slope would reduce from peak flow to approximately 4% of peak flow in 10km (6.21 miles). For this estimated inundation polygon, planner's buffered Mudbrook Creek to match the width of the dam (2,000 ft) through to its confluence with the Tuscarawas River. At the Tuscarawas River, planners were then able to align the resultant polygon with the 1% annual chance special flood hazard area for the remaining four miles to run out the distance suggested by the Ministry of Forests, Lands and Natural Resources Operations resource.

The Marathon Brine Pond Dam maintains the same height on all sides of a square-shaped structure which holds 53 acre-feet of water (ODNR, n.d.). Further, the topography of the immediate adjacent area is relatively flat. It is a storage pond with no feeder waterway. Therefore, a failure would not progress down a creek channel. However, according to British Columbia's Ministry of Forests, Lands and Natural Resource Operations (2016), an impoundment of 50 acre-feet across an area with a 0.1% slope would reduce from peak flow upon a catastrophic failure to less than 30% of that flow in approximately 0.5 km (1,637 ft). Planners assumed this 1,637 ft to be a maximum distance from the structure that water would travel (since water from the failure could effectively surround the structure) and thus created a buffer polygon around the dam structure at a distance of 1,637 ft.

Dale Walborn Reservoir Dam[1]

- *Estimate of Exposed Persons: 170*
- *Residential Structures: 76*
- *Non-Residential Structures: 24*
- *Critical Facilities: 4*
- *Loss Estimate: $30,480,874*

Lake Cable Dam[1]

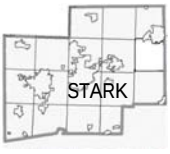
- *Estimate of Exposed Persons: 80*
- *Residential Structures: 36*
- *Non-Residential Structures: 11*
- *Critical Facilities: 2*
- *Loss Estimate: $14,361,181*

Bolivar Dam[2]

- *Estimate of Exposed Persons: 22,000*
- *Residential Structures: 8,800*
- *Non-Residential Structures: 440*
- *Critical Facilities: 10*
- *Loss Estimate: $2,545,244,289*

Lords Lake Dam[3]

- *Estimate of Exposed Persons: 983*
- *Residential Structures: 320*
- *Non-Residential Structures: 101*
- *Critical Facilities: 17*
- *Loss Estimate: $128,664,458*



Marathon Brine Pond Dam[3]

- *Estimate of Exposed Persons: 116*
- *Residential Structures: 38*
- *Non-Residential Structures: 12*
- *Critical Facilities: 2*
- *Loss Estimate: $15,240,437*

Source: Dam EAPs[1], National Inventory of Dams–USACE-Consequences Estimate[2], Ohio EMA HAZUS, ArcView GIS, British Columbia Ministry of Forests, Lands and Natural Resource Operations, Dam Safety Program – Estimating Dam Break Downstream Inundation[3]

Losses and damages resulting from a levee failure has been assessed as a function of "Risk Characteristics" for each levee system in the US Army Corp of Engineers National Levee Database (NLD). A risk classification was not assessed for each levee in Stark County; however, FEMA FIRM maps were analyzed to estimate the number of people and structures that would be at risk, as well as the property value exposed. The five levees in Stark County, and a levee that extends from Stark County into Carroll County would place approximately 2,124 people and 812 structures at risk of damages. The property value at risk in Stark County would be approximately $380,000,000 (State of Ohio Enhanced Hazard Mitigation Plan, 2019).

Vulnerability Assessment

This section summarizes the vulnerability to Stark County from dam and levee failures. Dam and levee failures results in consequences such as damages to existing buildings, damage to infrastructure, loss of services form utilities, loss of government services (including fire and police), loss of business income, displacement of individuals and businesses, loss of crops and livestock, and loss of life (FEMA, n.d.).

Because dam and levee failures have the potential to result in loss of life and severe economic loss, the American Society of Civil Engineers (ASCE) recommends that all high hazard dams have any Emergency Action Plan (EAP) in the event of an impending failure (ASCE, 2013). An EAP, is "an essential plan used in the event of a dam failure to identify and notify people residing below the dam, and to coordinate their evacuation" (ASCE, 2013). The Ohio HMP states that "all classes are required to have EAPs and Class I's are required to include dam failure inundation mapping" (2019).

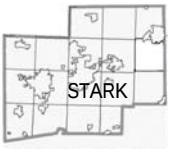
Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding dam and levee failure.

PUBLIC SENTIMENT, DAM & LEVEE FAILURE – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Dam & Levee Failure	118 (68.60%)	42 (24.42%)	7 (4.07%)	5 (2.91%)	172
In the past ten years, do you remember this hazard occurring in your community?				1 (0.6%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				7 (4.07%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				2 (1.16%)	172

Source: Online Public Survey Results

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

DAM & LEVEE VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	2	Low	There have been six dam incidents and zero levee failures in Stark County from 1994 to 2022 (for an average of 0.2 incidents per annum).
Response	4	One month	Due to the number of Class I dams in Stark County, the response to an event could extended into months.
Onset	1	Over 24 hours	Because officials frequently inspect dams and their inundation can be predicted based on weather, warning of a critical failure is expected.
Magnitude	1	Localized (< 10% land area affected)	Most dams are located in rural areas of the county.
Business	2	1 week	Most dams are in rural areas. The county's economy should not be disrupted for more than one week.
Human	3	Medium (multiple severe injuries)	There are six Class I dams located within the county, and 2 large Class I dams in neighboring counties that would impact Stark County. Failure of these dams are likely to cause multiple severe injuries.
Property	3	25-50% of property affected	Approximately 25-50% of the properties located within the hydrological shadows of dams in the county would be affected during a failure. .
Total	16	Medium	



Drought

A drought is a period of unusually constant dry weather that persists long enough to cause deficiencies in water supply (surface or underground). Droughts are slow-onset hazards, but, over time, they can severely affect crops, municipal water supplies, recreational resources, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts.

2.0 RISK ASSESSMENT

2.2.2 Drought

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrological imbalance.				
VULNERABILITY  	Period of Occurrence	At any time, typically after a period of prolonged absence of precipitation	Hazard Index Ranking:	Low
	Warning Time:	Over 24 hours	State Risk Ranking:	5
	Probability:	Remote (unlikely to occur on an annual basis)	Severity:	Critical (25-50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	USDA FSA S3384

Hazard Introduction and Overview

"Drought" is a period of abnormally dry weather, which persists long enough to produce a serious hydrological imbalance. Drought is a term used in relation to who or what is affected by the lack of moisture. Drought can be a result of multiple causes, including global weather patterns that produce persistent, upper-level high-pressure systems with warm, dry air, resulting in less precipitation. Droughts develop slowly; typically, they are already underway when officially identified. There are several types of droughts (Sears, 2017, p. 138).

- **Meteorological Drought:** Differences from the normal precipitation amounts. Because not every area receives the same amount of rainfall, a drought in one place might not be considered a drought in another.
- **Agricultural Drought:** Moisture deficiency seriously injurious to crops, livestock, or other agricultural commodities. Parched crops may wither and die. Pastures may become insufficient to support livestock. The effects of agricultural droughts are difficult to measure because there are many other variables that may impact production during the same growing season.
- **Hydrological Drought**: Reduction in stream flow, lake and reservoir levels, depletion of soil moisture, and a lowering of the groundwater table. Consequently, there is a decrease in groundwater discharge to streams and lakes. Prolonged hydrological drought will affect the water supply.
- **Socioeconomic Drought:** A lack of water that begins to affect people's daily lives.

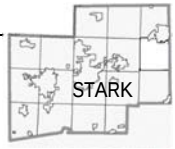
Precipitation falls in uneven patterns across the country; the amount of precipitation at a particular location varies from year to year, but over the years, the average amount is reasonably constant. The amount of rain and snow also varies with the seasons. Even if the total amount of rainfall for a year is about average, rainfall shortages can occur during a period when moisture is critically necessary for plant growth, such as in early summer. When little to no rain falls, soils can dry out, and plants can die. When rainfall is less than normal for several weeks, months, or years the water in wells decreases. If dry weather persists and water-supply problems develop, the dry period can become a drought (USGS, n.d.).

Location and Extent

Droughts occur throughout North America, and in any given year at least one region will experience drought conditions. Droughts are region-wide phenomena that can affect all areas and jurisdictions within the region. Within Stark County, the effects of drought would be nearly equal. The severity of drought can vary throughout the year; what begins as a mild drought can become severe or extreme, then subside to a mild incident. This process can take weeks or months, and the effects can be felt after drought conditions end.

The Palmer Drought Severity Index (PDSI) is a measure of drought that widely used to track moisture conditions. The PDSI is "an interval of time, generally in months or years in duration, during which the actual moisture supply at a given place rather consistently falls short of the climatically appropriate moisture supply." The range of PDSI is from -4.0 (extremely dry) to +4.0 (excessively wet), with the central half (-0.5 to +0.5) representing the normal or near-normal conditions. In the United States, the USDA, National Drought Mitigation Center at the University of Nebraska-Lincoln, U.S. Department of Commerce, and National Oceanic and Atmospheric Administration (NOAA) developed another measurement of droughts named the U.S. Drought Monitor (USDM). The table at right shows the two scales and how they compare.

USDM AND PDSI COMPARISON			
U.S. Drought Monitor		*Palmer Drought Severity Index*	
N/A		> 4.0	Extreme moist spell
		3.0 to 3.99	Very moist spell
		2.0 to 2.99	Unusual moist spell
		1.0 to 1.99	Moist spell
		0.50 to 0.99	Incipient moist spell
		-0.49 to 0.49	Near normal
		-0.5 to -0.99	Incipient dry spell
D0	Abnormally dry	-1.0 to -1.99	Mild drought
D1	Moderate drought	-2.0 to -2.99	Moderate drought
D2	Severe drought	-3.0 to -3.99	Severe drought
D3	Extreme drought	< -4.0	Extreme drought
D4	Exceptional drought	N/A	



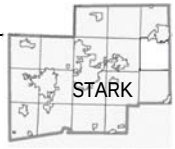
In addition to the PDSI, the Crop Moisture Index (CMI) calculates the change in moisture available from week to week, which gives a short-term status of agricultural moisture (National Weather Service, 2005). The following table describes the Crop Moisture Index.

CROP MOISTURE INDEX	
Crop Moisture Index Value	*Drought Condition*
3.0 and up	Excessively Wet
2.0 to 2.9	Wet
1.0 to 1.9	Moist
-0.9 to 0.9	Slightly Dry/ Favorable Moist
-1.0 to -1.9	Abnormally Dry
-2.0 to -2.9	Excessively Dry
-3.0 or less	Severely Dry

Source: National Weather Service

Though it is difficult to anticipate precisely where drought conditions will occur in the future, Stark County can estimate the chances of experiencing drought conditions generally. NOAA's Earth System Research Laboratory (ESRL) has divided the U.S. into "climate divisions." ESRL further maintains data for each of these areas, including the historical Palmer Drought Severity Index (PDSI) values for all months between 1895 and 2018. Stark County's climate division, Northeastern Ohio, experienced drought conditions (i.e., incipient, mild, moderate, severe, or extreme drought per the PDSI) in 40.73% of the months between 1895 and 2018. The following map displays ESRL Climate Divisions' months spent in drought for Stark County.

A growing population, with individual and commercial demands upon water supplies, coupled with industrial and agricultural uses, will combine to affect water use during both normal and drought conditions. As estimated five million residents rely upon ground water sources and an additional two million depend upon private wells for their daily water supply.



STARK COUNTY HAZARD MITIGATION PLAN

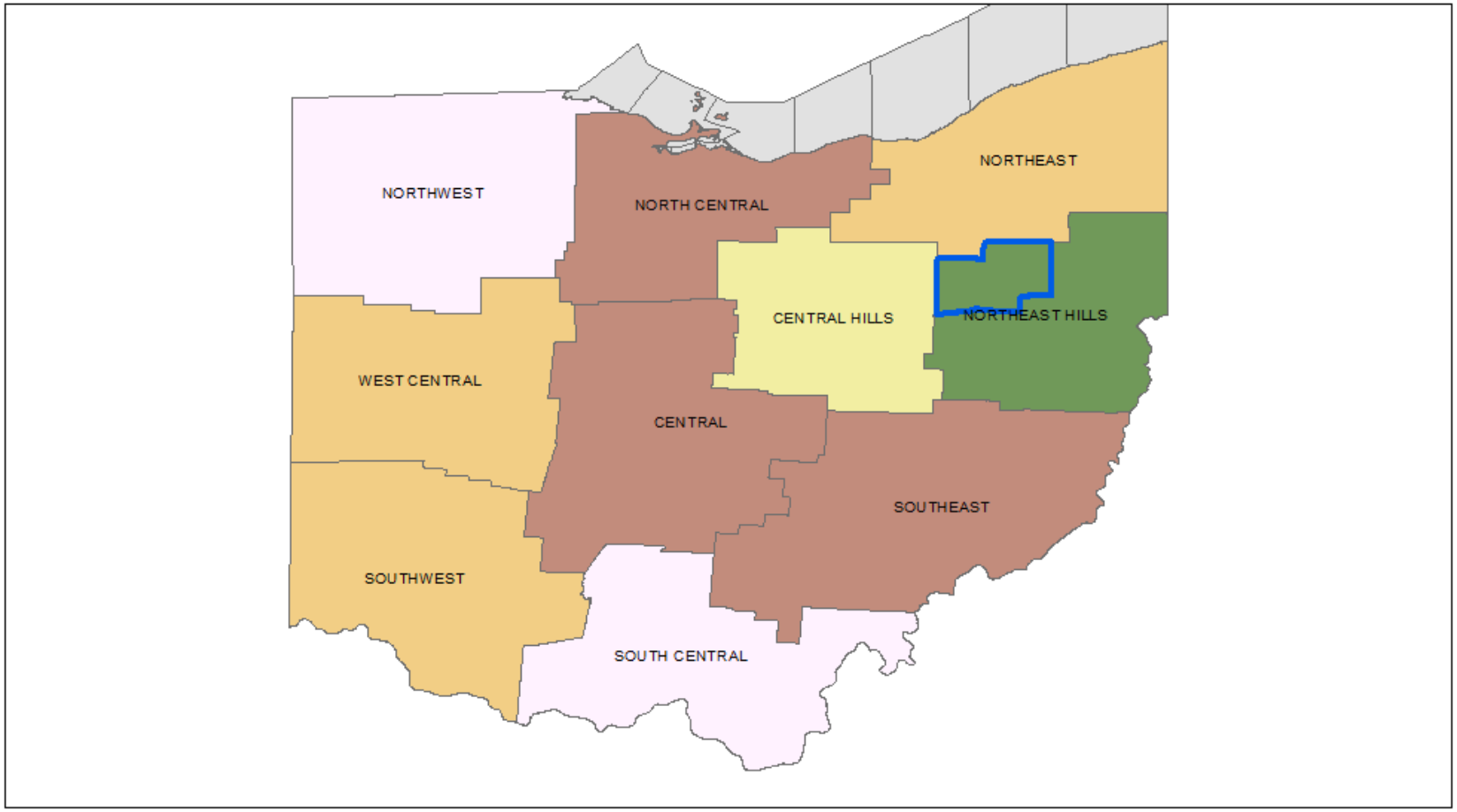
ESRL Climate Divisions: Months Spent in Drought

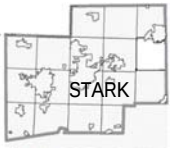
Data Source(s):
NOAA Earth System Research Laboratory

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

Months in Severe-Extreme Drought
1895 through 2021

- 5.38%
- 5.38% - 6.23%
- 6.23% - 7.09%
- 7.09% - 7.61%
- 7.61% - 8.07%





According to representatives with the Stark County Emergency Management Agency (SCEMA), the City of Canton's water supply is pumped from water wells located in Tuscarawas County. A failure of these pumps or low water levels in the wells could result in a water shortage in the City of Canton.

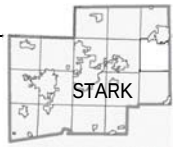
Hazard Impacts

Droughts can impact drinking water both in terms of availability and demand. According to the U.S. Environmental Protection Agency (EPA), as temperatures rise, people and animals need more water to maintain health. Additionally, a large number of economic activities require abundant water sources such as energy production and growing food crops. As droughts reduce available water sources, local officials will need to monitor water usage closely to maintain enough for critical uses. An extreme drought would have a negative effect on the large agricultural or open urban area sector of Stark County which makes up approximately 54 percent (54%) of the land cover, or approximately 137,000 acres. In 2020 Stark County had 1,547 farms in operation, with an average size of 86 acres per form. These farms produced nearly $96 million of crops and livestock (OEDA, 2020).

Prolonged droughts can affect municipality's ability to provide adequate water supplies, as water storage supplies would begin to become critically low throughout the region. Mandatory water conservation measures, and water use priorities may be enacted and enforced. The Ohio Department of Health (ODH) may have to conduct water quality sampling of numerous private water wells throughout the region as a buildup of contaminants in these wells is common during extreme drought conditions. Local clinics and hospitals may begin to see a significant increase of respiratory infections (i.e., asthma, bronchitis and pneumonia) resulting from the extremely dry and windy conditions affecting air quality.

The significant lowering of the ground-water table and a decrease in ground-water discharge to streams and lakes may have an effect on tourism and recreational attractions at parks and lakes. The Ohio Environmental Protection Agency (OEPA) in coordination with the Ohio Department of Natural Resources (ODNR), Division of Water Resources may be required to post no boating and no swimming signs at various lakes and streams where water quality standards are not being met due to stagnant and contaminated water. Stagnant water from reduced levels can provide a breeding ground for disease-carrying mosquitoes.

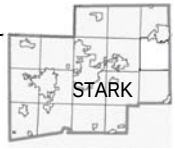
The effects of drought would negatively impact the following business types throughout Stark County; farmers, local water utilities, restaurants, tourism industry (recreation at parks and lakes, golfing, boating, fishing, etc.), laundry mats, community swimming pools, and car washes.



The National Drought Mitigation Center has developed the U.S. Drought Monitor. The Drought Monitor is a map that is updated weekly using data from the previous week to show areas of the U.S. that are in a drought. The following table lists the U.S. Drought Monitor classifications of drought, along with potential impacts.

U.S. DROUGHT MONITOR CLASSIFICATION			
Category	*Description*	*Possible Impacts*	*Palmer Drought Severity Index*
D0	Abnormally Dry	Going into drought: • Short-term dryness slowing planting, growth of crops or pastures Coming out of drought • Some lingering water deficits • Pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested	-2.0 to -2.9
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	• Major crop/pasture losses • Widespread shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

Source: National Drought Mitigation Center



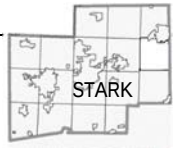
No two states experience drought the same way. In an effort to communicate the effects of drought on a smaller scale, the U.S. Drought Monitor developed a table presenting drought impacts that have reported in each state. The following table presents impacts listed for the state of Ohio.

DROUGHT IMPACTS BY STATE, OHIO	
Category	*Impact*
D0	Crop growth is stunted; stock pond levels decline
	Prayer session is held for rain
D1	Hay yield is low; hay is expensive; corn is curling; farmers feed hay early; fruit (cherries and plums) yield is low
	Small brush fires occur; burn bans begin
	Voluntary water restrictions are requested
	Fewer mosquitoes are observed than normal
	Drought is hard on landscaping businesses
D2	Crops are suffering
	The number of wildfires is high
	Trees lose leaves early
	Soil is dry, cracked, and pulling away from foundations
	Creeks are dried up
D3	Soybeans are severely dry, crop yields are minimal, supplemental hay for livestock increases, livestock are stressed
	Lawns go dormant
D4	Ohio has had little or no experience in D4 so no impacts have been recorded at that level in the Drought Impact Reporter

Source: National Drought Mitigation Center

Severe drought conditions can negatively affect human health (CDC, 2019). Some effects are experienced short-term and can be directly observed and measured, while others are indirect and are not easy to anticipate or monitor. The possible health implications of drought include:

- Compromised quantity and quality of drinking water;
- Increased recreational risks;
- Effects on air quality;
- Diminished living conditions related to energy, air quality, and sanitation and hygiene;
- Compromised food and nutrition; and
- Increased incidence of illness and disease.



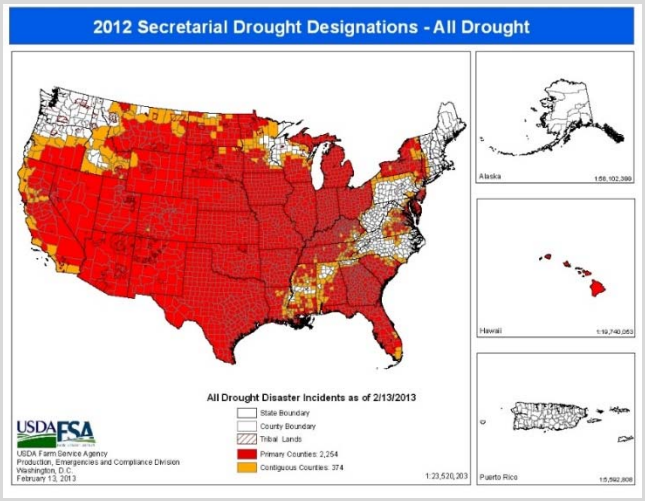
Historical Occurrences

Data sources suggest that four significant droughts have impacted Stark County, occurring in 1996, 1997, 1999 and 2012. Stark County received a drought-related disaster declarations from the Secretary of the U.S. Department of Agriculture in 2012 (USDA Farm Services Agency, 2020).

2012 DROUGHT (Excessive Heat)

USDA FSA Designation: S3384 (Primary)

Most locations ended the winter season of 2011-2012 with near-normal precipitation and below-normal snowfall, which led to below-normal snowmelt. March experienced much-above-normal, record-breaking temperatures, which led to above-normal evapotranspiration and an early start to the growing season. This condition, combined with a lack of snowmelt in the winter, led to abnormally dry conditions across the region by the middle of April. Given much-below-normal rainfall in April and May, topsoil preconditioned for drought, and already low streamflow across area streams, rivers, and lakes, drought conditions developed across the Midwest region by May. With high pressure remaining in control outside of some fast-moving low-pressure systems, dry weather ruled the summer months. Record-breaking heat combined and a lack of substantial precipitation brought on devastating drought conditions. By the middle of July, all of the local areas were in at least D2 or severe drought conditions with a large portion of the area in D3 or extreme drought conditions (on a scale from D0 to D4 drought severity). These conditions lasted until the middle of August.



The National Centers for Environmental Information (NCEI) Storm Events Database records instances of drought form 1996 to present. The following table presents the NCEI droughts that have affected Stark County.

HISTORICAL DROUGHT OCCURRENCES – STARK COUNTY					
Location	*Date*	*Injuries*	*Deaths*	*Property Damage*	*Crop Damage*
Stark (Zone)	8/1/1996	0	0	$0	$3 Million
Stark (Zone)	7/1/1997	0	0	$0	$0
Stark (Zone)	6/1/1999	0	0	$0	$0
Stark (Zone)	7/1/1999	0	0	$0	$0
Stark (Zone)	8/1/1999	0	0	$0	$0
Stark (Zone)	9/1/1999	0	0	$0	$0

Source: NCEI Storm Events Database

Countywide Drought – August, 1996

For much of the summer of 1996, dry weather persisted throughout northern Ohio. Rainfall averaged from a few tenths of inch in north central and northwest Ohio, to one to two inches in extreme northeast Ohio. August rainfall normally averages between three and four inches. Rainfall totals were 0.71 inches at Cleveland Airport, which ranked among the five driest Augusts on record. Crops that normally mature during August were affected by the dry weather and crop losses were predicted at ten to thirty percent.

Countywide Drought – July, 1997

Lower than normal precipitation diminished crop yields in Northeast Ohio by amounts ranging from approximately 25 percent to 60 percent. The Akron-Canton Airport reported 1.19 inches of precipitation for the entire month of July, which made it the third driest July on record.

Countywide Drought – June through September, 1999

Little rain fell from late May through much of June, only 1.19 inches of rainfall fell at Akron-Canton during the month making it the 5th driest June on record. Scattered rains late in June brought hope for farmers; however, crop yields were already reduced. Losses from reduced crop yields were estimated at $200 million for northern Ohio. Several communities instituted water use restrictions.

Countywide Drought – November 2007, January 2009

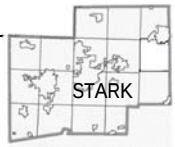
According to the National Drought Mitigation Center, the U.S. Department of Agriculture designed 73 counties in Ohio as primary natural disaster areas on November 27, 2007; and 47 counties on January 26, 2009 due to damages and losses resulting from drought conditions, Stark County was included for both droughts.

Loss and Damages

The USDA maintains data regarding agricultural activities through five-year censuses. The following table provides an overview of the 2007, 2012, and 2017 censuses.

CENSUS OF AGRICULTURAL DATA – STARK COUNTY					
Year	*Farms*	*Land in Farms (acres)*	*Harvested Cropland (acres)*	*Average Harvested Cropland per Farm (acres)*	*Market Value of Agricultural Products Sold*
2007	1,300	138,061	95,234	104.4	$135,671,000
2012	1,168	135,749	101,164	118.5	$130,693,000
2017	1,547	132,896	92,962	83.2	$95,843,000

Source: USDA, Census of Agricultural



Although there is no direct correlation between the presence of farms and drought risk, the market value of agricultural products sold provides evidence of total economic activity exposed to losses from drought. On average, $121 million in agricultural products in Stark County are vulnerable to drought conditions in any given year.

For planning purposes, utilizing research on average crop yield losses provides the basis for a mathematical loss calculation. Kuwayama (2019) focused on corn and soybeans and found that a week of drought in non-irrigating counties results in average crop yield reductions ranging from 0.1% to 1.2%. The average market value of agricultural products sold annually (i.e., across 52 weeks) in Stark County suggests an average weekly value of approximately $2,321,840 (for a potential exposure ranging from $2,322 to $27,862).

The declared incidents cited above note the length of the 1999 drought as from June through September (four months). The average length of historical droughts (receiving a secretarial designation) in Stark County is thus four months (or 16 weeks). Combining these calculations suggests a range of exposure of $37,152 to $445,792 per drought. (NOTE: The $3M loss figure for the 1996 event represents the entire impacted area, not just Stark County.)

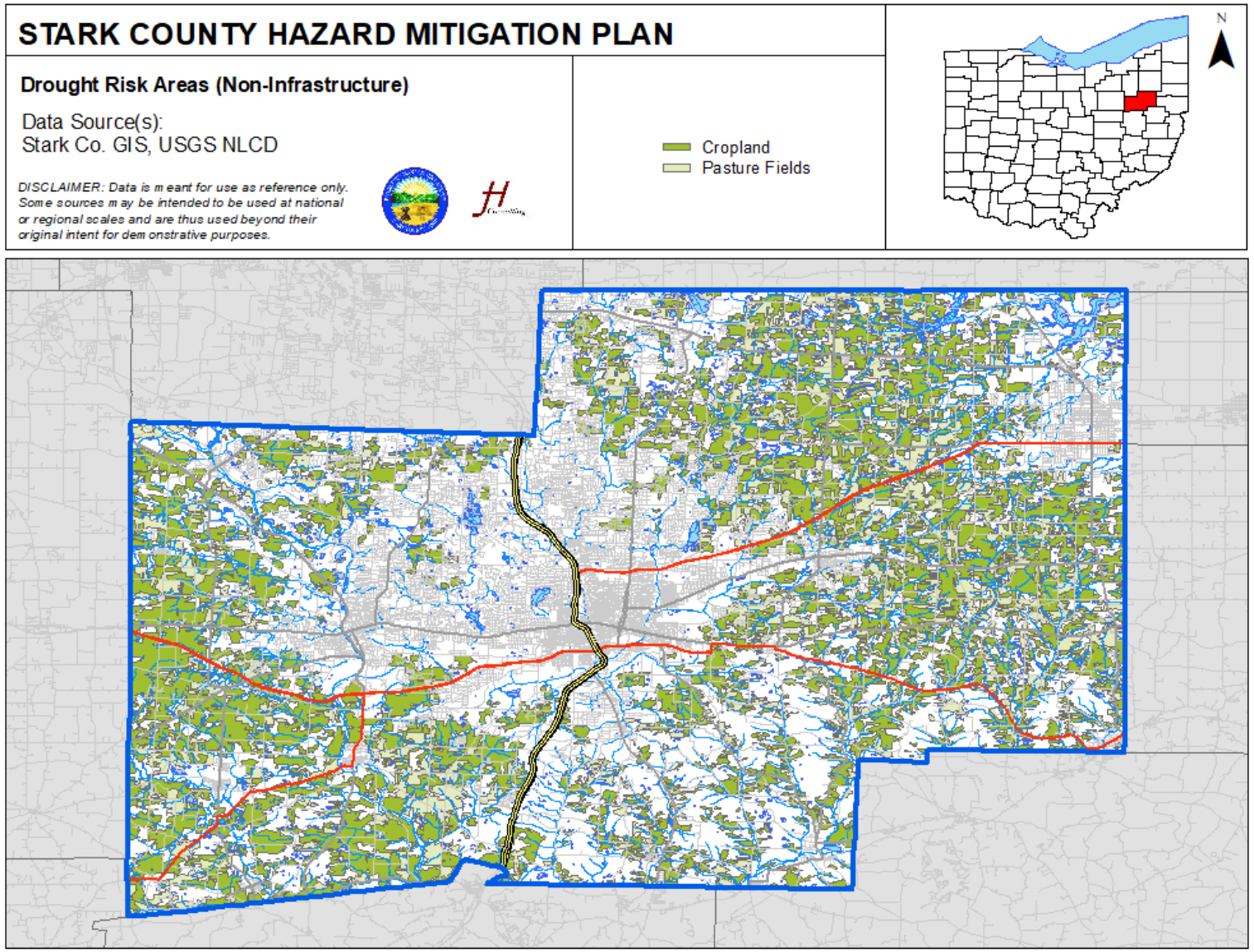
Vulnerability Assessment

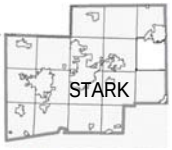
This section summarizes the vulnerability to Stark County from drought. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding drought.

PUBLIC SENTIMENT, DROUGHT – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Drought	76 (44.19%)	78 (45.25%)	15 (8.72%)	3 (1.75%)	172
In the past ten years, do you remember this hazard occurring in your community?				39 (22.67%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				46 (26.74%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				4 (2.33%)	172

Source: Online Public Survey Results

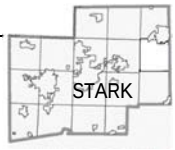
The following map graphically depicts potential risk areas in Stark County. Risk areas correspond to those with land uses of "crop" and "pasture."





The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

DROUGHT VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	2	Low	Four events in 26 years (i.e., 1996-2020) yields an estimate of 0.15 incidents per annum.
Response	4	One month	Though the agricultural response may be extensive and much longer, it is a response that is not as acute as many other emergency responses.
Onset	1	Over 24 hours	Drought conditions occur following an extended period of specific hydrological conditions.
Magnitude	3	Critical (25-50% of land area affected)	Stark County has a land area of 575 mi^2 (Census 2020) (or 3,036,000 acres). Given 132,896 acres in farmland (2020 Census of Agriculture), approximately 23% of the county's land area is agriculture.
Business	2	One week	Drought is not likely to necessitate wide-spread business closures for extended periods.
Human	1	Low (few minor illnesses)	Drought is not likely to result in injuries; however can result in a slight increase in respiratory infections such as bronchitis and pneumonia.
Property	2	10-25% of property affected	Though a significant amount of the land area could be impacted, drought conditions do not affect personal property as severely.
Total	15	Low	

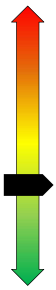


Earthquake

An earthquake is a sudden release of energy that creates a movement in the earth's crust. Most earthquake-related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the extent and duration of the shaking. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (in mountain regions and along hillsides), and liquefaction.

2.0 RISK ASSESSMENT

2.2.3 Earthquake

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates.				
VULNERABILITY  HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	Earthquakes can occur at any time	Hazard Index Ranking:	Low
	Warning Time:	None	State Risk Ranking:	6
	Probability:	Remote (unlikely to occur on an annual basis)	Severity:	Minor (localized, less than 10% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	None

Hazard Introduction and Overview

Earth consists of four layers: the inner core (innermost layer), outer core, mantle, and crust (outermost layer). Further, the crust consists of many tectonic plates that are slowly moving, sliding past, and bumping into one another. Most earthquakes originate along the edges of these tectonic plates, called fault lines. The rough edges of the tectonic plates become lodged against each other. When a plate moves enough, the edges become dislodged, causing an earthquake. The epicenter of the earthquake is the location directly above the ruptured fault. (USGS, n.d.).

Some earthquakes have foreshocks, which are smaller earthquakes that happen at the same location as the larger earthquake that follows. The largest, main earthquake is called the main shock, which always has aftershock that follow. Current technology doesn't allow scientists to determine that an earthquake is a foreshock until the larger earthquake follows.

Regulators and researchers have documented earthquakes induced by human activity in the United States, Japan, and Canada. The cause of these human-caused earthquakes was the injection of fluids into deep wells for waste disposal and secondary recovery of oil, and filling large reservoirs for water supplies. Deep mining and nuclear testing can also cause small to moderate quakes. A common misconception is that hydraulic fracturing, or "fracking," is causing *all* of the induced earthquakes. In reality, fracking "is directly causing a small percentage of the felt-induced earthquakes observed in the United States. Most induced earthquakes in the United States are a result of the deep disposal of fluids (wastewater) related to oil and gas production" (Rubinstein and Mahani, 2015).

Location and Extent

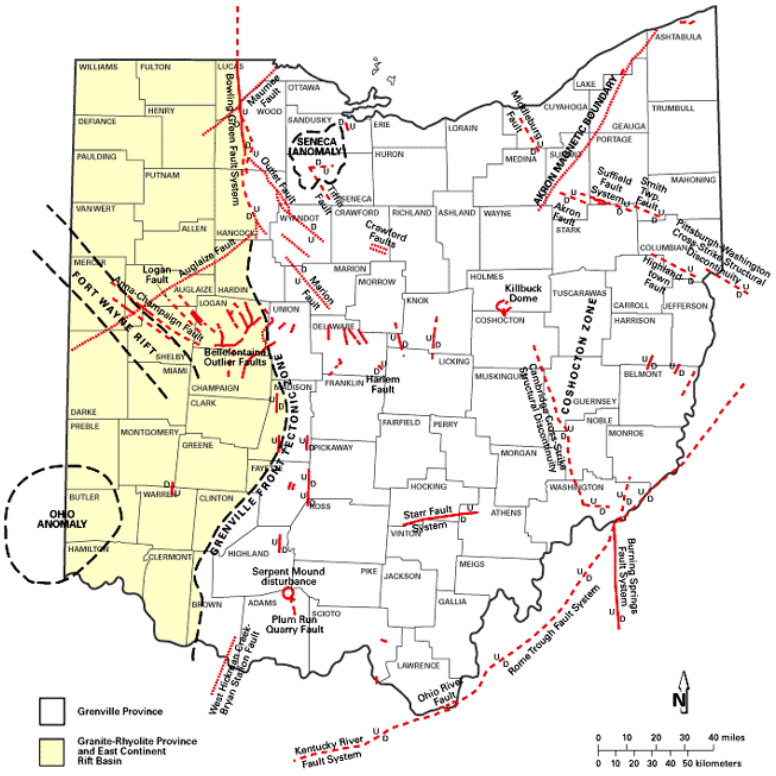
Earthquakes are one of nature's most damaging hazards, and are more widespread than is often realized. The area of greatest seismic activity in the United States is along the Pacific Coast in the states of California and Alaska; however, as many as 40 states can be characterized as having moderate earthquake risk. Although most people do not think of Ohio as an earthquake-prone state, at least 170 earthquakes with epicenters in Ohio have been felt since 1776. Ohio is on the periphery of the New Madrid Seismic Zone, an area in Missouri and adjacent states that was the site of the largest earthquake sequence to occur in historical times in the continental United States.

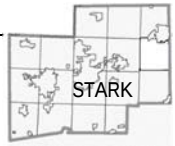
Earthquake epicenters occur on fault lines; however, their effects can be felt miles away. Although Ohio is not considered to be at high risk for an earthquake, there are several fault lines, some well-known and some speculative, traversing the state. Two (2) such fault lines underlie Stark County.

The map below illustrates fault lines in Ohio and was modified by the USGS from a Division of Geological Survey Map PG-23. This map portrays a number of deep faults and other structures that have been identified by a variety of geologic studies. Very few of the faults are visible at the surface.

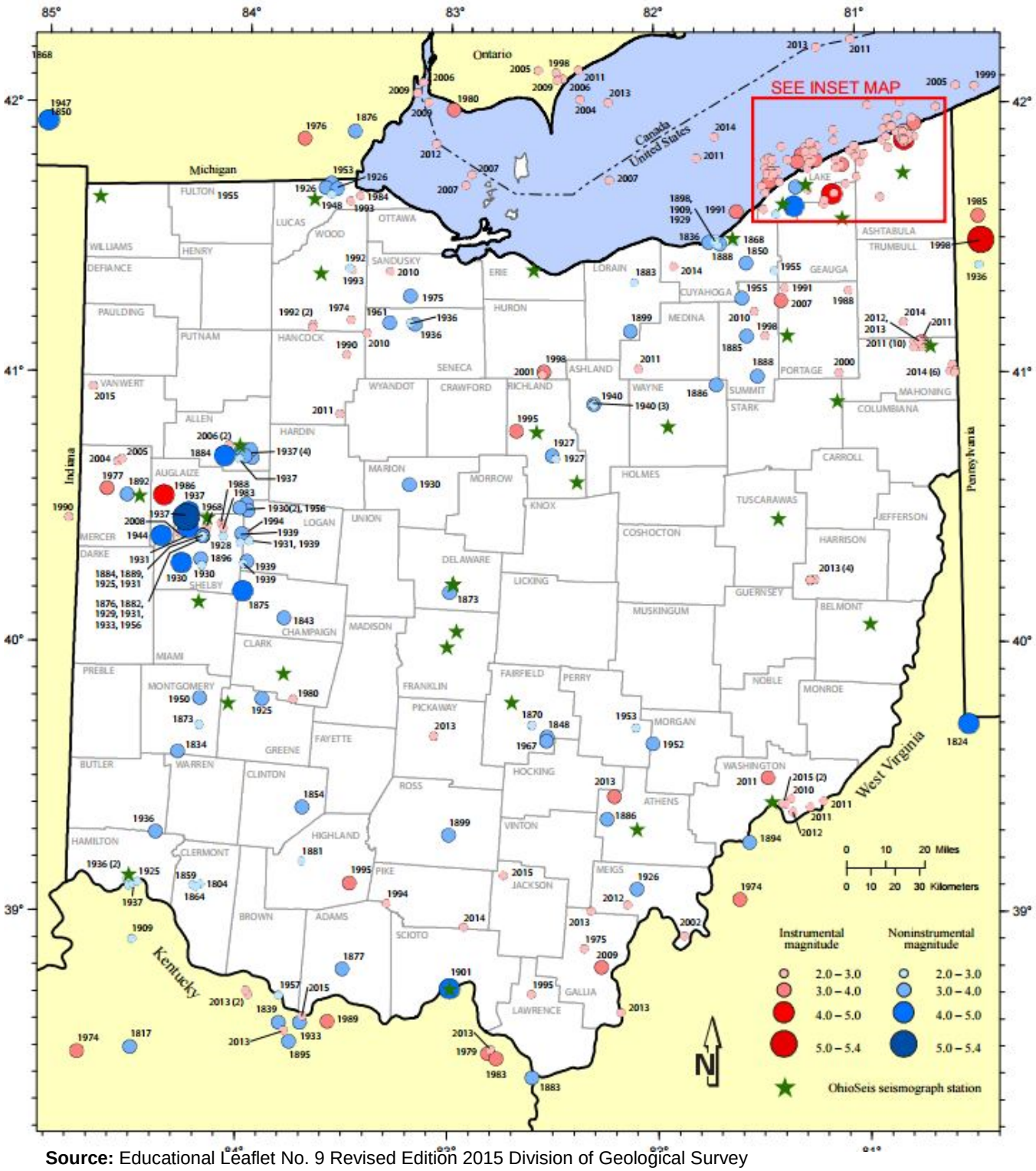
As shown, two fault lines underlie the northeastern most portion of Stark County. The Suffield Fault System runs across the southeastern portion of Portage County and northeastern corner of Stark County. The other fault is the Smith Township fault which crosses the northeastern portion of Stark County, crossing into southwestern Mahoning County.

The image below illustrates the location of earthquake epicenters within Ohio. There has not been an earthquake epicenter occurrences in Stark County; however, in 1888 a non-instrumental 3.0-4.0 magnitude earthquake was epi-centered in southern Summit County just north of Stark County.

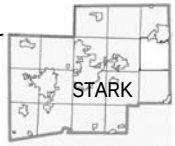




In 2000, an instrumental 2.0-3.0 magnitude earthquake was epi-centered in southeastern Portage County, on the Portage – Stark County line.

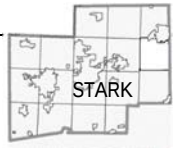


Source: Educational Leaflet No. 9 Revised Edition 2015 Division of Geological Survey



Although there are numerous intensity scales to evaluate the effect of earthquakes, the Modified Mercalli Intensity Scale (MMI) is the scale currently used in the U.S. The MMI was developed in 1931 by seismologists Harry Wood and Frank Neumann. The MMI scale assigns value to a site after an earthquake based on observed effects, ranging from acceptable to catastrophic. The MMI scale is shown in the table below.

MODIFIED MERCALLI AND MAGNITUDE SCALE COMPARISON		
	Modified Mercalli Scale	*Magnitude Scale*
I	Felt by few people under especially favorable conditions.	1.5
II	Felt by few persons at rest, especially on upper floors of buildings.	2.0 2.5
III	Felt quite noticeably indoors, especially on upper floors of buildings. Many do not recognize it as an earthquake. Standing vehicles may rock slightly. Vibration feels like passing truck.	3.0
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation of a heavy truck striking building; standing vehicles rock noticeably.	3.5
V	Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned.	4.0 4.5
VI	Felt by all; many frightened. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.	5.0
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by vehicle drivers.	5.5
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse; damage great in poorly built structures; fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned. Disturbs	6.0
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. Underground pipes broken.	6.5 7.0
X	Some well-built wooden structures are destroyed; most masonry and frame structures with foundations destroyed; train rails bent.	7.5
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Underground pipelines taken out of service. Train rails bent greatly.	8.0
XII	Damage total. Waves seen on ground surfaces. Lines of sight and level are distorted. Objects thrown into the air.	8.5



Hazard Impacts

The severity of the effects of earthquakes are dependent on the amount of energy released from the fault or epicenter. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and after just a few seconds can cause massive damage and extensive causalities. Common effects of earthquakes are ground motion and shaking, surface ruptures, and ground failure. The most significant human risk during an earthquake is structure movement and collapse. Contents within structures may fall or fail and injure or kill occupants inside of the structures.

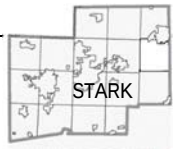
Earthquakes can affect people and structures alike, although older structures may be more susceptible to cracks and damage. "With most earthquakes, trauma caused by the collapse of buildings is the cause of most deaths and injuries. However, a surprisingly large number of patients require acute care for non-surgical problems such as acute myocardial infraction, exacerbation of chronic diseases such as diabetes or hypertension, anxiety and other mental health problems, respiratory disease from exposure to dust and asbestos fibers from rubble, and near-drowning resulting from significant, rapid flooding as a result of dam or levee failures.

Earthquakes can cause a variety of cascading effects, including fires due to broken electrical lines and gas mains, structural damage and utility and communication system outages, they can trigger landslides, and, less commonly, tsunamis. Ground shaking refers to the vibration of the ground during an earthquake. Generally, the severity of ground shaking increases as magnitude increases, and decreases as distance from the causative fault increases.

Historical Occurrences

The Ohio Department of Natural Resources maintains the Ohio Earthquake Database, which lists all earthquakes detected in Ohio since 2010. According to the database, there has not been an earthquake epicenterd in Stark County since 2010.

According to the USGS database, Stark County has a very low earthquake risk, with a total of one earthquake being centered in Stark County since 1931. The USGS database indicates that there is a 0.91% change of a major earthquake occurring within 30 miles of Stark County within the next 50 years. According to the database the largest earthquake within 30 miles of Stark County, was a magnitude 2.9 which occurred in 2000.

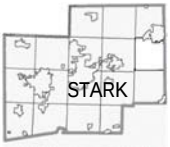


Data from various sources indicate the following occurrences of earthquakes within close proximity of Stark County. A brief description is provided on higher magnitude earthquakes.

- On 7/27/1980, a magnitude 5.2 earthquake occurred 226.6 miles away from the geographic center of Stark County (City Data, n.d.).
- On 1/31/1986, a magnitude 5.0 earthquake occurred 55.4 miles away from the center of the county (City Data, n.d.). Seventeen injuries were reported, but only 2 were actually caused by the earthquake. The majority of the damage consisted of cracked plaster and broken windows. There were13 different after shock events up to 24 days after the main event with magnitude 0.5 – 2.4 (USGS, 2003).
- On 7/12/1986, a magnitude 4.5 earthquake occurred 157.9 miles away from the geographic center of Stark County. (City Data, n.d.).
- On 9/25/1998, a magnitude 5.2 earthquake occurred, the epicenter of this earthquake was 69.3 miles from Stark County (City Data, n.d.).
- On 1/26/2001, a magnitude 4.4 earthquake occurred. The epicenter of this earthquake was 83.3 miles away from Stark County. (City Data, n.d.).
- On 3/12/2007, a magnitude 3.7 earthquake occurred. The epicenter was 31.9 miles away from the county center (City Data, n.d.).
- On 6/23/2010, a magnitude 5.8 earthquake occurred approximately 300 miles away at the Ontario-Quebec border in Canada. The tremor caused buildings to sway and office chairs to shake. Some residents had said they felt as if they were going to pass out (CantonRep, 2011).
- On 8/23/2011, a magnitude 5.8 earthquake occurred in Mineral, VA and was felt all up and down the east coast as well as in Stark County. As a result, several buildings in Canton were evacuated, no damage was reported (CantonRep, 2011).
- On 6/10/2019, a magnitude 4.2 earthquake occurred just off the coast in Lake Erie. No damage was reported although many people were alarmed by the earthquake.

Loss and Damages

Historically, though earthquakes have been felt in the area, they have not caused any structural or operational losses in Stark County. The effects of a potential earthquake striking Stark County was analyzed using the HAZUS program from the Federal Emergency Management Agency. The output was provided by the Ohio EMA. The scenario depicts a 5.0 magnitude earthquake occurring in downtown Canton. The table below, compiled from the



HAZUS output via the loss estimation workbook provided by Ohio EMA, shows the number of structures damaged and the estimated damage cost.

STARK COUNTY EXPECTED BUILDING DAMAGE BY OCCUPANCY (HAZUS)										
	None		*Slight*		*Moderate*		*Extensive*		*Complete*	
	Count	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*
Agriculture	304	0.33	114	0.32	132	0.66	68	1.07	17	0.96
Commercial	3,588	3.87	1,849	5.22	2,166	10.83	1,075	16.81	317	17.62
Education	124	0.13	59	0.17	70	0.35	32	0.49	10	0.54
Government	93	0.10	42	0.12	51	0.25	21	0.33	6	0.35
Industrial	1,173	1.27	530	1.50	675	3.37	373	5.84	106	5.87
Other Residential	6,155	6.64	2,567	7.24	1,943	9.71	703	10.99	163	9.07
Religion	475	0.51	198	0.56	183	0.92	93	1.45	28	1.55
Single Family	80,770	87.15	30,068	84.87	14,785	73.91	4,033	63.03	1,152	64.03
TOTAL	92,682		35,427		20,005		6,398		1,799	

Source: FEMA, HAZUS Data

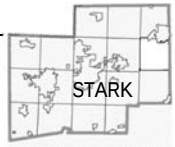
STARK COUNTY HAZUS BUILDING-RELATED ECONOMIC LOSS ESTIMATES (MILLIONS OF DOLLARS)							
Category	*Area*	*Single Family*	*Other Residential*	*Commercial*	*Industrial*	*Others*	*Total*
Income Losses	Wage	0.00	9.40	217.50	11.99	9.38	248.27
	Capital Related	0.00	3.99	172.51	7.67	2.66	186.83
	Rental	44.69	29.89	85.93	3.85	4.94	169.30
	Relocation	157.28	19.62	146.29	17.83	42.12	383.14
	Subtotal	201.96	62.90	622.23	41.34	59.10	987.54
Capital Stock Losses	Structural	255.59	51.98	196.08	64.41	47.71	615.77
	Non-Structural	1,004.11	300.26	552.56	200.62	129.46	2,187.01
	Content	408.76	96.01	312.93	141.64	74.63	1,033.97
	Inventory	0.00	0.00	7.36	29.40	0.90	37.66
	Subtotal	1,668.46	448.25	1,068.93	436.07	252.70	3,874.41

Source: FEMA, HAZUS Data

The Ohio EMA's "loss estimate workbook for HAZUS results" provided the figures included in the table below.

STARK COUNTY EARTHQUAKE EXPOSURE ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	19,970	$5,139,390,225.44
Non-Residential	7,739	$3,700,304,793.09
Critical Facilities	493	$235,761,596.52
TOTALS	28,202	$9,075,456,615.05

Source: Ohio EMA HAZUS-MH Loss Estimate Workbook Calculation



Vulnerability Assessment

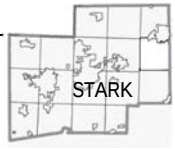
This section summarizes the risk to Stark County from earthquakes. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding earthquakes.

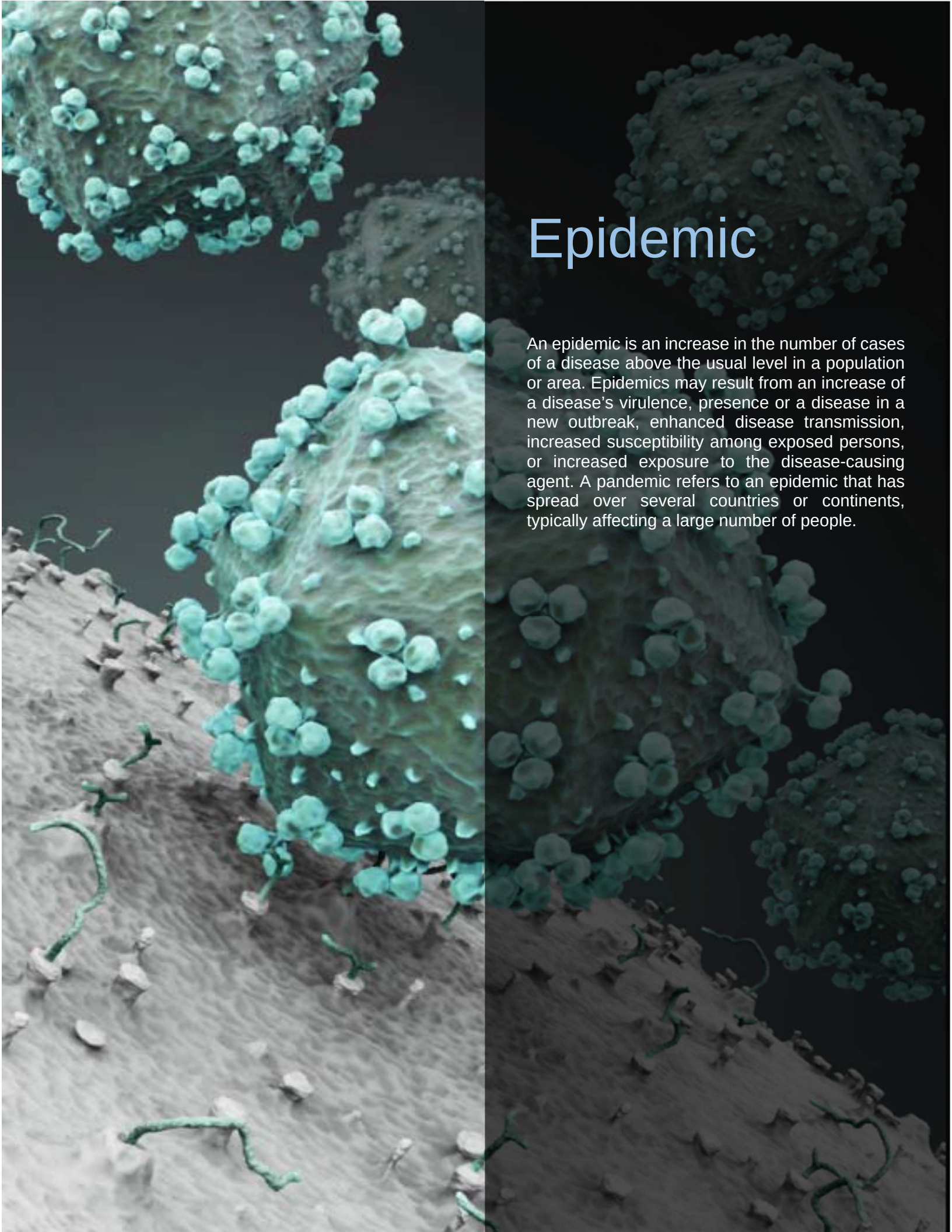
PUBLIC SENTIMENT, EARTHQUAKE – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Earthquake	120 (69.77%)	46 (26.74%)	5 (2.91%)	1 (0.58%)	172
In the past ten years, do you remember this hazard occurring in your community?				19 (11.05%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				10 (5.81%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				1 (0.58%)	172

Source: Online Public Survey Results

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

EARTHQUAKE VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	2	Low (Remote – unlikely to occur on an annual basis.	The USGS database indicates that there is a 0.91% change of a major earthquake occurring within 30 miles of Stark County within the next 50 years.
Response	2	One day	Historical data indicate that earthquakes have caused little to no damage in Stark County; thus, the response would be minimal.
Onset	5	No warning	Earthquakes occur with little or no warning.
Magnitude	1	Less than 10% of land area affected	The highest magnitude event was a 3.1 magnitude. This event did not cause any damage.
Business	1	Less than 24 hours	No historical earthquakes disrupted the county's economy.
Human	1	Minimum (minor injuries)	Past earthquakes in Stark County have been low magnitude and have not caused any human injuries or deaths.
Property	1	Less than 10% of property affected	Earthquakes in Stark County have been low magnitude and caused little to no property damage.
Total	13	Low	





Epidemic

An epidemic is an increase in the number of cases of a disease above the usual level in a population or area. Epidemics may result from an increase of a disease's virulence, presence or a disease in a new outbreak, enhanced disease transmission, increased susceptibility among exposed persons, or increased exposure to the disease-causing agent. A pandemic refers to an epidemic that has spread over several countries or continents, typically affecting a large number of people.

2.0 RISK ASSESSMENT

2.2.4 Epidemic

This profile primarily examines two types of public health emergencies, each corresponding to a level of disease presence (defined below): epidemic and pandemic.				
VULNERABILITY  HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	At any time	Hazard Index Ranking:	Low
	Warning Time:	More than 24 hours	State Risk Ranking:	Not Ranked
	Probability:	Occasional (May or may not occur on annual basis)	Severity:	Minor (localized, some illnesses)
	Type of Hazard:	Natural	Disaster Declarations:	EM-3457-OH DR-4507-OH

Hazard Introduction and Overview

An epidemic is a natural hazard risk that can occur in Stark County. Although the probability of an epidemic striking Stark County is relatively low, the risk associated with this hazard is very high. In 2016, pandemic and infectious diseases accounted for three of the top ten causes of death worldwide. Microorganisms such as bacteria, viruses, fungi, or parasites, cause these diseases and pass directly or indirectly from one person to another (Baylor College of Medicine, n.d.). Humans can also become infected from an infected animal that harbors a pathogenic organism.

Location and Extent

According to the Center for Disease Control and Prevention (CDC), there are three widely accepted "levels" of disease presence.

- ***Endemic*** refers to the baseline level of a particular disease in a population or area. This level is not necessarily the desired level, but the observed level.
- ***Epidemic*** refers to an increase in the number of cases of a disease above the usual level in that population or area. Epidemics may result from an increase of the disease's virulence, presence of a disease in a new outbreak, enhanced disease transmission, increased susceptibility among exposed persons, or increased exposure to the disease-causing agent. Note that, while the term "epidemic" originally only included infectious diseases, some non-infectious health conditions (such as obesity and the opioid misuse) have reached epidemic status in the United States.

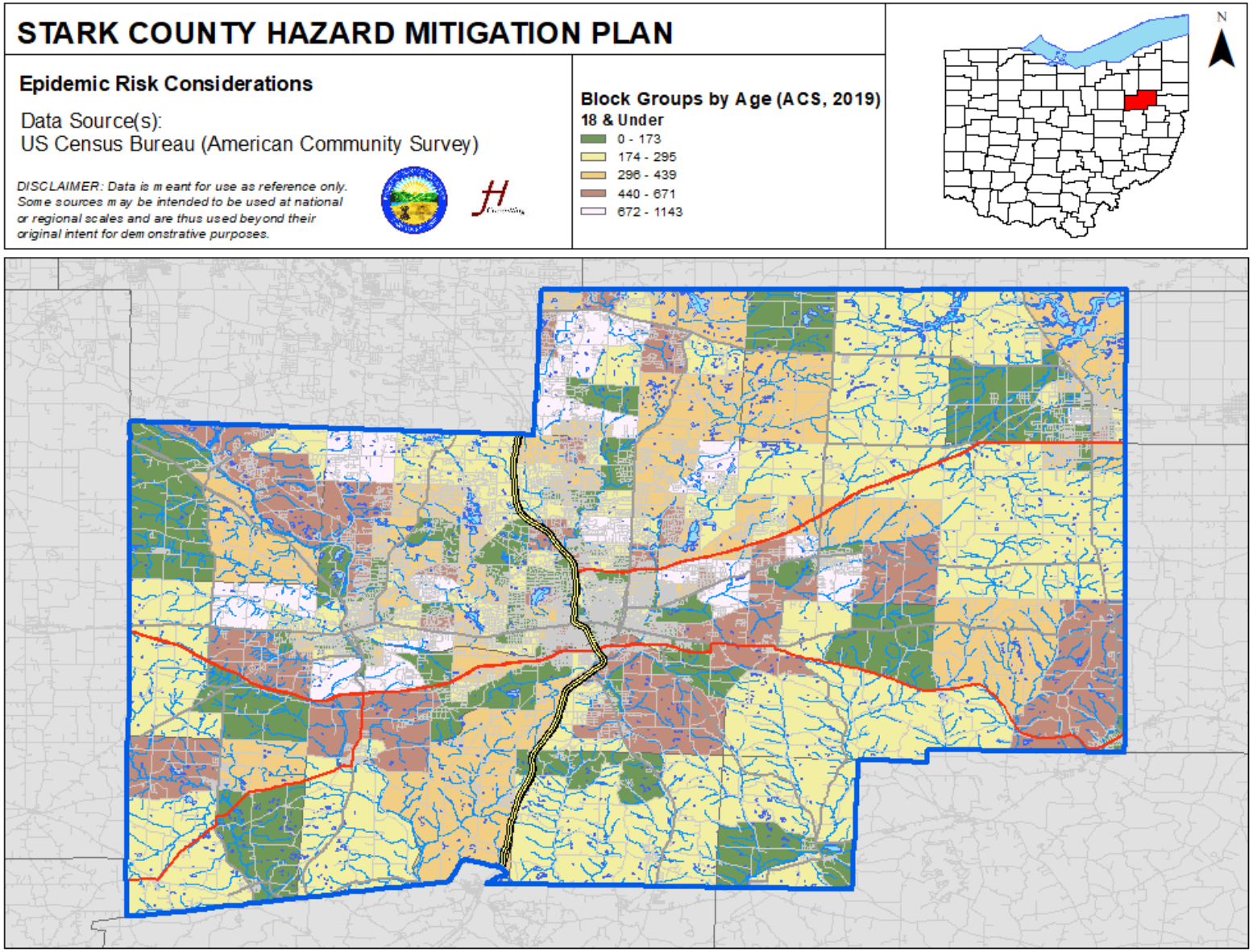
- ***Pandemic*** refers to an epidemic that has spread over several countries or continents, typically affecting a large number of people.

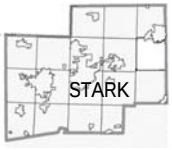
An epidemic or pandemic would affect all areas of Stark County, but certain sub-sections of the population would be more affected than others. Those most vulnerable are children, the elderly, and individuals with pre-existing medical conditions and chronic illnesses. The following map shows the Census block groups with the highest concentrations of those aged 19 and under.

Epidemic outbreaks are more probable to occur in densely populated areas, such as the Cities of Canton, Massillon, and Alliance, especially at facilities containing large numbers of occupants such as multi-unit residential developments, commercial and industrial sites at which a large work force is employed. A potential epidemic is of particular concern at these facilities.

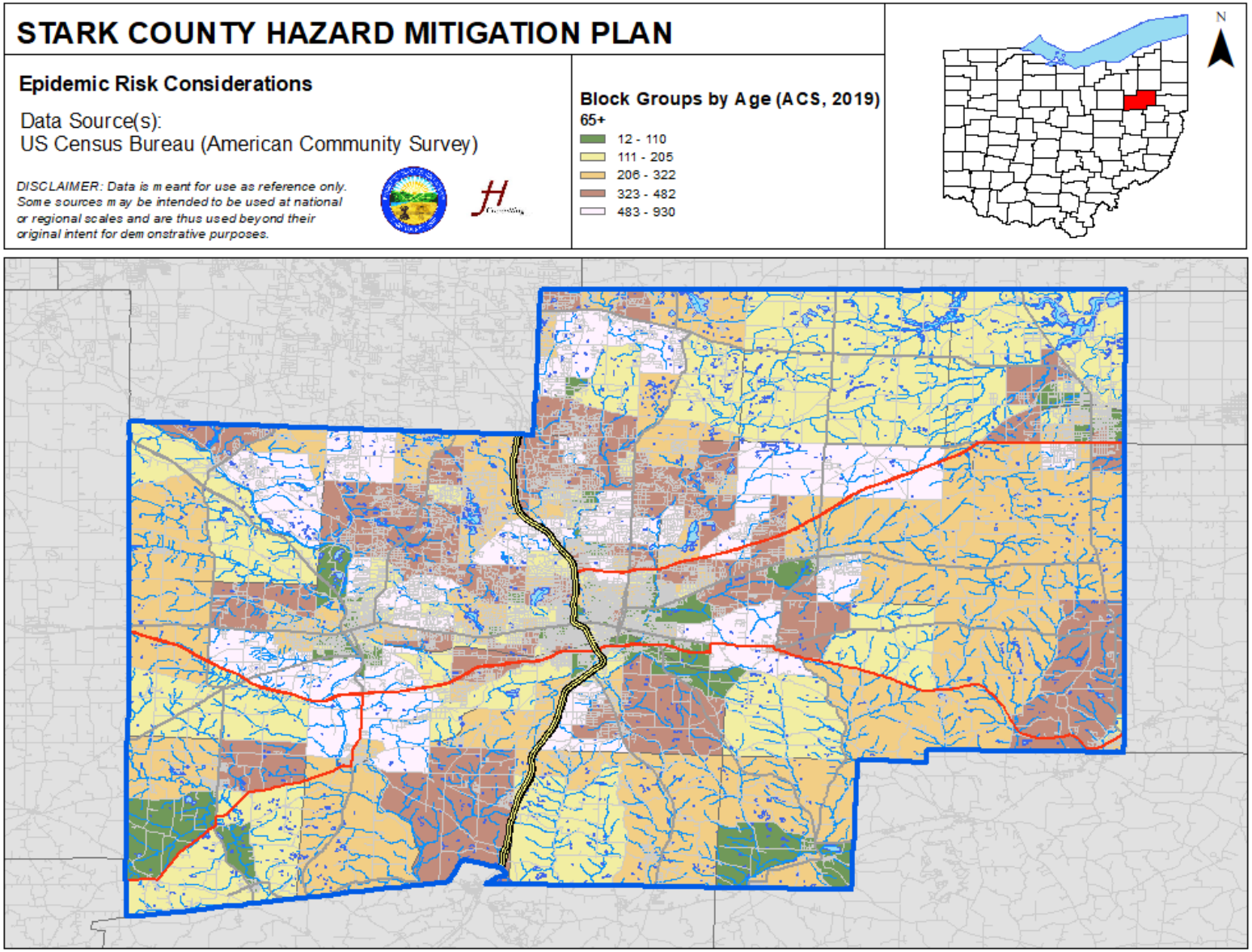
Epidemics and pandemics can last several days, extend into several weeks, and in some extreme cases, they can last for several months to over a year. The Stark County Health Department has taken many steps to ensure a base level of preparedness for epidemic and pandemic conditions. Initiatives surrounding general preparedness for Avian flu (beginning in 2006) and most recently for H1N1 (swine flu) have led other local governments to create and adopt business continuity plans. Since various residents in Stark County travel and because groups/individuals from out of county (or state) frequently travel to Stark County destinations, the possibility does exist for novel strains to be introduced to the local population, thus validating epidemic/pandemic planning efforts.

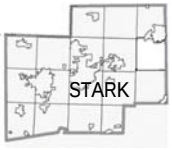
The following map shows the Census block groups with the highest concentrations of those aged 19 and under.





The following map shows the Census block groups with the highest concentrations of those aged "over 65."





Hazard Impacts

An epidemic is a contagious disease that attacks a large number of people at the same time. Epidemics can develop with little or no warning and quickly erode the capacity of local medical care providers. The potential impacts of an epidemic are illness or fatalities, disruption or closing of schools, and the forced closure of businesses and industrial operations. The extent of illness caused by a communicable or infectious disease depends on both the person infected and the pathogen infecting them. For example, the influenza virus usually circulates from November to March and affects up to 20% of Americans. Unlike seasonal influenza, pandemic strains of the flu virus are easily circulated and affect healthy individuals.

SEASONAL FLU	FLU PANDEMIC
Outbreaks occur every year, usually in winter.	This occurs only rarely (only four times since 1918).
Caused by influenza viruses that are similar to those already affecting people.	Caused by a new influenza virus that people have not been exposed to before.
Healthy adults usually not at risk for serious complications.	Healthy adults may be at increased risk for serious complications.
Hospitals and healthcare providers can usually meet public needs.	Hospitals and healthcare providers may be overwhelmed and difficult to access.
The vaccine is available at beginning of flu season.	A vaccine would probably not be available in the early stages of a pandemic.
It causes an average of 36,000 deaths each year in the United States.	The number of deaths could be significantly higher. In the 1918 pandemic, approximately 675,000 people died in the United States.
Generally does not have a severe impact on daily life.	May have a severe impact on daily life, including widespread restrictions on travel, closings of schools and businesses, and cancellation of public events.

Pandemics are further exacerbated by the fact that healthcare resources can become scarce during an event. An increased number of cases and a reduced number of caregivers can overload jurisdictions or healthcare systems ability to provide medical attention to everyone who becomes ill. Furthermore, preventative measures, such as vaccinations or prophylactic medication, may be in short supply or unavailable in a novel strain of a virus.

Fortunately, there are vaccines for several communicable diseases. The State of Ohio does not provide vaccination reports at the county level, but does provide information concerning vaccinations of children between 19 and 35 months in age.

OHIO VACCINATION RATES 2010-2017									
Vaccine	*Dose*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*
DTP/DTaP	4+	84.3%	85.2%	83.3%	75.8%	85.1%	80.9%	78.6%	81.1%
Polio	3+	94.9%	94.7%	92.5%	90.4%	94.6%	91.8%	86.6%	88.2%
MMR	1+	93.6%	93.3%	90.3%	86.0%	95.6%	88.1%	87.4%	88.3%
Hib	3+	92.2%	96.6%	91.2%	90.3%	92.9%	78.6%	79.0%	76.7%
Hepatitus B	3+	94.8%	95.8%	89.4%	87.4%	92.3%	92.3%	88.0%	89.5%
Varicella (Chickenpox)	1+	89.7%	93.4%	90.8%	85.4%	92.9%	86.2%	85.5%	85.5%
PCV7 or PCV13	4+	81.8%	83.8%	83.8%	71.6%	83.3%	79.1%	81.0%	78.8%
Series	*–*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*
4•3•1•3•3•1	–	76.0%	80.6%	72.1%	69.7%	73.6%	–	–	–
4•3•1•3•3•1:4	–	73.8%	74.7%	66.8%	61.7%	68.1%	68.1%	68.0%	66.4%

Source: Centers for Disease Control and Prevention, National Immunization Program, National Immunization Survey

Vaccination rates in infants and toddlers in Ohio have fluctuated since 2010, but has consistently remained in the upper 50th percentile. However, it typically requires vaccination rates above 85% to provide sufficient community (i.e., herd) immunity to those who are not vaccinated.

Historical Occurrences

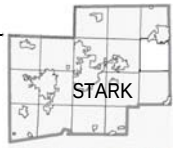
Five pandemic influenza events have occurred in the last century. The 1918 Spanish Influenza outbreak remains the worst-case pandemic on record, with the number of deaths dramatically decreasing with each event, with the exception of the current and on-going Corona Virus, 2019 (COVID-19) pandemic.

PREVIOUS WORLDWIDE PANDEMIC EVENTS		
Date	*Pandemic Name/Subtype*	*Worldwide Deaths*
1918-1920	Spanish Flu / H1N1	50 million
1957-1958	Asian Flu / H2N2	1-3 million
1968-1969	Hong Kong Flu / H3N2	1 million
2009-2010	Swine Flu / A/H1N1	25,174
2019-On-going	Corona Virus 2019 (COVID-19) / (SARS)	6.1 million (on-going)

Source: World Health Organization

H1N1 Epidemic of 2009

A recent pandemic influenza event was the H1N1 (swine flu) epidemic in 2009. The CDC monitored the spread of the disease on a near-daily basis. The H1N1 flu was relatively mild for most people, but the virus spread with unprecedented speed; more than 700 schools in the United States closed, and many hospitals quarantined infected individuals. H1N1 was almost entirely responsible for total anomalies resolved as health events for 2009.



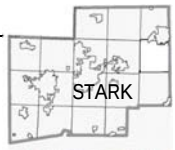
At the end of 2009 and into 2010, Ohio experienced an outbreak of H1N1. During the week of November 1 to November 7, 2009, there were 686 hospitalized cases of influenza reported in Ohio. At least 26 people hospitalized with H1N1 infection have died in Ohio. Reported deaths were from Butler (2), Cuyahoga (5), Franklin (10) and one each in Carroll, Fayette, Greene, Hamilton, Licking, Lorain, Ross, Stark, and Warren counties. Please note that this is likely an underestimate of Ohio deaths due to H1N1 (State of Ohio EOC, 2009).

Stories ran in December about the CDC report that H1N1 cases were declining nationally. There was also a story in the Massillon Independent about a decline in H1N1 cases in Stark County. All stories indicated that the flu comes and goes in waves and that they may have an increase of cases in the following months (State of Ohio EOC, 2009). By January 30, 2010 at least 51 people hospitalized with H1N1 infection died in Ohio. Registered providers ordered over 4 million vaccines (State of Ohio EOC, 2010).

Ebola Epidemic of 2014

On the morning of October 15th, 2014, the Ohio Department of Health (ODH) learned that a Dallas-area nurse who later tested positive for Ebola, arrived from Dallas at Cleveland Hopkins International Airport on October 10th on a Frontier Airlines flight for a visit in Summit County, and returned to Dallas on October 13th on another Frontier Airlines flight. ODH officials worked with Summit County Public Health officials to contact the nurse's family members and identify all those with whom the nurse may have had direct contact while in Ohio. Ohio had no confirmed cases of Ebola during the event response.

There was an increase in ED visits for gastrointestinal symptoms in Defiance, Stark, Licking, and Ross Counties. Fourteen counties had seven or less contacts and those figures were not broken out by county in order to protect the privacy of individual contacts. One of these was in Stark County: Active monitoring (no direct contact, but within 3 feet for more than one hour), verified self-monitoring (no direct contact, in same enclosed space, not within 3 feet, for more than one hour) or self-monitoring (no direct contact, in same enclosed space, not within 3 feet, for less than one hour) (State of Ohio EOC, 2014).



West Nile Virus of 2016

There were 12 positive test results of West Nile mosquitoes in Stark County in 2005 and in 2008, the positive results came from a mosquito pool located in Richville Park in Perry Township. Disease spread by the West Nile mosquito include, Yellow Fever, Dengue Fever, and numerous types of encephalitis.

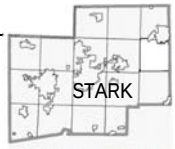
May 23 and 25, 2001, two West Branch High School students died of Neisseria meningitides and another student, who attended Marlington High School, also was diagnosed with the same strain of meningitides. Students and staff in the area schools (approximately 5,800) opted to get vaccinated against meningitis.

In the summer of 2016, Stark County Health Department inspectors trapped mosquitoes five times that carried the West Nile Virus in Jackson Township. No cases or the disease were reported in people living in Stark County but there were eight incidents in Ohio that year (CantonRep, 2016).

Coronavirus Disease 2019 (COVID-19 / SARS-CoV-2)

The most recent, and still on-going pandemic is the Coronavirus, which causes Severe Acute Respiratory Syndrome (SARS – COVID-19). The virus is believed to have started spreading as early as 2018, originating from the Wuhan Institute of Virology laboratory in Wuhan, Chain which experiments with corona viruses. To date there have been over 518,791,169 confirmed cases of the virus, resulting in over 6.2 million deaths worldwide. The virus has spread to ever country and continent of the world. The pandemic completely shut-down the entire United States for several months due to stay-at-home and social distancing order, isolation and quarantine mandates, global air travel was restricted for several months, the pandemic is still having a negative effect on the countries supply-chain. The overall cost of the pandemic on the US economic is in the trillions.

The total number of confirmed cases in Stark County is 80,382; and the total number of deaths resulting from the virus in Stark County is 1,716, as of May, 2022 (University of Virginia Covid-19 Surveillance Dashboard).



Loss and Damages

Major concerns during a public health emergency include the ability of local healthcare providers to give medical attention to everyone who becomes ill, and the ability to identify the source of illness in the population. Cascading effects of public health emergencies can include:

- illness or death,
- civil disturbance,
- distrust of government,
- poor water quality, and
- temporary loss of income.

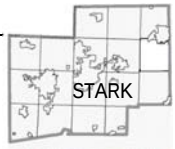
Losses based on historical epidemic occurrences are difficult to estimate. According to a study by Molinari (2007), seasonal influenza results in a substantial economic impact, estimated, in part, at $16.3 in lost earnings. By population, Stark County represents 0.12% of the United States. Since seasonal influenza primarily impacts the human population, using Stark County's composition of the U.S. as a multiplier (i.e., 0.0012) and applying it to the potential economic impact, lost earnings in Stark County could reach a staggering $19,828,794 each year. Though that number appears high, it equates to approximately $85.54 per year for each person listed by the U.S. Census Bureau as "in civilian labor force" for the county. Epidemics rarely affect structures. Epidemics may affect people and, at times, the operations of critical facilities, businesses, and other community assets.

Vulnerability Assessment

This section summarizes the vulnerability to Stark County from the epidemic hazard. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding epidemics.

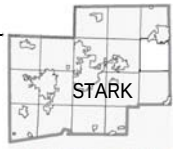
PUBLIC SENTIMENT, EPIDEMIC – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Epidemic	16 (9.30%)	48 (27.91%)	57 (33.14%)	51 (29.65%)	172
In the past ten years, do you remember this hazard occurring in your community?				146 (84.9%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				154 (89.53%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				5 (2.91%)	172

Source: Online Public Survey Results



The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

EPIDEMIC VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	3	Medium (Occasional – may or may not occur annually).	Stark County can expect seasonal outbreak of infectious diseases annually. Even when considering the 2020 COVID-19 pandemic, large-scale situations would likely occur 0.05 times per year.
Response	5	More than one month	Pandemic responses, like the H1N1 response and the on-going COVID-19 response, far exceed one month in duration.
Onset	1	Over 24 hours	While one person can become ill in less than a day, the onset of a pandemic is slow and takes place over weeks or months.
Magnitude	1	Less than 10% of land area affected	An epidemic would affect less than 10% of land area in Stark County. Its impacts are limited to human health.
Business	2	At least one weeks	For this category, planners again averaged potential impacts. A "normal" outbreak would not likely impact business operations. However, a pandemic response (e.g., COVID-19) would disrupt business operations for at least a week or more.
Human	2	Low (Some illnesses)	Though many people may become ill, most recover from communicable diseases.
Property	1	Less than 10% of property affected	Epidemic events primarily affect human health, not property.
Total	15	Low	



Flooding

A flood is the partial or complete inundation of normally dry land. The various types of flooding include flash flooding, riverine flooding, and coastal flooding. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities.

Canal Fulton Flooding

2.0 RISK ASSESSMENT

2.2.5 Flooding

A flood is a general or temporary condition of partial or complete inundation of normally dry land areas or the rapid accumulation of runoff surface waters from any source. A flash flood is a sudden local flood, typically due to heavy rain.				
VULNERABILITY HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	At any time, typically after prolonged periods of precipitation	Hazard Index Ranking:	High
	Warning Time:	6-12 hours for flash floods	State Risk Ranking:	1
	Probability:	Frequent (Will occur on an annual basis)	Severity:	Marginal (10-25% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	DR-266-OH DR-1556-OH DR-1484-OH DR-1580-OH DR-1519-OH DR-1651-OH

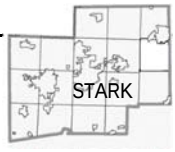
Hazard Introduction and Overview

Floods are one of the most frequent hazards in the United States (FEMA, 2017), and flooding is the most frequently occurring natural disaster in Ohio (Ohio Mitigation Plan, 2019). 99% of US counties were impacted by flooding between 1996 and 2019. Each year, floods cause more property damage in the U.S. than any other type of natural disaster, killing an average of 150 people a year. The history of flooding within Stark County indicates that it can occur at any time of the year. However, nearly all major floods are produced by winter and spring rains falling on saturated, snow covered, or frozen soil. According to FEMA, flooding is a temporary condition of partial or complete inundation of normally dry land areas from:

1. The overflow of inland tidal waters
2. The unusual and rapid accumulation of runoff of surface waters from any source
3. Mudslides which are proximately caused by flooding and are akin to a river of liquid and slowing mud on the surfaces of normally dry areas, as when earth is carried by a current of water and deposited along the path of the current

Other types of flooding include flash flooding, river flooding, coastal flooding, ice/debris jams, snowmelt, and dam or levee failure. Stark County is vulnerable to all of the above, with the exception of coastal flooding. Flooding is the highest priority hazard in Stark County.

- **River flooding** occurs when water levels rise over the top of river banks due to excessive rainfall from combined rainfall and snowmelt, or an ice jam.

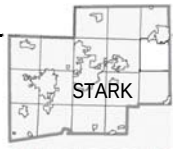


- **Ice/debris jams** occur when a river or stream's water level rises due to a buildup of ice or other debris. As ice or debris moves downstream, it may get caught on obstructions to the water flow. When this occurs, water can be held back, causing upstream flooding. When the jam breaks, flash flooding can occur downstream.
- **Snowmelt** can cause flooding when rapidly rising temperatures melt snow quickly. The water runs off the already saturated ground into nearby streams or rivers, causing them to rapidly rise or overflow. Unlike rainfall that can reach the soil almost immediately, the snowpack can store the water for an extended amount of time until temperatures rise above freezing, and the snow melts.
- **Dam or levee failures** Dams and levees can overtop, have excessive seepage, or have a structural failure, which cause result in flooding, and are covered in section 2.2.1.

According to the National Flood Insurance Program (NFIP), flash floods are the most common severe weather emergency in the United States (2016.) The NFIP also states that a flash flood is defined as "a rapid flooding of low-lying areas in less than six hours, which is caused by intense rainfall from a thunderstorm or several thunderstorms" (2016.) These storms are capable of dropping large amounts of rain within a brief period. Flash floods occur with little or no warning and can reach full peak in only a few minutes. Flash floods develop more quickly that river flooding, and are harder to predict. Unlike river flooding, flash floods can occur in many places that river flooding does not. These areas are less prepared for flooding, leading to greater danger and potential for property damage. Flash flooding is usually a widespread event, as small creeks and streams overfill their banks and flood large areas of agricultural fields and rural roads. Flooding that occurs in or near the urban areas is often attributed to failing storm sewers and poor drainage systems. Excessive amounts of paved areas or other impermeable surfaces upstream can increase the amount and rate of water runoff. Development affects the runoff of storm water and snowmelt. When rain falls in an undeveloped area, as much as 90 percent of it will infiltrate the ground; in a highly developed area, as much as 90 percent will run off.

Location and Extent

Floods occur in every state in the U.S., and, according to NOAA's National Severe Storms Laboratory, kill more people each year than tornados, hurricanes, or lightning (NSSL, n.d.). Stark County has a history of being vulnerable to flooding county-wide, largely due to the physical geography of the county, which includes several rivers and creeks as well as varied



topography. Additional flooding can occur due to inadequate storm drain capacity and/or ground saturation. The Tuscarawas River flows from north to south through the western portion of the county, passing through Massillon City and the Village of Canal Fulton and Navarre. Nimishillen Creek flows north south through the central portion of the county. Other areas commonly impacted by flooding include Louisville (Constitution Avenue), North Industry, Brewster, North Canton, and Ross Avenue and Ninth Street in Canton.

Riverine flooding is very likely to continue striking these same areas. Some areas near the paths of the Tuscarawas River are particularly low-lying areas, especially in Bethlehem Township, which contains the lowest point of the county, and areas near the Middle Branch of Nimishillen Creek. As indicated in the Stark County Regional Planning Commission's Floodplain Study, flooding often affects 12 of Stark County's 36 political subdivisions.

