LUCAS COUNTY
OHIO

LUCAS COUNTY

2019 Multi-Jurisdictional Hazard Mitigation Plan

JH Consulting LLC

LUCAS COUNTY, OHIO
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN
2019 UPDATE

LUCAS COUNTY
EMA

PREPARED BY
JH CONSULTING, LLC OF WEST VIRGINIA
MAY, 2019

TABLE OF CONTENTS

LUCAS COUNTY HAZARD MITIGATION PLAN
EXECUTIVE SUMMARY

The *Lucas County Hazard Mitigation Plan* of 2019 is an update to the *Countywide All Natural Hazard Mitigation Plan* (CANHMP) of 2013. The Lucas County Emergency Management Agency (LCEMA) updated the plan utilizing a planning committee with representatives from the local governments, private businesses, and community organizations throughout 2018. The first version of this plan is from 2004.

This plan considers all the jurisdictions[i] – county, cities, villages, and townships – within the geographical boundaries of Lucas County, Ohio, and is therefore considered a multi-jurisdictional plan. The plan has been prepared in accordance with federal requirements outlined in the Disaster Mitigation Act of 2000 (DMA, 2K) which requires counties to formulate a hazard mitigation plan in order to be eligible for mitigation funds made available by the Federal Emergency Management Agency (FEMA). Section 322 of the Robert T. Stafford Act requires that all states and local jurisdictions develop and submit mitigation plans designed to meet the criteria outlined in 44 CFR Parts 201 and 206. This plan has been approved by the committee who developed it, the Ohio Emergency Management Agency, and the Federal Emergency Management Agency.

The previous 2013 version of this plan considered only natural hazards that affect or could potentially affect the county. This update includes additional technological and human-caused hazards to more accurately represent the risks within Lucas County. The plan includes technological and human-caused hazards such as chemical, biological, radiological, nuclear, and explosives (CBRNE) / terrorism, civil disturbance, dam and levee failure, and hazardous materials incidents; it also includes natural hazards such as drought, earthquake, floods, harmful algal bloom, lake surge and seiche waves, landslides, pandemic, severe thunderstorms, severe winter storms, temperature extremes, tornadoes, wildfires, and wind events.

This hazard mitigation plan now aligns and integrates better with the Toledo, Lucas County Emergency Operations Plan of 2017, which considers emergency operations for more than just natural hazards. The plan considers hazards such as severe thunderstorms and tornadoes, flooding, earthquake, hazardous materials release, homeland security, severe winter storm, and radiological incidents. Therefore, adding human-caused and technological hazards to this hazard mitigation plan was a logical step.

The committee discussed and redefined the goals that this plan will strive to achieve through the implementation of hazard mitigation strategies or projects. The previous version of this plan included one goal for each hazard; now, the goals address a variety of identified issues that face the county due to hazards. Every county and jurisdictional project that is completed will move the county towards a state of higher overall resiliency for the population, critical infrastructure, and the environment ensuring continuity of daily life after disasters.

[i] While this plan considers all the jurisdictions, the Village of Harbor View elected not to participate in the update of this plan. However, because the Village of Harbor View is within the geographical boundaries of Lucas County, they are not excluded from sections that refer to demographic trends and predictions.

1.0 INTRODUCTION

PURPOSE

The purpose of the mitigation plan is to identify risks and vulnerabilities from hazards that affect Lucas County, Ohio to prevent or reduce the loss of life and injury and to limit future damage costs by developing methods to mitigate or eliminate damage from various hazards.

SCOPE

The *Lucas County 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 residential areas, a mitigation strategy for high-risk hazards, and a method to maintain and update the plan.

PLAN AUTHORITY

The Lucas County Hazard Mitigation Plan is a multi-jurisdictional plan meaning that it includes several jurisdictions within the plan. The plan has been prepared in accordance with federal requirements outlined in the Disaster Mitigation Act of 2000 (DMA, 2K) which requires counties to formulate a hazard mitigation plan in order to be eligible for mitigation funds made available by the Federal Emergency Management Agency (FEMA). Section 322 of the Robert T. Stafford Act requires that all states and local jurisdictions develop and submit mitigation plans designed to meet the criteria outlined in 44 CFR Parts 201 and 206.

When the content of this plan is a requirement under 44 CFR 201.6 (the local mitigation planning section), it is identified with a description of the guidance. The following table describes the relevant requirements under 44 CFR 201.6 and the sections in the plan where the fulfillment of the guidance can be found.

44 CFR 201.6 REQUIREMENTS IN THIS PLAN		
Section	*Description*	*Section in plan*
§ 201.6	Local Mitigation Plans. 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

44 CFR 201.6 REQUIREMENTS IN THIS PLAN		
Section	*Description*	*Section in plan*
§ 201.6(a)(4)	Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. State-wide plans will not be accepted as multi-jurisdictional plans.	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 other private and non-profit interests to be involved in the planning process; and	Section 1.1 The Planning Process
§ 201.6(b)(3)	Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.	Section 1.3 Capabilities Section 4.2 Plan Integration
§ 201.6(c)	Plan content. The plan shall include the following:	N/A
§ 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. The risk assessment shall include:	Section 2.0 Risk Assessment
§ 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.	Section 2.4 Profile Hazards
§ 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. The plan should describe vulnerability in terms of:	Section 2.4 Profile Hazards
§ 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;	Section 2.4 Profile Hazards
§ 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;	Section 2.4 Profile Hazards
§ 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.	Section 1.4 Trends and Predictions
§ 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 2.4 Profile Hazards
§ 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. This section shall include:	Section 3.0 Mitigation Strategy
§ 201.6(c)(3)(i)	A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.	Section 3.1 Mitigation Goals

44 CFR 201.6 REQUIREMENTS IN THIS PLAN		
Section	*Description*	*Section in plan*
§ 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.	Section 3.2 Mitigation Actions and Action Plan
§ 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.	Section 3.2 Mitigation Actions and Action Plan
§ 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 and Action Plan
§ 201.6(c)(4)	A plan maintenance process that includes:	N/A
§ 201.6(c)(4)(i)	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, and Updating the Plan
§ 201.6(c)(4)(ii)	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 Plan Integration
§ 201.6(c)(4)(iii)	Discussion on how the community will continue public participation in the plan maintenance process.	Section 4.2 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 Commissioner, 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 6
§ 201.6(d)(2)	The Regional review will be completed within 45 days after receipt from the State, whenever possible.	N/A
§ 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 5 years in order to continue to be eligible for mitigation project grant funding.	Section 3.1 Mitigation Goals Section 3.2 Mitigation Actions and Action Plan Section 5.0 Appendix 3

1.1 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.

This section describes the process by which the Lucas County Hazard Mitigation Plan was updated. It includes the partners who participated and provided information as well as the process by which the data was collected.

1.1.1 Partners and Process

To begin the process of updating the hazard mitigation plan, the Lucas County Emergency Management Agency (LCEMA) and JH Consulting, LLC (the consultant) held a conference call at the end of March of 2018 to strategize. During this meeting, the attendees discussed the involvement of partners in the planning committee, jurisdictional involvement, and laid out the general process of the plan update. The LCEMA then invited their partners to serve on the planning committee and attend the first meeting. The following table includes the list of planning committee members that attended the subsequent meetings.

PLANNING COMMITTEE MEMBERS		
Agency/Affiliation	*Name*	*Title*
American Red Cross	Doug Fee	Disaster Program Manager
City of Oregon	Jim Gilmore	Commissioner of Building and Zoning
City of Sylvania Police	Danilynn Miller	Administrative Sergeant
City of Toledo Police	Philip Cook	Sergeant
City of Toledo Water Treatment	Shelley Hoelzer-Spahn	Systems Specialist
City of Waterville Fire	Doug Meyer	Fire Chief
City of Toledo Environmental Services	Michelle Hughes-Tucker Beatrice Miringu	Chief of Emergency Response Senior Environmental Specialist
FirstEnergy	Meg Adams	External Affairs Manager
Hospital Council of NW Ohio	Patrick Trejchel	Regional Preparedness Manager
Lucas County Auditor's Office	Tina Mack	GIS Manager
Lucas County Emergency Management Agency	Pat Moomey Matt Krause Aletha Reshan Hannah Schwartz Abby Buchhop	Director Operations Officer Homeland Security Grants Specialist Operations Officer GIS Planner / Operations Officer
Lucas County Emergency Services	Greg Bonfiglio	GIS Analyst
Lucas County Engineers Office	Bob Neubert	GIS Technician
Lucas Soil & Water	Joey Sink-Oiler Jessica Wilbarger	District Manager Natural Resource Specialist
Metroparks of the Toledo Area	Joe Fausnaugh	Chief of Operations
Monclova Township Fire	Kevin Bernhard	Fire Chief
OSU Extension - Lucas County	Holly Ball	Director
TMACOG (Toledo Metropolitan Area Council of Governments)	Kari Gerwin	Director of Water Quality Planning

PLANNING COMMITTEE MEMBERS		
Agency/Affiliation	*Name*	*Title*
Toledo-Lucas County Health Dept	Dan Baker	Emergency Preparedness Coordinator
Village of Holland Police	Robert Reed	Chief of Police
Village of Ottawa Hills Police	John Wenzlick	Chief of Police
Village of Whitehouse Fire	Josh Hartbarger	Fire Chief

The following table is a summary of the meetings the partners held for the development of the plan. Each meeting is described below in more detail. For agendas, presentations, advertisements, and minutes of these meetings, refer to Appendix 1 Planning Documentation).

MEETINGS HELD FOR THE PLAN UPDATE			
Date	*Format*	*Location*	*Participants*
March 28, 2018	Conference call	Online	LCEMA and JH Consulting
May 2, 2018	In person	Lucas County EMA	Committee members
June 28, 2018	In person	Lucas County EMA	Committee members
July 17, 2018	Conference call	Online	Committee members
August 21, 2018	In person public meeting	Lucas County Emergency Services Training Center	Members of the public and committee members
August 21, 2018	In person public meeting	Lucas County Emergency Services Training Center	Members of the public and committee members
August 22-23, 2018	In person	All Jurisdictions	Jurisdictional representatives and JH Consulting
August 23, 2018	In person	Lucas County EMA	Committee members

Committee Meeting 1

On Thursday, May 3, 2018, the *Lucas County Hazard Mitigation Plan* committee met for the first time to initiate the several month process of updating the plan. The consultant gave a brief overview of the requirements for hazard mitigation plans and the process by which this plan will be updated.

The consultant also reviewed the expectations of committee members that included attending meetings, acting as liaisons with their agencies and jurisdictions within the county, participating in activities and discussions, reviewing draft documents, and maintaining contact with the LCEMA and the consultant throughout the process.

During the first meeting, the committee reviewed the 2013 plan action items and took time to update the status of each project according to their knowledge and experience with the projects. The committee also reviewed the goals from the 2013 plan and noticed that there were one or more goals for each hazard, making a total of 29 goals for the plan. Upon inspecting each goal, the committee determined that the goals were repetitive and did not address broader issues. After some discussion, the committee came up with a list of five

themes that would be the goals for the updated plan. To see detailed information on the goals, refer to Section 3.1 Mitigation Goals.

To finalize, the consultant presented links to two surveys. The first for jurisdictions to fill out; it included questions about their capabilities: rules, regulations, and ordinances, administrative, technical, and financial capabilities. The second survey was for public involvement

Committee Meeting 2

On Thursday, June 28, 2018, the *Lucas County Hazard Mitigation Plan* committee met for the second time to continue the process of updating the plan. The committee mainly reviewed and discussed goals and hazards. The main focus of the meeting was to review the existing list of hazards and update it according to recent events and new information. The last plan contained only natural hazards; the county's EMA website includes non-natural hazards in their list of local hazards. Because of this, and because the committee recognized that non-natural hazards also threaten the county, the committee included new hazards in the list. For a detailed list of hazards, refer to Section 2.1 Hazards Identification.

After finalizing the hazard list, the consultant reviewed the method by which risk is assessed. The committee discussed and wrote down events they recalled occurring in the past few years, what the impacts were, and if there was any way to reduce the impacts going forward. The consultant finalized the meeting by reviewing the standings for the online surveys: the capabilities survey for the jurisdictions to complete, and the public survey to be shared on social media.

Committee Meeting 3

The planning committee met for the third time on Wednesday, July 18, 2018 via teleconference. The meeting focused on discussions regarding county assets, plan integration, plan maintenance, surveys and scheduling the next meetings.

The 2013 plan did not include an asset list therefore one would need to be created; the committee determined that the Lucas County EMA and GIS departments would assist in creating the list.

In terms of plan integration and maintenance, the consultant gave examples of different plans that could be included with hazard mitigation projects; these include comprehensive plans, emergency operations plans, etc. To update and maintain this plan,

the committee decided on a series of steps that this plan outlines in Section 4.1 Monitoring, Evaluating, and Updating the Plan.

Public Involvement and Meetings

At the beginning of the process, the committee approved two surveys to be launched online to garner public input. The first one was available in April of 2018 and by the end of this update had 139 responses; the second one was available in August of the same year and received 32 responses.

The first public survey asked the public about their hazards of concern and the occurrences, how well they thought the county and officials responded, how they received warning information, how well their household was prepared for emergencies, what types of mitigation actions they do, if they had homeowners and flood insurance, and general demographic information. The second survey asked the public about their support for additional regulatory efforts for mitigation measures, spending tax dollars and grants on mitigation activities, upgrading water systems and addressing stormwater problems, education campaigns, and other measures that would increase resiliency within the community.

LCEMA, with the assistance of committee members, organized and advertised for two public meetings on August 21, 2018, at 1:30 p.m. and 6:30 p.m. at the Lucas County Emergency Services Training Center. Various members of the public and the media attended both meetings: twelve people attended the first meeting and six attended the second public meeting.

For more information on the meetings as well as the answers to the surveys conducted, refer to Appendix 2 Public Involvement.

Jurisdictional Visits

On August 22 and 23, 2018, the consultant visited each jurisdiction in person to ensure their participation in the plan update process. The consultant introduced the project to the jurisdictional representatives if they did not already know about it and gave each jurisdiction the following documents or information for their reference and to share with colleagues (see Appendix 1 Planning Documentation for the documents).

- FEMA's *Local Hazard Mitigation Planning* fact sheet
- A document titled *Mitigation Project Ideas* that contained examples of mitigation projects for various hazards

- A reference sheet, *Lucas County Hazard Mitigation Plan Update 2018*, that detailed specifics of this project

In addition to visiting the jurisdictions, the consultant had contact with the jurisdictions through emails, phone calls, and mail.

Committee Meeting 4

On Thursday, August 23, 2018, the planning committee met for the fourth time. The consultant reviewed the five-year cycle for the update of the hazard mitigation plan so the full committee was familiar with the process.

The consultant gave a brief overview of the public meetings held earlier that week; Committee members discussed various ways to push out the two public surveys currently available. The committee decided to hold off on pushing out survey information until the draft version of the plan is ready for public view. At that time, the notification can mention the plan as well as the survey. In addition, they discussed ways they would continue to involve the public throughout the 5-year cycle of this plan (for detailed information see Section 4.3 Continued Public Involvement).

Additional Committee Interaction

Throughout the months of December, 2018 and January 2019, the committee reviewed and provided comments for various draft sections of the plan. Committee members and jurisdictional representatives used that time to supply additional information and data as needed.

Throughout the plan update process there were other partners who LCEMA and the consultant contacted. The following table lists the people, their agency or affiliation, and how they contributed to the plan if they replied.