According to information obtain from the US Department of Agriculture Soil Conservation Service, in the late 1970s, the drainage patterns of Swartz and Guiley Ditches were altered. Nearly all of the water draining from Hartville into Middle Branch Nimishillen Creek flowed through Guiley Ditch, which had been enlarged and deepened. Previously, Swartz Ditch carried this water. The results of the diversion are higher peak flows in Guiley Ditch and the travel time of flow between the Hartville area and Middle Branch Nimishillen Creek reduced. The combination of these two factors caused increased flow in the Middle Branch itself and added to flooding problems along Middle Branch.

Representatives with the Stark County Parks District indicated that portions of recreational trails have been impacted by flooding in the past, to include washouts, scouring, and erosion of trail segments. The Ohio & Erie Canal Towpath Trail between Butterbridge Road and Forty Corners Street as well as portions of the Mahoning Valley Trail were closed for several weeks during the spring of 2011 due to washouts and severe scouring.

According to FEMA and the Ohio Committee for Severe Weather Awareness, floods are among the most frequent and costly disasters. Historically, floods were referred to as a function of time (i.e. a "100-year" flood). A more accurate description would be that a "100-year" flood is one that has a 1% chance of occurring in a year, a 50-year flood is one that has a 2% chance of occurrence in a year, a 500-year flood has a 0.2% chance of occurrence in any year.

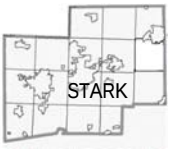
The National Flood Insurance Program (NFIP) has identified a subset of structures covered by flood insurance policies that are referred to as "repetitive loss" and "severe repetitive loss" properties. The following table lists the criteria for classification as a repetitive loss or severe repetitive loss property as defined by both the Flood Mitigation Assistance (FMA) Grant and the NFIP.

REPETITIVE LOSS AND SEVERE REPETITIVE LOSS DEFINITIONS		
Program	*Repetitive Loss*	*Severe Repetitive Loss*
Flood Mitigation Assistance (FMA) Grant	*A Repetitive Loss (RL) property is a structure covered by a contract for flood insurance made available under the NFIP that:* Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25% of the market value of the time of each such flood event; At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.	(a) Is covered under a contract for flood insurance made available under the NFIP; and (b) Has incurred flood-related damage i. For which 4 or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claim's payments exceeding $20,000, or ii. For which at least 2 separate claims payments (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.
National Flood Insurance Program (NFIP)	A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.	A single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Source: FEMA, National Flood Insurance Program (NFIP)

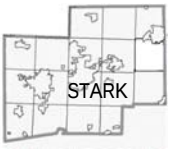
Repetitive Loss Properties

Within Stark County, and its municipalities, there are 37 repetitive loss properties, 29 residential and 8 non-residential, which have sustained a total of 95 losses. Repetitive loss figures are shown in the table below. In total, the 29 residential repetitive loss properties have experienced 75 losses resulting in total payouts of $859,281; while the 8 non-residential properties have had 20 losses with total payouts of $664,341. There are repetitive loss properties located in seven municipalities of Stark County. Approximately 46% of the total repetitive loss properties are located in unincorporated area of Stark County. The City of North Canton was the municipality with the most repetitive loss properties with seven, all of these properties are single family residential. Single family dwellings accounted for all but two of the residential properties.



REPETITIVE LOSS PROPERTIES – STARK COUNTY							
Community	*Community Number*	*Occupancy*	*Zone*	*Building Payments*	*Contents Payments*	*Total Paid*	*Average Payment*
City of Canal Fulton	390511	Other Non-Residential	--	$2,766.65	$2,726.35	$5,493.00	$2,746.50
City of Canal Fulton	390511	Other Non-Residential	C	$45.50	$1,6384.88	$1,6430.38	$5,476.79
City of Canal Fulton	390511	Other Non-Residential	--	$800.00	$18,290.00	$19,090.00	$19,090.00
City of Canal Fulton	390511	Other Non-Residential	--	$805.00	$9595.50	$10,400.50	$10,400.50
City of Canton	390512	Single Family	AE	$17,141.42	$4,834.64	$21,976.06	$7,325.35
Village of East Canton	390513	Single Family	A	$9,996.06	$5,102.15	$15,098.21	$7,549.11
City of Louisville	390516	Single Family	X	$26,766.66	$10,586.35	$37,353.01	$18,676.51
City of Louisville	390516	Single Family	AE	$74,433.89	$19,272.88	$93,706.77	$31,235.59
City of Louisville	390516	Other Non-Residential	B	$192,048.60	$343,160.29	$535,208.89	$133,802.22
City of Louisville	390516	Single Family	A03	$48,256.48	$0.00	$48,256.48	$24,128.24
City of Louisville	390516	Single Family	A03	$49,312.56	$2,000.00	$51,312.56	$25,656.20
City of Massillon	390517	Single Family	AE	$20,555.86	$6,039.94	$26,595.80	$4,432.63
Village of Minerva	390518	2-4 Family	X	$33,513.62	$6,198.62	$39,712.24	$19,856.12
City of North Canton	390521	Single Family	A05	$27,802.81	$0.00	$27,802.81	$6,950.70
City of North Canton	390521	Single Family	A05	$7,138.04	$0.00	$7,138.04	$3,569.02
City of North Canton	390521	Single Family	A05	$16,309.07	$0.00	$16,309.07	$8,154.54
City of North Canton	390521	Single Family	AE	$20,143.73	$12,200.00	$32,343.73	$16,171.87
City of North Canton	390521	Single Family	X	$11,947.52	$1,682.13	$13,629.65	$6,814.83
City of North Canton	390521	Single Family	A04	$18,190.01	$0.00	$18,190.01	$9,095.01
City of North Canton	390521	Single Family	A05	$6,780.09	$0.00	$6,780.09	$3,390.05
Stark County[1]	390780	Single Family	AE	$26,991.17	$13,222.92	$40,214.09	$6,702.35
Stark County[1]	390780	Other Non-Residential	--	$10,734.21	$6,056.80	$16,791.01	$8,395.51
Stark County[1]	390780	Single Family	AE	$39,105.68	$0.00	$39,105.68	$9,776.42
Stark County[1]	390780	Condo	AE	$12,968.81	$6,616.28	$19,585.09	$4,896.27
Stark County[1]	390780	Single Family	A	$47,461.10	$0.00	$47,461.10	$23,730.55
Stark County[1]	390780	Single Family	A03	$8,906.76	$0.00	$8,906.76	$2,968.92
Stark County[1]	390780	Single Family	A	$3,956.39	$341.95	$4,298.34	$2,149.17
Stark County[1]	390780	Single Family	AE	$5,054.44	$0.00	$5,054.44	$2,527.22
Stark County[1]	390780	Single Family	A	$10,552.59	$0.00	$10,552.59	$5,276.30
Stark County[1]	390780	Single Family	C	$45,410.39	$778.71	$46,189.10	$15,396.37
Stark County[1]	390780	Single Family	X	$32,136.44	$0.00	$32,136.44	$10,712.15
Stark County[1]	390780	Busi-Non Residential	AE	$41,342.21	$0.00	$41,342.21	$13,780.74
Stark County[1]	390780	Single Family	X	$30,919.42	$0.00	$30,919.42	$15,459.71
Stark County[1]	390780	Single Family	X	$29,435.89	$494.00	$29,929.89	$14,964.95
Stark County[1]	390780	Single Family	AE	$64,246.84	$6,500.00	$70,746.84	$35,373.42
Stark County[1]	390780	Single Family	X	$31,922.87	$0.00	$31,922.87	$15,961.44
Stark County[1]	390780	Single Family	AE	$4,144.07	$1,494.62	$5,638.69	$2,819.35

Source: Ohio Emergency Management Agency **Note:** [1] Unincorporated area of Stark County



There are nine Severe Repetitive Loss (SRL) properties in Stark County, six residential and three non-residential, which have sustained a total of 56 losses. All but three of the SRL properties are located in unincorporated areas of Stark County. Two are located in the City of Louisville, and one is located in the City of North Canton. Single family dwellings accounted for 67% of the residential SRL properties. Total payouts (i.e., building and contents) for SRL properties equal $4.18 million, (i.e., residential $663,904; and non-residential $3.52 million).

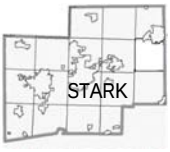
SEVERE REPETITIVE LOSS PROPERTIES – STARK COUNTY							
Community	*Community Number*	*Occupancy*	*Zone*	*Building Payments*	*Contents Payments*	*Total Paid*	*Average Payment*
City of Louisville	390516	Other Non-Residential	A03	$854,977.40	$466,420.67	$1,321,398.07	$330,349.52
City of Louisville	390516	Busi-Non Residential	AE	$64,809.21	$45,103.32	$109,912.53	$18,318.76
City of North Canton	390521	Single Family	AE	$52,394.54	$9,165.34	$61,559.88	$15,389.97
Stark County[1]	390780	Single Family	A04	$154,281.96	$54,051.62	$208,333.58	$13,888.91
Stark County[1]	390780	Single Family	AE	$63,973.48	$23,715.69	$87,689.17	$7,307.43
Stark County[1]	390780	2-4 Family	A	$26,787.64	$30,034.09	$56,821.73	$11,364.35
Stark County[1]	390780	Single Family	C	$21,289.55	$0.00	$21,289.55	$10,644.78
Stark County[1]	390780	Other Non-Residential	A05	$1,225,054.00	$862,776.59	$2,087,830.59	$521,957.65
Stark County[1]	390780	2-4 Family	AE	$151,967.38	$76,243.16	$228,210.54	$57,052.64

Source: Ohio Emergency Management Agency **Note:** [1] Unincorporated area of Stark County

The table at right indicates that incorporated jurisdictions that are in compliance with state floodplain management standards and participate in the National Floodplain Insurance Program (NFIP), and the date in which they entered the program. Stark County has been participating in the NFIP since January 13, 1978. Stark County and participating jurisdictions have adopted and implemented floodplain management requirements, including regulating all and substantially improved construction in Special

NFIP ENROLLMENT		
Jurisdiction	*Enrollment Date*	*Current Effective Map Date*
Stark County	January 13, 1978	September 14, 2018
Alliance City	June 7, 1974	September 29, 2011
Canal Fulton City	January 9, 1974	September 29, 2011
Canton City	December 14, 1973	September 14, 2018
Louisville City	May 17, 1974	September 29, 2011
Massillon City	December 28, 1973	September 14, 2018
North Canton City	May 17, 1974	September 29, 2011
Beach City Village	July 30, 1976	September 29, 2011 (M)
Brewster Village	February 8, 1974	February 16, 2012 (M)
East Canton Village	July 18, 1975	September 29, 2011 (M)
East Sparta Village	April 5, 1974	September 14, 2018
Hartville Village	Not participating	No special flood hazard areas
Hills & Dales Village	Not participating	No special flood hazard areas
Magnolia Village	May 3, 1974	September 14, 2018
Meyers Lake Village	Not participating	No special flood hazard areas
Minerva Village	July 23, 1976	September 29, 2011
Navarre Village	January 16, 1974	September 29, 2011
Waynesburg Village	March 29, 1974	September 14, 2018
Wilmot Village	Not participating	No special flood hazard areas

(M) No elevation determined – All Zone A, C and X
** Listed on the "Communities Not in the National Flood Program" list*
Source: FEMA Community Status Book Repot



Flood Hazard Areas, and will continue to enforce regulations in the future.

Each jurisdiction has designated an "NFIP Coordinator". The NFIP Coordinator routinely monitors and maintains the jurisdiction's floodplain area and ordinance to ensure that development is compliant with that ordinance (and, consequently, the NFIP).

Hazard Impacts

Stark County has had four Presidential Declared disasters with over $30 million in damages in just the past few decades. Floods are one of the most costly disasters in the United States. Just one inch of water in a home can cause up to $25,000 in damages. There are a variety of other hazards associated with flooding. Those hazards can be categorized as primary, secondary, or tertiary effects. The following table presents the effects of flood hazards.

EFFECTS OF FLOODING	
Type	*Description*
Primary Effects	• With higher velocities, streams are able to transport larger particles as suspended load. Such large particles include not only rocks and sediment, but, during a flood, such large objects as automobiles, houses, and bridges. • Massive amounts of erosion can be accomplished by floodwaters. Such erosion can undermine bridge structures, levees, and buildings, causing their collapse. • Water entering human-built structures causes damage. Even with minor flooding of homes, furniture is ruined, floors and walls are damaged, and anything that comes in contact with the water is likely to be damaged or lost. Flooding of automobiles usually results in damage that cannot easily be repaired. • The higher velocity of floodwaters allows the water to carry more sediment as suspended load. When the floodwaters retreat, velocity is generally much lower and sediment is deposited. After retreat of the floodwaters, everything is usually covered with a thick layer of stream-deposited mud, including the interior of buildings. • Flooding of farmland usually results in crop loss. Livestock, pets, and other animals are often carried away and drowned. • Humans that get caught in high velocity floodwaters are often drowned. • Floodwaters can concentrate garbage, debris, and toxic pollutants into small areas that can cause the secondary effects of health hazards.
Cascading or Secondary Effects	• Disruption of Services ➢ Drinking water supplies may become polluted, especially if sewerage treatment plants are flooded. ➢ Gas and electrical service may be disrupted. ➢ Transportation systems may be disrupted, resulting in shortages of food and cleanup supplies.
Long-Term or Tertiary Effects	• Location of river channels may change as the result of flooding; new channels develop, leaving the old channels dry. • Sediment deposited by flooding may destroy farmland (although silt deposited by floodwaters could also help to increase agricultural productivity). • Jobs may be lost due to the disruption of services, destruction of business, etc. (although jobs may be gained in the construction industry to help rebuild or repair flood damage). • Insurance rates may increase. • Corruption may result from misuse of relief funds. • Destruction of wildlife habitat.

In addition to property and structure damage, flood waters pose a risk to human health. Floodwaters can contain downed power lines, human and livestock waste, household, medical, and industrial waste and debris, wild or stray animals, and other contaminants that can cause illnesses (CDC, 2018).

Flash floods are considered the most dangerous type of floods. Flash flood waters are fast-moving, and can destroy buildings and bridges and scour new channels. Occasionally debris floating in flash-floodwater accumulates at natural or man-made obstructions and restricts the flow of water. This obstruction causes upstream flooding, and subsequent downstream flooding if the obstruction suddenly releases.

Some areas are at a higher risk for flooding than others. For example, densely populated areas are at a high risk for flash floods. Construction in these areas increases runoff by reducing the amount of rain absorbed by the ground. In these areas, heavy rain can overwhelm storm drain systems, or drains can become plugged by debris, both of which contribute to flooding.

Flooding impacts to a community include injuries and potentially fatalities to citizens and public safety officials, damage to property, loss revenue and economic damages, and increased demand on public safety and infrastructure related services. Response activities include unanticipated overtime for Emergency Operations Center (EOC) activations, evacuations and sheltering of displaced individuals, rerouting traffic destined for impassible roads, bridge and road damage repairs, and rescue or medical missions related to motorists and isolated individuals. Private property damages to homes and vehicles as well as land erosion, river channel changes, agricultural damages and livestock losses resulting in significant rural economic impacts to local residents.

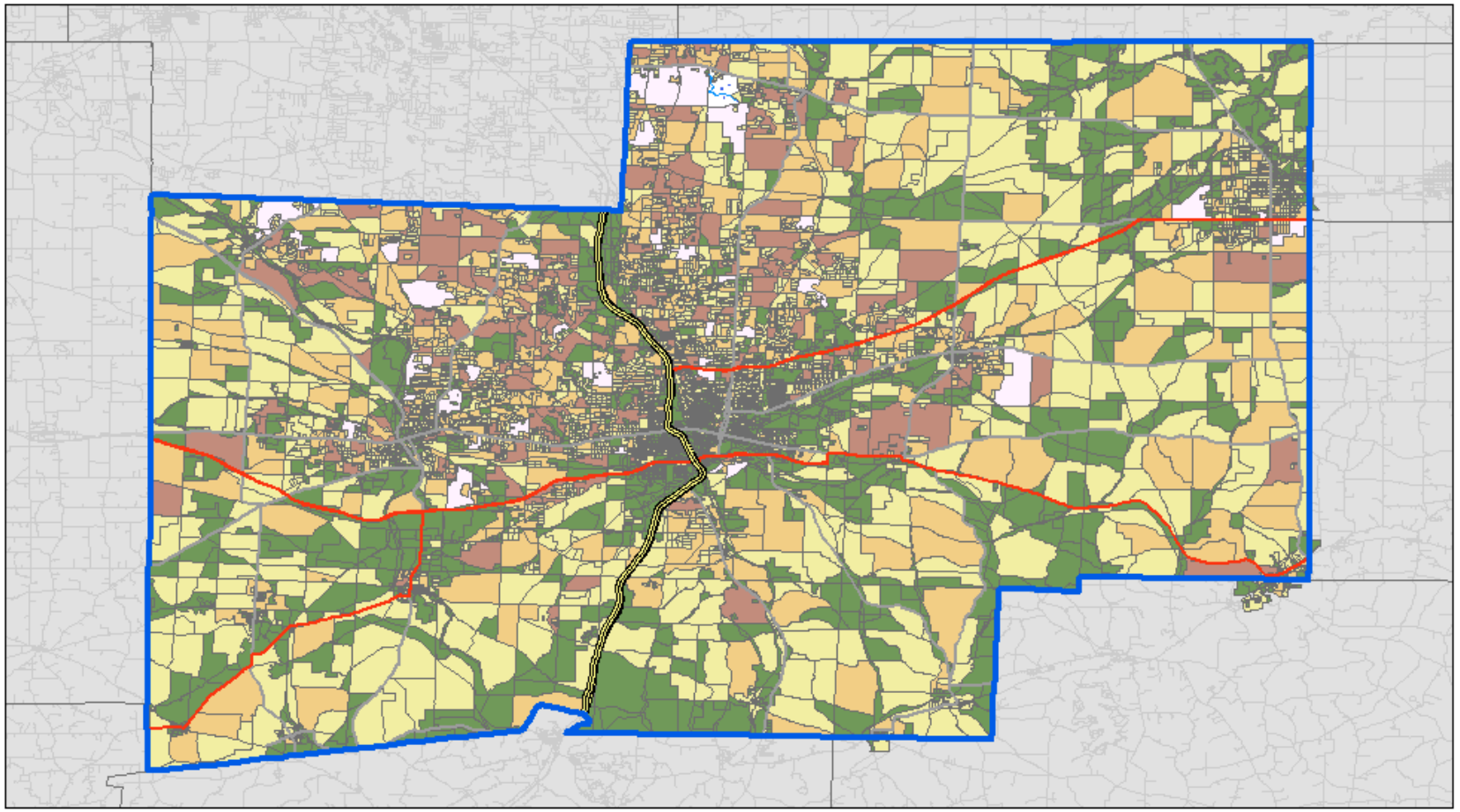
STARK COUNTY HAZARD MITIGATION PLAN

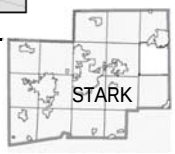
Population Density (by Census Blocks)

Data Source(s):
Stark Co. GIS, US Census Bureau

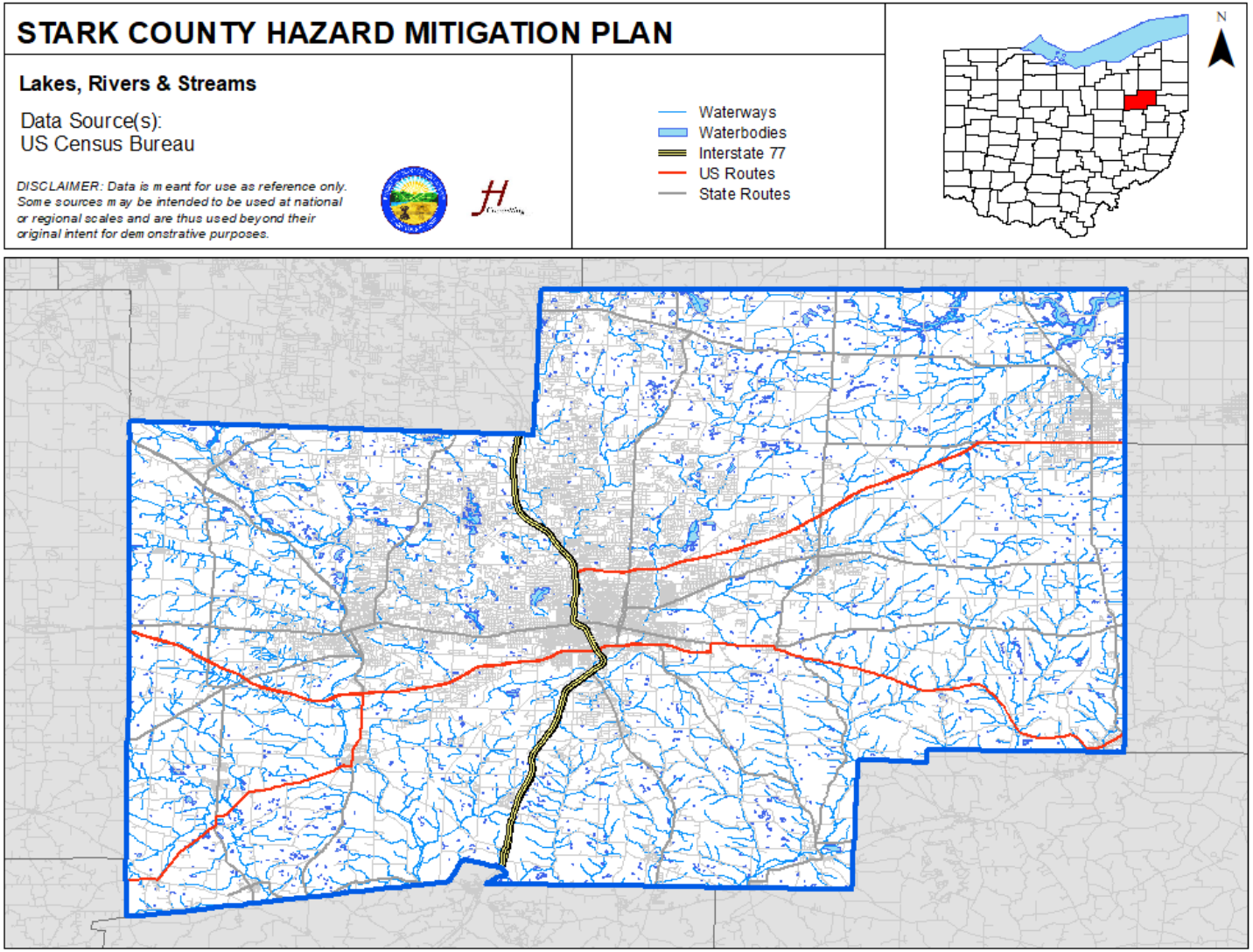
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

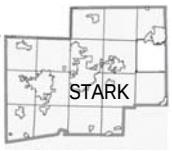
Blocks Census 2020
Total Population
- 0 - 28
- 29 - 83
- 84 - 190
- 191 - 412
- 413 - 889





Areas near rivers are also at an increased risk for flooding. Excessive rain, ice jams, snowmelt, and runoff can all increase the water levels of a river or stream. The Tuscarawas River, Nimishillen Creek, and their tributaries (i.e., Middle Branch, East Branch, West Branch, Swartz and Guiley Ditches) all have the potential to cause flooding in Stark County. The following map depicts their location throughout the county.





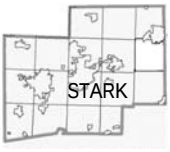
Historical Occurrences

Early records of flooding in Stark County date back to 1935 when portions of downtown Canton were flooded.

More recent flood events are listed in the National Centers for Environmental Information's Storm Events Database, which maintains records of flood events in Stark County since 1997. The following table presents the 23 flood events in Stark County since 1997, along with the associated deaths, injuries, and property and crop damages for each event.

HISTORICAL FLOODING OCCURRENCES – STARK COUNTY						
Location	*Date*	*Event Type*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Stark County	6/01/1997	Flood	0	0	$50,000	$0
Stark County	4/03/2000	Flood	0	0	$0	$0
Stark County	4/08/2000	Flood	0	0	$0	$0
Stark County	7/23/2003	Flood	0	0	$100,000	$0
Stark County	7/27/2003	Flood	0	0	$0	$0
Stark County	8/04/2003	Flood	0	0	$50,000	$0
Stark County	8/05/2003	Flood	0	0	$100,000	$0
Stark County	1/04/2004	Flood	0	0	$250,000	$0
Stark County	1/05/2004	Flood	0	0	$200,000	$0
Stark County	6/15/2004	Flood	0	0	$0	$0
Stark County	9/09/2004	Flood	0	0	$300,000	$0
Stark County	1/01/2005	Flood	0	0	$4,800,000	$0
Stark County	8/05/2005	Flood	0	0	$50,000	$0
Stark County	8/30/2005	Flood	0	0	$150,000	$0
Canal Fulton	2/28/2011	Flood	0	0	$300,000	$0
Massillon	5/24/2011	Flood	0	0	$0	$0
Canal Fulton	5/25/2011	Flood	0	0	$0	$0
McDonaldsville	5/25/2011	Flood	0	0	$0	$0
Canton	1/12/2017	Flood	0	0	$500,000	$0
Aultman	11/18/2017	Flood	0	0	$2,000	$0
Stark County	6/17/2019	Flood	0	0	$8,200,000	$0
Waco	6/04/2020	Flood	0	0	$0	$0
North Industry	5/09/2021	Flood	0	0	$0	$0
	TOTAL	23	0	0	$15,052,000	$0

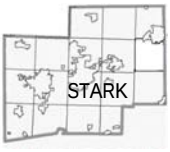
Source: NCEI Storm Event Database



The NCEI Storm Events Database also lists flash flood events in Stark County. Since 1996, there have been 42 flash flood events, for an average of 1.68 flash floods per year. These flash floods have resulted in approximately $62 million in property damage, $403,000 in crop damage, no deaths or injuries were recorded. The following table describes these events.

HISTORICAL FLASH FOOD OCCURRENCES – STARK COUNTY						
Location	*Date*	*Event Type*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Minerva	4/29/1996	Flash Flood	0	0	$0	$0
Countywide	5/10/1996	Flash Flood	0	0	$0	$0
Central Portion	5/11/1996	Flash Flood	0	0	$3,000	$0
Northwest Portion	5/11/1996	Flash Flood	0	0	$1,000	$0
East Central Portion	5/17/1996	Flash Flood	0	0	$30,000	$8,000
Massillon	6/13/1996	Flash Flood	0	0	$10,000	$0
Northern Portion	6/13/1996	Flash Flood	0	0	$20,000	$0
Countywide	6/24/1996	Flash Flood	0	0	$0	$0
Canton	7/07/1996	Flash Flood	0	0	$0	$0
Louisville	8/08/1996	Flash Flood	0	0	$0	$0
Countywide	12/11/1996	Flash Flood	0	0	$5,000	$0
Countywide	6/01/1997	Flash Flood	0	0	$60,000	$35,000
Countywide	6/18/1997	Flash Flood	0	0	$10,000	$0
Canton	1/08/1998	Flash Flood	0	0	$0	$0
Canton	5/02/1998	Flash Flood	0	0	$0	$0
Waynesburg	6/16/1998	Flash Flood	0	0	$0	$0
Alliance	6/27/1998	Flash Flood	0	0	$20,000	$0
Alliance	8/24/1998	Flash Flood	0	0	$0	$0
Countywide	8/25/1998	Flash Flood	0	0	$0	$0
Canton	9/06/1999	Flash Flood	0	0	$20,000	$0
Canton	6/12/2000	Flash Flood	0	0	$50,000	$0
Countywide	7/14/2000	Flash Flood	0	0	$250,000	$0
Canton	8/09/2001	Flash Flood	0	0	$0	$0
Canton	5/15/2003	Flash Flood	0	0	$100,000	$0
Countywide	7/27/2003	Flash Flood	0	0	$52,000,000	$0
Countywide	6/14/2004	Flash Flood	0	0	$1,200,000	$0
Southwest Portion	6/16/2004	Flash Flood	0	0	$400,000	$0
Southeast Portion	8/28/2004	Flash Flood	0	0	$850,000	$0
Southeast Portion	9/08/2004	Flash Flood	0	0	$1,200,000	$0
Massillon	6/25/2005	Flash Flood	0	0	$50,000	$0
Southern Portion	6/22/2006	Flash Flood	0	0	$500,000	$250,000
Hartville	8/20/2007	Flash Flood	0	0	$30,000	$0
Marlboro	6/26/2008	Flash Flood	0	0	$10,000	$10,000
Aultman	7/19/2011	Flash Flood	0	0	$2,000,000	$100,000
North Canton	5/04/2012	Flash Flood	0	0	$50,000	$0
Lake Cable	6/16/2014	Flash Flood	0	0	$250,000	$0
Fairhope	6/18/2004	Flash Flood	0	0	$1,500,000	$0
North Canton	6/18/2004	Flash Flood	0	0	$1,500,000	$0
Louisville	6/16/2018	Flash Flood	0	0	$75,000	$0
Justus	7/07/2019	Flash Flood	0	0	$0	$0
Louisville	7/07/2019	Flash Flood	0	0	$0	$0
Louisville	6/05/2020	Flash Flood	0	0	$2,000	$0
TOTAL		42	0	0	$62,196,000	$403,000

Source: NCEI Storm Event Database



Countywide Flood – July 27, 2003 (DR-1484-OH)

Thunderstorms dumped heavy rain across most of Stark County. A maximum of 4.5 inches of rain was measured at Louisville, with 4 inches measured at Massillon. Significant flooding occurred along the east and west branches of Nimishillen Creek. The creek rose six feet in two hours and crested at an all-time high of 14.07 feet at North Industry. Communities located along the creek including North Canton, Canton and Louisville were devastated by flooding. The previous highest crest was 11.3 feet on January 22, 1959. This event resulted in a FEMA Disaster Declaration.

Canton South High School baseball dugout, Nimishillen Creek overflowed its banks

Countywide Flood – January 1, 2005 (DR-1580-OH)

Heavy rain and runoff from snowmelt caused widespread flooding in Stark County. It was the fifth wettest January ever at the Akron-Canton Airport with 5.62 inches of rain for the month. In addition to this rain, extensive snowpack existed over Stark County at the beginning of the month. Temperatures in the 50s the first three days of the month caused a rapid snowmelt and brought area streams and creeks to bank full. Just as things began to return to normal, heavy rains fell on the area on the 11th and 12th resulting in major flooding, especially along the Tuscarawas River in southern Stark County as a direct result of flood mitigation activities as reservoirs downstream. Major flooding was also reported along Little Sandy and Sugar Creeks as a result of backups caused by record high water levels at reservoirs just south of the county line. Occupants of six homes along Sugar Creek had to be evacuated with an additional 50 homes accessible only by boat. The Brewster area was the hardest hit spot with at least two people needing to be rescued. Flood waters in some parts of the town were as much as 10 feet deep, with at least six feet of water at the water treatment plant. Extensive flooding was also reported in Minerva, Navarre, East Sparta and Canal Fulton. Dozens of roads had to be closed due to flooding, a few remaining closed for as much as two weeks. All totaled, over a hundred homes were severely damaged with several hundred more sustaining at least minor damage. This flood resulted in approximately $4.8 million in property damage.

Countywide Flood – February 28, 2011

Snow melt and heavy rain combined to create widespread flooding. Six to ten inches of heavy snow was on the ground at the onset of the rain. Dozens of water rescues were reported and hundreds of people had to be evacuated. Dozens of road had to be closed due to flooding and washouts were reported in several area. Reports that 40 to 50 people had to be rescued from homes and vehicles as the water came up. Over a thousand homes were damaged by flooding. Damage estimates from northern Ohio topped $30 million for this event. The Nimishillen Creek reached a 100-year flood stage and its second highest crest on record (12.96 feet).

Flooding along West Branch of Nimishillen Creek creates the appearance of a concrete whale swimming in Canton, Ohio. "Willie the Blue Whale" was part of the children's theme park, Mother Gooseland.

Canton Flood – January 12, 2017

Heavy rainfall across the Nimishillen Creek basin resulted in major flooding in the Canton and Perry Township areas. The river rose quickly along with its tributaries the East, West, and Middle Branches. Water quickly surrounded apartment buildings in a low-lying area at the Gazebo Garden Apartments on Constitution Avenue in Louisville, approximately a dozen families were evacuated. The city parks in Canton were closed. In Canton twenty families were evacuated from a mobile home park off Cleveland Avenue. The flood levels reached in this event were comparable with one in 2004 and 2011, yet due primarily to mitigation efforts the impacts were significantly less. This event resulted in approximately $500,000 in property damage.

Countywide Flood – June 17, 2019

Concurrent major flooding on the tributary Chippewa Creek and the headwaters of the Tuscarawas River resulted in a flood near the 0.2 percent or 500 year flood level at the confluence in Canal Fulton and Clinton. Downstream of Canal Fulton the Tuscarawas River reached a near 1 percent recurrence flood, or 100 year event in the City of Massillon. This was the worst flood levels since

the 1913. One neighborhood of 30 homes was cut off due to flooding on the only access road Millhaven Road. These homes were cut off for about a week before flood waters receded enough to allow passage. The flood resulted in approximately $8.2 million in property damage. The City of Massillon is protected by an extensive levee systems which extends through most of the city. Therefore most of the city is not impacted by flood waters until major flood stage. Near 3rd Street and Lake Avenue water was up to the foundation of 6 homes, water was over 3rd SW Street, and up to the bottom of the bridge of Lake Avenue. Further downstream in Navarre flood waters covered Center Street NW and Ohio Street SW (U.S. Route 62), a major thoroughfare.

Various Locations – 1960's to Present

According to reports from local officials during meeting attendance and correspondence throughout the planning process several flooding events have taken place in Stark County over the past few years.

- The Village of Brewster was isolated by a flood in the 1960's, in early 1970's the Army Corps of Engineers constructed a levee.
- A 500-year storm caused widespread flooding and damaged multiple homes and infrastructure on July 27 and 28, 2003 in Canton. Lengthy cleanup was required.
- The City of Louisville experienced flooding along Nimishillen Creek in 2003, 2004, 2015, and 2017. Homes were evacuated and businesses were damaged. People drove into river waters and needed to be rescued. Property damage ranged from extensive to marginal. The photo on the next page shows flooding from January of 2017 near a pharmacy in Louisville.
- North Canton experienced flooding along the Zimber Ditch area in 2011, 2014, and 2016. Numerous homes sustained flood damage as a result. As many as 19 homes were bought out through a multiagency grant and matching funds.
- The Tuscarawas River flooded in 2014 in Lawrence Township south of State Route 93.
- The City of Canal Fulton has areas that are prone to flooding due to large amounts of rainfall and snow melt that overflow the Tuscarawas River and the Ohio and Erie Canal, including the Historical District and the largest area of the park land. The issue is mostly a nuisance, but causes property damage and dangerous conditions. The last significant flood occurred in the spring of 2015.
- In the Village of East Canton, the Village Park flooded in the spring of 2016; half the park was flooded, causing the mulch from the playground to go into the nearby creek and creating a muddy mess due to heavy rains. No injuries were reported.

- On June 12, 2017, heavy rain and flooding caused erosion at Maplehurst and Dueber Avenue in East Sparta.
- In 2017 Canton Township experienced flooding in a mobile home park; multiple trailers were evacuated.
- The Village of East Sparta's major concern is flooding since it impacts travel in and out of the village.

Loss and Damages

There have been 65 flooding events in Stark County resulting in approximately $77.6 million in property and crop damage, for an average of $1,194,631 per event.

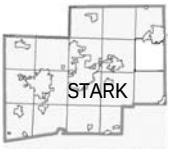
FEMA estimates losses from flooding through the HAZUS-MH program. The program calculates the expected losses to buildings during a 100-year flood event. The following tables outline damages during the event to buildings by occupancy, buildings by construction type, and building economic losses.

EXPECTED BUILDING DAMAGE BY OCCUPANCY – STARK COUNTY												
Occupancy	*1-10*		*11-20*		*21-30*		*31-40*		*41-50*		*>50*	
	Ct.	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	11	42	13	50	2	8	0	0	0	0	0	0
Education	1	100	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	4	50	3	38	1	13	0	0	0	0
Religion	1	100	0	0	0	0	0	0	0	0	0	0
Residential	147	24	255	41	114	18	56	9	24	4	24	4
TOTAL	160		272		119		57		24		24	

Source: FEMA, HAZUS Data

EXPECTED BUILDING DAMAGE BY BUILDING TYPE – STARK COUNTY												
Building Type	*1-10*		*11-20*		*21-30*		*31-40*		*41-50*		*Substantially*	
	Ct.	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*
Concrete	1	50	0	0	1	50	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	15	20	35	47	15	20	6	8	2	3	2	3
Steel	3	27	6	55	2	18	0	0	0	0	0	0
Wood	138	25	225	40	102	18	50	9	22	4	22	4

Source: FEMA, HAZUS Data



BUILDING-RELATED ECONOMIC LOSS ESTIMATES (MILLIONS OF DOLLARS)						
Category	*Area*	*Residential*	*Commercial*	*Industrial*	*Others*	*Total*
Building Loss	Building	77.98	34.93	25.60	4.25	142.76
	Content	36.84	102.98	65.13	26.31	231.26
	Inventory	0.00	2.84	10.18	0.10	13.12
	Subtotal	114.82	140.75	100.91	30.66	387.14
Business Interruption	Income	1.09	91.08	2.17	9.81	104.15
	Relocation	24.35	28.11	2.21	5.41	60.08
	Rental Income	10.72	20.13	0.50	0.69	32.04
	Wage	2.57	93.24	2.55	68.05	166.41
	Subtotal	38.73	232.56	7.43	83.96	362.68
TOTAL		153.55	373.31	108.34	114.62	749.82

Source: FEMA, HAZUS Data

To complete the Ohio Emergency Management Agency's (EMA's) Mitigation Information Portal (MIP) vulnerability assessment, the Ohio EMA's "loss estimate workbook for HAZUS results" provided the figures included in the following table.

FLOODING EXPOSURE ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	9,204	$2,700,755,000
Non-Residential	4,939	$1,440,875,000
Critical Facilities	712	$210,547,000
TOTALS	14,855	$4,352,177,000

Source: Ohio EMA HAZUS-MH Loss Estimate Workbook Calculation

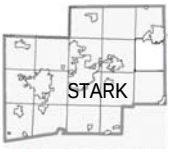
According to the 2019 Ohio Hazard Mitigation Plan, there are no critical state-owned or leased facilities located in the 100-year floodplain of Stark County.

Vulnerability Assessment

This section summarizes the vulnerability of Stark County to flooding. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding flooding.

PUBLIC SENTIMENT, FLOODING – STARK COUNTY					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
Flooding	21 (12.21%)	65 (37.79%)	55 (31.98%)	31 (18.02%)	172
In the past ten years, do you remember this hazard occurring in your community?				123 (71.5%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				107 (62.21%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				0 (0.00%)	172

Source: Online Public Survey Results

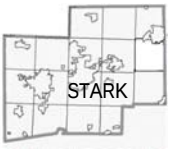


The following table identifies the assets located in flood risk areas.

ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Located in Floodway					
Minerva Sewage Treatment Plant	805 Valley Street	Minerva	X		
Navarre Water Treatment Plant	338 Wooster St. NW	Navarre	X		
Special Flood Hazard Area (SFHA) 1% Annual Chance					
Allen Elementary School	1326 Sherrick Rd. SE	Canton		X	
Dragway of Magnolia	5910 Westbrook St. SE	Magnolia		X	
Special Flood Hazard Area (SFHA) 0.2% Annual Chance					
Minerva Sewage Treatment Plant	401 E. Lincoln Way	Minerva	X		
Weber Dental Manufacturing Co.	2206 13th St. NE	Canton		X	
Minerva High School	501 Almeda Ave	Minerva		X	
Quad Ambulance Service	6930 Minerva Rd. SE	Waynesburg		X	
Sandy Creek Joint Fire District	505 E Lincoln Way	Minerva		X	
Washington Middle School	1220 9th St NE	Canton		X	

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

FLOODING VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	5	Excessive	There have been 23 flood events and 42 flash flood events in Stark County since 1996, for a combined average of 2.6 events per year.
Response	4	One month	The recovery to large scale flooding events can take several weeks.
Onset	3	6-12 hours	With current technology, flash floods can be detected up to 6 hours prior to an event.
Magnitude	2	Limited (10-25% of land area affected	On average, between 10 and 25% of land area is affected by a flood event.
Business	3	At least two weeks	The HAZUS MH analysis indicates that several commercial/industrial structures are vulnerable to flooding conditions; as such, the general economy of the county would likely be impacted for at least 2 weeks.
Human	2	Low (some injuries)	Floods and flash floods are capable of causing injuries and deaths. However, there have been very limited cases of injuries and fatalities resulting from flooding or flash flooding historically.
Property	3	25-50% of property affected	Historical data indicates that the average property damage event is $654,000 per flood and $1,481,000 per flash flood, which is less than 10% of the property in Stark County.
Total	22	High	



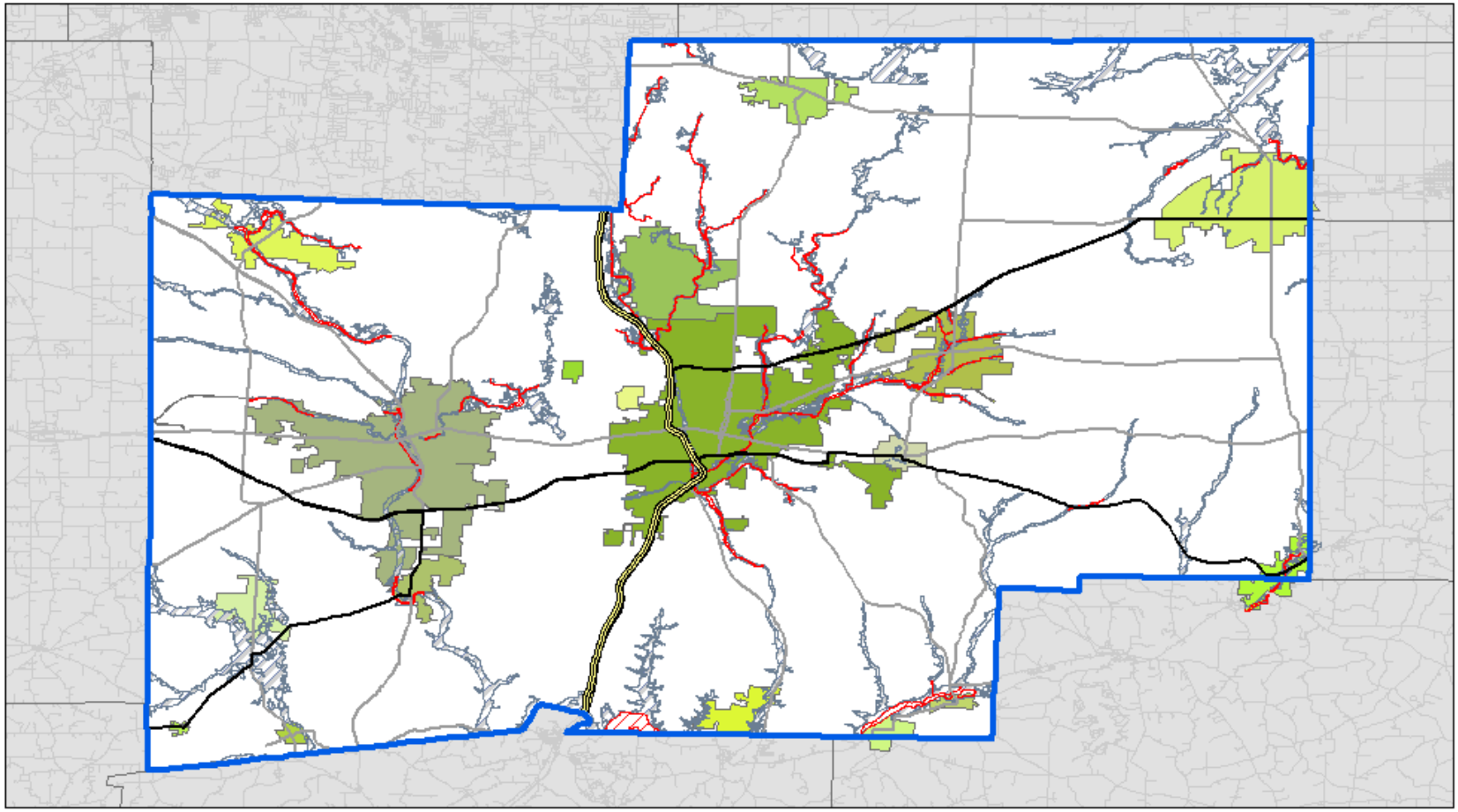
STARK COUNTY HAZARD MITIGATION PLAN

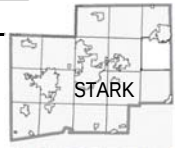
Special Flood Hazard Areas

Data Source(s):
FEMA, OEMA, Stark Co. GIS

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Interstate 77
- US Routes
- State Routes





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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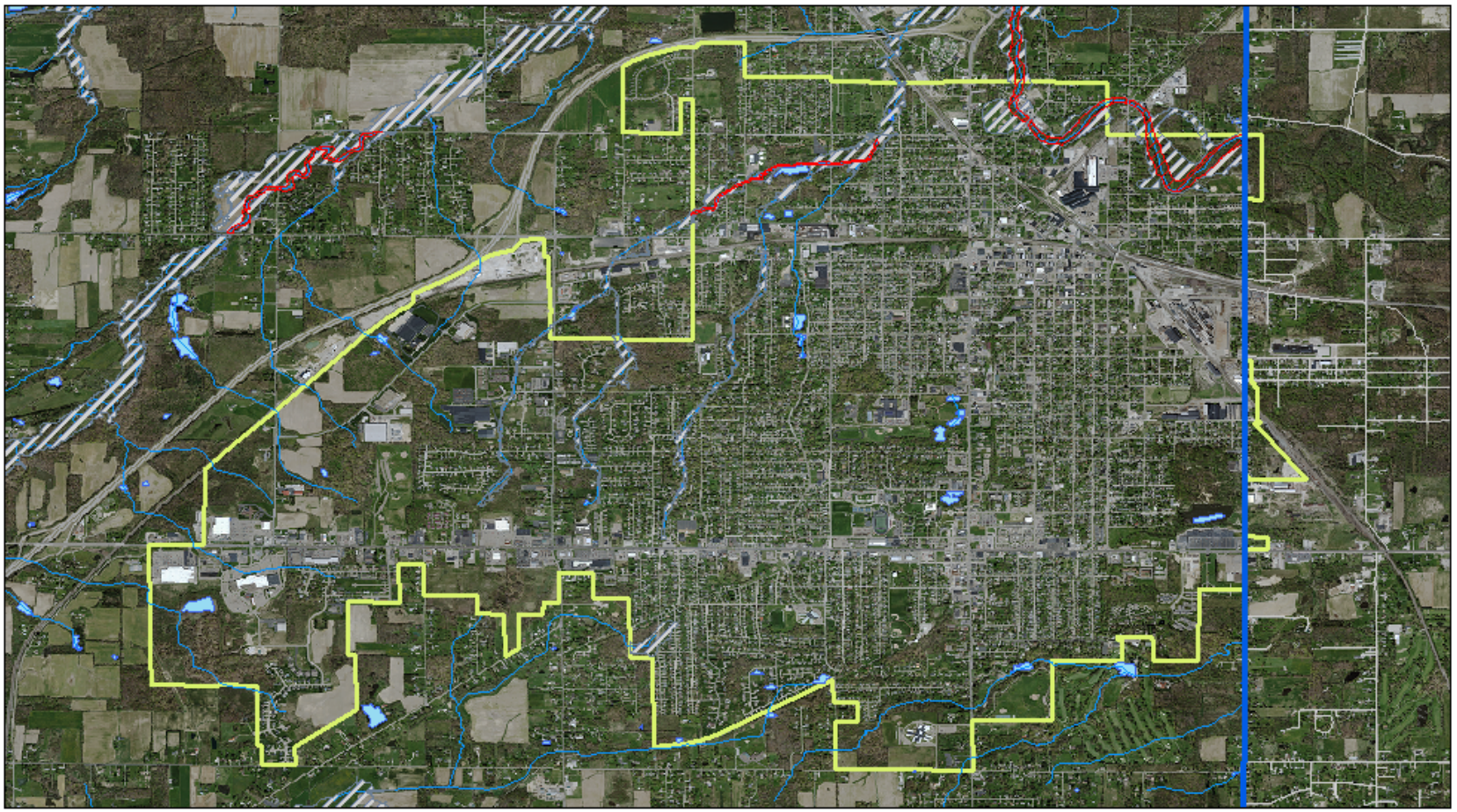
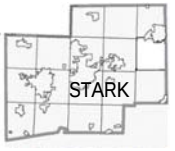
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Alliance (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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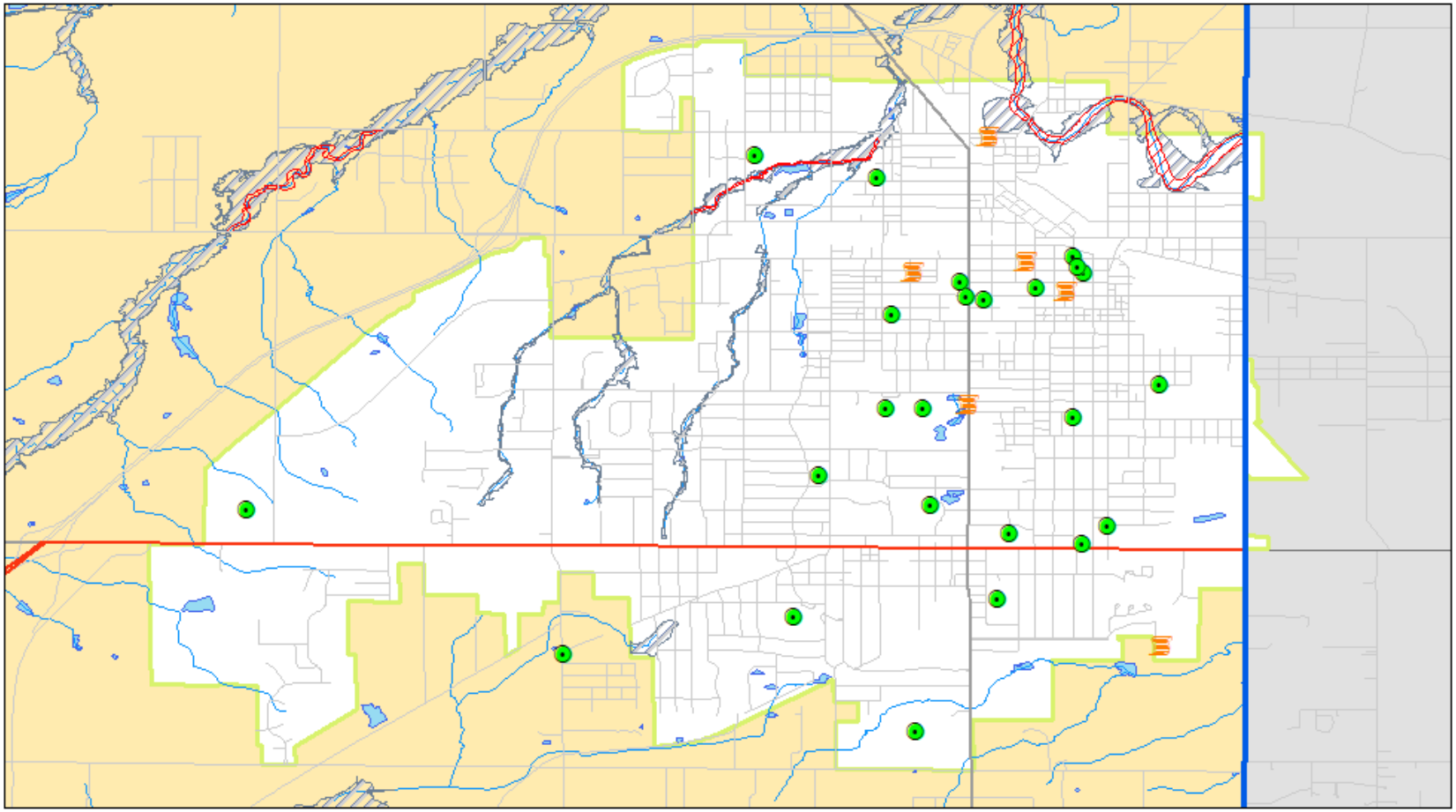
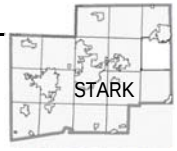
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Alliance (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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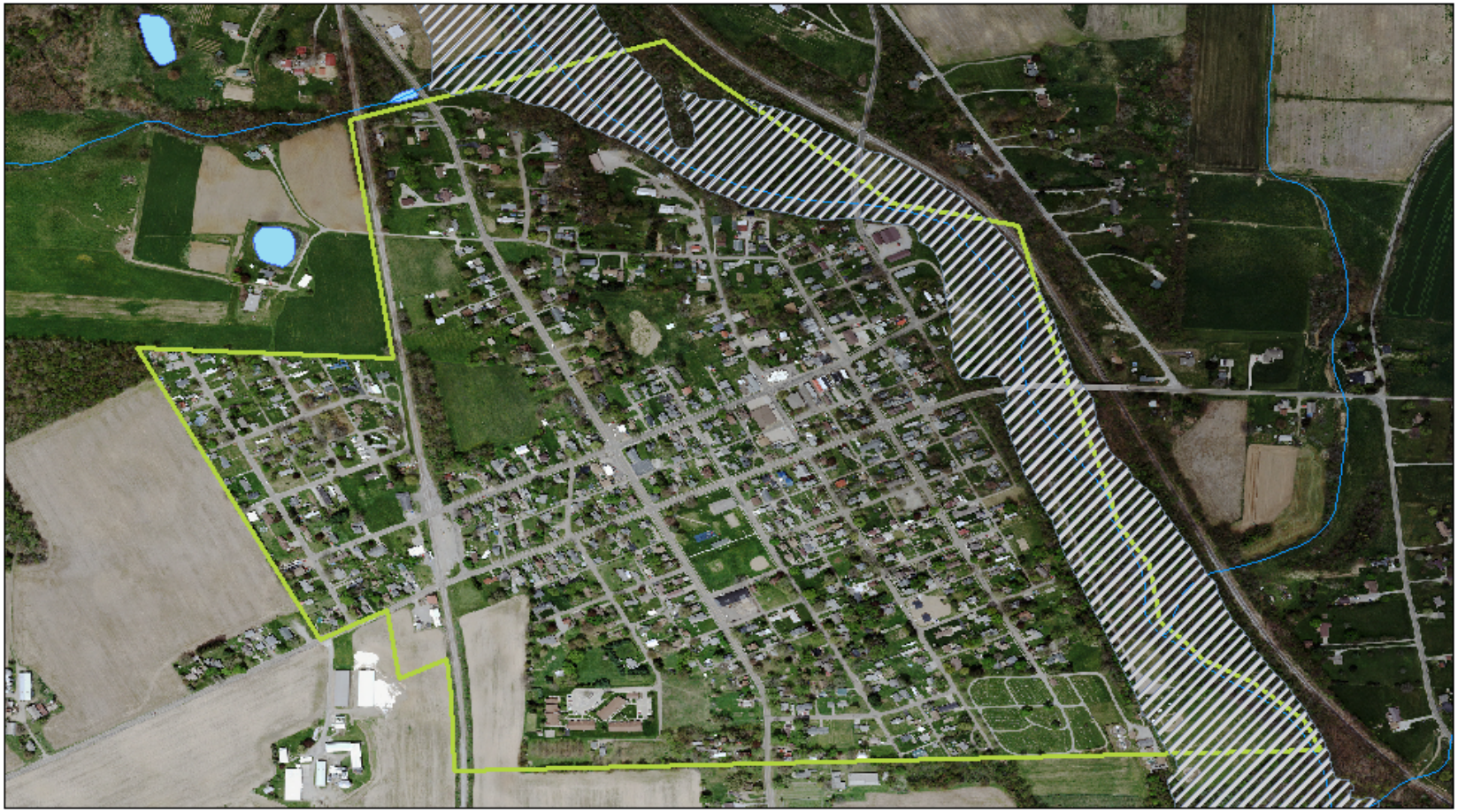
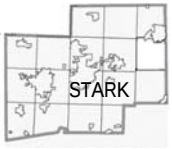
SFHA-Regulated & Special Floodway
SFHA-1% Annual Chance
SFHA-0.2% Annual Chance
Beach City (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

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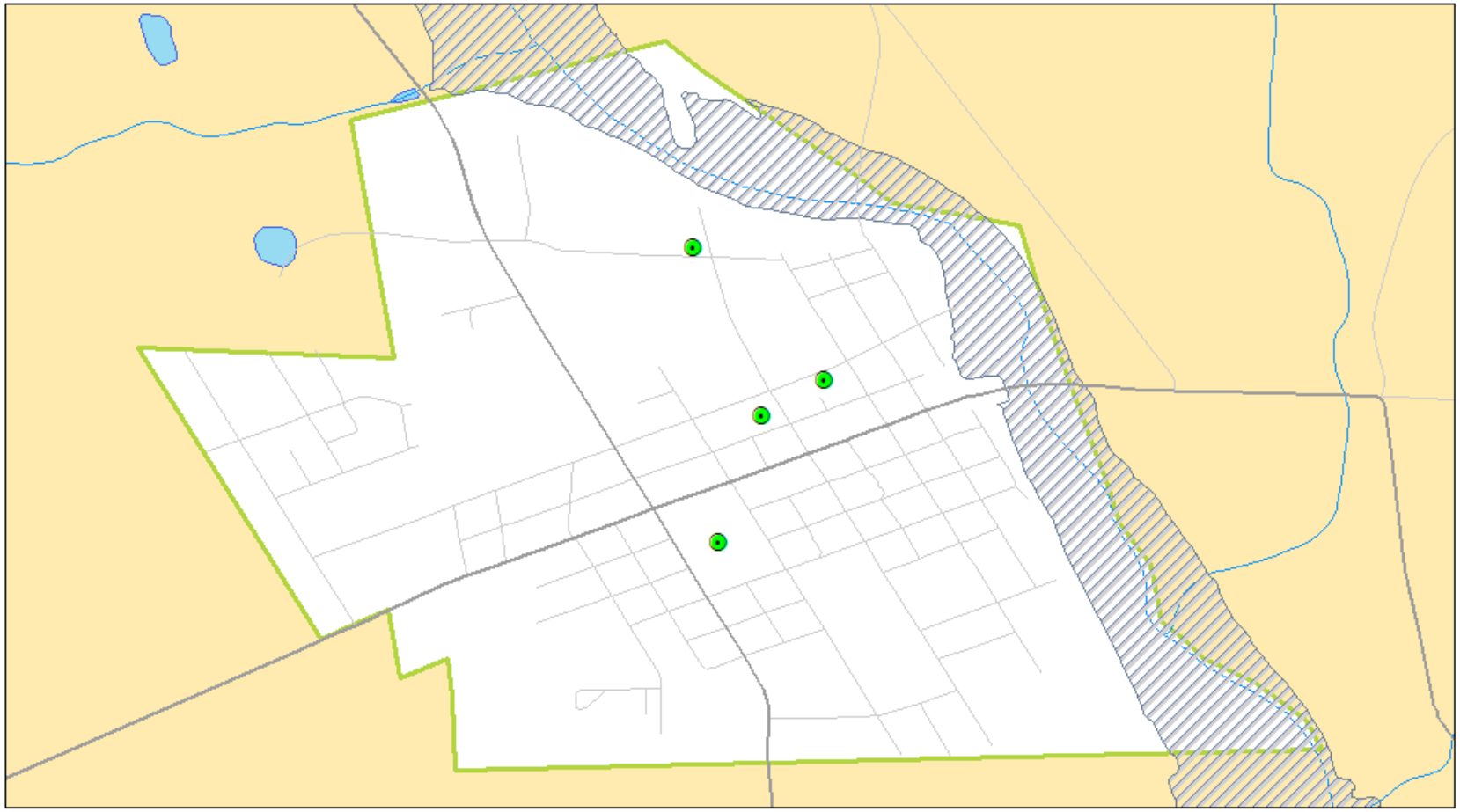
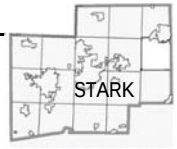
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Beach City (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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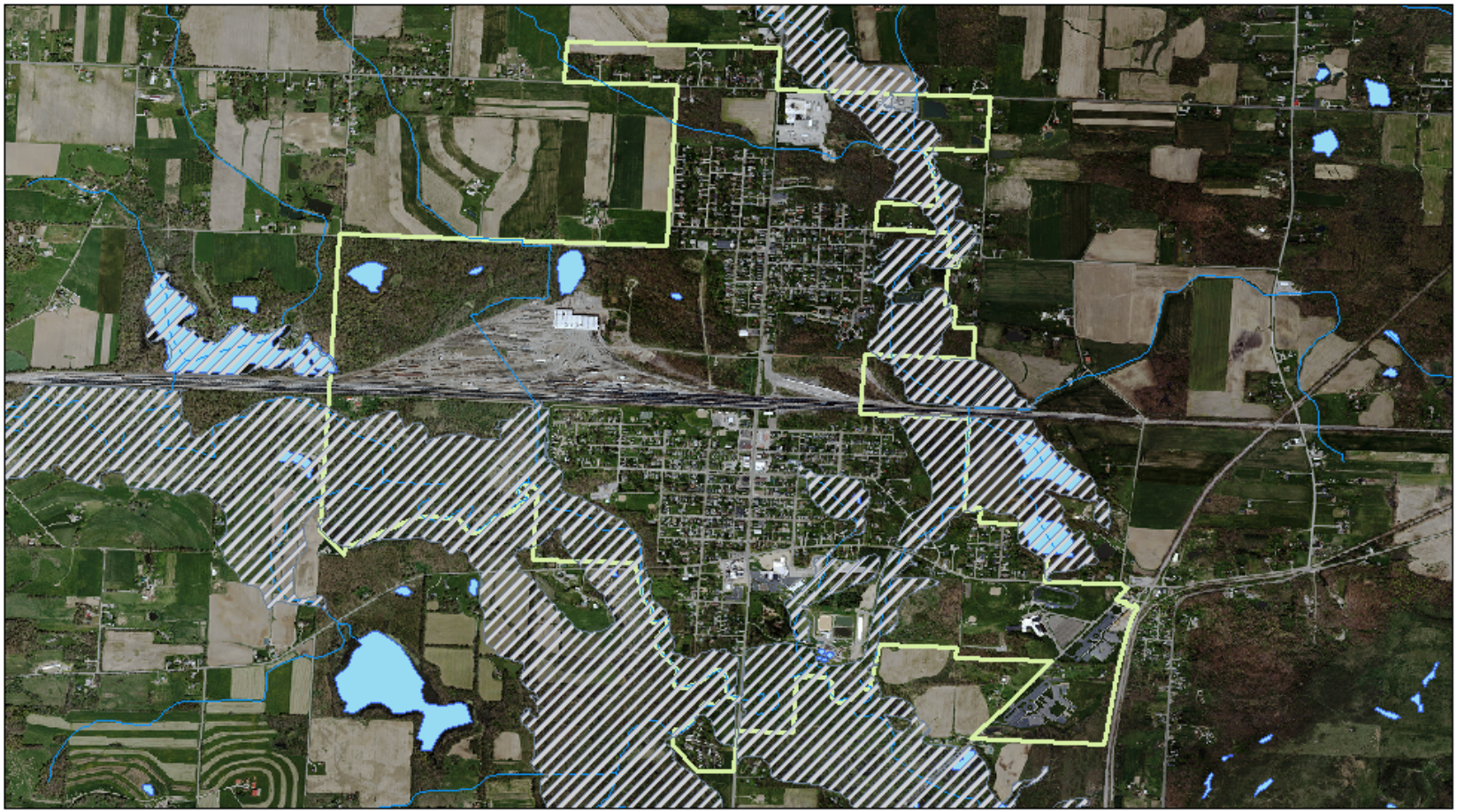
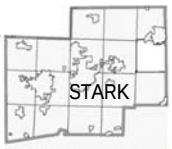
SFHA-Regulated & Special Floodway
SFHA-1% Annual Chance
SFHA-0.2% Annual Chance
Brewster (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

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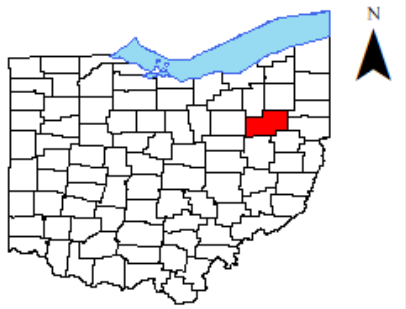
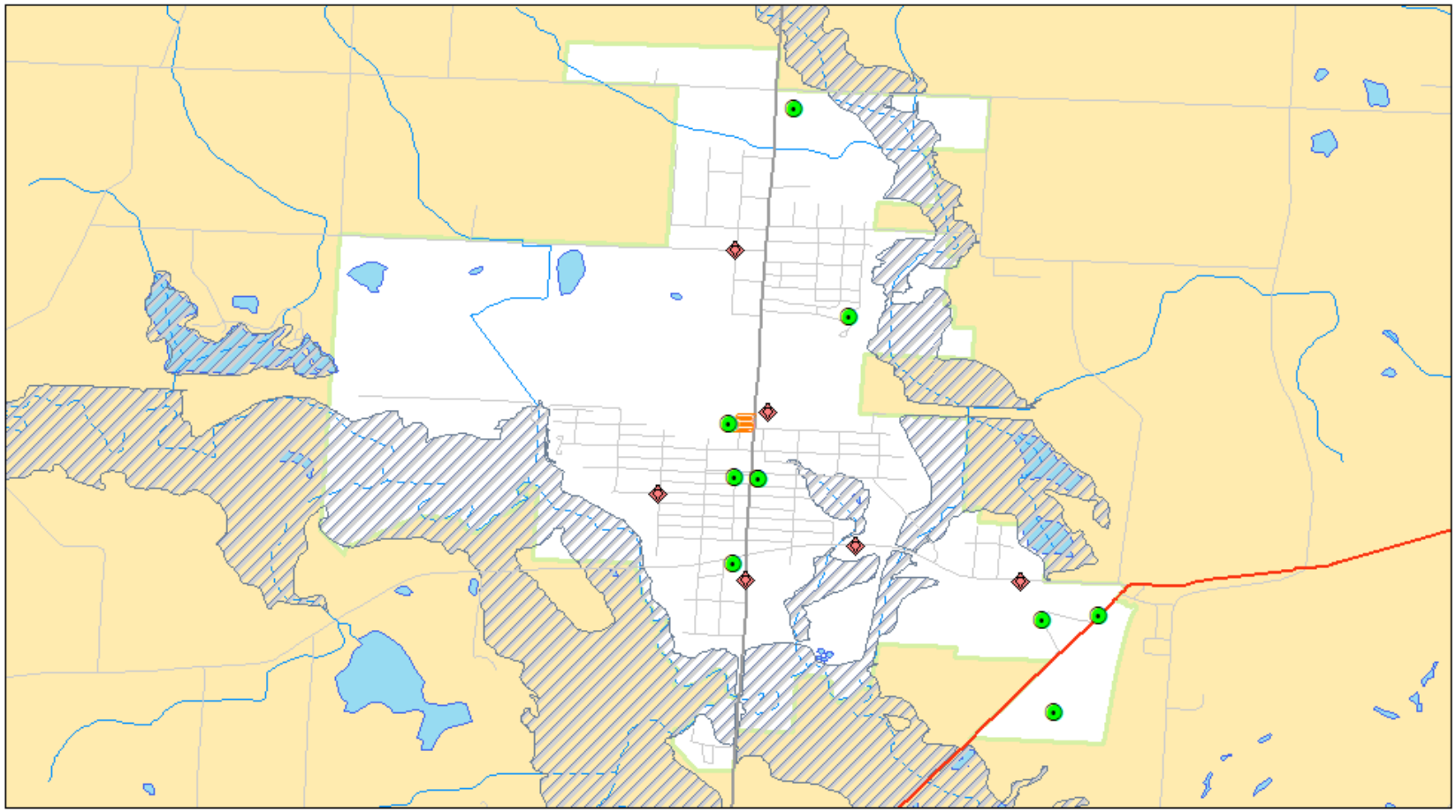
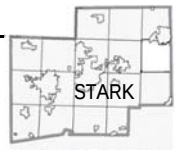
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Brewster (Village)







STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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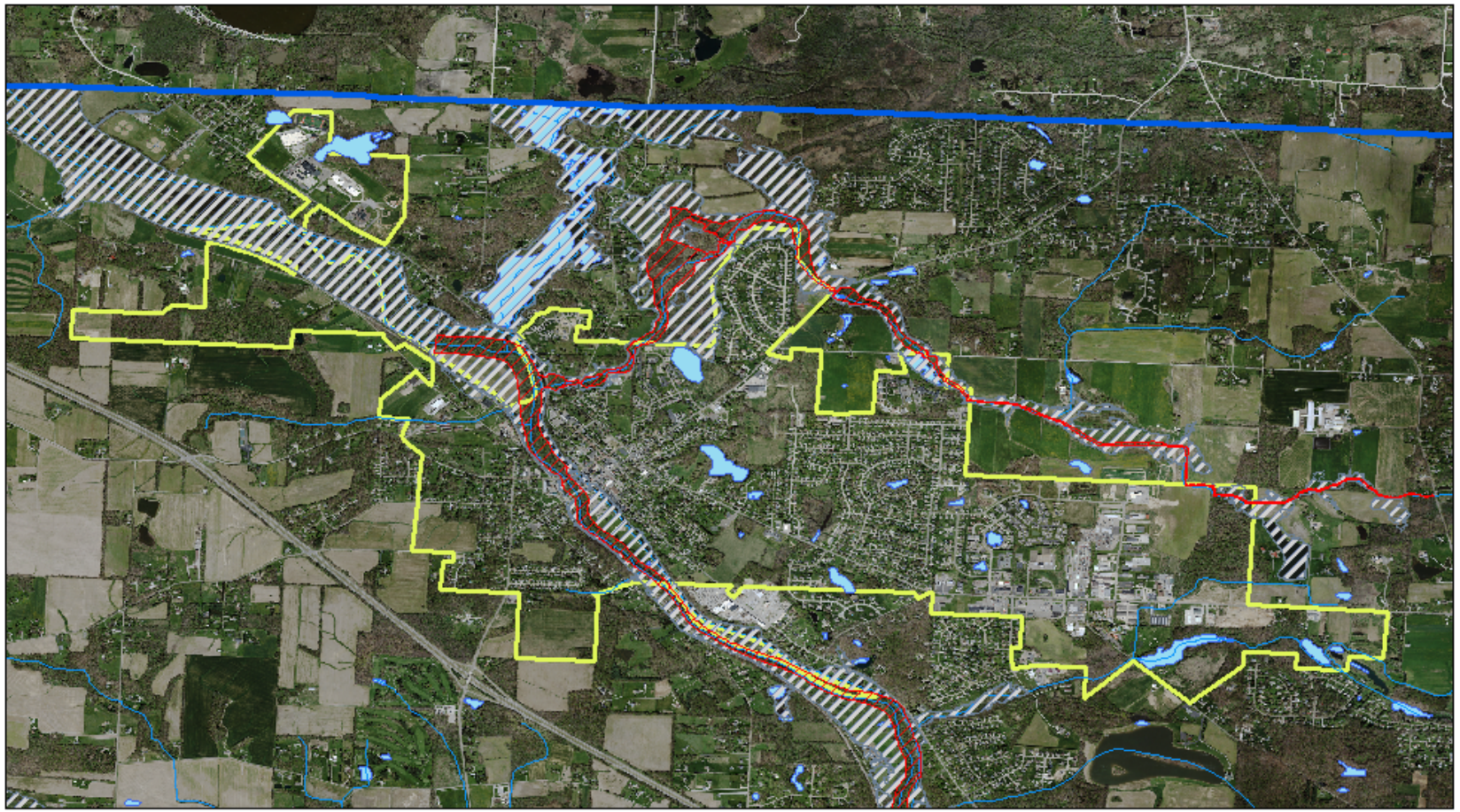
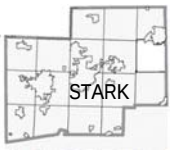
SFHA-Regulated & Special Floodway
SFHA-1% Annual Chance
SFHA-0.2% Annual Chance
Canal Fulton (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
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US Census Bureau

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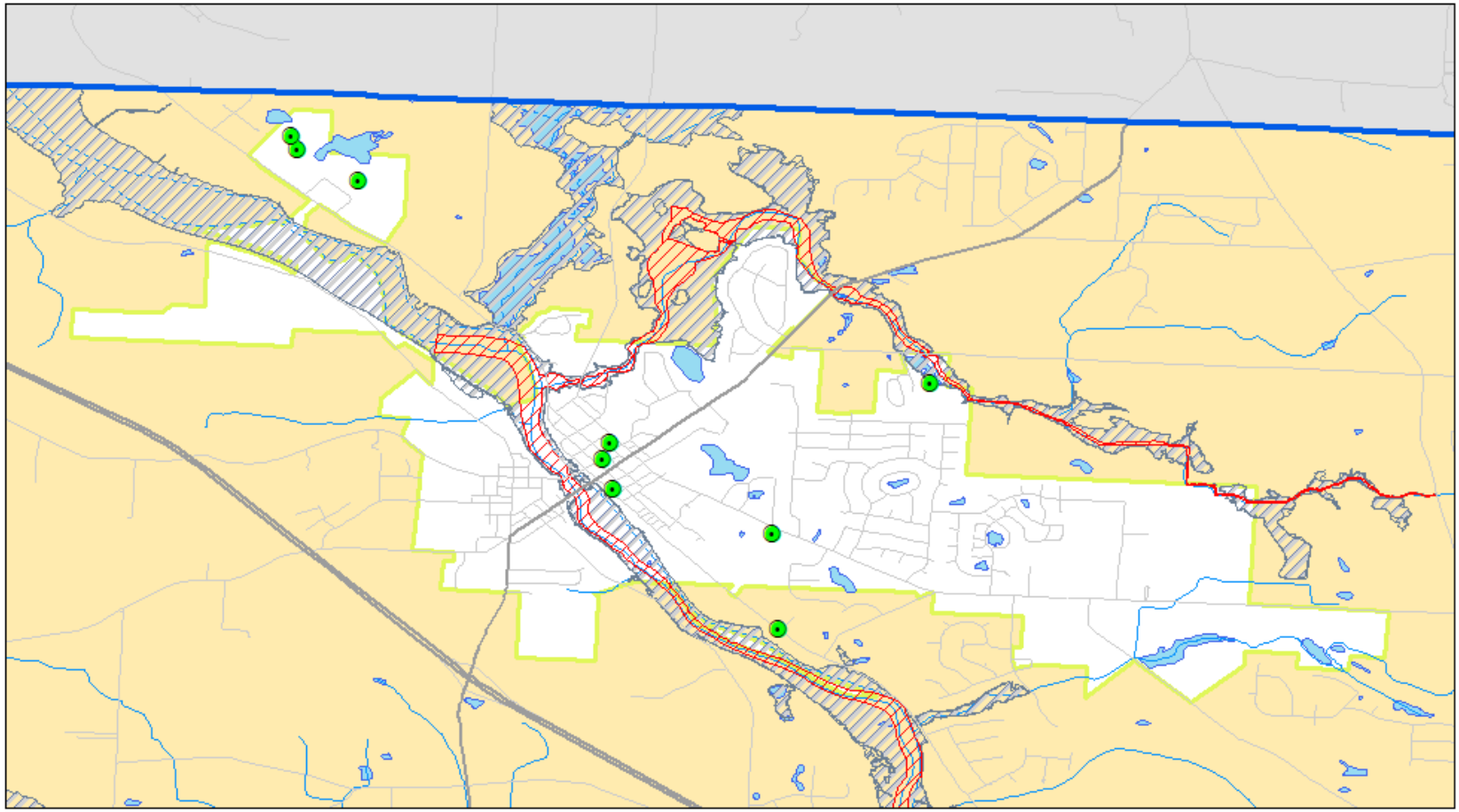
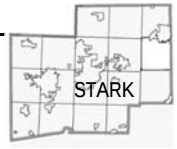
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Canal Fulton (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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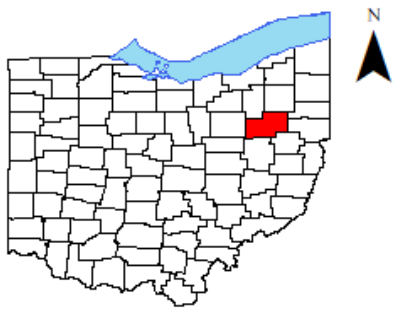
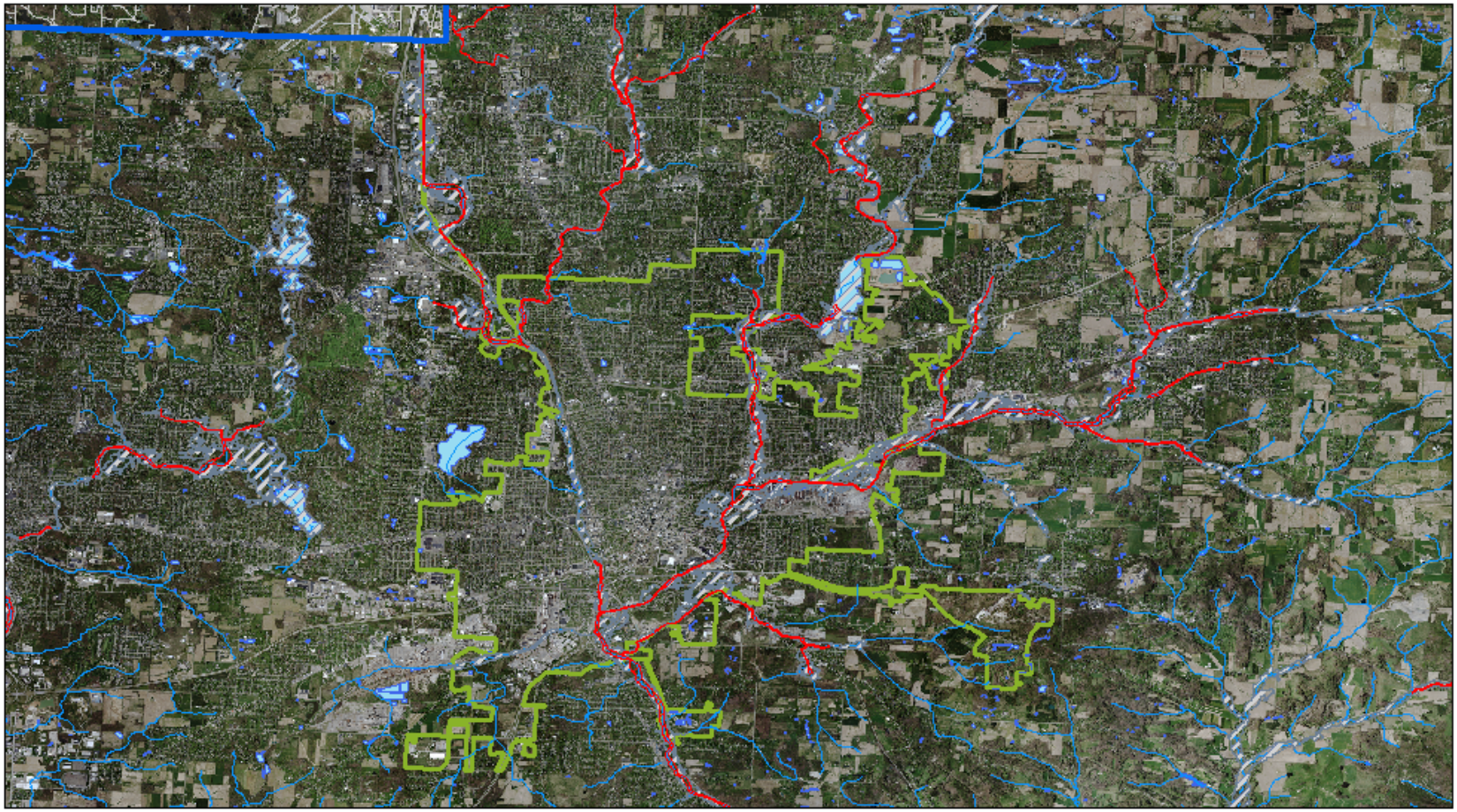
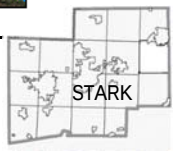
SFHA-1% Annual Chance
SFHA-0.2% Annual Chance
Canton (City)







STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
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- Infrastructure
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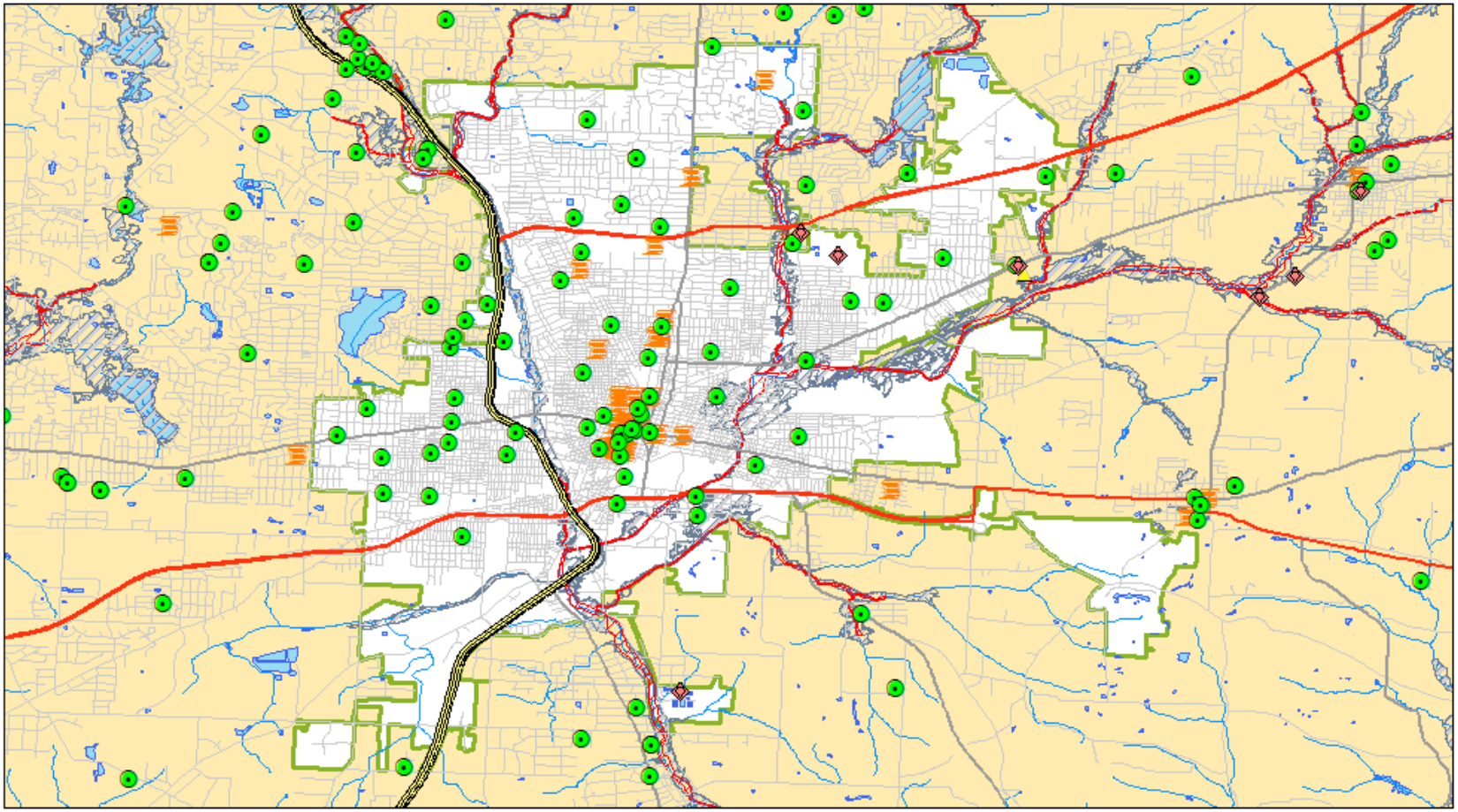
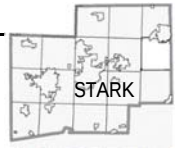
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Canton (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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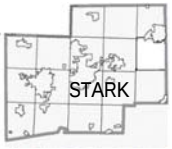
- SFHA-0.2% Annual Chance
- East Canton (Village)



STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

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- Critical Facilities
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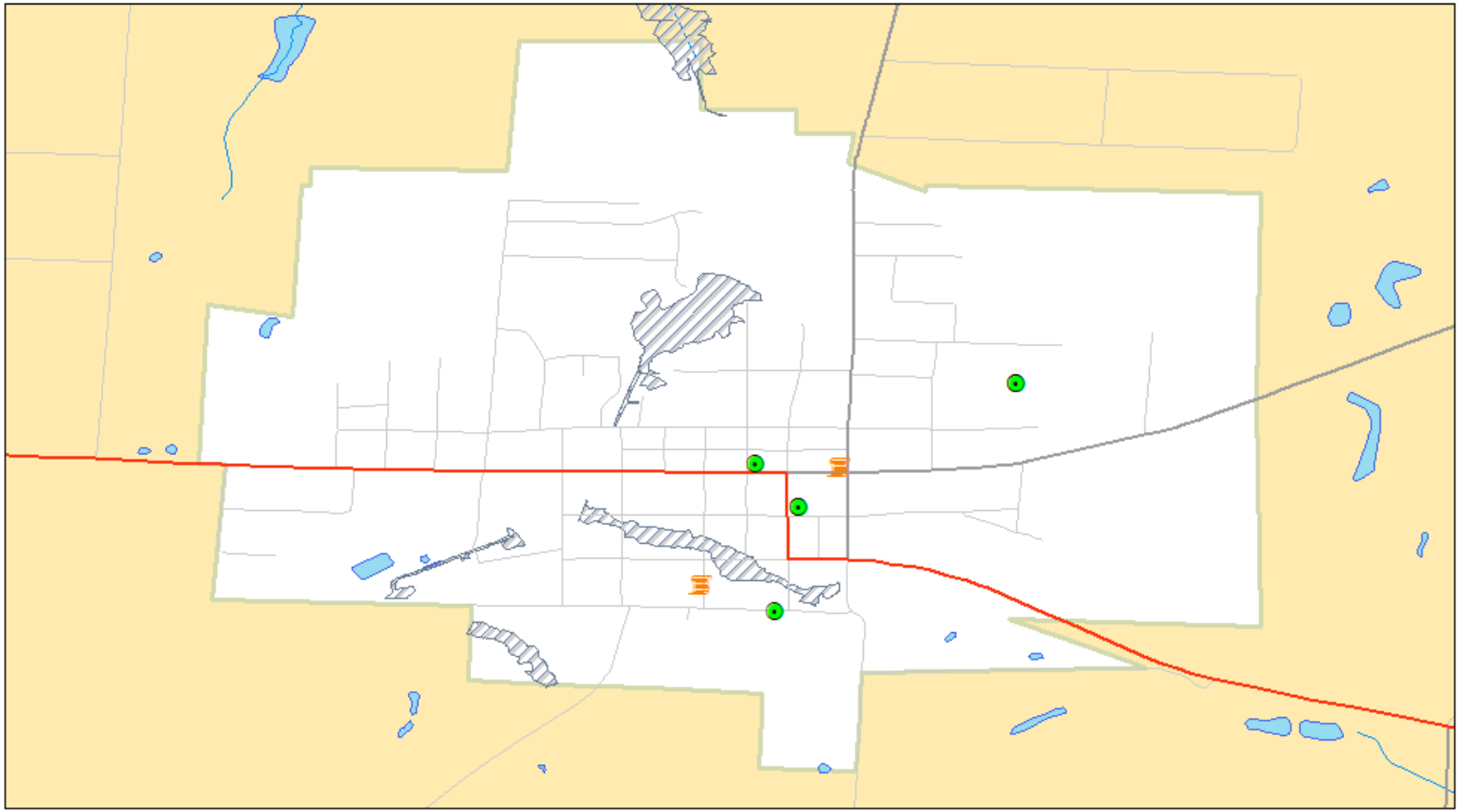
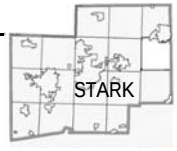
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- East Canton (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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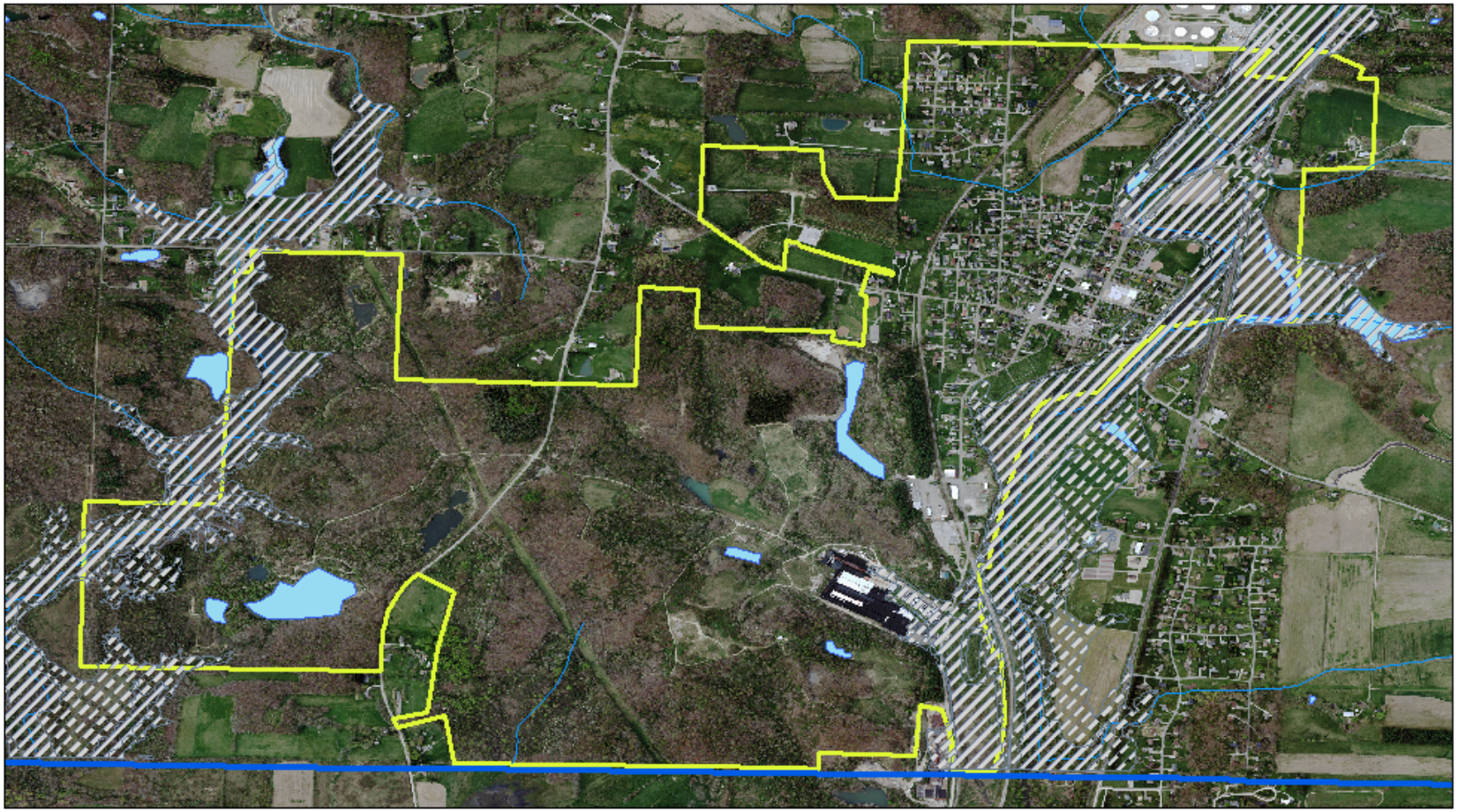
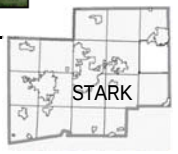
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- East Sparta (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

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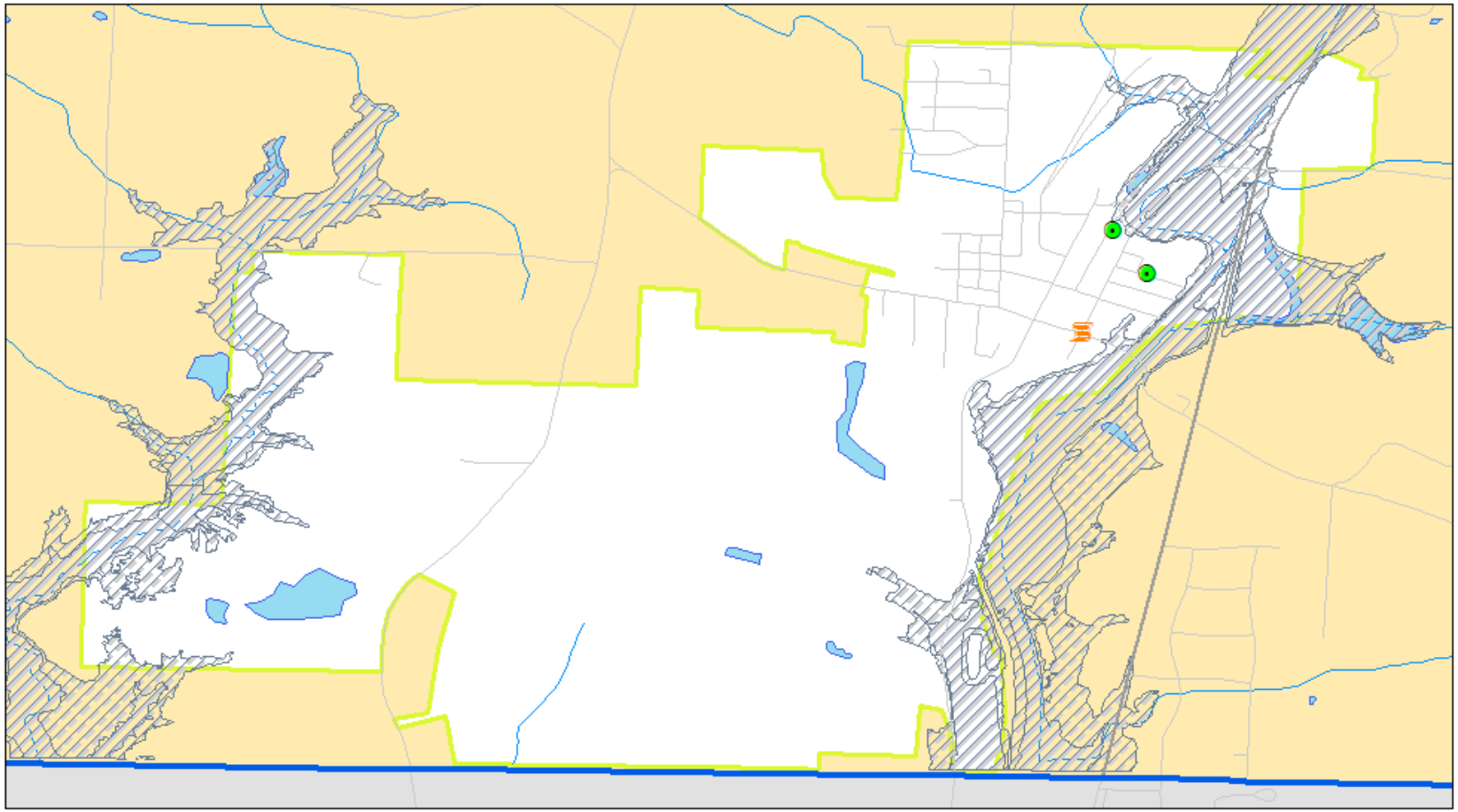
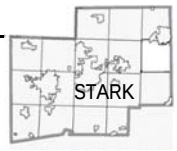
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- East Sparta (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

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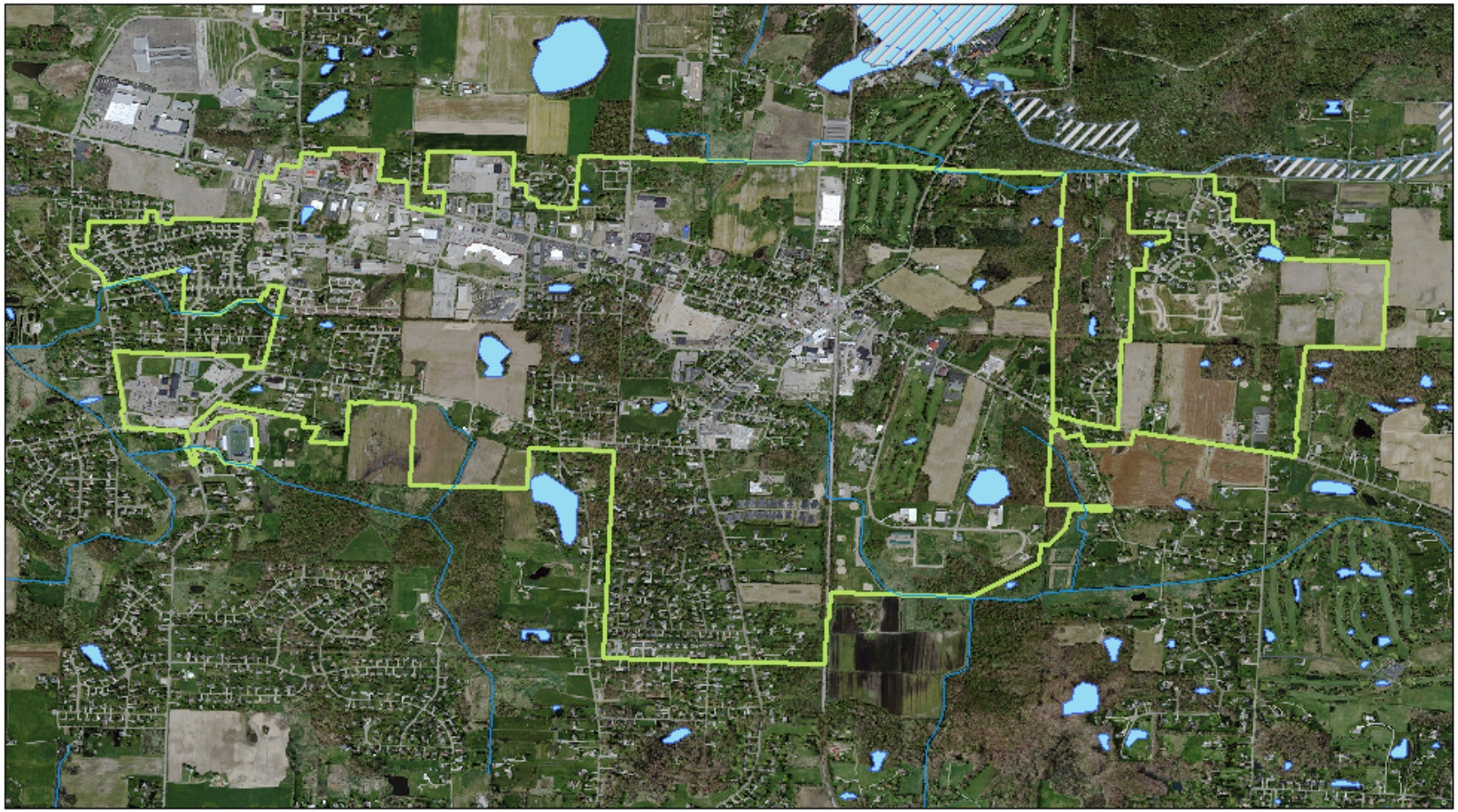
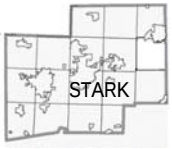
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Hartville (Village)





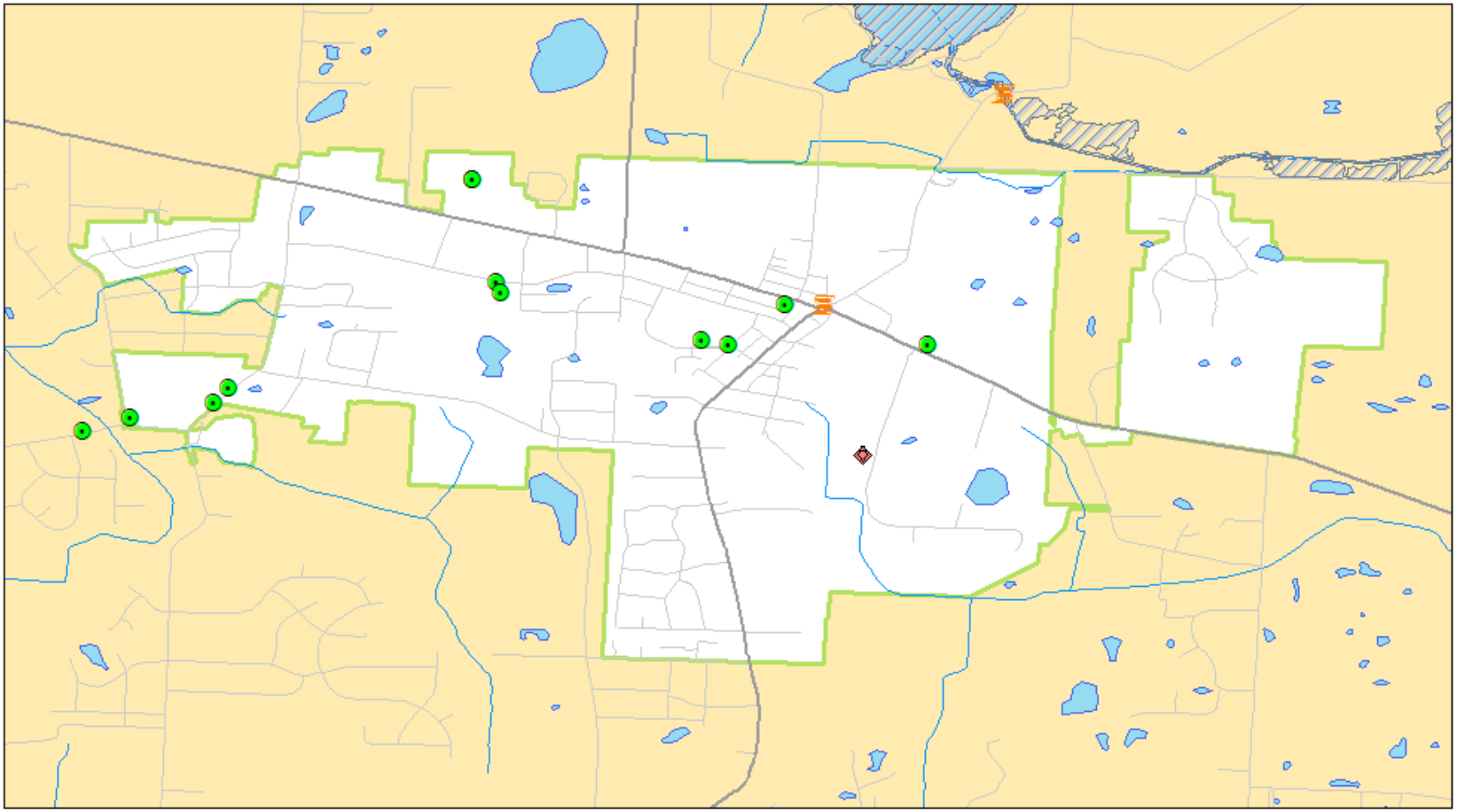
STARK COUNTY HAZARD MITIGATION PLAN

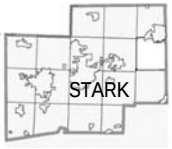
Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee, US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Hartville (Village)





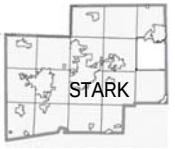
STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Hills & Dales (Village)



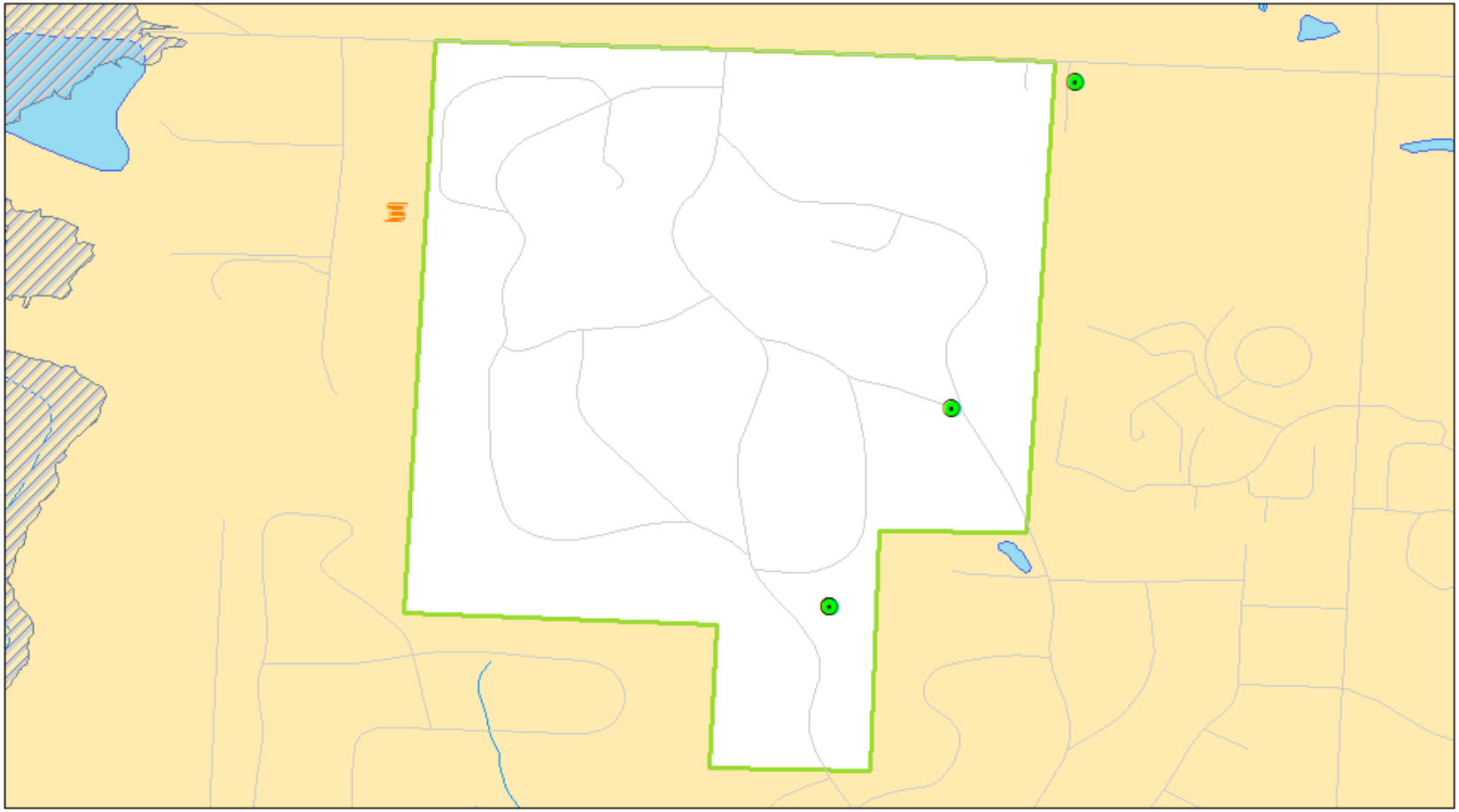
STARK COUNTY HAZARD MITIGATION PLAN

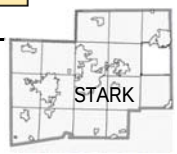
Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Hills & Dales (Village)





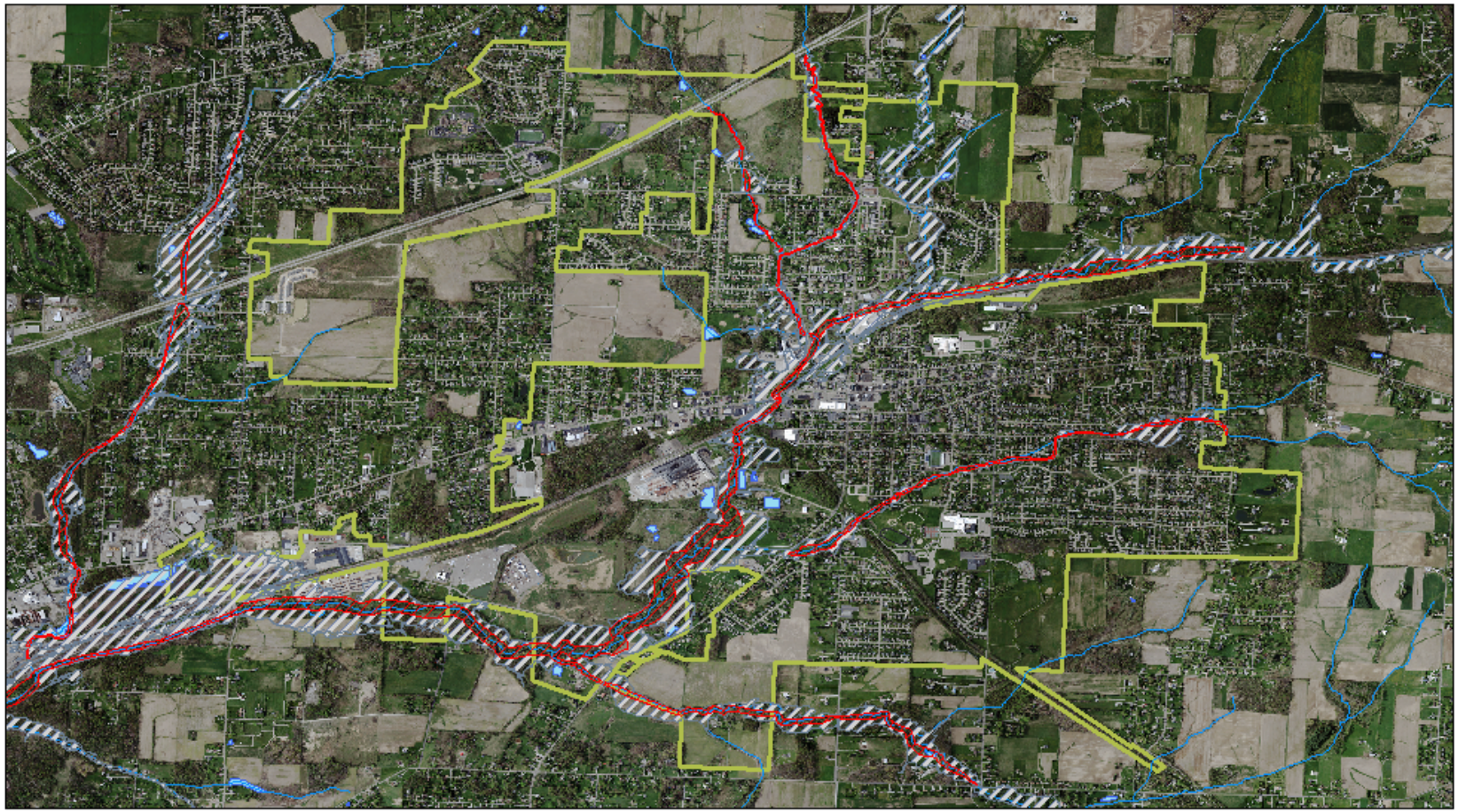
STARK COUNTY HAZARD MITIGATION PLAN

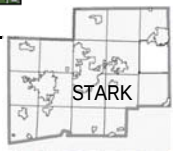
Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Louisville (City)





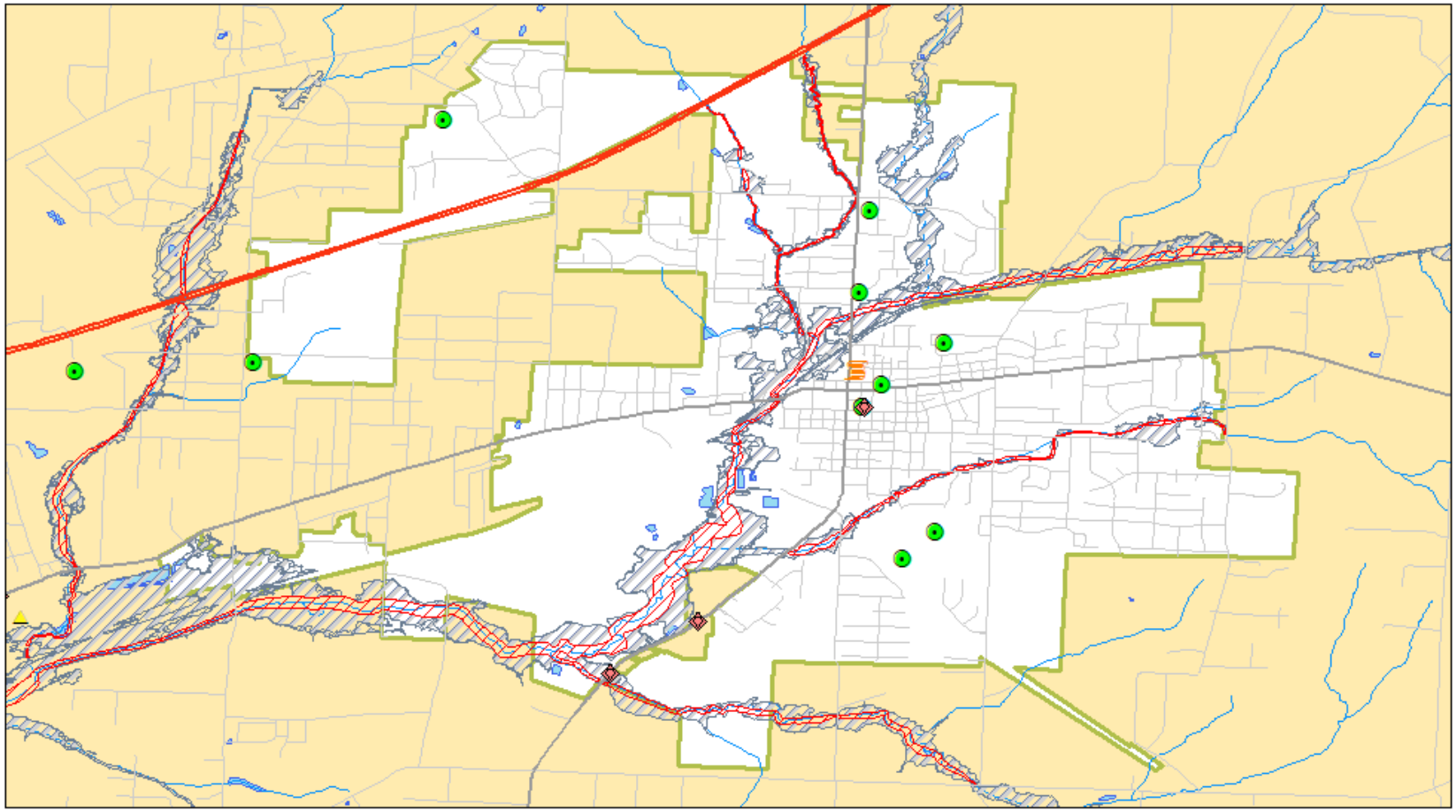
STARK COUNTY HAZARD MITIGATION PLAN

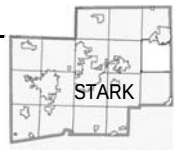
Special Flood Hazard Areas (Street View, w/ Assets)

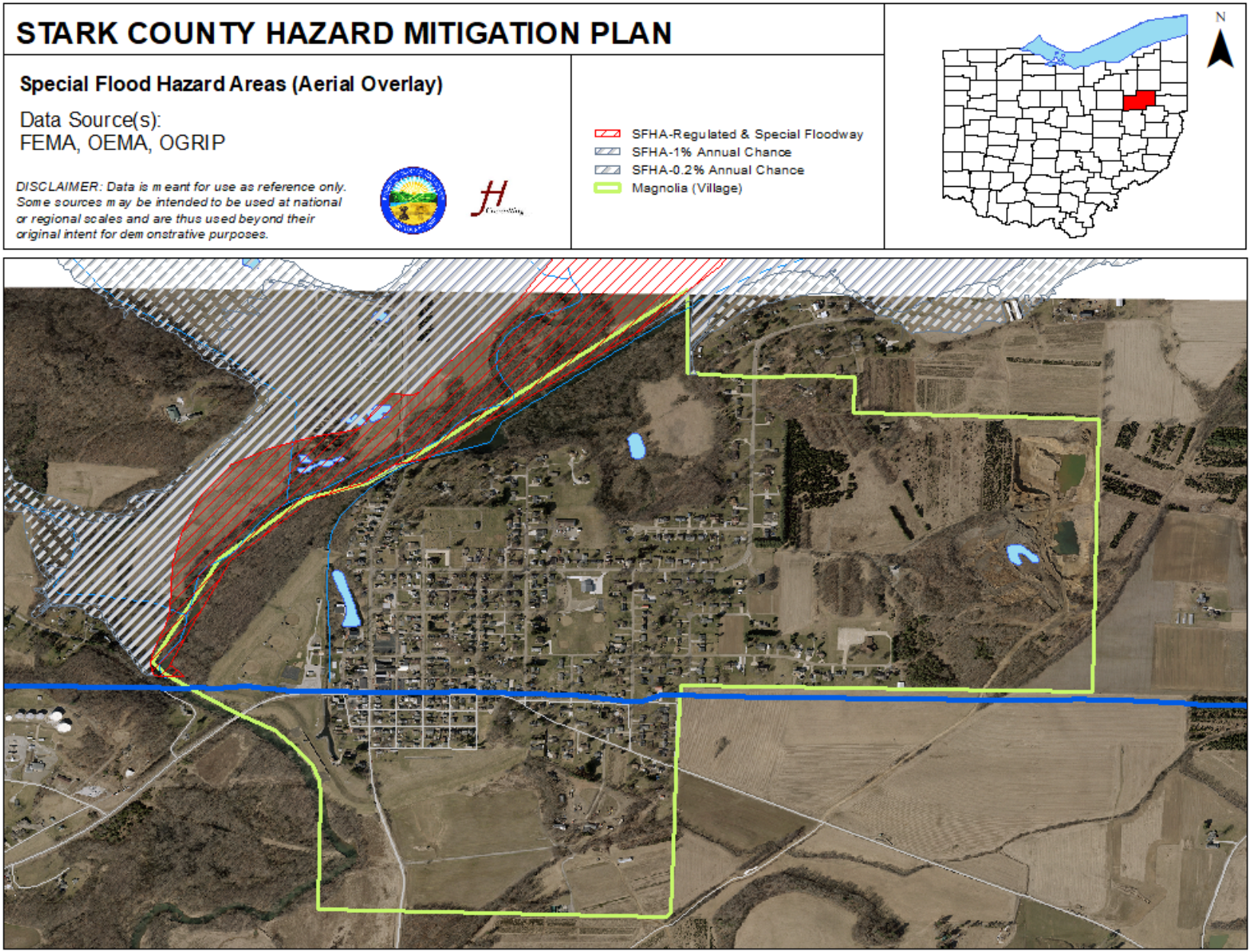
Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

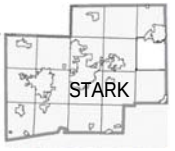
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Louisville (City)






STARK COUNTY HAZARD MITIGATION PLAN
Special Flood Hazard Areas (Aerial Overlay)
Data Source(s):
FEMA, OEMA, OGRIP
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
SFHA-Regulated & Special Floodway
SFHA-1% Annual Chance
SFHA-0.2% Annual Chance
Magnolia (Village)
N


STARK

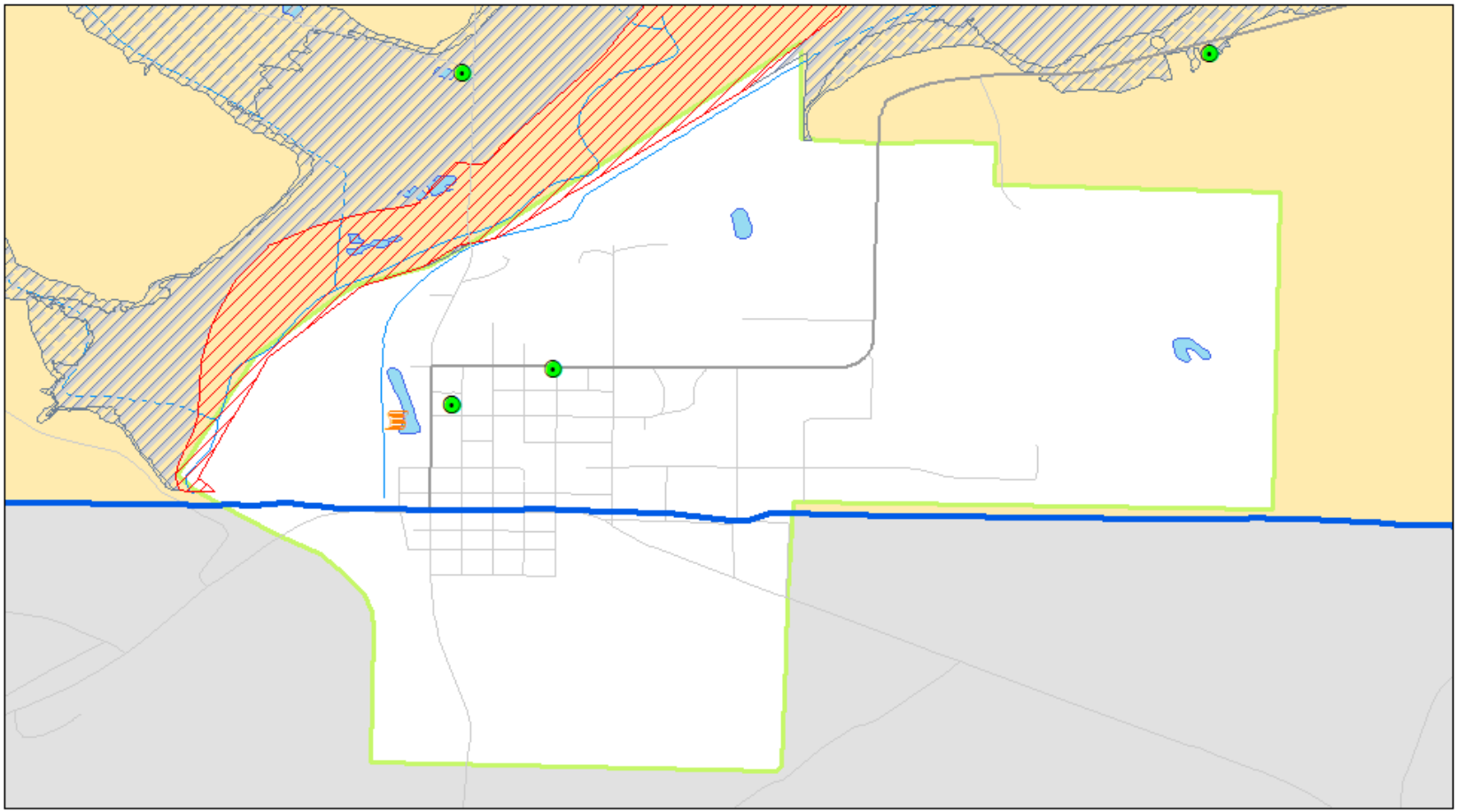
STARK COUNTY HAZARD MITIGATION PLAN

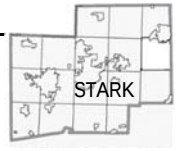
Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Critical Facilities
- High Potential Loss Facilities
- Historical & Cultural Resources
- Infrastructure
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Magnolia (Village)





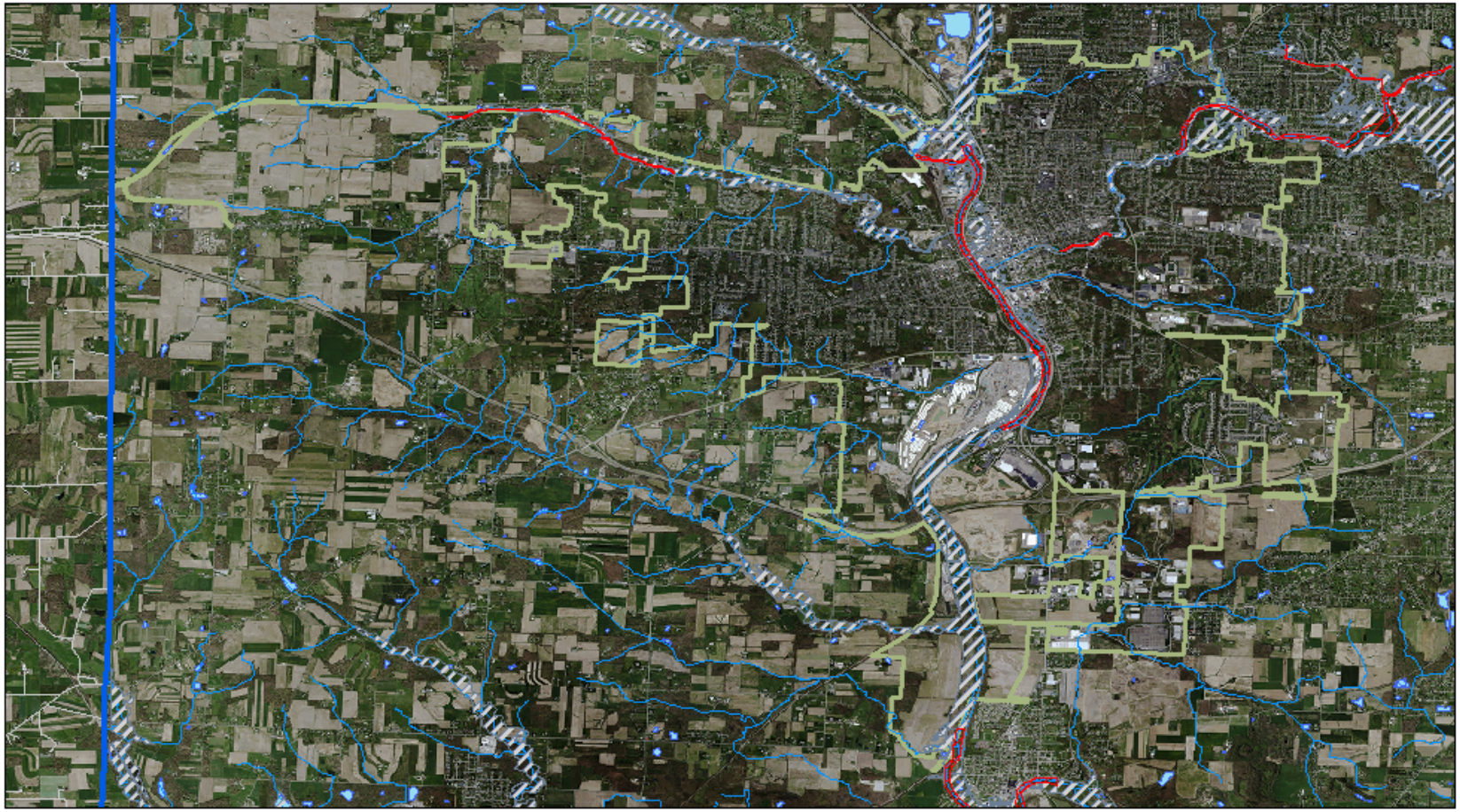
STARK COUNTY HAZARD MITIGATION PLAN

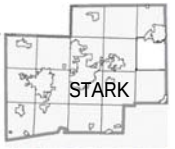
Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Massillon (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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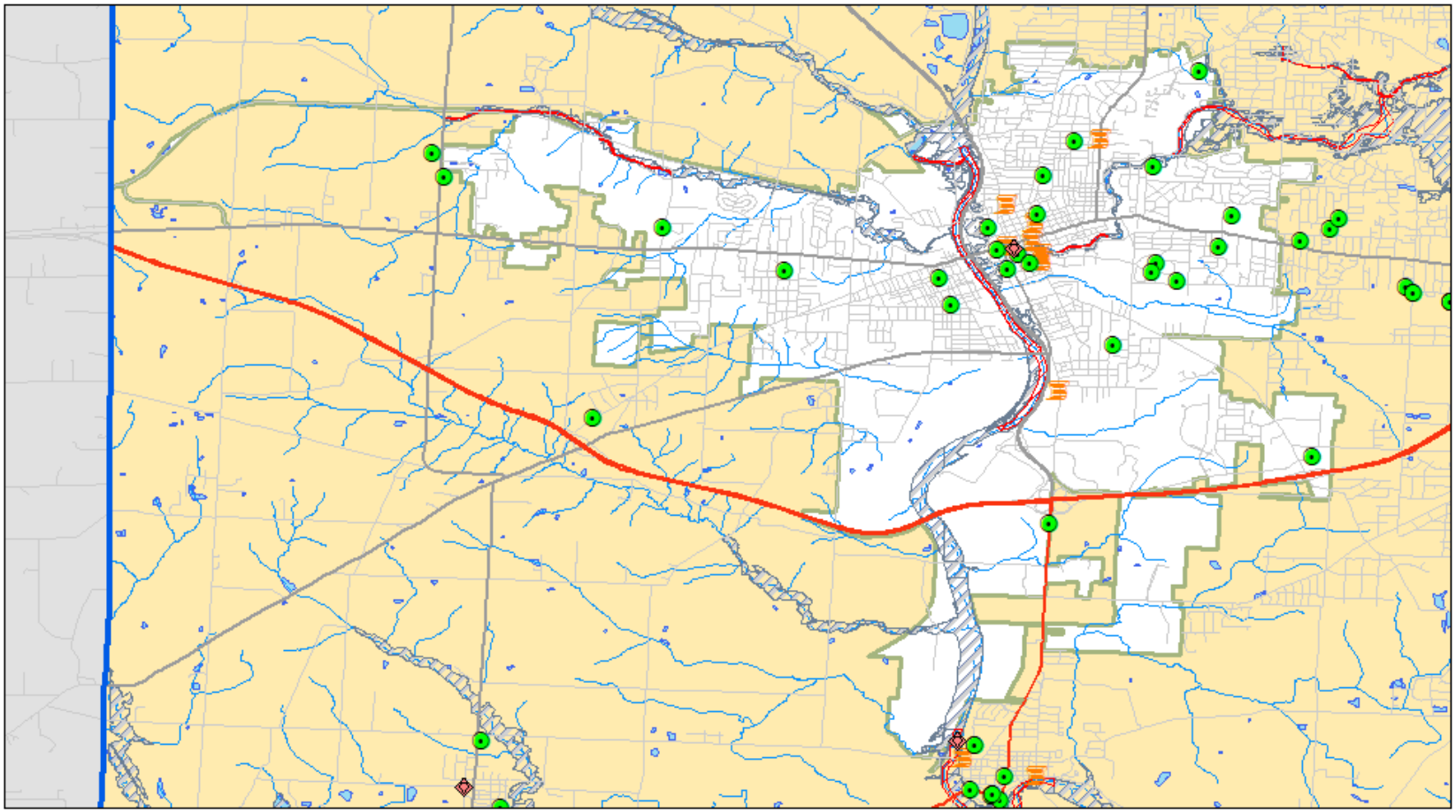
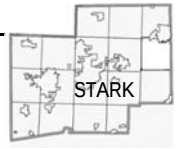
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Massillon (City)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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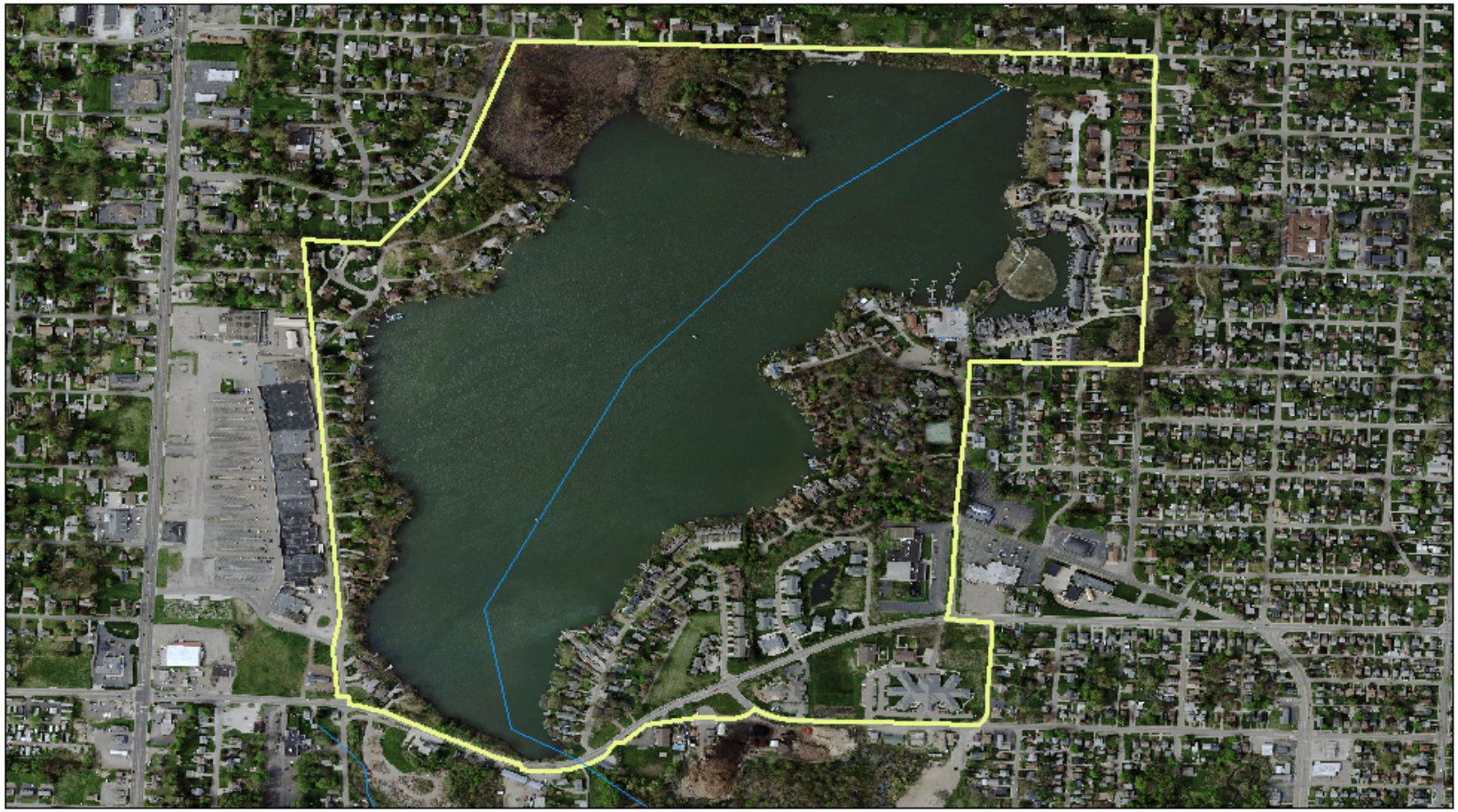
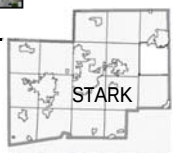
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Meyers Lake (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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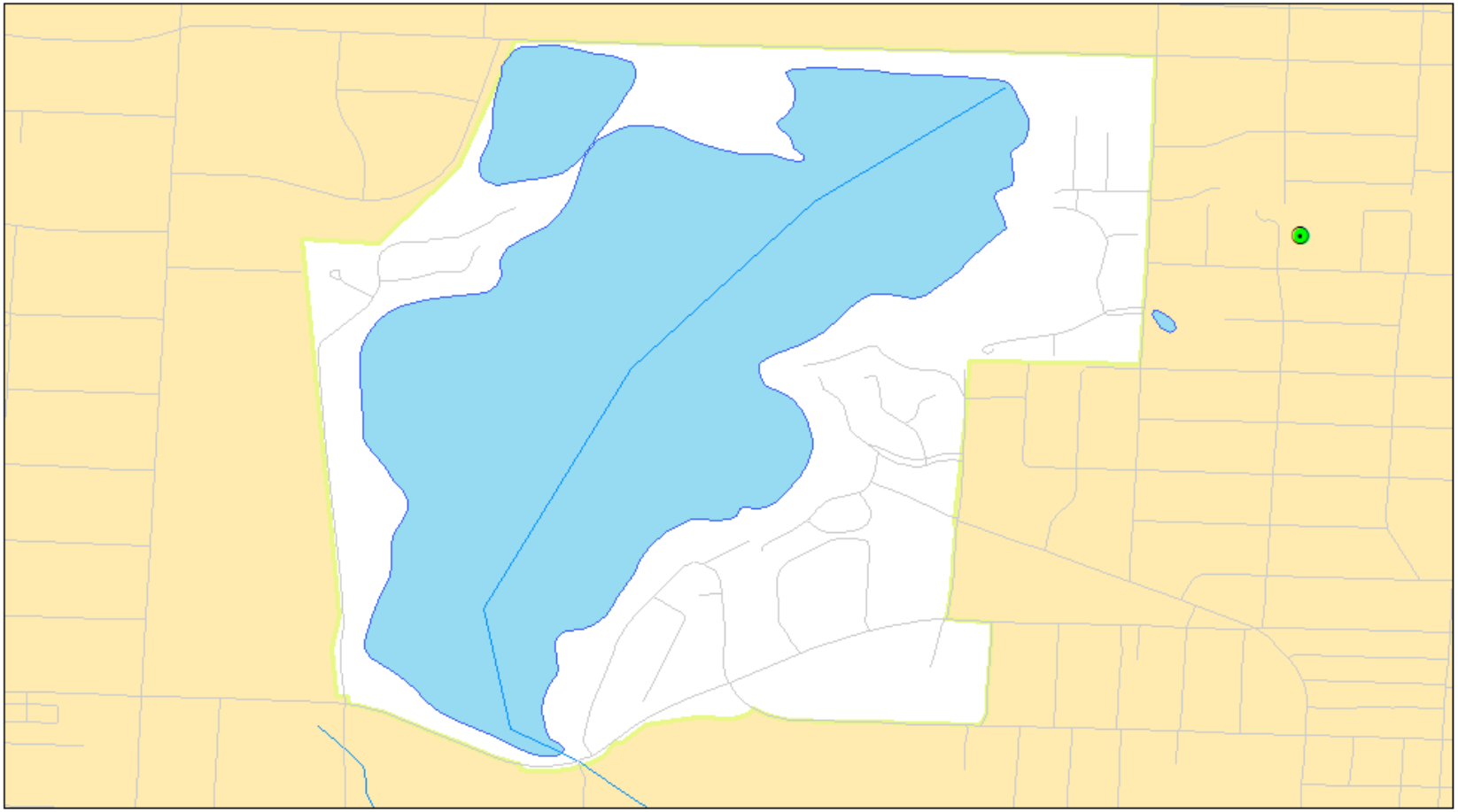
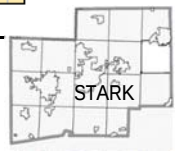
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Meyers Lake (Village)





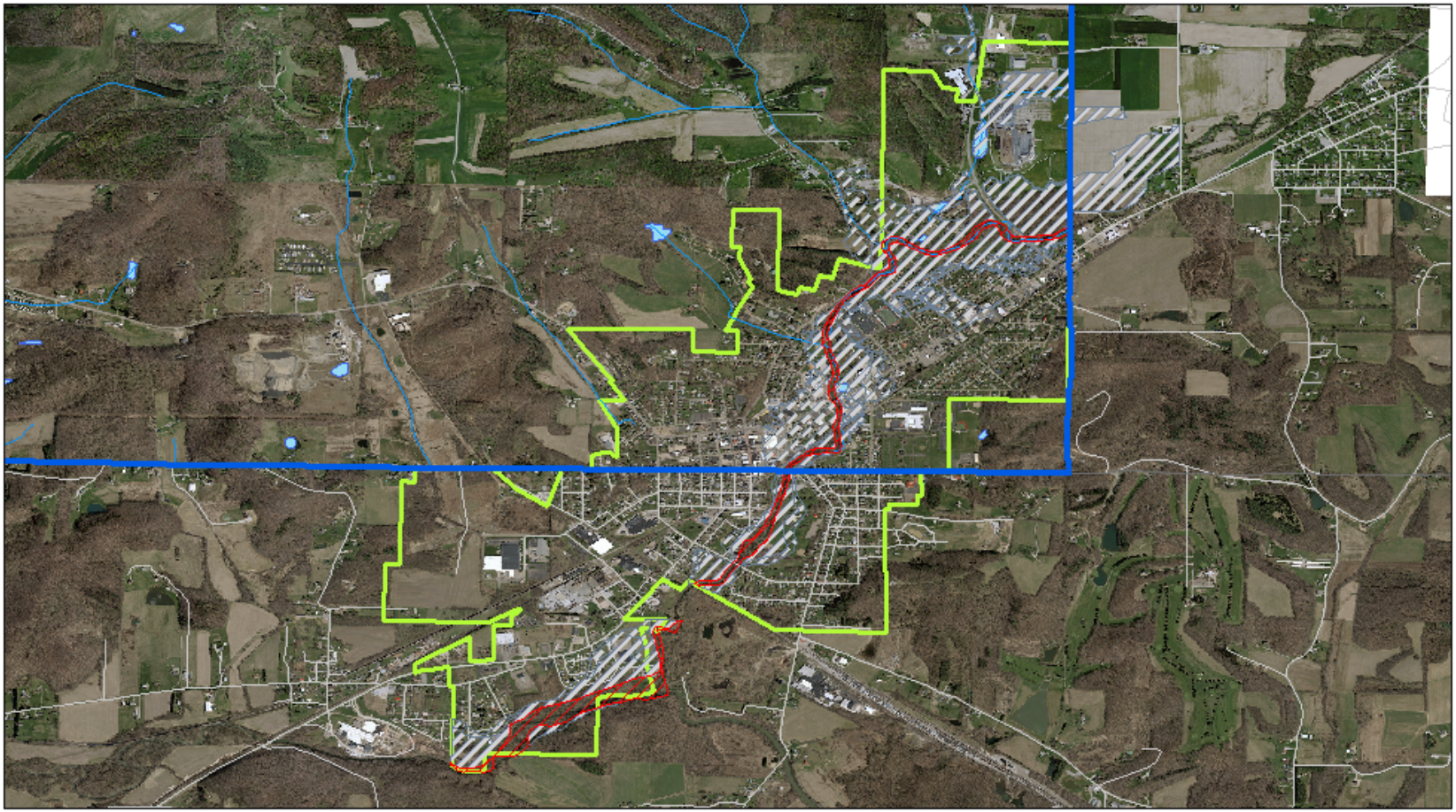
STARK COUNTY HAZARD MITIGATION PLAN

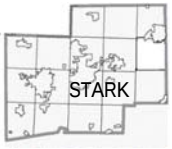
Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Minerva (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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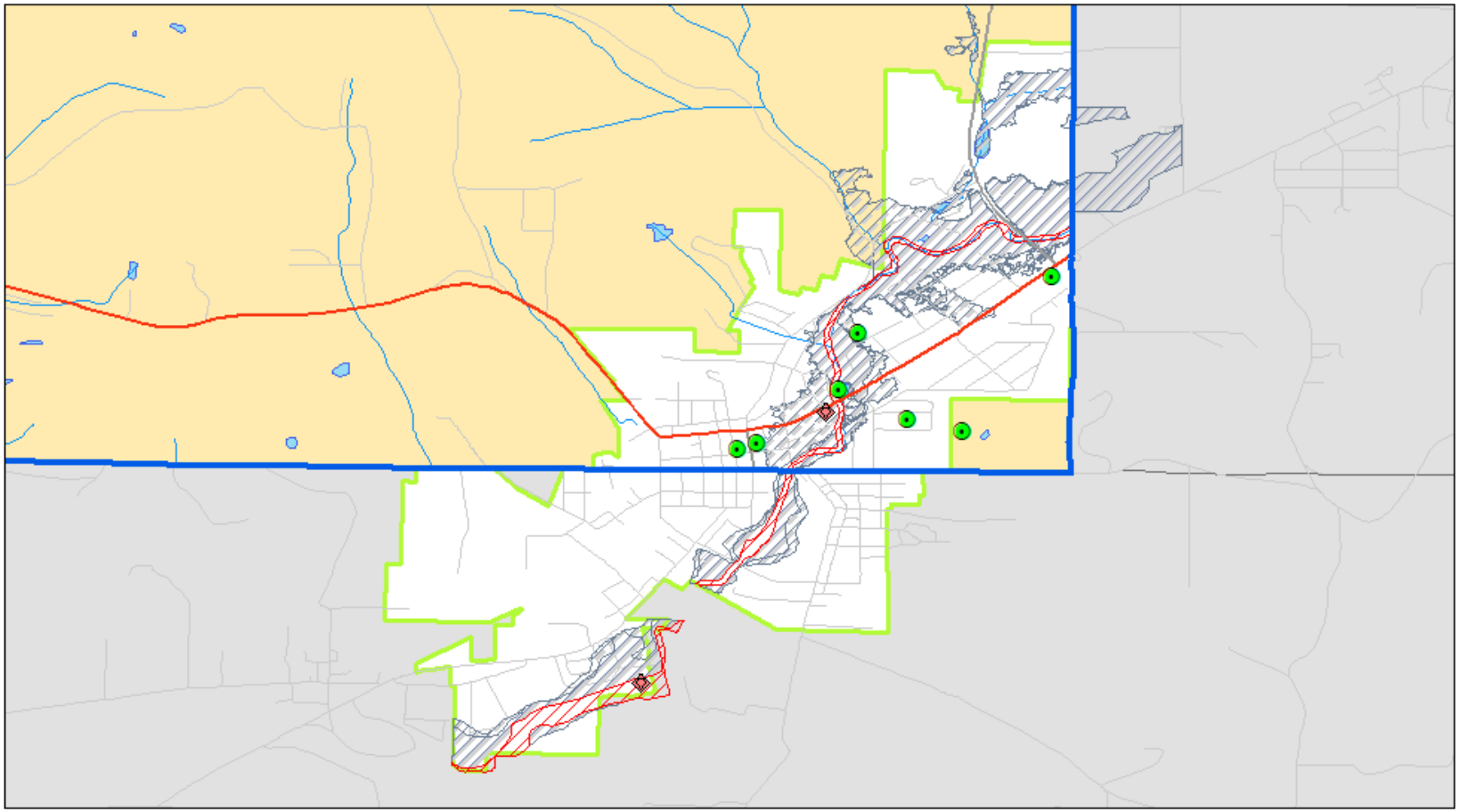
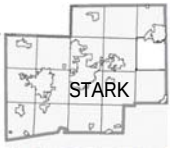
- Critical Facilities
- High Potential Loss Facilities
- Historical & Cultural Resources
- Infrastructure
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Minerva (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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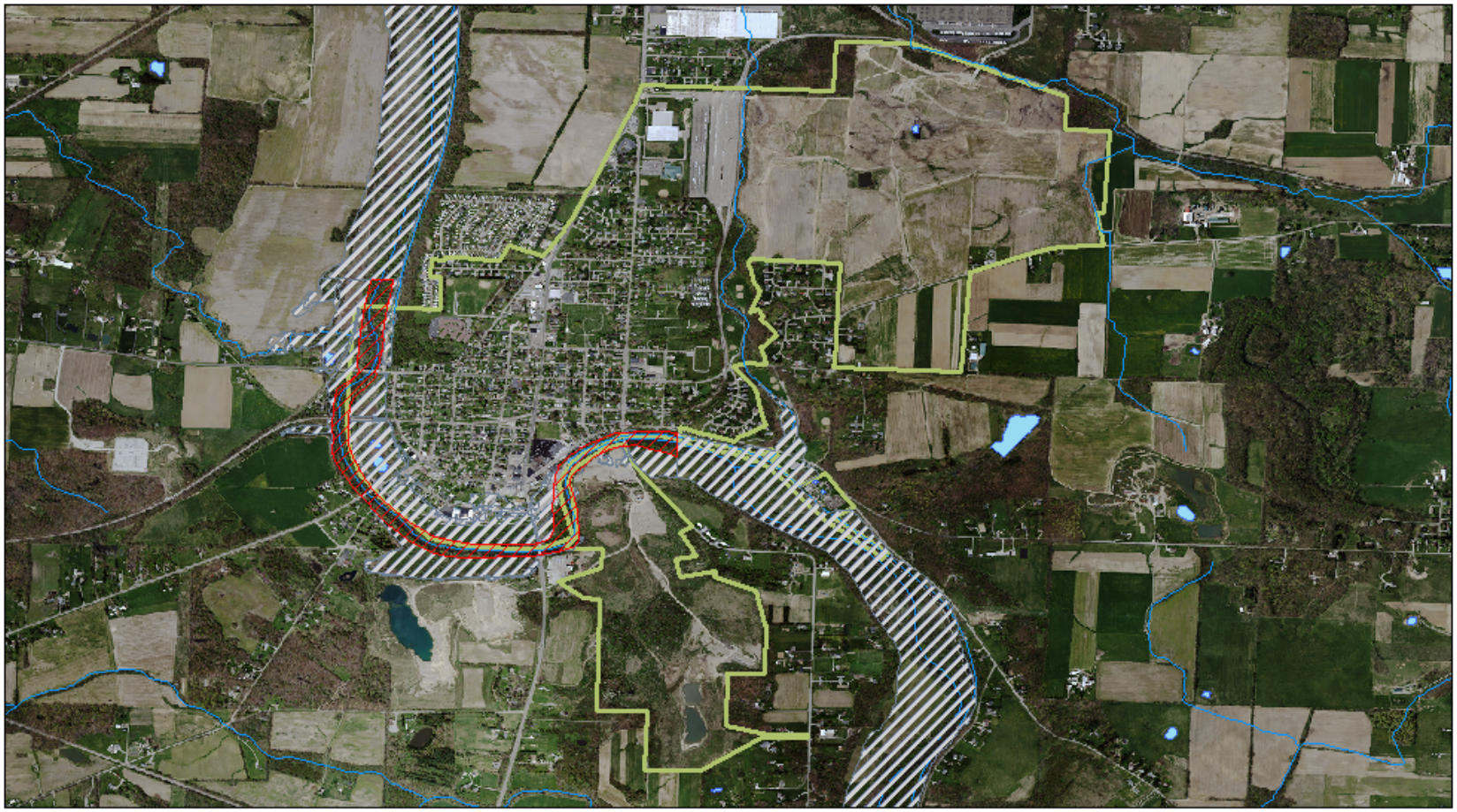
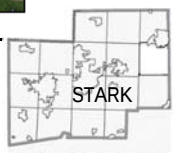
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Navarre (Village)





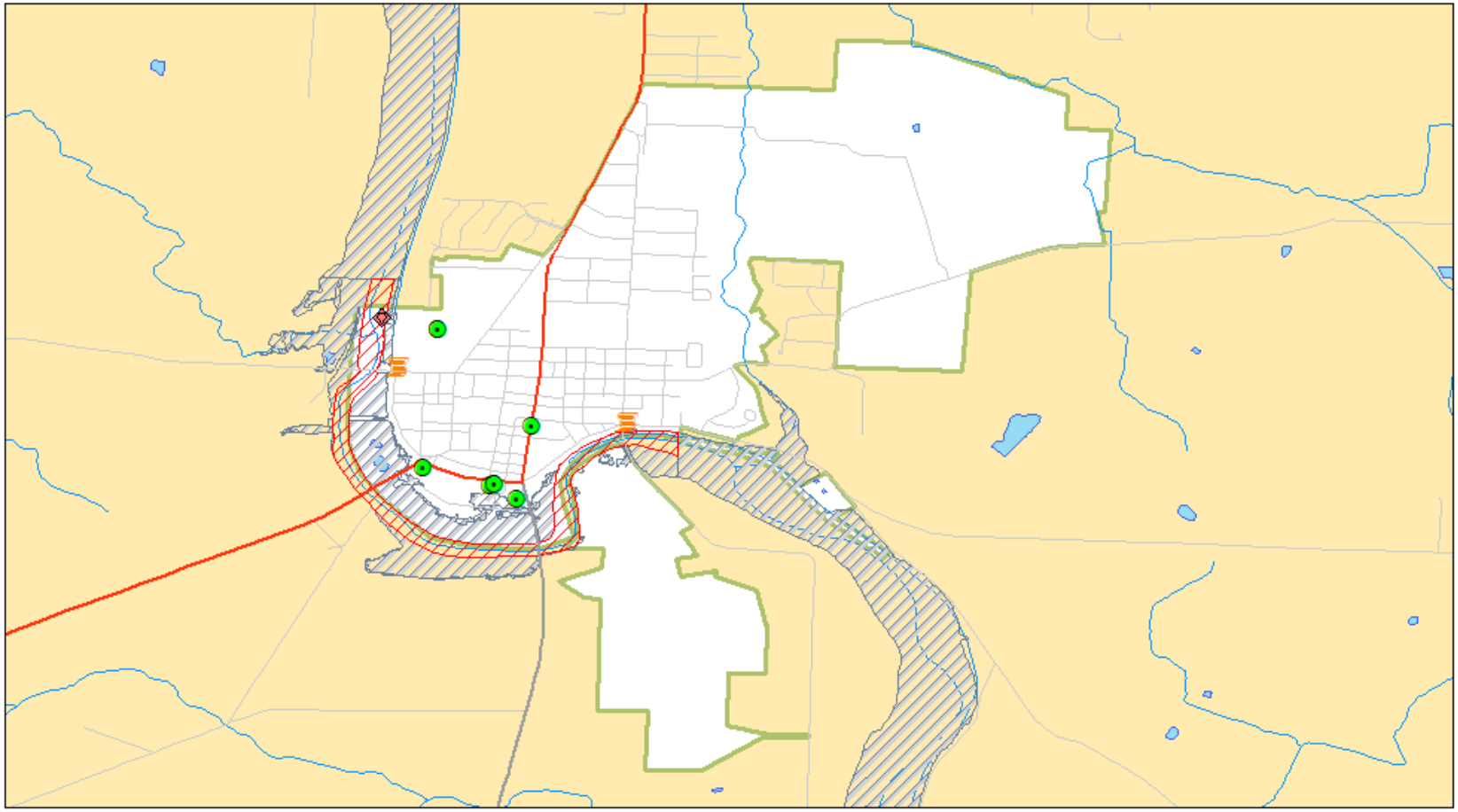
STARK COUNTY HAZARD MITIGATION PLAN

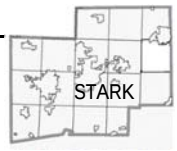
Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Navarre (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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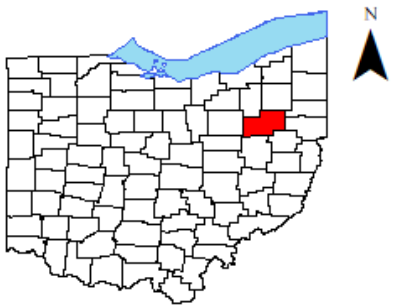
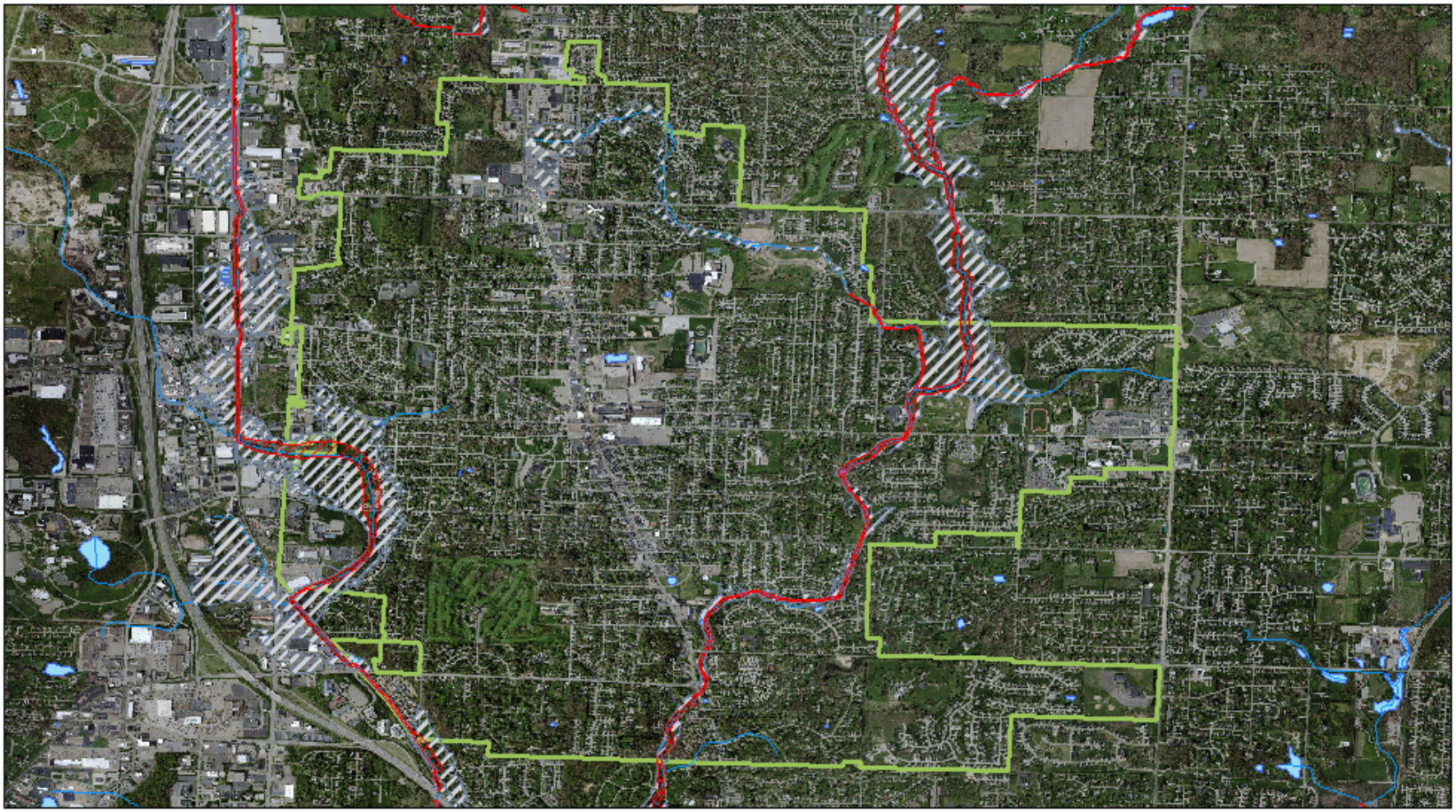
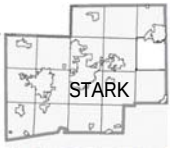
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- North Canton (City)







STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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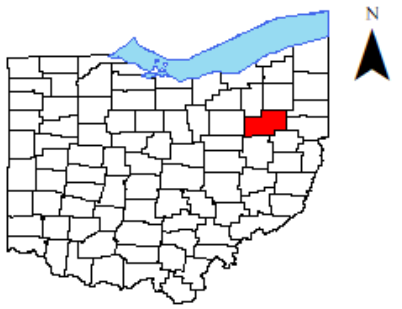
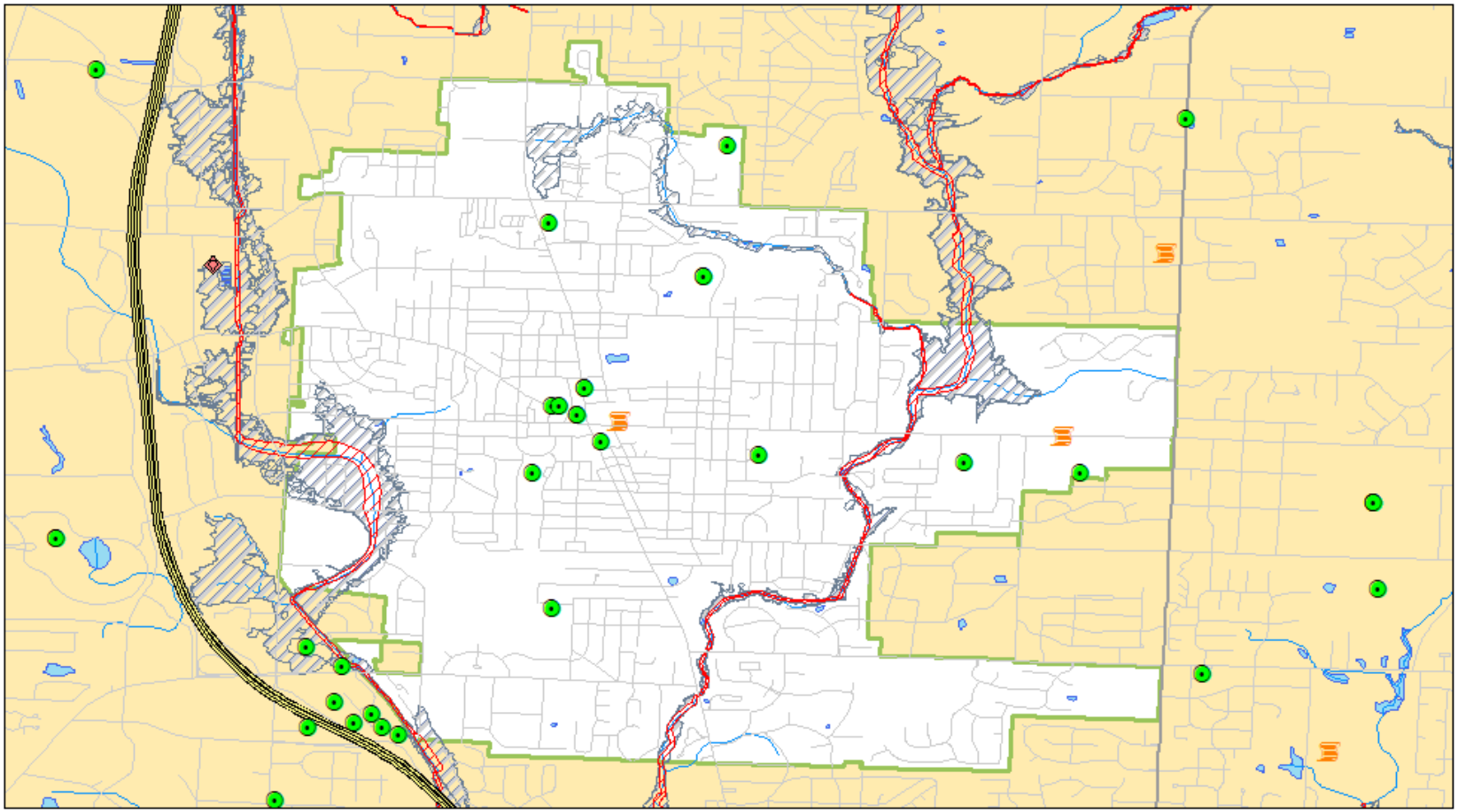
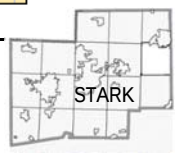
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- North Canton (City)







STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

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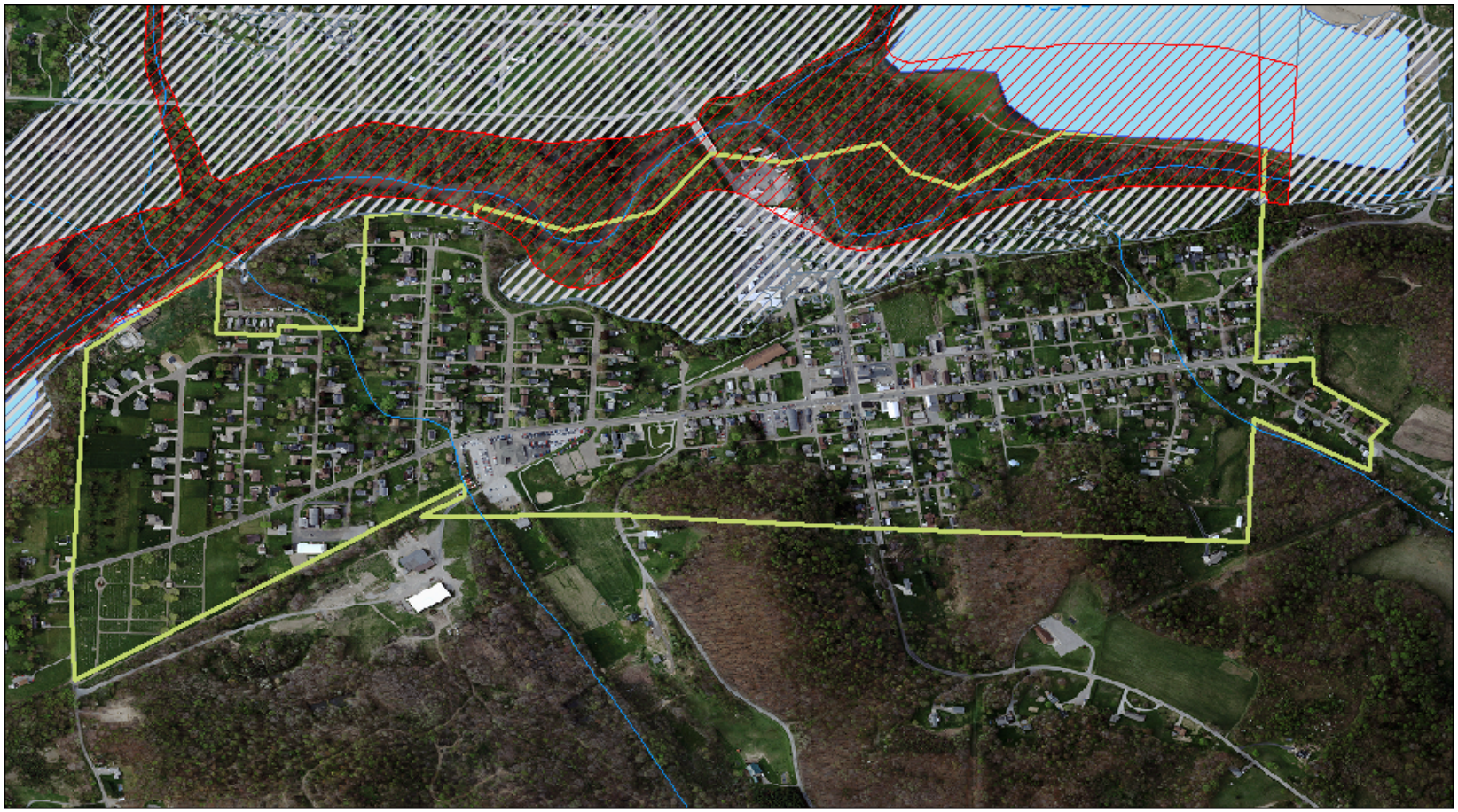
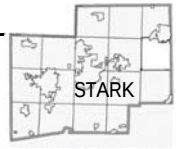
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Waynesburg (Village)





STARK COUNTY HAZARD MITIGATION PLAN

Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

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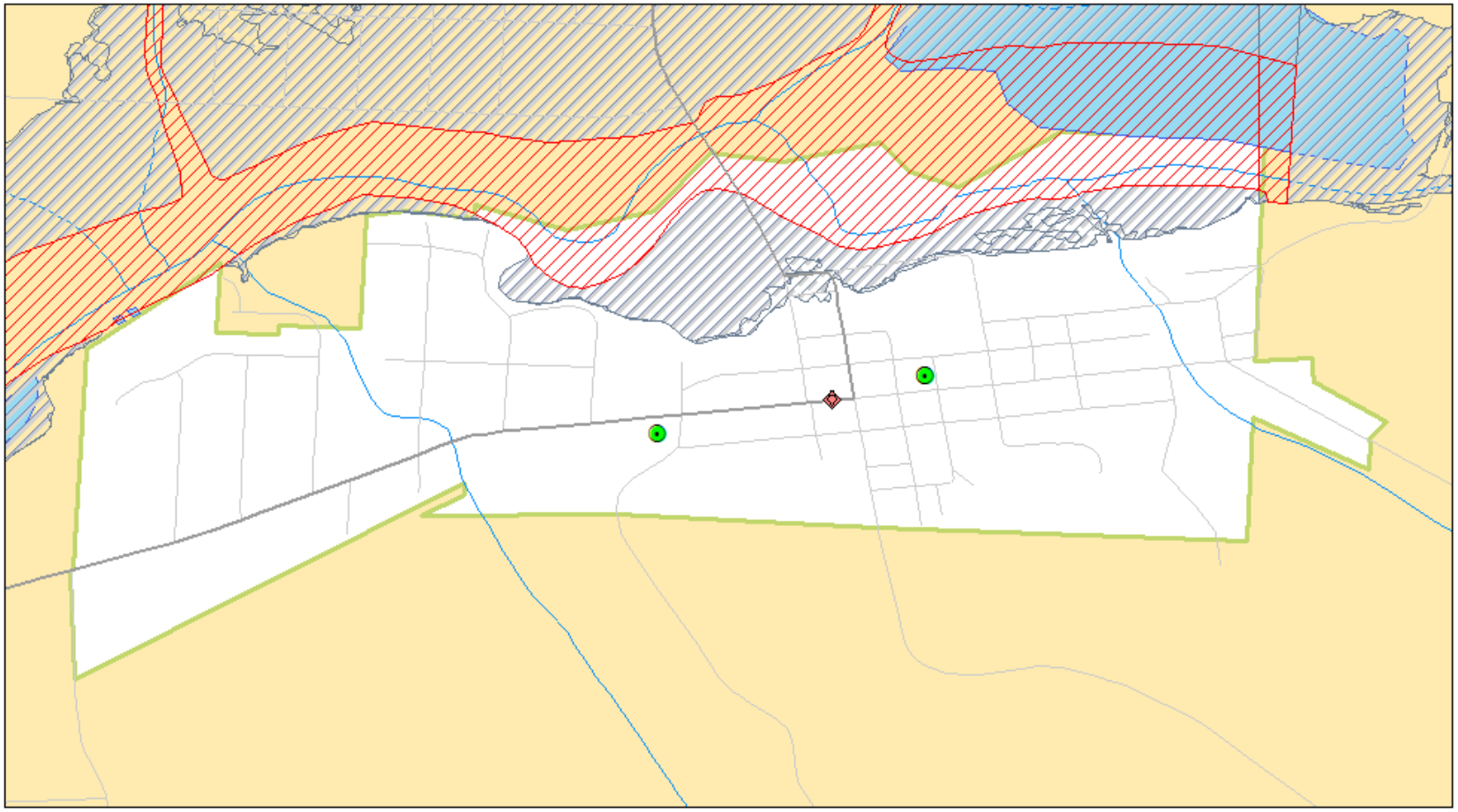
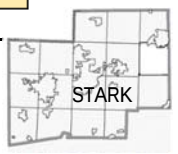
- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Waynesburg (Village)





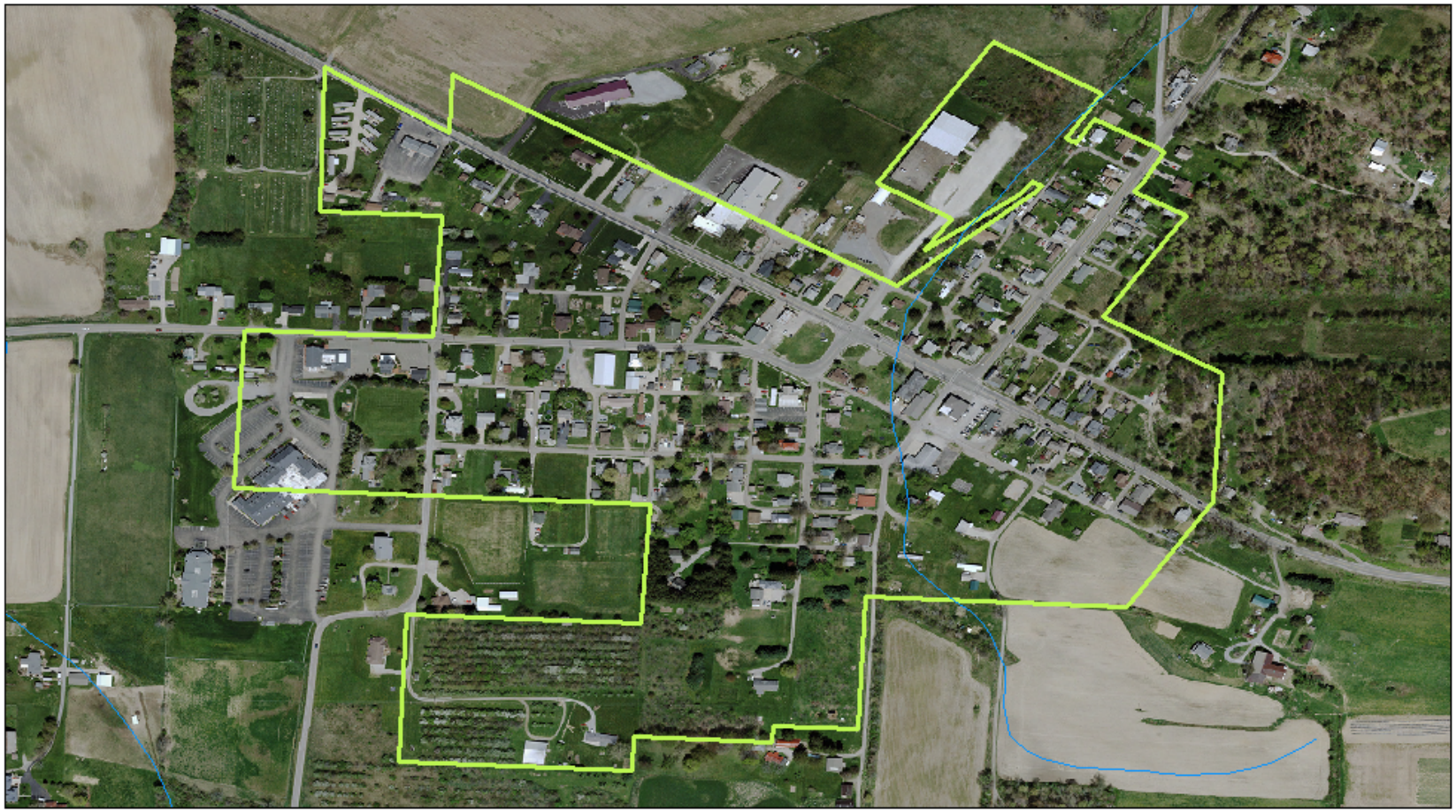
STARK COUNTY HAZARD MITIGATION PLAN

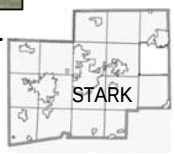
Special Flood Hazard Areas (Aerial Overlay)

Data Source(s):
FEMA, OEMA, OGRIP

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Wilmot (Village)





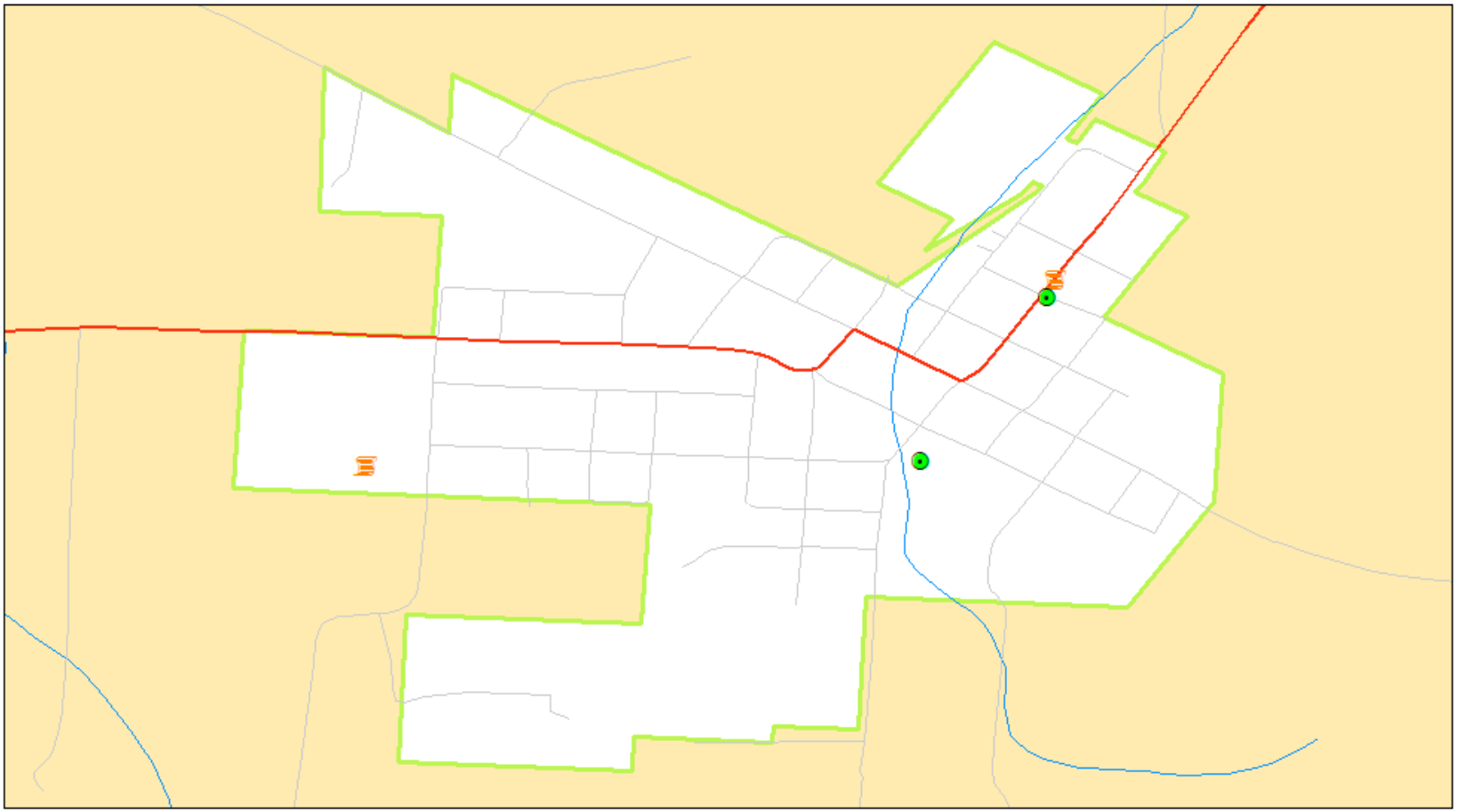
STARK COUNTY HAZARD MITIGATION PLAN

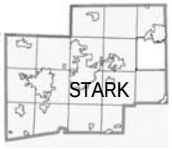
Special Flood Hazard Areas (Street View, w/ Assets)

Data Source(s):
FEMA, OEMA, Stark Co. HMP Steering Committee,
US Census Bureau

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

- Infrastructure
- High Potential Loss Facilities
- Critical Facilities
- Historical & Cultural Resources
- SFHA-Regulated & Special Floodway
- SFHA-1% Annual Chance
- SFHA-0.2% Annual Chance
- Wilmot (Village)





Chemical reaction at North Canton Water Plant

Hazardous Materials Release

Hazardous materials are defined as any substance (biological, chemical, radiological, etc.) that has the ability to causes adverse effects on health or the safety of individuals, the general public, or the environment.

A hazardous materials release involve the release, spill, leak, pumping, pouring, emitting, emptying, discharge, injection, escaping, leaching, dumping, or disposing of a hazardous material into the environment.

Chemical fire in City of Canton

2.0 RISK ASSESSMENT

2.2.6 Hazardous Materials Release

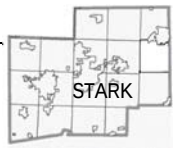
A hazardous material is a chemical or biological material that may pose a threat to life, health, property, or the environment. For this profile, the hazardous materials incidents include only those that are not intentional.				
VULNERABILITY HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	At any time	Hazard Index Ranking:	Medium
	Warning Time:	Less than 6 hours	State Risk Ranking:	Not ranked
	Probability:	Probable (likely to occur on an annual basis)	Severity:	Localized (less than 10% of land area affected, multiple severe injuries)
	Type of Hazard:	Technological	Disaster Declarations:	None

Hazard Introduction and Overview

A hazardous material is a substance or material which, because of its chemical, physical or biological nature, poses a threat to life, health, or property if released from a confined setting. A release may occur by spilling, leaking, emitting toxic vapors, or any other process that enables the material to escape its container, enter the environment, and create a potential hazard. Several common hazardous materials include those that are explosive, flammable or combustible, corrosive, poisonous or radioactive. Related combustible hazardous materials include oxidizers and reactive materials, while toxins produced by etiological (biological) agents are types of poison that can cause disease.

A hazmat release while in transit is of great concern to the U. S. Department of Transportation (DOT). While fixed sites store and use hazardous materials, the materials are usually produced elsewhere and shipped to a fixed facility by rail car, truck, or onboard ships or barges. Signs or placards denoting the hazard, identify the vehicles carrying hazardous materials. The possibility of release is present at any time. Hazardous materials constantly move through Ohio on interstate highways, the rail system, and on shipping lanes in rivers and tributaries.

The hauling, storage, and use of hazardous materials play a vital role in the economy of our nation. Over four billion tons of hazardous materials are transported annually, and 100,000 trucks haul hazardous materials on the country's highways each day. Almost half of all freight trains carry hazardous materials.



An incident causing the accidental release of a hazardous material is spontaneous, with little time of warning. Further, the recovery and clean-up activities involved in a hazmat incident may require several hours, days, or even weeks to complete. Hazardous materials can release as a secondary result of a natural disaster like an earthquake or flood. In either case, buildings or vehicles can release their hazardous materials inventories when structurally compromised or involved in traffic accidents.

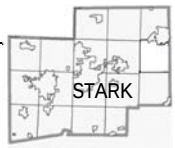
Location and Extent

Ohio is a crossroads state into which, through which, or out of which, virtually every one of the 50,000 chemicals known to be manufactured in the US are transported. There are approximately 2,500 hazardous materials shipments per day on the highways across Ohio.

While hazardous materials spills, leaks or accidents may occur anywhere in Stark County, they are more likely to occur on transportation routes (such as roads or railways) and at facilities that routinely handle hazardous materials (such as gas stations, chemical companies, and other Tier II reporting or Toxic Release Inventory [TRI] facilities).

The transportation infrastructure utilized to move hazardous materials through Stark County is spread throughout the county, with a slight concentration in the central portion of the county. Several transportation routes traverse the area, including US Routes 30, 62, 250, and 621 and State Routes 21, 42, 44, 93, 172, 183, 212, 236, 241, 225, 619, 627, 800. Central Stark County also contains a large portion of Interstate 77, which passes through Canton near its downtown area. Railway transportation is also present in Stark County, with the following companies servicing clients in the area: CSX Transportation, Ohio Central Railroad, Inc., R.J. Corman Railroad Company/Cleveland Lines, LLC, and Wheeling & Lake Erie. Stark County contains pipelines for Columbia Gas Transmission, LLC, Dominion Energy Ohio, Ergon Terminaling, Inc., WMRE of Ohio-American, LLC, Marathon Pipeline, LLC, and Inland Corporation.

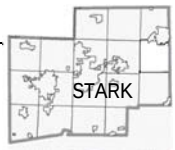
Two hundred seventy two (272) facilities reported the storage and use of hazardous materials to the Stark County Local Emergency Planning Committee (LEPC) in 2019. According to infromation obtained from the 2019 Stark County Commidity Flow Study, the Tier II Covered Facilities (i.e., those required to report hazardous materials information to the LEPC) contributed the largest number of unique hazardous materials across all analysis (i.e., highway, railway, pipeline, air, and covered facilities).



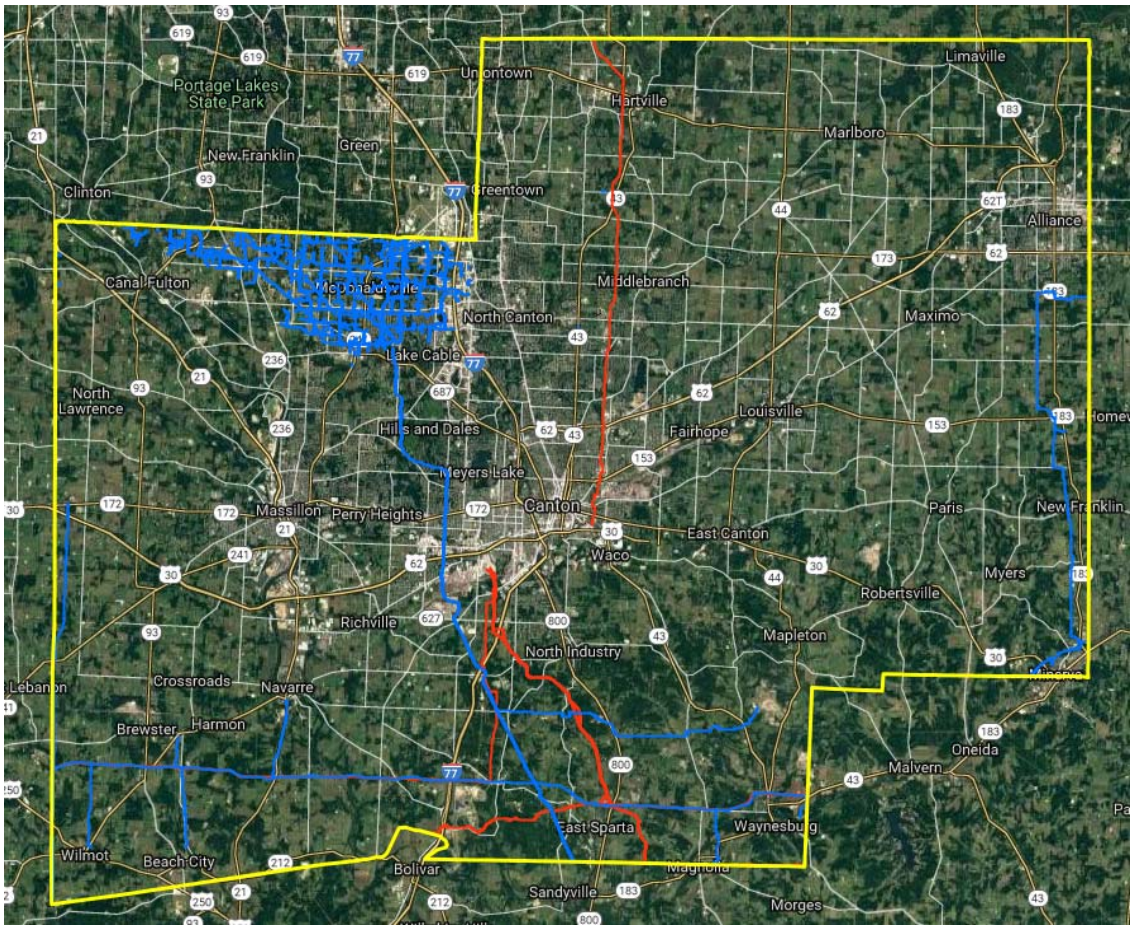
Two major agencies collect data as they relate to hazardous materials incidents the Pipeline and Hazardous Materials Safety Administration (PHMSA) governed by the U.S. DOT and the National Response Center (NRC), governed by the U.S. Coast Guard (USCG). The types of materials that can cause a hazmat release are wide-ranging and may include chlorine, sodium hydroxide, sulfuric acid, radioactive isotopes, anhydrous ammonia, gasoline, and other hydrocarbons, as well as medical/biological waste from hospitals or clinics. Hazardous materials subject to reporting under the Emergency Planning and Community Right-to-Know Act (EPCRA) or Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) include these four groups.

- **Extremely Hazardous Substances (EHS)**: These are materials with acutely toxic properties that may do irreversible damage or cause death to people or harm the environment when released or used outside their intended use. Examples include ammonia, chlorine, and sulfuric acid.
- **Hazardous Substances:** These are any materials posing a threat to human health and the environment or any substance designated by the U.S. Environmental Protection Agency (EPA) to be reported if a designated quantity of the substance is spilled into the waters of the United States or otherwise released into the environment.
- **Hazardous Chemicals**: If present at a chemical facility in certain amounts, these substances require a safety data sheet (SDS) under the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects such as cancer, burns, or dermatitis.
- **Toxic Chemicals**: Chemicals or chemical categories that appear on the list because of their chronic or long-term toxicity.

Stark County is home to several miles of gas transmission pipelines and hazardous liquid pipelines. Transmission lines traverse primarily the southern and northwestern portion of the county with one line located in the eastern most portion of the county. Hazardous liquid pipelines appear in the south central portion and central portion of the county. The following image, taken from the National Pipeline Mapping System (NPMS) (PHMSA, 2019), shows the locations of pipelines. Red lines are hazardous liquid lines, while blue lines are transmission pipelines.



Pipelines in Stark County



Hazard Impacts

Due to the wide variety of substances used, transported, and stored in the area, it is difficult to assign an overall impact of these substances to public health, the environment, the economy, and the infrastructure. Some spills cause minor if any damage to the area. For example, spilling a few gallons of gasoline on concrete during transfer causes minimal economic impact; rarely does the spilled substance cause any environmental impacts. This is not to say that all spills are minor; some can be very harmful to human health and the environment and costs thousands, if not millions of dollars to clean up. Spills into waterways and those that reach the groundwater are of particular concern due to the threat they impose to drinking water and subsequently public health, the environment, and fauna in the area.

Additionally, transportation-based hazard incidents have the potential to result in cascading impacts. For example, a rail-based incident could isolate a community in Stark County as well as several other communities in the region. Officials from such operators as CSX

Transportation concur. The following map shows the location of railroad/highway crossings in Stark County; there are 505 crossings.

STARK COUNTY HAZARD MITIGATION PLAN

Railways & RR Highway Crossings

Data Source(s):
FRA, OGRIP, US Census Bureau

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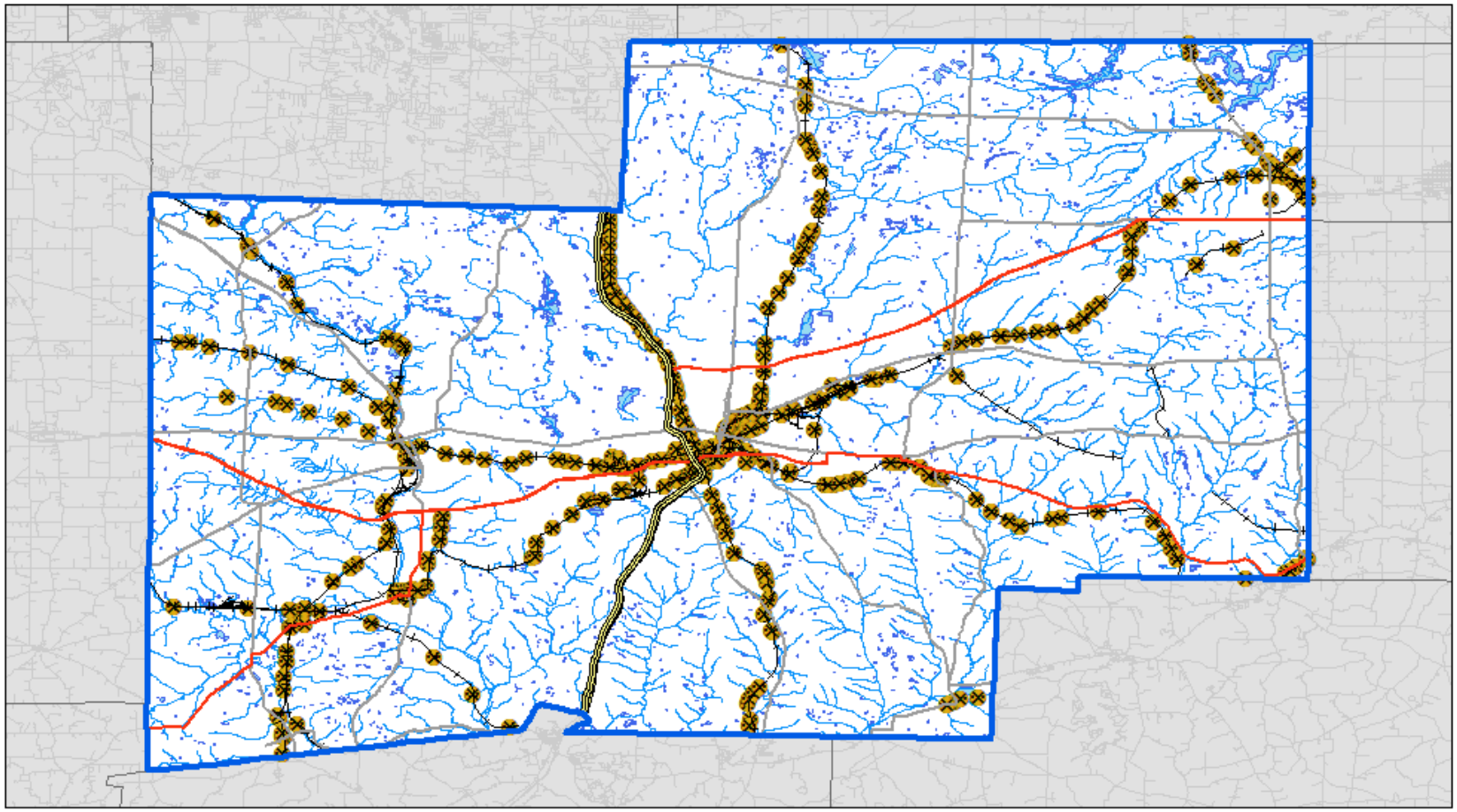
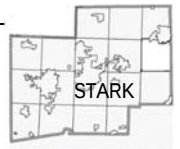
Railroads
RR Highway Crossings

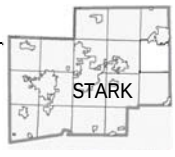




Hazardous materials incidents can occur rapidly over a large area. The chemical, physical, and biological properties of hazardous materials pose a potential risk to life, health, the environment, and property when not properly contained. Many factors determine the impact of a potential incident, including quick and solid decision-making by emergency officials, location and type of release, evacuation and shelter-in-place needs, public health concerns, and relevant economic considerations. Additionally, while most incidents are generally brief, the resulting recovery and cleanup may take time to exact.

If evacuation is necessary due to a chemical emergency, road closures and traffic jams may result. If a large-scale evacuation is deemed necessary, it can pose serious long-term economic consequences to the involved population area. A delay in the resumption of industry commerce may cause economic losses for both business owners and employees. Also, an evacuation ordered on short-notice could cause serious problems for businesses requiring time to shut down specialized equipment. Public or private emergency response organizations agencies may be challenged by the expenses dictated by a hazardous material release and may need to wait an uncomfortable length of time for the responsible party to reimburse any outstanding costs, further straining the economic resources of the region.

A major incident involving significant injuries may severely tax regional medical services, as medical facilities aren't generally designed to handle mass amounts of victims on short notice. Consequently, in the event of a major incident, hospitals and other medical facilities must still be able to provide their customary level of service to all patients, regardless of whether they were incident victims or not.

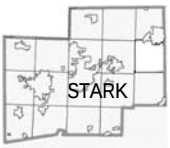


Historical Occurrences

According to information obtained from the *2019 Stark County Hazard Identification and Risk Assessment (HIRA)*, small hazmat incidents which require a response by the Stark County Hazardous Material Emergency Response Team occur almost monthly. There have been 63 transportation related hazmat incidents in Stark County between 2010 and 2019, see table below (Stark County CFS, 2019).

According to the Federal Railroad Administration (FRA) there have been 174 railroad accidents in Stark County since 2009. The Pipeline and Hazardous Materials Safety Administration (PHMSA) reports five accidents involving liquid pipelines in Stark County: 2009 – crude oil release, 2010, 2013 & 2016 – refined petroleum product release, and 2017 – crude oil release. PHMSA records indicate one incident involving a natural gas pipeline in 2017.

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
3/31/2010	7:00 A.M.	Akron Canton Regional Airport	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained and cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/11/2010	5:00 P.M.	8495 Port Jackson Ave. Canton	Corrosive Liquids, n.o.s. (UN 1760)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained and the undamaged portion of the package was repacked for return to shipper.	Spillage
5/10/2011	10:00 A.M.	4850 Navarre Rd. SW, Canton	Fire Extinguishers Containing Compressed or Liquefied Gas (UN 1044)	Unloaded out of trailer, Pin came out of cylinder and leaked fire extinguisher powder.	Spillage
6/22/2011	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained and the undamaged portion of the package was repacked for return to shipper.	Spillage
4/24/2012	9:00 A.M.	4850 Navarre Rd. SW, Canton	Flammable Liquids, n.o.s. (UN 1993)	Package had no labels or markings that it contained any hazardous material inside. Glass container inside box was not packed in a way to prevent breakage of interior bottle.	Spillage



Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
6/12/2012	7:00 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/22/2012	9:30 P.M.	4850 Navarre Rd. SW, Canton	Self-Reactive Solid Type D (UN 3226)	No report provided.	Spillage
7/24/2012	7:00 A.M.	8495 Port Jackson Canton	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/9/2012	7:00 A.M.	8495 Port Jackson North Canton	Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/15/2012	6:10 P.M.	East Canton, Minerva, and East Rochester	Fuel Oil (UN 1993)	The transporter was loaded at the Canton Refinery by a refinery operator. When the refinery operator closed the dome lid, he failed to remove the tab that allows the trailer to vent, which leaves a small gap between the dome lid and where it seats. The driver left the loading rack not knowing that the dome lid was not closed properly, which caused product to leak out on turns on highway.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
9/14/2012	2:45 A.M.	Interstate 77 Exit 101 Canton	Sodium Hydroxide, Solution (UN 1824)	Tractor tanker was struck by another vehicle while traveling through an intersection. The vehicle stuck the tanker resulting in the release of approximately one pint of material onto the roadway. An environmental contractor was dispatched to the site for cleanup. The roadway was neutralized, and absorbents were applied to the area. The waste was collected and containerized for disposal.	Spillage
12/20/2012	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
12/20/2012	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
1/11/2013	8:30 P.M.	Akron Canton Regional Airport	Isopropanol or Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
3/13/2013	8:00 A.M.	1500 W. Main St., Louisville	Hydrofluoric Acid, >60% Strength (UN 1790)	Failure - File 365702 bolts connecting flange to bracket missing. Carrier offloading at Consignee and notices leak from flange. Approximately 1 quart spilled in containment area. Consignee used hose to wash down spill into recovery drain. Carrier took tanker for repair. Replaced 2 bolts and tightened. No further leaks. Carrier went back to Consignee to complete delivery.	Spillage
3/18/2013	7:00 A.M.	Akron Canton Regional Airport	Amines, Liquid, Corrosive, n.o.s. or Polyamines, liquid, Corrosive, n.o.s (UN 2735)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
6/7/2013	7:00 A.M.	Akron Canton Regional Airport	Isopropanol or Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/29/2013	3:40 A.M.	1700 Shepard Church SW Canton	Fuel Oil (UN. 1993)	On June 29, 2013, an underground storage tank was overfilled resulting in the release of 25 gallons of diesel fuel to the asphalt and one storm drain. An environmental contractor was dispatched and applied absorbents to the impacted asphalt. Absorbent boom was applied to the impacted storm drain. The outfall of the storm drain system was thoroughly inspected, and no evidence of diesel fuel was detected. All contaminated material was containerized for transportation and disposal.	Spillage
7/10/2013	8:00 P.M.	Akron Canton Regional Airport	Corrosive Liquids, n.o.s. (UN 1760)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/21/2013	5:40 A.M.	4850 Navarre Rd. SW, Canton	Ethanol or Ethyl Alcohol (UN 1170)	Flammable liquid package discovered on straight line belt during preload hours of operation. Package was responded to by RMP Jeff Johnson. Closure of one-gallon container was loose in transit. There was no internal packaging.	Spillage
11/13/2013	7:00 A.M.	Akron Canton Regional Airport	Paint (UN 1263)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
3/6/2014	8:00 A.M.	1500 W. Main St., Louisville	Hydrofluoric Acid, >60 Strength (UN 1790)	Carrier noticed 2 teaspoons of product had leaked from seam underneath trailer after offloading of the product. The product spilled into Consignee's containment area, and they washed it down into their recovery drain. Trailer only leaked while it was pressurized. Once pressure was gone, so was the leak. Tanker will go for pressure test, and any repairs will be made. Event 40524	Spillage
4/16/2014	8:30 A.M.	Louisville	Hydrogen Peroxide, Aqueous Solutions (UN 2014)	Employee forked drum while loading.	Spillage
6/22/2014	11:30 P.M.	Marathon Refinery, Canton	Petroleum, Crude Oil (UN 1267)	While unloading driver noticed product dripping into the bucket. While tightening the valve, the hose popped off, and about 60 gallons spilled out. Some splashed on driver who went to the hospital and was treated and released.	Spillage
8/12/2014	5:30 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/16/2014	2:00 P.M.	Interstate 77, Exit 101 Canton	Hydrochloric Acid (UN 1789)	It was determined that the internal valve was not functioning properly in the compartment of a 407. A small amount of the material was found to be leaking from the belly valve of one of the three compartments of the tank. The material was trans loaded to a vac-tanker and returned to the original site for disposition.	Spillage
8/20/2014	3:45 P.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquid, Basic, Organic, n.o.s. (UN 3267)	Package was loaded on its side.	Spillage

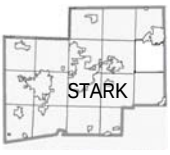
Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
1/13/2015	9:45 A.M.	1500 W. Main St. Louisville	Hydrofluoric Acid, <60% Strength (UN 1790)	The consignee's intake pipe-liner was frozen when carrier's driver began offloading product; the liner cracked inside the intake pipe. The release lasted less than 5 minutes and carrier's driver shut down the process as soon as he heard the noise from the pressure on the line. Consignee cleaned up the product that spilled in their containment area.	Spillage
1/20/2015	8:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquids, n.o.s. (UN 1760)	Package was found in unload. Package was leaking without any damage to outside carton.	Spillage
2/10/2015	8:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquids, n.o.s. (UN 1760)	Seam on inner plastic gallon container cracked due to improper packing for transport.	Spillage
3/6/2015	5:00 A.M.	8495 Port Jackson North Canton	Printing Ink, Flammable, or Printing Ink Related Material (UN 1210)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/3/2015	6:30 P.M.	Louisville	Hydrofluoric Acid, >60 Strength (UN 1790)	Carrier offloading, checked tank levels, smelled the hazardous product. Carrier hit the emergency shut off valve. Carrier found 2-3 oz. of product on top of trailer had leaked from the bolts which connect the tee valve for the emergency valve was loose. Carrier tightened the bolts and was able to complete offloading with no other issues. Carrier washed the trailer area off and washed down the consignee containment drain system. Carrier instructed to take trailer back to shipper for further inspection.	Spillage
5/2/2015	10:15 P.M.	Canton	Petroleum Crude Oil (UN 1267)	Carrier at consignee to offload, carrier removed the API valve cap on passenger side of trailer, and 3-5 gallons product sprayed out on carrier and cement which went down a drain (sump system). Carrier had all PPE gear on. Carrier was not injured and changed cloths. Carrier said the API valve was a new style which is different from driver side valve, carrier thought it was in the closed position. Consignee said no clean up required.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
2/27/2016	11:15 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
3/18/2016	3:00 P.M.	Akron Canton Regional Airport	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/6/2016	9:17 P.M.	8495 Port Jackson North Canton	Aerosols, Flammable (UN 1950)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/6/2016	6:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	Package was discovered in unload. There was no damage to the exterior packaging. However, the package was leaking. All contents leaked out.	Spillage
6/7/2016	9:01 P.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/23/2016	9:15 P.M.	8495 Port Jackson North Canton	Amines, Liquid, Corrosive, n.o.s. or Polymines, Liquid, Corrosive, n.o.s. (UN 2735)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
8/24/2016	8:33 A.M.	3500 21 St., SW Canton	Caustic Soda (UN 1824)	Driver failed to close internal valve causing pressure to build. When he disconnected hose product misted on lips. Was treated and released.	Spillage
9/21/2016	7:00 A.M.	8495 Port Jackson North Canton	Alcohols, n.o.s. (UN 1987)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
9/21/2016	8:21 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
12/21/2016	7:00 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/20/2017	5:00 P.M.	8495 Port Jackson NW., North Canton	Environmentally Hazardous Substances, Solid, n.o.s. (UN 3077)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
10/18/2017	8:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
1/12/2018	7:00 A.M.	8495 Port Jackson North Canton	Flammable Liquids, n.o.s. (UN 1993)	Package discovered at terminal appeared wet and leaking. Liquid started to bleach some of the stickers on the steel drum. When inspected found that lid of the drum was not completely sealed.	Spillage
1/12/2018	7:30 A.M.	8495 Port Jackson North Canton	Flammable Liquids, n.o.s. (UN 1993)	Package was found at terminal appeared wet when inspected found inner package containing one gallon of isopropanol that appeared to be leaking due to having a loose cap or broken seal.	Spillage
3/20/2018	6:00 A.M.	8495 Port Jackson North Canton	Sulfuric Acid, >51% Acid or greater (UN 1830)	Package discovered at terminal was missing shipping label and indication of recipient, appeared leaking. When inspected, found 1 x 5 mL glass bottle of 1:1 sulfuric acid to be completely crushed.	Spillage
4/19/2018	7:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal wet. Upon inspection, I found Chem Trend Mold cleaner leaking from can. Can was heavily dented and appeared to have leakage from cap are due to slight puncture. New Comments: Package found at terminal wet. Upon inspection, I found Chem Trend Mold cleaner leaking from can. Can was heavily dented and appeared to have leakage from cap are due to slight puncture. Approximately half an ounce leaked from container.	Spillage
5/12/2018	7:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal leaking contents. Upon inspection, I found Keim wood coating leaking due to bent lid. New Comments: I found approximately 4 ounces to have leaking from a 5 gallon can of wood coating.	Spillage
5/23/2018	8:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal leaking contents. Upon inspection, I found Keim wood coating can leaking paint. New Comments: I found approximately 3 ounces to have leaked from a 5 gallon can of wood coating.	Spillage
7/11/2018	7:00 A.M.	8495 Port Jackson North Canton	Extracts, Flavoring, Liquid (UN 1197)	Upon arrival at the terminal found the plastic pail leaking from the broken cap. Someone had taped up the lid to help slow down the leaking, leaked onto another package.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
9/27/2018	8:00 A.M.	4719 Navarre Rd., SW Canton	Potassium Hydroxide, Solution (UN 1814)	Driver arrived at consignee, and while he was waiting to unload one of the compartments on the trailer started leaking from where the internal valve bolts up to the trailer. 2 gallons impacted the concrete, and the rest was contained in buckets by the driver and consignee.	Spillage
9/27/2018	9:30 A.M.	1600 Harmot Ave., Canton	Potassium Hydroxide, Solution (UN 1814)	On September 27, 2018, at 0939 ET, Schneider Bulk Carriers reported a tanker release to ERTS that occurred on September 27, 2018, at 0930 ET. It was reported that due to an internal valve failure, UN1814 Potassium Hydroxide released from a 1200-gallon tanker. The driver contained the release with plastic buckets until a response team could arrive. At 1235 ET, contractors arrived onsite and utilized the driver's diaphragm pump on the leaking valve to unload the tanker and transfer into Schneider's relief trailer onsite. Floor dry and neutralizer were used to clean the impacted asphalt. At 1330 ET, contractors indicated that 2-gallons released to a 45' x 10' area of the pavement. It was also stated that (2) 55-gallon poly drums, (2) 5-gallon, and (1) 1-gallon poly buckets of product was collected. At 1710 ET, contractors stated the transfer was complete. An estimated 60-gallons released in total but only approximately 2-gallons released to the pavement. Contractors utilized acidic degreaser to have a final pH reading of 7. Absorbents were worked into the asphalt and collected. At 1915 ET, contractors completed cleanup. The impacted asphalt was neutralized between 7-9 pH. A total of (3) 55-gallon poly drums of waste was generated. At 2000 ET, contractors departed site. All waste was staged onsite for Schneider personnel to manage and to be picked up at a later date.	Spillage
10/27/2018	4:05 A.M.	8495 Port Jackson North Canton	Ethanol or Ethyl Alcohol or Ethanol Solutions or Ethyl Alcohol Solutions (UN 1170)	Upon arrival to the terminal, the package appeared to be wet. After further inspection, it was determined that due to a loose or broken cap, some of the content spilled out.	Spillage
1/30/2019	10:30 A.M.	8495 Port Jackson North Canton	Methanol (UN 1230)	Original comments: Package found at terminal leaking contents. Upon inspection, I found Methanol Container leaking due to broken seal. New Comments: After closer examination, it was determined that approximately 4 ounces had leaked out.	Spillage



Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
2/5/2019	5:00 P.M.	2419 Gambrinus, Canton	Gasoline (UN 1203)	The trailer was loading, and the weld on the sump started leaking. There was a crack at the weld between the shell and the sump. It was not determined how the crack originated.	Spillage
3/19/2019	6:50 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	Upon arrival to the terminal, the plastic pail appeared to be leaking. After further inspection, it was determined that the cap was broken.	Spillage
4/16/2019	7:30 A.M.	8495 Port Jackson North Canton	Hydrogen Peroxide, Aqueous Solutions with more than 40% but not more than 60% Hydrogen Peroxide (UN 2014)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/26/2019	8:45 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/30/2019	7:45 P.M.	4850 Navarre Rd. SW, Canton	Isopropanol or Isopropyl Alcohol (UN 1219)	This package was on a TDP trailer. Upon opening the trailer, it was discovered that multiple hazardous boxes were on their side and had other packages stacked on them.	Spillage
5/24/2019	5:00 A.M.	3812 Cleveland Ave., Canton	Diesel Fuel (UN. 1993)	The North Canton Transfer, LLC driver was attempting to deliver diesel fuel into the customer's storage tank. In the course of doing so, it appears that the storage over-pressurized. This caused approximately 25 gallons of diesel fuel to be released. Sunpro Environmental responded to the scene and handled the remediation. No further environmental impact is anticipated.	Spillage
7/25/2019	4:40 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Source: PHMSA

Canton Chemical Fire – September 17, 2013

After consulting with EPA representatives and the Stark County HazMat team, it was discovered that airborne concentration levels had dropped to safe levels to declare an "all-clear" for residents evacuated due to a chemical reaction, and subsequent fire at the Convoy Containers facility on 20th street. It was discovered that workers were inside the vacant building once owned by Convoy Containers removing hardened sulfur from vats, when there was a chemical reaction. It began emitting toxic sulfur dioxide vapors and eventually caught fire. Shifting winds posed a danger to all nearby residents and also hampered firefighting efforts. Sulfur dioxide was burning, it is highly flammable and caustic if inhaled. Approximately 7,000 people from 25th Street to 4th Street were ordered to evacuate due to the toxic fumes being emitted. A number of schools were forced to close as a result of this incident as well. A shelter was set up with more than 300 individuals registered and around 130 spending the night.

North Canton Chemical Reaction – August 31, 2015

According to the Jackson Township Fire Chief, a truck driver mistakenly pumped chlorine into a fluoride tank at the North County Water Treatment Plant, this mixture of chlorine and fluoride resulted in poisonous fumes being emitted from the 500-gallon tank. The plant was evacuated and the truck driver and three plant employees were taken to an area hospital for medical evaluation. Emergency responders instructed local residents to shelter-in-place, and motorists were instructed to avoid the area. A commercial hazardous materials restoration company was utilized to ventilate the water treatment plant.

Massillon Radium Response – February 23, 2016

According to information obtained from the 2019, State of Ohio Enhanced Hazard Mitigation Plan, the State of Ohio has been recording noteworthy disasters varying in origin and effect for almost 200 years. One of these events involved the Stark County Radium Response.

On February 23, 2016, the county responded to a radiological (non-intentional) event. Several loads of shredded scrap metal contaminated with Radium 226 were accidentally distributed to two Stark County locations from a site in Pennsylvania. Between the two sites, three workers were confirmed to be contaminated along with the trucks used for transportation and the production and office areas at the Massillon facility. It was confirmed that one worker contaminated his vehicle, parts of his home and one of his family members. The response took multiple weeks and involved seven state and local agencies to conclude.

Loss and Damages

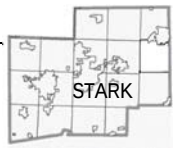
The Pipeline and Hazardous Materials Safety Administration (PHMSA) provides loss data for some incidents. The Stark County PHMSA data included 97 incidents with "damages" reported. Those reported damages were $2,519,602, or an average of $25,975 per incident. Further, these losses were over a period of 26 years (i.e., 1996 to 2022). Another perspective on these estimated losses would be an average of approximately $96,908 per year.

The average estimated loss comprises 0.000002% of the total building stock exposure in Stark County. Planners thus applied that percentage to the categorized number of structures and exposure to derive MIP loss figures.

HAZARDOUS MATERIALS RELEASE EXPOSURE ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	1	$71,139.50
Non-Residential	1	$21,961.19
Critical Facilities	1	$3,807.31
TOTALS	3	$96,908.00

Vulnerability Assessment

This section summarizes the risk to Stark County from hazardous material incidents. The map image graphically depicts potential risk areas in Stark County.



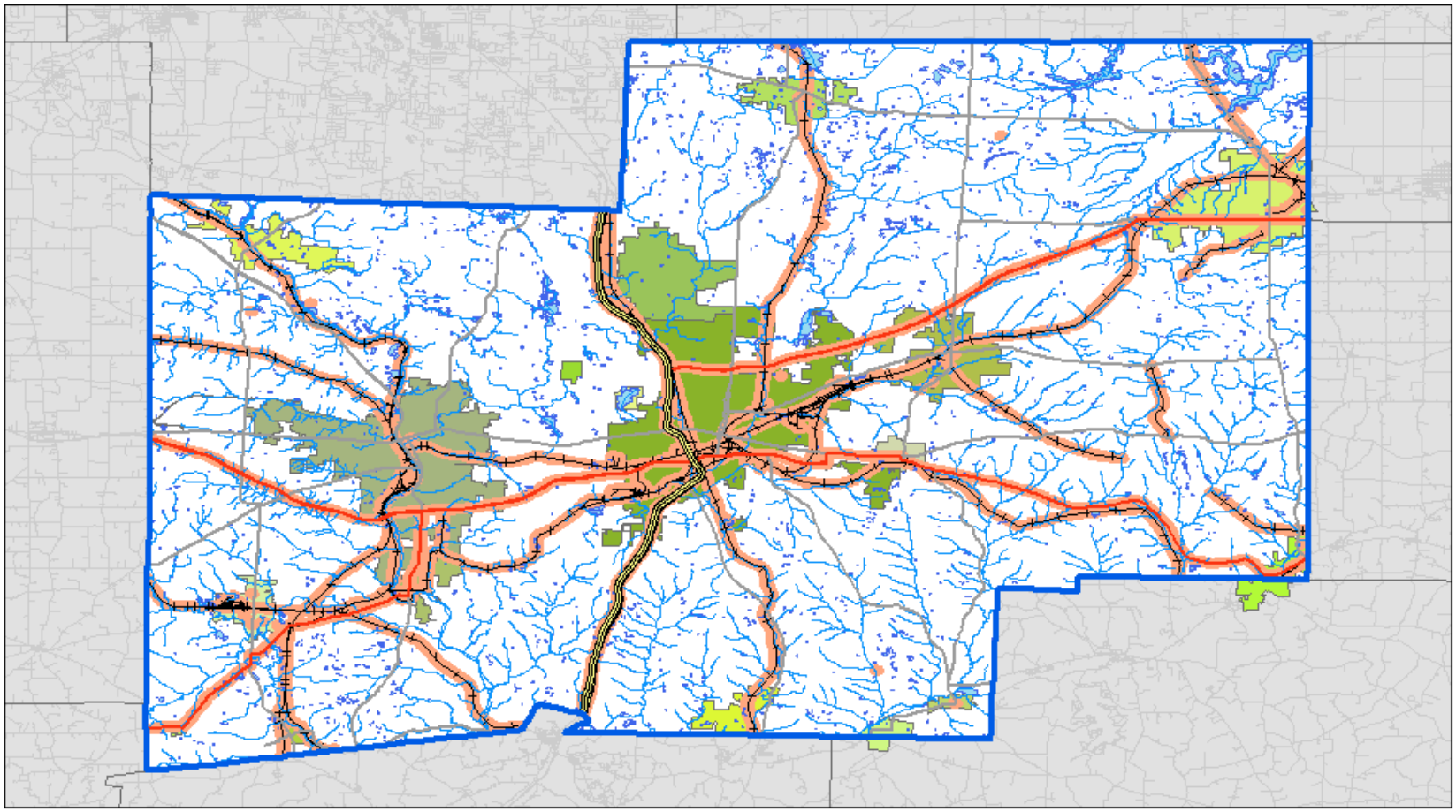
STARK COUNTY HAZARD MITIGATION PLAN

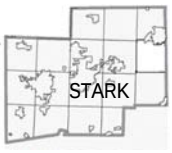
Hazmat Release Risk Considerations

Data Source(s):
FRA, OGRIP, US Census Bureau, USEPA ECHO

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

1000' Buffer (US Routes, Rails, Major Facilities)
Railroads
Interstate 77
US Routes
State Routes

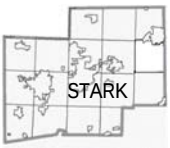




Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding hazardous materials releases.

PUBLIC SENTIMENT, HAZARDOUS MATERIALS RELEASE – STARK COUNTY					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
Hazardous Materials Release	30 (17.44%)	51 (29.65%)	58 (33.72%)	33 (19.19%)	172
In the past ten years, do you remember this hazard occurring in your community?				41 (23.8%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				23 (13.37%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				2 (1.16%)	172

Source: Online Public Survey Results



The following table identifies the assets located in hazardous materials release risk areas.

ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Alliance Bank Building	502 E. Main St.	Alliance		X	
Alliance City Health Department	537 E. Main St.	Alliance		X	
Alliance Community Hospital	Easton St. NE	Alliance		X	
Alliance Maintenance Building	1146 S. Freedom Ave	Alliance		X	
Alliance Police Department	470 E. Market St.	Alliance		X	
Altercare of Navarre	517 Park St. NW	Navarre		X	
Beach City Police Department	302 N Church Ave	Beach City		X	
Bethlehem Twp Fire Department	34 Main St. S	Navarre		X	
Brewster Cheese	675 Wabash Ave S	Brewster		X	
Brewster Police Department	145 1st St. SW	Brewster		X	
Canal Fulton Fire Department	155 Market St E	Canal Fulton		X	
Canal Fulton Post Office	210 S Canal St	Canal Fulton		X	
Canterbury Villa of Alliance	1785 N Freshley Ave	Alliance		X	
Canton Twp Fire Department	110 7th St SW	Canton		X	
Choices High School	401 14th St SE	Canton		X	
Community Care Center	200 E State St	Alliance		X	
Country Lawn Ctr. Rehab. & Nursing	10608 Navarre Rd SW	Navarre		X	
Diamond Sports Facility	2782 Diamond St NE	Canton		X	
Dueber Station Post Office	220 Dueber Ave SW	Canton		X	
East Canton Police Department	130 Cedar St S	Canton		X	
East Canton Post Office	117 Nassau St W	East Canton		X	
Edison Junior High School	4201 13th St SW	Massillon		X	
Fairfield Inn	5285 Broadmoor Cir NW	Canton		X	
Fairless Elementary School	12000 Navarre Rd SW	Navarre		X	
Fairless High School	11885 Navarre Rd SW	Navarre		X	
Fairless Middle School	11836 Navarre Rd SW	Navarre		X	
First National Bank Building	11 Lincoln Way W	Massillon		X	
Glenoak Career Center	Canton	Canton		X	
Guardian Care	1035 E Lincoln Way	Minerva		X	
Hampton Inn	5256 Broadmoor Cir NW	Canton		X	
Hartville Elementary School	245 Belle Ave SW	Hartville		X	
Hartville Police Department	202 W Maple St	Hartville		X	
Harvard Company--Weber Dental Manuf. Co.	2206 13th St NE	Canton		X	
Heartland Behavioral Healthcare	3000 Erie Ave SW	Massillon		X	
Hercules Motors Corp. Industrial Complex	101 11th St SE	Canton		X	
Home Two Suites	5244 Broadmoor Cir NW	Canton		X	
La Quinta	5335 Broadmoor Cir NW	Canton		X	
Lake Elementary School	225 Lincoln St SW	Hartville		X	
Lathrop Elementary School	1114 Gonder Ave SE	Canton		X	
Lawrence Township Police Department	6740 Erie Ave N	Canal Fulton		X	

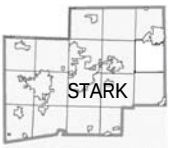
ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Lexington Township Volunteer Fire Department	14555 Gaskill Dr NE	Alliance		X	
Liberty Elementary School	1800 S Liberty Ave	Alliance		X	
Louisville City School District	407 E Main St	Louisville		X	
Louisville Elementary School	1025 Washington Ave	Louisville		X	
Louisville Fire Department	215 S Mill St	Louisville		X	
Louisville Middle School	1300 S Chapel St	Louisville		X	
Louisville Police Department	215 S Mill St	Louisville		X	
Louisville Post Office	1000 N Chapel St	Louisville		X	
Mason Elementary School	316 30th St NW	Canton		X	
Massillon City Health Department	111 Tremont Ave SE	Massillon		X	
Massillon City School District Admin. Bldg.	207 Oak Ave SE	Massillon		X	
Massillon Post Office	333 Erie St S	Massillon		X	
McKinley High School	2323 17th St NW	Canton		X	
Mercy Medical Center	1320 Mercy Dr NW	Canton		X	
Metalco	Louisville St NE	Canton		X	
Middlebranch Elementary School	7500 Middlebranch Ave NE	Canton		X	
Middlebranch Middle School	7500 Middlebranch Ave NE	Canton		X	
Middlebranch Post Office	7940 Middlebranch Ave NE	Canton		X	
Minerva Elementary School	130 Bonnieview Ave	Minerva		X	
Minerva High School	501 Almeda Ave	Minerva		X	
Minerva Police Department	209 N Market St	Minerva		X	
Minerva Post Office	112 W High St	Minerva		X	
Morgan Elementary School	935 Garwood St	Alliance		X	
Navarre Elementary School	148 Main St N	Navarre		X	
Navarre Police Department	99 Canal St W	Navarre		X	
Navarre Post Office	33 Canal St W	Navarre		X	
Navarre Village Fire Department (Erie Valley)	27 Canal St W	Navarre		X	
NE Waterworks Post Office	1930 Spangler Rd NE	Canton		X	
North Lawrence Fire Department	4052 Alabama Ave NW	N. Lawrence		X	
Oakwood Middle School	2300 Schneider St NE	Canton		X	
Osnaburg Township Fire Department	110 Church St W	Canton		X	
Perry High School	3737 13th St SW	Massillon		X	
Pfeiffer Middle School	4315 13th St SW	Massillon		X	
Plain Township Fire Station Two	3625 Middlebranch Ave NE	Canton		X	
Prairie College Elementary School	3021 Prairie College St SW	Canton		X	
R.G. Drage Career Education Center	2800 Richville Dr SE	Massillon		X	
Ransom H Barr Elementary School	2000 47th St NE	Canton		X	
Residence Inn	5280 Broadmoor Cir NW	Canton		X	

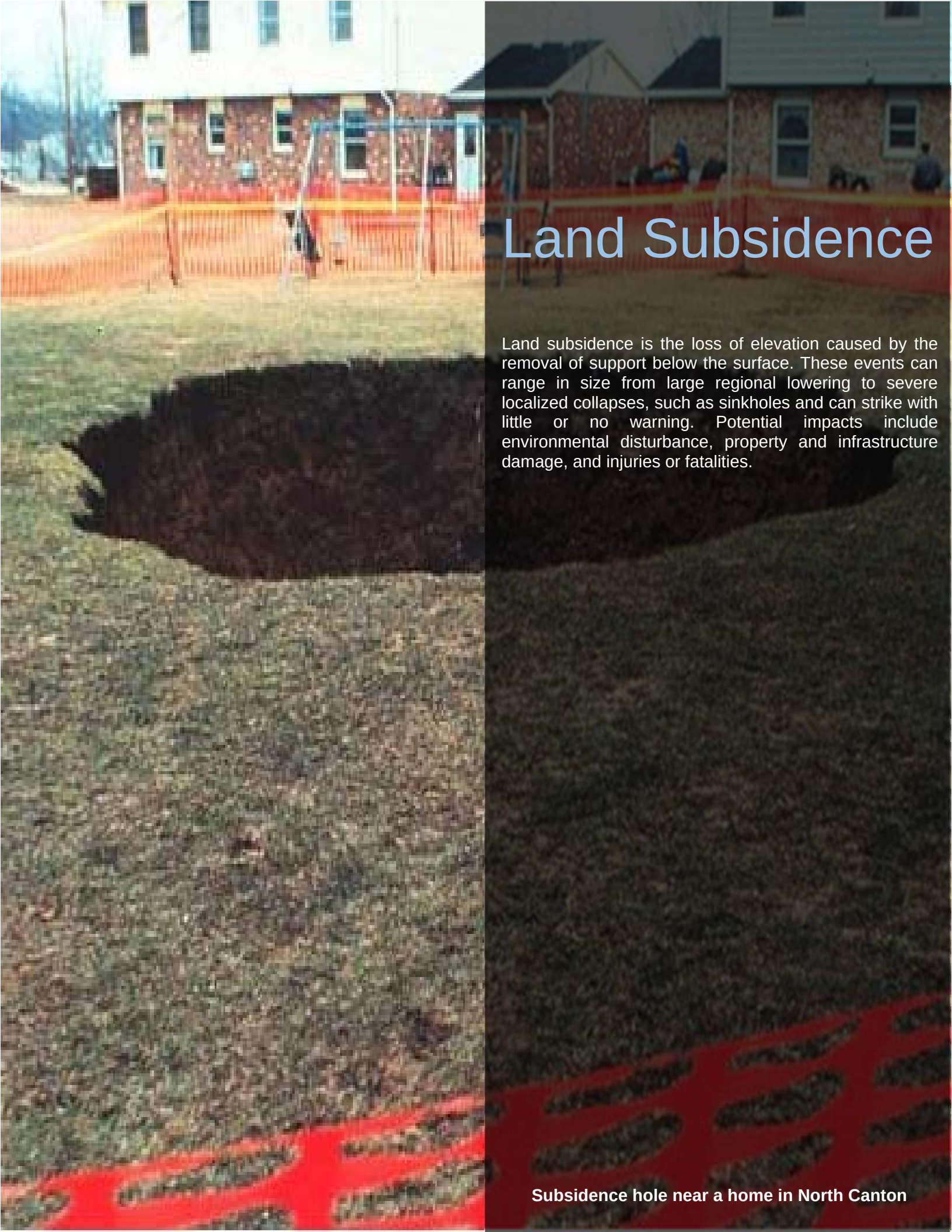
ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Robert A. Taft Middle School	3829 Guilford Ave NW	Canton		X	
Robertsville Fire Department	11185 Lincoln St SE	Canton		X	
Rochester Park Assisted Living	517 Park St NW	Navarre		X	
Rural Metro Ambulance Service	542 E State St	Alliance		X	
Sandy Creek Joint Fire District	505 E Lincolnway	Minerva		X	
Stark County Health Department	3951 Convenience Cir NW	Canton		X	
Stark County Sheriff	4500 Atlantic Blvd NE	Canton		X	
Staybridge Suites	3879 Everhard Rd NW	Canton		X	
Taft Elementary School	3829 Guilford Ave NW	Canton		X	
The Venue mall	3939 Everhard Rd NW	Canton		X	
Village of East Canton	130 Cedar St S	Canton		X	
Village of Navarre	27 Canal St W	Navarre		X	
Washington Middle School	1220 9th St NE	Canton		X	
Waynesburg Elementary School	200 W Lisbon St	Waynesburg		X	
Waynesburg Fire Department	141 E Lisbon St	Waynesburg		X	
Waynesburg Police Department	141 E Lisbon St	Waynesburg		X	
William R Day Elementary School	3101 38th St NW	Canton		X	
Wilmot Fire Department	204 Mill St	Wilmot		X	
Wilmot Police Department	300 Massillon St	Wilmot		X	
YMCA of Central Stark County	1201 30th St NW	Canton		X	
American Aluminum	4416 Louisville St NE	Canton		X	
Alliance Wastewater Treatment Plant	12251 Rockhill Ave NE	Alliance	X		
Beach City Runway	10431 Dolphin St SW	Beach City	X		
Brewster Electric Substation	300 Block of 7th St SE	Brewster	X		
Brewster Electric Utility Buildings	300 4th St SW	Brewster	X		
Brewster North Water Tower	200 Chestnut St NW	Brewster	X		
Brewster South Water Tower	800 Block of 7th St	Brewster	X		
Brewster WWTP	725 Wabash Ave S	Navarre	X		
Brewster Water Treatment Plant	300 4th St SW	Brewster	X		
Canal Fulton WWTP	5500 Butterbridge Rd NW	Canal Fulton	X		
Canton Sewage Treatment Plant	3530 Central Ave SE	Canton	X		
Canton Water Treatment Plant	2664 Harrisburg Rd NE	Canton	X		
Clay's Park Resort Runway	13190 Patterson St NW	N. Lawrence	X		
Fox Runway	Willowdale St	Magnolia	X		
Hammond Runway	Ravenna Ave NE	Louisville	X		
Hartville Sewage Treatment Plant	565 Wales Dr	Hartville	X		
Louisville Sewage Treatment Plant	Ravenna Ave	Louisville	X		
Louisville Water Treatment Plant	215 S Mill St	Louisville	X		
Massillon Sewage Treatment Plant	1 James Duncan Plz	Massillon	X		
McIntosh Oil and Gas Storage	2973 Harrisburg Rd	Canton	X		
Minerva Water Treatment Plant	401 E Lincoln Way	Minerva	X		
Navarre Water Treatment Plant	338 Wooster St NW	Navarre	X		
Norfolk Southern Rail Yard	Louisville St NE	Canton	X		
North Canton WTP	7300 Freedom Ave	North Canton	X		
Sunset Strip Runway	8515 St Peters Church	Louisville	X		

ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Waynesburg Sewage Treatment Plant	14th Lincoln/Donora St	Waynesburg	X		
Wheeling & Lake Erie Railway	100 First Street SE	Brewster	X		
Brewster Railroad YMCA/Wandle House	45 Wabash Ave S	Brewster			X
Eagles Building--Strand Theater	243 E Main St	Alliance			X
Eagles' Temple	601 Market Ave S	Canton			X
Earley-Hartzell House	840 N Park Ave	Alliance			X
First Methodist Episcopal Church	301 Lincoln Way E	Massillon			X
First Reformed and First Lutheran Churches	909 Tuscarawas St E	Canton			X
Haines House	186 W Market St	Alliance			X
Hartville Hotel	101 N Prospect Ave	Hartville			X
House of Loreto	2812 Harvard Ave NW	Canton			X
Ideal Department Store Building	55 Lincoln Way E	Massillon			X
Landmark Tavern	501 Tuscarawas St E	Canton			X
Loew-Define Grocery Store and Home	202 Market St NE	Navarre			X
Putman, Walter S., House	303 Lawnford Ave	Wilmot			X
Saint Joseph's Roman Catholic Church	322 3rd St SE	Massillon			X
Saxton House	331 Market St S	East Canton			X
St. Louis Church	300 N Chapel St	Louisville			X
Stahl--Hoagland House	330 Wooster St NW	Navarre			X
WANDLE House	45 Wabash Ave S	Brewster			X
Werner Inn	131 Nassau St E	East Canton			X
Wilmot United Brethren Church	Massillon St	Wilmot			X

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

HAZARDOUS MATERIALS RELEASE VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	3	Medium (May or may not occur annually)	Stark County experienced 97 hazmat incidents resulting in damages between 1996 and 2022 (a 26-year period), for an average of 3.73 incidents resulting in damages per year.
Response	2	One Day	A full day serves as a conservative estimated duration of a hazmat response.
Onset	5	None	Hazmat incidents typically occur with no warning.
Magnitude	1	Localized (Less than 10% of land area affected)	Hazmat incidents are site-specific, and thus highly localized.
Business	2	One week	Hazmat incidents have the ability to disrupt an area for up to a week.
Human	3	Medium (multiple severe injuries)	There is a potential for multiple severe injuries and illness to result from a hazmat release.
Property	3	25-50% of property affected	A hazmat release at a fixed facility would most likely affect 25-50% of the property.
TOTAL	19	Medium	





Land Subsidence

Land subsidence is the loss of elevation caused by the removal of support below the surface. These events can range in size from large regional lowering to severe localized collapses, such as sinkholes and can strike with little or no warning. Potential impacts include environmental disturbance, property and infrastructure damage, and injuries or fatalities.

Subsidence hole near a home in North Canton

2.0 RISK ASSESSMENT

2.2.7 Land Subsidence

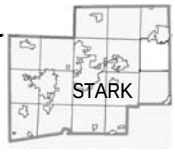
Land Subsidence is the loss of elevation caused by the removal of support below the surface. These events can range in size from large regional lowering to severe localized collapses, such as sinkholes and can strike with little to no warning.				
VULNERABILITY  HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	At any time. Increased in areas where mining and extraction of groundwater have occurred.	Hazard Index Ranking:	Medium
	Warning Time:	Ranges from no warning to months	State Risk Ranking:	10
	Probability:	Probable (Likely to occur on an annual basis)	Severity:	Minor (Less than 10% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	DR-1580-OH

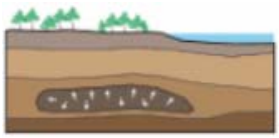
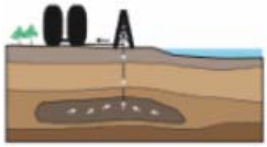
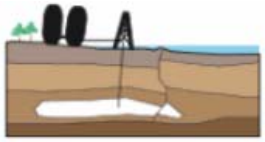
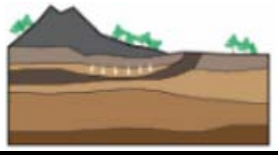
Hazard Introduction and Overview

Land subsidence causes damage and loss of life through several processes. Land subsidence includes pushing, crushing, or burying objects in their path and the damming of rivers and waterways (Haddow, Bullock, & Coppola, 2014, pg.46.)

Land Subsidence is the motion of the Earth's surface as it shifts downward relative to a benchmark (often sea-level) of the surrounding terrain. There are a number of causes for this effect. In Ohio, the two primary causes are Abandoned Underground Mines (AUMs) and karst topography. Underground mining of coal began in the early 1800's and continues to current day. In the 1900's, underground salt, limestone, and gypsum mining began. All mining activities create voids under the Earth's surface. Several key factors determining the potential for these voids to collapse include depth, mining technique used, type of rock and/or soils, and development on the ground surface. The last form of land subsidence in Ohio is associated with expansive soils, which are soils or soft rock that dramatically expand or swell when wet and shrink or contract when dry. The swelling and shrinking action can cause extensive damage to transportation routes, such as highways and rail lines, and structures that are built over these areas, as the soils can experience significant shifting. There is no historical evidence of expansive soils in Stark County.

Mine subsidence is the loss of elevation caused by the removal of support below the surface. These events can range in size from large regional lowering to severe localized collapses, such as sinkholes. Mine subsidence is a geologic hazard that can strike with little or no warning and can result in catastrophic and costly damages.

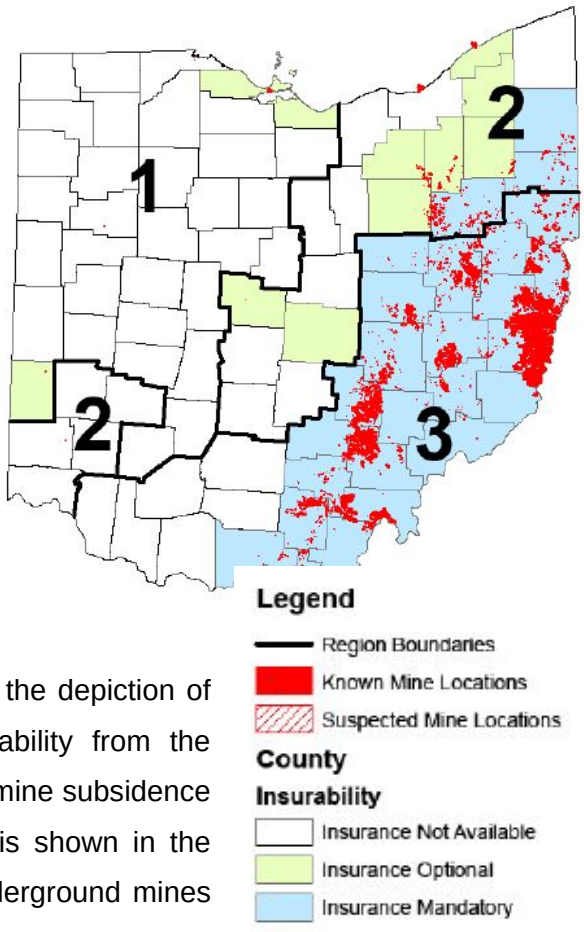


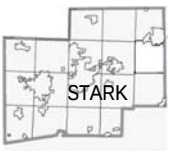
EFFECTS OF LAND SUBSIDENCE			
Type	*Existing Condition*	*Disturbance*	*Effect*
Oil / Natural Gas Extraction 			
Mining 			

According to the ONDR, Division of Geological Survey, karts is a little-known, but unique and important landform that can be found throughout the state of Ohio. Regions that contain sinkholes, caves, springs, disappearing streams, and enlarged fractures are known as karst terrains.

Location and Extent

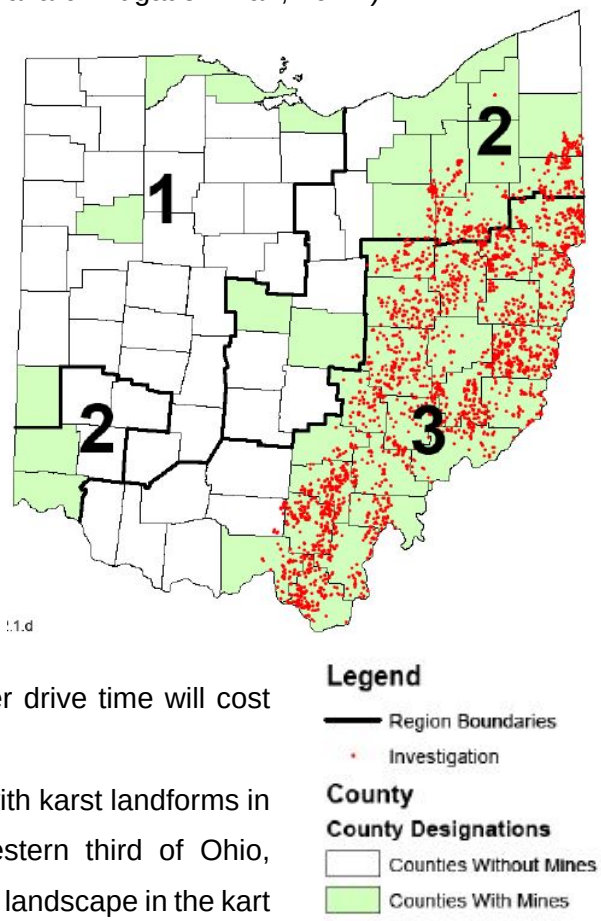
Stark County is at risk of land subsidence related to abandoned mines located throughout the county. Beginning in the 1800's and continuing today, there has been considerable coal mining in the Appalachian region of Ohio. According to the land subsidence profile in the statewide Hazard Mitigation Plan (HMP), Stark County is located in a region of the state with multiple known mine locations predominately in the southern and western portions of the county, specifically beneath the cities of Canal Fulton, Magnolia, Massillon and North Canton, and the villages of Brewster, East Canton, Navarre, Waynesburg and Wilmot. Stark County is also located in an area of the state where insurance is mandatory for land owners. The image at right is the depiction of abandoned mine locations and insurance availability from the statewide plan. The Ohio HMP also shows where mine subsidence events and investigations have occurred, which is shown in the image below. There are an estimated 7,000+ underground mines



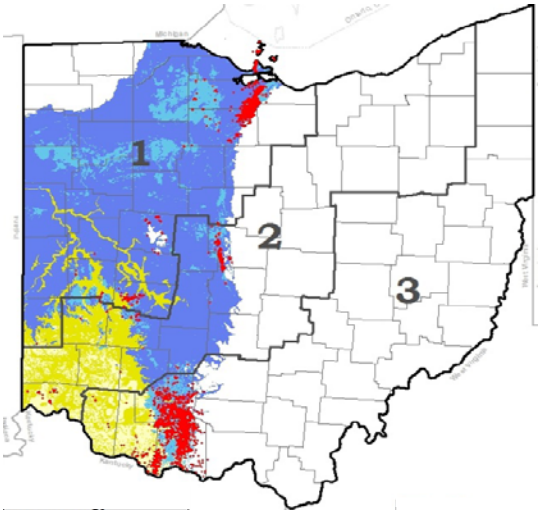


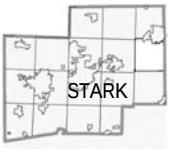
across Ohio, but only 50% of these are recorded in the Department of Natural Resources' database and 2,700 are unmapped (State of Ohio Hazard Mitigation Plan, 2011.)

Mine subsidence events will most likely occur with little to no warning, especially if involving an unmapped and unregistered abandoned mine site. While the area of the subsidence will most likely be small, damage to roads and structures located within or adjacent to the event can be significant. The potential damage increases as the size of the mine increases. Roadways that are damaged by these types of events will need significant repairs, including the reinforcement of the roadbed. Detours of major travel routes will have significant economic impacts. Detour cost calculations provided by ODOT show that a road closure of 20 days resulting in an 11 minute longer drive time will cost drivers an average of $1,952.06 per day.



Sinkholes are the main hazard associated with karst landforms in Ohio. Karst features are associated with the western third of Ohio, excluding the far northwestern counties. The current landscape in the kart region of Ohio was created by glaciers as they advanced from the north reaching the Ohio River roughly 14,000 years ago. When the last glacier receded, it left behind a layer of unconsolidated material in a wide range of depths. The shallower and loose material layer, the great the change of water penetrating to the underlying bedrock, resulting in a void or ground deformation occurring. This is represented by the probable karst areas on the map below, as can be seen Stark County is not located in a known karst topography area.





The Ohio Department of Natural Resources Division of Geological Survey indicates that in Stark County, the most prevalent types of rock are the Pennsylvanian and Mississippian. The Pennsylvanian sedimentary rocks are mainly shale, sandstone, siltstone, mudstone, limestone, and coal. There was a period of widespread erosion between one layer and the next. Mississippian sedimentary rocks include sandstone, shale, siltstone, conglomerate, and minor limestone. These types of sedimentary rocks may be quite soft and crumble, but may also be well cemented and resistant.

Hazard Impacts

The Ohio Department of Natural Resources (ODNR) recognizes land subsidence as a significant risk in Stark County. According to the ODNR, Land subsidence has the capability of damaging or destroying homes, businesses, and highways, resulting in annual costs of millions of dollars in Ohio. Land subsidence events typically affect residential areas and the roads in the county. After a land subsidence event the clean-up projects for the County's roads are prepared by the Engineering Department and contracted out for completion. These projects range in cost from $10,000 to $6,000,000.

Mine subsidence can cause foundation damage to buildings, disrupt underground utilities, and be a potential risk to human life. The ODNR Abandoned Underground Mine Locator indicates there are several abandoned underground mines located beneath the southern and western portions of the county; subsequently, Stark County is at risk to instances of mine subsidence.

Land subsidence is not random, and is not a totally unpredictable phenomena. Certain inherent geologic conditions are a prerequisite and one or more of the following conditions can serve as an alert to potential land subsidence problems.

- Joined rocks,
- Fine-grained, permeable rock or sediment,
- Areas of abandoned underground mines,
- Areas with large buried pipelines.

Although there have not been any instances of large, catastrophic land subsidence in Stark County, the potential for damage is present. Generally, land subsidence causes death, injuries, trauma and suffocation from entrapment. Depending on the location, these events could cause losses and damages to homes, infrastructure and critical facilities and block whole communities off.

Historical Occurrences

Abandoned underground mines in Ohio are monitored by the ODNR, Division of Mineral Resources Management. There are two programs within the division to address mine subsidence, one for emergencies and the other for non-emergencies. The emergency program gives priority to events which are directly affecting a structure or transportation route. Repeated emergency incidents can lead to larger non-emergency response. The City of North Canton has experienced repeated emergency events culminating in area-wide engineering studies to address subsidence problems.

Land subsidence issues have been known to occur in Ohio and adjoining states since 1850, but the damage caused by land subsidence has become increasingly expensive as urban development encroaches more and more on the area's hillsides. A portion of Stark County's topography is that of steep to gently sloping, which, along with the large number of underground mines located in the western and southern portion of the county, increases the county's vulnerability to land subsidence. Although land subsidence is a site-specific hazard, local officials feel proactive measures should be taken to mitigate subsidence across the county, especially near areas targeted for development, prior to an occurrence.

According to reports from local officials during meeting attendance throughout the planning process, several events have taken place in Stark County in the past few years. Here are the occurrences.

- Plain Township had a sinkhole in a yard on Firestone NE. The Ohio Department of Natural Resources was called to inspect.
- Several instances of land subsidence over the past ten years in North Canton causing property damage and need for street repairs.
- On June 3, 2017, the Village of Hills and Dales experienced land subsidence at Strathmore NW and Brentwood where the roadway needed to be repaired.
- A sinkhole opened up on Alabama Ave in 2015 in Lawrence Township.
- There was a mine shaft cave-in on Briggle Avenue in East Sparta in 2012.
- On 47th Street off Middlebranch in Plain Township in the 1980s while installing a sanitary sewer main and dewatering, an entrance to a "family" mine was found. This mine turned out to be neighborhood wide and sinkholes have developed and have been grouted. However the coal mining area is extensive and can still cause issues.

Loss and Damages

There are several highways that could be damaged as a result of mine subsidence in Stark County: US Route 30 and 62, and State Routes 21, 43, 93, 172, 289 and 800, all these routes have been undermined.