OTHER PARTNERS		
Agency/Affiliation	*Name*	*Contribution*
Fulton County EMA, OH	Becky Goble	No reply
Henry County EMA, OH	Tracy Busch	No reply
Wood County EMA, OH	Bradley Gilbert	No reply
Ottawa County EMA, OH	Fred Petersen	No reply
Monroe County EMA, MI	Mark Hammond	No reply
Lenawee County EMA, OH	Craig Tanis	No reply
Ontario Emergency Management, Canada	Christopher Pape	No reply
University of Toledo Social Work	Louis Guardiola	No reply

OTHER PARTNERS		
Agency/Affiliation	*Name*	*Contribution*
University of Toledo Geology and Planning	Dan Hammel	No reply
University of Toledo GIS	Kevin Czajkowski	No reply
University of Toledo Engineering Technology	Linda Beall	No reply
University of Toledo Environmental Science	Timothy Fisher	No reply
University of Toledo Economics	Kevin Egan	No reply
University of Toledo Environmental Engineering	Cyndee Gruden	No reply

1.1.2 Roles, Responsibilities, and Participation

The various planning committee members, jurisdictional representatives, other stakeholders, and the public worked together throughout the entire plan update process. The development of this plan consisted in having the planning committee members define the direction of the plan; this consisted of but was not limited to the following tasks.

- Hold meetings to update the plan
- Reach out to jurisdictional representatives and other partners
- Review and revise goals and objectives for the plan and mitigation actions
- Discuss and determine a way to monitor, evaluate, and update the plan
- Determine how to keep the public involved during the 5-year cycle of the plan
- Review and update the mitigation projects or strategies
- Review and approve the draft plan
- Share public surveys online and promote public meetings

The jurisdictional representatives also had an important role in updating this plan. Tasks they completed included but were not limited to the following.

- Meet with the consultant
- Complete the online survey about their capabilities
- Provide updated mitigation projects
- Determine the hazard(s) that most affects their community
- Received updates about the project from the Toledo Metropolitan Area Council of Governments (TMACOG).

The following table outlines how each jurisdiction participated in the update of this plan; because not all jurisdictional representatives were available to attend one or all of the meetings, there were five other ways they could participate.

1. Attended meeting(s)

2. Capabilities survey
3. NFIP survey
4. Provided projects
5. Emails / phone calls
6. Jurisdiction visited

JURISDICTIONAL PARTICIPATION				
Jurisdiction	*Representative(s)*	*Title / Department*	*Included*	*Description of Participation*
Lucas County	Pat Moomey Matt Krause	Director, LCEMA Operations Officer, LCEMA	Yes	LCEMA members hosted and participated in all planning meetings. LCEMA also ensured completion of the capabilities survey for the county jurisdiction. The LCEMA asked the county floodplain coordinator to complete the NFIP survey. The LCEMA reviewed, updated, and approved the updates to the county projects. The consultant conducted numerous phone calls and traded emails with EMA staff throughout the project.
Maumee	Bruce Wholf	Building & Zoning Inspector	Yes	Maumee's participation came from surveys and a visit by the consultant. The surveys provided insight as to the city's capabilities, as well as the types of mitigation projects it would support. The consultant visit also enabled the city's input on risks and the creation of two projects.
Oregon	Jim Gilmore	Commissioner	Yes	Oregon representatives attended one meeting, and provided projects when the consultant visited the city. The city also corresponded regularly via telephone and email with the consultant.
Sylvania	Danilynn Miller Kevin Aller	Admin. Sergeant Dir. Public Safety	Yes	Sylvania sent a representative to one of the planning meetings and completed both the capabilities and NFIP survey. The city also provided risk and project information to the consultant during a visit.
Toledo	Philip Cook Shelley Hoelzer-Spahn Beatrice Miringu Michelle Hughes-Tucker	Toledo Police Dept. City of Toledo Water Treatment Toledo Environmental Services Toledo Environmental Services	Yes	A Toledo representative participated in all planning meetings. Toledo completed the capabilities and NFIP surveys for its jurisdiction. Toledo representatives provided comments on risk data and new projects specific to the city. Finally, the consultant conducted phone calls and traded emails to share project-specific information with the city's representatives.
Waterville	Patrick Wambo James Badgonas	Fire Chief Administrator	Yes	Waterville's fire chief attended two meetings, and the consultant visited in-person with the city administrator. The city also participated through the two surveys issued as part of the project and via email and telephone interactions with the consultant.
Berkey	Jeff Noe	Councilmember	Yes	Though Berkey was not able to attend any meetings, the consultant visited Berkey and spoke with Council Member Noe. The primary focus of that conversation was the village's projects. The discussion yielded status updates for six projects and two new projects.

JURISDICTIONAL PARTICIPATION				
Jurisdiction	*Representative(s)*	*Title / Department*	*Included*	*Description of Participation*
Harbor View	N/A	N/A	No	The LCEMA invited Harbor View to participate in the process; however, the village did not participate. Should the village opt to participate at any point during the upcoming five-year window (i.e., the effective coverage period of this version of the plan), the LCEMA will support its inclusion through participation in annual review meetings, appending village-specific risk information to the hazard profiles and village-specific projects to Section 3.2, etc.
Holland	Robert Reed Leslie Ferman	Police Chief Admin. Asst.	Yes	Holland representatives attended planning meetings and responded to survey requests. The village also provided project data when meeting with the consultant in-person.
Ottawa Hills	John Wenzlick Marc Thompson	Police Chief Manager	Yes	Ottawa Hills' police chief attended two of the planning meetings, and the village manager provided information on risks and projects when the consultant visited in August 2018.
Swanton	Rosanna Hoelzle Michael Wolever	Administrator Fire Chief	Yes	Swanton could not attend planning meetings, but did provide information on the risks impacting the village and potential projects through participation in the capabilities and NFIP surveys. The village's administrator and fire chief also visited with the consultant when she visited in the summer of 2018.
Whitehouse	Josh Hartbarger	Fire Chief	Yes	The village's fire chief attended a planning meeting. Village representatives also provided responses to the capabilities and NFIP surveys and interacted regularly with the consultant via email and telephone. Finally, the village confirmed projects when the consultant visited in August.

In addition to the county, city, and village representatives, the majority of the townships in Lucas County participated in the process by completing the online capabilities survey. The committee had representation from Monclova Township.

1.1.3 Timeline

Lucas County contracted the services of JH Consulting, LLC of West Virginia at the beginning of March, 2018. The meetings with different stakeholders and planning committee members took place between March and November of 2018. The final draft of this plan was approved by the committee in January of 2019 and subsequently submitted to the Ohio Emergency Management Agency and the Federal Emergency Management Agency for their review and approval.

1.1.4 Previous Plan Updates

The creation of this plan occurred in 2004 and was updated once in 2013. The following outline the process by which Lucas County created and updated the plan.

2004

Preparation of the Lucas County 2004 Countywide All-Natural Hazard Mitigation Plan (CANHMP) was in response to the Federal Disaster Mitigation Act of 2000 (DMA2K), passed by congress, and the subsequently developed rules, published in the Federal Register Notice, Part III 44 CFR Parts 201 and 206 "Hazard Mitigation Planning and Hazard Mitigation Grant Program: Interim Final Rule" dated February 26, 2002.

The primary purpose of initiating the 2004 process in Lucas County was to identify the community policies, actions, and tools for implementation over the long term that will result in a reduction in risk and potential for future losses from natural hazards within Lucas County. This was systematically accomplished by learning about the natural hazards that could affect Lucas County, setting goals to reduce associated risks, identifying appropriate Action Items to achieve these goals, and ensuring success with a well-defined implementation strategy.

These activities included assessing community support to determine the geographic scope of the project, building the planning team (Core Group and Key Group), and engaging the public in the entire planning process.

One of the very first steps completed on the Lucas County 2004 CANHMP project was to assess the individual sources for community support for the project and the level of support that could be expected from these entities. This initial step helped Lucas County make decisions regarding which jurisdictions would be included and how large of a geographic scope the CANHMP would cover.

2013

A similar planning process was utilized during preparation of the 2013 plan revision. A series of seven Core Group meetings were held at LCEMA during preparation of the 2013 plan revision. These meetings were held almost on a monthly basis from November 2010 to August 2011. No meetings were held in December 2010, May 2011, or July 2011. All meetings were open to the public, and the individual members of the Core Group were encouraged to advertise the date, time, and location of the meetings in their community to ensure the general public also was provided an opportunity to participate.

As part of the 2013 plan revision, LCEMA again identified representatives from each of the four cities, six villages, and eleven townships within Lucas County, and sent formal participation request letters to these individuals. Additionally, adjacent counties, neighborhood groups, non-profit organizations, state, Federal and local government

representatives, businesses, development organizations, elected officials, and academic institutions were also identified and invited to participate in the planning process. For the 2013 plan revision, 18 of the 21 jurisdictions returned signed agreement forms, and thus participated in the planning process to develop this document. The jurisdictions that did not participate in the planning process include the unincorporated areas within the Townships of Jerusalem, Spencer, and Washington. In addition to the jurisdictional participants, representatives from the Lucas County Engineer's Office, Auditor's Office, the Toledo Metro Area Council of Governments, Toledo/Lucas County Soil and Water Conservation District, Lucas County LEPC, Ohio EMA Mitigation Branch, the Hospital Council of NW Ohio, The Toledo Red Cross, the USACE Buffalo District, and the University of Toledo signed participation agreements and were included in the planning process for the 2013 plan revision.

1.2 THE PLANNING AREA

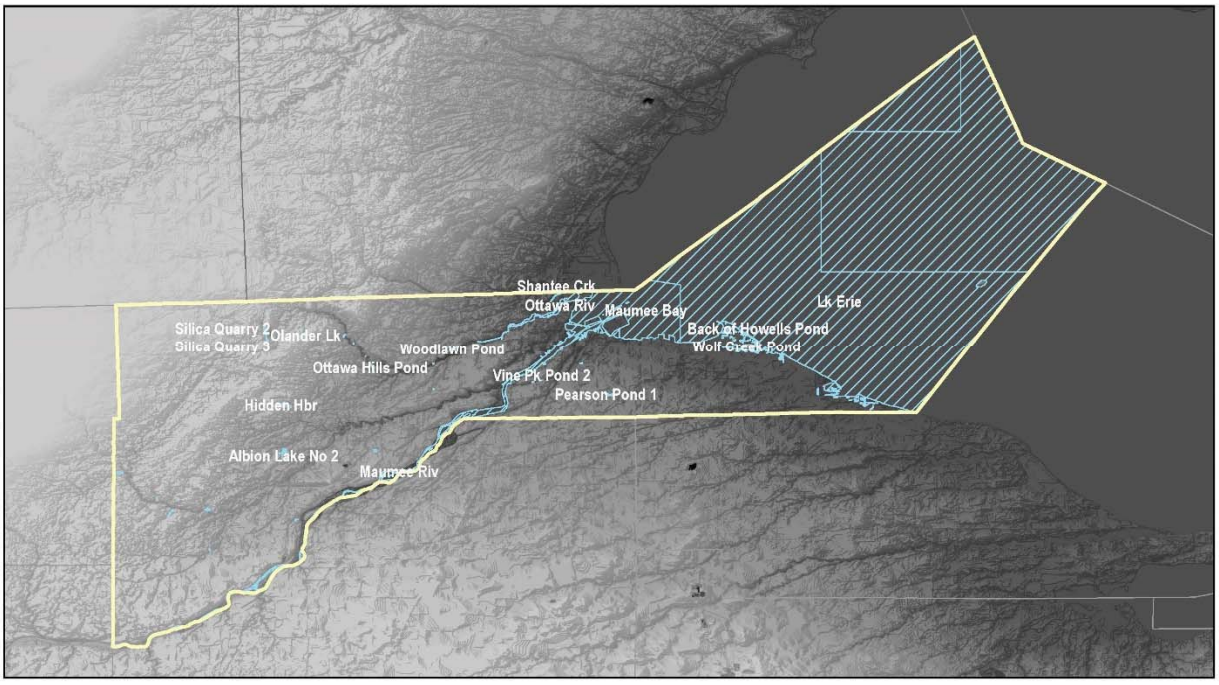
The geographical planning area for this plan includes the cities and villages, as well as the townships within the borders of Lucas County, Ohio. The following pages describe Lucas County's geography, climate, demographics, economy, education, health, transportation, utilities, media, tourism, and attractions in an effort to completely describe the characteristics of the county. The cities and villages within the county are briefly described and a list of disaster declarations affecting Lucas County is included.

1.2.1 Geography

Lucas County has just over 340 square miles of land. The County is located in northwest Ohio; it borders Michigan to the north, Lake Erie to the East, Ottawa and Wood Counties to the South, and Henry and Fulton Counties to the West.

Water is an important element in Lucas County; the Maumee River flows northeastward along the southern part of the county until it meets Lake Erie. Various smaller creeks or rivers meander through the county to meet up with the Maumee River such as Swan Creek and the Ottawa River.

The map below shows the topography of Lucas County (darker shades are lower elevations), Lake Erie and the rivers that run through the county. Lucas County is relatively flat but has slopes near rivers and streams.

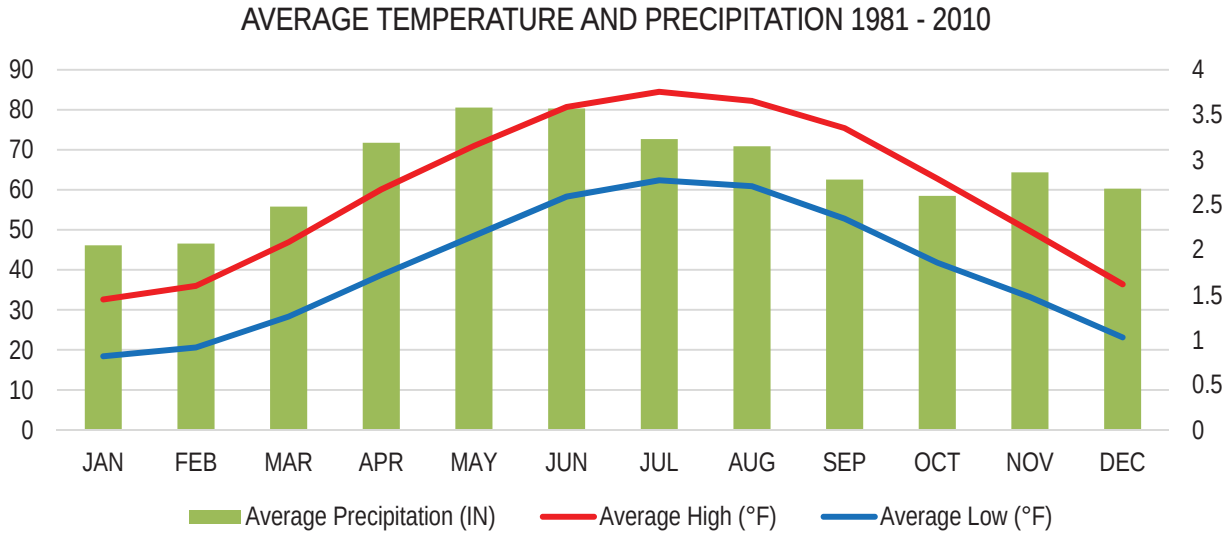


Relevance to Hazard Mitigation

The physical features of a region can have a positive or negative effect on the impact of hazards. For example, the presence of rivers, streams, and lakes can contribute to flooding when severe thunderstorms bring large quantities of rain; or the presence of vegetation in urban areas can reduce the heat island effect and keep the microclimate cooler during extreme heat.

1.2.2 Climate

According to the National Oceanic and Atmospheric Administration (NOAA), the average high and low temperatures in Lucas County, specifically at the Toledo Express Airport weather station range between 18.4°F at the coldest in January to 84.5°F at the hottest in July; this is based on the monthly average between 1981 and 2010. Precipitation fluctuates throughout the year but, on average, the total rainfall is approximately 34.2 inches. The following graph shows the average high and average low temperatures throughout the County from 1981 to 2010; the graph also illustrates the average precipitation per month for the same time period.



Relevance to Hazard Mitigation

Many of the hazards analyzed in this plan are natural hazards, meaning that the climate contributes to the hazard occurrences and intensity.

1.2.3 Demographics

The U.S. Census Bureau maintains data for the county, cities, and villages. The most recent data are estimates from July 1, 2017; when available, the most current data is provided. The most recent census was in 2010 and some of the information has not been updated since then. However, the most current data is presented for the county, all cities, and villages.

Not as much detailed data is available for the villages of Lucas County; however, some key elements are available. The available data is presented under every county and cities table; subsequent sections will follow the same layout – county and cities population, and then villages data.

In Lucas County, the majority of people live in the City of Toledo, which holds over half of the entire county's population. Three quarters of the population in the county is white, the other quarter is made up of a combination of black or African Americans, American Indians or Alaska Natives, Asians, Native Hawaiians, and Hispanic or Latinos. Of the total population, around 3.5% in the county are foreign-born. There are over 25 thousand veterans in Lucas County, more than half of them are in Toledo.

COUNTY AND CITIES POPULATION						
Fact	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*
Population estimates, July 1, 2017	430,887	13,787	19,973	18,941	276,491	5,492
Population, Census, April 1, 2010	441,815	14,286	20,291	18,965	287,208	5,523
Persons under 5 years	6.4%	6.1%	4.8%	4.9%	6.9%	5.5%
Persons under 18 years	23.1%	22.3%	22.1%	22.8%	23.3%	27.7%
Persons 65 years and over	15.8%	15.8%	17.4%	19.6%	13.4%	14.4%
Median age	37.9	41	42.8	42.8	35.3	39.5
Female persons	51.6%	50.7%	51.5%	52.2%	51.5%	52.1%
White alone	74.6%	93.6%	89.8%	93.2%	63.5%	93.7%
Black or African American alone	20.1%	2.8%	2.3%	1.6%	27.2%	1.2%
American Indian and Alaska Native alone	0.4%	0.1%	0.3%	0.1%	0.3%	0.2%
Asian alone	1.8%	1.9%	1.4%	2.7%	1.4%	3%
Native Hawaiian and Other Pacific Islander alone	0.1%	0.1%	0%	0%	0%	0%
Two or More Races	3.1%	1%	3.6%	2.1%	4.9%	1.8%
Hispanic or Latino	7.1%	3%	7.6%	2.4%	8.2%	2.7%
Veterans, 2012-2016	26,216	842	1,381	1,096	16,213	281
Foreign born persons, 2012-2016	3.5%	1.9%	2.6%	4.2%	3.4%	3%

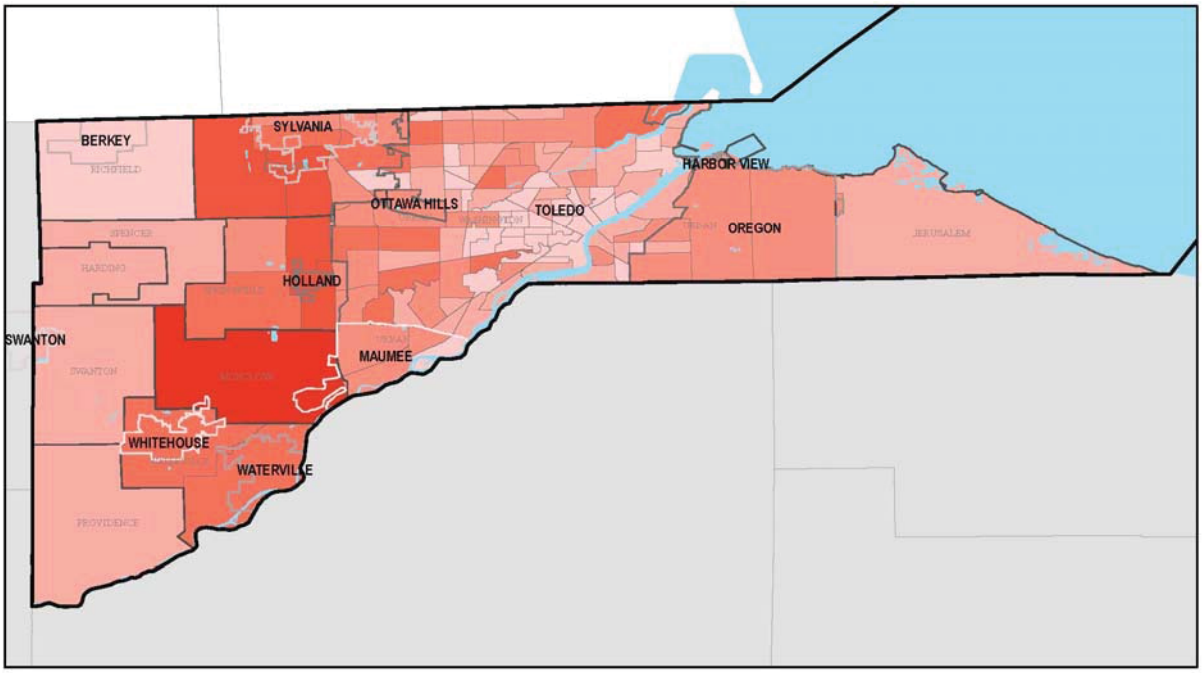
Source: U.S. Census Bureau

The smallest village in Lucas County is Harbor View, with 100 people, and the largest is Whitehouse. Swanton is the village with the youngest median age population while Harbor View is the oldest.

VILLAGES POPULATION						
Fact	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
Population Estimate, 2017	233	100	1,650	4,474	3,899	4,730
Median Age	44.8	57.1	44	42.3	36	39.7
Foreign-Born Population	5	0	85	387	38	0
White Alone	312	47	1,411	3,979	3,643	4,260
Black of African American Alone	0	0	101	92	44	60
American Indian and Alaska Native Alone	1	5	0	0	8	0
Asian Alone	0	0	115	300	0	0
Native Hawaiian and Other Pacific Islander Alone	0	0	0	0	0	0
Some Other Race Alone	0	0	11	6	60	22
Two or More Races	0	0	109	120	0	36
Hispanic or Latino	2	0	41	26	292	96
Veterans	14	5	113	165	249	334

Source: U.S. Census Bureau

The most densely populated city in Lucas County is Toledo, followed by Sylvania, Maumee, Waterville, and Oregon. The cities combined, make up only 38.6% of the land cover, but account for 77.6% of the total population in the county. The following map shows the population density from the US Census Bureau; the darker color indicates that there is a higher density. Although the Toledo area is the most densely populated, the divisions in the census' tract break down the actual locations of the population within the city.



COUNTY AND CITIES POPULATION DENSITY						
Fact	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*
Population (2017)	430,887	13,787	19,973	18,941	276,491	5,492
Land area in square miles, 2010	340.86	9.89	29.28	6.48	80.69	4.69
Population density (people per square mile)	1,264	1,394	682	2,923	3,426	1,171

Source: U.S. Census Bureau

Relevance to Hazard Mitigation

In hazard mitigation, the main goal is to reduce loss of life or injury as a result of a hazard; knowing the amount of people that need to be protected can influence the types of projects a jurisdiction or community should consider.

1.2.4 Economy

Cities are typically the center of diverse employment for people living all over the county and even for neighboring counties; Lucas County is no exception. According to the U.S. Census Bureau, there are over 22,000 firms in the cities of Lucas County, almost two thirds of the total firms in the county.

COUNTY AND CITIES ECONOMIC FACTORS						
Fact	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*
Business						
Total employer establishments, 2016	9,583	N/A	N/A	N/A	N/A	N/A
All firms, 2012	32,125	1,628	1,017	17,685	1,991	446
Men-owned firms, 2012	17,865	995	548	9,139	1,109	238
Women-owned firms, 2012	10,880	389	270	6,984	561	189
Minority-owned firms, 2012	5,648	54	50	4,539	82	F
Nonminority-owned firms, 2012	25,200	1,371	883	12,374	1,767	414
Veteran-owned firms, 2012	2,782	119	97	1,474	237	39
Employment						
Mean travel time to work (minutes), workers age 16 years+, 2012-2016	20.5	19.1	19.3	19.6	21.7	24.3
Median household income (in 2016 dollars), 2012-2016	$42,917	$63,043	$55,157	$34,548	$72,936	$79,293
Per capita income in past 12 months (in 2016 dollars), 2012-2016	$25,977	$33,612	$28,254	$20,317	$37,235	$30,951
Persons in poverty, percent	19.8%	7.9%	10.7%	27.5%	7.7%	4.3%
Housing						
Median value of owner-occupied housing units, 2012-2016	$105,500	$128,900	$130,200	$77,800	$165,900	$175,500
Median gross rent, 2012-2016	$674	$767	$620	$651	$785	$1,041
Households, 2012-2016	178,477	5,817	8,136	118,451	7,613	1,899
Persons per household, 2012-2016	2.38	2.41	2.44	2.31	2.43	2.83

Source: U.S. Census Bureau

VILLAGES ECONOMIC FACTORS						
Fact	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
Employment						
Median Household Income	$69,583	$42,188	$46,950	$118,700	$52,452	$76,133
Individuals Below Poverty Level	6.1%	17.3%	6.7%	2.4%	10.5%	7.8%
Housing						
Total housing units	143	32	712	1,794	1,448	1,647

Source: U.S. Census Bureau

Employment affects income and poverty levels and can translate to a way of living and quality of life. Although the amounts vary from one city or village to another, on average in Lucas County, the median income for a household is close to $43,000. However, there is a 19.8% poverty rate in the county overall.

Lucas County has a variety of employment opportunities. The table to the right outlines the companies that are among the top ten employers in the county.

TOP TEN EMPLOYERS IN LUCAS COUNTY			
Employer	*Type*	*Location*	*Employees (2011)*
ProMedica Health Care	Medical facilities	Toledo	10,174
Mercy Health Partners	Hospitals	Toledo	6,185
University of Toledo	Education	Toledo	4,691
U.T. Health Science	Hospital	Toledo	3,750
Lucas County	Government	Toledo	3,700
Toledo Public Schools	Education	Toledo	3,193
City of Toledo	Government	Toledo	2,700
The Andersons	Grain storage, retail	Maumee	1,793
United Parcel Service	Mail service	Maumee	1,681
General Motors	Automotive manufacturing	Toledo	1,635

Sources: ToledoRegion.com and LocalWiki

Kroger, Inc., Wal-Mart, and Meijer, Inc., are also large retail grocery employers in the area. In addition, there are other large employers in the area that provide employment to the people living in Lucas County. Some examples include Bowling Green State University, Sauder headquarters, Owens Community College, First Solar, LLC, Norplas, Inc., and Owens-Corning headquarters.

Relevance to Hazard Mitigation

The economy of a community can play a big part in the preparedness for and recovery from disasters. As mentioned previously, the primary goal of hazard mitigation is to reduce loss of life and injury; however, this indicates that people are the most important element to protect and therefore people's livelihoods. Their livelihoods will greatly depend on their place of employment's resiliency and ability to continue after a disaster.

1.2.5 Education

Culture and education can play an important role in the overall health and wellbeing of any given location. In Lucas County, the overall percentage of people who have a high school degree or higher is just about 89%. In the cities and villages of the county, there is typically a higher rate of graduation as seen in the following tables.

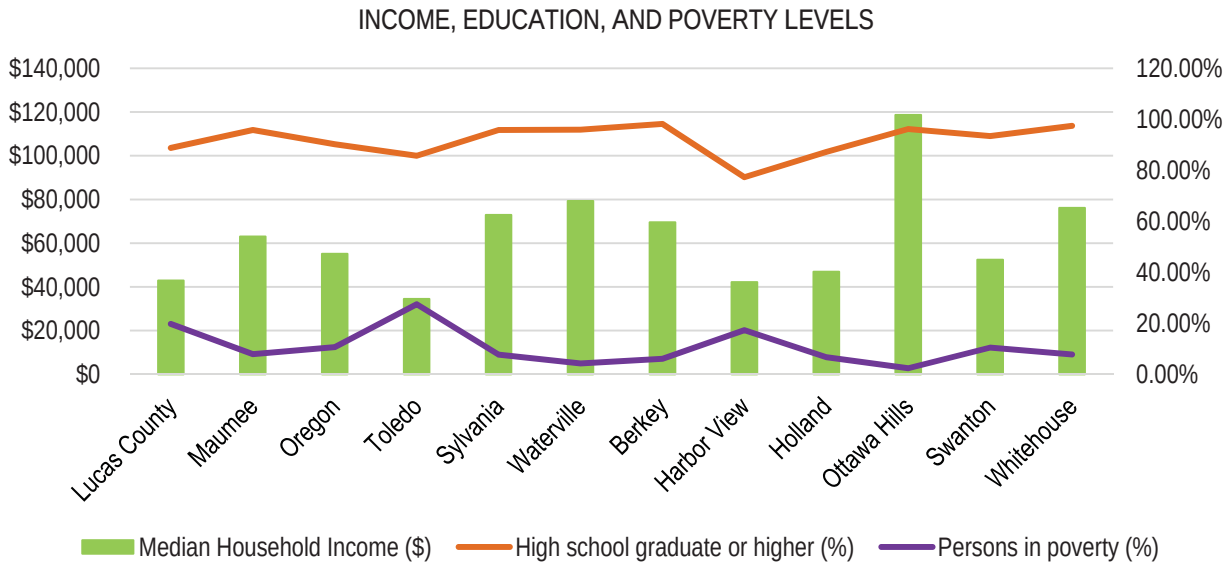
COUNTY AND CITIES EDUCATION						
Fact	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*
Language other than English spoken at home, percent of persons age 5 years+, 2012-2016	6.4%	4.1%	4.6%	6.9%	5%	4.7%
High school graduate or higher, percent of persons age 25 years+, 2012-2016	88.8%	95.8%	90.2%	85.7%	95.8%	95.9%
Bachelor's degree or higher, percent of persons age 25 years+, 2012-2016	25.1%	37.1%	18.3%	18%	43.1%	40.8%

Source: U.S. Census Bureau

VILLAGES EDUCATION						
Fact	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
Educational attainment: High School Graduate or Higher	98.20%	77.30%	87.20%	96.20%	93.40%	97.40%

Source: U.S. Census Bureau

It is no surprise, then, to see that education and income are directly tied to poverty levels. As the graph below shows, the median household income closely reflects the level of education of the people. The inverse is true for graduation rates and poverty; data suggests that these two factors are closely related. In essence, the higher the graduation rate, the higher the income levels, and the lower the poverty rate.



Relevance to Hazard Mitigation

The education of a population does not necessarily only mean schooling. As shown above, there are people who speak other languages, which can hinder their ability to understand dangerous hazard situations. In addition, lack of education can contribute to the vulnerability of a community: people who are uneducated, will tend to have lower income, and lower income will translate to less ability to prepare for, evacuate from, or recover from a hazard event or incident.

1.2.6 Health

The U.S. Census Bureau provides a glimpse of the health of the population within Lucas County and its cities. The following table outlines the percentages of Lucas County residents living with a disability who are under 65m and the percentage of people living without health insurance under 65.