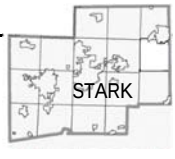
Loss estimates for land subsidence are limited to the data available, according to information obtained from the ODNR-Division of Mineral Resources Management, and the Ohio Mine Subsidence Underwriting Associations, Stark County has 422 Abandoned Underground Mines. Subsidence issues related to these AUMs has resulting in 54 completed subsidence reclamation projects over the past 15 years at a cost of $1,507,450. This creates an average subsidence reclamation cost of approximately $28,000 per project.

On average Stark County experiences 3.5 land subsidence reclamation projects per year, this creates an annual loss estimate of $98,000.

Vulnerable structure estimates for this hazard are based on the estimation from the Ohio Mine Subsidence Underwriting Association's reclamation project costs of $98,000 per year within Stark County. This figure was broken down into loss estimates for the three categories using the Ohio EMA's HAZUS-MH loss estimation workbook. The loss estimate for each structural category was then divided by the average structure value found in the loss estimation workbook. The table below is the result of these calculations.

LAND SUBSIDENCE EXPOSURE ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	1	$71,941.13
Non-Residential	1	$22,208.65
Critical Facilities	1	$3,850.22
TOTALS	3	$98000

Source: Ohio EMA HAZUS-MH Loss Estimate Workbook Calculation



Vulnerability Assessment

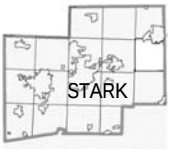
Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding Land Subsidence.

PUBLIC SENTIMENT, LAND SUBSIDENCE – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Land Subsidence	73 (42.44%)	69 (40.12%)	22 (12.79%)	8 (4.65%)	172
In the past ten years, do you remember this hazard occurring in your community?				11 (6.4%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				9 (5.23%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				2 (1.16%)	172

Source: Online Public Survey Results

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

LAND SUBSIDENCE VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	4	High	According to information obtained from the ODNR large portions of the western and southern portions of Stark County have been undermined.
Response	3	One week	Most land subsidence areas take a minimum of 1 week to clean-up and repair.
Onset	3	N/A	Some instances of land subsidence can occur with no warning at all.
Magnitude	1	Localized (< 10% of land area affected)	All land subsidence events are site specific in natures, and do not affect vast areas.
Business	2	One Week	Businesses located in the affected area of a large-scale land subsidence event would be impacted for a minimum of one week.
Human	2	Minimum (minor injuries)	Historically land subsidence have only resulted in property damage. The greatest chance of personal injury would be to motorists.
Property	2	Less than 10% of property affected	All land subsidence events are site specific in natures, and do not affect vast areas.
Total	17	Medium	



Severe Summer Storms

A severe thunderstorm is one that produces a tornado, winds in excess of 58 miles per hour, or hail one inch in diameter or larger, and is accompanied by lightning

Straight-line winds (Derechos), downbursts, macrobursts, microbursts, and gust fronts are all part of sever wind events. A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings and particularly manufactured homes. Tornadoes are move likely to occur during the months of March through May and tend to form in the late afternoon and early evening.

2.0 RISK ASSESSMENT

2.2.8 Severe Summer Storms

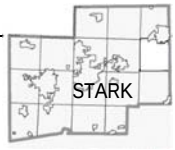
A severe thunderstorm is one that produces a tornado, winds in excess of 58 miles per hour, or hail of one inch in diameter or larger. These storms are accompanied by lightning. Straight-line winds (Derechos), downbursts, macrobursts, microbursts, and gust fronts are all part of severe wind events. Tornadoes are violently-rotating columns of air that touch the ground and are usually attached to the base of an intense thunderstorm.

Period of Occurrence:	Thunderstorms, typically occur during the late spring and summer months.	Hazard Index Ranking:	Medium
Warning Time:	12-24 hours	State Risk Ranking:	3
Probability:	Frequent (Will occur on an annual basis)	Severity:	Catastrophic (more than 50% of land area affected)
Type of Hazard:	Natural	Disaster Declarations:	DR-266-OH DR-1556-OH DR-1484-OH DR-1651-OH DR1519-OH DR-3346-OH

Hazard Introduction and Overview

Thunderstorms are local storms accompanied by lightning and thunder that are capable of producing strong winds, tornadoes, hail, and flash flooding. There are five types of thunderstorms, each described in detail in the table below.

TYPES OF THUNDERSTORMS				
Type	*Description*	*Duration*	*Wind Speeds*	*Associated Hazards*
Single Cell	Uncommon	20 - 30 minutes	N/A	• Non-damaging hail • Microbursts • Weak tornadoes
Multi-Cell	Common, organized cluster of two or more single cells.	Each cell lasts approximately 20 minutes	Downbursts of up to 80 mph	• Heavy rainfall • Downbursts • Hail • Weak tornadoes
Mesoscale Convective System (MCS)	A well-organized system of thunderstorms	Up to 12 hours or more	55 mph or more	• Torrential rainfalls • Derechos • Tornadoes
Squall Lines	May extend over 250 to 500 miles and 10 to 20 miles wide	Individual cells last from 30 to 60 minutes	N/A	• Significant rain after the storm • Derechos
Super Cells	Most dangerous storms, visible with Doppler radars	1 - 6 hours	Updrafts and downdrafts of more than 100 mph	• Tornadoes • Hail

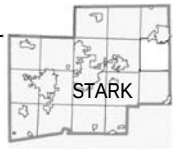


A thunderstorm is "severe" when it produces a tornado, winds of at least 58 mph, or hail at least one inch in diameter. Hazards associated with severe thunderstorms include lightning, heavy rain, hail, damaging wind, and tornadoes. Thunderstorms are a seasonal hazard and can be expected to occur every year. According to the NWS the most active thunderstorm season in Ohio is late spring and early summer.

A hailstorm is defined as an atmospheric disturbance manifested in strong winds and accompanied by precipitation. The precipitation is made of hailstones, or hard pellets of snow and ice. Hail is a form of precipitation that occurs when updrafts from a thunderstorm carry raindrops into colder temperatures. The drops of water freeze together in the cold upper regions of the thunderstorm clouds. Hailstones grow by colliding with super-cooled water droplets, the stronger the updraft of the storm the longer the drops of water can freeze together, thus the larger the hailstone. When a hailstone becomes too heavy for the updraft to support it, or the updraft weakens, the hailstone falls to the ground. Hailstones less than one inch in diameter typically fall to the ground at nine to 25 mph. Hailstones typically associated with severe thunderstorms (i.e., 1" to 1 3/4" in diameter) can fall to the ground at 40 mph. The TORRO Hailstorm Intensity Scale (Voss Law Firm, n.d.) measures hail, H0 – H10, based on diameter. The TORRO scale and reference objects appear in the table below.

TORRO HAILSTORM INTENSITY SCALE			
TORRO Intensity	*Intensity Category*	*Diameter (mm)*	*Reference Object*
H0	Hard Hail	5	Pea
H1	Potentially Damaging	5-15	Mothball
H2	Significant	10-20	Marble, Grape
H3	Severe	20-30	Walnut
H4	Severe	25-40	Pigeon's egg > Squash ball
H5	Destructive	30-50	Golf ball > Pullet's egg
H6	Destructive	40-60	Hen's egg
H7	Destructive	50-75	Tennis ball > Cricket ball
H8	Destructive	60-90	Large orange > Softball
H9	Super Hailstorms	75-100	Grapefruit
H10	Super Hailstorms	>100	Melon

Lightning is a naturally-occurring giant spark of electricity in the air between clouds, the air, or the ground. Air acts as an insulator between the cloud and the ground, but when the charge difference becomes great enough, this insulating capacity breaks down, allowing the rapid discharge of electricity. This electrical discharge is known as lightning. Lighting can reach a significant distance from a storm, up to 25 miles according to the National Severe Storms Library (NSSL). While lightning is a common occurrence and can be seen in most thunderstorms, only

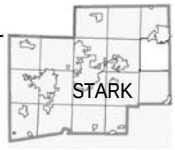


about 20% of the lighting observed in a storm will strike the ground. Lightning strikes occur with no warning and kills between 75 to 100 Americans each year (Haddow, Bullock, & Coppola, 2014)

Severe wind includes non-tornadic winds from thunderstorms. There are six types of severe wind: straight-line wind, downbursts, macrobursts, microbursts, gust fronts, and Derechos.

- **Straight-line Wind:** Straight-line wind is a term used to define any thunderstorm wind not associated with rotation, used mainly to differentiate from tornadic winds.
- **Downburst:** Downburst is the general term for all localized strong wind events caused by a strong downdraft within a thunderstorm.
- **Macroburst:** An outward burst of strong winds at or near the surface with a diameter larger than 2.5 miles that occurs when a strong downdraft reaches the surface.
- **Microburst:** A small, concentrated downburst that produces an outward burst of strong winds near the surfaced. Microburst are small and short-lived, with a diameter less than 2.5 miles and lasting only 5-10 minutes.
- **Gust Front:** The leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. It is characterized by a wind shift, temperature drop, and gusty winds ahead of a thunderstorm.
- **Derecho:** A widespread, long-lived wind storm associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts and downbursts. An event with wind speeds of at least 58mph and a diameter of 240 miles is a derecho.
- **Tornadoes:** Are violently-rotating columns of air that touch the ground and are usually attached to the base of an intense thunderstorm.

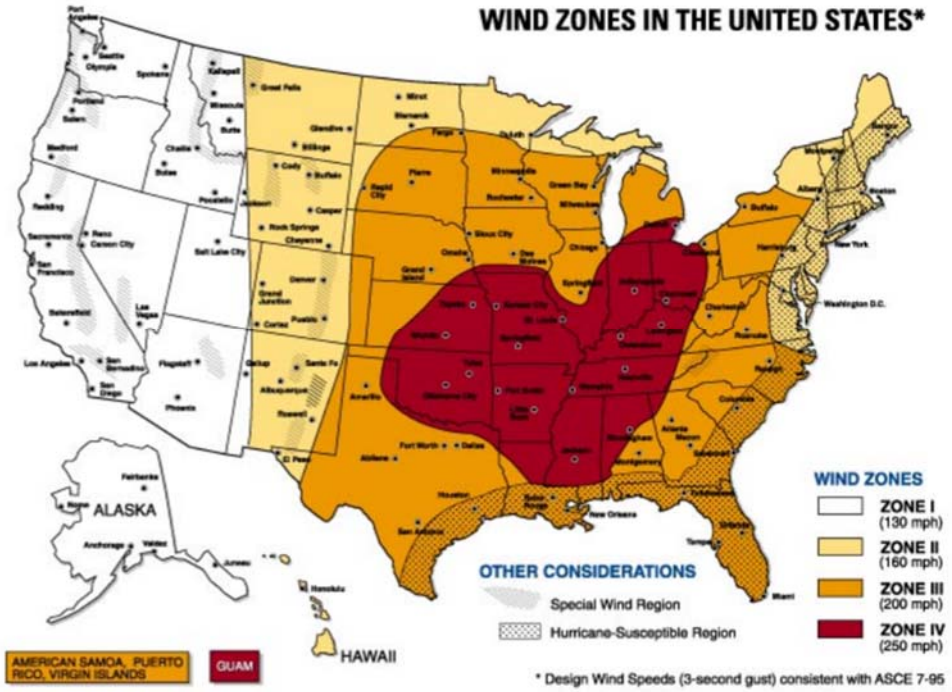
Tornadoes form when warm, humid air collides with cold, dry air. They are vertical funnels of rapidly spinning air that extend from a thunderstorm cloud to the ground. Tornadoes can have wind speeds up to 250 miles per hour and widths of approximately 660 feet. They occur in the U.S. more than anywhere else in the world. Tornadoes originate from rotating thunderstorms called “supercells” or from quasi-linear convective systems (QLCS). Tornados are historically very difficult to predict. The storms that may produce a tornado can be forecasted, but not every storm with that potential will spawn a tornado and predicting where and when that will happen is incredibly difficult.

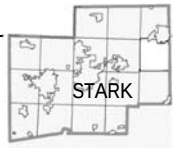


Location and Extent

Severe thunderstorms and associated hail and lightning can affect all areas of the county. These events can last a few seconds (i.e., lightning), minutes (tornadoes), hours (thunderstorms and hailstorms), or days (high winds).

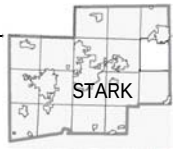
The wind is a commonplace phenomenon across the globe. Wind events can impact several jurisdictions at the same time, with varying duration and severity. The vast majority of Stark County is at an equal risk of experiencing severe wind and tornadoes. FEMA's wind zone map classifies wind zones in the United States. As shown below, while the state of Ohio is and the majority of Stark County are primarily in Zone IV, the eastern most portion of Stark County lies within a Zone III area. Buildings located in a Zone IV area should be constructed to withstand three-second gusts of up to 250 mph.





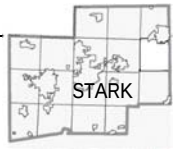
The Beaufort Wind Scale measures wind. This scale characterizes wind using a 0-12 metric based on observation rather than exact measurements. The table below outlines the scale in detail.

BEAUFORT WIND SCALE					
Force	*Wind Speed*		*Description*	*Appearance of Wind Effects*	
	Knots	*MPH*		*On Water*	*On Land*
0	>1	>1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	4-7	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	8-12	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	13-18	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	19-24	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	25-31	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	32-38	Near Gale	Sea heaps up, waves 13-19 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	39-46	Gale	Moderately high (18-25 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	47-54	Strong Gale	High waves (23-32 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	55-63	Storm	Very high waves (29-41 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	64-72	Violent Storm	Exceptionally high (37-52 ft.) waves, foam patches cover sea, visibility more reduced	N/A
12	64+	72+	Hurricane	Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	N/A



Historical tends show that some areas of the county, such as the Midwest and plain states commonly referred to as tornado alley, have a higher probability of tornado occurrences; however, they can and have struck in many other areas. The nature of tornadoes is that they strike at random. While it is known that some areas of the country experience tornadoes more than others, predicting exactly what parts of Stark County have a greater chance of being struck by a tornado is difficult. The best predictor of future tornadoes is the occurrence of previous tornadoes. For planning purposes, it is less important to map the tornado risk than it is to identify it. This is because it is so difficult to predict the path of future tornadoes. The nature of Officials also utilize the Enhanced Fujita (EF) Scale to classify tornadoes. This scale uses a rating system based on wind speeds and related damages. The EF scale was adapted from the original Fujita Scale designed by Dr. Theodore Fujita to better estimate wind and storm damage. The table below describes the EF Scale.

ENHANCED FUJITA (EF) SCALE		
EF Rating	*3-second Gust Speed (mph)*	*Possible Damage*
0	**65-85**	**Light Damage.** Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to signboards.
1	**86-110**	**Moderate Damage.** Surface peeled off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
2	**111-135**	**Considerable Damage**. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
3	**136-165**	**Severe Damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off the ground and thrown.
4	**166-200**	**Devastating Damage**. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
5	**201+**	**Incredible Damage**. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile sized missiles fly through the air more than 100-yards; trees debarked; incredible phenomena will occur.



The original Fujita Scale is provided below as the majority of documented tornadoes that have occurred in Stark County were measures utilizing this scale.

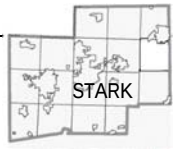
FUJITA TORNADO SCALE		
Scale	*Wind Estimate (MPH)*	*Typical Damage*
F0	< 73	**Light Damage**. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73 – 112	**Moderate Damage**. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113 – 157	**Considerable Damage**. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-objects missiles generated; cares lifted off ground.
F3	158 – 206	**Severe Damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.
F4	207 – 260	**Devastating Damage**. Wall-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261 – 318	**Incredible Damage**. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 109 yards; trees debarked; incredible phenomena will occur.

Hazard Impacts

The impacts of thunderstorms can include widespread property damage, injuries, and even fatalities. Hailstones can be the most damaging part of a severe thunderstorm, inflicting injuries and destroying crops like a giant pummeling machine. Hailstone damage is often confined to automobiles and crops; however, structural damage is a possibility in the form of broken windows, damaged gutters, HVAC systems, and siding. The table below outlines the typical impacts of a hailstorm.

Intensity (TORRO Scale)	Typical Damage Impacts
H0	No Damage
H1	Slight damage to plants, crops
H2	Significant damage to fruit, crops, vegetation
H3	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Widespread glass damage, vehicle bodywork damage
H5	The wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Bodywork of grounded aircraft dented, brick walls pitted
H7	Severe roof damage, risk of serious injuries
H8	Severe damage to aircraft bodywork
H9	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open
H10	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open

In some cases, lightning has caused fires in structures and open land or forests. A bolt of lightning reaches a temperature of 50,000 degrees Fahrenheit in a split second. Ohio averages four deaths and 15 injuries per year as a result of lightning. Individual lightning strikes occur with



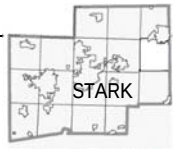
no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, pg.51.) Heavy rains can damage vegetation and infrastructure and cause flash flooding. Recently, some of the most damaging impacts of severe thunderstorms have been the cascading effects of long-duration power outages.

Severe wind events can cause a variety of secondary and tertiary hazard events. In addition to damaging roofs and other home finishing's, wind can cause damage to trees that may interrupt power service or block roadways. Such damages could be widespread and severe, potentially overwhelming the capacity of local responders to address the situation.

While tornadoes are typically short-lived, they are intensely focused and destructive. Tornadoes are the most violent of all atmospheric storms. Damage from tornadoes comes from the strong winds they contain. Wind speed in tornadoes can reach 300 miles per hour; winds of that speed can destroy homes, uproot trees, cause automobiles to become airborne, and turn glass and debris into high-velocity projectiles. Secondary and tertiary impacts from tornadoes include damage to roofs and other home finishing's. Additionally, fallen trees can interrupt power service or black transportation access.

Historical Occurrences

Stark County has experienced 398 severe summer weather related events since 1965. This rate is an average of 6.98 severe summer weather events per year. These events appear by category in the table below. Thunderstorms accounted for 59% of the total severe summer weather events. Hailstorms accounted for the most property damage at approximately $87 million, and tornadoes resulting in the most injuries and fatalities.



HISTORICAL SEVERE SUMMER STORMS OCCURRENCE – STARK COUNTY									
THUNDERSTORM (1955 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Wind Speeds*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	Highest			Property	Crop
234	44	Countywide (52%)	3.55	55 kts.	80 kts.	3	1	$9.01M	$25K
Most thunderstorm events in one year = 21 in 2019									
HAIL (1960 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Hail Size*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Largest*			*Property*	*Crop*
131	34	Canton (36%)	2.18	1”	3”	1	0	$86.92M	$205K
Most hail events in one year = 9 in 1998									
LIGHTNING (1996 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*			*Injuries*	*Fatalities*	*Damages*	
								Property	*Crop*
16	12	Canton (25%)	0.64			2	1	$876K	$0
Most lightning events in one year = 5 in 1998									
TORNADOS (1996 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*			*Injuries*	*Fatalities*	*Damages*	
								Property	*Crop*
17	11	Canal Fulton Massillon Brewster	0.30			12	2	$52.0M	$0
Most tornado events in one year = 3 in 2002									

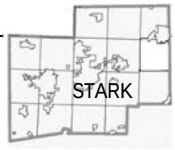
Source: NCEI Storm Event Database

Countywide High Wind Event – September, 2008

A high wind event associated with remnants of Hurricane Ike, was responsible for an estimated $3 million in damages and left as many as two million people without power across northern Ohio.

Canton & Massillon Hailstorm – July, 2008

A cold front moved east across northern Ohio on July 26th, a severe thunderstorm developed along this front, golf ball to tennis ball sized hail was reported from just east of Massillon to Canton. Hen egg sized hail (i.e., 2.5 inch) was reported at the Pro Football Hall of Fame along Interstate 77. The hail accumulated to several inches in depth in some areas. Thousands of vehicles and homes sustained damage from the hail. The damage appeared to be most extensive on the south side of Canton. This hailstorm resulted in approximately $30 million in property damage.



Northern Stark County Lighting Strike – June, 1996

Lightning struck and caused a fire at an oil well in the Middlebranch/Hartville area. Lightning also caused one house fire in North Canton. Lightning also struck an oil well in the Waynesburg/Magnolia area. The resulting blaze caused structural damage.

Osnaburg Twp Lighting Strike – July, 1996

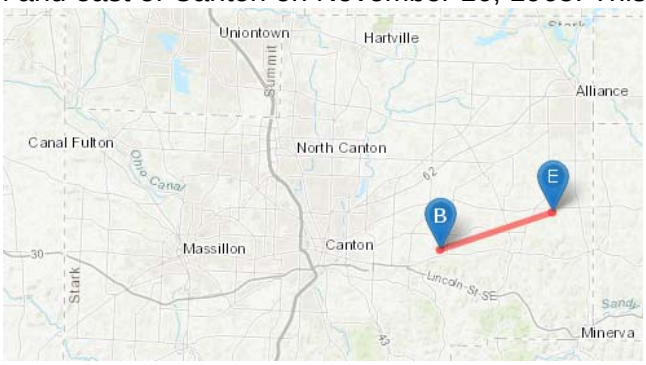
Lightning hit an oil storage tank. The tank was blown onto a nearby lawn, narrowly missing a house. The oil was dumped into Little Sandy Creek, where most of it was contained.

Canton Lighting Strike – May, 2000

Lightning struck a government building in downtown Canton. Approximately $50,000 worth of radio and communications equipment was destroyed.

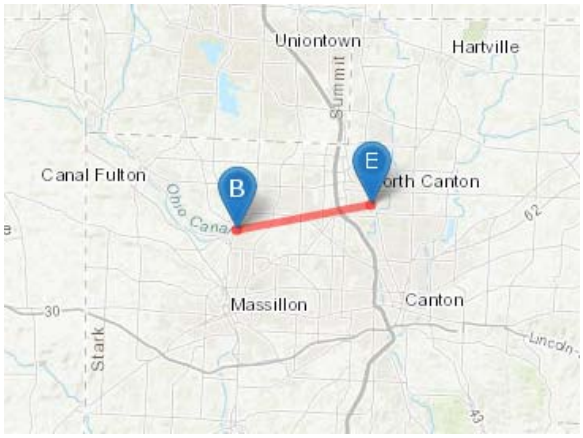
Northeast of Canton Tornado – November, 1965

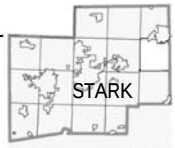
An F2 tornado ripped through just north and east of Canton on November 16, 1965. This tornado was approximately 300 yards wide and remained on the ground for 5.9 miles. Damages from the tornado were estimated at $2.5 million dollars. The tornado resulted in a total of nine injuries and two fatalities.



Crystal Springs Tornado – April, 2002

A strong F2 tornado touched down causing major damages and two injuries along a path of just over seven miles. Major damage occurred along the path which was nearly a quarter mile in width at times. The initial touchdown occurred west of the intersection of Arlington Avenue and Windy Lane Street near Crystal Springs, it then moved east through residential neighborhoods in Jackson Township, before passing to the north of Lake Cable, crossing interstate 77 near Portage Street and finally dissipated near a shopping district along State Route 297 in North Canton. Over 300 homes were damaged with 25 structures being g destroyed. An additional 38 buildings including three businesses were partially destroyed.





A middle school building suffered extensive damage and was closed for nearly a week for repairs, a nearby high school also sustained damages. Approximately 1,000 trees were downed and over 300 vehicles were damaged. In total this tornado resulted in $45.5 million in property damage.

Loss and Damages

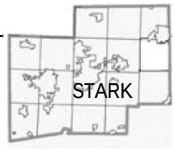
Severe summer weather can impact all areas and jurisdictions of Stark County and are typically widespread events. Severe summer weather events have resulted in approximately $149 million in property damages and $230,000 in crop damages in Stark County over the past 67 years, creating an annual average damage estimate of $2.23 million. This likely underestimates damages caused to infrastructure and power lines.

Historical occurrences can yield dollar and crop loss estimates for severe summer weather. By dividing the total losses of each by the number of reported historical occurrences, general property loss estimates for each of the events comprising “severe summer weather” are as follows:

- Thunderstorm Winds: $38,504 per event (based on 234 total events)
- Hailstorms: $665,076 per event (based on 131 total events)
- Lightning: $54,750 per event (based on 16 total events)
- Tornados: $3,058,824 per event (based on 17 events)

Tornado specific loss estimation information obtained from the 2019, *Ohio Enhanced Hazard Mitigation Plan* provide the following for Stark County.

County	*Total # of Tornados*	*Total Damages*	*Avg. Damage per Event*	*Estimated Annual Tornadoes*	*Estimated Annual Losses*
Stark	12	$88,937,842	$7,411,487	0.18	$1,327,430



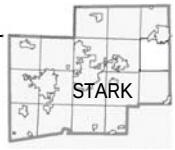
For Mitigation Information Portal (MIP) data entry, planners utilized the historical worst-case scenario loss. Planners considered the entire building stock as exposed and used the worst-case scenario event to occur in Stark County as the representative historical occurrence for completion of the following table. Information contained in the table below is based on an event commonly known to some Ohioans as "The Ohio Fireworks Derecho" (NOAA, n.d.) which was similar to an EF-2 tornado. The storm resulted in $65,000,000 of losses across 21 counties (for an average of approximately $3,095,200 per county).

SEVERE SUMMER STORMS LOSS ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	16	$2,206,026
Non-Residential	5	$865,292
Critical Facilities	1	$23,920
TOTALS	22	$3,095,238

Vulnerability Assessment

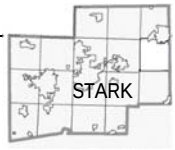
This section summarizes the vulnerability of Stark County to severe summer storms. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding severe summer storms. For the following table, data includes severe thunderstorms and associated hail, lighting, and tornadoes, as those hazards appeared combined in the survey.

PUBLIC SENTIMENT, SEVERE SUMMER STORMS – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Severe Summer Storms	30 (17.44%)	60 (34.88%)	56 (32.56%)	26 (15.12%)	172
In the past ten years, do you remember this hazard occurring in your community?				113 (65.7%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				88 (51.16%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				1 (0.58%)	172



The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

SEVERE SUMMER STORMS VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	5	Excessive (Frequent – will occur during a year)	There have been 398 severe summer weather events since 1955. Stark County can expect an average of 5.9 severe summer weather events per year.
Response	2	One day	The response to most severe summer weather events typically occurs over the course of one day.
Onset	2	12-24 hours	All types of severe summer weather can be predicted up to 12 hours in advance.
Magnitude	4	More than 50% of land area affected	Severe summer storm events typically affect large portions of the county simultaneously.
Business	1	Less than 24 hours	Businesses would not typically close for a severe summer storm event. Damages from a significant storm may cause a short (less than 24 hour) disruption of services.
Human	2	Low (some injuries)	There have been 18 injuries, and four deaths reported due to severe summer storm. While injury and death are possible, it is unlikely that severe summer storm would cause significant human injuries.
Property	2	10-25% of property affected	Though impacting large land areas, severe summer storm events often result in minimal property damage (when considering it at a countywide level).
Total	18	Medium	



Severe Winter Storms

Severe winter weather is a combination of blizzards, heavy snow, blowing snow, ice storms, and dangerous wind chills that could threaten life or property.

2.0 RISK ASSESSMENT

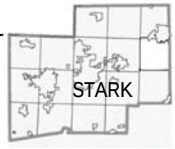
2.2.9 Severe Winter Storms

Severe winter storms include blizzards, heavy snow fall, blowing snow, ice storms, and dangerous wind chills that could threaten life or property.				
VULNERABILITY HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	Winter storms typically occur from November through March.	Hazard Index Ranking:	Medium
	Warning Time:	12-24 hours	State Risk Ranking:	2
	Probability:	Frequent (Will occur on an annual basis)	Severity:	Catastrophic (more than 50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	EM-3029-OH EM-3055-OH DR-1580-OH

Hazard Introduction and Overview

During winter, there are multiple instances of cold weather, snow, and storms. This profile includes only those winter weather events that are damaging enough to be considered "severe." These include NOAA-labeled winter storms, heavy snow, blizzards, and ice storms.

- **Winter Storm:** A winter storm is a combination of heavy snow, blowing snow, and dangerous wind chills.
- **Heavy Snow:** Heavy snow refers to snowfall accumulating to 4" or more in 12 hours or less, or snowfall accumulating to 6" or more in 24 hours or less.
- **Blizzard:** A blizzard is a dangerous winter storm that is a combination of blowing snow and wind and results in very low visibility. Heavy snowfall and severe cold usually accompany blizzards, but not always. Sometimes strong winds can pick up fallen snow, creating a ground blizzard. A Blizzard is a winter storm which produces the following conditions for three hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than ¼ mile, on a widespread or localized basis.
- **Ice Storm:** An ice storm is a storm that results in the accumulation of at least 0.25'' of ice on exposed surfaces. It can create hazardous driving and walking conditions, and tree branches and power lines can easily snap under the weight of the ice.



Just like with other storms, the right combination of ingredients is necessary for a winter storm to develop. The three key components of a winter storm are cold air, lift, and moisture.

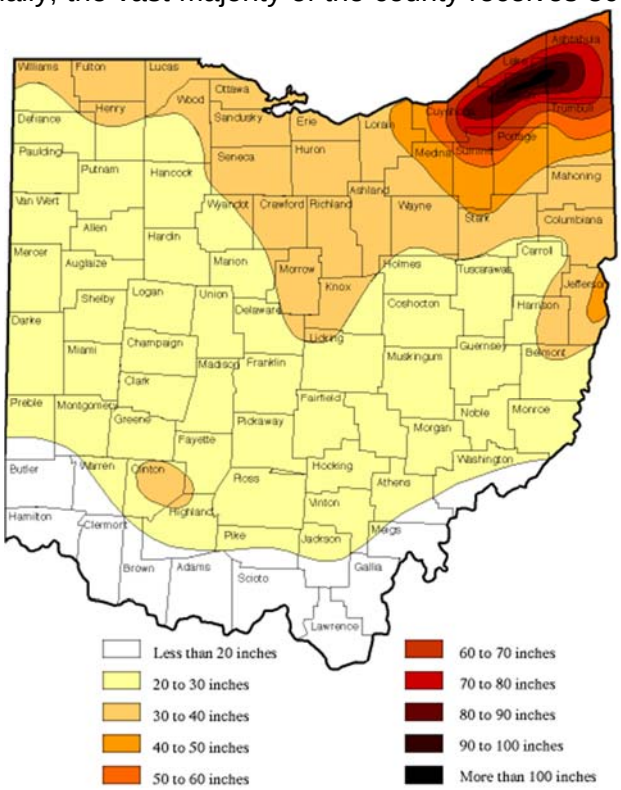
Location and Extent

All of Stark County is equally susceptible to winter storms (i.e., blizzards, heavy snow fall, ice storms, and extreme cold temperatures); however, the northwestern portion of the county is more susceptible to heavy snow fall due to the higher elevations in this portion of the county. The highest elevation in the county is Paris Township at 1,353 feet.

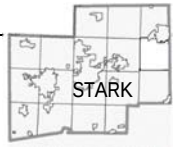
The image at right, obtained from the Ohio Department of Transportation, illustrates that Stark County is divided into two different snow fall categories. The northwestern half of the county, receive between 40 and 50 inches of snow annually, the vast majority of the county receives 30 to 40 inches of snow annually.

A severe winter storm could affect the entire county at the same time, virtually brining all county operations to a standstill. This type of hazard creates a difficult emergency response effort; adverse road conditions can impeded or prohibit all vehicle movement, including emergency response vehicles.

Winter weather affects several jurisdictions simultaneously, yet with varying severity and duration. There is no widely-used scale to classify snowstorms, but Paul Kocin and Louis Uccellini from the National Weather Service developed the Northeast Snowfall Impact Scale (NESIS). The NESIS characterizes and ranks high-impact Northeastern snowstorms from “notable” to “extreme.”



Source: Ohio Department of Transportation



NORTHEAST SNOWFALL IMPACT SCALE		
Category	*NESIS Value*	*Description*
1	1.0-2.499	Notable
2	2.5-3.99	Significant
3	4.0-5.99	Major
4	6.0-9.99	Crippling
5	10.0+	Extreme

Source: National Weather Service

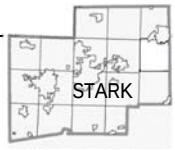
Significantly, the NESIS does not predict the impacts of a forecasted storm; instead, it is a mechanism for rating impacts after a storm occurs.

Hazard Impacts

Severe winter storms create treacherous driving conditions, according to a *FEMA Winter Storm Fact Sheet*, the leading cause of fatalities during winter storms is from automobile or other transportation accidents. According to the National Severe Storms Laboratory (NSSL), most deaths from winter storms are not from the storm itself. People die from traffic accidents on icy roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold. During severe storms, everyone is potentially at risk, particularly those stranded in their vehicle or outside during the storm. Recent data shows that 70% of injuries related to ice and snow occur in automobiles, and 25% are people caught out in the storm. Most victims are males over 40 years old.

Heavy snow can result in property damage from roof collapses, and extreme cold temperatures can cause waterlines to freeze and bust. Ice accumulation can topple power lines, utility poles, and communication towers causing electrical power to be lost, which for several means a loss of a critical home heating source. The resultant disruption in communication and utility services can last several days. Even minimal ice accumulation can pose a serious threat to motorists and pedestrians. Bridges and overpasses are particularly dangerous, as they freeze before other surfaces.

Health hazards generated from severe winter storms include frostbite and hypothermia. Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in the victim's fingers, toes, nose, and ear lobes are symptoms of frostbite. Hypothermia is a condition brought on when the body temperature drops to less than 55 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.



Historical Occurrences

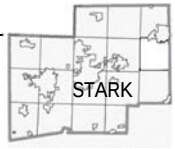
Stark County has experienced 33 severe winter weather events since 1996. This rate is an average of 1.32 severe winter weather events per year. These events appear by category in the table below. There were no records of blizzards in the NCEI Storm Events Database for Stark County.

HISTORICAL SEVERE WINTER WEATHER OCCURRENCE – STARK COUNTY									
HEAVY SNOW (1996 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Snow Depth*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Highest*			*Property*	*Crop*
7	CW	Countywide	0.28	9”	12”	0	0	$1.65M	$0
Most heavy snow events in one year = 2 in 1996 and 1999									
ICE STORMS (2005 to 2021)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Ice Accumulation*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Highest*			*Property*	*Crop*
3	CW	Countywide	0.18	1/4”	3/4”	0	0	$6.3M	$0
Most heavy snow events in one year = 2 in 2007									
WINTER STORM (1999 to 2021)									
Total Events	*Areas Affected*	*Month w/ Most Events*	*Avg. Events / Year*			*Injuries*	*Fatalities*	*Damages*	
								Property	*Crop*
23	CW	February	1.05			2	0	$11.45M	$0
Most winter storm events in one year = 4 in 2008									
33	N/A	N/A	N/A	N/A		2	0	$19.4	$0

Source: NCEI Storm Event Database

Per NCEI records, a large series of storms occurred in January 1999. One of these, which occurred on January 2, resulted in a total of 56 reported injuries from a combination of minor vehicle accidents and falls and resulted in an estimated $600,000 in property damages. The largest of these storms happened on January 14, causing one million dollars in damages. According to the record, heavy snow accumulated six to ten inches. The weight of snow and ice that had continued to accumulate since late December caused structures to collapse.

The Canton Repository reported on January 16, 1999 that the Hartville RV Center, located at 540 South Prospect Avenue in Hartville, collapsed on January 15th under the weight of snow and ice. No injuries were reported; however, the entire contents of the 104 by 50 foot structure were destroyed. The loss was estimated to be as high as $265,000. In a more recent event a winter storm in February 2011 left nearly 80,000 people without power in northern Ohio and stranded hundreds of motorists causing an estimated $300,000 in property damages.



According to reports from local officials during meeting attendance throughout the planning process, several events have taken place in Stark County in the past few years. Here are the occurrences.

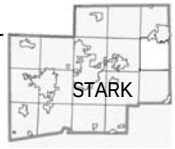
- Power outages damage from ice was reported in Plain Township in 2011.
- In 2004 an ice storm caused power outages for two days in many places in North Canton. Almost all residents needed assistance in finding shelter with friends or relatives outside the area.
- In the winter of 2011 a severe ice storm hit the Village of Hills and Dales. Power was out for a week and trees were down throughout the jurisdiction.
- The most significant ice storm the county has experienced occurred in February 2011. Approximately ½" of ice accumulated resulting in almost 60% of the county losing electrical power, in some areas for up to 10 days. This resulted in the largest sheltering operation in the counties history, with an initial population of over 250 individuals.
- Heavy snow and cold weather was experienced in Lawrence Township in February and March of 2015.

Loss and Damages

Severe winter weather can impact all areas and jurisdictions of Stark County and are typically widespread events. Severe winter weather events have resulted in $19.4 million in property damages in Stark County over the past 25 years, creating an annual average of approximately $588,000 in property damages per event. This likely underestimates damages caused to infrastructure and power lines.

For Mitigation Information Portal (MIP) data entry, planners utilized the historical worst-case scenario loss. Planners considered the entire building stock as exposed and used the average Stark County event as the representative historical occurrence for completion of the following table.

SEVERE WINTER STORM LOSS ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	5	$646,578
Non-Residential	1	$253,614
Critical Facilities	1	$7,011
TOTALS	7	$907,203



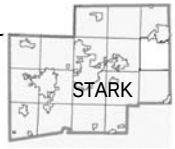
Vulnerability Assessment

This section summarizes the vulnerability of Stark County to severe winter weather events. Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding severe winter storms. For the following table, data includes severe winter storms and associated blizzards, heavy snow, ice and extreme cold, as those hazards appeared combined in the survey.

PUBLIC SENTIMENT, SEVERE WINTER STORMS – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Severe Winter Storms	23 (13.37%)	54 (31.40%)	67 (38.95%)	28 (16.28%)	172
In the past ten years, do you remember this hazard occurring in your community?				119 (69.2%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				77 (44.77%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				8 (4.65%)	172

The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

SEVERE WINTER STORMS VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	5	Excessive (Frequent – will occur during a year)	There have been 33 severe winter weather events since 1996. Stark County can expect an average of 1.32 severe winter weather events per year.
Response	2	One day	The response to most severe winter weather events typically occurs over the course of one day.
Onset	2	12-24 hours	All types of severe winter weather can be predicted up to 12 hours in advance.
Magnitude	4	More than 50% of land area affected	Severe winter weather events typically affect large portions of the county simultaneously.
Business	2	One week	Businesses may be required to close for up to one week due to poor road conditions, and not be able to get to the business.
Human	3	Medium (multiple severe injuries)	Several people could be injured in vehicle accidents, and or suffer heart attacks while shoveling snow.
Property	2	10-25% of property affected	Though impacting large land areas, severe winter weather events often result in minimal property damage (when considering it at a countywide level).
Total	20	Medium	



Temperature Extremes

Temperature Extremes are those 10°F or more above the average high or below the average low for an area.

Extreme heat is defined as three or more consecutive days with daytime temperatures of 90°F or higher and nighttime temperatures no lower than 85°F, accompanied by high humidity.

In the northern part of the U.S. “extreme cold” is used to describe well below zero temperatures.

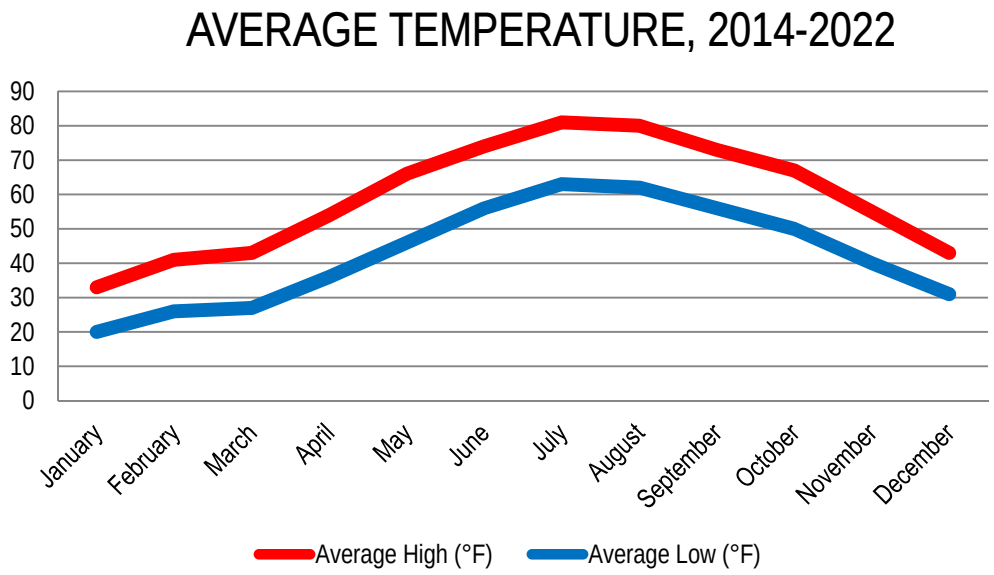
2.0 RISK ASSESSMENT

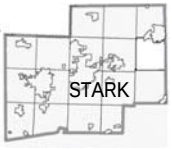
2.2.10 Temperature Extremes

Extreme temperatures are those 10°F or more above the average high or below the average low for an area.				
VULNERABILITY HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	June-September & November-March	Hazard Index Ranking:	Low
	Warning Time:	24-48 Hours	State Risk Ranking:	Not Ranked
	Probability:	Occasional (may or may not occur on annual basis)	Severity:	Critical (25-50% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	None

Hazard Introduction and Overview

Temperatures vary widely over a year, but each season has an average temperature range. To know what range of temperature is considered extreme for the region, it is necessary to know what the average temperatures are throughout any given year. The National Oceanic and Atmospheric Administration (NOAA) generates monthly "normal" reports from its different stations. The data presented below shows the average minimum and maximum temperatures from 2014 to 2022 using data from the Akron-Canton Regional Airport station, the closest station to Stark County.



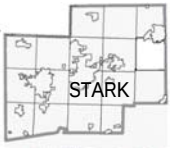


Extreme temperatures are those 10 degrees above or below the average high or low temperature. For example, an *extremely* cold temperature for Stark County would be below 10°F in January, and above 90°F in July would constitute an *extremely* hot temperature.

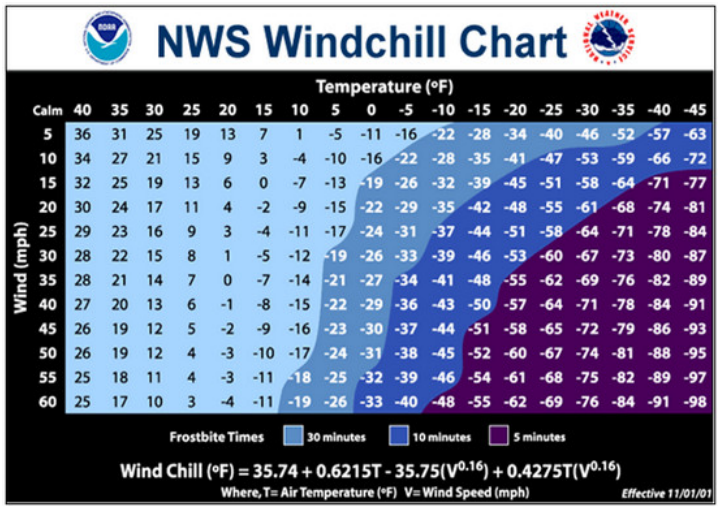
The National Centers for Environmental Information (NCEI) tracks four types of extreme temperatures.

- **Cold/Wind Chill:** Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typical value is -18° F or colder) conditions, on a widespread or localized basis. There can be situations where advisory criteria are not met, but the combination of seasonably cold temperatures and low wind chill values (roughly 15° F below normal) may result in a fatality.
- **Extreme Cold/Wind Chill:** A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35° F or colder), on a widespread or localized basis. Normally these conditions should cause significant human and/or economic impact.
- **Heat:** A period of heat resulting from the combination of high temperatures (above normal) and relative humidity. A heat event occurs whenever heat index values meet or exceed locally/regionally established advisory thresholds or a directly-related fatality occurs due to the heat event.
- **Excessive Heat:** Excessive heat results from a combination of high temperatures (well above normal) and high humidity. An excessive heat event occurs when heat index values meet or exceed locally/regionally established excessive heat warning thresholds, on a widespread or localized basis (National Weather Service Instruction 10-1605, 2007).

Extreme heat has been a hazard in Ohio, causing heat stroke to occur to residents and providing detrimental to crops. Health hazards related to extreme heat include sunburns, heat cramps, heat exhaustion, and heat stroke. In a normal year, approximately 175 Americans die from exposure to extreme heat. Young children, elderly, and those who are sick or overweight are more likely to become victims. According to 2019 census estimates from the U.S. Census Bureau approximately 20% (74,596 people) of the total population of Stark County is 65 years of age and over. Men are more susceptible to heat related illnesses because they perspire more than women, quickening the rate at which they become dehydrated.



While there is no widely accepted definition of extremely cold temperatures, periods of colder than average conditions can cause an array of negative consequences depending on their duration (Haddow, Bullock, & Coppola, 2014, p.51). Extremely cold temperatures are immediately dangerous to both humans and livestock by causing frostbite and hypothermia, which can lead to permanent injury and death. The chart below shows how quickly frostbite can occur at different temperatures and wind speeds. In unprotected structures cold temperatures can freeze water pipes causing them to burst upon thawing, leading to significant damage. Cold snaps during typically warmer weather during the growing season can damage and destroy some crops, depending on their sensitivity to temperature.



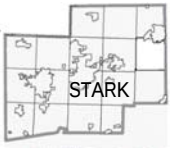
Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Location and Extent

Extreme heat is a hazard usually found in more desert regions than Stark County, Ohio. However, extreme heat has been a hazard in Ohio. Extreme cold temperatures can affect all areas of the county equally and extend into neighboring counties and states. Polar vortices expand during the winter months and are often associated with large outbreaks of Arctic air in the United States. Arctic air originating from the North Pole can travel over Canada and to several U.S. states and affect a large amount of people, animals and crops (NWS, n.d.).

Extreme temperatures affect each jurisdiction in Stark County equally. Although the temperatures may vary slightly across the county, the average of the county's temperatures and the extent of extremes are very similar. The National Weather Service, in collaboration with local partners, issues several heat-related products as conditions warrant. Descriptions of those products are in the table below.

The highest reported temperature in Ohio through the year 2020 was 113°F, this occurred on July 21, 1934 and was reported in the southeastern portion of the state. Extreme temperature events will affect each jurisdiction in Stark County essentially equally. Although temperatures may vary slightly throughout the county, the average temperatures and extent of extremes are very similar.

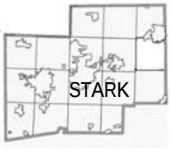


NATIONAL WEATHER SERVICE TEMPERATURE-RELATED PRODUCTS	
Product	*Description*
Excessive Heat Warning	Issued within 12 hours of extremely dangerous heat conditions. Issued when the maximum heat index temperature is expected to be 105°F or higher for at least two days and night time air temperatures will not drop below 75°.
Excessive Heat Watch	Issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. Officials use a watch when the risk of a heatwave has increased, but its occurrence and timing is still uncertain.
Heat Advisory	Issued within 12 hours of the onset of extremely dangerous heat conditions. This Advisory is issued when the maximum heat index temperature is expected to be 100°F or higher for at least two days, and nighttime temperatures will not drop below 75°.
Excessive Heat Outlook	Issued when the potential exists for an excessive heat event in the next 3-7 days. It provides information to those who need considerable lead time to prepare for an event.

Source: National Weather Service

Urban heat islands occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. Urbanized areas experience higher temperatures than outlying rural areas as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited (i.e., Canton, Massillon, Alliance, North Canton), become "heat islands" of higher temperatures relative to outlying areas. Daytime temperatures is urban areas are approximately 1 to 7°F higher than temperatures in outlying or rural areas, and nighttime temperatures are about 2 to 5°F higher.

Heat islands can contribute to higher daytime temperatures, reduced nighttime cooling, and higher air-pollution levels. These, in turn, contribute to heat-related fatalities, and heat-related illnesses such as respiratory difficulties, heat cramps, heat exhaustion, and heat stroke. Sensitive populations (i.e., the elderly, young children, and those who work outdoors) are particularly at risk during these events. The map on the following page illustrates the areas of Stark County where urban heat islands may exists.



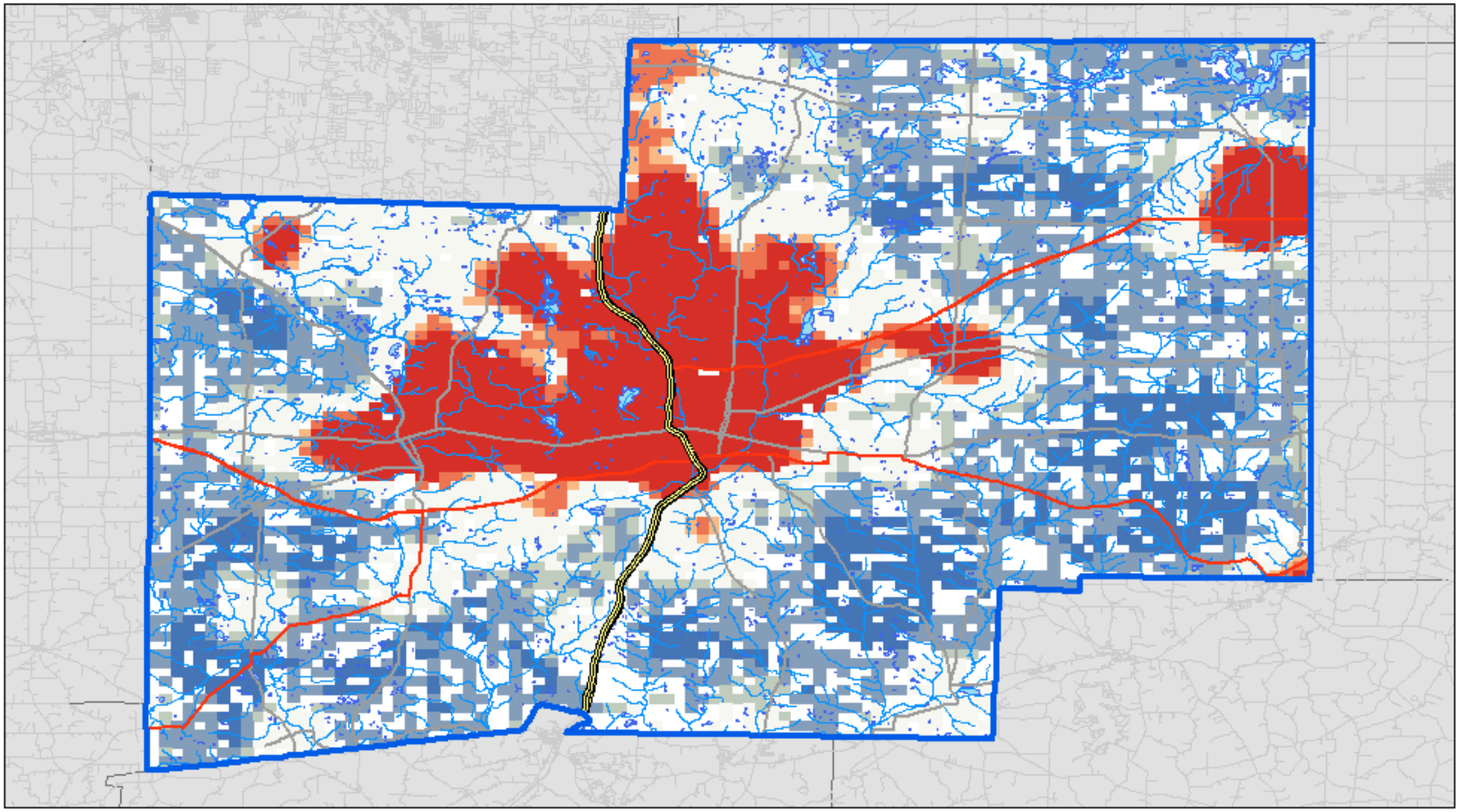
STARK COUNTY HAZARD MITIGATION PLAN

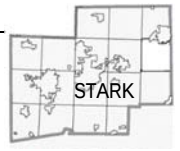
Temperature Extremes: Est. Urban Heat Island Effect

Data Source(s):
Stark Co. GIS

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

Stark County Addresses
Optimized Hot Spot Analysis
- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence





The National Weather Service also issues products regarding extremely cold temperatures. Such products include frost advisories, freeze watches and warnings, and hard freeze watches and warnings. The descriptions are in the table below.

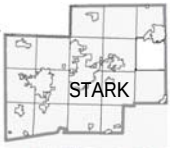
NWS, PRODUCTS RELATED TO EXTREME COLD	
Product	*Description*
Frost Advisory	Issued when temperatures, winds, and sky cover are favorable for frost development. This is most likely when temperatures are less than or equal to 36 degrees.
Freeze Watch	Freeze Watches are issued a few days ahead of a cold front in which temperatures are expected to be 29-32 degrees.
Freeze Warning	Freeze Warnings are issued when low temperatures are expected to be 29-32 degrees.
Hard Freeze Watch	Hard Freeze Watches are issued days ahead of a cold front in which temperatures are expected to be 28 degrees or less.
Hard Freeze Warning	Hard Freeze Warnings issued when temperatures are expected to be 28 degrees or less

Hazard Impacts

Extreme temperatures tend to affect the population's health rather than infrastructure. The extent of damage to infrastructure consists of broken pipes and cracks in the pavement due to expansion/contraction during extreme cold events and power outages during both extreme heat and cold events.

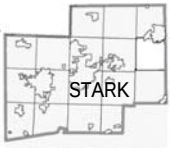
Extreme heat has a variety of impacts on human health at the individual level. Exposure to high temperatures can trigger a variety of heat stress conditions such as heart attack, heat stroke, heat exhaustion, heat cramps, sunburn, and heat rash. When combined with high relative humidity, heat exacerbates these conditions. High humidity also reduces the ability of sweat to evaporate from the skin. Prolonged exposure to heat may necessitate medical intervention, and in extreme cases cause death. Since 1999, 97 people have died of heat-related illnesses in Ohio (CDC, 2019).The following table presents human health risk by heat index temperature.

HEAT RISKS	
Heat Index	*Possible Heat Disorders for People in High-Risk Groups*
80°F-90°F	Fatigue possible with prolonged exposure to physical activity
90°F -105°F	Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
105°F -130°F	Sunstroke, heat cramps, or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
130°F+	Heat/Sunstroke highly likely with continued exposure
Source: https://nws.weather.gov/blog/nwsdesmoines/2014/06/06/iowa-heat-awareness-day-june-5-2014-2/	



Individuals most likely to experience the negative effects of extreme heat include those 65 years and older, children younger than two, and people with chronic diseases (CDC, 2018). These individuals should limit outdoor activity during the warmest parts of the day and wear appropriate clothing and sun protection.

Extreme cold conditions also impact human health in several ways. Cold weather acts as a vasoconstrictor, meaning it constricts blood vessels and raises the risk of a heart attack. Prolonged exposure to cold weather can cause cold-related illnesses, which include hypothermia, frostbite, trench foot/immersion foot, and chilblains. Extreme temperatures of either type, heat or cold, appear to impact children and the elderly more severely than other population groups. The following maps show concentrations of the elderly (i.e., 65 and over) as well as children (i.e., under 19) in Stark County.



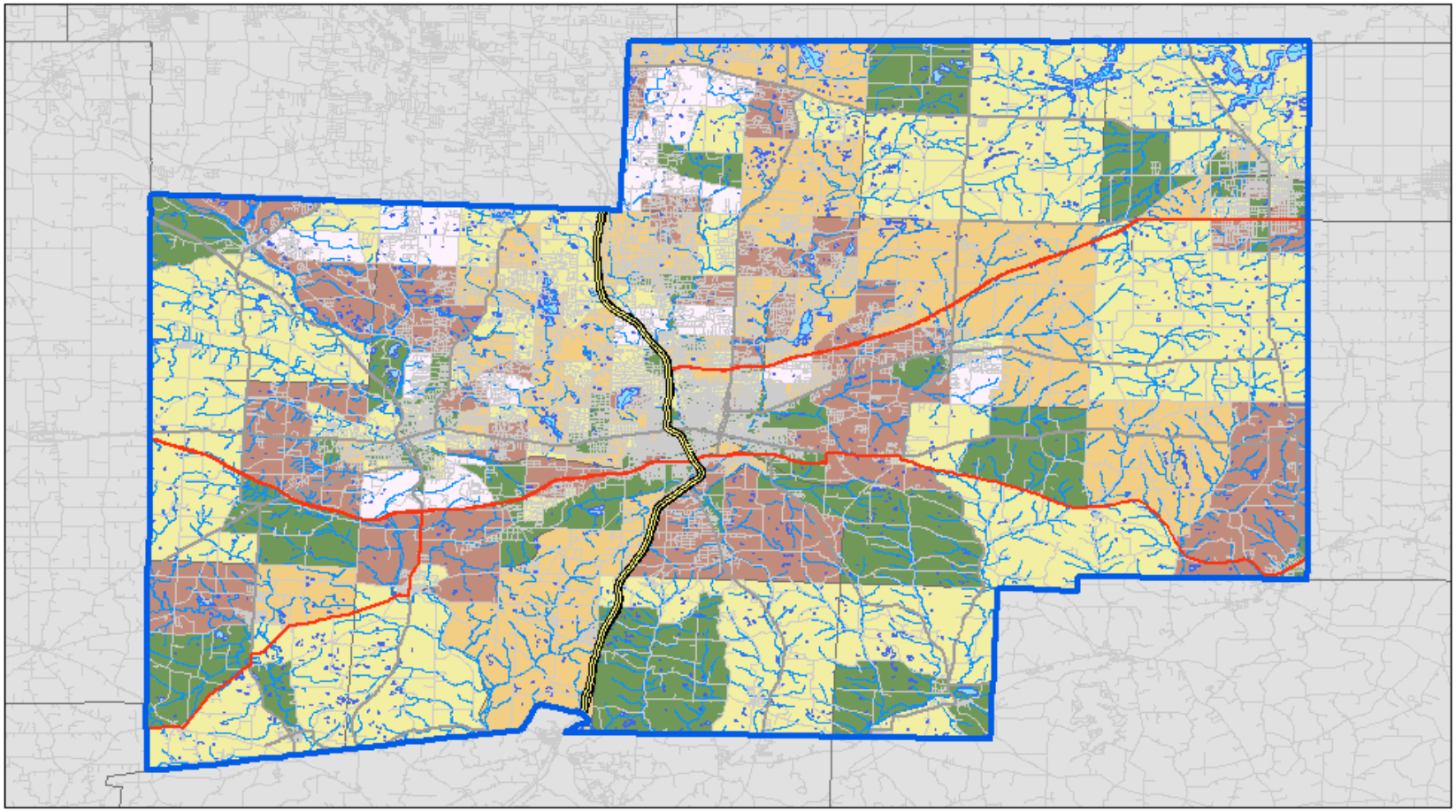
STARK COUNTY HAZARD MITIGATION PLAN

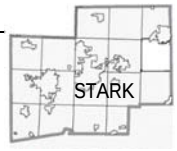
Temperature Extremes: Vulnerable Populations

Data Source(s):
US Census Bureau (American Community Survey)

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

Block Groups by Age (ACS, 2019)
Under 19 & 65+
- 17 - 332
- 333 - 551
- 552 - 800
- 801 - 1180
- 1181 - 1722





Historical Occurrences

The National Center for Environmental Information (NCEI) Storm Event Database maintains records of extreme temperature occurrences. The following table presents the NCEI extreme temperature events for Stark County. There were no recorded extreme heat events in the NCEI Storm Event Database. As indicated in the table below the month with the most instances of extreme cold is January.

HISTORICAL OCCURRENCES OF TEMPERATURE EXTREMES – STARK COUNTY					
Date	*Event Type*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
02/02/1996	Cold/Wind Chill	0	0	$100,000	$0
01/10/1997	Cold/Wind Chill	0	0	$5,000	$0
03/27/2012	Cold/Wind Chill	0	0	$0	$0
01/15/2009	Extreme Cold	0	0	$0	$0
01/06/2014	Extreme Cold	0	0	$0	$0
01/28/2014	Extreme Cold	0	0	$0	$0
02/20/2015	Extreme Cold	0	0	$0	$0
01/30/2019	Extreme Cold	0	0	$0	$0
	TOTAL	0	0	$105,000	$0

Source: NCEI Storm Events Database

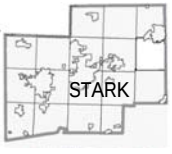
As shown in the above table, there have been eight instances of cold or extreme cold temperatures in Stark County since 1996. This gives an average of 0.32 cold or extreme cold events per year.

Countywide Cold/Wind Chill – February 2, 1996

Bitter cold arctic are was in-place over the area with overnight low temperatures averaging between zero and 10 below and daytime high temperatures in the single digits. Wind gusts of 25 mph dropped wind chills as low as 40 below zero. Record lows were set at most stations across northern Ohio. A number of pipes and water mains froze and ruptured.

Countywide Extreme Cold – January 6, 2014

Brutal cold weather settled over the area, resulting in the coldest temperatures since January of 1994. Air temperatures of minus 10 degrees were recorded at the Akron-Canton Regional Airport. Wind chills dipped below minus 25 degrees. All of the schools in the area were closed for two days.



Countywide Excessive Heat – August, 1995

In August of 1995, an unusually long period of hot weather with afternoon temperatures generally in the 90s and relatively high humidity caused injuries and fatalities. Twelve of the thirteen fatalities were older citizens, and all occurred in Cuyahoga County in the Cleveland urban area. Nights remained unusually warm and in a number of cases temperatures stayed in the 80s all night in the city which likely contributed to the heat related problems. Injuries were generally from heat stress/stroke. Older utility systems suffered a high incidence of breakdown due to prolonged high demand, and some roads buckled in the heat.

Loss and Damages

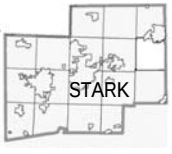
According to the NCEI Storm Events Database, there has been eight instance of extreme cold temperatures that resulted in $105,000 in property damage. As such, a historical loss estimate suggests the county could experience up to $13,125 per event. Temperature extreme events rarely affect structures; these events usually affect the population. The vast majority of the property damages associated with the extreme cold events involved water main pipes freezing and busting.

Vulnerability Assessment

This section summarizes Stark County's vulnerability to temperature extremes. Stark County conducted an online survey for the public to share its thoughts on the hazard of temperature extremes. The following table presents the results of that survey.

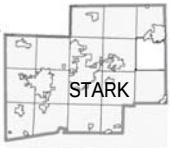
PUBLIC SENTIMENT, TEMPERATURE EXTREMES – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Temperature Extremes	39 (22.67%)	59 (34.30%)	51 (29.65%)	23 (13.37%)	172
In the past ten years, do you remember this hazard occurring in your community?				91 (52.9%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				98 (56.98%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				0 (0.00%)	172

Source: Online Public Survey Results



The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

TEMPERATURE EXTREMES VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	3	Low	Stark County has experienced eight temperature extreme events since 1996, for an average of 0.32 events per year.
Response	2	One day	Temperature extreme events do not warrant an extended emergency response.
Onset	1	Over 24 hours	Current technology can predict temperature extreme events up to 24 hours prior to the onset of the event.
Magnitude	3	Critical (25-50% of land area affected)	Extreme temperature events are widespread events that typically affect entire regions.
Business	1	Less than 24 hours	Businesses and critical facilities would not typically be interrupted extreme temperature events.
Human	2	Low (some heat related illnesses)	Temperature extremes can cause or exacerbate illnesses, particularly in vulnerable populations.
Property	2	Less than 10% of property affected	Property damage due to temperature extreme events is unlikely.
Total	14	Low	



Wildfire

A wildfire is any outdoor fire that is not controlled, supervised, or arranged that spreads rapidly through vegetative fuels. Wildfire probability depends on local weather conditions; outdoor activities such as camping, debris burning, and construction; and the degree of public cooperation with fire prevention measures. Wildfires can result in widespread damage to property and loss of life.

2.0 RISK ASSESSMENT

2.2.11 Wildfire

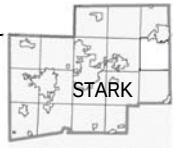
Uncontrolled fires that spread rapidly through vegetative fuels (i.e., forests, grasslands, and prairies), exposing and possibly consuming structures. These dangerous fires can devastate not only wildlife and natural areas, but also communities.				
VULNERABILITY  HIGHEST HIGH MEDIUM LOW LOWEST	Period of Occurrence:	Most common in Spring and Fall	Hazard Index Ranking:	Low
	Warning Time:	Sudden. Less than 24 hours	State Risk Ranking:	11
	Probability:	Remote (Unlikely to occur on an annual basis)	Severity:	Minor (less than 10% of land area affected)
	Type of Hazard:	Natural	Disaster Declarations:	None

Hazard Introduction and Overview

A wildfire is an unplanned, uncontrolled, fire that spreads rapidly through vegetative fuels (i.e., forests, grasslands, and prairies), exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that is visible for miles. Wildfires can occur at any time of the year but mostly happen during prolonged, dry, hot spells. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Human carelessness, negligence, and ignorance cause most wildfires (i.e., debris burning, arson, equipment fires, smoking, campfires, etc.). In some instances, lightning strikes can precipitate spontaneous combustion. ODNR Division of Forestry estimates that more than 15,000 wildfire and natural fuel fires occur in any given year, caused mainly by people carelessly burning debris.

CAUSES OF WILDFIRES IN OHIO (1997 – 2007)		
Cause	*Number of Fires*	*Acres Burned*
Debris Burning	3,395	13,754
Incendiary (arson)	1,174	9,217
Equipment	224	694
Smoking	177	692
Campfires	128	573
Children (playing w/ matches)	87	189
Lightning	56	77
Railroad	22	35
Other/Unknown	2,972	17,391
*NOTE: Other/Unknown indicates wildfire was not investigated to the point of confidently determining cause		

Source: Ohio Mitigation Plan, 2019



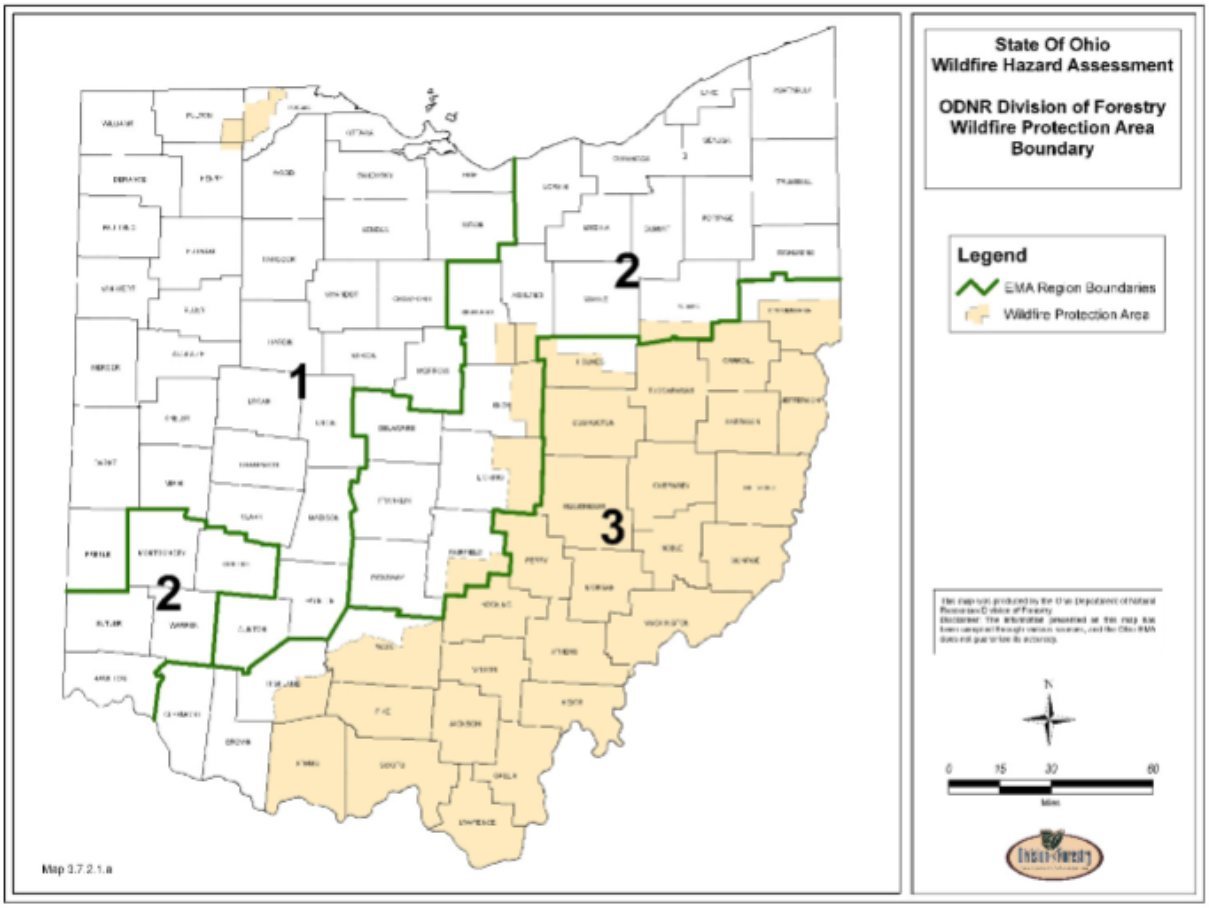
Ohio's wildfire seasons occur primarily in the spring (i.e., March, April and May) before vegetation has matured and greened, and the fall (i.e., October and November) when leaf drop occurs. During these times and especially when weather conditions are warm, windy, and with low humidity, vegetation is particularly susceptible to burning.

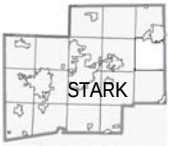
Open burning is regulated by state laws and local burning ordinances. Outside municipal limits, burning is prohibited from six am to six pm during the months of March, April, May, October, and November.

"Wildland fire can be a friend and a foe. In the right place at the right time, wildland fire can create many environmental benefits, such as reducing grass, brush, and trees that can fuel large and severe wildfires and improving wildlife habitat. In the wrong place at the wrong time, wildfires can wreak havoc, threatening lives, homes, communities, and natural and cultural resources" (U.S. Forest Service).

Location and Extent

Wildfires in Ohio occur most frequently in the southern, southeastern, and eastern parts of the state. Each year in Ohio, an average of 1,000 wildfires burn 4,000 to 6,000 acres of forest



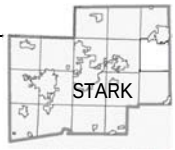


and grassland within ODNR Division of Forestry's forest fire protection district. The protection district includes all 200,000+ acres of Ohio's 21 State Forests, as well as all privately owned lands within the district boundaries. The forest fire protection district corresponds mostly to the state's unglaciated hill country (southern and eastern Ohio), the southern portion of Stark County is within the Wildfire Protection Area.

Area of concern for wildfires in Stark County would be the 180,696 acres of shrub and grasslands, pastures, and forestland with recreational opportunities and other attractions in designated areas such as Deer Creek Reservoir, Fry Family Park, Jackson Bog State Nature Preserves, Molly Stark Park, Petros Lake Park, Quail Hollow Park, Sippo Lake Park, Tam O'Shanter Park, and Walborn Reservoir. Campfires, coupled with large numbers of visitors and a large proportion of trees, make wildfires a potential hazard for Stark County.

The Stark County Parks District has indicated that increasing the amount of defensible space around vulnerable areas, and conducting prescribed burning techniques to reduce fuel loads should be implemented to reduce the probability of grass fires impacting residential and commercial properties located within close proximity of grasslands.

The map below shows the areas in Stark County that could be susceptible to wildfire conditions. It shows areas with potential fuels (i.e., deciduous forest, evergreen forest, herbaceous wetlands, urban/recreational grasses, and woody wetlands).



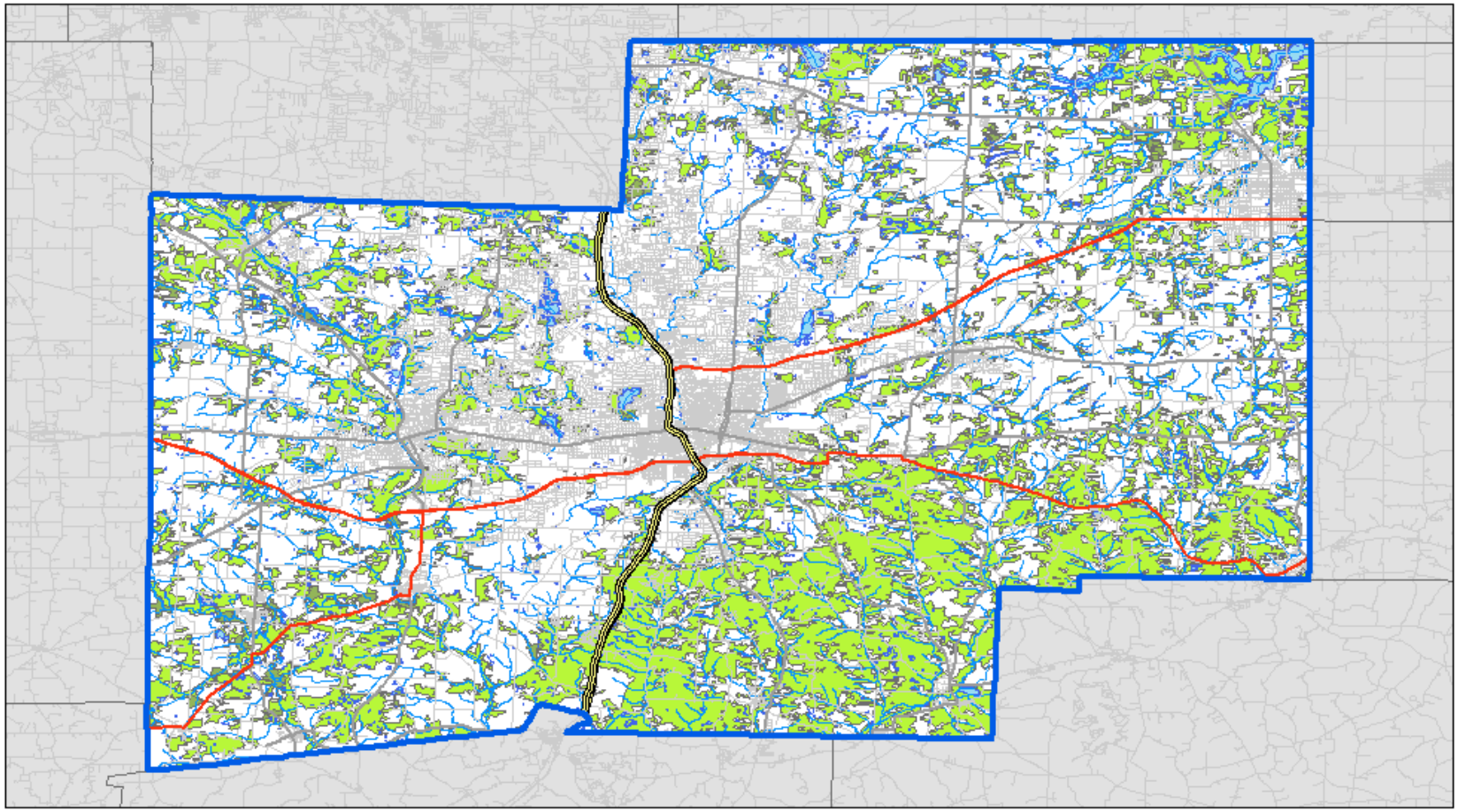
STARK COUNTY HAZARD MITIGATION PLAN

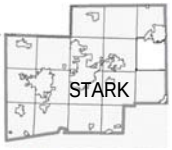
Wildfire Risk Areas

Data Source(s):
Stark Co. GIS, USGS NLCD

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.

Deciduous Forest
Evergreen Forest
Woody Wetlands

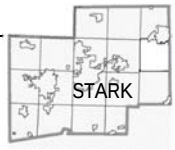




Stark County experiences several small fires each year, most of which are easily controlled by local fire departments and do not reach the threshold for inclusion as a "wildfire." Like all other fires, wildfires require four conditions to start: an available fuel source (including dried leaves or grass), dry conditions (including low relative humidity), an ignition source, and a chemical reaction to sustain combustion. The first two conditions typically occur in Ohio in the spring and fall, when trees are bare, and sunlight can warm the ground and dry surface fuels.

The National Fire Danger Rating System is a system that allows fire officials to estimate current fire danger for a given area based on available fuels, weather, topography, and risks.

- **Low:** When the fire danger is "low," fuels do not ignite easily, and a more intense heat source is needed to start fires. Dry grasslands may burn quickly, but wood fires will spread slowly, and control of these fires is typically not difficult.
- **Moderate:** When the fire danger is "moderate," fires can start from accidental causes, but the number of fire starts is generally low. If a fire does start on open, dry grassland, it can spread quickly on windy days. Most wood fires spread slowly or moderately. The average fire intensity will be moderate, except in heavy concentrations of fuel. Fires are still not likely to become severe and are typically easy to control.
- **High:** When the fire danger is "high," fires can start easily from most fuel sources. Unattended campfires and brush fires are likely to escape and can spread quickly. Fires can become serious and difficult to control unless extinguished when they are still small.
- **Very High:** When the fire danger is "very high," fires will start easily from most fuel sources, spread rapidly, and quickly increase in intensity following ignition. These fires can be challenging to control and will often become much more extensive and longer-lasting than fires in lower categories.
- **Extreme:** When the fire danger reaches "extreme," fires of all types can start quickly and burn intensely. All fires are potentially dangerous and can spread rapidly with intense burning. Small fires become larger much faster than at the "very high" level. Long-distance fire spotting is likely. These fires can become dangerous and often last for several days.



Hazard Impacts

A major cause of forest fires in Ohio is debris burning. These fires typically start small but spread by wind to dead grass and leaves bordering woodlands. The number and severity of wildfires depend on external factors such as drought, human activity, wind activity, and the amount of available fuel. Wildfires can burn less than one acre up to thousands of acres of land in a short period of time. These fires can completely destroy recreational areas, community infrastructure, cultural and economic resources, timber, forage, wildlife habitats, scenic vistas, and watersheds.

Secondary effects of wildfires include erosion, increased landslide potential, the introduction of invasive species, and changes in air and water quality.

A Project Manager with Stark Parks indicated that their organization periodically coordinates with local fire departments to conduct controlled burns in an effort to limit fuel loads in an effort to reduce the potential for wildfires.

Historical Occurrences

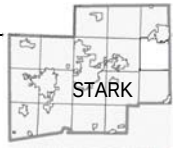
Weather is the primary factor that determines the severity of fall and spring wildfire seasons in Ohio. Drought conditions, combined with windy days create red flag, or extreme high fire danger. Weather conditions leading up to and in 1930 resulted in the worst year to date for wildfires in Ohio, as 15,400 acres were recorded as burning over the course of the year. The extreme drought in 1950 that continued for the next several years provided for very active wildfire seasons as well. March 27, 1950 is considered the worst fire control day in Ohio's history, as 65 fires burned a total of 5,900 acres. A total of 680 wildfires burned 22,445 acres in the fall of 1952.

Between January, 2007 and November, 2017, Ohio has experienced 8,235 wildfires that burned 42,622 acres within the ODNR-Division of Forestry Wildfire Protection Area. The table below provides data regarding acres burned specific to Stark County.

PAST WILDFIRE OCCURRENCES (2007 – 2017)									
County	*Total Fire Event*	*Total Acres Burned*	*Est. Events per Year*	*1 to 99 Acres*		*10 to 99 Acres*		*100+ Acres*	
				Events	*% of Total*	*Events*	*% of Total*	*Events*	*% of Total*
Stark	116	618	11	99	85%	17	15%	0	0%

Loss and Damages

Estimating monetary losses to wildfire is difficult as the vast majority of wildfires in Ohio occur in open land or fields and monetary losses are not often recorded. This lack of data may result in inconsistencies if an analysis was done based on reported monetary loss. However, from



an exposure assumption, the greater the number of people and property in an area, and the greater variables for wildfire severity of that area, the greater the potential loss. The data that is more consistently available are the number of acres burned per event. For this estimate, the total number of acres burned from January 1, 2007 to December 31, 2017 for Stark County was divided by the respective number of events recorded. This results in an average of 5.3 acres burned per event.

Structural vulnerability to wildfires typically occurs where the built environment intersects with the natural environment. In a 2005 study, researchers reported one-third of homes as being located either in a "wildland urban interface" area or an "intermix WUI" (USDA, 2013, p. 12). Planners thus multiplied the total building stock by one-third. Further, according to the National Fire Protection Association (NFPA), the average per-incident loss attributed to wildfire data captured in a ten-year period of large-loss fire was $195,729,342.

The Ohio EMA's "loss estimate workbook for HAZUS results" provided the figures included in the table below.

STARK COUNTY WILDFIRE EXPOSURE ESTIMATE – MIP DATA ENTRY		
Structure Type	*Number*	*Loss Estimate*
Residential	1,015	$139,500,415
Non-Residential	298	$54,717,677
Critical Facilities	8	$1,512,594
TOTALS	1,321	$195,730,686

Vulnerability Assessment

The following table identifies Stark County assets and dams located in wildfire risk areas.