HEALTH IN LUCAS COUNTY						
Fact	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*
With a disability, under age 65 years, percent, 2012-2016	11.7%	8%	7.5%	13.9%	5.8%	3.4%
Persons without health insurance, under age 65 years	6.6%	5.5%	7.6%	11.9%	4.5%	4.8%

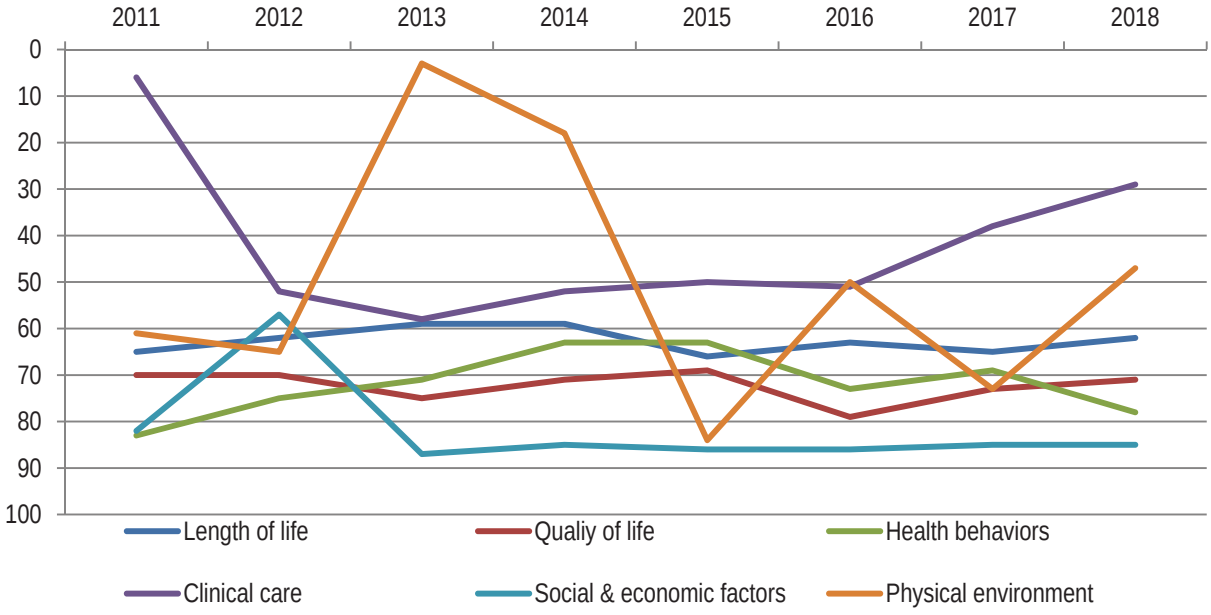
Source: U.S. Census Bureau

County Health Rankings is a program funded by the Robert Wood Johnson Foundation in collaboration with the University of Wisconsin Population Health Institute. These organizations observe and record a variety of factors or indicators of health in each county. Data is presented by state; for example, there are 88 counties in the State of Ohio, which means that each county in Ohio is ranked from 1 to 88, 1 being the best.

- **Length of Life**: The length of life indicator includes premature deaths.
- **Quality of Life**: Quality of life includes poor or fair health, poor physical health days, poor mental health days, and low birth rate.
- **Health Behaviors**: Health behavior indicators include smoking, adult obesity, food environment index, physical inactivity, access to exercise opportunities, excessive drinking, alcohol impaired driving deaths, sexually transmitted infections, and teen births.

- **Clinical Care**: The clinical care indicators include uninsured people, available primary care physicians, dentists, and mental health providers, and preventable hospital stays.
- **Social and Economic Factors**: Social and economic factors include high school graduation, college graduation, unemployment, children in poverty, income inequality, children in single-parent households, social associations, violent crime, and injury deaths.
- **Physical Environment**: The physical environment considers air pollution, drinking water violations, severe housing problems, and driving alone to work.

The following graph illustrates the data from the indicators described above from 2011 to 2018 for Lucas County.



Relevance to Hazard Mitigation

In Lucas County the two indicators with most variants include the physical environment and clinical care. The most notable change is the physical environment between 2013 and 2015, which suggests that something happened to cause the decline. Coincidentally, in 2014 there was a water ban in Toledo due to tests that revealed toxins in the water supply that came from Harmful Algal Bloom in Lake Erie.

1.2.7 Transportation

For the overall size of the county, Lucas County is well connected via land, water, and rail. Though vast networks of interstates, federal and state highways, country roads, rail, airports and water ports, commerce can develop and people can move.

The following is a brief description of the major highway network in Lucas County.

- **I-75** travels from Wood County to the south of Lucas, and turns north to enter Lucas County, crossing the Maumee River to Toledo before continuing northeastward into Michigan near Lake Erie. The total amount of miles I-75 has in Lucas County is 11.2 miles.

- **I-80 / I-90 / Ohio Turnpike** crosses Lucas County from east to west in the middle of the county. Within county borders, it crosses I-475 northwest of Maumee. The total amount of miles I-80/I-90/Ohio Turnpike has in Lucas County is 14.4 miles.

- **I-475** traverses the county from north to south just west of Maumee in the southern part of the county and east of Ottawa Hills in the north. The total amount of miles I-475 has in Lucas County is 16.3 miles.

- **I-280** connects I-80/I-90/Ohio Turnpike in Wood County to I-75 in Lucas County northeast of Toledo. The total amount of miles I-280 has in Lucas County is 2 miles.

- **US-20 / US-20A / US-23 / US-24 / US-223** are the US routes that come through Lucas County. US-20 is a four-lane highway that goes north from Maumee and turns directly west near Ottawa Hills. US-20A is an alternate to US-20 that goes parallel to US-20 and heads westward from Maumee. US-23 is the northward continuation of I-475 that turns into US-223 that goes into Michigan. US-24 roughly follows the southern part of the county border toward Toledo and turns north toward Michigan.

- **OH-2 / OH-51 / OH-25 / OH-64 / OH-65 / OH-120 / OH-184 / OH-246 / OH-295** are the main state routes that interconnect the county.

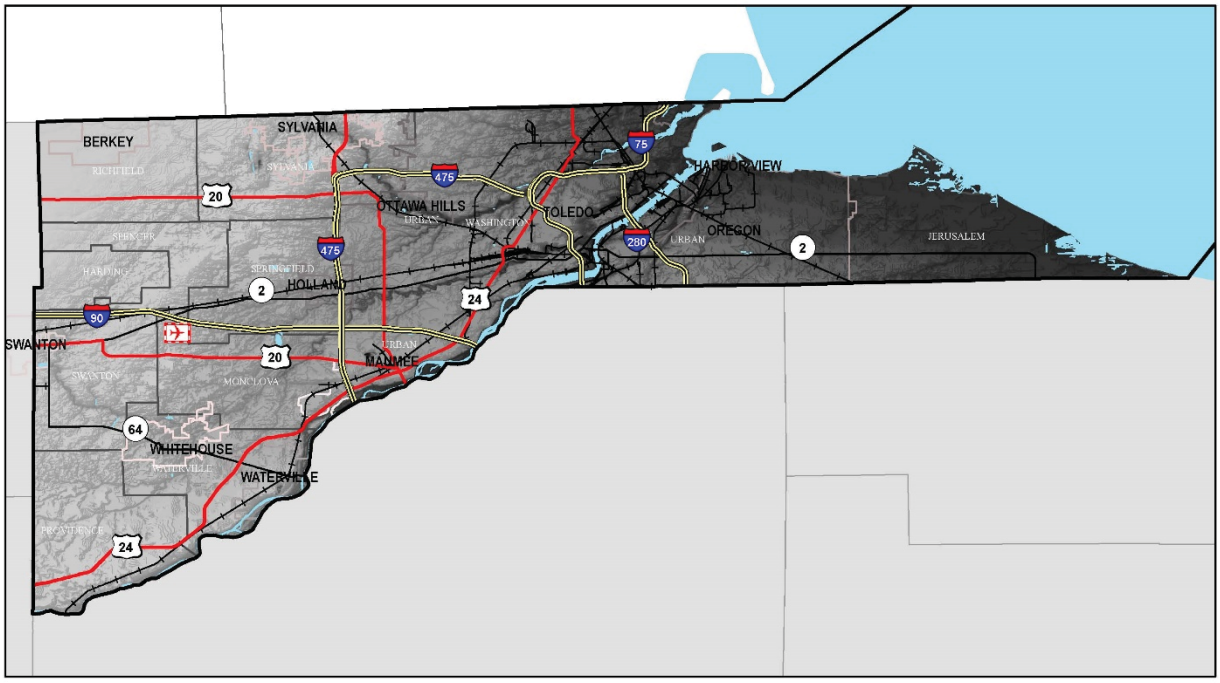
The interconnectedness continues with the rail system. There are several companies that maintain railroads and come into, go out of, or cross Lucas County. The railroad operators include CSX, Norfolk Southern, Ann Arbor Railroad, Temperance Yard Corporation, Canadian National, and Wheeling and Lake Erie. Lucas County is critical to rail

infrastructure in the state and in the US; Toledo has one of the 11 intermodal terminals in the state. The Toledo intermodal terminal is strategically positioned to serve Canadian imports and exports, water ports, and highways, and connect the entire country.

The Toledo Express Airport serves Lucas County with two airlines and direct flights to several destinations. It is located outside Toledo, just east of Swanton. In addition, there are several private airports and heliports in and around the county.

Toledo has a maritime cargo port and shipyard from and to where goods can be transported. Along the Maumee River, there are several locations where ships can get repaired, pick up grain, goal, cement, petroleum and other goods.

Public Transportation is one of Lucas County's assets. The Toledo Area Regional Transit Authority (TARTA) offers bus routes and a variety of shuttles. The services reach Toledo, Sylvania, Waterville, Maumee, Ottawa Hills, Oregon, and several other unincorporated areas of the vicinity through over 40 bus routes. However, the western and easternmost parts of the county are not served through TARTA.



Relevance to Hazard Mitigation

Available public transportation for low income residents can reduce their chances of not being able to evacuate during an emergency. The vast networks of highways and rail infrastructure helps move goods and services through the county. During and after emergencies, these networks become critical to moving necessary resources to critical facilities and moving people.

1.2.8 Utilities

The Public Utilities Commission (PUCO) of Ohio provides information on their website about the utilities available in each county in Ohio.

Natural gas distributers in Lucas County include Columbia Gas of Ohio, Inc., Waterville Gas and Oil Company, Suburban Natural Gas Company, and the Ohio Gas Company.

Electric companies include Toledo Edison, which provides power to the majority of the county and Tricounty Rural Electric that provides power to a small portion of the southwestern most part of the county.

Phone companies that provide service in Lucas County include UTO (CenturyLink), Frontier North, and AT&T Ohio.

The City of Toledo water provides drinking water for all the jurisdictions, except City of Waterville who get water from Bowling Green.

Relevance to Hazard Mitigation

Utility companies and their resources are essential to the recovery from a disaster. However, they are also crucial to the mitigation of potential hazards; by properly maintaining the infrastructure, they are reducing the negative effects that could arise from certain hazards.

1.2.9 Media

Lucas County is served by a variety of media outlets, primarily radio stations and television stations. The following table outlines the radio stations, newspapers and television stations that are within the county; there are more stations originating from outside the county that reach Lucas County.

MEDIA IN LUCAS COUNTY				
Radio Stations			*Newspaper*	*Television Stations*
88.3 FM - WXTS	96.9 FM - WNKL	104.7 FM - WIOT	Toledo Blade	Channel 11 WTOL - CBS
88.3 FM - WXUT	98.3 FM - WMIM	105.5 FM – WQQO		Channel 13 WTVG - ABC
89.3 FM - WYSZ	99.9 FM - WKKO	106.5 FM - WTOD, CBS		Channel 21 WNWO - NBC
91.3 FM - WGTE, NPR	100.7 FM – W264AK	107.3 FM - WJUC		Channel 30 WGTE - PBS
92.5 FM – WVKS	101.5 FM - WRVF	1230 AM - WCWA		Channel 36 WUPW - FOX
94.5 FM - WXKR	102.3 FM - WPOS	1370 AM - WSPD		Channel 40 WLMB - Religious
93.5 FM – WRQN	103.7 FM – WCKY	1560 AM - WWYC		Channel 48 WNGT-LP - MyTV
95.7 FM - WIMX	104.1 FM - W281AL	1610 AM - WNMJ728		

Relevance to Hazard Mitigation

A good relationship between the media and the community is essential; partnerships that are nurtured regularly will improve communications before, during, and after disasters. The media is one of the largest hazard notification and warning mechanisms for residents to receive accurate, up-to-date information on what they can expect, what they should do, and learn about the available resources.

1.2.10 Tourism and Attractions

The Toledo area in Lucas County attracts people from within the county, other counties and states; this is due to the variety of tourism attractions in the region. The following table lists some of the art, sports, nature, and entertainment attractions.

ATTRACTIONS IN LUCAS COUNTY			
Art	*Sports*	*Nature*	*Entertainment*
• Toledo Museum of Art • Valentine Theatre • Toledo Symphony Orchestra • Toledo Opera • The Huntington Center (Lucas County Arena) • Theater League • Owens Center for Fine and Performing • Arts • Toledo Repertoire Theatre	• Fifth Third Field • University of Toledo Athletics • Toledo Walleye Hockey	• Toledo Zoo • Toledo Area Metroparks • Kellys Island • Toledo Botanical Garden • Historic Woodlawn Cemetery • Owens Corning Nature Walk	• Cedar Point Amusement Park • Sauder Village • The Docks • Erie Street Market • St. Clair Village Shops • Imagination Station Toledo • Garden Smiles by Carruth Studio • Toledo Lucas County Public Libraries • SS Col. James M. Schoonmaker Museum Ship

Source: Toledo.com

Relevance to Hazard Mitigation

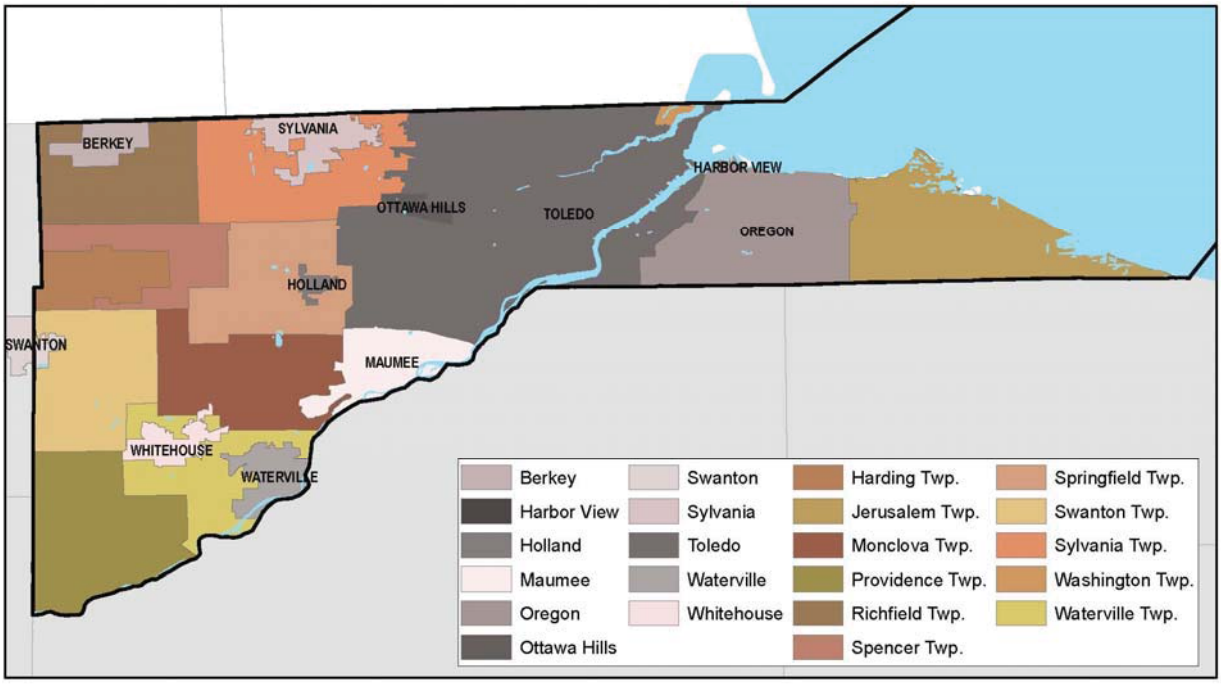
In hazard mitigation, it is important to consider the population of an area, as mentioned previously. However, it is also important to know how much the population can increase during certain scheduled events and times of year. This population may not be included in the demographics of the county, but needs to be considered for planning.

1.2.11 Jurisdictions

There are five cities, six villages, and 11 townships that make up the jurisdictions of Lucas County, each one unique.

CITIES, VILLAGES, AND TOWNSHIPS OF LUCAS COUNTY			
Cities	*Villages*	*Townships*	
Maumee	Berkey	Harding	Springfield
Oregon	Harbor View*	Jerusalem	Swanton
Sylvania	Holland	Monclova	Sylvania
Toledo	Ottawa Hills	Providence	Washington
Waterville	Swanton	Richfield	Waterville
	Whitehouse	Spencer	

** The Village of Harbor View elected not to participate in the update of this plan.*



1.2.12 Asset Inventory

Community assets are what makes Lucas County unique; the people, natural and built environment, and economic assets are crucial to the wellbeing of the county prior to an emergency and well after a disaster. Protecting these types of assets is vital to the resilience of Lucas County. The following table describes these types of assets in more detail.

Some of the categories of assets mentioned in the next table have already been addressed, such as the economic assets and people in sections 1.2.3, 1.2.4, and 1.2.10. The assets are economic – by employing a large part of the population – and part of the built environment – by having physical facilities where the employees work – at the same time.

The following tables outline the assets in Lucas County. These are taken from the Lucas County GIS and Assessor's office information provided in GIS shapefiles.

ASSET LIST CATEGORIES		
Type	Examples	
People	• Concentrations of residents and employees • Visiting populations • Access and functional needs populations • Locations that provide health or social services critical to disaster recovery	
Economy	Major employers, primary economic sectors, and commercial centers whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.	
Built Environment	Infrastructure	Systems that are critical for life safety and economic viability. • Transportation • Power • Communication • Water and wastewater systems.
	Critical Facilities	Structures and institutions necessary for a community's response to and recovery from emergencies. • Hospitals and medical facilities • Police and fire stations • Emergency operations centers • Evacuation shelters • Schools • Airport/heliport
	High Potential Loss Facilities	• Nuclear power plants • Dams • Military and civil defense installations • Locations housing hazardous materials
	Cultural Resources	Cultural or historic assets that are unique or irreplaceable. • Museums • Geological sites • Concert halls • Parks • Stadiums
Natural Environment	Most valuable areas that can provide protective functions that reduce the magnitude of hazard events. Critical habitat areas and other environmental features that are important to protect.	

People Assets

People are the most valuable assets in Lucas County; all mitigation actions should strive to protect and reduce or eliminate harm to the population above all else. Some people need additional protections and are considered vulnerable populations. Vulnerable populations are typically the elderly, the ill, and the young children. For additional information on vulnerable populations see Section 2.2.2 Considering Vulnerability. The following table identifies where there are clusters of elderly and young populations in Lucas County – nursing homes or assisted living facilities, and day care centers.

The facility types in this section include the following.

- Nursing homes and assisted living
- Preschool and daycare

PEOPLE ASSETS		
Name	*Facility Type*	*City*
A Wyse Care	Nursing Home/Assisted Living	Toledo
Addison Heights / Swan Pointe Care Center	Nursing Home/Assisted Living	Maumee
Ahepa 118 Apartments	Nursing Home/Assisted Living	Toledo
Alan B ACF	Nursing Home/Assisted Living	Toledo
Alexis Gardens	Nursing Home/Assisted Living	Toledo
Alpine House of Toledo / Golden Haven Nursing and Rehab	Nursing Home/Assisted Living	Toledo
Althea Adult Care, Inc	Nursing Home/Assisted Living	Toledo
Ann Grady Center	Nursing Home/Assisted Living	Holland
Arbors at Oregon Nursing and Rehab	Nursing Home/Assisted Living	Oregon
Arbors at Sylvania	Nursing Home/Assisted Living	Toledo
Arbors at Toledo	Nursing Home/Assisted Living	Toledo
Arbors at Waterville	Nursing Home/Assisted Living	Waterville
Arlington By the Lake	Nursing Home/Assisted Living	Toledo
Ashland Manor	Nursing Home/Assisted Living	Toledo
Ashley's Manor Residential	Nursing Home/Assisted Living	Toledo
B B G Adult Family Home	Nursing Home/Assisted Living	Toledo
Barbara Jean McDonagh Home	Nursing Home/Assisted Living	Toledo
Bittersweet Farms	Nursing Home/Assisted Living	Whitehouse
Brandy's Family Home	Nursing Home/Assisted Living	Toledo
Briggs Home, L.L.C.	Nursing Home/Assisted Living	Toledo
Browning Masonic Community	Nursing Home/Assisted Living	Waterville
C T Quality Care	Nursing Home/Assisted Living	Toledo
Central Family Home	Nursing Home/Assisted Living	Toledo
Chell's Gardens Assist. Living	Nursing Home/Assisted Living	Toledo
Childcare Adventures Early Learning Center	Preschool / Daycare	Toledo
Christie's Homes	Nursing Home/Assisted Living	Toledo
Clark Family Home	Nursing Home/Assisted Living	Toledo
Community Care at Waterford	Nursing Home/Assisted Living	Toledo
Concord Care Center of Toledo	Nursing Home/Assisted Living	Toledo
Country Brook Assisted Living	Nursing Home/Assisted Living	Toledo
Covenant House	Nursing Home/Assisted Living	Toledo
Creek Side / Lutheran Homes Society	Nursing Home/Assisted Living	Holland
Crossgates Preschool	Preschool / Daycare	Toledo
Damas Care L.L.C.	Nursing Home/Assisted Living	Toledo
Darlington House and Rehab Center	Nursing Home/Assisted Living	Toledo
Delores Place Assist. Living 2	Nursing Home/Assisted Living	Toledo
Delores Place Assist. Living 3	Nursing Home/Assisted Living	Toledo
Delores Place Assisted Living	Nursing Home/Assisted Living	Toledo
Derco #2 Adult Family Home	Nursing Home/Assisted Living	Toledo
Derco Adult Family Home	Nursing Home/Assisted Living	Toledo
Dorr Community Residence	Nursing Home/Assisted Living	Holland
Eber Community Residence	Nursing Home/Assisted Living	Holland
Edgewood Nursing Home	Nursing Home/Assisted Living	Toledo
Eileen Community Residence	Nursing Home/Assisted Living	Toledo
Elizabeth Scott Community / Care Center	Nursing Home/Assisted Living	Maumee
Elsie Bohannon ACF	Nursing Home/Assisted Living	Toledo
Elsie Bohannon ACF II	Nursing Home/Assisted Living	Toledo
Everwood Community Residence	Nursing Home/Assisted Living	Toledo
Fairview Skilled Nursing and Rehab Center	Nursing Home/Assisted Living	Toledo

PEOPLE ASSETS		
Name	*Facility Type*	*City*
Family Outreach	Nursing Home/Assisted Living	Toledo
Foundation Park	Nursing Home/Assisted Living	Toledo
Franciscan Care Center	Nursing Home/Assisted Living	Toledo
Franciscan Services Corp / Rosary Care Center	Nursing Home/Assisted Living	Sylvania
Genesis Health Care	Nursing Home/Assisted Living	Sylvania
Glendale Assisted Living	Nursing Home/Assisted Living	Toledo
Glenn Adult Foster Care	Nursing Home/Assisted Living	Toledo
Hadley Home	Nursing Home/Assisted Living	Toledo
Harborside of Sylvania Nursing Home / Sunbridge Healthcare	Nursing Home/Assisted Living	Sylvania
Harris Adult Care Facility	Nursing Home/Assisted Living	Toledo
Hazel's Group Home	Nursing Home/Assisted Living	Toledo
Hcr Manorcare Inc	Nursing Home/Assisted Living	Toledo
Heartland Nursing Facility at Holly Glen	Nursing Home/Assisted Living	Toledo
Heartland of Oregon	Nursing Home/Assisted Living	Oregon
Heartland of Waterville	Nursing Home/Assisted Living	Waterville
Heartland-Oregon	Nursing Home/Assisted Living	Oregon
Heather Downs Rehab	Nursing Home/Assisted Living	Toledo
Henderson House	Nursing Home/Assisted Living	Toledo
High Point Commons Retirement	Nursing Home/Assisted Living	Whitehouse
Hospice of Northwest Ohio	Nursing Home/Assisted Living	Toledo
I Care Family Home	Nursing Home/Assisted Living	Toledo
Jean Scott Furney Home	Nursing Home/Assisted Living	Toledo
John & Sherwin Harris Homes	Nursing Home/Assisted Living	Toledo
Josina Lott Residential	Nursing Home/Assisted Living	Toledo
Joy's Adult Care Home	Nursing Home/Assisted Living	Toledo
Joy's Too Adult Care Home	Nursing Home/Assisted Living	Toledo
King's Resident Facilities	Nursing Home/Assisted Living	Toledo
King's Resident Facilities #2	Nursing Home/Assisted Living	Toledo
King's Towers	Nursing Home/Assisted Living	Toledo
Kingston Care Center / Residence Sylvania	Nursing Home/Assisted Living	Sylvania
Kingston Healthcare Company	Nursing Home/Assisted Living	Toledo
Lake Park Skilled Nursing	Nursing Home/Assisted Living	Sylvania
Lane Park	Nursing Home/Assisted Living	Oregon
Liberty Nursing Center of Toledo	Nursing Home/Assisted Living	Toledo
Liberty Nursing Centers / Pristine Senior Living / Sunbridge Care and Rehab-West	Nursing Home/Assisted Living	Toledo
Little Sisters of The Poor / Sacred Heart Home	Nursing Home/Assisted Living	Oregon
Live Love Laugh Companion Care	Nursing Home/Assisted Living	Toledo
Luther Crest / Luther Woods Apartments	Nursing Home/Assisted Living	Toledo
Luther Grove	Nursing Home/Assisted Living	Toledo
Luther Hills Apartments	Nursing Home/Assisted Living	Oregon
Luther Ridge Apartments	Nursing Home/Assisted Living	Oregon
Lutheran Home Assisted Living	Nursing Home/Assisted Living	Toledo
Lutheran Housing Services	Nursing Home/Assisted Living	Toledo
Lutheran Village at Wolf Creek	Nursing Home/Assisted Living	Holland
Lutheran Village of Wolf Creek	Nursing Home/Assisted Living	Toledo
Luxury Care Homes	Nursing Home/Assisted Living	Toledo
Mack Adult Care Family Home	Nursing Home/Assisted Living	Toledo
Madonna Homes	Nursing Home/Assisted Living	Toledo
Marksch Group Home	Nursing Home/Assisted Living	Holland

PEOPLE ASSETS		
Name	*Facility Type*	*City*
Marria's 2 Adult Family Home	Nursing Home/Assisted Living	Toledo
Marria's Adult Family Home	Nursing Home/Assisted Living	Toledo
Mayfair Preschool	Preschool / Daycare	Toledo
McTigue Home	Nursing Home/Assisted Living	Toledo
Merit House Senior Community	Nursing Home/Assisted Living	Toledo
Michael Mes Manor	Nursing Home/Assisted Living	Toledo
Moretha's A C F	Nursing Home/Assisted Living	Toledo
Moretha's Acf #2	Nursing Home/Assisted Living	Toledo
Morgan Adult Care, Inc	Nursing Home/Assisted Living	Toledo
Morris Family Home #2	Nursing Home/Assisted Living	Toledo
Morris Group Home	Nursing Home/Assisted Living	Toledo
Morrison Adult Care Facility	Nursing Home/Assisted Living	Toledo
New Beginning Res. Care	Nursing Home/Assisted Living	Toledo
Northwest Ohio Development Ctr	Nursing Home/Assisted Living	Toledo
Oakleaf Village	Nursing Home/Assisted Living	Toledo
Oblate Residences	Nursing Home/Assisted Living	Toledo
Oras Residential Facility	Nursing Home/Assisted Living	Toledo
Orchard Villa	Nursing Home/Assisted Living	Oregon
Overton Adult Family Living	Nursing Home/Assisted Living	Toledo
Park Lane Luxury Apartments	Nursing Home/Assisted Living	Toledo
Parkcliffe Alzheimer's	Nursing Home/Assisted Living	Toledo
Pelham Manor	Nursing Home/Assisted Living	Toledo
Phenix Adult Family Home	Nursing Home/Assisted Living	Toledo
Phenix Adult Family Home 2	Nursing Home/Assisted Living	Toledo
Point Place Care & Rehab	Nursing Home/Assisted Living	Toledo
Preston Homes	Nursing Home/Assisted Living	Toledo
Promedica Goerlich Center / Nursing Home / Crewtview Club Apartments	Nursing Home/Assisted Living	Sylvania
Quality Community Living	Nursing Home/Assisted Living	Toledo
Quality Community Living #2	Nursing Home/Assisted Living	Toledo
Quality Community Living #3	Nursing Home/Assisted Living	Toledo
Regency Health Care	Nursing Home/Assisted Living	Sylvania
Renaissance Senior Apartment	Nursing Home/Assisted Living	Toledo
Richards Community Residence	Nursing Home/Assisted Living	Toledo
Ridgewood Manor	Nursing Home/Assisted Living	Maumee
Robin McCant Care Homes	Nursing Home/Assisted Living	Toledo
Senior Star at West Park Place	Nursing Home/Assisted Living	Toledo
Serenity Gardens of Sylvania	Nursing Home/Assisted Living	Sylvania
Shining Star Adult Care Center	Nursing Home/Assisted Living	Toledo
Spring Meadows Community	Nursing Home/Assisted Living	Holland
Staples Adult Care	Nursing Home/Assisted Living	Toledo
Staples Adult Care Ii	Nursing Home/Assisted Living	Toledo
Stateline Group Home	Nursing Home/Assisted Living	Toledo
Sunrise Centergroup Home	Nursing Home/Assisted Living	Toledo
Sunset House / The Woodlands	Nursing Home/Assisted Living	Ottawa Hills
Sunset Village	Nursing Home/Assisted Living	Sylvania
Sunshine Inc of North West Oh	Nursing Home/Assisted Living	Maumee
Sunshine Inc of Northwest Ohio / Garden Family Home	Nursing Home/Assisted Living	Maumee
Sunshine/Bancroft Family Home	Nursing Home/Assisted Living	Toledo
Sunshine/King Road Family Home	Nursing Home/Assisted Living	Toledo

PEOPLE ASSETS		
Name	*Facility Type*	*City*
Sunshine/Kit Family Care Home	Nursing Home/Assisted Living	Maumee
Sunshine/Ragan Woods Care	Nursing Home/Assisted Living	Toledo
Sunshine/Strayer Family Care	Nursing Home/Assisted Living	Maumee
Sunshine/Vanderbilt Family	Nursing Home/Assisted Living	Toledo
Swan Cove Retirement Apartments	Nursing Home/Assisted Living	Toledo
Swan Creek Retirement Village	Nursing Home/Assisted Living	Toledo
Sylvania Children's Center	Preschool / Daycare	Toledo
Talbot Center	Nursing Home/Assisted Living	Toledo
Tender Care Group Home	Nursing Home/Assisted Living	Toledo
The Lakewoods Senior Apartments	Nursing Home/Assisted Living	Toledo
The Laurels of Toledo	Nursing Home/Assisted Living	Toledo
Theresa Foster-Johnson, Inc	Nursing Home/Assisted Living	Toledo
Toddler Tech Child Care and Kindergarten	Preschool / Daycare	Toledo
Toledo Day Nursery (4 Locations)	Preschool / Daycare	Toledo
Tree House Adult Family Home	Nursing Home/Assisted Living	Toledo
Ursuline Convent	Nursing Home/Assisted Living	Toledo
Vicki's Home Care	Nursing Home/Assisted Living	Toledo
Victorian Manor 2 Inc	Nursing Home/Assisted Living	Toledo
Victorian Manor 3, Inc	Nursing Home/Assisted Living	Toledo
Village Meadows 50 Club	Nursing Home/Assisted Living	Holland
West Gate Residential Suites	Nursing Home/Assisted Living	Toledo
Westmoor Retirement Living Ctr	Nursing Home/Assisted Living	Toledo
Whitehouse Country Manor	Nursing Home/Assisted Living	Whitehouse
Wellie's Adult Family Home	Nursing Home/Assisted Living	Toledo
Wotring Home	Nursing Home/Assisted Living	Toledo
Zeigler Collingwood Home	Nursing Home/Assisted Living	Toledo
Zion Christian Preschool	Preschool / Daycare	Waterville

Built Environment Assets – Infrastructure

Infrastructure is "the system of public works of a country, state, or region"; it can also refer to resources such as personnel, buildings, or equipment required for an activity. It is the underlying foundation or basic framework of a system or organization. "Infra- means "below;" so the infrastructure is the "underlying structure" of a country and its economy, the fixed installations that it needs in order to function. These include roads, bridges, dams, the water and sewer systems, railways and subways, airports, and harbors" (Merriam-Webster, n.d.).