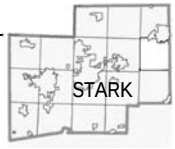
ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Altercare of Canton	7006 Fulton Dr NW	Canton		X	
Altercare of Louisville Ctr. for Rehab. & Nursing	7187 St Francis St	Louisville		X	
Chapel Hill Community	12200 Strausser St NW	Canal Fulton		X	
Country Lawn Ctr. for Rehab. & Nursing	10608 Navarre Rd SW	Navarre		X	
Dunkeith Park	Hills and Dales Rd NW	Hills and Dales		X	
East Sparta Elementary School	2195 Poplar St SE	East Sparta		X	
Emergency Medical Transport	2511 Waynesburg Dr SE	Canton		X	
Fairless High School	11885 Navarre Rd SW	Navarre		X	
Fairless Middle School	11836 Navarre Rd SW	Navarre		X	
Lawrence Twp Police Dept	6740 Erie Ave N	Canal Fulton		X	
Marlington High School	10450 Moulin Ave NE	Alliance		X	

ASSET	ADDRESS	CITY	ASSET TYPE		
			Infrastructure	*Critical Facilities*	*Cultural Resources*
Massillon City School District Warehouse Bldg.	1 George Red Bird Dr SE	Massillon		X	
Massillon City Tiger Stadium	314 Russell Blvd SE	Massillon		X	
Minerva Middle School	600 E Line St	Minerva		X	
North Industry Post Office	4724 Cleveland Ave SW	Canton		X	
Northwest High School	8580 Erie Ave NW	Canal Fulton		X	
Northwest Middle School	8614 Erie Ave NW	Canal Fulton		X	
Prairie College Elementary School	3021 Prairie College St SW	Canton		X	
R.G. Drage Career Education Center	2800 Richville Dr SE	Massillon		X	
Robertsville Fire Department	11185 Lincoln St SE	Robertsville		X	
Shearers Foods, Inc.	692 Wabash Ave N	Brewster		X	
Washington High School	1 Paul E Brown Dr SE	Massillon		X	
Waynesburg Elementary School	200 W Lisbon St	Waynesburg		X	
Canton Water Treatment Plant	2664 Harrisburg Rd NE	Canton	X		
Clay's Park Resort Runway	13190 Patterson St NW	N. Lawrence	X		
Fox Runway	Willowdale St	Magnolia	X		
Hammond Runway	Ravenna Ave NE	Louisville	X		
Navarre Water Treatment Plant	338 Wooster St NW	Navarre	X		
Firestone, Charles E., House	2814 West Dale Road NW	Canton			X
Massillon Cemetery Building	1827 Erie Street S	Massillon			X
Purcell, Robert A. and Elizabeth H., House	2700 Fairway Lane	Alliance			X
Stewart, Harry Bartlett, Property	13340 Congress Lake Road	Hartville			X
Town Pump of East Sparta, The	Walnut Street and Main Avenue	East Sparta			X

Stark County conducted an online survey for the public to share its thoughts on hazard vulnerabilities. The following table presents the results of that survey regarding wildfires.

PUBLIC SENTIMENT, WILDFIRE – STARK COUNTY					
Hazard	*Level of Concern*				*Total Responses*
	Not at All	*Somewhat*	*Concerned*	*Very*	
Wildfire	116 (67.44%)	47 (27.33%)	7 (4.07%)	2 (1.16%)	172
In the past ten years, do you remember this hazard occurring in your community?				3 (1.7%)	172
Have you noticed an increase in the occurrences or intensity of this hazard?				7 (4.07%)	172
Have you noticed a decrease in the occurrences or intensity of this hazard?				2 (1.16%)	172

Source: Online Public Survey Results



The following table assigns point totals based on the research presented in this profile for each category that appears in Ohio EMA's Mitigation Information Portal (MIP) tool.

WILDFIRE VULNERABILITY SUMMARY			
Category	*Points*	*Description*	*Notes*
Frequency	2	Low (Remote, unlikely to occur in a year)	There were 116 fire events in Stark County from 2007 to 2017, (for an average of 11 incidents per annum). The total acreage burned from the 116 events was 618 acres for an average of 5.3 acres burned per fire event.
Response	3	One week	Wildfires in the region are typically small and easily-contained; however, may still require a small-scale response for up to a week.
Onset	4	Less than 6 hours	Officials can easily predict wildfire conditions, but fires themselves occur with no notice.
Magnitude	1	Localized (Less than 10% of land area affected)	The average wildfire burns 3.87 acres, which is substantially less than 10% of Stark County's land area.
Business	2	One Week	Most wildfires in Stark County are small; however, there is the possible of some businesses being impacted for up to one week.
Human	2	Low (Some injuries)	Generally, the risk of injury or death due to wildfire is low. First responders to the event may experience adverse health effects.
Property	1	Less than 10% of property affected	The average wildfire in Stark County would burn less than 10% of the county's land area. By proxy, wildfires would impact less than 10% of the property in the county.
Total	15	Low	

2.0 RISK ASSESSMENT

2.3 Hazard Rankings

One of the components of the risk assessment is to determine the risk of, and vulnerability to hazards. This can be determined by the probability of occurrence and the potential severity of hazard events. This process helps identify which hazards pose the most significant concerns to Stark County and its municipalities. The probability of an event derives from the number of historical events within a certain timeframe. Timeframes vary based on information available from different sources (and they can vary widely).

The Ohio Emergency Management Agency (OEMA) Mitigation Information Portal (MIP) supports an overall ranking for the hazards considered in the state's mitigation plans. Like the MIP tool, this plan recognizes the value of implementing several categories to determine the overall risk and vulnerability. The following narrative and tables describe the categories utilized by this plan and how they relate to the available data.

FREQUENCY			
Value	*Score*	*Description*	*Definition*
.76 - >1.0	5	Excessive (Frequent)	Will occur during a year (MIP: hazard or event resulted in nine or more declarations)
.51 - .75	4	High (Probable)	Likely to occur in a year (MIP: hazard or event resulted in six to eight declarations)
.26 - .50	3	Medium (Occasional)	May (or may not) occur in a year (MIP: hazard or event resulted in three to five declarations)
0 - .25	2	Low (Remote)	Unlikely to occur in a year (MIP: hazard or event resulted in one to two declarations)
0	1	None (Improbable)	So unlikely that it can be assumed it will not occur in a year (MIP: hazards or events result in no local disaster declarations)

Historical occurrences inform all calculations, not worst-case scenarios. In cases with zero occurrences, other available data (which varies across the hazards and is outlined in each profile) support determinations.

"Frequency" refers to the number of times a hazard occurs in a specific period (based on available historical data). In most instances, the total occurrences (e.g., three occurrences) are divided by the length of time (in years) that data is available (e.g., ten years). Thus three occurrences divided by ten years equals 0.3. The table above translates the resultant numeric values into a narrative description of frequency (that corresponds to MIP categories). In the example described here, the hazard would have a 'low' frequency. At times, no historical data is available; in these cases, the hazard receives the lowest possible points for the category (i.e., one). The table below presents the remainder of the categories (including "frequency").

MIP CATEGORIES							
	Frequency	*Response*	*Onset*	*Magnitude*	*Business*	*Human*	*Property*
1	None	Less than half a day	Over 24 hours	Localized (Less than 10% of land area affected)	Less than 24 hours	Minimum (minor injuries)	Less than 10% of property affected
2	Low	One day	12-24 hours	Limited (10-25% of land area affected)	One week	Low (some injuries)	10-25% of property affected
3	Medium	One week	6-12 hours	Critical (25-50% of land area affected)	At least two weeks	Medium (multiple severe injuries)	25-50% of property affected
4	High	One month	Less than 6 hours	Catastrophic (More than 50% of land area affected)	More than 30 days	High (multiple deaths)	More than 50% of property affected
5	Excessive	More than one month	N/A	N/A	N/A	N/A	N/A

Each hazard receives a score for each cate gory that corresponds to the number in the far left column. Hazards receive scores of between 7 (i.e., all seven categories receive a value of one) and 30 points (i.e., all seven categories receive a value of four or five). The list below represents an overall range by which planners ranked all of the hazards in this plan.

Range of Points (Score)	*Hazard Ranking*
7 - 10	Lowest
11 - 15	Low
16 - 20	Medium
21 - 25	High
26 - 30	Highest

The following table summarizes risk and vulnerability for all of the hazards included in the plan. It outlines the points each hazard received per the above methodology.

SUMMARY OF HAZARD RANKINGS – STARK COUNTY									
Hazard	*Risk*	*Frequency*	*Response*	*Onset*	*Magnitude*	*Business*	*Human*	*Property*	*Total*
Dam & Levee Failure	Medium	2	4	1	1	2	3	3	16
Drought	Low	2	4	1	3	2	1	2	15
Earthquake	Low	2	2	5	1	1	1	1	13
Epidemic	Low	3	5	1	1	2	2	1	15
Flooding	High	5	4	3	2	3	2	3	22
Hazmat Release	Medium	3	2	5	1	2	3	3	19
Land Subsidence	Medium	4	3	3	1	2	2	2	17
Severe Summer Storms	Medium	5	2	2	4	1	2	2	18
Severe Winter Storms	Medium	5	2	2	4	2	3	2	20
Temperature Extremes	Low	3	2	1	3	1	2	2	14
Wildfire	Low	2	3	4	1	2	2	1	15

2.0 RISK ASSESSMENT

2.4 Development Trends and Complicating Variables

This section examines various demographic and other development trends in Stark County to contextualize future risk to the hazards identified by this plan.

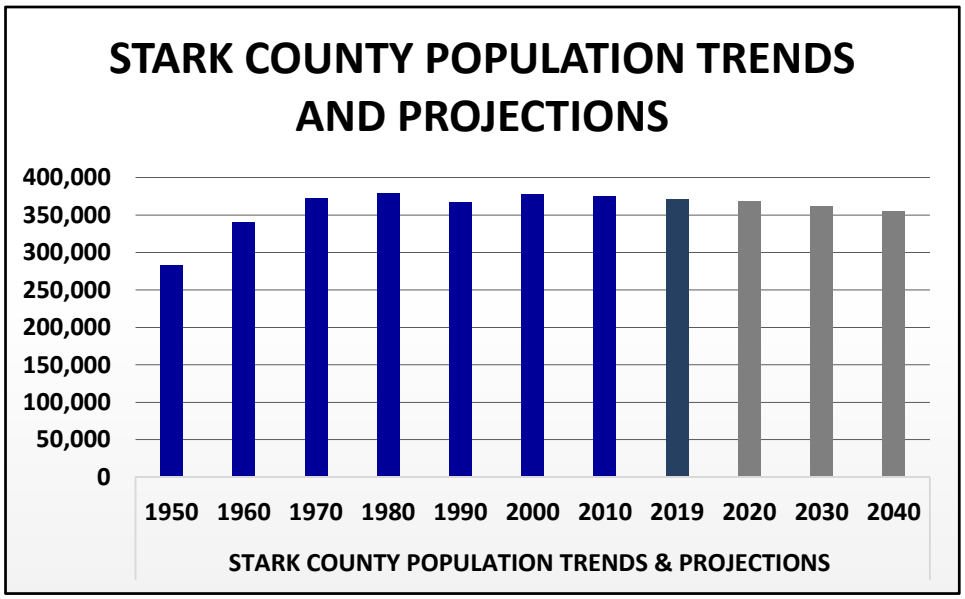
2.4.1 Development Trends

§ 201.6(c)(2)(ii)(c)	Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land-use decisions.

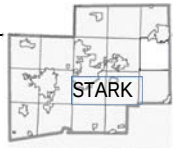
Population

Hazard Mitigation Relevance: People are the essential assets in a community. Understanding population trends and concentrations assists in describing current and future vulnerability, as well as in the design of outreach and to target preparedness, response, and mitigation actions. Also, understanding where people reside or visit in a community informs the appropriate locations for mitigation projects (FEMA, 2013).

Stark County's population has fluctuated since the mid-1900s. As the graphic below indicates, the population grew steadily (per decennial Census data) between 1950 and 1980. Since then, the population has slightly declined with each decennial census with the exception of a slight increase from 1990 to 2000. Projections for 2020, 2030, and 2040 show a continuing decline.



Source: Stark County Profile prepared by the Ohio Development Services Agency, Office of Research, https://development.ohio.gov/files/research/Stark.pdf



The following table assigns figures to the bars on the above graph.

STARK COUNTY POPULATION CHANGE, 1950-2040											
Jurisdiction	*1950*	*1960*	*1970*	*1980*	*1990*	*2000*	*2010*	*2019*	*2020*	*2030*	*2040*
Stark County	283,194	340,345	372,210	378,823	367,585	378,098	375,586	370,606	368,210	361,130	355,500

Source: Ohio Development Services Agency, Office of Research – Stark County Profile

It is also helpful to consider population trends in the population clusters throughout Stark County. The Ohio Development Services Agency identifies the following as the "largest places" (2020) in Stark County.

POPULATION CHANGE, LARGEST PLACES			
Place	*2010 Pop.*	*2019 Pop.*	*% Change*
Canton City	73,007	70,447	- 25.60
Jackson Township	40,152	40,058	-0.94
Plain Township	34,900	34,349	-5.51
Massillon City	32,149	32,584	+4.35
Perry Township	28,303	28,026	-2.77
Lake Township	27,017	26,911	-1.06
Alliance City (part)	22,282	21,412	-8.70
North Canton City	17,488	17,176	-3.12
Canton Township	12,685	12,467	-2.18
Nimishillen Township	9,652	9,475	-1.77

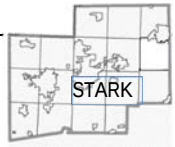
Source: Ohio Development Services Agency, Office of Research – Stark County Profile

As illustrated in the table above, the 2019 populations of all but one places declined from the 2010 Census, with the City of Canton seeing the largest population decrease. The only place that saw a population increase was the City of Massillon. While this data is difficult to interpret for hazard mitigation purposes, it suggests that less local funding will be available in regular jurisdictional budgets for special mitigation projects.

Residential construction slowly declined in Stark County from 2015 to 2017, then rose in both 2018 and 2019. The following table presents the residential construction data.

RESIDENTIAL CONSTRUCTION 2015-2019					
Criterion	*2015*	*2016*	*2017*	*2018*	*2019*
Total Units	558	553	525	527	624
Total Valuation (000)	$105,900	$108,088	$108,513	$115,707	$131,070
Single-Unit Buildings	405	457	445	412	478
Avg. Cost per Single Unit Building	$233,144	$220,792	$230,599	$256,554	$250,040
Multi-Unit Buildings	153	96	80	115	146
Avg. Cost per Multi-Unit Bldg.	$75,012	$74,852	$73,708	$87,011	$79,114

Source: Ohio Development Services Agency, Office of Research – Stark County Profile



Outward migration in jobs and population to the suburbs is a somewhat anticipated trend that Stark county has continued to experience sine the 2017 Comprehensive Plan was completed. Older, established cities have been working diligently to retain their population and employment force, but statistics present a continued increase in suburbanization, which consequently has led to a loss in farmland, higher commuting and infrastructure costs, and a growing financial burden on the central cities to sustain existing services on a reduced revenue stream.

Areas of the county that saw steady population increases over the last decade include Lake Township (15.7%), Canal Fulton (8.3%), Jackson Township (7.0%) and North Canton (6.8%).

Economic and Business Development

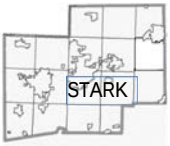
Hazard Mitigation Relevance: Describing economic and business development trends helps to assess dependencies between economic sectors and the infrastructure needed to support them (FEMA, 2013).

The Office of Research within Ohio's Development Services Agency noted changes in the number of establishments and employment between 2013 and 2018. The following table presents the data.

ESTABLISHMENTS, EMPLOYMENT, AND WAGES BY SECTOR, 2013 AND 2018 COMPARISON

Sector	*Number of Establishments*		*Average Employment*		*Total Wages*		*Average Weekly Wage*	
	Since 2012 (%)	2018	Since 2012 (%)	2018	Since 2012 (%)	2018 ($)	Since 2012 (%)	2018 ($)
Private Sector	-1.8%	8,295	2.8%	141,190	14.2%	$5,904,725,384	11.0%	$804
Goods-Producing	-4.5%	1,399	1.0%	34,023	11.2%	$1,973,861,346	10.2%	$1,116
Natural Resources & Mining	-11.2%	79	-26.2%	662	-29.4%	$36,734,562	-4.3%	$1,067
Construction	-1.6%	802	16.1%	7,572	36.5%	$445,239,272	17.6%	$1,131
Manufacturing	-7.7%	518	-1.8%	25,788	6.8%	$1,491,887,512	8.9%	$1,113
Service-Producing	-1.3%	6,896	3.4%	107,168	15.8%	$3,930,864,038	11.9%	$705
Trade, Transportation & Utilities	-1.8%	1,895	0.4%	28,910	11.5%	$1,032,188,645	11.2%	$687
Information	7.5%	86	-6.0%	1,490	1.5%	$64,484,304	7.9%	$832
Financial Services	0.7%	843	-8.5%	6,538	9.6%	$358,973,996	19.9%	$1,056
Professional & Business Services	-0.1%	1,324	9.1%	14,510	29.5%	$726,366,394	18.7%	$963
Education & Health Services	4.0%	1,097	1.2%	31,103	11.3%	$1,291,523,432	10.1%	$799
Leisure & Hospitality	-0.3%	894	13.1%	18,865	30.2%	$302,887,405	15.3%	$309
Other Services	-10.4%	751	6.4%	5,739	25.2%	$153,887,975	17.8%	$516
Federal Government			-0.3%	965	8.7%	$63,091,740	9.0%	$1,257
State Government			-4.0%	1,320	14.5%	$80,493,178	19.3%	$1,173
Local Government			1.5%	16,489	9.6%	$686,572,637	8.0%	$801

Source: Ohio Development Services Agency, Office of Research – Stark County Profile



The population data presented above show a decline across the entire county. There has been speculation that job losses, particularly in the natural resources and mining section, have led to outward population migration, as the above table would largely support. However, the Ohio Department of Development reports that the county's unemployment rate has slightly declined since 2016.

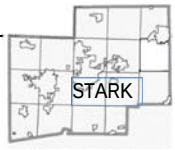
- **2015:** 5.3%
- **2016:** 5.5%
- **2017:** 5.2%
- **2018:** 4.9%
- **2019:** 4.5%

Transportation

Hazard Mitigation Relevance: The transportation infrastructure is a vital community asset, particularly in the response and recovery phases. Ensuring open arterial routes helps with emergency response, the movement of life-saving (or sustaining) supplies, etc. Identifying critical transportation assets and understanding their potential vulnerabilities can inform projects designed to support their continuity in emergencies.

Economic development often correlates with roadway development and improvements, particularly where and to what extent transportation improvements are needed. The Ohio Department of Transportation (ODOT) maintains a schedule of planned road, bridge, and bikeway projects from 2020 through 2025. According to ODOT, most transportation projects will occur in the central portion of Stark County, though most major corridors will see some activity. Major roadway projects slated for the Canton, Canal Fulton, and Alliance areas include the following:

- U.S. 62 Relocation
- Resurfacing of State Route 93 and 236 includes minor bridge work to five structures
- Resurfacing of US 30 from Mapleton Street to western Minerva Corporation limit
- Resurfacing of State Route 619 between Atwater Avenue and State Route 183
- State Route 21 bridge replacement project
- State Route 43 drainage improvement project
- Stark-Jackson pedestrian tunnel under Fulton Drive at Jackson High School
- State Route 172 & Perry Drive Intersection Safety Project
- U.S. 30 roadway relocation project
- I-77 and US 30 interchange improvements



Development Trends

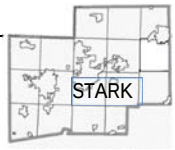
Understanding the risk that the county faces from future hazard occurrences is a multifaceted exercise. The profiles in Section 2.0 provide a background of this risk and provide loss estimates based on historical data, but are generally based in the past. Identifying and analyzing development trends allows for the consideration of future vulnerability. This information comes from a variety of sources, including economic trends, municipal comprehensive plans, and interviews with local officials. The following pages contain select examples of how some jurisdictions are dealing with future development.

As Stark County ages, it is apparent that planning must take place to address the needs of the population as well. The Stark County Comprehensive Plan of 2019 identifies a few instances where planning can greatly benefit not only the people living there currently, but future generations that may be at risk of certain hazards such as flooding.

One of the overall strategies in the latest Comprehensive Economic Development Strategy (CEDS) plans for Stark County was to attract reinvestment into already established areas to improve economic conditions and reduce urban sprawl. This could also reduce introducing new development into areas where known site-specific hazards exist (i.e., dam and levee failure, flooding, land subsidence, and wildfire).

According to a representative with the Stark County Regional Planning Commission, “Stark County is currently experiencing urban sprawl, as portions of the population are moving out of the legacy cities into more suburban townships”. “Residential population has recently been moderately targeted for Jackson Township”. Stark County contains four of the largest urban townships in the state of Ohio (i.e., population over 30,000); these townships include, Jackson, Plain, Lake and Perry.

The Stark County Regional Planning Commission indicated that a large portion of future commercial and industrial development is targeted for Lake Township in areas along I-77.



Land Use

Hazard Mitigation Relevance: Land use descriptions inform discussions of risk and vulnerability. For example, flooding may exist as a high risk, but may not correlate with high susceptibility in open or unpopulated forested areas. Further, understanding land use may identify valuable areas where natural features can provide protective functions that reduce the magnitude of hazard events (FEMA, 2013). *Proposed* land uses can inform discussions about the types of assets that future hazard occurrences could impact.

Stark County is unique in that it has a diversity of urban, suburban, and rural areas. While many communities have county-wide zoning, Stark County is unique in that of the 17 townships, only 12.5 are zoned. There is no zoning in Tuscarawas, Sugarcreek, Sandy and Paris Townships; Bethlehem Township is partially zoned.

Agricultural Land Uses

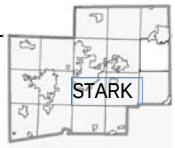
Agriculture has remained a major land use in Stark County. Major areas of agricultural activity include large portions of the east side of the county in Marlboro, Osnaburg, Paris and Washington Townships, as well as areas west and southwest of Massillon in Bethlehem, Sugarcreek and Tuscarawas Townships. Agricultural land use has been decreasing consistently over the years. Agricultural land use decreased from 50.9% in 1975 to 39.5% in 2015. Large farms are being divided into smaller residential tracts, or into large home estate tracts.

Agricultural land located in Ohio
Source: Farm Progress

Residential Land Uses

Residential land use refers predominantly to the denser living areas in the County, and includes single-family dwellings, as well as two-family and multi-family residential properties. This category of land use has recorded consistent growth over the years. It constituted 10% of the land in the county in 1965, and has increased to 34% of the total land area of the county today. The future growth of residential land use in the county is projected to keep pace with population growth through the plan period. It is expected; however, that much of the residential land use growth will be concentrated in the northern

Aerial view of downtown Canton
Source: Aerial Aspect Photography



portion of the county in Jackson and Lake Townships, and will consist of primarily single-family dwellings in low-density developments.

Commercial Land Use

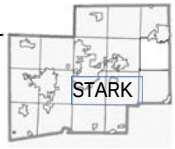
Commercial land use in the county includes retail, office, services, and other businesses. Commercial land is mainly concentrated in the central business districts of Canton, Massillon, and Alliance, yet there is a very substantial amount in other major townships. Commercial land use constituted only 1% of the total land area in 1965, it has increase to approximately 4% today.

A possible explanation for the increase in commercial land is the economic boom that was occurring in the 2000s, until the 2008 recession. In 2006, SCRPC reviewed 156 site plans for new developments, the number of site plans reviewed decreased to 107 in 2015. Commercial land use is not expected to change much over the next several years according to information obtained from the 2017 Stark County Comprehensive Plan. Commercial land use is projected to reach 3.7% of the county's land area by 2040, an increase of only 0.1% (i.e., approximately 250 acre increase).

Industrial Land Use

Industrial activities have long played a key role in Stark County's economy. Major industrial activities are primarily located in the Cities of Canton and Massillon, as well as in suburban areas immediately east and southwest of Canton. Other industrial activities are located in the City of Alliance. The County's industrial land use constituted 0.9% of the total land use in 1965. Since then, there has been an increase in the industrial land in Stark County, as 8,970 acres are now classified as such. The industrial land use is not expected to change significantly over the next several years, as trends in land use nationwide reveal a continuing decline in manufacturing within the region. Industrial land use is projected to cover 2.7% of the county's land area by 2040.

The Timken Company's Faircrest Plant located in Perry Township
Source: Canton Repository



Public Service Land Use

The public service category of land use includes schools, medical institutions, religious facilities, cultural facility, government office, and other public buildings. These facilities are widely scattered throughout the county. With the exception of schools and government buildings serving the rural townships, many of these land uses are found in urban service areas of the county.

Aultman Hospital campus located in Canton
Source: Medscape

This category of land use grew from 1.5% in 1965, to 7.2% currently. With some additional schools and public buildings expected to be built in the developing suburban areas, this land use is expected to reach 7.8% (approximately 2,400 acre increase) of the county's land area by 2040.

Recreational Land Use

Recreational land use has seen considerable growth over the years. In addition to Stark Parks-owned land, other uses in the recreation category include those tracts used for private recreation, such as golf courses, driving ranges, and campgrounds. Land in the recreational category is projected to grow to 1.4% (approximately 235 acre increase) of the county's land area by 2040. Although public parklands will increase over the coming years, recreation areas is also expected to be muted slightly, as private open space areas succumb to development.

Quail Hollow State Park located in Lake Township
Source: Lake Township Chamber

Vacant Land Use

Vacant land constitutes undeveloped areas not used for agricultural activities. Typical uses of this land are resource extraction and intended residential/commercial/industrial open spaces. Land under this category has been declining since 1975, as areas such as strip mines are reclaimed and put into other land uses and as new allotments are being development. Vacant land has decreased significantly since 2004, to 25,205 acres (6.8% of the total land area). This category of land use is expected to decline further to 6.2% by 2040.

This decrease, combined with the continual development of single-family tracts will have dramatic consequences on available land if not planned for and protected appropriately. This will also increase the potential negative effects of certain hazards identified during this plan update (i.e., flooding, land subsidence, temperature extremes, and wildfires).

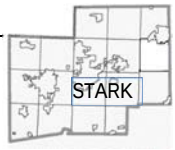
The 2040 land use projections below were obtained from the 2017, Stark County Comprehensive Plan. The 2040 land use projections below were calculated by first taking the average percent change for each land use category over the four-year period of 2012-2015; that percent change was then projected onto each five-year increment from 2015-2040. The land use categories in the 2015 table were computed by grouping together individual parcels based on their assigned land use tax assessment code. With the new assessment and mapping methods, there are some parcels in the county that have no assigned assessment code, such as roadways or survey discrepancies and are therefore accounted for in the "null" category.

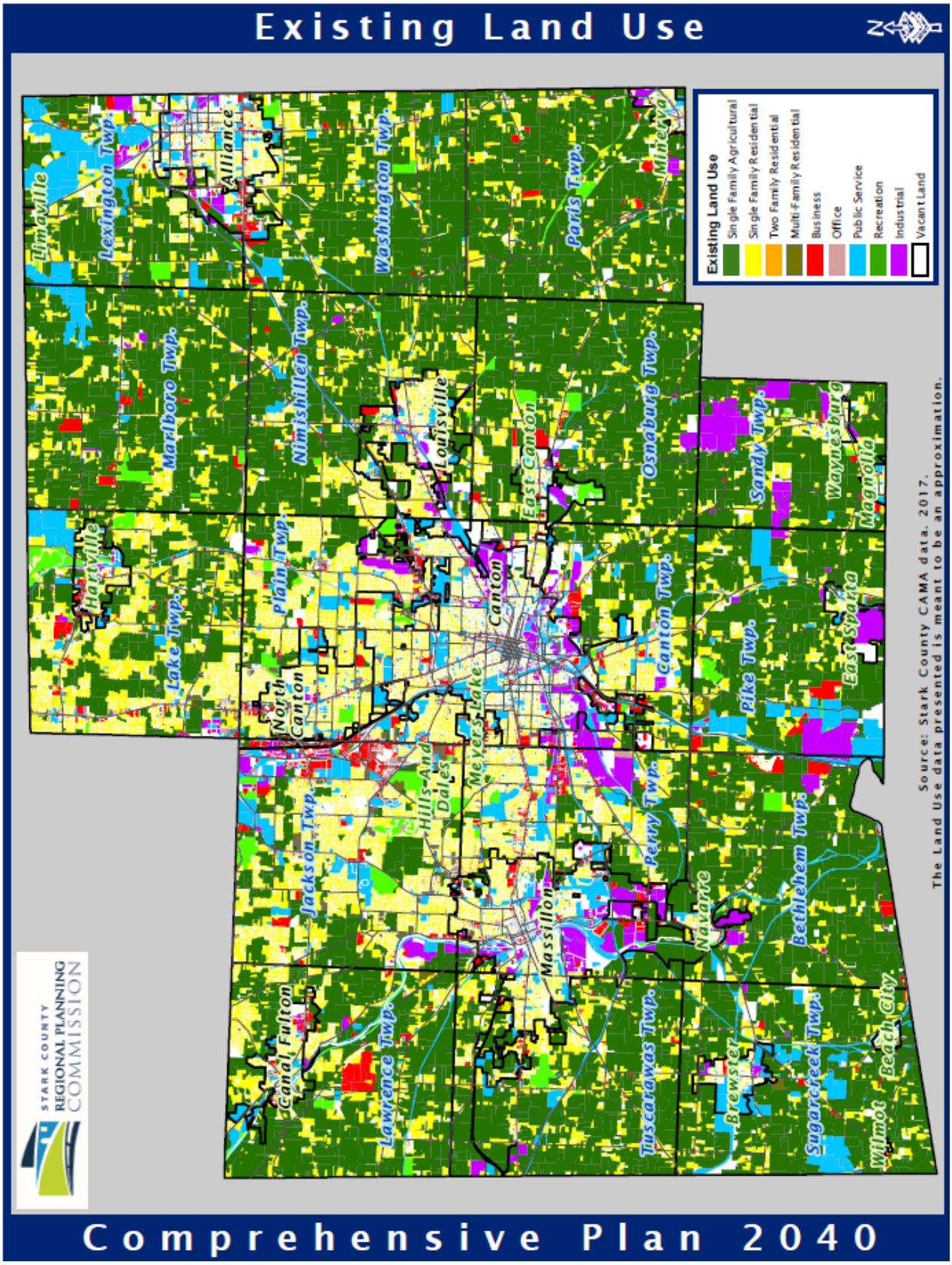
2040 LAND USE PROJECTIONS – STARK COUNTY					
Land Use	*2015*		*2040*		*Difference*
	%	*Acres*	*%*	*Acres*	*Acres*
Residential	33.4%	123,852	33.9%	125,870	2,018
Agricultural	39.5%	146,473	39.2%	145,578	-895
Commercial	3.6%	13,438	3.7%	13,684	246
Industrial	2.4%	8,970	2.6%	9,829	859
Public Service	7.2%	26,633	7.8%	29,019	2,386
Recreation	1.3%	4,847	1.4%	5,083	236
Vacant Land	6.8%	25,205	6.2%	22,876	-2,329
Null	5.8%	21,842	5.2%	19,321	-521
Total	100%	371,260	100%	371,260	N/A

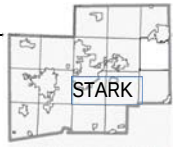
Source: 2017, Stark County Comprehensive Plan

As indicated in the table above the land uses of residential and public service are expected to increase by approximately 2,000 acres by 2040, and the land uses of agricultural and vacant land are expected to decrease by 895 acres and 2,329 acres respectively. If these predictions come to fruition, this would replace existing open space with residential and public service land uses possibly increasing the potential of certain hazards (i.e., flooding, land subsidence, temperature extremes, and wildfire).

The graphic below highlights land use identified as "residential/business/public service/recreational/industrial/ and vacant land." Most of the residential areas are along roadways and in the municipalities of central Stark County. Commercial, industrial, and transportation areas also appear throughout the county, yet with a higher balance in the central portion in and near the cities of Canton, North Canton, and Massillon.




Existing Land Use
Existing Land Use
Single Family Agricultural
Single Family Residential
Two Family Residential
Multi-Family Residential
Business
Office
Public Service
Recreation
Industrial
Vacant Land
Limaville
Lexington Twp.
Alliance
Washington Twp.
Paris Twp.
Minerva
Marlboro Twp.
Nimishillen Twp.
Louisville
East Canton
Osnaburg Twp.
Sandy Twp.
Waynesburg
Magnolia
Hartville
Lake Twp.
Plain Twp.
Canton
Canton Twp.
Pike Twp.
East Sparta
North Canton
Meyers Lake
Hills And Dales
Jackson Twp.
Perry Twp.
Bethlehem Twp.
Navarre
Massillon
Canal Fulton
Lawrence Twp.
Tuscarawas Twp.
Brewster
Sugarcreek Twp.
Beach City
Wilmot
Source: Stark County CAMA data, 2017.
The Land Use data presented is meant to be an approximation.
STARK COUNTY REGIONAL PLANNING COMMISSION
Comprehensive Plan 2040


STARK

Planned Development and Hazard Areas

According to information obtained from the 2017, Stark County Comprehensive Plan, almost 50% of the land Ohio is classified by the U.S. Department of Agriculture as “prime farmland”, which is the most fertile and productive land in the county. Ohio has the fifth highest percentage of prime farmland in the nation, however, Ohio has also lost more high-quality acres of farmland than any other state except Texas. Several communities in Stark County are interested in agricultural preservation, and identifying non-agricultural areas that may be better suited for future development. The two regions of Stark County that should be strongly considered for agricultural preservation include the eastern most and western most portions of the county.

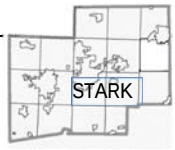
Besides its economic value, agriculture can provide environmental benefits through water pollution control, wildlife habitat enhancement, air quality improvements, and a potential reduction in damages sustained as a result of several of the hazards identified in this plan update.

In northeast Ohio, the Western Reserve Land Conservancy works to permanently protect natural areas and farmland, ensuring that the land under a conservation easement remains protected, this will ensure that open green space remains. Many of the benefits of open space are often overlooked. Benefits include:

- Providing areas for active and passive recreation.
- Contribution to a community’s quality of life
- Serving as an economic asset by improving property values and attracting businesses
- Providing buffers between areas of known hazards and extensive development
- Serving valuable environmental functions by preserving wetlands, floodplains, and groundwater recharge, and minimizing flooding.

According to the Vice President of Business Development with the Stark County Economic Development Board the vast majority of future industrial and commercial development will be targeted for the industrial parks within Stark County. The board often gets inquiries from businesses and organization looking to move their operations into Stark County, for example Amazon is currently building a one million square foot facility in the City of Canton, and Tractor Supply is building a large facility in the Village of Navarre. Industrial parks located within Stark County include:

- Canton Industrial Park (Canton)
- Weirton Industrial Park (Canton)
- Mahoning Industrial Park (Canton)



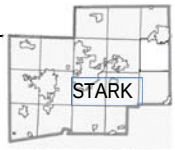
- Mills Business Park (Canton)
- Commerce Park (Alliance)
- Beck Industrial Park (Louisville)
- Millennium Industrial Park (Massillon)
- Nova Industrial Park (Massillon)
- Promler-North Canton Industrial Park (North Canton)
- Hartville Industrial Park (Hartville)
- Prospect Industrial Park (Navarre)

Future Development and Flooding Hazard

The Stark County Commission and Canton City Council, in cooperation with the Muskingum Watershed Conservancy District (MWCD), the U.S. Army Corps of Engineers, and the U.S. Geological Survey conducted studies and assessments regarding flooding issues, they all agreed to make efforts to implement the recommendation identified regarding flood reduction policies and programs at both the local and county levels. These agencies agreed, that development should be limited in flood-prone areas, and recommended to strengthen county floodplain regulations to either not allow, or limit structures being built within the 100-year flood zone. As development continues to increase in flood-prone areas, the collective efforts of all affected parties will be essential in bringing the county one step closer towards mitigation and protection from flooding.

The following flood-prone areas where development should be limited due to health and safety concerns where identified in the 2017, Stark County Comprehensive Plan:

- 100-year flood zone areas with flood control dam easements. A number of areas are impacted during high water events when “dry dams” impound, or hold, water in order to prevent or lessen flooding downstream. These areas include:
  - Areas around Sugar Creek in Southwestern Stark County. These are primarily in Sugarcreek Township and include the Villages of Beach City and Brewster. These are also significant areas with restricted development along the Beach Creek Dam.
  - Areas north of the Bolivar Dam along the Tuscarawas River from the Village of Navarre, in Bethlehem Township, south to the county line, as well as the Sandy and Limestone Creeks. This area also includes the Nimishillen Creek in Pike and Sandy Townships, as well as the Village of East Sparta, Magnolia, and Waynesburg. In recent years, the flood easements for the Bolivar Dam have experienced significant flooding



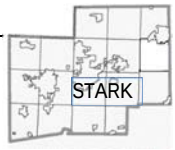
as waters were repeatedly impounded by the dam, in order to limit flooding downstream; and

- Outlet areas of the dams including Lake Cable in Jackson Township, Sippo Lake in Perry Township, and Congress Lake in Lake Township.

- Areas with 100-year flood zones not directly related to impoundment dams include:
  - The Tuscarawas River and creeks feeding it north of Navarre, including the Cities of Massillon and Canal Fulton
  - The Middlebranch Creek and tributaries feeding it through the cities of North Canton, Canton, Louisville and as far north as Uniontown and Hartville, as well as the Village of East Canton to the east.
  - The Mahoning River and areas surrounding the Berlin Reservoir. These areas are primarily in Lexington Township and the City of Alliance.

Several large neighborhoods are located in the 100-year floodplain, including a significant number of distressed and delinquent homes. Floodplains represent a known hazard to life and property. Furthermore, federal flood insurance is the only tool that homeowners can use to protect their investments. In recent years the insurance premiums for federal flood insurance have been repeatedly raised. The ultimate objective is insurance rates that pay their own way and are not subsidized by the general public. Rates will continue to climb. The net effect will be to make homes built in the floodplain more expensive. Therefore, floodplain neighborhoods, especially where there are concentrations of vacant, distressed and delinquent homes are prime candidates for land conversion in Canton. Potential alternative uses of floodplain land are agriculture and open space/natural parks. Canton already has a beginning framework of open space and linear parks along its major waterways. Expanding this system through flood plain acquisitions and conversion will provide a larger, exceptional open space system. This will have several benefits such as reducing life and safety risks, reducing the “urban footprint” that must be serviced and maintained, removing blight influences on nearby neighborhoods, and even increasing property values on future adjacent development.

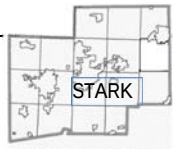
Stark Parks has taken on several projects pertaining to floodplain management, including acquiring grants from FEMA and the Ohio Emergency Management Agency (OEMA) to assist with elevating repeatedly flooded buildings located in flood-prone areas. By removing these structures, the sites are able to be restored to natural floodplains, which ultimately improves storm



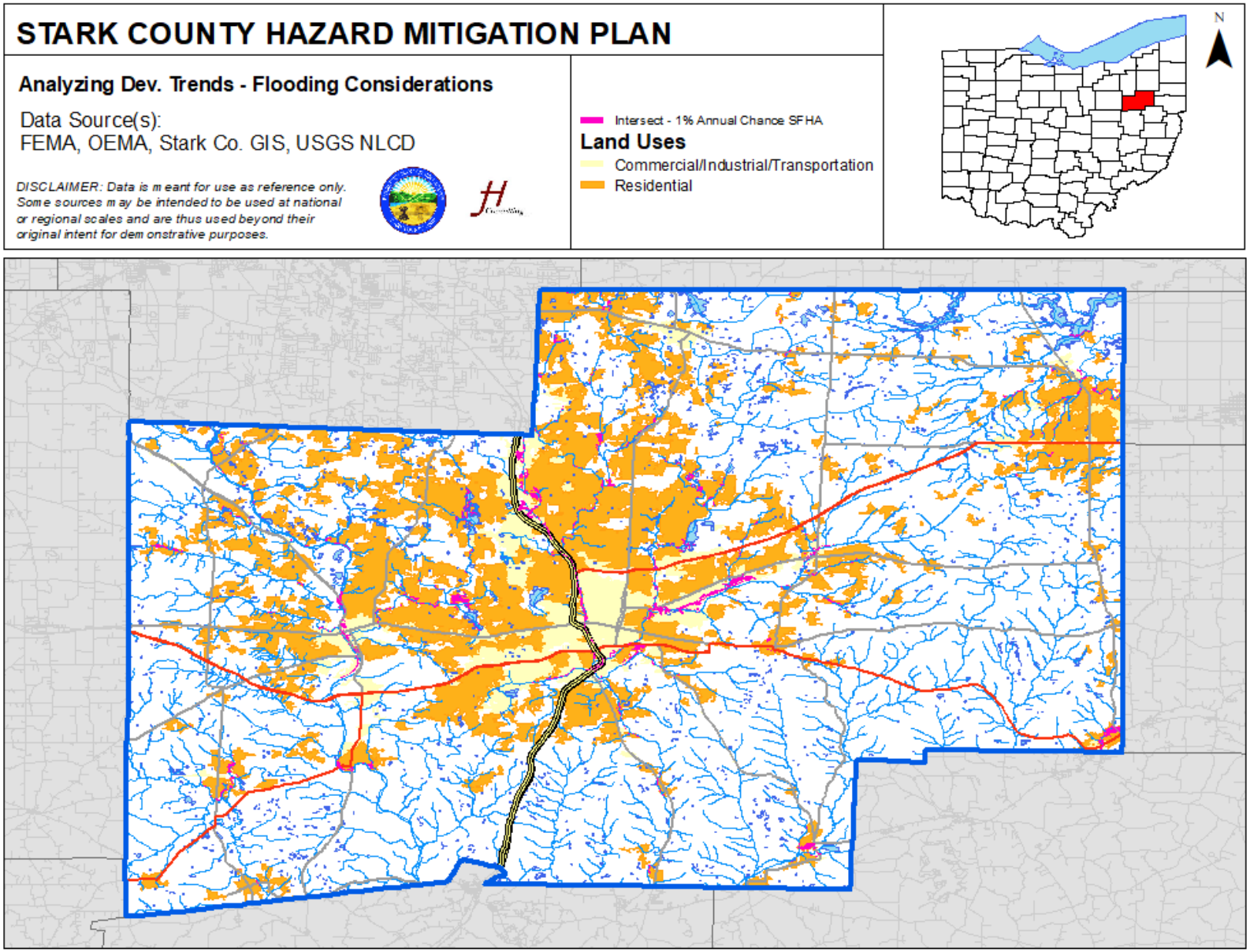
water runoff control and water quality and can be utilized for activities that have low-to-no impact on the environment, such as parks and trails.

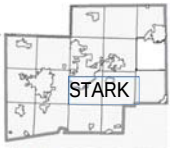
According to a representative with the Stark County Regional Planning Commission, several county agency work together to limit future development in floodplain areas on project-by-project basis.

When planning for new development, this plan suggests that it is vital to consider areas where further development avoids damages from future hazardous events. Local officials plan to develop transportation assets and commercial and residential areas (as evidenced by the discussions above). Since transportation development is scheduled throughout the county (i.e., not targeted to a single area), the following maps identify areas targeted for residential and commercial/industrial development cross-referenced with various risk areas per the risk assessment in Section 2.2.

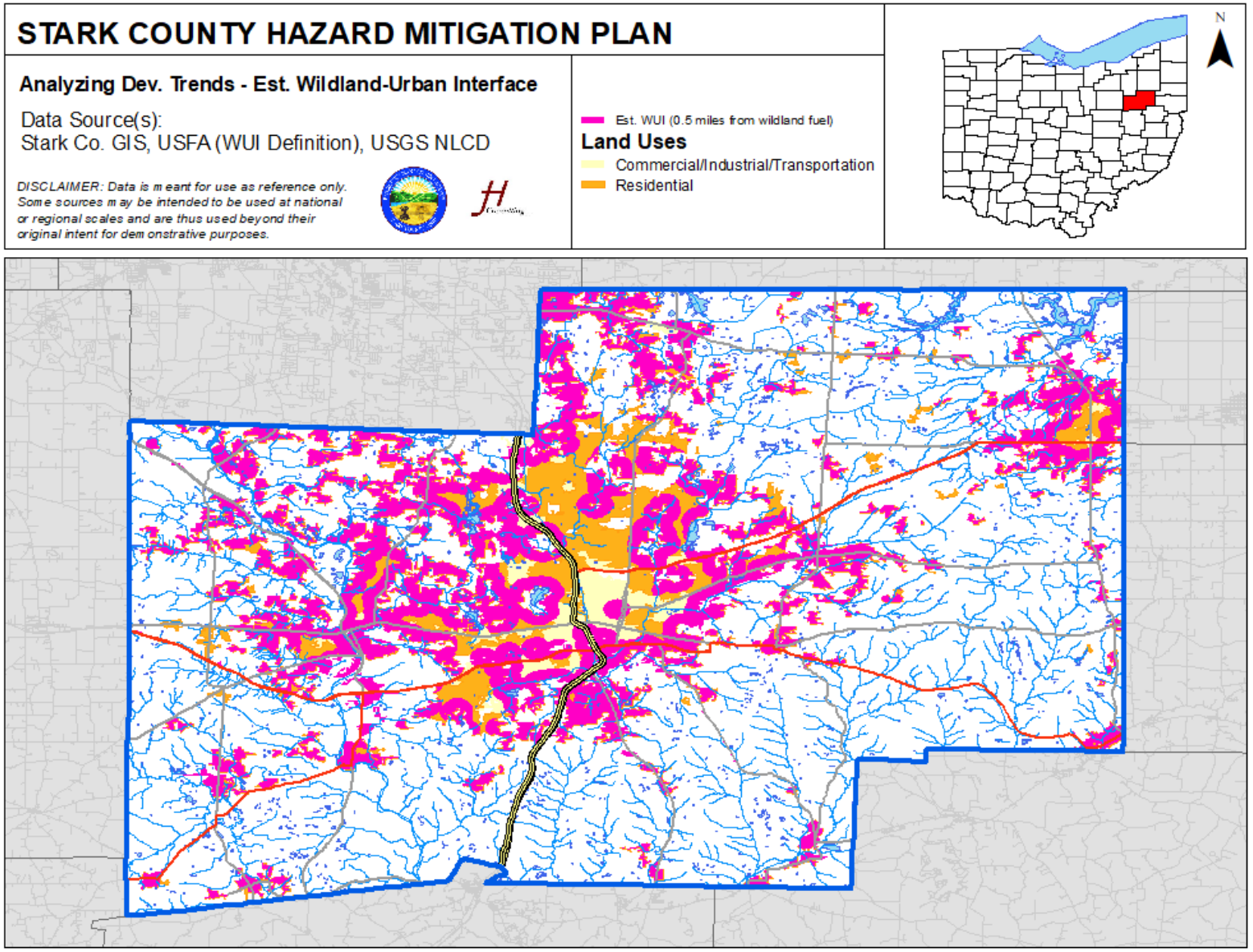


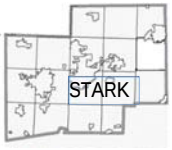
This map shows the areas of residential and commercial/industrial land use that overlap flood hazard areas.





This map shows the areas of residential and commercial/industrial land use that sit in areas prone to wildfire.





2.4.2 Complicating Variables

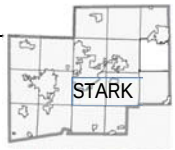
Direct, measurable consequences of disasters can include fatalities, injuries, and damages to humans, animals, or property. Disasters do not end there; there are several indirect effects, tangible and intangible, associated with them. Some examples of these include loss of livelihood and income, loss of community and population, mental and psychosocial impacts, costs of rebuilding, repair or replacement, loss of inventory, wages and tax revenue, etc. (Coppola, 2015). All of these also have a cost associated with them, but it is much more challenging to assign a specific dollar value and quantify them accurately. For this plan, the primary focus of loss estimates will be the direct consequences of the given hazard.

Countless situations could occur that could result in a disruption to critical systems throughout Stark County. Loosely-related variables often considered *cascading hazards*, can complicate some hazards. For example, high winds may cause sporadic damage, but usually do not become a significant countywide concern until a large number of residents are without power. In addition to weather-related power outages, cascading hazards in Stark County could include (but not be limited to) the following.

- Damage to infrastructure (i.e., roads, bridges, pipes, utility poles, etc.) and residences following flooding
- Flooding of downstream or protected areas in the event of a dam or levee failure
- Drinking water supply shortages and contamination following severe and prolonged drought conditions or floods
- Power outages, ruptured gas lines, etc. following earthquakes or severe weather
- Public health concerns following flooding conditions
- Population displacement before, during, or after an event that may be temporary or permanent

Public Health, Social Vulnerability, and Other General Vulnerability Indicators

Vulnerability is the “measure of the propensity of an object, area, individual, group, community, country, or other entity to incur the consequences of a hazard” (Coppola, 2015, p. 33). Many aspects contribute to the vulnerability of society; these can include income disparity, class, race or ethnicity, gender, age, disability, health, and literacy (Thomas & Phillips, 2013, pp. 2-3). Understanding the overall health status of the community is essential in determining the vulnerability of the population to any given hazard; emergencies and disaster situations can exacerbate existing medical conditions. Vulnerable populations, populations of concern, or populations at risk are those individuals or groups of people who are more exposed to the dangers



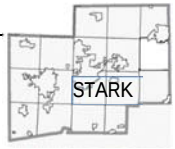
of the impacts of a hazard because of their age, gender, income, occupation, disability, physical or mental health, literacy, religion, education, or ethnicity.

Some groups face several stressors related to both climate and non-climate factors. For example, people living in impoverished urban or isolated rural areas, floodplains, and other at-risk locations are more vulnerable not only to extreme weather and persistent climate change but also to social and economic stressors. Many of these stressors can occur simultaneously or consecutively. Over time, this accumulation of multiple, complex stressors is expected to become more evident as climate impacts interact with stressors associated with existing mental and physical health conditions and with other socioeconomic and demographic factors. Where appropriate (and where information is available), hazard profiles provide further vulnerability details.

Understanding trends associated with populations corresponding with various social vulnerability indicators can inform hazard mitigation decision-making. For instance, in areas with a low median household income, households may not be able to afford mitigation measures on their own. Populations living under the poverty line may have difficulty recovering. Thus, a community can lessen the indirect losses those families incur by strengthening capabilities to support those populations (e.g., assisting with access to FEMA and other governmental agencies accepting requests for disaster assistance, considering all options for structural mitigation projects to protect areas where clusters of those populations live, etc.). Phillips, Thomas, Fothergill, and Blinn-Pike (2010) provide a series of social vulnerability indicators. The following indicators[1] correspond to data that are available to the Stark County planning committee.

- **Age:** Senior citizens are reluctant to secure aid after a disaster out of concern they may lose their independence. (Proxy Data per Census: Under 18, 65+)
- **Class:** Lower-income families and households tend to live in housing that suffers disproportionately during disasters. (Proxy Data per Census: Median household income, Poverty %)
- **Gender:** Women tend to be the ones most likely to secure relief aid for the family, yet they are under-represented and under-used in recovery efforts. (Proxy Data per Census: Female population)
- **Literacy:** Few options exist to inform and prepare people with low reading levels. (Proxy Data per Census: No diploma)

[1] Definitions are quotes from the Phillips et al. text. See p. 3 of the first edition.



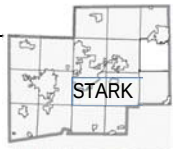
- **Race & Ethnicity:** Warning messages tend to be in the dominant language with an expectation that people will take the recommended action immediately. Research indicates that culture influences how people may receive and interpret warnings and how they may respond. (Proxy Data per Census: White, Black/African American, Two or more races, Language other than English spoken in the home)

The complicating variables related to each hazard often appear in the hazard profiles. The information presented relates to worst-case scenario events; a single event may not always reach all impacts described. It is important, however, to understand that the implications of hazards go beyond those seen immediately after the event. The effects of one event can last months or even years, especially where public health, social, economic, environmental, and infrastructure impacts are concerned.

Hazards and Climate Change

Many natural hazards are related to the climate or weather, such as droughts, severe weather, and floods. There is an important distinction between weather and climate. Weather refers to the atmospheric conditions of a geographical region over a short period, such as days or weeks. Climate, in contrast, refers to the atmospheric conditions of a geographic area over long periods, such as years or even decades (Keller & Devecchio, 2015, pp. 406-407). According to the U.S. Global Change Research Program, there are weather and climate changes already observed in the United States.

- Since recordkeeping began in 1895, the average U.S. temperature has increased by 1.3°F to 1.9°F, with most of the increase happening since 1970. Also, the first decade of the 2000s was the warmest on record.
- The average precipitation across the U.S. has increased since 1900, with some areas experiencing higher than the national average and some lower. Heavy downpours are increasing, especially over the last 30-50 years.
- Drought events have increased in the west. Changes in precipitation and runoff, combined with changes in consumption and withdrawal, have reduced surface and groundwater supplies in many areas.
- Some types of severe weather events have experienced changes. Heatwaves are more frequent and intense, and cold waves have become less frequent and intense overall.
- The intensity, frequency, and duration of North Atlantic hurricanes have increased since the early 1980s.

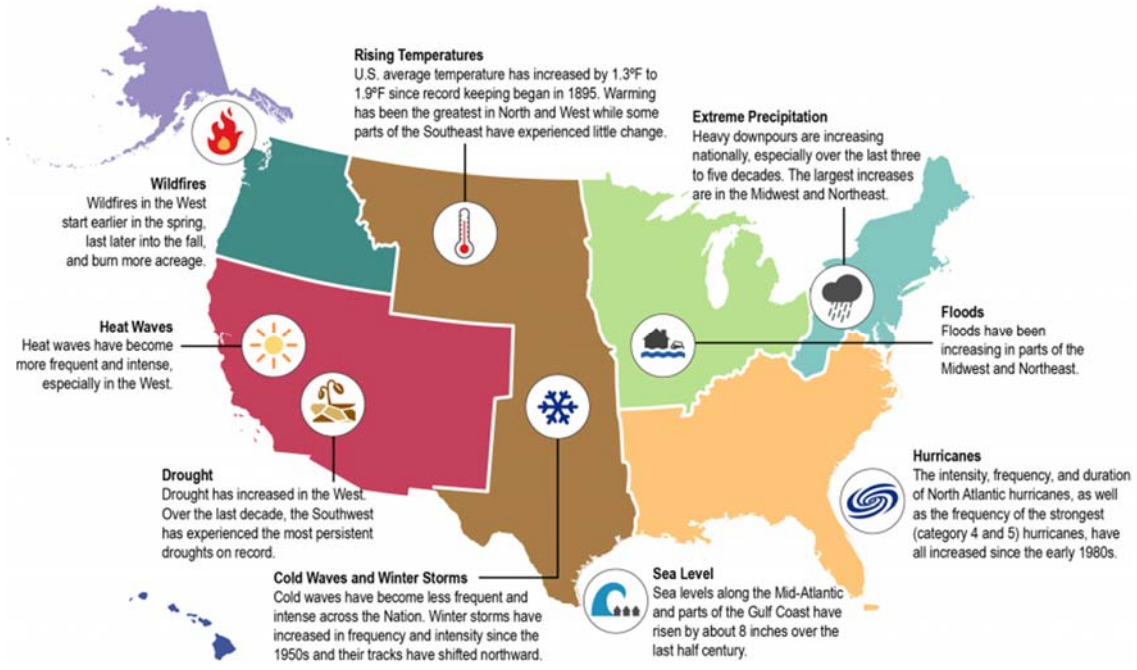


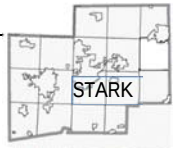
Climate change can have a significant impact on human health and the environment. The changes mentioned above can affect the environment by leading to changes in land use, ecosystems, infrastructure conditions, geography, and agricultural production. Extreme heat, poor air quality, reduced food and water supply and quality, changes in infectious agents, and population displacement can lead to public health concerns such as heat-related illnesses, cardiopulmonary illnesses, food, water, and vector-borne diseases and have consequences on mental health and stress (USGCRP, 2016).

The National Climate Assessment (NCA) defined climate trends for national U.S. regions in 2014. The major trends are:

- wildfires and heat waves on the west coast,
- rising temperatures and increased severity and frequency of winter storms in the middle of the country,
- more rain and flooding in the Midwest and northeastern parts of the country, and
- an increase in sea levels in the mid-Atlantic with a rise in hurricane activity in the southeastern states.

The Intergovernmental Panel on Climate Change (IPCC) largely concurs with the above list (IPCC, n.d.). In Ohio, the trend will likely be an increase in flooding, as noted in the graphic below.

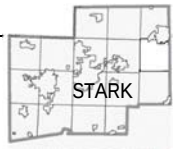




3.0 MITIGATION STRATEGY

§ 201.6(c)(3)	A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

According to FEMA (2013), "the mitigation strategy is made up of three main required components: mitigation goals, mitigation actions, and action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risk to hazards." This section contains the aforementioned items; it describes the updated goals and objectives for this multi-jurisdictional mitigation plan, it outlines the action items (or projects) for each participating jurisdiction within Stark County, and each project identifies the agency responsible for completing the project as well as a general timeline for completion.



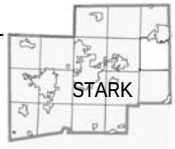
3.0 MITIGATION STRATEGY

3.1 Mitigation Goals and Objectives

During the first plan update meeting, the steering committee decided to keep the comprehensive goal from the 2017 plan. The committee realized there are several ways to organize goals, but decided to maintain the one overarching goal and five specific objectives that can be achieved through the mitigation projects included in the plan. The overarching goal and objectives apply to the county's unincorporated areas as well as the cities and villages; this way all communities within the county are working towards the same five objectives and ultimately towards the overall goal.

During the first meeting, the committee members approved the following as this plan's organizing goal and objectives.

MITIGATION GOAL & OBJECTIVES – STARK COUNTY		
Overarching Goal	Become resilient to all hazards in Stark County and quickly recover from disaster and/or emergency situations through the implementation of mitigation measures and projects.	
Objective Number	Description	Hazard Addressed
Objective 1:	Reduce the severity of flooding and flash flooding impacts throughout Stark County as well as the vulnerabilities from High Hazard Potential Dams (HHPDs).	Flooding / Dam & Levee Failure
Objective 2:	Reduce the severity of severe summer weather impacts (i.e., hail, lightning, thunderstorms, severe wind and tornadoes) throughout Stark County.	Severe Summer Weather
Objective 3:	Reduce the severity of severe winter weather impacts (i.e., blizzards, heavy snow, and ice storms) throughout Stark County.	Severe Winter Weather
Objective 4:	Collaborate with partner agencies and organizations to more effectively educate the public on the implementation of mitigation strategies and projects.	All Hazards
Objective 5:	Maintain existing hazard mitigation infrastructure and measures, and enforce existing codes, regulations, and ordinances as appropriate.	All Hazards



3.0 MITIGATION STRATEGY

3.2 Mitigation Actions

This section serves as a mitigation action plan to reduce the losses and other impacts Stark County may suffer from the hazards included in the risk assessment. "A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's goal and objectives. The actions to reduce vulnerability to threats and hazards form the core of the plan, and are a key outcome of the planning process" (FEMA, 2013).

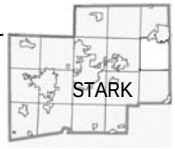
§ 201.6(c)(3)(ii)	A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
§ 201.6(c)(3)(iii)	An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects and their associated costs.

The Stark County Emergency Management Agency (SCEMA), the county's mitigation steering committee, and the county's consultant, coordinated directly with the jurisdictions in the county to update the project list. Outreach included individual calls and technical assistance. Further, on May 6, 2022, a third virtual planning meeting was held, this meeting was open to all jurisdictions to discuss existing project status, new projects, etc. The narrative below is the result of that outreach.

Types of Mitigation Actions

There are five primary types of mitigation actions that can work to reduce long-term vulnerability: local plans and regulations, structure and infrastructure projects, natural systems protection, education programs, and preparedness and response activities (Coastal Hazards Research Center & Center for Sustainable Community Design, n.d.).

- **Local Plans and Regulations**: Local land use or comprehensive plans embody the goals, values, and aspirations of the community, as expressed through a process of community engagement. Local ordinances and review processes influence land development and building construction. In some cases, plans and regulations can work at cross-purposes. For example, a capital improvement plan may call for extending water and



sewer lines to an area that is vulnerable to natural hazards. Examples include the following.

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- Building codes and enforcement
- NFIP Community Rating System
- Capital improvement programs
- Open space preservation
- Storm water management regulations and master plans

- **Structure and Infrastructure Projects**: These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. These projects could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct human-made structures to reduce the impact of hazards. Examples include the following.
  - Acquisitions and elevations of structures in flood-prone areas
  - Utility undergrounding
  - Structural retrofits
  - Floodwalls and retaining walls
  - Detention and retention structures
  - Culverts
  - Safe rooms

- **Natural Systems Protection**: These are actions that minimize damage and losses while preserving or restoring the functions of natural systems. Examples include the following.
  - Sediment and erosion control
  - Stream corridor restoration
  - Forest management
  - Conservation easements
  - Wetland restoration and preservation

- **Education Programs**: These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Although this type of mitigation reduces risk less directly than structural projects or regulations, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public can lead to direct actions. Examples include the following.
  - Radio or television spots
  - Websites with maps and information
  - Real estate disclosure
  - Presentations to school groups or neighborhood organizations
  - Mailings to residents in hazard-prone areas.
  - StormReady
  - Firewise Communities

- **Preparedness and Response Activities:** Mitigation actions that reduce or eliminate long-term risk are different from actions taken to prepare for or respond to hazard events. Mitigation activities lessen or eliminate the need for preparedness or response resources in the future. When analyzing risks and identifying mitigation actions, the planning team may also identify emergency response or operational preparedness actions.

  For some hazards such as tornadoes, including preparedness actions in the mitigation plan may be necessary and practical. The mitigation plan may be the best place for your community to capture and justify the need for these actions. However, these will not supplant or meet the federal requirements for identifying mitigation actions. It is important that the planning team understands the difference and can distinguish between mitigation and other emergency management activities.

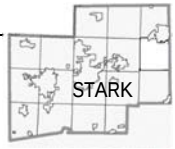
To help committee members and participating jurisdictions better understand the types of mitigation techniques that work best for the hazards identified in the risk assessment, the following table serves as a reference.

HAZARD	MITIGATION TECHNIQUES				
	Local Plans & Regulations	*Structure & Infrastructure Projects*	*Natural Systems Protection*	*Education Programs*	*Preparedness & Response Activities*
Dam & Levee Failure	X			X	X
Drought	X	X	X	X	X
Earthquake	X			X	X
Epidemic				X	X
Flooding	X	X	X	X	X
Hazmat Release			X	X	X
Land Subsidence	X		X	X	
Severe Summer Storms	X	X		X	X
Severe Winter Storms	X	X		X	X
Temperature Extremes				X	X
Wildfire	X			X	X

Possible Funding Sources

The following is a list of relevant funding sources, including but not limited to grant programs that can potentially be utilized to implement the mitigation strategies identified below.

- Assistance to Firefighters Grant (AFG)
- Building Resilient Infrastructure and Communities (BRIC)
- Community Development Block Grant (CDBG)
- FEMA Public Assistance Grant Program
- Flood Mitigation Assistance (FMA) Program
- Floodplain Management Services Program (FMSP)
- Hazardous Materials Emergency Program (HMEP)
- Hazard Mitigation Grant Program (HMGP)
- High Hazard Potential Dams (HHPD) Grant
- Homeland Security Grant Program (HSGP)
- Hospital Preparedness Program (HPP)
- Repetitive Flood Claim (RFC) Program
- Severe Repetitive Loss (SRL) Program
- Small Business Administration (SBA) Loans



Prioritization

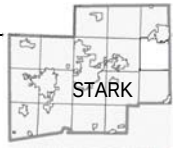
Stark County prioritized the action items (i.e., projects) included in this plan. The county used the following criteria (roughly corresponding to the STAPLEE method) as considerations when prioritizing projects.

- **Social Impacts**: Consider whether the public would support implementation of the project. If so, priority likely rises.
- **Technical Feasibility**: Consider whether the project can be done and if it will yield the intended outcomes. If yes, priority would likely rise.
- **Administrative Requirements**: Consider the staffing, funding, and maintenance requirements of the project. If current capabilities can successfully manage and sustain the project, priority would be strengthened.
- **Political Impacts**: Consider the acceptability of the project from the political frame. If it is likely to cause political upheaval, it would receive a lower priority.
- **Legal Ramifications**: Consider whether the project can be lawfully implemented. If not, the project cannot be listed.
- **Environmental Impacts**: Consider whether there would be negative consequences to environmental assets should the project be implemented. If assets are impact, priority would be likely to fall.
- **Economic Impacts/Cost Benefit**: Consider the criteria in *FEMA Publication 386-5: Using Benefit Cost Review in Mitigation Planning* (2007) to determine the "pros" and "cons" of each project. Maximizing the use of available funds would positively affect a project's priority.

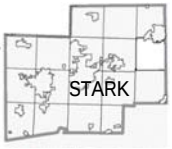
Stark County's committee permitted tie scores. As such, when reviewing the "Priority" line in the following table, readers may notice gaps in the numbering (e.g., "1, 2, 5, 6…). In these instances, it means that three projects tied at the second-highest (thus, priority two) score. See Appendix 2 for documentation of the calculations.

Jurisdictional Mitigation Actions

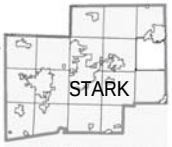
The following tables lists the active hazard mitigation actions for Stark County and the cities and villages that participated in this plan update. These actions have broad applicability and benefit multiple jurisdictions or unincorporated areas. See Appendix 3 for a list of inactive (i.e., completed, deleted, and deferred) projects.



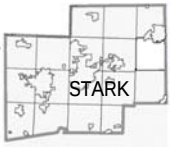
2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
4.1 Epidemic	Public awareness campaigns	Coordinate with local health officials to produce public awareness campaigns on local media outlets to enhance, and revise, messaging regarding vaccination information and administrative controls (i.e., handwashing, social distancing), the use of personal protective equipment (i.e., face coverings) as well as other lessons learned from the recent COVID-19 pandemic.	New	Education Program	BRIC*, HPP*, HMGP*, Local Funding	5 Years	Stark County Health Department	1/1/23	12/31/28	1
Note:	This project will remain as on-going. As epidemic/pandemics are identified several media outlets, social media, and mass notification systems are utilized to disseminate Public Service Announcements (PSAs) on a regular basis.									
12.1 Misc.	Public awareness campaigns	Distribute information explaining the risk of hazards in Stark County via social media following the Ready.gov National Seasonal Preparedness Messaging Calendar.	On-going	Education Program	BRIC, HMGP, Local Funding	6 Months	Stark County EMA	1/1/23	6/31/23	2
Note:	This is an on-going strategy. Hazard related information is posted on social media on a regular, and as needed basis.									
11.1 Wildfire	Creating defensible space	Encourage residents and businesses to maintain their property in, or near, forested areas (i.e., cut tall grass, trim trees, remove low hanging branches, clear dead leaves, twigs, stack firewood at least 100 feet from structures, etc.) and to create defensible space between structures and adjacent forests.	New	Natural Systems Protection	HMGP, FMAG*, Local Funding	3 Years	Starks Parks	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



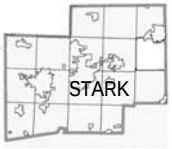
2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
1.1 Dam & Levee Failure	Dam Safety Inspections	Coordinate with the ODNR, Dam Safety Engineering Program to conduct periodic safety inspections of existing dams in Stark County, and garner community support for the removal or repair of dams in disrepair.	On-going	Preparedness & Response Activity	HHPD*, USACE*, HMGP	5 Years	Stark County EMA	1/1/23	12/31/28	4
Note:	This is an on-going strategy. Sippo Reservoir was lowered as part of the Massillon Levee upgrade project.									
8.1 Summer Storms	Advanced Warning	Coordinate efforts with the local media to post advance warnings of hazardous weather.	On-going	Preparedness & Response Activity	HMGP, Local Funding	6 Months	Stark County EMA	1/1/23	6/31/23	4
Note:	This is an on-going strategy that is implemented on an as needed basis. Stark County participates in the WeatherReady National Ambassador Program.									
6.1 HazMat Release	Interoperable Communication System	Maintain a communications system that will allow all jurisdictional fire, police, and EMS departments to communicate with each other during large-scale emergency situations.	On-going	Preparedness & Response Activity	BRIC, HSGP*, HMGP, Local Funding	5 Years	Stark County EMA	1/1/23	12/31/28	6
Note:	This is an on-going strategy. A contract was established with Motorola for radio equipment. A countywide 800mhz radio system is in place, includes fire/police/EMS as well as municipalities and schools.									
12.3 Misc.	Advanced Warning	Encourage the use of NOAA All Hazard Radios among residents that continuously broadcast National Weather Service forecasts and provide direct warnings to the public for natural, technological, and man-made hazards.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	3 Months	Municipal Leadership	1/1/23	3/31/23	7
Note:	This is an on-going strategy. Jackson Township has radios available at their town hall at-cost for residents.									
3.2 Earthquake	Emergency exercise participation	Continue to encourage more participation at the county and municipal levels in National Shake-out Exercises that are conducted on an annual basis.	New	Preparedness & Response Activity	HMGP, Local Funding	1 Year	Stark County EMA	1/1/23	12/31/23	7
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



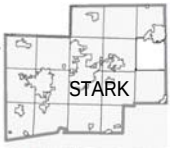
2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.2 Flooding	Flood task force	Facilitate the formation of flood task forces throughout the county to address flooding problems on a regular basis.	Deferred	Preparedness & Response Activity	BRIC, HMGP, FMSP, Local Funding	2 Years	Stark County Soil & Water Conservation District	1/1/23	12/31/24	9
Note:	This mitigation strategy has been deferred. Still looking to implement, no active storm water utility limits ability, do bring committees together to complete what we can.									
2.1 Drought	Water conservation	Educate local residents on the benefits of conserving water at all times, not just during drought conditions.	On-going	Education Program	USDA*, BRIC, Local Funding	1 Year	Stark County Health Department	1/1/23	12/31/23	9
Note:	This is an on-going strategy. Mailers have been disseminated through county water departments and Aqua Ohio Water.									
12.2 Mics.	Emergency Go-Kits	Encourage residents to prepare themselves by stocking up with necessary items or developing a family disaster plan and supply kit.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	2 Years	Stark County EMA	1/1/23	12/31/24	9
Note:	This is an on-going strategy. A checklist of basic necessities was printed on the back of EMA staff business cards. Regular updates via social media.									
6.2 HazMat Release	Conducting Commodity Flow Studies	Continue to conduct periodic Commodity Flow Studies to determine what hazardous materials are stored and shipped through the county by different modes of transportation	New	Education Program	HMEP*, Local Funding	2 Years	Stark County LEPC	1/1/23	12/31/24	12
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
10.1 Temp. Extreme	Extreme Temperature Annex maintenance	Ensure that the Extreme Temperature Annex developed by the four health departments is frequently updated.	New	Local Plans & Regulations	BRIC, HMGP, Local Funding	3 Years	Stark County Health Department	1/1/23	12/31/25	12
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. The most current version of the annex is 2019									
11.3 Wildfire	Prescribed burning	Use prescribed burning techniques to reduce fuel loads in areas that threaten public safety and property	New	Preparedness & Response Activity	AFG, HMGP, FMAG	3 Years	Starks Parks	1/1/23	12/31/25	12
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



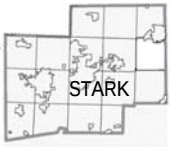
2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.3 Summer Storms	Tornado Lottery	Continue to promote participation in the statewide tornado lottery.	New	Preparedness & Response Activity	Local Funding	1 Year	Stark County EMA	1/1/23	12/31/23	15
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
11.2 Wildfire	Participation in ODNRs Wildfire Program	Ensure continued participation by Southern Stark County in ODNR's wildfire program to continue funding eligibility under the Appalachian Region.	New	Preparedness & Response Activity	ODNR*, AFG*	1 Year	Stark County Fire Chief's Association	1/1/23	12/31/23	15
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.4 Flooding	Flood resistant recreational trail systems	Design recreational trail systems to be more resistant to flood damage (i.e., washouts, scouring, erosion, etc.) by incorporating ditching, rock-check dams, culverting, and installation of short-span bridges or box culverts, bank reinforcement/stabilization where necessary.	New	Structure & Infrastructure Project	BRIC, CDBG, FMSP, HMGP	5 Years	Starks Parks	1/1/23	12/31/28	15
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
10.2 Temp. Extreme	Water Spray Parks	Consider the development of "Water Spray Parks" at county/city public parks in heat-vulnerable neighborhoods or near large bodies of water (i.e., along the Tuscarawas River, or large lakes).	New	Structure & Infrastructure Project	HMGP, BRIC*, CDBG*, Local Funding	5 Years	Stark County Economic Development	1/1/23	12/31/28	18
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
6.3 HazMat Release	Tier II Assessments	Continue to conduct Tier II Assessments to identify agencies/ organizations that are submitting Tier II forms that should not be, as well as those that are not submitting Tier II Forms that should be, to include new agencies/ organizations.	New	Preparedness & Response Activity	HMEP, Local Funding	3 Years	Stark County LEPC	1/1/23	12/31/25	18
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
9.1 Winter Storm	Tree trimming	Coordinate with power companies to periodically trim trees near power lines to prevent limb breakage and power failure.	New	Natural Systems Protection	HMGP, BRIC, Local Funding	3 Years	City and Village Councils of participating jurisdictions	1/1/23	12/31/25	20
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
3.1 Earthquake	Earthquake education campaign	Educate local officials as to conditions in Stark County that would compound the effects of an actual earthquake, such as soil type, etc.	On-going	Education Program	BRIC, HMGP, Local Funding	2 Years	Stark County Soil & Water Conservation District	1/1/23	12/31/24	20
Note:	This is an on-going strategy. It has been discovered that portions of Stark County contain very loamy soils.									
5.1 Flooding	Stream bank restoration	Undertake stream bank restoration effort to clear log jams, trees and shrubs, and sediment bars.	On-going	Natural System Protection	HMGP, FMSP, FMA*	3 Years	Stark County Soil & Water Conservation District	1/1/23	12/31/25	22
Note:	This is an on-going strategy, and will continue to be into the future. Several miles of stream bank have been cleared, the county reassesses on an annual basis. Several trees have been planted along the Zimber Ditch. Open space is being maintained where Acquisition Relocation projects have been carried out in the Zimber Ditch area.									



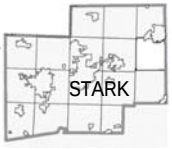
2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.2 Summer Storms	Storm shelters	Identify the number, location, and strength requirements to house residents and withstand high wind speeds. Consider the construction of community and residential storm shelters, strategically placed as necessary throughout the county (i.e., concrete safe rooms near mobile home parks, shopping malls, and other vulnerable public areas).	New	Structure & Infrastructure Project	HMGP, BRIC	5 Years	Stark County EMA City and Village Councils of all participating jurisdictions	1/1/23	12/31/28	22
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
1.2 Dam & Levee Failure	Rehabilitation of High Hazard Potential Dams (HHPDs)	Coordinate with dam owners to ensure rehabilitation of High Hazard Potential Dams as necessary.	New	Structure & Infrastructure Project	HHPD, HMGP, BRIC	5 Years	Stark County Engineer's Office	1/1/23	12/31/28	24
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
7.1 Land Subsidence	Subsidence reclamation projects	Coordinate with the Ohio Department of Natural Resources, Division of Mineral Resources Management, Office of Abandoned Mine Lands and Reclamation to undertake reclamation projects if subsidence occurs at a specific location.	On-going	Structure & Infrastructure Project	HMGP, BRIC, Local Funding	5 Years	Stark County Engineer's Office	1/1/23	12/31/28	24
Note:	This is an on-going strategy. Stark County is located in an area of the state where insurance is mandatory for land owners under the Ohio Mine Subsidence Underwriting Associations. All insurance policies charge $1 for mine subsidence.									
5.3 Flooding	Storm water system enhancement	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems that may involve detention and retention ponds.	Deferred	Structure & Infrastructure Project	FMSP, CDBG, BRIC	5 Years	Stark County Sanitary Engineering Department	1/1/23	12/31/28	26
Note:	This mitigation strategy has been deferred. Hydraulic study has been conducted to increase retention basins at Mt. Pleasant, have applied for funding, some legal issues with storm water utility.									



2022 MITIGATION ACTION PLAN – STARK COUNTY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
2.2 Drought	Water system interconnects	Determine the feasibility of developing emergency waterline interconnects amongst different water system providers to allow for the sharing of water.	New	Structure & Infrastructure Project	USDA, CDBG, BRIC, Local Funding	5 Years	Stark County Engineer's Office	1/1/23	12/31/28	27
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. Aqua Ohio has established an interconnect with Navarre, each can provide the other with water as necessary.									

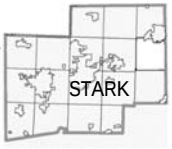
2022 MITIGATION ACTION PLAN – CITY OF ALLIANCE										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
7.1 Land Subsidence	Land Subsidence Awareness	Promote community awareness of subsidence risks and effects by distributing informational brochures.	On-going	Education Program	Local Funding	2 Years	City Council	1/1/23	12/31/24	1
Note:	This is an on-going strategy.									
5.1 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	City Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – CITY OF CANAL FULTON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Securing yard items	Encourage business owners and residents to secure loose materials and place yard and patio items indoors, or in an area where winds cannot blow them about.	On-going	Preparedness & Response Activity	BRIC, Local Funding	1 Years	City Council	1/1/23	12/31/23	1
Note:	This is an on-going strategy.									

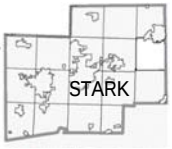


2022 MITIGATION ACTION PLAN – CITY OF CANAL FULTON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	CRS participation	Participate in the Community Rating System (CRS) and, if applicable join the NFIP.	On-going	Local Plans & Regulations	BRIC, HMGP, FMSP	3 Years	City Council	1/1/23	12/31/25	2
Note:	This is an on-going strategy.									
5.2 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	City Council	1/1/23	12/31/28	3
Note:	This is an on-going strategy.									

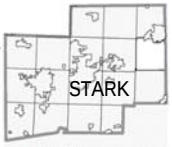
2022 MITIGATION ACTION PLAN – CITY OF CANTON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Stream restoration	Conduct stream restoration projects in publicly owned spaces along Nimishillen Creek and its tributaries.	On-going	Natural System Protection	BRIC, HMGP, FMSP	3 Years	City Council	1/1/23	12/31/25	1
Note:	This project is on-going, awaiting necessary funding.									
5.2 Flooding	Buy outs	Conduct acquisition/demolition, elevation and relocation projects.	On-going	Structure & Infrastructure Project	BRIC, SRL, FMA	5 Years	City Council	1/1/23	12/31/28	2
Note:	This project is on-going, awaiting necessary funding.									



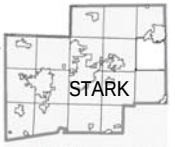
2022 MITIGATION ACTION PLAN – CITY OF LOUISVILLE										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Securing yard items	Encourage residents to control and secure debris, yard items, or stored objects such as oil, gasoline, propane tanks, and paint or chemical barrels, that could be swept away, and pose a hazard when flooding occurs.	On-going	Preparedness & Response Activity	BRIC, FMSP, Local Funding	1 Year	City Council	1/1/23	12/31/23	1
Note:	This is an on-going strategy. Established Riparian District in Zoning. (Carter Lumber, Garden Gazebo Apartments, etc.)									
5.2 Flooding	Buy outs.	Conduct acquisition/demolition of flood prone residential and commercial structures	On-going	Structure & Infrastructure Project	BRIC, SRL, FMA	5 Years	City Council	1/1/23	12/31/28	2
Note:	This is an on-going strategy. Attempt to purchase additional properties as they become available.									
5.3 Flooding	Retention / Detention basins	Installation of additional storm water retention/detention basins to slow the flooding due to hard surface areas in the city.	On-going	Structure & Infrastructure Project	HMGP, FMSP, BRIC	5 Years	City Council	1/1/23	12/31/28	3
Note:	This is an on-going strategy. Still identifying potential funding sources.									
5.4 Flooding	Bridge replacement	Encourage Norfolk Southern railroad to replace bridge immediately north of S.R. 153. The current bridge is a bottleneck, constricting flow and increasing flooding upstream including at S.R. 44	On-going	Structure & Infrastructure Project	HMGP, FMSP, FMA, BRIC	5 Years	City Council	1/1/23	12/31/28	4
Note:	This is an on-going strategy. Attempting to identify potential funding sources.									



2022 MITIGATION ACTION PLAN – CITY OF MASSILLON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
10.1 Temp. Extreme	Water Spray Park	Develop a Water Spray Park in a heat-vulnerable neighborhood.	New	Structure & Infrastructure Project	HMGP, CDBG, BRIC	3 Years	City Council	1/1/23	12/31/25	1
Note:	The City of Massillon has been working to develop a Water Spray Park for three years. Conceptual drawings have been developed. Looking for additional funding to construct.									
4.1 Epidemic	COOP Plan	Develop a Continuity of Operations Plan (COOP) to allow the City to become more resilient.	New	Local Plans & Regulations	HPP, EMPG, BRIC	5 Years	City Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. Some efforts have been taken on this project.									
4.2 Epidemic	Health messaging	Coordinate with local health officials to enhance messaging regarding vaccination information, administrative controls, and lessons learned resulting from the recent COVID-19 pandemic.	New	Preparedness & Response Activity	HPP, BRIC, HMGP,	3 Years	City Council	1/1/23	12/31/25	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. Some efforts with regards to messaging have been initiated.									
9.1 Winter Storms	Snow removal	Develop mutual aid agreements with private contractors to aid in the snow removal process.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. This will remain an on-going project into the future.									
5.8 Flooding	Backflow valve installation	Encourage homeowners to install backflow valves to prevent reverse-flow flood damage.	New	Structure and Infrastructure Project	HMGP, FMSP, BRIC	3 Years	City Council	1/1/23	12/31/25	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
8.2 Summer Storms	Convert traffic lights to mast arm	Convert traffic lights to mast arm design in known high wind areas.	New	Structure and Infrastructure Project	HMGP, CDBG, BRIC	5 Years	City Council	1/1/23	12/31/28	6
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. Some traffic lights have already been converted, several still need to be.									
5.6 Flooding	Flow monitor installation	Install flow monitors on various wastewater piping systems where needed.	New	Structure and Infrastructure Project	HMGP, CDBG, BRIC	3 Years	City Council	1/1/23	12/31/25	6
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. City is currently working with Stark County on this. The city operates a Regional WWTP.									