FEMA has several categories of assets that they recognize: banking and finance, chemical, commercial facilities, communications, critical manufacturing, dams, defense industrial base, emergency services, energy, food and agriculture, government facilities, healthcare and public health, information technology, nation monuments and icons, nuclear reactors, materials, and waste, postal and shipping, transportation systems, and water.

In this plan, infrastructure refers to the public works aspect of the built environment, rather than the systems that compose critical facilities such as public health, and emergency response.

The facility types in this section include the following.

- Economic
- Infrastructure

BUILT ENVIRONMENT ASSETS - INFRASTRUCTURE		
Name	*Facility Type*	*City*
First Energy	Economic	Oregon
Green Yard Waste Facility	Infrastructure	Sylvania
Maumee River Wastewater Treatment Plant	Infrastructure	Monclova
Oregon Waste Water Treatment Plant	Infrastructure	Oregon
Oregon Water Treatment Plant	Infrastructure	Oregon
Port of Toledo	Infrastructure	Toledo
Swanton Water Plant	Infrastructure	Swanton
Toledo Water Treatment Plant (2 Locations)	Infrastructure	Toledo
Water and sewer infrastructure	Infrastructure	All
Power infrastructure	Infrastructure	All
Cable / Internet / Telephone / Cellular infrastructure	Infrastructure	All
Local, county, state, and federal roads	Infrastructure	All
Bridges over roads	Infrastructure	All
Rail lines	Infrastructure	All

Built Environment Assets – Critical Facilities

A critical facility provides services and functions essential to a community, especially during and after a disaster. Typical critical facilities include hospitals, fire stations, police stations, storage of critical records, and similar facilities; these facilities should be given special consideration when formulating regulatory alternatives and planning. For a critical facility to function, the building systems and equipment must remain operational; also, it should be supplied with essential utilities (power, water, waste disposal, communications, natural gas, etc.) (FEMA, 2018).

The facility types in this section include the following.

- Local government
- County government
- State government
- Federal government
- Law enforcement
- Fire

- Emergency medical services (EMS)
- Hospital, medical centers, and urgent care
- Healthcare
- Education
- Higher education

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
180Th Air National Guard Headquarters	State Government	Monclova
911 Emergency Services / Lucas County Emergency Management Agency	County Government	Toledo
Academy of Business & Tech / First Church of God Christian School	Education	Toledo
Achieve Career Preparatory Academy / St. Agnes	Education	Toledo
Advanced Specialty Hospital	Healthcare	Toledo
Aerospace and Natural Science Academy of Toledo*	Education	Toledo
Agriculture Education Center	Higher Education	Toledo
Airport Urgent Care	Hospital/Medical Center/Urgent Care	Toledo
Alliance Academy of Toledo	Education	Toledo
Alternate Learning Center / Westwood Elementary School	Education	Toledo
Alternative Education Academy	Education	Toledo
American Red Cross Greater Toledo Area Chapter - Headquarters	Healthcare	Toledo
Anthony Wayne High School	Education	Whitehouse
Anthony Wayne Junior High School	Education	Whitehouse
Apostolic Christian Academy	Education	Toledo
Arbor Hills Junior High School	Education	Sylvania
Arlington Elementary School	Education	Toledo
Army National Guard	State Government	Toledo
Army Recruitment Post at The University of Toledo	Federal Government	Toledo
Arrowhead Surgical Center	Healthcare	Maumee
Aurora Academy / Good Shepherd	Education	Toledo
Autism Academy of Learning	Education	Toledo
Autism Model School / St. Clement	Education	Toledo
Autistic Choice for Education	Education	Ottawa Hills
Bancroft Hills Elementary School	Education	Toledo
Bay Park Community Hospital	Hospital/Medical Center/Urgent Care	Oregon
Bennett Venture Academy	Education	Toledo
Berkey Police Department	Law Enforcement	Berkey
Beverly Elementary School	Education	Toledo
Birmingham Elementary School	Education	Toledo
Blackmon Center / Wynn Center	Education	Oregon
Blessed Sacrament Elementary School	Education	Toledo
Board of Mental Retardation	County Government	Maumee
Board of Mental Retardation (3 Locations)	County Government	Toledo
Body of Christ Learning Center	Education	Toledo
Bowser Elementary School	Education	Toledo
Bowsher High School	Education	Toledo
Brookside Ambulance Service / Rumpf Ambulance	EMS	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Brookside Ambulance Service / Rumpf Ambulance	EMS	Toledo
Brookside Ambulance Service / Rumpf Ambulance	EMS	Toledo
Bureau of Alcohol Tobacco and Firearms	Federal Government	Toledo
Bureau of Motor Vehicles	State Government	Oregon
Bureau of Motor Vehicles	State Government	Sylvania
Bureau of Motor Vehicles	State Government	Toledo
Bureau of Motor Vehicles	State Government	Toledo
Bureau of Motor Vehicles	State Government	Toledo
Bureau of Motor Vehicles Toledo	State Government	Toledo
Burroughs Elementary School	Education	Toledo
Byrnedale Elementary School	Education	Toledo
Byrnedale Junior High School	Education	Toledo
Cardinal Stritch High School and Academy	Education	Oregon
Carl T Cotter	Higher Education	Toledo
Cathedral Christian	Education	Sylvania
Center for Choice	Healthcare	Toledo
Central Academy of Ohio	Education	Toledo
Central Catholic High School	Education	Toledo
Central Elementary School	Education	Toledo
Central Trail Elementary School	Education	Sylvania
Chase Elementary School	Education	Toledo
Chase STEMM Academy	Education	Toledo
Cherry Elementary School	Education	Toledo
Child Study Institute	Education	Toledo
Children's Oasis Development Center	Education	Toledo
Christ The King Elementary School	Education	Toledo
Clay Elementary School	Education	Oregon
Clay High School	Education	Oregon
Clerk of Courts Office	County Government	Toledo
Coast Guard	Federal Government	Toledo
Collingwood Learning Center	Education	Toledo
Cordelia Martin Health Center	Healthcare	Toledo
Cordelia Martin Health Center	Healthcare	Toledo
Cotter Apprentice Training	Education	Toledo
Court House	County Government	Toledo
Coy Elementary School	Education	Oregon
Crissey Elementary School	Education	Holland
Crossgates Elementary School	Education	Toledo
Cummings-Zucker High School	Education	Toledo
Davita Flower Hospital Dialysis	Healthcare	Sylvania
Davita Maumee Bay Dialysis	Healthcare	Oregon
Davita Point Place Dialysis	Healthcare	Toledo
Davita Swan Creek Dialysis	Healthcare	Toledo
DEA/ATF/IRS	Federal Government	Toledo
Department of Public Safety, Liquor Enforcement	State Government	Holland
Department of Solid Waste Management	County Government	Toledo
Department of Transportation	State Government	Toledo
Deveaux Elementary / Junior High School	Education	Toledo
Discovery Academy	Education	Toledo
Dog Warden	County Government	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Dorr Elementary School	Education	Toledo
Dorr Street Elementary School	Education	Toledo
Douglas Center	Higher Education	Toledo
East Broadway Elementary School	Education	Toledo
East Side Central Elementary School	Education	Toledo
East Toledo Junior High School	Education	Toledo
Edgewater Elementary School	Education	Toledo
Eisenhower Intermediate	Education	Oregon
Ella P. Stewart Academy for Girls	Education	Toledo
Elmhurst Elementary School	Education	Toledo
Emergicare	Healthcare	Toledo
Emmanuel Baptist Christian School	Education	Toledo
Endoscopy Center	Healthcare	Toledo
Englewood Peace Academy	Education	Toledo
Environmental Services	County Government	Toledo
Eye Institute of Nw Ohio	Healthcare	Maumee
Fairfield Elementary School	Education	Maumee
Fairgrounds	County Government	Maumee
Fall Meyer Elementary School	Education	Toledo
Fallen Timbers Middle School	Education	Whitehouse
Family Court Center	County Government	Toledo
Fassett Middle School	Education	Oregon
FBI Toledo Resident Agency	Law Enforcement	Toledo
Feilbach	Education	Toledo
Flower Hospital	Hospital/Medical Center/Urgent Care	Sylvania
Focus Health Care of Ohio	Healthcare	Maumee
Fort Miami Elementary School	Education	Maumee
Franklin Elementary School	Education	Toledo
Fresenius Kidney Care Toledo	Healthcare	Toledo
Fresenius Kidney Care Toledo - Wernerts Corner	Healthcare	Toledo
Fulton Elementary School	Education	Toledo
Garfield Elementary School	Education	Toledo
Gateway Middle School	Education	Maumee
Gesu Elementary School	Education	Toledo
Glann Elementary School	Education	Toledo
Glass City Academy	Education	Toledo
Glendale-Feilbach Elementary School	Education	Toledo
Glenwood Elementary School	Education	Toledo
Good Shepherd Lutheran	Education	Toledo
Government Office	Federal Government	Maumee
Greater Toledo Urgent Cares - Sylvania	Hospital/Medical Center/Urgent Care	Toledo
Greenfield Health Systems	Healthcare	Toledo
Greenwood Elementary School	Education	Toledo
Grove Patterson Academy Elementary School	Education	Toledo
Gunckel Elementary School	Education	Toledo
Hale Elementary School	Education	Toledo
Harbor View Village Offices	Local Government	Harbor View
Harding Township Hall	Local Government	Swanton
Harvard Elementary School	Education	Toledo
Harvest Lane Christian	Education	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Hawkins Elementary School	Education	Toledo
Heather Downs Elementary School	Education	Toledo
Heather Downs Rehabilitation & Residential Care Center	Healthcare	Toledo
Heffner Elementary School	Education	Toledo
Hiawatha Elementary School	Education	Toledo
Highland Elementary School	Education	Sylvania
Hill View Elementary School	Education	Sylvania
Holland Elementary School / Springfield Middle School	Education	Holland
Holland Police Department	Law Enforcement	Holland
Holland Village Administration	Local Government	Holland
Holloway Elementary School	Education	Holland
Holy Cross Lutheran	Education	Toledo
Holy Rosary	Education	Toledo
Holy Spirit Seminary	Education	Toledo
Hope Learning Academy	Education	Toledo
Hopewell Elementary School	Education	Toledo
Horace Mann Elementary School	Education	Toledo
Horizon Science Academy - Springfield	Education	Toledo
Horizon Science Academy - Toledo	Education	Toledo
HQ 983Rd Engineer Battalion	Federal Government	Monclova
Human Services Department	County Government	Toledo
Imagine Clay Avenue Community School	Education	Toledo
Imagine Clay Avenue Community School / St. Elizabeth Seton School	Education	Toledo
Imagine Hill Academy / Our Lady of Lourdes	Education	Toledo
Imagine Madison Avenue School of Arts	Education	Toledo
Innovative Dialysis of Toledo Innovative Dialysis	Healthcare	Toledo
Internal Revenue Service I R S	State Government	Toledo
International Studies Center / Toledo Technology Academy	Education	Toledo
Jackman Elementary School	Education	Toledo
Jades Academy / Lake Erie Academy / St. Anthony Villa	Education	Toledo
Jefferson Center Alternative High School	Education	Toledo
Jefferson Junior High School	Education	Toledo
Jerusalem Elementary School	Education	Curtice
Jerusalem Township Administration	Local Government	Curtice
Jerusalem Township Fire Department	Fire	Curtice
Job and Family Services	County Government	Toledo
Jones Junior High School	Education	Toledo
Jones Leadership Academy	Education	Toledo
Keyser Elementary School	Education	Toledo
Kindercare #1028	Education	Toledo
King Elementary School	Education	Toledo
Kleis Elementary School	Education	Toledo
L. Hollingworth School For The Talented And Gifted	Education	Toledo
Lagrange Elementary School	Education	Toledo
Larchmont Elementary School	Education	Toledo
Lcic Office	County Government	Toledo
Leverette Elementary School	Education	Toledo
Leverette Junior High School	Education	Toledo
Lial Catholic School	Education	Whitehouse