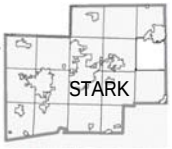


2022 MITIGATION ACTION PLAN – CITY OF MASSILLON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Bury power lines	During all new development, bury power lines to provide uninterrupted power during severe wind events.	New	Structure and Infrastructure Project	HMGP, CDBG, BRIC	3 Years	City Council	1/1/23	12/31/25	8
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. This is a part of the City's existing subdivision standards.									
5.1 Flooding	Structural elevations	Identify and consider elevating critical flood-prone structures above the 100-year flood level (Revised).	On-going	Structure & Infrastructure Project	HMGP, FMA, BRIC	5 Years	City Council	1/1/23	12/31/28	8
Note:	This project is on-going, attempting to identify a funding source.									
5.5 Flooding	Retention basins	Require developers to construct on-site retention basins for excessive storm water.	New	Structure and Infrastructure Project	HMGP, FMSP, BRIC	5 Years	City Council	1/1/23	12/31/28	10
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. This is part of existing subdivision regulations enforced by Ohio EPA.									
5.7 Flooding	Debris removal from bridge abutments	Routinely clear debris from the support bracing and abutments underneath low-lying bridges along Sippo Reservoir Creek and Little Sippo Creek.	New	Natural Systems Protection	HMGP, FMSP, BRIC	5 Years	City Council	1/1/23	12/31/28	10
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.4 Flooding	Upgrade storm drainage systems	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems that may involve detention and retention ponds.	New	Structure and Infrastructure Project	FMA, CDBG, BRIC	5 Years	City Council	1/1/23	12/31/28	10
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.2 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	City Council	1/1/23	12/31/28	13
Note:	This project is on-going, attempting to identify a funding source.									
5.3 Flooding	Stream bank restoration	Undertake stream bank restoration efforts to clear log jams, trees and sediment bars.	New	Natural Systems Protection	BRIC, HMGP, FMSP	5 Years	City Council	1/1/23	12/31/28	14
Note:	This is a new mitigation strategy, developed during the 2022 plan update process. Stream bank restorations efforts are underway in portions of the City.									

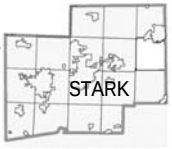


2022 MITIGATION ACTION PLAN – CITY OF NORTH CANTON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Buy outs & Structural elevations	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties	On-going	Structure & Infrastructure Project	SRL, RFC, FMA,	5 Years	City Council	1/1/23	12/31/28	1
Note:	This project is on-going, Partners with Stark Parks, Stark County, Cities of Louisville and Canton, the Muskingum Watershed, and the State of Ohio to obtain matching grant funds to conduct approximately 20 acquisition/relocation projects within city of North Canton to date.									

2022 MITIGATION ACTION PLAN – VILLAGE OF BEACH CITY										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	NFIP Participation	Coordinate with Ohio EMA and FEMA Region 5 regarding Community Status Book listing for participation in the NFIP.	On-going	Local Plans & Regulations	Local Funding	1 Year	Village Council	1/1/23	12/31/23	1
Note:	This is an on-going strategy.									
2.1 Drought	Upgrade water supply	Enhance and upgrade existing water supply and distribution systems to withstand drought events.	New	Structure & Infrastructure Project	CDBG, BRIC	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
10.1 Temp. Extreme	Water spray park	Install a water spray park at the Beach City Community Park.	New	Structure & Infrastructure Project	HMGP, CDBG, BRIC	3 Years	Village Council	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.2 Flooding	Open Space	Expand existing parks, preserves, and maintain these areas as open space.	New	Natural System Protection	BRIC, FMSP, FMA	5 Years	Village Council	1/1/23	12/31/28	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.3 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

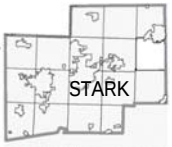


2022 MITIGATION ACTION PLAN – VILLAGE OF BREWSTER										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	Awareness Campaign	Awareness of hazards via utility bills, website, social media.	On-going	Education Program	BRIC, Local Funding	2 Years	Village Council	1/1/23	12/31/24	1
Note:	This is an on-going strategy.									
5.1 Flooding	Zoning Code adjustments	Periodically FEMA provides required modifications to, and to remain current & eligible for Flood Insurance, the Brewster Zoning Code will be adjusted.	On-going	Local Plans & Regulations	BRIC, FMSP, FMA	3 Years	Village Council	1/1/23	12/31/25	2
Note:	This is an on-going strategy.									
5.2 Flooding	Zoning Code adjustments	The current zoning code is a fluid instrument intended to be tweaked as needed.	On-going	Local Plans & Regulations	BRIC, FMSP, FMA	3 Years	Village Council	1/1/23	12/31/25	3
Note:	This is an on-going strategy.									
5.3 Flooding	Zoning Code adjustments	The current zoning regulations are dated, implementation of modifications will include mitigation efforts to reduce potential hazards.	On-going	Local Plans & Regulations	BRIC, FMSP, FMA	3 Years	Village Council	1/1/23	12/31/25	4
Note:	This is an on-going strategy.									
12.2 Misc.	Early Warning System	Research and then employ a contractor to provide software for an emergency notification system.	On-going	Preparedness & Response Activity	BRIC, HMGP, AFG	5 Years	Village Council	1/1/23	12/31/28	5
Note:	This is an on-going strategy.									
5.4 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	6
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

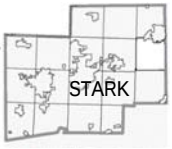


2022 MITIGATION ACTION PLAN – VILLAGE OF EAST CANTON										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	Mass notification system.	Purchase, install, and activate "all call" - a mass notification phone system to reach all residence in the village at once.	On-going	Preparedness & Response Activity	BRIC, HMGP, HSGP	3 Years	Village Council	1/1/23	12/31/25	1
Note:	This is an on-going strategy.									
12.2 Misc.	NOAA All Hazard Radio	Purchase an All-Hazard NOAA Radio for the village.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	2 Years	Village Council	1/1/23	12/31/24	2
Note:	This is an on-going strategy.									
5.1 Flooding	NFIP Participation	Coordinate with Ohio EMA and FEMA Region 5. The FEMA Community Status Book lists the village as a participant in the NFIP, yet the village responded as a non-participant in the capability survey.	Deferred	Local Plans & Regulations	Local Funding	1 Year	Village Council	1/1/23	12/31/23	3
Note:	This strategy was deferred, still looking to complete this project in the future.									
5.2 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – VILLAGE OF EAST SPARTA										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	CRS Participation	Participate in the Community Rating System.	On-going	Local Plans & Regulations	BRIC, Local Funding	3 Years	Village Council	1/1/23	12/31/25	1
Note:	This is an on-going strategy.									
5.2 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

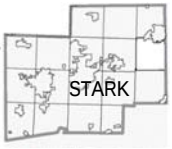


2022 MITIGATION ACTION PLAN – VILLAGE OF HARTVILLE										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
4.1 Epidemic	COOP Plan	Develop a Continuity of Operations Plan (COOP) to allow the Village to become more resilient.	New	Local Plans & Regulations	HPP, EMPG, BRIC	5 Years	Village Council	1/1/23	12/31/28	1
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
10.1 Temp. Extreme	Cooling / heating centers	Identify public facilities that can be utilized as cooling and heating centers throughout the Village.	New	Preparedness & Response Activity	HMGP, BRIC, Local Funding	3 Years	Village Council	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
4.2 Epidemic	Enforcement of public health measures	Determine effective methods of enforcing, isolation, quarantining, and travel restrictions as necessary.	New	Preparedness & Response Activity	BRIC, Local Funding	3 Years	Village Council	1/1/23	12/31/25	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.1 Flooding	Flow monitor installation	Install flow monitors on various wastewater piping systems where needed.	New	Structure & Infrastructure Project	HMGP, FMSP BRIC	5 Years	Village Council	1/1/23	12/31/28	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
12.1 Misc.	Fire & police station retrofits	Retrofit fire and police stations to become hazard resistant.	New	Structure & Infrastructure Project	HMGP, HSGP, CDBG, BRIC	5 Years	Village Council	1/1/23	12/31/28	5
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



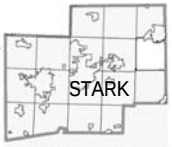
2022 MITIGATION ACTION PLAN – VILLAGE OF HILLS & DALES										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Tree trimming	Establish a community forestry program to trim trees to prevent limb breakage and safeguard nearby utility lines by maintaining the public right-of-way.	On-going	Natural System Protection	BRIC, HMGP, Local Funding	5 Years	Village Council	1/1/23	12/31/28	1
Note:	This is an on-going strategy Completing in phases. Coordinate with utility companies and homeowners. Ongoing due to continual rapid tree growth.									
5.1 Flooding	Storm drainage capacity	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems.	New	Structure & Infrastructure Project	HMGP, CDBG, BRIC	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
6.1 Hazmat Release	SIP Awareness Campaign	Increase education and awareness regarding the public protection measure of Shelter-in-Place (SIP) amongst county residents.	New	Education Program	BRIC, HMGP, Local Funding	3 Years	Village Council	1/1/23	12/31/25	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – VILLAGE OF MAGNOLIA										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	Mitigation Planning	Participate in annual plan updates	On-going	Education Program	None	5 Years	Village Council	1/1/23	12/31/28	1
Note:	This is an on-going strategy. The Village will continue to actively participate in each required 5-year update of this plan.									
5.1 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



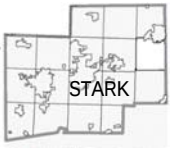
2022 MITIGATION ACTION PLAN – VILLAGE OF MEYERS LAKE										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	NOAA All Hazard Radio	Encourage the use of NOAA All-Hazard Radios among residents that continuously broadcast National Weather Service forecasts and provide direct warnings to the public for natural, technological, and man-made hazards.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Village Council	1/1/23	12/31/23	1
Note:	This is an on-going strategy, still looking for funding source.									
12.2 Misc.	Mass Notification System	Institute a mass notification system called "Calfire", which is a mass text messaging system.	New	Preparedness & Response Activity	BRIC, HMGP, Local Funding	3 Years	Village Council	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – VILLAGE OF MINERVA										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Stream Gauges	Consider purchasing and strategically placing stream gauges along portions of the Still Fork and Big Sandy Creeks.	On-going	Preparedness & Response Activity	BRIC, HMGP, FMSP	3 Years	Village Council	1/1/23	12/31/25	1
Note:	This is an on-going strategy, still looking for funding source									
5.2 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



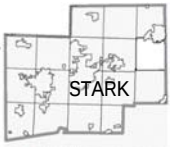
2022 MITIGATION ACTION PLAN – VILLAGE OF NAVARRE										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
1.1 Dam & Levee Failure	Dam failure flood studies	Coordinate with the US Army Corps of Engineers to update outdated flood studies encompassing areas affected by the failure or topping of the Class I dams within and near the Village of Navarre.	On-going	Preparedness & Response Activity	BRIC, HHPD, HMGP	5 Years	Village Council	1/1/23	12/31/28	1
Note:	This is an on-going strategy, still looking for funding source.									
5.1 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	New	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Village Council	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – VILLAGE OF WAYNESBURG										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Buy outs.	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA,	5 Years	Village Council	1/1/23	12/31/28	1
Note:	This is an on-going strategy, still trying to identify a possible funding source.									
12.1 Misc.	NOAA All Hazard Radio	Maintain NOAA All-Hazard Radios, and the Emergency Alert System throughout the Village of Waynesburg.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Village Council	1/1/23	12/31/23	2
Note:	This is an on-going strategy.									
5.2 Flooding	Stream debris removal	Clean out accumulated debris from the creek that causes flooding, before flowing into Sandy Creek. Floods 300 West Lisbon Street, goes under N. Mckinley Street.	On-going	Natural Systems Protection	BRIC, FMSP, Local Funding	5 Years	Village Council	1/1/23	12/31/28	3
Note:	This is an on-going strategy, still attempting to identify who will do this.									



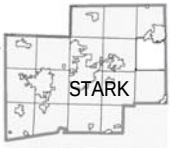
2022 MITIGATION ACTION PLAN – VILLAGE OF WILMOT										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Secure items from being blown around	Encourage residents and business owners to secure or move indoors all loose materials, yard items, and patio furniture that can be blown about during severe winds and tornadoes.	On-going	Preparedness & Response Activity	BRIC, Local Funding	1 Years	Village Council	1/1/23	12/31/23	1
Note:	This is an on-going strategy, and will continue to be moving forward.									

2022 MITIGATION ACTION PLAN – BETHLEHEM TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
9.1 Winter Storms	Snow removal	Develop mutual aid agreements with private contractors to aid in the snow removal process.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going strategy.									
9.2 Winter Storms	Tree trimming	Coordinate with power companies to periodically trim trees near power lines to prevent limb breakage and power failures.	New	Preparedness & Response Activity	BRIC, HMGP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.1 Flooding	Green space	Establish a "green infrastructure program" to manage and expand existing parks, preserves, wetlands and open green spaces.	New	Natural System Protection	RFC, BRIC, FMSP, FMA	3 Years	Township Trustees	1/1/23	12/31/25	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.2 Flooding	Stream bank restoration	Undertake stream bank restoration efforts to clear log jams, trees, and sediment bars.	New	Natural System Protection	BRIC, HMGP, FMSP, FMA	5 Years	Township Trustees	1/1/23	12/31/28	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



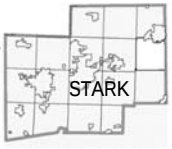
2022 MITIGATION ACTION PLAN – CANTON TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
7.1 Land Subsidence	Informational campaign	Develop and distribute an informational brochure to the residents of Canton Township that addresses the hazards associated with land subsidence and actions residents can take to safeguard against those hazards.	On-going	Education Program	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going strategy. Currently utilize newsletters and website to disseminate information regarding land subsidence.									
5.1 Flooding	Buy outs	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is an on-going strategy. Still attempting to obtain necessary funding.									

2022 MITIGATION ACTION PLAN – JACKSON TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
9.1 Winter Storm	Snow fences	Consider constructing snow fences or planting rows of trees to serve as living snow fences to limit blowing and drifting snow over critical roadways of the township.	On-going	Natural System Protection	BRIC, HMGP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	1
Note:	This is an on-going strategy, still attempting to obtain necessary funding.									



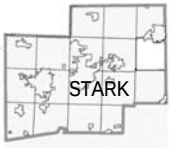
2022 MITIGATION ACTION PLAN – LAKE TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
9.1 Winter Storm	Snow fences	Installation of snow fence to limit blowing and drifting snow over critical roadways of the township.	On-going	Natural System Protection	BRIC, HMGP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	1
Note:	This is an on-going strategy, still attempting to obtain necessary funding.									
9.2 Winter Storms	Snow removal	Develop mutual aid agreements with private contractors to aid in the snow removal process.	New	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – LAWRENCE TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Hail-resistant construction	Encourage business owners and residents to use structural bracing, window shutters, laminated glass in windowpanes, and hail-resistant roof shingles to minimize damage to public and private structures.	On-going	Structure & Infrastructure Projects	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going strategy, still attempting to obtain necessary funding.									
5.1 Flooding	Floodplain Regulations	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	On-going	Local Plans & Regulations	BRIC, FMSP, FMA	3 Years	Township Trustees	1/1/23	12/31/25	2
Note:	This is an on-going strategy, still attempting to obtain necessary funding.									



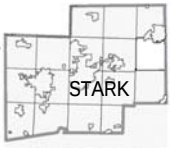
2022 MITIGATION ACTION PLAN – LEXINGTON TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Early Warning	Provide public service messages detailing what actions residents should take to safeguard themselves during severe thunderstorms and other emergencies.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	1
Note:	This is an on-going strategy. Attempting to obtain necessary funding.									

2022 MITIGATION ACTION PLAN – MARLBORO TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Information Campaign	Provide information to residents living along the creeks and streams feeding the Walborn Reservoir of the potential damage and effects of the reservoir reaching capacity just before the dam tops.	On-going	Education Program	HMGP, Local Funding	5 Years	Township Trustees	1/1/23	12/31/28	1
Note:	This is an on-going strategy, still attempting to obtain necessary funding.									
5.2 Flooding	Stream bank restoration	Coordinate with Stark Parks to periodically undertake stream bank restoration efforts to clear log jams, trees, and sediment bars.	New	Natural Systems Protection	BRIC, HMGP, FMSP, FMA	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

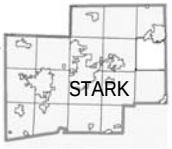


2022 MITIGATION ACTION PLAN – NIMISHILLEN TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	Early Warning	Increase the coverage and use of NOAA Weather Radios and the Emergency Alert System throughout Nimishillen Township.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going strategy.									
5.1 Flooding	Buy outs	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is an on-going strategy, still attempting to obtain necessary funding									

2022 MITIGATION ACTION PLAN – OSNABURG TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Securing yard items	Encourage residents to secure debris, yard items, or stored objects including oil, gasoline, propane tanks, paint, and chemical barrels that may be swept away by floodwaters.	On-going	Preparedness & Response Activity	Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going strategy, and remain as such in the future.									

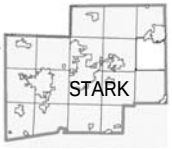


2022 MITIGATION ACTION PLAN – PARIS TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Hail-resistant construction	Encourage the use of structural bracing, window shutters, laminated glass in windowpanes, and hail-resistant roof shingles to minimize damage to public and private structures.	On-going	Structure & Infrastructure Projects	BRIC, HMGP, Local Funding	1 Year	Township Trustees	1/1/23	12/31/23	1
Note:	This is an on-going mitigation strategy.									
8.2 Summer Storms	Tree pruning	Establish standards for all utilities regarding tree pruning around overhead utility lines.	New	Natural System Protection	BRIC, HMGP, Local Funding	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
8.3 Summer Storms	Utility loop-feeds	Install redundancies and loop-feeds in existing utility lines.	New	Structure & Infrastructure Projects	HMGP, BRIC Local Funding	5 Years	Township Trustees	1/1/23	12/31/28	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

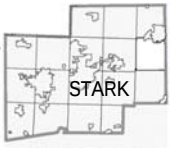


2022 MITIGATION ACTION PLAN – PERRY TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
12.1 Misc.	Early Warning	Coordinate with amateur radio operators in Perry Township, as well as the Stark County EMA, to increase the coverage area and use of the existing storm warning system.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	2 Years	Township Trustees	1/1/23	12/31/24	1
Note:	This is an on-going strategy.									
5.1 Flooding	Floodplain Regulations	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	On-going	Local Plans & Regulations	BRIC, HMGP, FMSP, FMA	3 Years	Township Trustees	1/1/23	12/31/25	2
Note:	This is an on-going strategy.									
5.2 Flooding	Buy outs	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Township Trustees	1/1/23	12/31/28	3
Note:	This is an on-going strategy. Attempting to identify funding sources.									

2022 MITIGATION ACTION PLAN – PIKE TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Floodplain Regulations	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	On-going	Local Plans & Regulations	BRIC, HMGP, FMSP, FMA	3 Years	Township Trustees	1/1/23	12/31/25	1
Note:	This is an on-going strategy, still attempting to obtain necessary funding									
5.2 Flooding	Emergency Exercises	Participate in emergency exercises facilitate by Marathon Ashland refinery, regarding holding tanks along Nimishillen Creek.	New	Education Program	HMGP, HMEP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

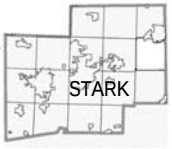


2022 MITIGATION ACTION PLAN – PLAIN TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
5.1 Flooding	Decrease impermeable ground coverage	Coordinate with property owners to decrease the amount of impermeable ground coverage in upland and drainage areas to allow more water to be absorbed into the ground.	On-going	Natural System Protection	BRIC, HMGP, FMSP	5 Years	Township Trustees	1/1/23	12/31/28	1
Note:	This is an on-going strategy. Some areas of the township have not yet been completed.									
8.1 Summer Storms	Tree cutting	Reduce the damage caused by severe weather to structures by cutting trees and house right-of-ways and conducting surveys after each storm.	On-going	Natural System Protection	BRIC, HMGP, Local Funding	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is an on-going strategy, still attempting to obtain necessary funding									
5.2 Flooding	Ditch clearing	Coordinate with ODOT, county and municipal road crews, or possibly contract with third party to assist with cleaning out ditches in areas where roadways typically flood.	New	Natural System Protection	HMGP, FMSP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	3
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
5.3 Flooding	Backflow Valves	Encourage homeowners to install backflow valves to prevent reverse-flow flood damage.	New	Structure & Infrastructure Projects	BRIC, HMGP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	4
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									
7.1 Land Subsidence	Subsidence reclamation	Conduct land subsidence reclamation projects as necessary.	New	Structure & Infrastructure Projects	HMGP, BRIC	5 Years	Township Trustees	1/1/23	12/31/28	5
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									



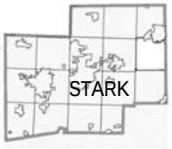
2022 MITIGATION ACTION PLAN – SANDY TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
8.1 Summer Storms	Structural anchoring	Encourage homeowners to apply additional anchoring of manufactured homes and exterior structures such as carports and porches.	On-going	Preparedness & Response Activity	BRIC, HMGP, Local Funding	2 Years	Township Trustees	1/1/23	12/31/24	1
Note:	This is an on-going strategy.									
6.1 HazMat Release	Emergency Exercises	Obtain funding to continue to participate in emergency exercise at the American Landfill (solid waste site) and at Minerva Enterprises (CND Landfill).	New	Education Program	BRIC, HMEP, Local Funding	3 Years	Township Trustees	1/1/23	12/31/25	2
Note:	This is a new mitigation strategy, developed during the 2022 plan update process.									

2022 MITIGATION ACTION PLAN – SUGAR CREEK TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
1.1 Dam & Levee Failure	Dam failure flood studies	Coordinate with the US Army Corps of Engineers to updated outdated flood studies encompassing areas affected by the failure or topping of the Beach City Dam.	On-going	Preparedness & Response Activity	BRIC, HHPD, HMGP	5 Years	Township Trustees	1/1/23	12/31/28	1
Note:	This is an on-going strategy.									
5.1 Flooding	Buy outs	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	On-going	Structure & Infrastructure Project	SRL, RFC, FMA	5 Years	Township Trustees	1/1/23	12/31/28	2
Note:	This is an on-going strategy. Attempting to obtain funding.									



2022 MITIGATION ACTION PLAN – TUSCARAWAS TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
7.1 Land Subsidence	Subsidence Identification	Contact the Ohio Department of Natural Resources, Division of Mineral Resources Management to learn of areas in Tuscarawas Township that could be affected by underground mining.	On-going	Education Program	HMGP, Local Funding	5 Years	Township Trustees	1/1/23	12/31/28	1
Note:	This is an on-going strategy.									
5.1 Flooding	Floodplain Regulations	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	On-going	Local Plans & Regulations	BRIC, HMGP, FMSP, FMA	2 Years	Township Trustees	1/1/23	12/31/24	2
Note:	This is an on-going strategy.									

2022 MITIGATION ACTION PLAN – WASHINGTON TOWNSHIP										
Project #	Mitigation Action	Strategy	Project Status	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Start Date	End Date	Project Priority
9.1 Winter Storms	Tree trimming	Establish a community forestry program with a goal of trimming trees and maintaining clear space around public right-of-ways.	On-going	Natural Systems Protection	HMGP, BRIC, Local Funding	2 Years	Township Trustees	1/1/23	12/31/24	1
Note:	This is an on-going strategy. Trees have been trimmed in a few areas of the township.									
5.1 Flooding	Floodplain Regulations	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	On-going	Local Plans & Regulations	BRIC, HMGP, FMSP, FMA	2 Years	Township Trustees	1/1/23	12/31/24	2
Note:	This is an on-going strategy.									



4.0 PLAN MAINTENANCE AND INTEGRATION

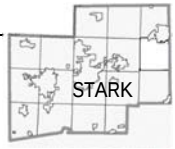
§ 201.6(c)(4)(i)	[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
§ 201.6(c)(4)(ii)	[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
§ 201.6(c)(4)(iii)	[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

This section of the plan outlines the process by which Stark County and the participating jurisdictions will update and maintain this document.

4.1 Monitoring, Evaluating and Updating the Plan

The steering committee recognizes the importance of a plan maintenance *process*, not only as a function of the regulatory driver governing completion of mitigation plans (as a requirement for mitigation funding) but also as an opportunity to support networking amongst key stakeholders. Further, the committee recognizes that postponing the plan update results in an ineffective effort wherein it is difficult to garner enthusiasm and participation on the part of extended stakeholders. To this end, during the fourth planning meeting, on June 15, 2022, the committee agreed to a maintenance process based on annual reviews conducted by the participating jurisdictions focusing on revisiting the status of mitigation projects, review of asset inventory lists, and making note of any events that occur, and the impact of those events. The overall process is as follows.

- **Year 1:** Focus on plan adoption; begin “Mitigation 101” outreach. The Stark County Emergency Management Agency (SCEMA) will ensure that participating jurisdictions receive copies of the plan and provide technical assistance, as necessary, to support adoption.
- **Year 3:** Meet to conceptually plan the next update; begin targeting funding for the next update.
- **Year 5:** The Steering Committee will initialize and coordinate the next plan update in year 5.



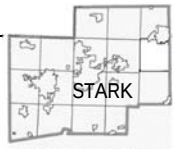
The goal of the annual discussions will be to generate content for the next plan update and educate new stakeholders as they enter the process. Representatives on the steering committee could change, and these discussions offer a prime opportunity to orient new members to what mitigation is, how the plan works, etc.

4.2 Implementation through Existing Programs

Most local leaders are aware of and understand traditional hazard mitigation funding programs (e.g., the Hazard Mitigation Grant Program [HMGP], Pre-Disaster Mitigation [PDM] program, etc.). However, the key to the widespread implementation of the mitigation plan is the recognition of opportunities for integrating opportunities for mitigation into other planning and community development initiatives. For instance, highway or streetscape projects present opportunities to address runoff and potential flash flooding. The development of parks and other open spaces can also mitigate weather hazards. Even substantial preparedness for the inevitable hazard occurrences can double as mitigation efforts in that a more efficient and effective response can lessen the overall loss the community experiences. As such, many other funding sources and programs beyond HMGP and PDM enable hazard mitigation.

Six existing mechanisms can support mitigation in Stark County: (1) floodplain management, (2) emergency operations planning, (3) infrastructure planning, (4) community and economic development, (5) public health planning, and (6) transportation planning. The following table describes the potential integration of these elements with hazard mitigation in detail.

MITIGATION INTEGRATION		
Existing Program	*Participating Agencies*	*Narrative (and Goal Alignment)*
Floodplain Management	Stark County Planning Commission Municipal Floodplain Administrators	According to FEMA's *Community Status Book* (current as of 03/2020), all but four of the jurisdictions in Stark County participate in the National Flood Insurance Program and thus maintain floodplain regulations that at least mirror the state's regulations. No communities in Stark County currently participate in the Community Rating System (CRS) program (as of October, 2021).



MITIGATION INTEGRATION		
Existing Program	*Participating Agencies*	*Narrative (and Goal Alignment)*
Emergency Operations Planning	Stark County Emergency Management Agency Municipal Partners Response Agency Partners Stark County Health Department Alliance City Health Department Canton City Public Health Massillon City Health Department	The SCEMA incorporates mitigation principals into the county's Emergency Operations Plan (EOP) to predetermine the hazards to which responders may respond. This plan works primarily to address the negative effects of natural, technological, and human-caused hazards (as an all-hazards framework). The health departments serving the county also prepare extensive response plans, to include an all-hazards response plan, pandemic and SNS response plans, epidemiological plans, etc. <u>INTEGRATION WITH MITIGATION EFFORTS</u> Emergency operations planning efforts support mitigation through improved response times, addressing impacts before the cascade (to the extent possible), etc. Mitigation planning can support emergency operations planning through the collection of hazard and vulnerability information.
Infrastructure Planning (including Stormwater Management)	Stark County Engineer Stark County Soil & Water Conservation District Stark County Regional Planning Authority	The county engineer is a party to the county's drainage and erosion/sediment control plan, along with the Stark County Soil & Water Conservation District. <u>INTEGRATION WITH MITIGATION EFFORTS</u> Water quality issues contribute to risk or, conversely, resilience as improvements occur. Specifically, drainage and other stormwater considerations can mitigate flooding through controls on the amount of runoff that occurs during precipitation events. Erosion control aspects support stream bank restoration, etc. Preservation of open space and other "green infrastructure" projects also impact the amount of runoff that ultimately overloads stormwater systems and contributes to site-specific flooding.

MITIGATION INTEGRATION		
Existing Program	*Participating Agencies*	*Narrative (and Goal Alignment)*
Community & Economic Development	Stark County Economic Development Board Stark County Community Foundation Stark County Regional Planning Authority Alliance Economic Development Canton Community Improvement Corporation Canal Fulton Economic Development Committee Louisville Economic Development Massillon Economic Development North Canton Economic Development Municipal Chamber of Commerce	The Stark County Economic Development Board participates in setting regional priorities for projects and investments. Regarding mitigation initiatives, through its participation in this project (as well as similar ones in neighboring counties), and is in a unique position to consider the risk (and risk reduction) implications of economic development projects. Further, the board compiles the region's Comprehensive Economic Development Strategy (CEDS). There are several municipal economic development departments and Chamber's of Commerce that set municipal priorities for projects and investments. <u>INTEGRATION WITH MITIGATION EFFORTS</u> Mitigation planning and community/economic development can co-exist in many ways. Mitigation efforts (specific the hazard identification elements) can inform prospective developers or project administrators of the types of precautions or structure mitigation measures they may wish to include in projects. Local officials may also use mitigation plan information to encourage green infrastructure and other low-impact development initiatives.
Public Health Planning	Stark County Health Department Alliance City Health Department Canton City Public Health Massillon City Health Department	The SCHD and municipal health department's maintain emergency response plans to guide efforts during public health emergencies (see above). Furthermore, the health departments participate in the community health needs assessment process, which identifies what residents and other stakeholders feel are the biggest threats and needs relative to the public in Stark County. In Stark County, health departments conduct community needs forums, and invite residents to comment on problems facing their neighborhoods. This plan update serves as an example of how that process integrates into mitigation planning (and vice versa). <u>INTEGRATION WITH MITIGATION EFFORTS</u> Public health planning efforts help to frame prevention and vulnerability reduction efforts per epidemic and other public health concerns (e.g., sanitation, water quality, etc.).

MITIGATION INTEGRATION		
Existing Program	*Participating Agencies*	*Narrative (and Goal Alignment)*
Transportation Planning	Stark County Engineer Stark County Port Authority Stark Area Regional Transit Authority Ohio Department of Transportation (ODOT) District 4 Municipal Transportation Departments	The Stark County Engineer seeks to improve and maintain the infrastructure of the county, to include transportation infrastructure (roads and bridges, including snow/ice control). The Ohio Department of Transportation participates in corridor planning initiatives throughout the region as well as collaborates regularly with public transit systems. ODOT prepares transportation improvement plans. INTEGRATION WITH MITIGATION EFFORTS Hazard identification and risk assessment sections of the mitigation plan may identify areas where the transportation infrastructure could be vulnerable to hazards such as landslides, erosion, subsidence, etc. Further, in Northeast Ohio, severe weather may affect transportation concerns.

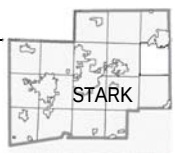
4.3 Continued Public Involvement

All adopting jurisdictions maintain copies of this plan. Citizens can review the plan and provide comments at any of these locations. Citizens may also access the plan through the SCEMA. The SCEMA will maintain a copy of the document on its website. Though the plan is available at these locations, citizens may not be aware of that availability or understand the nature and purpose of a multi-jurisdictional hazard mitigation plan. As such, additional means of public education and involvement are important.

Additionally, the online public survey was highly effective, and it could also serve as a means of encouraging public participation during the cycle. The SCEMA will consider utilizing the long survey distributed as part of this project, as well as the mini-survey, to develop an online survey for distribution in Year 3. The questions on that survey will resemble the following.

1. Do you live or work in Stark County? If so, in what community?
2. What hazard do you feel presents the biggest risk to Stark County? Why?
3. Have you noticed an increase or decrease in the occurrences or intensity of any of the following hazards?
4. Do you live in a special flood hazard zone?
5. What disaster preparedness measures have you taken in your home (e.g., 72-hour kit, etc.)?
6. Have you received, heard about, or searched for educational opportunities about disaster preparedness? If so, please describe your efforts.
7. How would you rate your ability to recovery from disasters?

Tracking this information will allow the steering committee that coordinates the next update to compare evolving responses (to see if a trend line forms). Further, it will enable local officials to determine whether efforts to educate the community are effective.



APPENDIX 1: PLANNING PROCESS INVOLVEMENT

This appendix provides evidence of the planning process, to include participation at meetings and topics discussed. Appendix 4 provides evidence of public participation.

STARK COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #1

AGENDA

Date: Wednesday, September 15, 2021
Time: 10:00 a.m.
Estimated Duration: 90 minutes
Location: TEAMS Teleconference

1. Welcome and Introductions
2. Hazard Mitigation 101
   - **Background:** FEMA and OEMA Requirements, Applicable Funding Source Eligibility
   - **Overview:** Planning Process
   - **Discussion:** Public Involvement Opportunities

3. Mitigation Goals
   - **Discussion:** What are mitigation goals?
   - **Review:** Mitigation Goals from Previous Version
   - **Activity:** Setting updated Goals and Objectives for the plan update

4. Updating Hazard List for 2021 plan update
   - **Overview:** Discussion amongst steering committee members to develop an updated list of hazards to be included in the plan update.
   - **Discussion:** Steering committee members reviewed a comprehensive list of natural, technological, and human-caused hazards to determine which hazards should be included in the plan update.
   - **Activity:** The steering committee selected hazards to be included in the plan update.

5. Schedule for Next Meetings
6. Adjournment

Committee Member Homework
Community Asset Inventory Review, Mitigation Project Status

STARK COUNTY HMP PLANNING MEETING 1 – SEPTEMBER 15, 2021			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Alliance City	Jason Hunt	Fire Chief	
Canal Fulton City	Joe Schultz	Mayor	
Canton City	Andrea Perry	Director of Public Services	X
Louisville City	Larry Collins	City Manager	X
Massillon City	Kathy Catazaro Perry	Mayor	
	Barbara Sylvester	Safety & Services Director	
North Canton City	Patrick De Orio	Director of Administration	
Beach City Village	John Hartman	Mayor	
Brewster Village	Chuck Hawk	Mayor	
	Michael Miller	Administrator	
East Canton Village	Kathleen Almasy	Mayor	
	Ed Collins	Administrator	
East Sparta Village	Don Stropki	Mayor	
Hartville Village	Cindy Marie Billings	Mayor	
Hills & Dales Village	Chad Lebold	Chief of Police	
Magnolia Village	Todd Boyd	Mayor	
Meyers Lake Village	Mike Labriola	Mayor	
Minerva Village	Phillip Turske	Administrator	
Navarre Village	Robert L. Benson	Mayor	
Waynesburg Village	Douglas Welch	Mayor	
Wilmot Village	Christina Hysong	Mayor	
Stark County EMA	Tim Warstler	Director	X
	Doug Wood	Deputy Director	X
	Matt Sweeney	Emergency Planner	X
Stark County Floodplain Coordinator	Angela Cavanaugh	Floodplain Coordinator	
Stark County Engineer	Steve D. Gronow	Engineer	X
Stark County GIS	Cathy Klinger	GIS Technician	
Stark County Health Department	Amy Ascani	Emergency Planning Coordinator	X
Stark County Economic Development	Ray Hexamer	Director	
Stark County Regional Planning	Bob Nau	Executive Director	X
Stark County Sanitary Engineering Dept.	James Brandenburg	Sanitary Engineer	X
Stark County Soil & Water	John Sweedon	Executive Director	
Muskingum WCD	Scott Tritt	Safety Administrator	X

STARK COUNTY HMP PLANNING MEETING 1 – SEPTEMBER 15, 2021			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Stark County OSU Extension	Heather Neikirk	Educator	
Stark Parks District	Sarah Buell	Projects Manager	
Stark County Sheriff's Department	CJ Stantz	Deputy	
Stark County Fire Chief's Association	Rick Annon	Fire Chief	
SARTA	Mark Finnicum	Regional Transit Authority	
Kent State University	James Biehl	Public Safety Manager	X
Stark State College	Diana Tsenekos	Emergency Planning & Security Coord.	
ODOT District 4	Brian Hoover	Highway Technician	
	Brian Olson	Maintenance Engineer	
Jackson Twp Police Department	Mark Brink	Chief of Police	

STARK COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #2

AGENDA

Date: Wednesday, November 17, 2021
Time: 10:00 a.m.
Estimated Duration: 90 minutes
Location: TEAMS Teleconference

1. Review and update Asset Inventory List
   - **Overview:** Discussion amongst steering committee members to develop an updated "Asset Inventory List" for Stark County as well as all cities, and villages.
   - **Discussion:** Steering committee members indicated a few assets that needed to be removed, added, and that needed to be renamed as a result of changes since 2017.
   - **Activity:** Assets were removed and added as necessary to update the 2017 "Asset Inventory List".

2. Review and Assign Status to 2017 Mitigation Projects
   - **Overview:** Discussion amongst steering committee members to assign status updates to each existing mitigation project.
   - **Discussion:** Steering committee members reviewed the list of mitigation projects contained in the 2017 plan and assigned the appropriate status to each.
   - **Activity:** The steering committee reviewed each existing mitigation project and determined whether each project was completed, deleted, deferred, or on-going.

3. Adjournment

Committee Member Homework
Continue to complete On-line Public Survey, create new mitigation strategies for 2021 plan

STARK COUNTY HMP PLANNING MEETING 2 – NOVEMBER 17, 2021			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Alliance City	Jason Hunt	Fire Chief	
Canal Fulton City	Joe Schultz	Mayor	
Canton City	Andrea Perry	Director of Public Services	
Louisville City	Larry Collins	City Manager	
Massillon City	Kathy Catazaro Perry	Mayor	x
	Barbara Sylvester	Safety & Services Director	
North Canton City	Patrick De Orio	Director of Administration	
Beach City Village	John Hartman	Mayor	
Brewster Village	Chuck Hawk	Mayor	
	Michael Miller	Administrator	
East Canton Village	Kathleen Almasy	Mayor	x
	Ed Collins	Administrator	
East Sparta Village	Don Stropki	Mayor	
Hartville Village	Cindy Marie Billings	Mayor	
Hills & Dales Village	Chad Lebold	Chief of Police	
Magnolia Village	Todd Boyd	Mayor	
Meyers Lake Village	Mike Labriola	Mayor	
Minerva Village	Phillip Turske	Administrator	x
Navarre Village	Robert L. Benson	Mayor	
Waynesburg Village	Douglas Welch	Mayor	
Wilmot Village	Christina Hysong	Mayor	
Stark County EMA	Tim Warstler	Director	x
	Doug Wood	Deputy Director	x
	Matt Sweeney	Emergency Planner	x
Stark County Floodplain Coordinator	Angela Cavanaugh	Floodplain Coordinator	
Stark County Engineer	Steve D. Gronow	Engineer	x
Stark County GIS	Cathy Klinger	GIS Technician	x
Stark County Health Department	Amy Ascani	Emergency Planning Coordinator	x
Stark County Economic Development	Ray Hexamer	Director	
Stark County Regional Planning	Bob Nau	Executive Director	
Stark County Sanitary Engineering Dept.	James Brandenburg	Sanitary Engineer	x
Stark County Soil & Water	John Sweedon	Executive Director	
Muskingum WCD	Scott Tritt	Safety Administrator	

STARK COUNTY HMP PLANNING MEETING 2 – NOVEMBER 17, 2021			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Stark County OSU Extension	Heather Neikirk	Educator	
Stark Parks District	Sarah Buell	Projects Manager	
Stark County Sheriff's Department	CJ Stantz	Deputy	
Stark County Fire Chief's Association	Rick Annon	Fire Chief	
SARTA	Mark Finnicum	Regional Transit Authority	
Kent State University	James Biehl	Public Safety Manager	x
Stark State College		Emergency Planning & Security Coord.	
ODOT District 4	Brian Hoover	Transportation Administrator	x
	Brian Olson	Maintenance Engineer	x
Jackson Twp Police Department	Mark Brink	Chief of Police	

STARK COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #3

AGENDA

Date: Friday, May 6, 2022
Time: 10:00 a.m.
Estimated Duration: 90 minutes
Location: TEAMS Teleconference

1. Discuss and development of new mitigation projects.
   - **Overview:** Discussion amongst steering committee members to develop new mitigation projects for the various hazards identified in the plan update.
   - **Discussion:** The contractor provided several sample mitigation projects for all the hazards included in the plan update. Steering committee members discussed the relevance of those sample mitigation projects, utilized information from the samples to develop several new mitigation projects for the county.
   - **Activity:** Several new mitigation projects were discussed and developed.

2. Prioritization of Newly Developed Mitigation Projects
   - **Overview:** The contractor presented the methodology to be utilized for the prioritization of the new mitigation projects. The steering committee discussed this methodology and agreed to utilize the scoring method proposed by the contractor utilizing the STAPLEE method.
   - **Discussion:** Steering committee members discussed the prioritization methodology presented by the contractor, asked several questions regarding the process, and came to an agreement to utilized the STAPLEE method to prioritize the newly development mitigation projects.
   - **Activity:** The newly identified mitigation projects where prioritized and added to the Action Plan portion of the plan update.

3. Contract presented a status update on the number of completed Public Surveys and Capability Surveys to the steering committee.

4. Adjournment

Committee Member Homework
Continue to complete On-line Public Survey and Capability Surveys

STARK COUNTY HMP PLANNING MEETING 3 – MAY 6, 2022			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Alliance City	Jason Hunt	Fire Chief	
Canal Fulton City	Joe Schultz	Mayor	
Canton City	Andrea Perry	Director of Public Services	X
Louisville City	Tom Pukys	City Manager	X
Massillon City	Kathy Catazaro Perry	Mayor	
	Matt Heck	Massillon Fire Department	X
North Canton City	Patrick De Orio	Director of Administration	
Beach City Village	John Hartman	Mayor	
Brewster Village	Chuck Hawk	Mayor	
	Michael Miller	Administrator	X
East Canton Village	Kathleen Almasy	Mayor	
	Ed Collins	Administrator	
East Sparta Village	Don Stropki	Mayor	
Hartville Village	Cindy Marie Billings	Mayor	
Hills & Dales Village	Chad Lebold	Chief of Police	
Magnolia Village	Travis Boyd	Mayor	X
Meyers Lake Village	Mike Labriola	Mayor	
Minerva Village	Phillip Turske	Administrator	X
Navarre Village	Robert L. Benson	Mayor	
Waynesburg Village	Douglas Welch	Mayor	
Wilmot Village	Christina Hysong	Mayor	
Stark County EMA	Tim Warstler	Director	X
	Doug Wood	Deputy Director	X
	Matt Sweeney	Emergency Planner	X
Stark County Floodplain Coordinator	Angela Cavanaugh	Floodplain Coordinator	
Stark County Engineer	Steve D. Gronow	Engineer	
Stark County GIS	Cathy Klinger	GIS Technician	
Stark County Health Department	Amy Ascani	Emergency Planning Coordinator	X
Stark County Economic Development	Ray Hexamer	Director	
Stark County Regional Planning	Bob Nau	Executive Director	
Stark County Sanitary Engineering Dept.	James Brandenburg	Sanitary Engineer	
Stark County Soil & Water	John Sweedon	Executive Director	
Muskingum WCD	Scott Tritt	Safety Administrator	

STARK COUNTY HMP PLANNING MEETING 3 – MAY 6, 2022			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Stark County OSU Extension	Heather Neikirk	Educator	
Stark Parks District	Sarah Buell & Emily Rindfleisch	Projects Manager	X X
Stark County Sheriff's Department	CJ Stantz	Deputy	
Stark County Fire Chief's Association	Rick Annon	Fire Chief	
SARTA	Mark Finnicum	Regional Transit Authority	
Kent State University	James Biehl	Public Safety Manager	
Stark State College		Emergency Planning & Security Coord.	
ODOT District 4	Brian Hoover	Transportation Administrator	X
	Brian Olson	Maintenance Engineer	
Jackson Twp Police Department	Mark Brink	Chief of Police	

STARK COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #4

AGENDA

Date: Wednesday, June 15, 2022
Time: 10:00 a.m.
Estimated Duration: 90 minutes
Location: TEAMS Teleconference

1. Discuss and develop an effective plan maintenance process for the Stark County Hazard Mitigation Plan updates moving forward.
   - **Overview:** Discussion amongst steering committee members to develop an effective plan maintenance schedule to continue to ensure that the plan is maintained and updated as necessary.
   - **Discussion:** The contractor provided several sample plan maintenance schedules that have been successfully implemented. Steering committee members discussed the relevance of those sample and utilized information from the samples to develop a plan maintenance process for the Stark County Hazard Mitigation Plan.
   - **Activity:** An effective plan maintenance process for the Stark County Hazard Mitigation Plan was developed and integrated into Section 4 of the plan update.

2. Formal adoption of the updated plan
   - **Overview:** The contractor provided an overview regarding the formal plan adoption process to county and municipal leadership.
   - **Discussion:** Steering committee members discussed what would be required of them to get the plan formally adopted, and discussed timeframes to get the plan adopted.
   - **Activity:** Adoption/Resolution documents will be emailed to all participating jurisdictions follow Approved Pending Adoption (APA) status.

3. A draft of the updated plan was emailed to all committee members a week prior to this meeting for their review. Committee members were given an opportunity during this meeting the make any comments (i.e., additions, deletions, modifications, etc.) regarding the draft plan prior to final plan development.

4. Adjournment

Committee Member Homework
Prepare for the plan adoption process.

STARK COUNTY HMP PLANNING MEETING 4 – JUNE 15, 2022			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Alliance City	Jason Hunt	Fire Chief	
Canal Fulton City	Joe Schultz	Mayor	
Canton City	Andrea Perry	Director of Public Services	X
Louisville City	Tom Pukys	City Manager	
Massillon City	Kathy Catazaro Perry	Mayor	
	Matt Heck	Massillon Fire Department	
North Canton City	Patrick De Orio	Director of Administration	
Beach City Village	John Hartman	Mayor	
Brewster Village	Chuck Hawk	Mayor	
	Michael Miller	Administrator	
East Canton Village	Kathleen Almasy	Mayor	
	Ed Collins	Administrator	
East Sparta Village	Don Stropki	Mayor	
Hartville Village	Cindy Marie Billings	Mayor	
Hills & Dales Village	Chad Lebold	Chief of Police	
Magnolia Village	Travis Boyd	Mayor	
Meyers Lake Village	Mike Labriola	Mayor	X
Minerva Village	Phillip Turske	Administrator	
Navarre Village	Robert L. Benson	Mayor	
Waynesburg Village	Douglas Welch	Mayor	
Wilmot Village	Christina Hysong	Mayor	
Stark County EMA	Tim Warstler	Director	X
	Doug Wood	Deputy Director	X
	Matt Sweeney	Emergency Planner	
Stark County Floodplain Coordinator	Angela Cavanaugh	Floodplain Coordinator	
Stark County Engineer	Steve D. Gronow	Engineer	
Stark County GIS	Cathy Klinger	GIS Technician	
Stark County Health Department	Amy Ascani	Emergency Planning Coordinator	X
Stark County Economic Development	Ray Hexamer	Director	
Stark County Regional Planning	Bob Nau	Executive Director	
Stark County Sanitary Engineering Dept.	James Brandenburg	Sanitary Engineer	
Stark County Soil & Water	John Sweedon	Executive Director	
Muskingum WCD	Scott Tritt	Safety Administrator	

STARK COUNTY HMP PLANNING MEETING 4 – JUNE 15, 2022			
STEERING COMMITTEE MEMBERS AND AFFILIATIONS – SIGN-IN			
Agency/Affiliation	*Name*	*Title*	*On Call*
Stark County OSU Extension	Heather Neikirk	Educator	
Stark Parks District	Sarah Buell & Emily Rindfleisch	Projects Manager	X
Stark County Sheriff's Department	CJ Stantz	Deputy	
Stark County Fire Chief's Association	Rick Annon	Fire Chief	
SARTA	Mark Finnicum	Regional Transit Authority	
Kent State University	James Biehl	Public Safety Manager	
Stark State College		Emergency Planning & Security Coord.	
ODOT District 4	Brian Hoover	Transportation Administrator	
	Brian Olson	Maintenance Engineer	
Jackson Twp Police Department	Mark Brink	Chief of Police	

APPENDIX 2: PROJECT PRIORITIZATION

This appendix contains a spreadsheet used to calculate project prioritization scores.

STARK COUNTY HAZARD MITIGATION PLAN (2022 UPDATE)

Mitigation Strategy Prioritization

Definition of Priority Scoring

5 Best outcome for each criterion (e.g., very few negative social impacts, minimal (or doable in-house) administrative requirements, etc.)
4 ↓
3 ↓
2 ↓
1 Worst outcome for each criterion (e.g., significant political drawback, economically unfeasible, negative environmental consequenc

STRATEGY		PRIORITY CATEGORIES								
Number	*Description*	Social Impacts	Technical Feasibility	Admin. Requirements	Political Impacts	Legal Ramifications	Env. Impacts	Economic / Cost Benefit	**SUM**	**RES. PRIORITY**
1.1	Coordinate with the ODNR, Dam Safety Engineering Program to conduct periodic safety inspections of existing dams in Stark County, and garner community support for the removal or repair of dams in disrepair.	4	5	4	4	5	5	3	30	**4**
1.2	Coordinate with dam owners to ensure rehabilitation of High Hazard Potential Dams (HHPDs) as necessary.	3	2	3	3	4	3	3	21	**24**
2.1	Educate local residents on the benefits of conserving water at all times, not just during drought conditions.	4	4	3	4	5	4	3	27	**9**
2.2	Determine the feasibility of developing emergency waterline interconnects amongst different water system providers to allow for the sharing of water.	3	2	2	3	4	2	3	19	**27**
3.1	Educate local officials as to the conditions in Stark County that would compound the effects of an actual earthquake, such as soil types.	2	3	3	4	5	5	1	23	**20**
3.2	Continue to encourage more participation at the county and municipal levels in the National Shake-Out exercises that are conducted on an annual basis.	3	3	4	5	5	5	3	28	**7**

4.1	Coordinate with local health officials to produce public awareness campaigns on local media outlets to enhance, and revise, messaging regarding vaccination information and administrative controls (i.e., handwashing, social distancing), the use of personal protective equipment (i.e., face coverings) as well as other lessons learned from the recent COVID-19 pandemic.	5	4	4	5	5	5	4	32	**1**
5.1	Undertake stream bank restoration efforts to clear log jams, trees and shrubs, and sediment bars.	4	2	3	3	4	3	3	22	**22**
5.2	Facilitate the formation of flood task forces throughout the county to address flooding problems on a regular basis.	5	4	2	3	5	5	3	27	**9**
5.3	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems that may involve detention and retention ponds.	3	1	2	4	4	3	3	20	**26**
5.4	Design recreational trail systems to be more resistant to flood damage (i.e., washouts, scouring, erosion, etc.) by incorporating ditching, rock-check dams, culverting, installation of short-span bridges or box culverts, bank reinforcement/stabilization where necessary.	4	3	3	3	5	4	3	25	**15**
6.1	Maintain a communications system that will allow all jurisdictional fire, police, and EMS departments to communicate with each other during large-scale emergency situations.	5	2	3	5	5	5	4	29	**6**
6.2	Continue to conduct periodic Commodity Flow Studies to determine what hazardous materials are stored and shipped through the county by different modes of transportation.	3	2	3	5	5	5	3	26	**12**
6.3	Continue to conduct Tier II Assessments to identify agencies/organizations that are submitting Tier II forms that should not be, as well as those that are not submitting Tier II forms that should be, to include new agencies/organizations.	4	3	2	3	5	5	2	24	**18**
7.1	Coordinate with the Ohio Department of Natural Resources, Division of Mineral Resources Management, Office of Abandoned Mine Lands and Reclamation to undertake reclamation projects if subsidence occurs at a specific location.	4	1	2	3	5	3	3	21	**24**

8.1	Coordinate efforts with the local media to post advance warnings of hazardous weather.	5	3	3	5	5	5	4	30	**4**
8.2	Identify the number, location, and strength requirements to house residents and withstand high wind speeds. Consider the construction of community and residential storm shelters, strategically placed as necessary throughout the county (i.e., concrete safe rooms near mobile home parks, shopping malls, and other vulnerable public areas).	4	2	2	3	4	4	3	22	**22**
8.3	Continue to promote participation in the statewide tornado lottery.	3	4	3	3	5	5	2	25	**15**
9.1	Coordinate with power companies to periodically trim trees near power lines to prevent limb breakage and power failure.	4	2	3	3	5	3	3	23	**19**
10.1	Ensure that the Extreme Temperature Annex developed by the four health departments is frequently updated.	3	3	3	4	5	5	3	26	**12**
10.2	Consider the development of “Water Spray Parks” at county/city public parks in heat-vulnerable neighborhoods or near large bodies of water (i.e., along the Tuscarawas River, or large lakes).	4	2	3	3	5	3	4	24	**17**
11.1	Encourage residents and businesses to maintain their property in or near forested areas (including short grass, thinned trees and removal of low hanging branches, cleaning of dead or dry leaves, needles, twigs, stacking firewood at least 100 feet away and uphill from structures, etc.) and to create buffer zones between structures and adjacent forests.	3	5	4	5	5	5	4	31	**2**
11.2	Ensure continued participation by Southern Stark County in ODNR’s wildfire program to continue funding eligibility under the Appalachian Region.	3	3	3	3	5	5	3	25	**15**
11.3	Use prescribed burning techniques to reduce fuel loads in areas that threaten public safety and property.	3	4	5	3	4	4	3	26	**12**
12.1	Distribute information explaining the risk of hazards in Stark County via social media following the Ready.gov National Seasonal Preparedness Messaging Calendar.	5	4	3	5	5	5	4	31	**2**
12.2	Encourage residents to prepare themselves by stocking up with necessary items or developing a family disaster plan and supply kit.	3	4	4	4	5	5	2	27	**9**

12.3	Encourage the use of NOAA All Hazard radios among residents that continuously broadcast National Weather Service forecasts and provide direct warnings to the public for natural, technological, and man-made hazards.	3	5	3	4	5	5	3	28	**7**
Alliance 7.1	Promote community awareness of subsidence risks and effects by distributing informational brochures.	4	3	3	4	5	5	3	27	**1**
Alliance 5.1	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**2**
Canal Fulton 8.1	Encourage business owners and residents to secure loose materials and place yard and patio items indoors, or in an area where winds cannot blow them about.	3	5	4	4	5	5	4	30	**1**
Canal Fulton 5.1	Participate in the Community Rating System (CRS) and, if applicable join the NFIP.	3	4	3	3	5	4	3	25	**2**
Canal Fulton 5.2	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**3**
Canton 5.1	Conduct stream restoration projects in publicly owned spaces along Nimishillen Creek and its tributaries.	4	3	4	4	4	3	4	26	**1**
Canton 5.2	Conduct acquisition/demolition, elevation and relocation projects.	3	3	3	3	4	4	4	24	**2**
Louisville 5.1	Encourage residents to control and secure debris, yard items, or stored objects such as oil, gasoline, propane tanks, and paint or chemical barrels, that could be swept away, and pose a hazard when flooding occurs.	4	4	4	4	5	5	4	30	**1**
Louisville 5.2	Conduct acquisition/demolition of flood prone residential and commercial structures.	3	4	3	4	5	4	4	27	**2**
Louisville 5.3	Installation of additional storm water retention/detention basins to slow the flooding due to hard surface areas in the city.	3	3	3	3	5	3	4	24	**3**
Louisville 5.4	Encourage Norfolk Southern railroad to replace bridge immediately north of S.R. 153. The current bridge is a bottleneck, constricting flow and increasing flooding upstream including at S.R. 44.	4	2	2	3	4	3	3	21	**4**
Massillon 10.1	Develop a Water Spray Park in a heat-vulnerable neighborhood.	5	4	5	5	5	4	5	33	**1**
Massillon 4.1	Develop a Continuity of Operations Plan (COOP) to allow the City to become more resilient.	5	3	4	5	5	5	5	32	**2**

Massillon 4.2	Coordinate with local health officials to enhance messaging regarding vaccination information, administrative controls, and lessons learned resulting from the recent COVID-19 pandemic.	5	4	3	4	5	5	4	30	**3**
Massillon 9.1	Develop mutual aid agreements with private contractors to aid in the snow removal process.	5	4	4	4	5	4	3	29	**4**
Massillon 5.8	Encourage homeowners to install backflow valves to prevent reverse-flow flood damage.	4	5	4	4	5	3	4	29	**4**
Massillon 8.2	Convert traffic lights to mast arm design in known high wind areas.	5	3	4	4	4	4	4	28	**6**
Massillon 5.6	Install flow monitors on various wastewater piping systems where needed.	5	3	3	5	5	3	4	28	**6**
Massillon 8.1	During all new development, bury power lines to provide uninterrupted power during severe wind events.	4	3	4	4	5	3	4	27	**8**
Massillon 5.1	Identify and consider elevating critical flood-prone structures above the 100-year flood level (Revised).	4	3	4	3	4	4	5	27	**8**
Massillon 5.5	Require developers to construct on-site retention basins for excessive storm water.	4	3	4	3	5	4	3	26	**10**
Massillon 5.7	Routinely clear debris from the support bracing and abutments underneath low-lying bridges along Sippo Reservoir Creek and Little Sippo Creek.	5	3	3	4	5	3	3	26	**10**
Massillon 5.4	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems that may involve detention and retention ponds	3	3	4	4	5	3	4	26	**10**
Massillon 5.2	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**13**
Massillon 5.3	Undertake stream bank restoration efforts to clear log jams, trees and sediment bars.	4	2	3	3	4	4	3	23	**14**
North Canton 5.1	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**1**
Beach City 5.1	Coordinate with Ohio EMA and FEMA Region 5 regarding Community Status Book listing for participation in the NFIP.	4	4	4	4	5	5	3	29	**1**
Beach City 2.1	Enhance and upgrade existing water supply and distribution systems to withstand drought events.	4	3	3	4	5	5	4	28	**2**
Beach City 10.1	Install a water spray park at the Beach City Community Park.	5	3	3	4	5	4	4	28	**2**
Beach City 5.2	Expand existing parks, preserves, and maintain these areas as open space.	3	3	4	3	4	4	3	24	**4**
Beach City 5.3	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**4**
Brewster 12.1	Awareness of hazards via utility bills, website, social media.	5	5	4	5	5	5	4	33	**1**

Brewster 5.1	Periodically FEMA provides required modifications to, and to remain current & eligible for Flood Insurance, the Brewster Zoning Code will be adjusted.	4	4	3	5	5	5	4	30	**2**
Brewster 5.2	The current zoning code is a fluid instrument intended to be tweaked as needed.	4	3	4	4	4	5	4	28	**3**
Brewster 5.3	The current zoning regulations are dated, implementation of modifications will include mitigation efforts to reduce potential hazards.	3	3	3	3	4	5	3	24	**4**
Brewster 12.2	Research and then employ a contractor to provide software for an emergency notification system.	4	2	3	3	4	3	3	22	**5**
Brewster 5.4	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	2	2	3	4	4	3	21	**6**
East Canton 12.1	Purchase, install, and activate “all call” - a mass notification phone system to reach all residence in the village at once.	5	3	4	4	5	4	4	29	**1**
East Canton 12.2	Purchase an All-Hazard NOAA Radio for the village.	5	4	3	4	5	4	3	28	**2**
East Canton 5.1	Coordinate with Ohio EMA and FEMA Region 5. The FEMA Community Status Book lists the village as a participant in the NFIP, yet the village responded as a non-participant in the capability survey.	3	3	3	3	5	5	3	25	**3**
East Canton 5.2	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**4**
East Sparta 5.1	Participate in the Community Rating System.	3	3	3	4	5	5	3	26	**1**
East Sparta 5.2	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**2**
Hartville 4.1	Develop a Continuity of Operations Plan (COOP) to allow the Village to become more resilient.	4	3	4	5	5	5	4	30	**1**
Hartville 10.1	Identify public facilities that can be utilized as cooling and heating centers throughout the Village.	3	4	3	4	5	5	3	27	**2**
Hartville 4.2	Determine effective methods of enforcing isolation, quarantining, and travel restrictions as necessary.	2	4	3	3	4	5	3	24	**3**
Hartville 5.1	Install flow monitors on various wastewater piping systems where needed.	3	2	2	4	5	4	4	24	**3**
Hartville 12.1	Retrofit fire and police stations to become hazard resistant.	4	1	2	3	5	3	3	21	**5**
Hills & Dales 8.1	Establish a community forestry program to trim trees to prevent limb breakage and safeguard nearby utility lines by maintaining the public right-of-way.	5	3	4	4	5	4	3	28	**1**

Hills & Dales 5.1	Consider installing, re-routing, or increasing the capacity of existing storm drainage systems.	4	3	3	3	5	3	4	25	**2**
Hills & Dales 6.1	Increase education and awareness regarding the public protection measure of Shelter-in-Place (SIP) amongst county residents.	4	3	3	3	5	4	2	24	**3**
Magnolia 12.1	Participate in annual plan updates.	3	3	4	5	5	5	4	29	**1**
Magnolia 5.1	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**2**
Meyers Lake 12.1	Encourage the use of NOAA All-Hazard Radios among residents that continuously broadcast National Weather Service forecasts and provide direct warnings to the public for natural, technological, and man-made hazards.	4	4	4	5	5	4	3	29	**1**
Meyers Lake 12.2	Institute a mass notification system called “Calfire”, which is a mass text messaging system.	4	3	4	5	5	4	3	28	**2**
Minerva 5.1	Consider purchasing and strategically placing stream gauges along portions of the Still Fork and Big Sandy Creeks.	4	3	3	4	5	3	4	26	**1**
Minerva 5.2	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**2**
Navarre 1.1	Coordinate with the US Army Corps of Engineers to update outdated flood studies encompassing areas affected by the failure or topping of the Class I dams within and near the Village of Navarre.	3	3	4	3	5	4	3	25	**1**
Navarre 5.1	Consider feasibility, and conduct acquisition/demolition, elevations and relocations of properties.	3	3	3	3	4	4	4	24	**2**
Waynesburg 5.1	Consider feasibility, and conduct acquisition/demolition, elevations and relocation of properties.	3	3	3	3	4	4	4	24	**1**
Waynesburg 12.1	Maintain NOAA All-Hazard Radios, and the Emergency Alert System throughout the Village of Waynesburg.	5	3	4	3	4	3	1	23	**2**
Waynesburg 5.2	Clean out accumulated debris from the creek that causes flooding, before flowing into Sandy Creek. Floods 300 West Lisbon Street, goes under N. Mckinley Street.	4	2	3	3	3	3	2	20	**3**
Wilmot 8.1	Encourage residents and business owners to secure or move indoors all loose materials, yard items, and patio furniture that can be blown about during severe winds and tornadoes.	4	5	4	5	5	5	3	31	**1**
Bethlehem 9.1	Develop mutual aid agreements with private contractors to aid in the snow removal process.	5	4	4	4	5	4	3	29	**1**

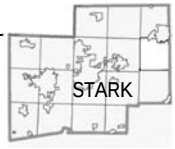
Bethlehem 9.2	Coordinate with power companies to periodically trim trees near power lines to prevent limb breakage and power failures.	4	3	3	4	5	3	3	25	**2**
Bethlehem 5.1	Establish a “green infrastructure program” to manage and expand existing parks, preserves, wetlands and open green spaces.	3	3	3	3	4	4	3	23	**3**
Bethlehem 5.2	Undertake stream bank restoration efforts to clear log jams, trees, and sediment bars.	3	2	3	3	3	3	4	21	**4**
Canton Twp 7.1	Develop and distribute an informational brochure to the residents of Canton Township that addresses the hazards associated with land subsidence and actions residents can take to safeguard against those hazards.	5	3	4	4	5	5	3	29	**1**
Canton Twp 5.1	Consider feasibility of acquisition/ demolition, elevations and relocation of properties.	3	3	3	3	4	4	4	24	**2**
Jackson 9.1	Consider constructing snow fences or planting rows of trees to serve as living snow fences to limit blowing and drifting snow over critical roadways of the township.	4	3	4	4	5	4	4	28	**1**
Lake 9.1	Installation of snow fence to limit blowing and drifting snow over critical roadways of the township.	4	3	4	4	5	4	4	28	**1**
Lake 9.2	Develop mutual aid agreements with private contractors to aid in the snow removal process.	5	3	3	3	5	3	3	25	**2**
Lawrence 8.1	Encourage business owners and residents to use structural bracing, window shutters, laminated glass in windowpanes, and hail-resistant roof shingles to minimize damage to public and private structures.	3	4	4	4	5	5	3	28	**1**
Lawrence 5.1	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	3	3	4	4	4	4	3	25	**2**
Lexington 8.1	Provide public service messages detailing what actions residents should take to safeguard themselves during severe thunderstorms and other emergencies.	4	3	3	4	5	4	2	25	**1**
Marlboro 5.1	Provide information to residents living along the creeks and streams feeding the Walborn Reservoir of the potential damage and effects of the reservoir reaching capacity just before the dam tops.	4	2	3	4	5	4	3	25	**1**
Marlboro 5.2	Coordinate with Stark Parks to periodically undertake stream bank restoration efforts to clear log jams, trees, and sediment bars.	4	3	3	3	4	3	3	23	**2**

Nimishillen 12.1	Increase the coverage and use of NOAA Weather Radios and the Emergency Alert System throughout Nimishillen Township.	4	4	4	5	5	5	3	30	**1**
Nimishillen 5.1	Consider feasibility of acquisition/demolition, elevations and relocation of properties.	3	3	3	3	4	4	4	24	**2**
Osnaburg 5.1	Encourage residents to secure debris, yard items, or stored objects including oil, gasoline, propane tanks, paint, and chemical barrels that may be swept away by floodwaters.	3	5	5	4	5	5	3	30	**1**
Paris 8.1	Encourage the use of structural bracing, window shutters, laminated glass in windowpanes, and hail-resistant roof shingles to minimize damage to public and private structures.	4	4	5	4	5	5	3	30	**1**
Paris 8.2	Establish standards for all utilities regarding tree pruning around overhead utility lines.	5	3	3	4	5	4	4	28	**2**
Paris 8.3	Install redundancies and loop-feeds in existing utility lines.	4	2	3	4	4	3	3	23	**3**
Perry 12.1	Coordinate with amateur radio operators in Perry Township, as well as the Stark County EMA, to increase the coverage area and use of the existing storm warning system.	4	4	5	5	5	4	4	31	**1**
Perry 5.1	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	4	3	4	4	5	5	3	28	**2**
Perry 5.2	Consider feasibility of acquisition/demolition, elevations and relocation of properties.	3	3	3	3	4	4	4	24	**3**
Pike 5.1	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	4	3	4	4	5	5	3	28	**1**
Pike 5.2	Participate in emergency exercises facilitate by Marathon Ashland refinery, regarding holding tanks along Nimishillen Creek.	3	3	2	5	5	5	3	26	**2**
Plain 5.1	Coordinate with property owners to decrease the amount of impermeable ground coverage in upland and drainage areas to allow more water to be absorbed into the ground.	3	4	4	5	5	5	3	29	**1**
Plain 8.1	Reduce the damage caused by severe weather to structures by cutting trees and house right-of-ways and conducting surveys after each storm.	4	2	3	4	5	4	3	25	**2**
Plain 5.2	Coordinate with ODOT, county and municipal road crews, or possibly contract with third party to assist with cleaning out ditches in areas where roadways typically flood.	4	2	2	4	4	4	3	23	**3**

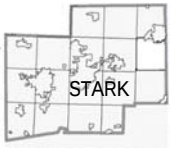
Plain 5.3	Encourage homeowners to install backflow valves to prevent reverse-flow flood damage.	2	3	3	3	5	4	2	22	**4**
Plain 7.1	Conduct land subsidence reclamation projects as necessary.	3	2	3	3	4	3	3	21	**5**
Sandy 8.1	Encourage homeowners to apply additional anchoring of manufactured homes and exterior structures such as carports and porches.	3	4	4	5	5	5	3	29	**1**
Sandy 6.1	Obtain funding to continue to participate in emergency exercise at the American Landfill (solid waste site) and at Minerva Enterprises (CND Landfill)	3	3	3	5	5	5	4	28	**2**
Sugar Creek 1.1	Coordinate with the US Army Corps of Engineers to updated outdated flood studies encompassing areas affected by the failure or topping of the Beach City Dam.	3	3	4	5	5	3	3	26	**1**
Sugar Creek 5.1	Consider feasibility of acquisition/demolition, elevations and relocation of properties.	3	3	3	3	4	4	4	24	**2**
Tuscarawas 7.1	Contact the Ohio Department of Natural Resources, Division of Mineral Resources Management to learn of areas in Tuscarawas Township that could be affected by underground mining.	4	3	4	5	5	5	3	29	**1**
Tuscarawas 5.1	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	4	2	3	4	5	5	3	26	**2**
Washington 9.1	Establish a community forestry program with a goal of trimming trees and maintaining clear space around public right-of-ways.	4	2	4	5	5	3	3	26	**1**
Washington 5.1	Coordinate with the appropriate county department to determine floodplain development regulatory coverage for the township.	3	2	3	4	5	4	3	24	**2**

APPENDIX 3: INACTIVE PROJECTS

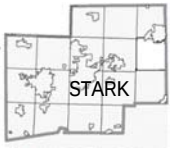
This appendix lists projects that have appeared in previous versions of the mitigation plan. It serves as a record of the mitigation projects that have been completed, or deleted, in Stark County.



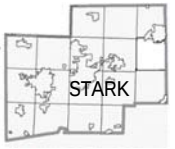
Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
1.1.2	Dam Failure	During all new dam construction, encourage the completion of a critical flood engineering analysis by a professional engineer licensed in the State of Ohio	Local Plans & Regulations	Local Funding, ODNR	5 Years	ODNR	**Deleted.** Falls under ODNR's normal operations
1.1.3	Dam Failure	Coordinate with the US Army Corps of Engineers to update outdated flood studies encompassing areas affected by the failure or topping of the Class I dams within and near Stark County, including, for example the Bolivar Dam and Beach City Dam.	Preparedness & Response Activity	PDM, USACE, Local Funding	3 Years	USACE	**Deleted.** Lack of interest and funding
2.1.1	Drought	Develop an informational brochure to distribute to local farmers and residents.	Education Program	Local Funding, USDA	6 Months	NRCS, Farm Bureau	**Completed.**
4.2.1	Epidemic	Coordinate with the county health district to identify the source of the epidemic and determine appropriate actions for the general public to take to reduce or slow the spread of the epidemic, especially following severe flooding.	Preparedness & Response Activity	HPP, Local Funding	Following an outbreak	Stark County Health Department	**Deleted.** This is already a required activity of the Health Department.
4.2.2	Epidemic	Coordinate with the health department to continue efforts of a community public health system with sufficient disease monitoring and epidemiological surveillance capabilities to adequately protect the population from large-scale outbreaks.	Preparedness & Response Activity	HPP, Local Funding	3 Years	Stark County Health Department	**Deleted.** This is already a required activity of the Health Department
4.2.3	Epidemic	Encourage residents to receive immunizations against communicable diseases.	Preparedness & Response Activity	Local Funding	Following an outbreak	Stark County Health Department	**Deleted.** This is already a required activity of the Health Department
5.3.1	Flooding	Implement and/or enforce building and development ordinances.	Local Plans & Regulations	Local Funding	3 Years	County Commission	**Deleted.** This is already in place through Building Inspector.



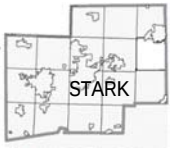
Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
5.4.2	Flooding	Consider either decreasing the amount of impermeable surfaces, or increasing the amount of permeable surfaces, as excessive amounts of paved areas or other such surfaces (impermeable) upstream can increase the amount and rate of water runoff that could be absorbed by natural vegetation (permeable).	Natural Systems Protection	PDM, HMGP, FMSP Local Funding	3 Years	County Commission	**Deleted.** This project is cost prohibitive. .
9.1.4	Summer Storms	Ensure that surge protection, such as surge protectors and grounding, has been installed on all critical electronic equipment owned by county government.	Preparedness & Response Activity	Local Funding	1 Month	Stark County IT	**Completed.** Several county buildings are now grounded. Grounding is encouraged during all new construction.
10.2.1	Severe Wind	Enforce building codes that will regulate the materials used during new construction.	Local Plans & Regulations	Local Funding	1 Year	County Commission	**Deleted.** Part of Building Inspector's required activities.
11.1.2	Winter Storms	Enforce existing codes that are already in place.	Local Plans & Regulations	Local Funding	1 Year	County Commission	**Deleted.** Part of Building Inspector's required activities.
1A.1.1 Alliance	Flooding	Clean or dredge Beach Creek and portions of the Mahoning River to clear log jams, trees, and sediment bars that prevent water from flowing freely.	Natural Systems Protection	PDM, HMGP, FMSP	5 Years	City Council	**Completed.**
1C.1.1 Canton	Flooding	Consider constructing dikes or floodwalls in flood-prone areas of the City of Canton	Structure & Infrastructure Project	PDM, HMGP, FMSP, FMA	5 Years	City Council	**Deleted.** This project is cost prohibitive.
1D.1.5 Louisville	Flooding	Public education to discourage drivers from entering flooded streets.	Education Program	HMGP, Local Funding	5 Years	City Council	**Completed.**
1D.1.6 Louisville	Flooding	Encourage neighboring jurisdictions and Stark County as a whole to develop retention and detention systems county-wide to reduce impact of future floods.	Structure & Infrastructure Project	PDM, FMSP, BRIC	5 Years	City Council	**Deleted.** This would be a county level project.
1E.3.1 Massillon	Dam & Levee	Continue to partner and work with ODNR to either rebuild or demolish the dam that is lower than the 100 year floodplain.	Structure & Infrastructure Project	PDM, HMGP, HHPD	5 Yeas	City Council	**Completed.** Sippo Reservoir dam has been lowered to meet ODNR specification.
1F.1.1 North Canton	Winter Storms	Consider construction snow fences or "living snow fences" (rows of trees or vegetation) to limit the blowing and drifting of snow over critical roadway segments.	Natural Systems Protection	PDM, HMGP Local Funding	3 Years	City Council	**Deleted.** Recent winter storms have not been an issue, priorities devoted elsewhere.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
1a.1.2 Beach City	Dam & Levee	Maintain current levees and intakes.	Structure & Infrastructure Project	PDM, HHPD, BRIC	5 Years	Village Council	**Deleted.** Being handled at the county level.
1b.1.1 Brewster	Land Subsidence	Conduct a mapping project to identify abandoned mines or geologically unstable terrain, in order to accurately advise future development in those areas.	Preparedness & Response Activity	PDM, HMGP, Local Funding	5 Years	Village Council	**Deleted.** Current administration unaware that a problem with land subsidence exists.
1c.1.1 East Canton	Land Subsidence	Maintain areas that are susceptible to subsidence or collapse as open space.	Natural Systems Protection	PDM, Local Funding	3 Years	Village Council	**Deleted.** No longer aligns with local priorities.
1c.1.4 East Canton	Misc.	Annual newsletter to all residents in the village	Education Program	Local Funding	1 Year	Village Council	**Completed.**
1e.1.1 Hartville	Flooding	Coordinate with the ODNR, Dam Safety Engineering Program to conduct periodic safety inspections of the Congress Lake Dam.	Preparedness & Response Activity	PDM, HHPD, Local Funding	3 Years	Village Council	**Deleted.** A failure of the Congress Lake Dam would not impact Hartville.
1e.1.2 Hartville	Flooding	Purchase and install a backup generator for the wastewater treatment plant to provide power in emergencies and avoid dumping sewage in the stream adjacent to the plant.	Structure & Infrastructure Project	HMGP, CDBG, Local Funding	5 Years	Village Council	**Completed.**
1h.1.1 Magnolia	Flooding	Clean/drag the Big Sandy Creek, clearing logjams, trees and shrubs, and sediment bars.	Natural Systems Protection	PDM, HMGP, FMSP, Local Funding	5 Years	Village Council	**Deleted.** Flooding along Big Sandy Creek would not impact the Village of Magnolia.
1iv.1.1 Lake Twp	Summer Storms	Establish a township forestry program to trim trees and clear debris from utility poles and maintain all public right-of-ways.	Preparedness & Response Activity	HMGP, Local Funding	2 Years	Township Trustees	**Deleted.** The utility companies inform us when they will be in the area trimming trees and clearing debris from utility lines/poles. For safety purposes township employees are prohibited from working near power lines.
2v.1.1 Lawrence Twp	Flooding	Consider the feasibility of conducting buyouts, elevations and relocation of properties.	Structure & Infrastructure Project	PDM, SRL, RFC, Local Funding	5 Years	Township Trustees	**Deleted.** Lack of funding source.



Project # (Prior Plan)	Hazard	Strategy	Project Type	Funding Source	Estimated Timeframe	Project Coordinator	Completed / Deleted
1xii.1.1 Pike Twp	Warning Sirens	Coordinate with pertinent state and county officials to increase the coverage area, or add more severe storm sirens in Pike Township	Preparedness & Response Activity	PDM, HMGP, Local Funding	2 Years	Township Trustees	**Deleted.** Public get storm warnings via cell phones, complain about sirens late at night.



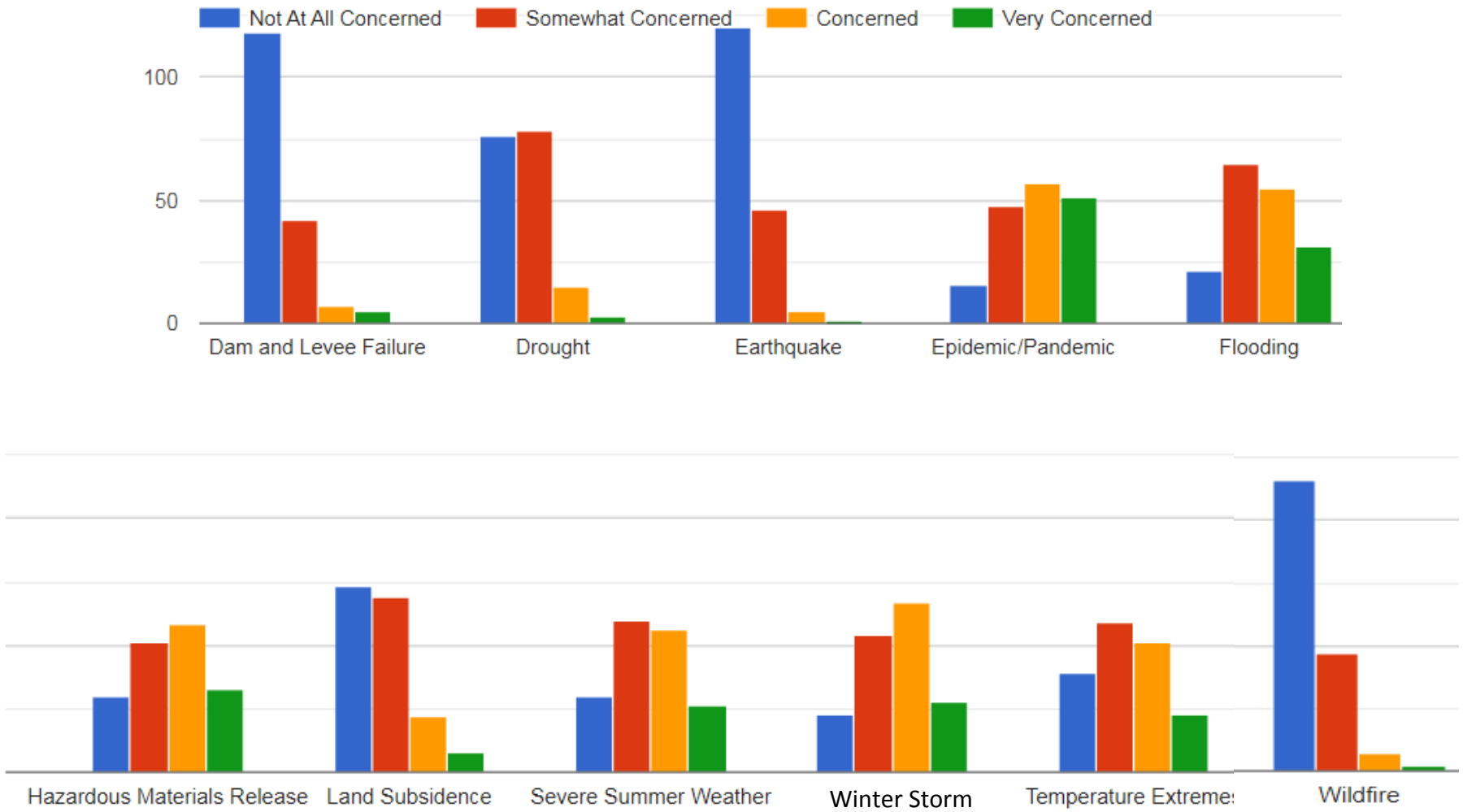
APPENDIX 4: PUBLIC PARTICIPATION

The appendix contains a summary of the raw data from the online survey distributed as part of this project, as well as other evidence of public participation.