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Libbey High School	Education	Toledo
Lifecare Medical Services Incorporated - Toledo Substation	EMS	Toledo
Lifestar Ambulance	EMS	Toledo
Lifestar Ambulance Service	EMS	Oregon
Lincoln Elementary School	Education	Toledo
Lincolnshire Elementary School / Washington Local	Education	Toledo
Little Miracles Montessori	Education	Sylvania
Longfellow Elementary School	Education	Toledo
Lourdes College	Higher Education	Sylvania
Lucas Co Juvenile Det Ctr	Law Enforcement	Toledo
Lucas County	County Government	Toledo
Lucas County Coroner	County Government	Toledo
Lucas County Corr Center-Sheriff Dept	Law Enforcement	Toledo
Lucas County Court of Common Pleas Domestic Relations Division	County Government	Toledo
Lucas County Court of Common Pleas General Division	County Government	Toledo
Lucas County E-9-1-1	Law Enforcement	Toledo
Lucas County Early Intervention	County Government	Toledo
Lucas County EMS Life Squad 1 / Toledo Fire And Rescue Station 5	EMS	Toledo
Lucas County EMS Life Squad 10	EMS	Holland
Lucas County EMS Life Squad 2	EMS	Toledo
Lucas County EMS Life Squad 3	EMS	Toledo
Lucas County EMS Life Squad 4	EMS	Toledo
Lucas County EMS Life Squad 5	EMS	Toledo
Lucas County EMS Life Squad 6	EMS	Sylvania
Lucas County EMS Life Squad 7	EMS	Maumee
Lucas County EMS Life Squad 8	EMS	Oregon
Lucas County EMS Life Squad 9	EMS	Whitehouse
Lucas County Government	County Government	Toledo
Lucas County Health Department Building	County Government	Holland
Lucas County Health Department Building	County Government	Toledo
Lucas County Human Services Department	County Government	Toledo
Lucas County Jail	Law Enforcement	Toledo
Lucas County Plaza Garage	County Government	Toledo
Lucas County Sanitary Engineer	County Government	Holland
Lucas County Senior Center	County Government	Toledo
Lucas County Sheriff	Law Enforcement	Toledo
Lucas County Sheriff's Department	Law Enforcement	Toledo
Lucas County Sheriff's Office	Law Enforcement	Toledo
Lucas County Sixth District Court of Appeals	County Government	Toledo
Lucas County Vehicle Maintenance	County Government	Toledo
Lucas County Work Release Department	County Government	Toledo
Luna Surgical Ctr of Toledo	Healthcare	Toledo
Lutheran Home at Toledo Assisted Living	Healthcare	Toledo
M.O.D.E.L. Community School	Education	Maumee
Maplewood Elementary School	Education	Sylvania
Maritime Academy of Toledo	Education	Toledo
Marshall Elementary School	Education	Toledo
Martin Luther King Jr. Academy for Boys	Education	Toledo
Mary Immaculate	Education	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Mary Manse College	Higher Education	Toledo
Maumee City Office Building	Local Government	Sylvania
Maumee Fire Division Station 1	Fire	Maumee
Maumee Fire Division Station 2	Fire	Maumee
Maumee High School/Wayne Trail Elementary School	Education	Maumee
Maumee Municipal Court	Local Government	Maumee
Maumee Municipal Court	Local Government	Maumee
Maumee Police Department	Law Enforcement	Maumee
Maumee Sewer Division	Local Government	Maumee
Maumee Valley Country Day School	Education	Toledo
McCord Junior High School	Education	Sylvania
McGregor Elementary School	Education	Toledo
McKinley Elementary School	Education	Toledo
McTigue Elementary School	Education	Toledo
McTigue Junior High School	Education	Toledo
Meadows Choice Community	Education	Toledo
Meadowvale Elementary School	Education	Toledo
Medcorp Incorporated Emergency Medical Services	EMS	Sylvania
Medcorp Incorporated Emergency Medical Services (7 Locations)	EMS	Toledo
Medical College of Ohio	Healthcare	Toledo
Medical College of Ohio	Higher Education	Toledo
Medical College of Ohio Campus Police Department	Law Enforcement	Toledo
Medical College of Ohio Hospital / University of Toledo Medical Center	Hospital/Medical Center/Urgent Care	Toledo
Mercy Occupational Health / St. Charles Mercy Hospital	Hospital/Medical Center/Urgent Care	Oregon
Mercy Occupational Health / St. Vincent Medical Center	Hospital/Medical Center/Urgent Care	Toledo
Monac Elementary School	Education	Toledo
Monclova Christian Academy	Education	Monclova
Monclova Elementary School	Education	Monclova
Monclova Maintenance Building	Local Government	Monclova
Monclova Old Town Hall	Local Government	Monclova
Monclova Township Administration	Local Government	Monclova
Monclova Township Fire and Rescue Department	Fire	Monclova
Monroe Academy of Toledo	Education	Toledo
Montessori Day School	Education	Toledo
Mt Vernon Elementary School	Education	Toledo
Natural Science Technology Center	Education	Toledo
Navarre Elementary School	Education	Toledo
New Horizons Academy	Education	Holland
Newbury Elementary School	Education	Toledo
Norfolk Southern Railway Police Department	Law Enforcement	Toledo
Northpointe Academy Elementary	Education	Toledo
Northpointe Academy Middle School	Education	Toledo
Northview High School	Education	Sylvania
Northwest Ohio Regional School Improvement Team	Higher Education	Toledo
Northwest Ohio Urgent Care	Hospital/Medical Center/Urgent Care	Maumee
Northwest Ohio Urgent Care	Hospital/Medical Center/Urgent Care	Toledo
Notre Dame Academy	Education	Toledo
NW Ohio Developmental Center	State Government	Toledo
NW Ohio Endoscopy Center	Healthcare	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Oakdale Elementary School	Education	Toledo
OccuHealth	Hospital/Medical Center/Urgent Care	Toledo
Occupational Care Consultants - East Office	Hospital/Medical Center/Urgent Care	Oregon
ODPS Investigative Unit Toledo	Law Enforcement	Holland
Ohio Air National Guard 180Th Fighter Wing HQ	Law Enforcement	Swanton
Ohio Virtual Academy	Education	Maumee
Old Orchard Elementary School	Education	Toledo
Old West End Academy Elementary School	Education	Toledo
One Government Center	State Government	Toledo
Optivue	Healthcare	Maumee
Optivue	Healthcare	Oregon
Orchard Villa (Legacy Health Services)	Healthcare	Oregon
Oregon City Administration	Local Government	Oregon
Oregon Eagle Learning Center	Education	Oregon
Oregon Fire Department Station 1	Fire	Oregon
Oregon Fire Department Station 2	Fire	Oregon
Oregon Fire Department Station 3	Fire	Oregon
Oregon Municipal Court	Local Government	Oregon
Oregon Municipal Fire Training Center	Local Government	Oregon
Oregon Police Department	Law Enforcement	Oregon
Oregon Urgent Care	Healthcare	Oregon
Oregon Urgent Care	Hospital/Medical Center/Urgent Care	Oregon
Ottawa Hills Elementary School	Education	Ottawa Hills
Ottawa Hills Fire and Rescue Department	Fire	Toledo
Ottawa Hills Junior/Senior High School	Education	Ottawa Hills
Ottawa Hills Police Department	Law Enforcement	Ottawa Hills
Ottawa Hills Village Administration	Local Government	Ottawa Hills
Ottawa River Elementary School	Education	Toledo
Ottawa River Elementary School	Education	Toledo
Our Lady of Perpetual Help School	Education	Toledo
Outpatient Surgi-Unit, Inc	Healthcare	Toledo
P.A.S.S.	Education	Toledo
Parkcliffe Advanced Care	Healthcare	Toledo
Parkland Craft Junior High School	Education	Toledo
Parks and Forestry Department	Local Government	Toledo
Parkway Surgery Ctr	Healthcare	Toledo
Paul Laurence Dunbar Academy	Education	Toledo
Pearson Center	Education	Toledo
Performing Arts School of Toledo	Education	Toledo
Peritoneal Dialysis Center	Healthcare	Toledo
Pickett Elementary School	Education	Toledo
Point Place Elementary School	Education	Toledo
Police/Alarm Building	Local Government	Toledo
Polly Fox Academy / The Phoenix Academy at Jefferson	Education	Toledo
Port Authority Offices	County Government	Toledo
Promedica Urgent Care	Hospital/Medical Center/Urgent Care	Toledo
Promedica Urgent Care	Hospital/Medical Center/Urgent Care	Toledo
Promedica Urgent Care - Sylvania	Hospital/Medical Center/Urgent Care	Sylvania
Providence Township Administration	Local Government	Neapolis
Providence Township Fire and Rescue Station 1	Fire	Neapolis

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Public Services Building	Local Government	Toledo
Public Utilities Dept	Local Government	Toledo
Queen of Apostles	Education	Toledo
Raymer Elementary School	Education	Toledo
RCG Arrowhead Dialysis Center	Healthcare	Maumee
Reach Academy	Education	Toledo
Reconstructive & Aesthetic	Healthcare	Toledo
Recreation Center	County Government	Maumee
Regina Coeli Parish School	Education	Toledo
Rescue Mental Health	Hospital/Medical Center/Urgent Care	Toledo
Reynolds Elementary School	Education	Toledo
Richfield Township Administration	Local Government	Berkey
Richfield Township Fire Department	Fire	Berkey
Riverside Elementary School	Education	Toledo
Robinson Achievement	Education	Toledo
Robinson Junior High School	Education	Toledo
Rogers High School	Education	Toledo
Rosa Parks Elementary School	Education	Toledo
Rosary Cathedral Catholic School	Education	Toledo
Rumpf Ambulance	EMS	Toledo
Ryder Elementary School	Education	Toledo
Sacred Heart / Aurora Academy	Education	Toledo
Saint Anne Mercy Hospital	Hospital/Medical Center/Urgent Care	Toledo
Saint Charles Mercy Hospital	Healthcare	Oregon
Saint Luke's Hospital	Hospital/Medical Center/Urgent Care	Maumee
Scott High School	Education	Toledo
Section 8 Housing Authority	Federal Government	Toledo
Sewer and Drainage Services Division	Local Government	Toledo
Sherman Elementary School	Education	Toledo
Shoreland Elementary School	Education	Toledo
Shuer Center	Education	Oregon
Social Security Administration	State Government	Toledo
Social Security Administration/Us Attorney General	State Government	Toledo
Solid Waste Division	Local Government	Toledo
Southview High School	Education	Sylvania
Spencer Sharples Elementary / High School	Education	Holland
Spencer Township Administration	Local Government	Holland
Spencer Township Fire And Rescue	Fire	Holland
Spring Elementary School	Education	Toledo
Springfield High School	Education	Holland
Springfield Township Administration	Local Government	Holland
Springfield Township Fire Department Station 1	Fire	Holland
Springfield Township Fire Department Station 3	Fire	Maumee
Springfield Urgent Care	Hospital/Medical Center/Urgent Care	Holland
St Adalbert / Rise and Shite Academy	Education	Toledo
St Angela Hall	Education	Toledo
St Anthony	Education	Toledo
St Benedict Catholic School	Education	Toledo
St Catherine	Education	Toledo
St Charles	Education	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
St Clare Academy	Education	Sylvania
St Francis Achievement	Education	Toledo
St Francis De Sales High School	Education	Toledo
St Hedwig	Education	Toledo
St Hyacinth	Education	Toledo
St James	Education	Toledo
St Joan of Arc Elementary School	Education	Toledo
St John	Education	Toledo
St John's Jesuit High School and Academy	Education	Toledo
St Joseph Elementary School	Education	Maumee
St Joseph School East Campus	Education	Sylvania
St Jude	Education	Toledo
St Martin Deporres	Education	Toledo
St Mary	Education	Toledo
St Michael	Education	Toledo
St Patrick of Heather Downs	Education	Toledo
St Paul Surgical Ctr	Healthcare	Toledo
St Philip Lutheran	Education	Toledo
St Pius X Elementary School	Education	Toledo
St Stephen	Education	Toledo
St Teresa	Education	Toledo
St Thomas Aquinas	Education	Toledo
St. George Urgent Care	Hospital/Medical Center/Urgent Care	Maumee
St. Ursula Academy	Education	Toledo
Star Academy of Toledo	Education	Toledo
Starr Elementary School	Education	Oregon
Start High School	Education	Toledo
Stickney Elementary School	Education	Toledo
Stone Hebrew Academy	Education	Sylvania
Stranahan Elementary School	Education	Toledo
Street, Bridges, And Harbor Division	Local Government	Toledo
Streets Department Maintenance Garage	County Government	Maumee
Sts Peter And Paul	Education	Toledo
Sun Bridge	Education	Toledo
Sunset Retirement Communities, Sunset House	Healthcare	Ottawa Hills
Sunset Retirement Communities, Sunset Village	Healthcare	Sylvania
Surgery Ctr at Regency Park	Healthcare	Toledo
Surgi Care	Healthcare	Maumee
Swan Creek Health Care Center	Healthcare	Toledo
Sylvan Elementary School	Education	Sylvania
Sylvania Franciscan Academy	Education	Sylvania
Sylvania Municipal Court	Local Government	Sylvania
Sylvania Northview High School	Education	Sylvania
Sylvania Police Department	Law Enforcement	Sylvania
Sylvania Street Division	Local Government	Sylvania
Sylvania Township Fire Department Station 1	Fire	Sylvania
Sylvania Township Fire Department Station 2	Fire	Toledo
Sylvania Township Fire Department Station 3	Fire	Sylvania
Sylvania Township Fire Department Station 4	Fire	Sylvania
Sylvania Township Offices	Local Government	Sylvania

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Sylvania Township Police Department	Law Enforcement	Sylvania
The Autism Academy of Learning	Education	Toledo
The Glendale Assisted Living	Healthcare	Toledo
The Mareda Center	Education	Toledo
The Phoenix Academy @ Alexis	Education	Toledo
Thurgood Marshall	Education	Toledo
Timberstone Junior High School	Education	Sylvania
Toledo Academy of Learning	Education	Toledo
Toledo Accelerated Academy	Education	Toledo
Toledo Air Guard Fire Department	Fire	Swanton
Toledo Aviation Center	Education	Swanton
Toledo Christian Schools	Education	Toledo
Toledo Clinic	Healthcare	Toledo
Toledo Correctional Inst	Education	Toledo
Toledo Crit. Serv. Steps Pro.	Education	Toledo
Toledo Dialysis	Healthcare	Toledo
Toledo Diocese	Education	Toledo
Toledo Downtown Maintenance	Local Government	Toledo
Toledo Early College High School	Education	Toledo
Toledo Fire & Rescue Operations Building	Local Government	Toledo
Toledo Fire and Rescue Department Station 1	Fire	Toledo
Toledo Fire and Rescue Department Station 11	Fire	Toledo
Toledo Fire and Rescue Department Station 13	Fire	Toledo
Toledo Fire and Rescue Department Station 14	Fire	Toledo
Toledo Fire and Rescue Department Station 16	Fire	Toledo
Toledo Fire and Rescue Department Station 17	Fire	Toledo
Toledo Fire and Rescue Department Station 18	Fire	Toledo
Toledo Fire and Rescue Department Station 18	Fire	Toledo
Toledo Fire and Rescue Department Station 19	Fire	Toledo
Toledo Fire and Rescue Department Station 21	Fire	Toledo
Toledo Fire and Rescue Department Station 23	Fire	Toledo
Toledo Fire and Rescue Department Station 24	Fire	Toledo
Toledo Fire and Rescue Department Station 25	Fire	Toledo
Toledo Fire and Rescue Department Station 3	Fire	Toledo
Toledo Fire and Rescue Department Station 4	Fire	Toledo
Toledo Fire and Rescue Department Station 6	Fire	Toledo
Toledo Fire and Rescue Department Station 7	Fire	Toledo
Toledo Fire and Rescue Department Station 9	Fire	Toledo
Toledo Hospital / Promedica Health Systems	Hospital/Medical Center/Urgent Care	Toledo
Toledo Hospital Dialysis Unit	Healthcare	Toledo
Toledo Islamic Academy	Education	Sylvania
Toledo Junior Academy	Education	Toledo
Toledo Lucas County Port Authority Fire Department	Fire	Swanton
Toledo Mental Health Security DMH	Local Government	Toledo
Toledo Metro Park District	Local Government	Toledo
Toledo Municipal Court	Local Government	Toledo
Toledo OSHP	Law Enforcement	Swanton
Toledo Parking Violations Office	Local Government	Toledo
Toledo Police Department	Law Enforcement	Toledo
Toledo Police Department	Law Enforcement	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Toledo Preparatory and Fitness Academy	Education	Toledo
Toledo Public Schools Food Services	Education	Toledo
Toledo School for The Arts	Education	Toledo
Toledo School of P N	Higher Education	Toledo
Toledo School of Practical Nursing	Education	Toledo
Toledo Technology Academy High School	Education	Toledo
Toledo Village Shule Community	Education	Toledo
Toledo Women's Center	Healthcare	Toledo
Township Middle School	Education	Swanton
Trilby Elementary School	Education	Toledo
Trinity Lutheran School	Education	Toledo
U S Drug Enforcement Admin	Law Enforcement	Toledo
U S Marshals Service	Law Enforcement	Toledo
U S Secret Service	Law Enforcement	Toledo
U.S. Renal Care - Alexis	Healthcare	Toledo
U.S. Renal Care - Sylvania	Healthcare	Sylvania
U.S. Renal Care - Wildwood	Healthcare	Toledo
Union Elementary School	Education	Maumee
United States Air Force Recruitment Post	Federal Government	Toledo
United States Air Force Recruitment Post	Federal Government	Toledo
United States Air Force Recruitment Post	Federal Government	Toledo
University of Toledo Main Campus	Higher Education	Toledo
University of Toledo Medical College	Higher Education	Toledo
University of Toledo Police Department	Law Enforcement	Toledo
University of Toledo Scott Campus	Higher Education	Toledo
Us District Court Probation Office	Federal Government	Toledo
Us Federal Court Building	Federal Government	Toledo
Waite High School	Education	Toledo
Walbridge Elementary School	Education	Toledo
Warren Elementary School	Education	Toledo
Washington Elementary School	Education	Toledo
Washington Junior High School	Education	Toledo
Washington Township Administration	Local Government	Toledo
Washington Township Fire and Rescue Department	Fire	Toledo
Washington Township Police Department	Law Enforcement	Toledo
Water Distribution	Local Government	Toledo
Waterville Center	Education	Waterville
Waterville Fire Department	Fire	Waterville
Waterville Police Department	Law Enforcement	Waterville
Waterville Primary School	Education	Waterville
Waterville Public Works Complex	Local Government	Waterville
Waterville Township Administration	Local Government	Waterville
Waterville Township Police Department	Law Enforcement	Whitehouse
Waterville Village Administration	Local Government	Waterville
Wayne Trail Elementary School	Education	Maumee
Wernert Elementary School	Education	Toledo
West Central Surgical	Healthcare	Toledo
West Side Montessori *	Education	Toledo
West Toledo Healthcare/Rehab Center	Healthcare	Toledo
West Toledo Urgent Care	Hospital/Medical Center/Urgent Care	Toledo