STARK COUNTY HAZARD MITIGATION PLAN

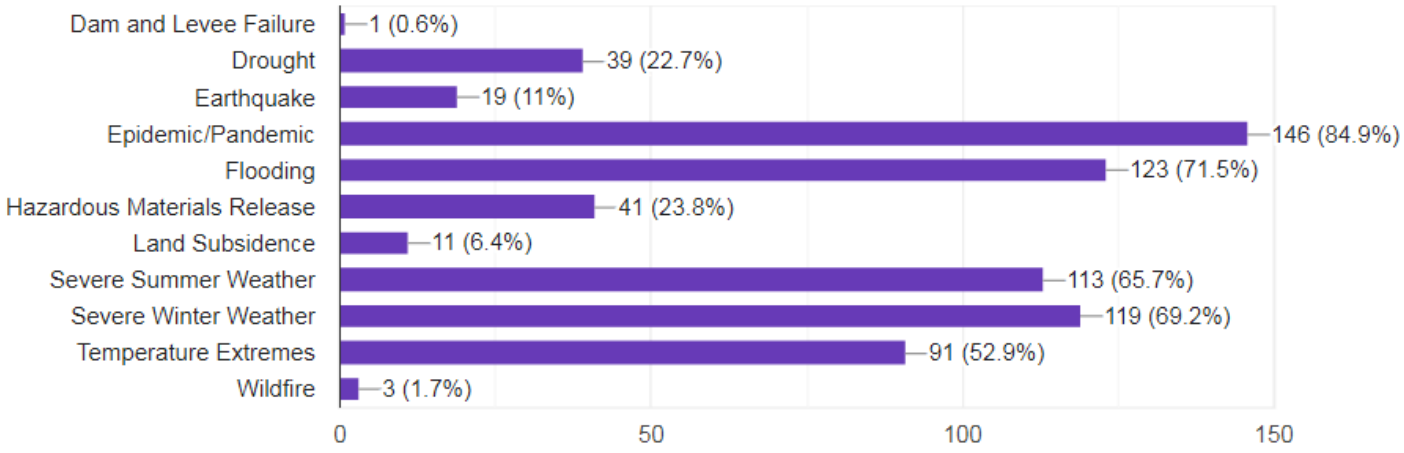
PUBLIC SURVEY SUMMARY

Please indicate how concerned you are about the following hazards where you live.

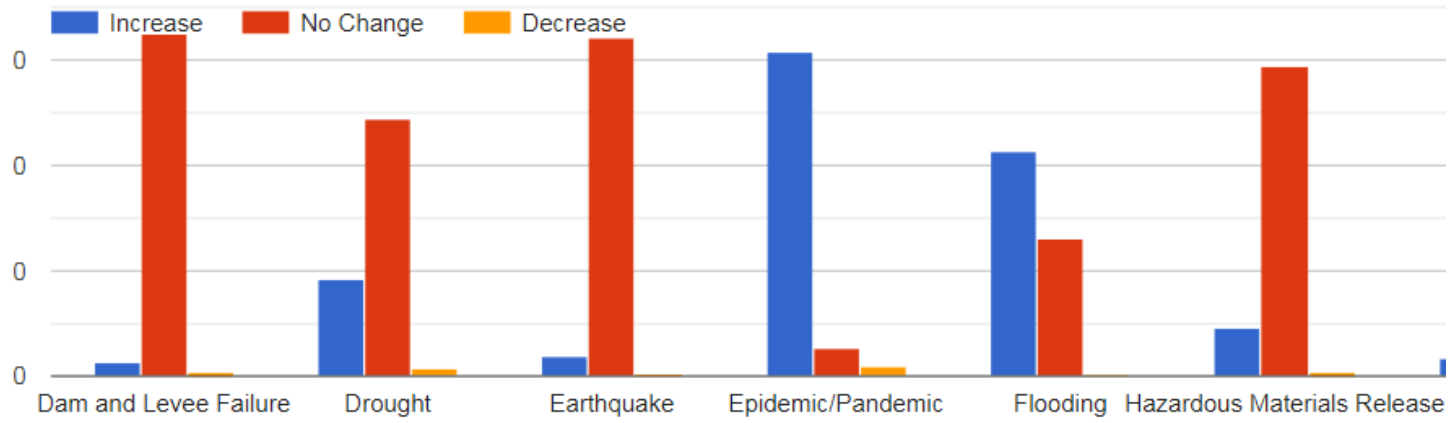


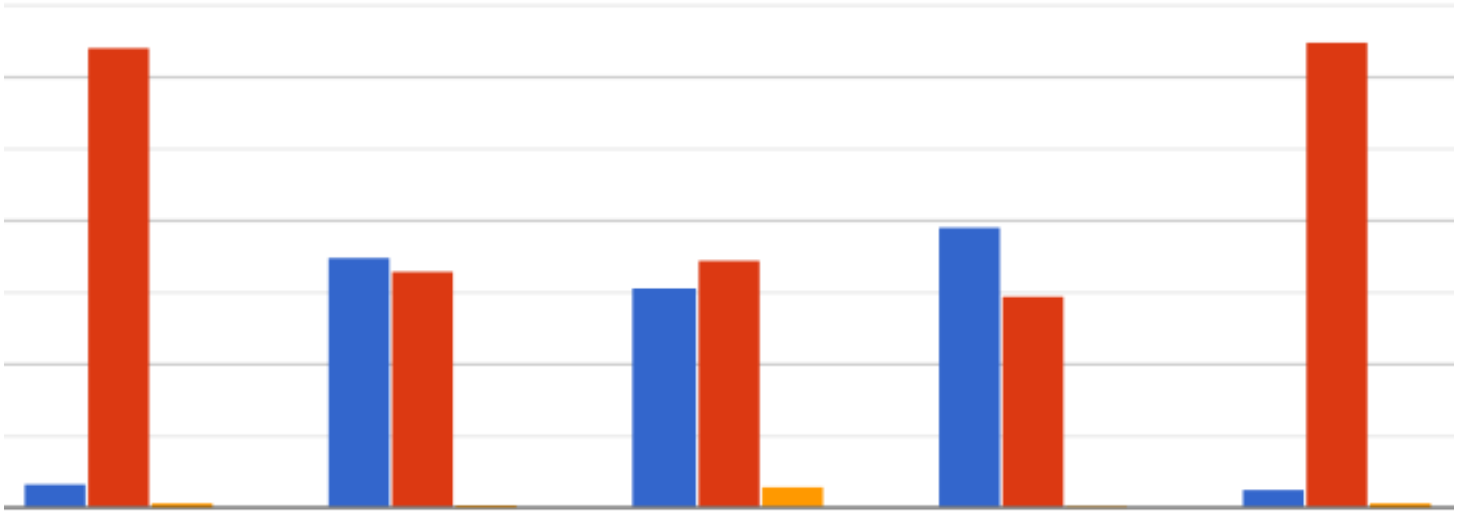
In the past 10 years, which hazards do you remember occurring in your community? (Check all that apply.)

172 responses



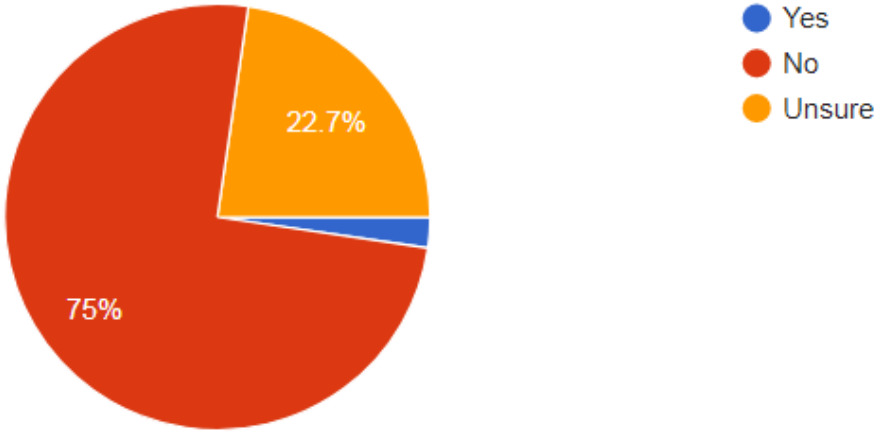
Have you noticed an increase or decrease in the occurrences or intensity of any of the following hazards?





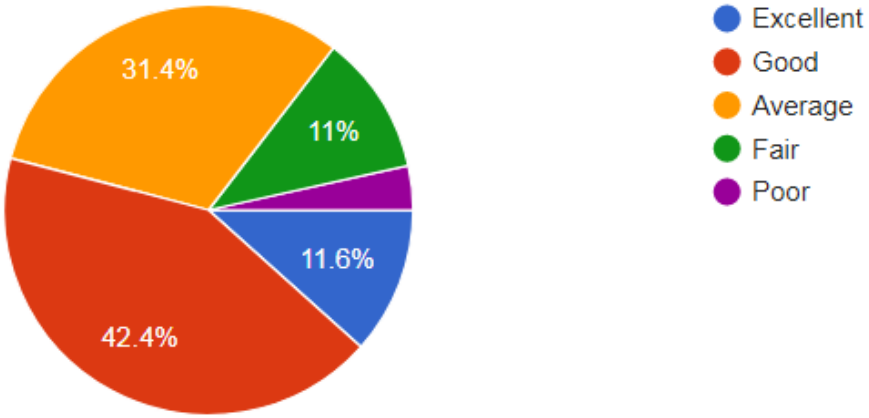
Do you live in a special flood hazard area (SFHA)?

172 responses



Think back to a recent occurrence (any from question 2). How would you rate your community's ability to respond?

172 responses



Please add any comments here regarding your community's ability to respond.

27 responses

Officials panicked and abandoned the disaster preparedness plans they have practiced for years.

When it comes to flooding, it doesn't seem like the community is able to do much to help

County blames Township.

I haven't seen them respond to one but any time there is something out of the ordinary, there is a learning curve.

Jackson police and fire responded well to the tornado that came thru the Lake Cable area in October.

The mayor needs to be more involved in community response.

Our community needs saving from real hazards- originating from satan

My previous answer remains applicable. As well, why is it that the Local Disaster Planning Committee is focused almost exclusively on Hazmat when other potential disasters may loom on the horizon?

We do not have enough emergency service members.

We seem to have a good warning system for weather events.

We live in a twp and ever since city sewer came in we've experience severe erosion, water drainage issues and street flooding. We lost 3 trees, one that fell on our home. No one seems concerned bc we are not in a classified flood area. New home construction on previous drainage areas at end of street are casing water flow issues. Builders brought in fill dirt to build homes on and water has no where to go.

This is a known issue and little to no preventative measures have been taken

Our township (Jackson) does a good job responding to winter weather events. They don't seem as able to mitigate flooding issues.

Tornado sirens were not going off in North Canton during a recent severe weather event and the tornado was less than 1 mile from my house.

I have very low expectations for my community to respond.

Flooding is not new to the area in Louisville Ohio

Automated emergency response from several agencies that provide equipment to help mitigate the incident.

removal of snow is slow

Living in the United States since 2000, we have come to appreciate the efficiency and expediency of all safety and protective services

Consolidate health departments, and emergency dispatch centers.

Signed up for Stark mass notifications but never received any notification or test.

More training of first responders, public training would be helpful

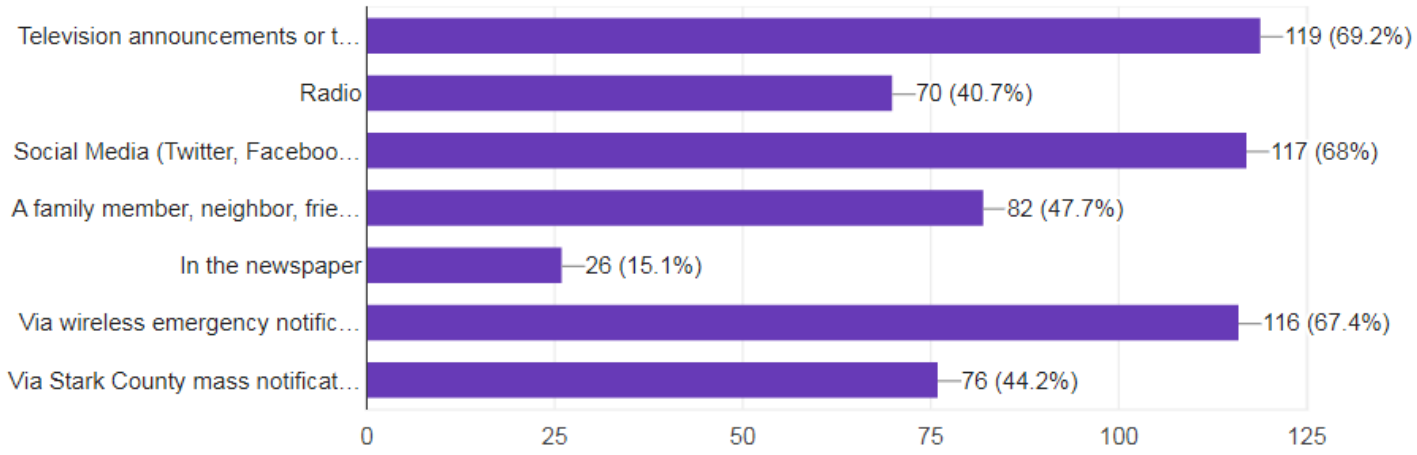
We have a creek flooding in our backyard and neither North Canton or Plain will do anything about it. They both claim it is the other jurisdiction responsibility because it is on the border, and every time it rains it floods.

Flooding: Inadequate storm water program

Our community has implemented previous hazard mitigation strategies and it has helped reduce the loss of life and property.

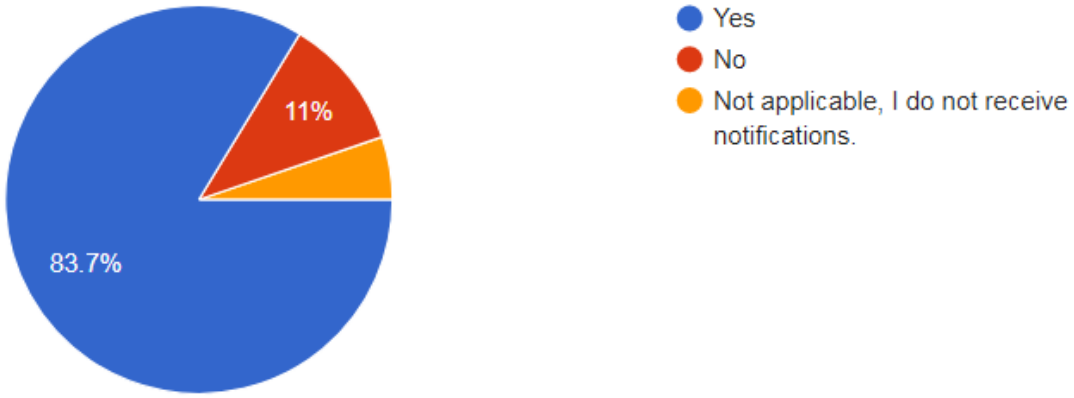
How do you find out about upcoming hazards such as the ones discussed previously in this survey? (Check all that apply)

172 responses



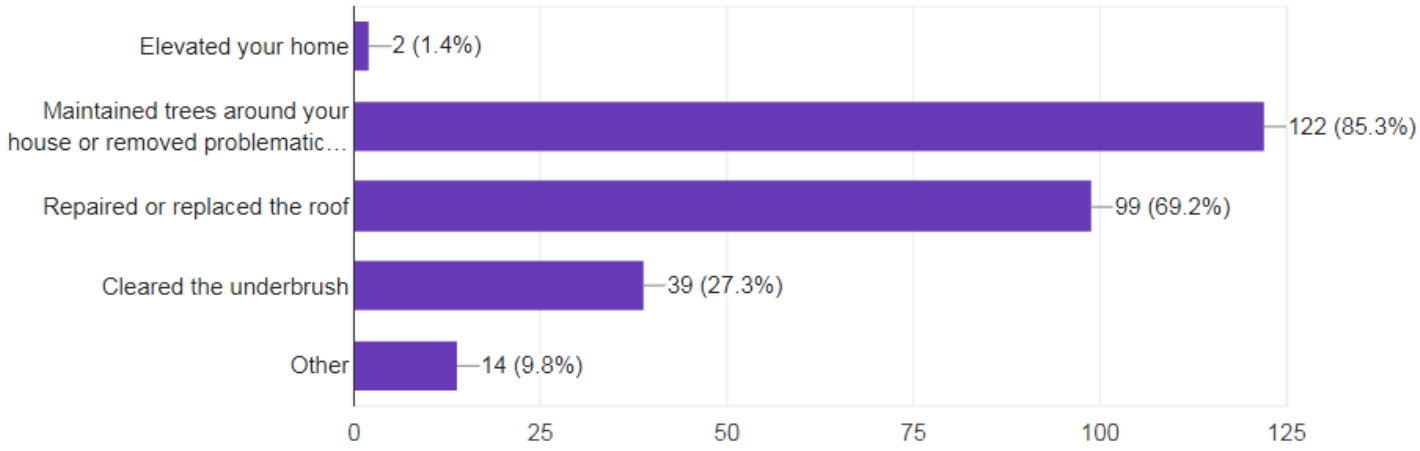
Do you receive timely, accurate, and effective notifications from these sources that allow you to make appropriate decisions about what to do?

172 responses



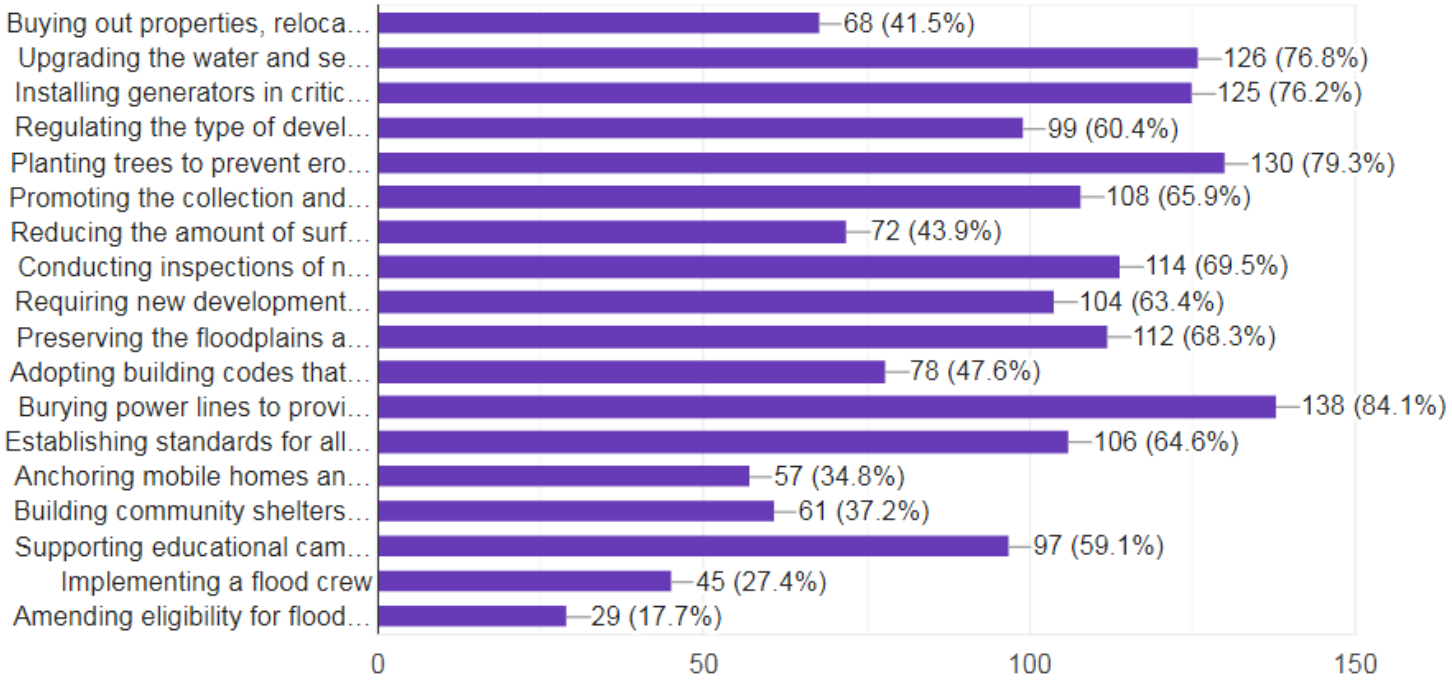
Mitigation is an effort by you, your community, and/or you officials make to reduce the negative impacts of hazards. Have you ever...(check all that apply)

143 responses



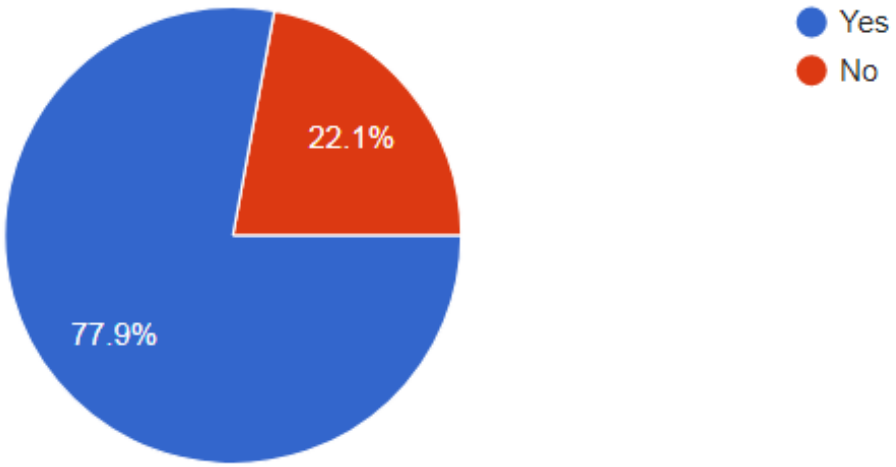
Please indicate the types of mitigation actions you would support; these could be something you can do, or an initiative by local officials. (Check all that apply)

164 responses



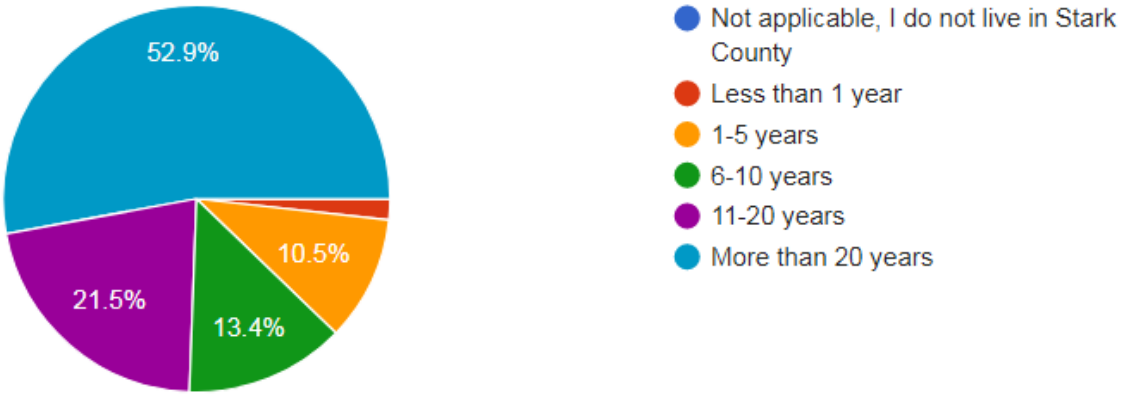
If a flood crew was available, would you support them accessing private land?

172 responses



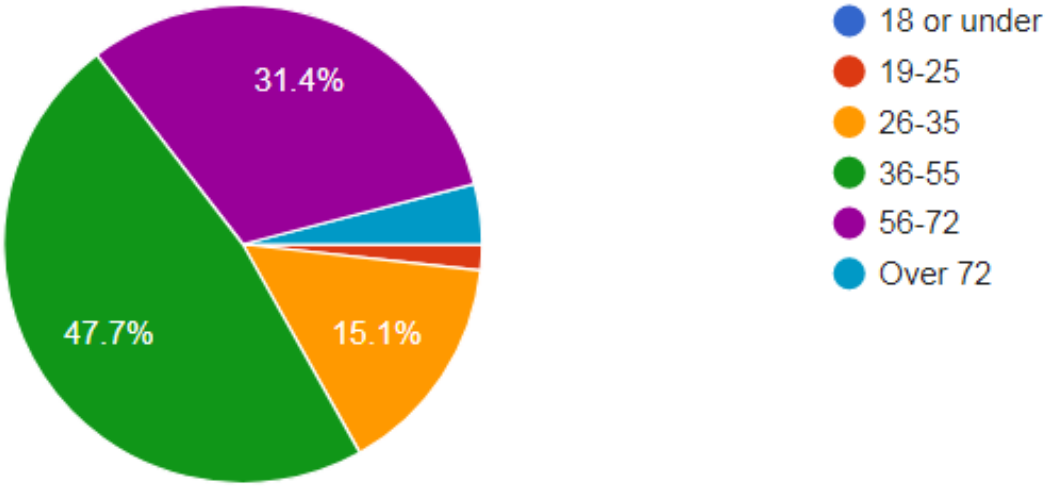
How Long have you resided/worked in your community?

172 responses



Please provide your age

172 responses



Please write any general comments or questions here.

19 responses

I would support the flood crew accessing private land WITH PERMISSION from owners.

The question about flood crew on private land is unclear and needs explanation for an accurate response. When would they access private property ? Emergencies only? Preemptively ? With what scope of authority? Could someone opt out?

Some of the terms used should be defined clearly (e.g., land subsidence)

We will be experiencing gods wrath soon. Please prepare.

In all things, we should be planning for a future our grandchildren can enjoy as much as we did. We need to think and act.
I was not sure what a flood crew was and what their responsibilities would be.

I feel like I'm wasting my time as a disaster responder, SAR specialist in a state that doesn't recognize the need to work cooperatively.

Need to address vacant homes and poor condition homes / rentals that are too close to other homes

I feel our tax money would be well spent on preventative measures like tree planting, shelter upgrades, and water retention systems.

Not quite understanding the intensions of a "Flood Crew"? Is the intension to mitigate proactively? Respond to incidents regarding flooding? To what extent is the duties of said flood crew and how does this integrate with local Fire and LE? To what level of training and equipment does this flood crew operate at?

I am more fearful of what the general public will do to me rather than any natural hazards. I've encountered very violent people in this city.

What are flood crews, when would the be deployed and what would they do?

Please address the way overdue issue of flooding in the Sandy Twp./Waynesburg area.

Thank you for sharing this worthwhile data collection instrument

I think we have to be mindful to how many structures that keep being built and how much farm land is being taken away to make developments and businesses. It causes problems with land erosion, flooding, pollution, etc. Why can't existing vacant buildings be torn down and something new built in it's place instead of taking up what little land we have left.

CANTON ONLY CARES ABOUT THE HOF / NOT THEIR CITIZENS.

Not a flood crew but I would support a storm water program that would take ownership and maintenance of existing storm sewers that currently are not maintained by anyone and construct additional infrastructure to store storm water for gradual release after the storm event.

I teach hazards and disasters/urban ecology at a local university and support all mitigation strategies. But I would really like to see our power lines buried. I grew up in Kansas where that was regular practice.

Need to include tornado/severe storms, wind events to the list of hazards we routinely get each year. Not sure if ice storms are included in the winter storms?

Unsure of what a flood crew is or does. I clicked yes just because an answer is required. I need more information to accurately answer that question.

VILLAGE OF EAST CANTON
STARK CO. OHIO

Home | Officials | Department | Extras | News | Community Events | Contact

Welcome

Welcome, and thank you for visiting the official home page of the Village of East Canton. Our website offers many services to our residents and visitors to our community. The Village staff shall continue to update this website sometimes even daily with new posting to keep you informed. You may elect to be notified automatically by email of all new posting to our website by clicking email notification under the "News" tab. You may select Community Events to view upcoming village events and meetings. Once again thank you for visiting our village on the web.

We Are Encouraging All Residents to take the Stark County Public Survey about Stark County's hazard mitigation planning process. This survey is designed to help the county, and the village of East Canton gauge public perceptions of hazard vulnerability and potential projects to lessen the impacts of future hazard occurrences. The information you provide will help reduce vulnerability by guiding local leaders as they prioritize mitigation projects.

Stark County Public Survey

Search

Proud Supporter

Contact Us

330.488.0220

Notary Service Available Free to all Village Residents

Free Community Event Listing

(Subject to Terms & Conditions)

2020 Consumer Confidence Report

Watch Council Meeting

East Canton 2021 Newsletter

Joint Planning Report

Osnaburg Township

Village Meetings Schedule

Live Video Photo/video Get messages

Create room

Stark County Emergency Management
Published by Stark Ema · Just now ·

Live in Stark County? Please take the time to fill out this short Public Disaster Survey. Having the feedback from our community members enables Stark County to reduce the effects of local disasters and receive increased funding in a disaster. We appreciate your time!
LINK:

DOCS.GOOGLE.COM
Stark County Public Survey
Thank you for taking the time to respond to this survey and participating in the Stark County hazard mitigation planning process. This survey is designed to help the county as a whole, and your community, gauge public...

Like Comment Share

Ohio Department of Transportation
November 13 at 10:06 AM ·

On this #WorldKindnessDay, we kindly remind you to move over and slow down for roadside workers. Learn more at moveover.ohio.gov #WorldKindnessDay2021

Home

What's happening?

Tweet

Stark County EMA @StarkCountyEMA · Now

Live in Stark County? Please take the time to fill out this short survey. Having feedback from our community members enables Stark County to reduce the effects of local disasters and receive increased funding in a disaster. We appreciate your time!
LINK:

docs.google.com
Stark County Public Survey
Thank you for taking the time to respond to this survey and participating in the Stark County hazar...

Ohio Emergency Management Agency @Ohio_EMA · 1h

#WinterSafety Awareness Week runs through Saturday. Remember: Ice & Snow, Take it Slow! Drive slower than the posted speed limit. Leave plenty of space between you and other vehicles. Know before you go. Check ODOT's OhGo.com for traffic and road conditions.

RE: Stark County Hazard Mitigation Plan Update

Doug Britvec <dbritvec@jhcsafety.com> 10:40 AM (0 minutes ago)
to tcottis, peggy.clark, jtroyer, andrew.frost, rshackelford, tsmoot, mccarthy, jvillegas, tlwarstler, Matthew, Douglas

All,

The Stark County Emergency Management Agency is currently in the process of completing the required five year update to the county's multi-jurisdictional hazard mitigation plan. The plan identifies the hazards to which Stark County is susceptible as well as a variety of projects that can be undertaken to lessen the effects of those hazards.

In particular, we are interested in your thoughts as to any hazards that may originate in your county yet affect, in part, Stark County. Conversely, we would like to know of any hazards that originate in Stark County that you feel may impact your county.

Thank you for participating in this important project. We look forward to your comments and, as always, feel free to contact us with any questions you may have.

--
Many Thanks,
Doug Britvec
Safety Division Manager

JH Consulting, LLC
29 East Main Street, Suite 1
Buckhannon, WV 26201
Phone: (304) 473-1009
Fax: (304) 473-1099
Cellular: (304) 612-5332
www.jhcsafety.com
Email: dbritvec@jhcsafety.com

from: **Doug Britvec** <dbritvec@jhcsafety.com>
to: tcottis@carrollcountyohio.us,
peggy.clark@ccoema.org,
jtroyer@co.holmes.oh.us,
andrew.frost@mahoningcountyoh.gov,
rshackelford@portageco.com,
tsmoot@summitoh.net,
mccarthy@co.tuscarawas.oh.us,
jvillegas@wcemaoh.org
cc: tlwarstler@starkcountyohio.gov,
"Matthew F. Sweeney"
<mfsweeney@starkcountyohio.gov>,
"Douglas E. Wood" <dewood@starkcountyohio.gov>
date: Feb 18, 2022, 10:40 AM
subject: RE: Stark County Hazard Mitigation Plan Update
mailed-by: jhcsafety.com

RE: RE: Stark County Hazard Mitigation Plan Update External Old Received/Stark HMP ×

Frost, Andrew
to me

I am still new to my position – I do not see any impacts either way on Stark County in my cursory look at my mitigation plan – Thank you, Andy

Andy Frost
Mahoning County EMA Director
700 Industrial Road
Youngstown, Ohio
andrew.frost@mahoningcountyoh.gov
330-740-2200 Office
330-550-6481 Cell

Stark County Hazard Mitigation Plan Update External

StJohn, Joseph <jstjohn@summitoh.net>
to me, Tom

Good morning,

Please see the list below of potential hazards both Summit and Stark Counties share.

Flooding – Tuscarawas River and Wolf Creek. The river flows between the counties; Wolf Creek is a tributary to the river in our county that may cause downstream flooding issues for Stark.
Akron-Canton Airport – major airport with shared land between Summit and Stark Counties.
Nexus Pipeline – natural gas transmission pipeline that flows into Summit from Stark.

Let me know if you have any questions.

Thank you,

Joseph St. John
Specialist I, Emergency Management Agency
Department of Public Safety
175 S. Main Street, Suite 103
Akron, OH 44308
Agency Phone: (330) 643-2558
Direct Office Line: (330) 643-8783

APPENDIX 5: CITATIONS

This appendix assures proper attribution to the many data sources used throughout the hazard mitigation plan.

Baylor College of Medicine. (n.d.). *Introduction to infectious diseases.* Online. Retrieved from https://www.bcm.edu/departments/molecular-virology-and-microbiology/emerging-infections-and-biodefense/introduction-to-infectious-diseases

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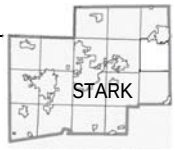

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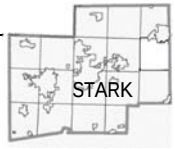

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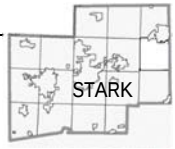


APPENDIX 6: HAZUS DATA

This appendix contains HAZUS runs for Earthquakes and Flooding for Stark County, reflecting loss and damage figures.

Hazus: Earthquake Global Risk Report

Region Name: StarkOH

Earthquake Scenario: Canton 5.0

Print Date: August 17, 2021

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Ohio

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 580.38 square miles and contains 86 census tracts. There are over 151 thousand households in the region which has a total population of 375,586 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 156 thousand buildings in the region with a total building replacement value (excluding contents) of 45,859 (millions of dollars). Approximately 91.00 % of the buildings (and 73.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,469 and 2,259 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 156 thousand buildings in the region which have an aggregate total replacement value of 45,859 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 69% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 6 hospitals in the region with a total bed capacity of 1,523 beds. There are 170 schools, 27 fire stations, 23 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 228 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 5,728.00 (millions of dollars). This inventory includes over 297.02 miles of highways, 433 bridges, 11,492.88 miles of pipes.

Table 1: Transportation System Lifeline Inventory

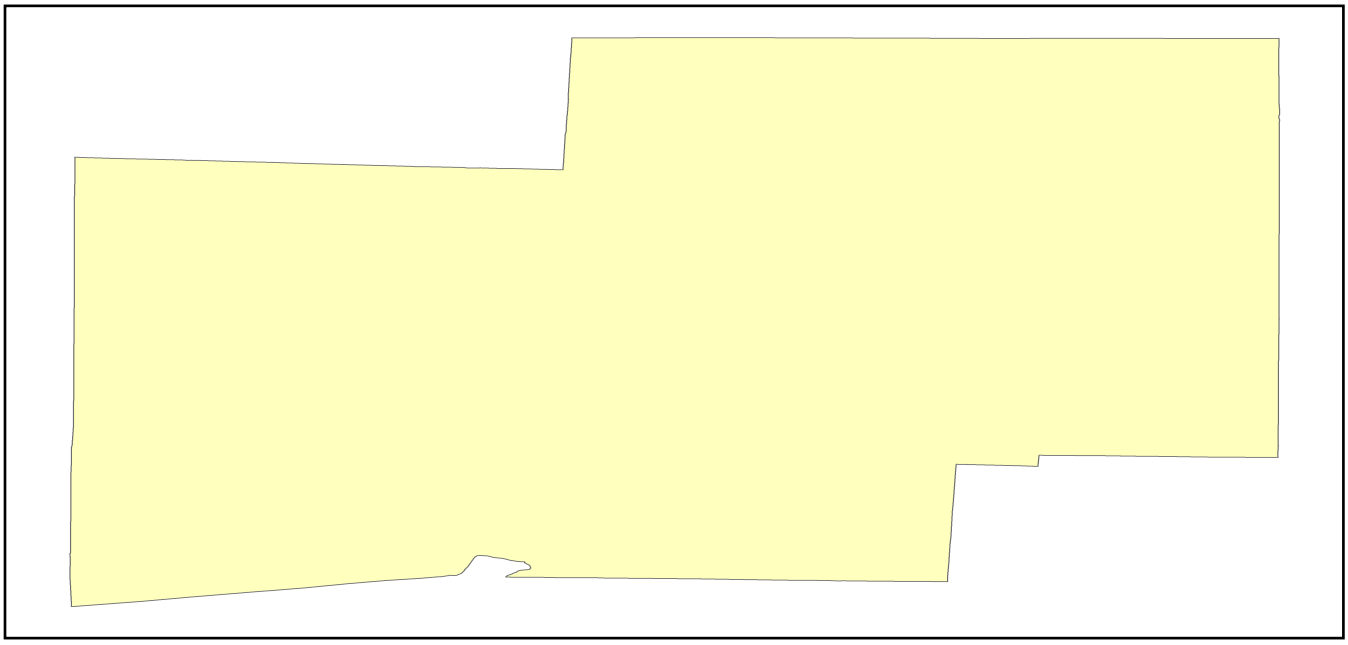
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	433	446.6601
	Segments	209	2502.9462
	Tunnels	0	0.0000
		Subtotal	**2949.6063**
Railways	Bridges	7	0.4851
	Facilities	5	13.3150
	Segments	259	308.5471
	Tunnels	0	0.0000
		Subtotal	**322.3472**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	3	3.4335
		Subtotal	**3.4335**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	4	42.6040
	Runways	4	151.8560
		Subtotal	**194.4600**
		Total	**3,469.80**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	184.9651
	Facilities	4	139.8600
	Pipelines	0	0.0000
		Subtotal	**324.8251**
Waste Water	Distribution Lines	NA	110.9790
	Facilities	25	1748.2500
	Pipelines	0	0.0000
		Subtotal	**1859.2290**
Natural Gas	Distribution Lines	NA	73.9860
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**73.9860**
Oil Systems	Facilities	1	0.1050
	Pipelines	0	0.0000
		Subtotal	**0.1050**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	14	1.4700
		Subtotal	**1.4700**
		Total	**2,259.60**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Canton 5.0
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-81.38
Latitude of Epicenter	40.79
Earthquake Magnitude	5.00
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 28,202 buildings will be at least moderately damaged. This is over 18.00 % of the buildings in the region. There are an estimated 1,799 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

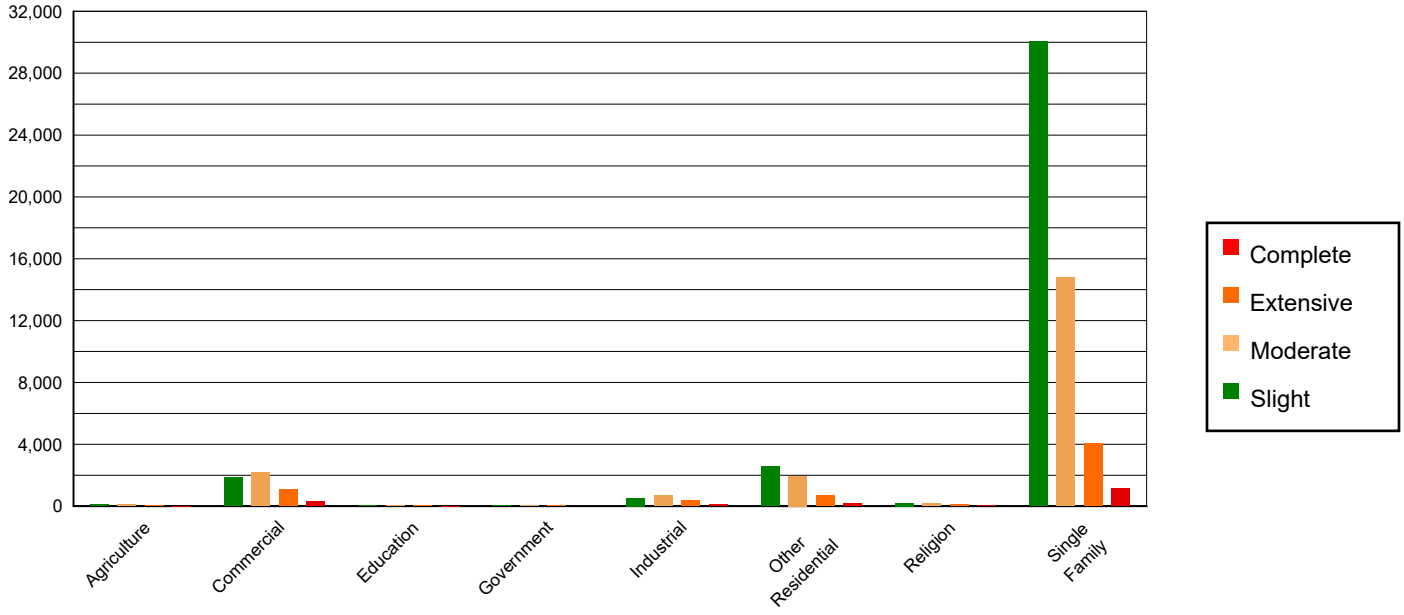


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	304.05	0.33	114.22	0.32	132.01	0.66	68.37	1.07	17.36	0.96
Commercial	3588.13	3.87	1849.43	5.22	2165.98	10.83	1075.35	16.81	317.10	17.62
Education	123.80	0.13	59.04	0.17	69.86	0.35	31.53	0.49	9.76	0.54
Government	92.97	0.10	42.09	0.12	50.69	0.25	20.87	0.33	6.38	0.35
Industrial	1172.73	1.27	530.05	1.50	675.11	3.37	373.42	5.84	105.70	5.87
Other Residential	6155.39	6.64	2566.75	7.24	1942.54	9.71	703.17	10.99	163.15	9.07
Religion	474.99	0.51	197.99	0.56	183.29	0.92	92.84	1.45	27.88	1.55
Single Family	80770.27	87.15	30068.48	84.87	14785.06	73.91	4033.02	63.03	1152.17	64.03
Total	**92,682**		**35,428**		**20,005**		**6,399**		**1,800**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	72458.68	78.18	25436.13	71.80	9295.55	46.47	1152.12	18.01	85.00	4.72
Steel	1499.89	1.62	626.71	1.77	1159.99	5.80	799.21	12.49	239.77	13.32
Concrete	475.72	0.51	193.90	0.55	248.99	1.24	128.50	2.01	26.64	1.48
Precast	457.06	0.49	156.67	0.44	265.91	1.33	192.34	3.01	37.10	2.06
RM	218.10	0.24	61.05	0.17	105.71	0.53	71.70	1.12	9.09	0.51
URM	16001.31	17.26	8203.97	23.16	7958.72	39.78	3651.76	57.07	1322.71	73.50
MH	1571.57	1.70	749.64	2.12	969.66	4.85	402.94	6.30	79.20	4.40
Total	**92,682**		**35,428**		**20,005**		**6,399**		**1,800**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 1,523 hospital beds available for use. On the day of the earthquake, the model estimates that only 539 hospital beds (35.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 49.00% of the beds will be back in service. By 30 days, 75.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	6	3	0	1
Schools	170	65	0	49
EOCs	0	0	0	0
PoliceStations	23	4	0	11
FireStations	27	2	0	15

Transportation Lifeline Damage

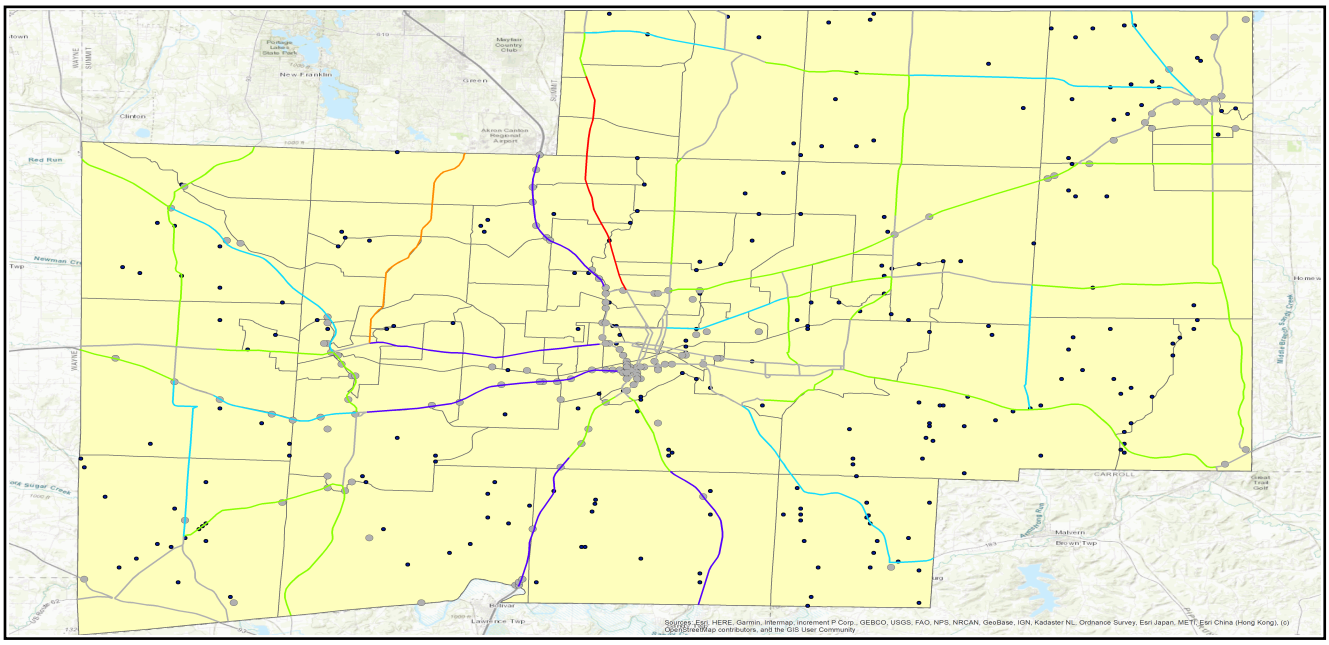


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	209	0	0	209	209
	Bridges	433	2	0	431	433
	Tunnels	0	0	0	0	0
Railways	Segments	259	0	0	259	259
	Bridges	7	0	0	7	7
	Tunnels	0	0	0	0	0
	Facilities	5	1	0	5	5
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	3	1	0	3	3
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	4	0	0	4	4
	Runways	4	0	0	4	4

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	4	2	0	1	4
Waste Water	25	11	0	10	25
Natural Gas	0	0	0	0	0
Oil Systems	1	1	0	0	0
Electrical Power	0	0	0	0	0
Communication	14	8	0	14	14

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	5,747	814	203
Waste Water	3,448	409	102
Natural Gas	2,299	140	35
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	151,089	4,014	1,543	0	0	0
Electric Power		75,669	45,794	16,722	2,668	96

Induced Earthquake Damage

Fire Following Earthquake

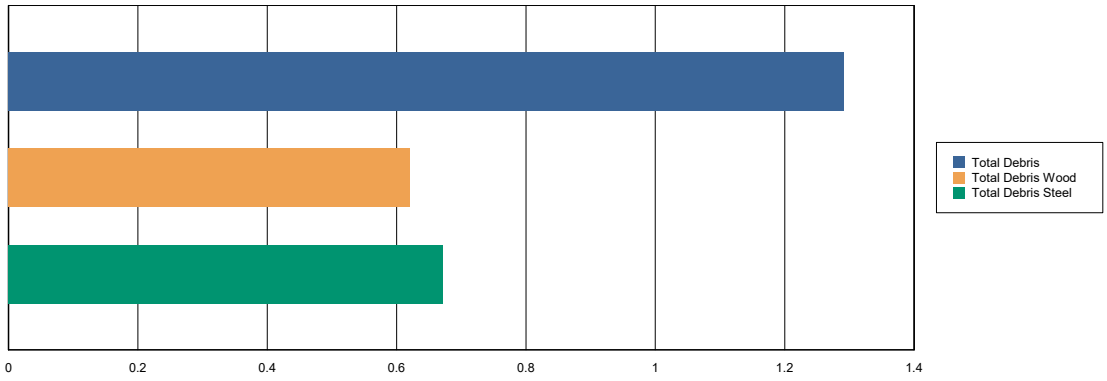
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1,292,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 48.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 51,680 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



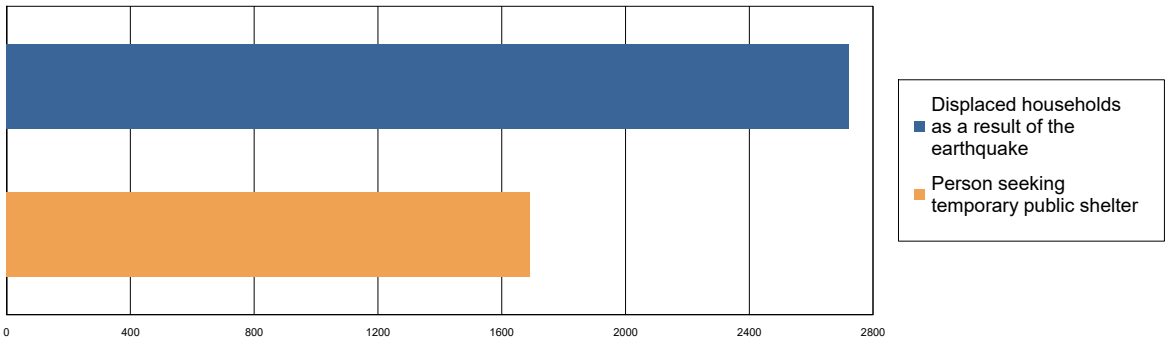
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.62	0.67	1.29	51,680 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 2,722 households to be displaced due to the earthquake. Of these, 1,691 people (out of a total population of 375,586) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
2,722	1,691

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	14.38	3.30	0.42	0.83
	Commuting	0.02	0.03	0.05	0.01
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	22.68	5.19	0.65	1.25
	Other-Residential	183.27	41.18	5.44	10.63
	Single Family	631.90	139.91	18.65	36.54
	Total	**852**	**190**	**25**	**49**
2 PM	Commercial	847.35	195.29	25.22	48.80
	Commuting	0.19	0.25	0.42	0.08
	Educational	337.91	82.09	11.78	22.82
	Hotels	0.00	0.00	0.00	0.00
	Industrial	167.11	38.36	4.82	9.27
	Other-Residential	43.15	9.99	1.38	2.59
	Single Family	145.13	33.27	4.64	8.69
	Total	**1,541**	**359**	**48**	**92**
5 PM	Commercial	598.35	138.61	18.11	34.58
	Commuting	3.39	4.54	7.64	1.48
	Educational	32.43	7.88	1.13	2.20
	Hotels	0.00	0.00	0.00	0.00
	Industrial	104.44	23.97	3.01	5.79
	Other-Residential	72.28	16.66	2.29	4.30
	Single Family	253.53	57.95	8.07	15.11
	Total	**1,064**	**250**	**40**	**63**

Economic Loss

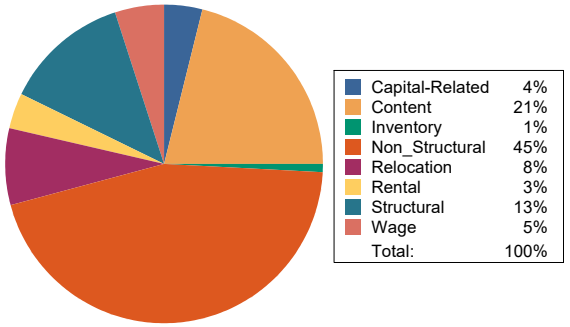
The total economic loss estimated for the earthquake is 5,136.97 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 4,861.94 (millions of dollars); 20 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 49 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

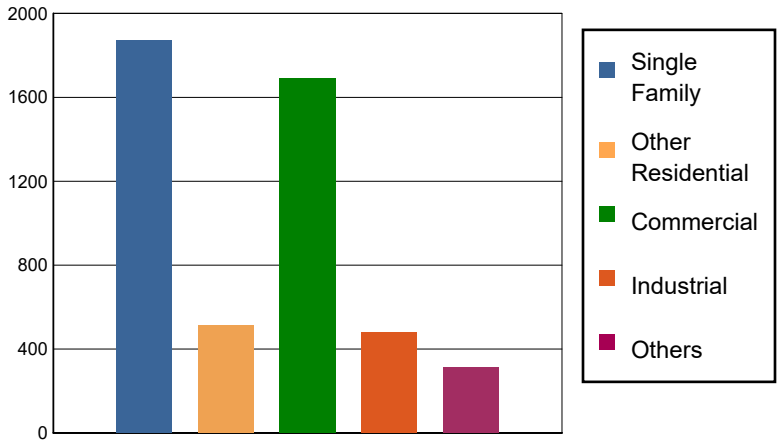


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	9.3965	217.4977	11.9919	9.3824	248.2685
	Capital-Related	0.0000	3.9908	172.5126	7.6723	2.6637	186.8394
	Rental	44.6852	29.8867	85.9305	3.8513	4.9362	169.2899
	Relocation	157.2789	19.6168	146.2938	17.8274	42.1166	383.1335
	Subtotal	**201.9641**	**62.8908**	**622.2346**	**41.3429**	**59.0989**	**987.5313**
Capital Stock Losses							
	Structural	255.5941	51.9783	196.0836	64.4097	47.7075	615.7732
	Non_Structural	1004.1085	300.2614	552.5607	200.6196	129.4572	2,187.0074
	Content	408.7577	96.0115	312.9285	141.6379	74.6333	1,033.9689
	Inventory	0.0000	0.0000	7.3648	29.4023	0.8962	37.6633
	Subtotal	**1668.4603**	**448.2512**	**1068.9376**	**436.0695**	**252.6942**	**3874.4128**
	Total	**1870.42**	**511.14**	**1691.17**	**477.41**	**311.79**	**4861.94**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2502.9462	0.0000	0.00
	Bridges	446.6601	13.0385	2.92
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**2949.6063**	**13.0385**	
Railways	Segments	308.5471	0.0000	0.00
	Bridges	0.4851	0.0005	0.10
	Tunnels	0.0000	0.0000	0.00
	Facilities	13.3150	3.1766	23.86
	Subtotal	**322.3472**	**3.1771**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	3.4335	0.6456	18.80
	Subtotal	**3.4335**	**0.6456**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	42.6040	3.7952	8.91
	Runways	151.8560	0.0000	0.00
	Subtotal	**194.4600**	**3.7952**	
	Total	**3,469.85**	**20.66**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	139.8600	27.0063	19.31
	Distribution Lines	184.9651	3.6628	1.98
	Subtotal	**324.8251**	**30.6691**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	1748.2500	220.9403	12.64
	Distribution Lines	110.9790	1.8399	1.66
	Subtotal	**1859.2290**	**222.7802**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	73.9860	0.6303	0.85
	Subtotal	**73.9860**	**0.6303**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.1050	0.0334	31.81
	Subtotal	**0.1050**	**0.0334**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	1.4700	0.2517	17.12
	Subtotal	**1.4700**	**0.2517**	
	Total	**2,259.62**	**254.36**	

Appendix A: County Listing for the Region

Stark,OH

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Ohio					
	Stark	375,586	33,664	12,194	45,859
Total Region		**375,586**	**33,664**	**12,194**	**45,859**

Hazus: Flood Global Risk Report

Region Name: Stark100yr

Flood Scenario: Stark100yr

Print Date: Tuesday, August 17, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

FEMA

RiskMAP
Increasing Resilience Together

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Ohio

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 581 square miles and contains 12,218 census blocks. The region contains over 151 thousand households and has a total population of 375,586 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 156,313 buildings in the region with a total building replacement value (excluding contents) of 45,859 million dollars. Approximately 91.06% of the buildings (and 73.41% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 156,313 buildings in the region which have an aggregate total replacement value of 45,859 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	33,664,886	73.4%
Commercial	7,315,744	16.0%
Industrial	2,869,542	6.3%
Agricultural	207,264	0.5%
Religion	982,233	2.1%
Government	209,993	0.5%
Education	609,484	1.3%
Total	**45,859,146**	**100%**

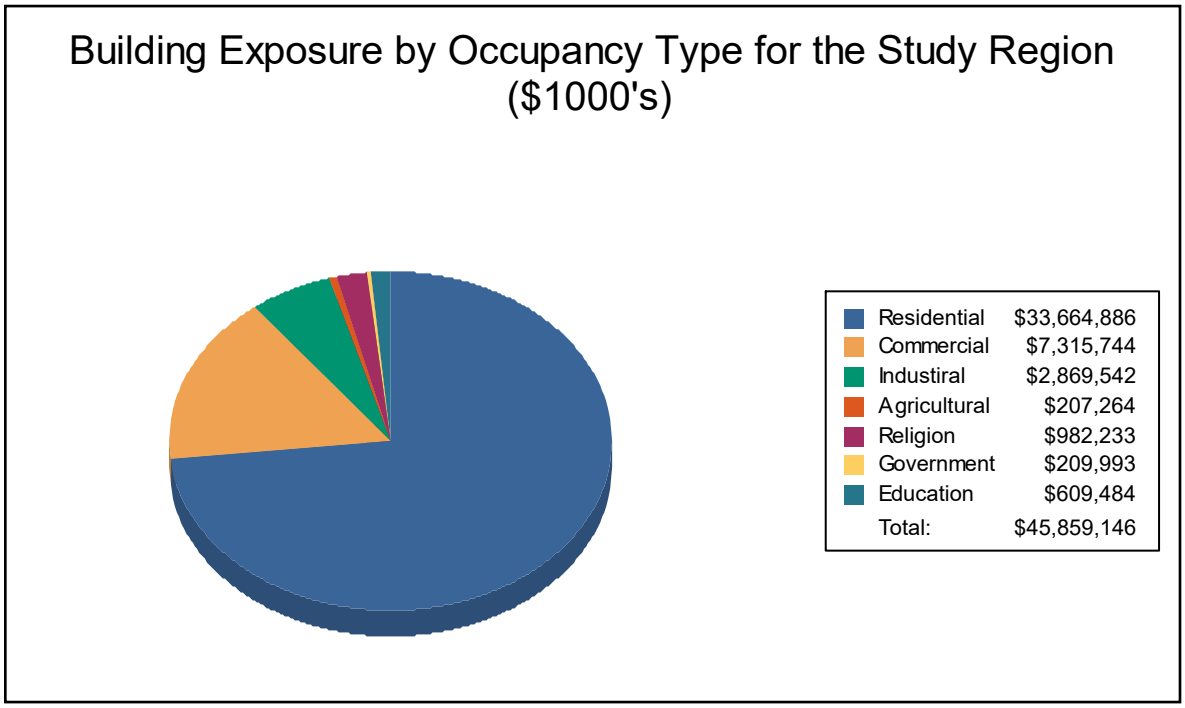
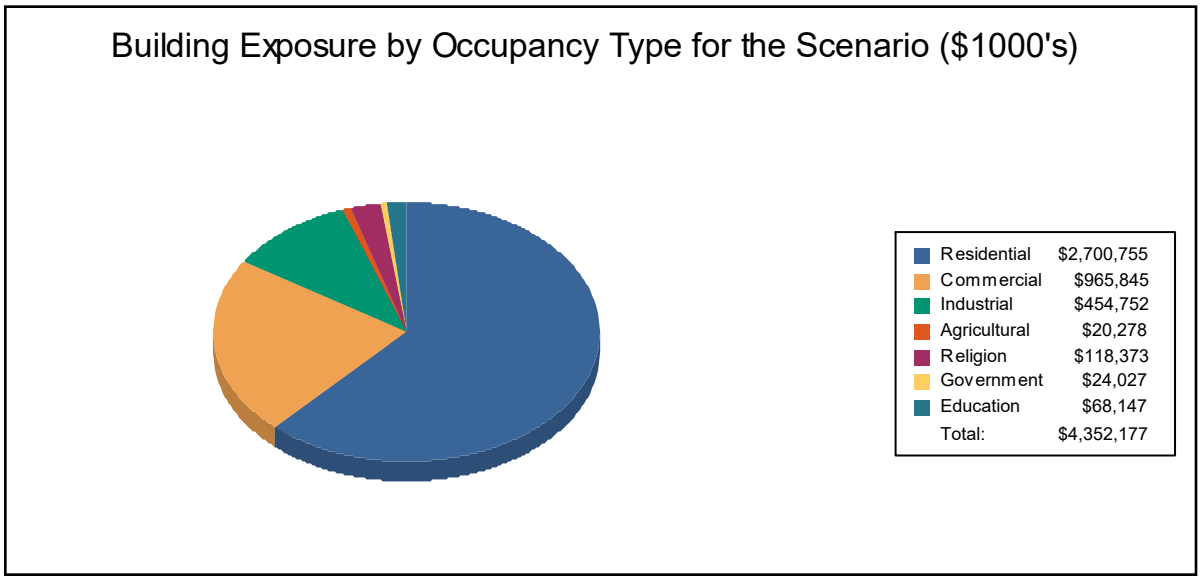


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,700,755	62.1%
Commercial	965,845	22.2%
Industrial	454,752	10.4%
Agricultural	20,278	0.5%
Religion	118,373	2.7%
Government	24,027	0.6%
Education	68,147	1.6%
Total	**4,352,177**	**100%**



Essential Facility Inventory

For essential facilities, there are 6 hospitals in the region with a total bed capacity of 1,523 beds. There are 170 schools, 27 fire stations, 23 police stations and no emergency operation centers.

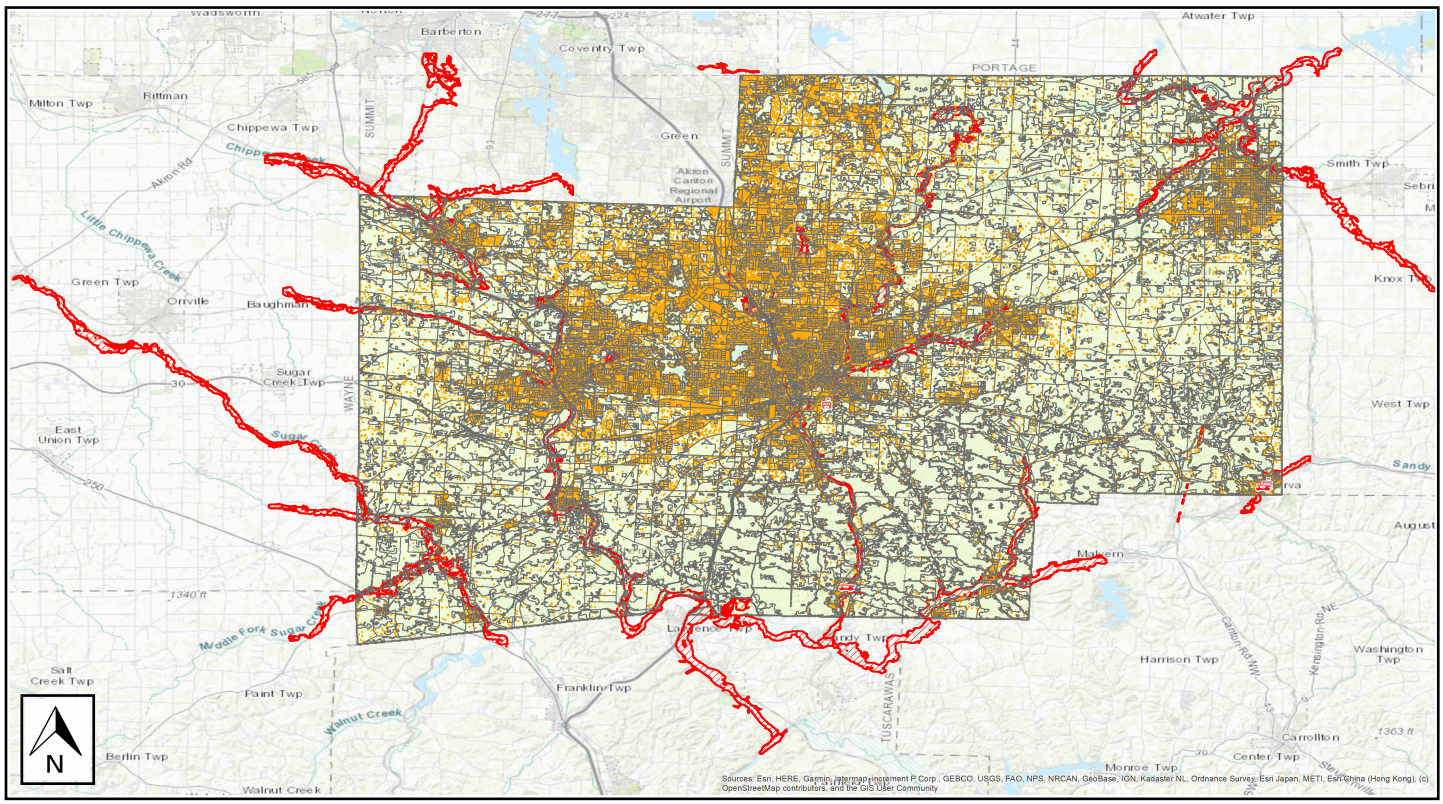
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Stark100yr
Scenario Name:	Stark100yr
Return Period Analyzed:	100
Analysis Options Analyzed:	FloodWarning,

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 496 buildings will be at least moderately damaged. This is over 76% of the total number of buildings in the scenario. There are an estimated 24 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

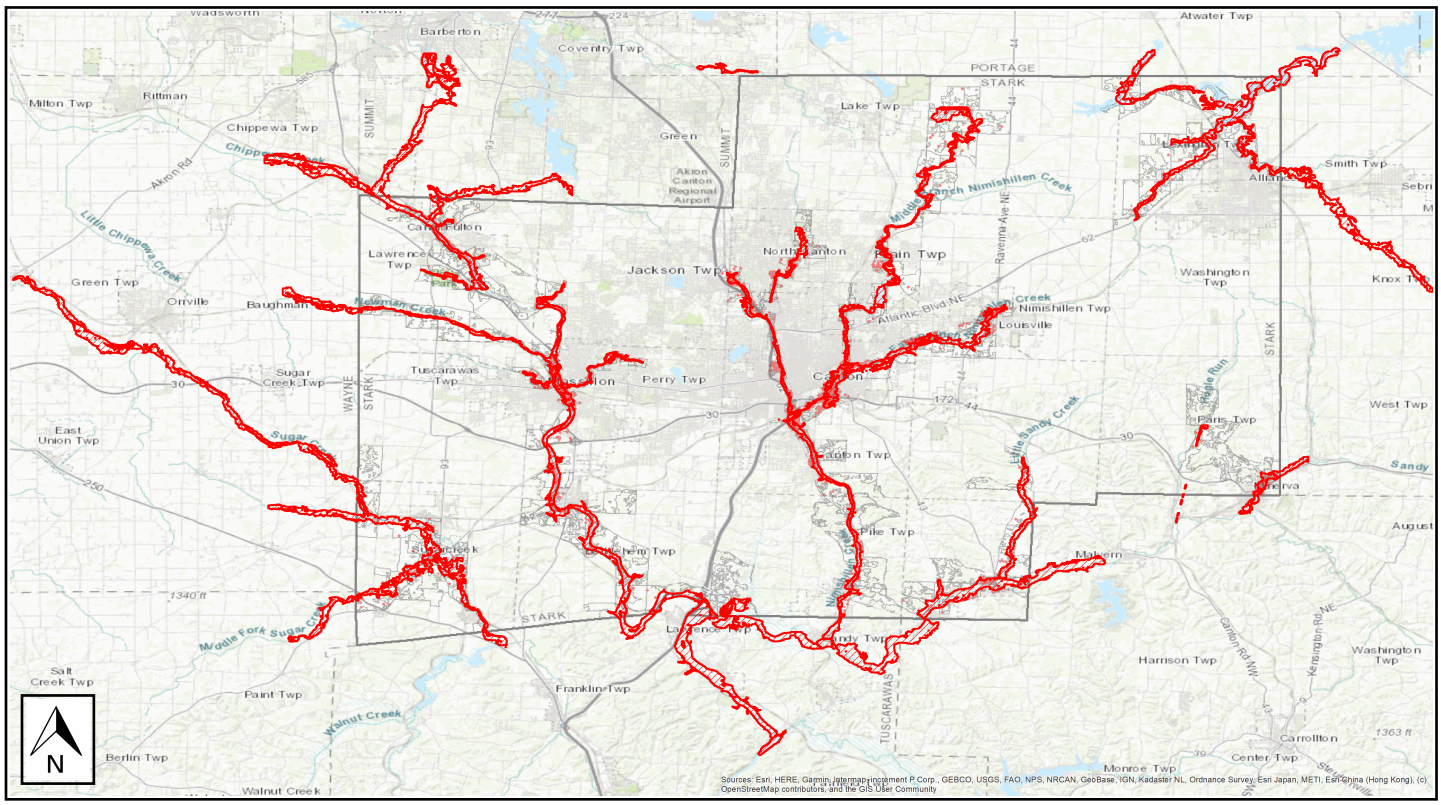


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	11	42	13	50	2	8	0	0	0	0	0	0
Education	1	100	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	4	50	3	38	1	13	0	0	0	0
Religion	1	100	0	0	0	0	0	0	0	0	0	0
Residential	147	24	255	41	114	18	56	9	24	4	24	4
Total	**160**		**272**		**119**		**57**		**24**		**24**	

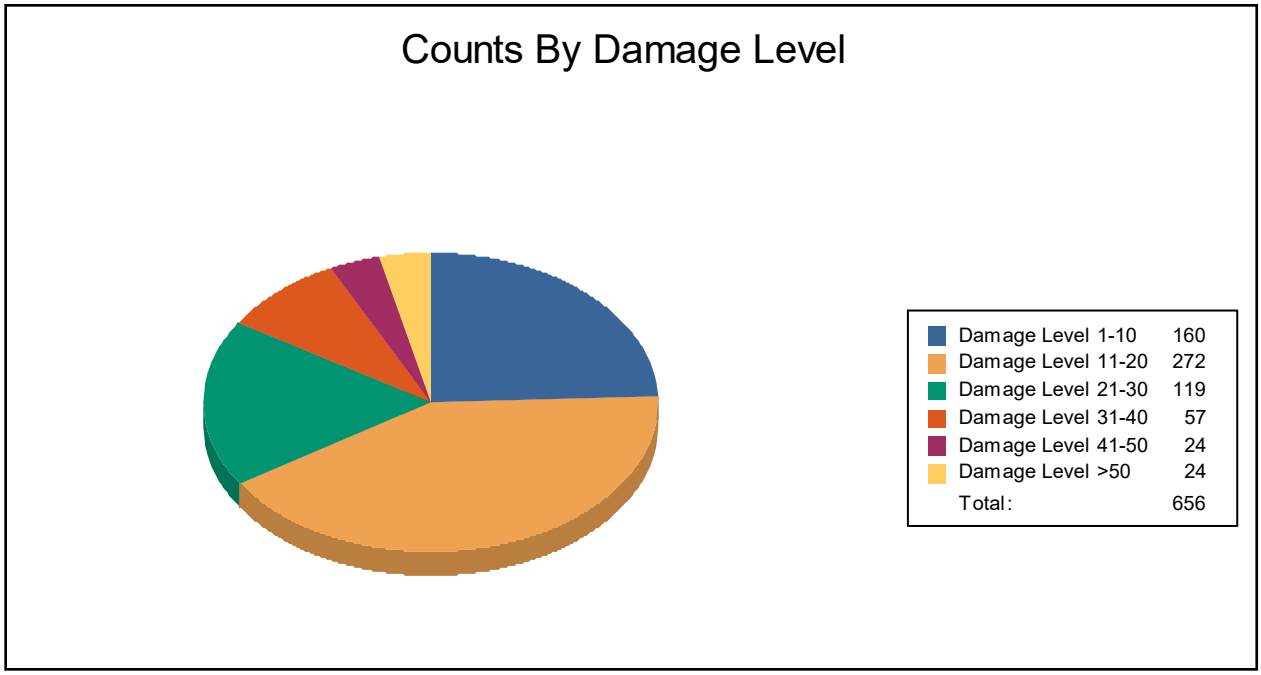


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1	50	0	0	1	50	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	15	20	35	47	15	20	6	8	2	3	2	3
Steel	3	27	6	55	2	18	0	0	0	0	0	0
Wood	138	25	225	40	102	18	50	9	22	4	22	4

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,523 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,523 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	0	0	0	0
Fire Stations	27	0	0	0
Hospitals	6	0	0	0
Police Stations	23	0	0	0
Schools	170	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

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

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Analysis has not been performed for this Scenario.

Economic Loss

The total economic loss estimated for the flood is 749.79 million dollars, which represents 17.23 % of the total replacement value of the scenario buildings.

Building-Related Losses

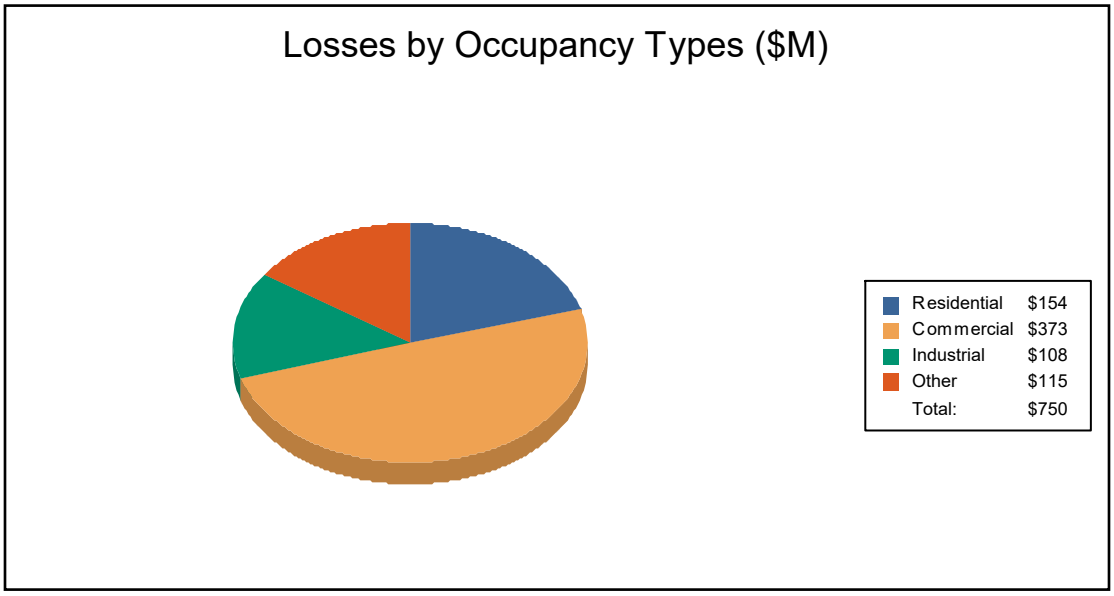
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 387.13 million dollars. 48% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 20.48% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	77.98	34.93	25.60	4.25	142.75
	Content	36.84	102.98	65.13	26.31	231.26
	Inventory	0.00	2.84	10.18	0.10	13.12
	Subtotal	**114.82**	**140.75**	**100.90**	**30.66**	**387.13**
Business Interruption						
	Income	1.09	91.08	2.17	9.81	104.14
	Relocation	24.35	28.11	2.21	5.41	60.08
	Rental Income	10.72	20.13	0.50	0.69	32.03
	Wage	2.57	93.24	2.55	68.05	166.41
	Subtotal	**38.73**	**232.55**	**7.42**	**83.96**	**362.66**
ALL	**Total**	**153.55**	**373.30**	**108.33**	**114.61**	**749.79**



Appendix A: County Listing for the Region

Ohio

- Stark

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Ohio				
Stark	375,586	33,664,886	12,194,260	45,859,146
Total	**375,586**	**33,664,886**	**12,194,260**	**45,859,146**
Total Study Region	**375,586**	**33,664,886**	**12,194,260**	**45,859,146**

APPENDIX 7: CROSSWALKS AND RESOLUTIONS

The appendix contains space to include the approved crosswalks per the Ohio Emergency Management Agency and Federal Emergency Management Agency, Region V. It will also house copies of the adopting resolutions upon plan approval.

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Stark County	**Title of Plan:** Stark County 2022 Hazard Mitigation Plan	**Date of Plan:** July 2022
Local Point of Contact: Tim Warstler	**Address:**	
Title: Director		
Agency: Stark County Office of Emergency Management		
Phone Number:	**E-Mail:**	

State Reviewer: Luan Nguyen	**Title:** State Hazard Mitigation Planner	**Date:** 8/11/2022

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region V		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 1	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 1 (Section 1.1.1, Committee Meeting #4, Pg 8) (Appendix 4)		X
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 1.1.3	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 1.3.3x Appendix 5	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 4.3	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 4.3 (see below)		X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A: REQUIRED REVISIONS A2. • As frequent applicants in past mitigation grants, Stark County Parks District should be made formal participants of the plan. Please reach out to Stark County Park District and IF THEY AGREE TO BECOME A FORMAL PARTICIPANT, this will require: o Basic overview of the Stark County Parks District in section 1.2 (Section 1.2.1, Stark Parks, Pg 26) o Summary of their Administrative and Technical, Fiscal, and Political Capabilities in section 1.3. (Section 1.3.2 Capability Assessment, Pg 63, 65) o Stark County Parks District specific mitigation actions the 2022 Mitigation Action Plan. (Section 3.2, 2022 Mitigation Action Plan Table, Project 11.3 Pg 294, Project 5.4 Pg 295) o A Stark County Parks District-specific vulnerability discussion in each of the hazard profiles that the mitigation actions (see bullet item above) addresses. (Section 2.2.5-Flooding Hazard Profile, Location & Extent, Pg 132) (Section 2.2.11-Wildfire Hazard Profile, Location & Extent, Pg 256) A6. • Page 317. State that the *Steering committee* will initialize and coordinate the next plan update in Year 5. If not the Steering Committee, state who or agency that will. (Section 4.1, 3rd Bullet, Pg 320)			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 2	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 2	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 2		X
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Page 130 - 132	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B: REQUIRED REVISIONS B3. • SEE ITEM IN ELEMENT A2 ABOVE REGARDING STARK COUNTY PARKS DISTRICT. See above • Page 90-91. Dam Failure Loss and Damages. Section should also include loss and damage estimates for remaining Class 1 dams with EAPs. This will meet the requirement for HHPD- allowing for funding of studies and rehabilitation specific to the dams assessed. If data is not available OR if the planning team chooses, the plan can be approved now but must be amended at the time of application for HHPD funding. (Section 2.2.1-Dam and Levee Failure Hazard Profile, Loss and Damages, Pg 92 - 94) Misc. • Page 202. Loss and Damages table for Hazardous Materials Release is labeled as Land Subsidence. (Section 2.2.6 Hazardous Materials Release Profile, Loss and Damages Section, Exposure Estimate Table, Pg 205)			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 1.3, 1.3.2		X
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Page 132		X
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 3.1	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 3.2		X
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 3.2, Appendix 2	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 4.2	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met

ELEMENT C: REQUIRED REVISIONS

C1.

- SEE ITEM IN ELEMENT A2 ABOVE REGARDING STARK COUNTY PARKS DISTRICT.
  See above
- For the following jurisdictions to be considered participants, Jurisdictional Capabilities must be filled out for Canal Fulton City, Brewster Village, and Waynesburg Village in section 1.3.
  - Alternatively, Summary of their Administrative and Technical, Fiscal, and Political Capabilities may be described in section 1.3.2 for the three jurisdictions.

  (Section 1.3, Jurisdictional Capabilities Table, Pg 59)

C2

- For Communities not participating in NFIP, have describe why they are not participating in NFIP i.e. "Not within flood plain".
  (Section 1.3.1, NFIP Participation Table, Pg 62) & (Section 2.2.5 NFIP Enrollment Table, Pg 135)

C4.

- SEE ITEM IN ELEMENT A2 ABOVE REGARDING STARK COUNTY PARKS DISTRICT.
- Section 3.2. Change all "Consider feasibility*, and conduct* acquisition/demolition, elevations and relocations properties.".
  - This action needs to be expanded to all jurisdictions that are currently participating in NFIP (See NFIP Participation Table on page 132).

  (Section 3.2, 2022 Mitigation Action Plan Table, Pg 299, 300, 302, 303, 304, 305, 307, 308, 309)
  (Section 3.2, 2022 Mitigation Action Plan Table, Pg 298 – 309)
- Section 3.2. Project #8.2, This project needs to be expanded to all participating jurisdictions in the county. Easiest way to do so is to include "City and Village Councils of all participating jurisdictions" under Project Coordinator.
  (Section 3.2, 2022 Mitigation Action Plan Table, Project #8.2, Pg 297)
- For project # 9.1, "Municipal Leadership" needs to be replaced with a specific title, group, or agency. "City and Village Councils of Participating Jurisdictions" is acceptable.
  (Section 3.2, 2022 Mitigation Action Plan Table, Project #9.1, Pg 296)
- Section 3.2. In Funding Source of all mitigation actions, Replace PDM with BRIC. If both PDM and BRIC is listed, remove PDM.
  (Section 3.2, 2022 Mitigation Action Plan Table, Pg 292 – 319)

ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 2.4	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Appendix 3	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 3.2 Appendix 2, 3.	X	

ELEMENT D: REQUIRED REVISIONS

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	PENDING	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	PENDING	X	
ELEMENT E: REQUIRED REVISIONS			
OPTIONAL: HIGH HAZARD POTENTIAL DAM RISKS			
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for high hazard potential dams?		X	
HHPD2. Did Element B3 (risk assessment) address HHPDs?			X
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?		X	
HHPD4. Did Element C4-C5 (mitigation actions) address HHPDs prioritize mitigation actions to reduce vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?		X	
REQUIRED REVISIONS HHPD2. See Dam Failure related item in Element B3 above. See above			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

+ Very strong Development trends and Future Development discussion.
+ Very strong public outreach effort and feedback.
+ Discussion of Social Vulnerability and Climate Change included in current plan update
    - Per FEMA Planning Policy Guidance, effective April 2023, Stark County specific Social Vulnerability Indicators needs to be expanded in probability and risk assessments of relevant hazards the next plan update.
    - Per FEMA Planning Policy Guidance, effective April 2023, Climate Change and future conditions needs to be expanded in probability and risk assessments of relevant hazards the next plan update.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*

- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
1												
2												
3												
4												
5												
6												
7												
8												

MULTI-JURISDICTION SUMMARY SHEET													
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
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MULTI-JURISDICTION SUMMARY SHEET													
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
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MULTI-JURISDICTION SUMMARY SHEET													
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
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MULTI-JURISDICTION SUMMARY SHEET													
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
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