BUILT ENVIRONMENT ASSETS – CRITICAL FACILITIES		
Name	*Facility Type*	*City*
Westfield Elementary School	Education	Toledo
Whiteford Elementary School	Education	Toledo
Whitegouse Village Administration Offices	Local Government	Whitehouse
Whitehouse Fire Department	Fire	Whitehouse
Whitehouse Maintenance Garage	Local Government	Whitehouse
Whitehouse Police Department	Law Enforcement	Whitehouse
Whitehouse Primary School	Education	Whitehouse
Whitmer Career & Technology Center	Education	Toledo
Whitmer High School	Education	Toledo
Whitney Vocational Tech High School	Education	Toledo
Whittier Elementary School	Education	Toledo
Wildwood Environmental Academy	Education	Maumee
Wildwood Surgical Ctr	Healthcare	Toledo
Wilson Education Beginnings	Education	Toledo
Winterfield Venture Academy	Education	Toledo
Woodward High School	Education	Toledo
Wynn Center	Education	Oregon
Zion Lutheran Day School	Education	Toledo

** School is a shelter*

Built Environment Assets – High Potential Loss Facility

Examples of high potential loss facilities include nuclear power plants, dams, military installations, and hazardous material facilities. Hazardous materials facilities include any facilities that produce or manage industrial/hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins (FEMA, n.d.). Hazardous materials facilities can also be toxic release inventory (TRI) facilities, which are facilities that the Environmental Protection Agency keeps records of in regards to certain toxic chemicals that may pose a threat to human health and the environment.

The facility types in this section include the following.

- Dams (also can be categorized under infrastructure)
- Toxic release inventory facility

BUILT ENVIRONMENT ASSETS – HIGH POTENTIAL LOSS FACILITY		
Name	*Facility Type*	*City*
Air Liquide America Corp Oregon Cdx	Toxic Release Inventory Facility	Oregon
Anatrace Products, L.L.C.	Toxic Release Inventory Facility	Maumee
Andersons Lawn Prods Group	Toxic Release Inventory Facility	Maumee
Apacs	Toxic Release Inventory Facility	Toledo
Asphalt Materials Inc	Toxic Release Inventory Facility	Oregon
Autoneum North America Inc	Toxic Release Inventory Facility	Oregon
Autoneum North America, Inc.	Toxic Release Inventory Facility	Oregon
Baron Drawn Steel	Toxic Release Inventory Facility	Toledo
Beta Tube Corp	Toxic Release Inventory Facility	Holland

BUILT ENVIRONMENT ASSETS – HIGH POTENTIAL LOSS FACILITY		
Name	*Facility Type*	*City*
Betco Corp	Toxic Release Inventory Facility	Toledo
Bobbart Industries Inc (Dba Amer Custom Ind)	Toxic Release Inventory Facility	Sylvania
Bowser-Morner Inc	Toxic Release Inventory Facility	Toledo
Buckeye Terminals L.L.C. - Toledo West Terminal	Toxic Release Inventory Facility	Toledo
Bunting Bearings L.L.C. Holland	Toxic Release Inventory Facility	Holland
Canberra Corp	Toxic Release Inventory Facility	Toledo
Certified Power Train Specialists	Toxic Release Inventory Facility	Toledo
Chemcentral Toledo Corp	Toxic Release Inventory Facility	Toledo
Chempace Corp	Toxic Release Inventory Facility	Toledo
Chemtrade Refinery	Toxic Release Inventory Facility	Oregon
Chrysler Group L.L.C.- Wrangler Paint	Toxic Release Inventory Facility	Toledo
Chrysler Parkway Annex	Toxic Release Inventory Facility	Toledo
Chrysler Toledo North Assembly Plant	Toxic Release Inventory Facility	Toledo
Citgo Holding Terminals, L.L.C. - Toledo Terminal	Toxic Release Inventory Facility	Oregon
Collins Park WTP Sludge Lagoon A	Dam	Toledo
Collins Park WTP Sludge Lagoon E	Dam	Toledo
Collins Park WTP Sludge Lagoons B & C	Dam	Toledo
Comfort Line	Toxic Release Inventory Facility	Toledo
Creative Products Inc	Toxic Release Inventory Facility	Holland
Creative Products, Inc.	Toxic Release Inventory Facility	Holland
Crown Cork & Seal (0448010466)	Toxic Release Inventory Facility	Toledo
Custom Deco Inc.	Toxic Release Inventory Facility	Toledo
Dana Corp Spicer Driveshaft Div	Toxic Release Inventory Facility	Toledo
Dana Light Axle Manufacturing L.L.C.	Toxic Release Inventory Facility	Toledo
Decorative Panels International	Toxic Release Inventory Facility	Toledo
Dial Corp	Toxic Release Inventory Facility	Toledo
Doane Pet Care Co	Toxic Release Inventory Facility	Maumee
Doehler Jarvis L P	Toxic Release Inventory Facility	Toledo
Doehler-Jarvis Toledo, Inc.	Toxic Release Inventory Facility	Toledo
Dolphin Co L.L.C.	Toxic Release Inventory Facility	Toledo
Dupont E I Denemours & Co	Toxic Release Inventory Facility	Toledo
Dynea Usa Inc	Toxic Release Inventory Facility	Toledo
Electro Prime Inc.	Toxic Release Inventory Facility	Toledo
Envirosafe Services of Ohio Inc	Toxic Release Inventory Facility	Oregon
Erie Steel Treating Inc	Toxic Release Inventory Facility	Toledo
Evergreen Lake Dam	Dam	Whitehouse
Faurecia Emission Control Technologies	Toxic Release Inventory Facility	Toledo
Faurecia Exhaust Sys Inc Technical Center	Toxic Release Inventory Facility	Toledo
Faurecia Exhaust Systems	Toxic Release Inventory Facility	Toledo
Federal-Mogul Corp., Ignition Products Technical Center	Toxic Release Inventory Facility	Toledo
FirstEnergy Bay Shore Power Plant	Toxic Release Inventory Facility	Oregon
Fiske Brothers Refining Co	Toxic Release Inventory Facility	Toledo
Ford Motor Co Maumee Stamping Plant	Toxic Release Inventory Facility	Maumee
FRC Intl Inc	Toxic Release Inventory Facility	Holland
Fresh Products L.L.C.	Toxic Release Inventory Facility	Toledo
Frostbite	Toxic Release Inventory Facility	Toledo
General Mills Inc	Toxic Release Inventory Facility	Toledo
General Motors L.L.C. - Toledo	Toxic Release Inventory Facility	Toledo
Gerity Schultz Corp	Toxic Release Inventory Facility	Toledo
Ha International L.L.C.	Toxic Release Inventory Facility	Toledo

BUILT ENVIRONMENT ASSETS – HIGH POTENTIAL LOSS FACILITY		
Name	*Facility Type*	*City*
Hale Chrome Service Inc	Toxic Release Inventory Facility	Toledo
Hearn Plating Co Ltd	Toxic Release Inventory Facility	Toledo
Hoosier Magnetics, Inc. - Toledo Plant	Toxic Release Inventory Facility	Toledo
Jennison-Wright Former Wood Treating Facility	Toxic Release Inventory Facility	Toledo
Johns Manville International Inc	Toxic Release Inventory Facility	Waterville
Johns-Manville Inc Research Center Waterville	Toxic Release Inventory Facility	Waterville
Johnson Controls Inc - Battery Group	Toxic Release Inventory Facility	Holland
Kern-Liebers USA Inc	Toxic Release Inventory Facility	Holland
Kuka Toledo Production Operations	Toxic Release Inventory Facility	Toledo
L & L Polishing & Plating	Toxic Release Inventory Facility	Toledo
Libbey Glass Inc.	Toxic Release Inventory Facility	Toledo
Linde Gas, L.L.C. - Maumee	Toxic Release Inventory Facility	Maumee
Lo-Temp Brazing Co Inc	Toxic Release Inventory Facility	Toledo
Maclean Flowform L.L.C.	Toxic Release Inventory Facility	Toledo
Magna T.E.A.M. Systems	Toxic Release Inventory Facility	Toledo
Manufacturers Enameling Corp	Toxic Release Inventory Facility	Toledo
Marathon Petroleum L.L.C. Oregon Terminal	Toxic Release Inventory Facility	Oregon
Metal Forming & Coining Group	Toxic Release Inventory Facility	Maumee
Metokote Corporation, Plant21	Toxic Release Inventory Facility	Maumee
Midwest Bio Renewables	Toxic Release Inventory Facility	Toledo
Mondelez Global L.L.C. Toledo Flour Mill	Toxic Release Inventory Facility	Toledo
Moore Chrome Products Co	Toxic Release Inventory Facility	Toledo
New Mather Metals Inc	Toxic Release Inventory Facility	Toledo
Ohio Module Manufacturing Co L.L.C.	Toxic Release Inventory Facility	Toledo
Ohio Pickling & Processing	Toxic Release Inventory Facility	Toledo
Ottawa River Processing	Toxic Release Inventory Facility	Toledo
P & J Industries Inc. (3 Locations)	Toxic Release Inventory Facility	Toledo
Pepsi-Cola General Bottlers Inc	Toxic Release Inventory Facility	Toledo
Perstorp Formaldehyde Plant	Toxic Release Inventory Facility	Toledo
Perstorp Polyols, Inc.	Toxic Release Inventory Facility	Toledo
Plaskon Electronic Materials Inc	Toxic Release Inventory Facility	Toledo
Powerlab Inc	Toxic Release Inventory Facility	Maumee
Powerlab Inc	Toxic Release Inventory Facility	Maumee
Ransom & Randolph Co	Toxic Release Inventory Facility	Maumee
Rexam Beverage Can Company	Toxic Release Inventory Facility	Whitehouse
Riker Products Inc.	Toxic Release Inventory Facility	Toledo
Rimer Enterprises Inc	Toxic Release Inventory Facility	Waterville
Safety-Kleen Sys	Toxic Release Inventory Facility	Toledo
Schindler Elevator Corp.	Toxic Release Inventory Facility	Toledo
Schindler Elevator Corporation	Toxic Release Inventory Facility	Holland
Sem-Com Co Inc	Toxic Release Inventory Facility	Toledo
Sem-Com Co Inc	Toxic Release Inventory Facility	Toledo
Spartan Chemical Co Inc	Toxic Release Inventory Facility	Maumee
Spartan Chemical Co Inc	Toxic Release Inventory Facility	Toledo
Specialty Gases of America, Inc.	Toxic Release Inventory Facility	Toledo
Steiner Co Inc	Toxic Release Inventory Facility	Holland
Stoneco Inc Maumee Plant	Toxic Release Inventory Facility	Maumee
Sun Chemical GPI	Toxic Release Inventory Facility	Maumee
Sunoco Partners Marketing & Terminals LP Toledo Terminal	Toxic Release Inventory Facility	Toledo
Supreme Bumpers Inc	Toxic Release Inventory Facility	Toledo

BUILT ENVIRONMENT ASSETS – HIGH POTENTIAL LOSS FACILITY		
Name	*Facility Type*	*City*
Swanton Upground Reservoir Dam	Dam	Swanton
Tag Chemicals Inc.	Toxic Release Inventory Facility	Toledo
Teledyne Continental Motors-Turbine Engines	Toxic Release Inventory Facility	Toledo
Tembec Btlsr Inc	Toxic Release Inventory Facility	Toledo
Tencom, Ltd.	Toxic Release Inventory Facility	Holland
Textileather Corporation	Toxic Release Inventory Facility	Toledo
The Yarder Manufacturing Co.	Toxic Release Inventory Facility	Toledo
Toledo Coke Corporation	Toxic Release Inventory Facility	Toledo
Toledo Refinery	Toxic Release Inventory Facility	Oregon
Toledo Refining Company LLC - WWTU	Toxic Release Inventory Facility	Oregon
U S Reduction Company	Toxic Release Inventory Facility	Toledo
U.S. Air Force Toledo Oh Ang	Toxic Release Inventory Facility	Swanton
Unisys Corp	Toxic Release Inventory Facility	Holland
Unitcast, Inc.	Toxic Release Inventory Facility	Toledo
Wheeltech Na Inc	Toxic Release Inventory Facility	Toledo
WR Grace & Co Grace Construction Prods	Toxic Release Inventory Facility	Toledo

Built Environment Assets – Cultural Resources

There are various acts that deal with cultural resources; the National Environmental Policy Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, the Archeological Data Preservation Act, the Federal Records Act, among others. Cultural resources can be defined as physical evidence or place of past human activity: site, object, landscape, structure; or a site, structure, landscape, object or natural feature of significance to a group of people traditionally associated with it (NPS, 2015). In addition to these, this plan includes locations that give the population a sense of community within the county.

The facility types in this section include the following.

- Community centers
- Historic buildings, sites, and districts
- Libraries

BUILT ENVIRONMENT ASSETS – CULTURAL RESOURCES		
Name	*Facility Type*	*City*
Ability Center of Greater Toledo	Community Center	Sylvania
Able Advocates for Basic Legal Equality	Community Center	Toledo
Adelante Inc	Community Center	Toledo
Albert Neukom House	Historic Building	Toledo
Anthony Wayne Community YMCA	Community Center	Waterville
Ashland Avenue Baptist Church	Historic Building	Toledo
Aurora L Gonzalez Community Center	Community Center	Toledo

BUILT ENVIRONMENT ASSETS – CULTURAL RESOURCES		
Name	*Facility Type*	*City*
Aurora L. Gonzalez Community Center	Community Center	Toledo
Autism Society of Northwest Ohio	Community Center	Toledo
Berdan Building	Historic Building	Toledo
Birckhead Place Historic District	Historic District	Toledo
Birmingham Historic District	Historic District	Toledo
Birmingham Library	Library	Toledo
B'Nai Israel Synagogue	Historic Building	Toledo
Boys & Girls Clubs of Toledo	Community Center	Toledo
Brandville School	Historic Building	Oregon
Bronson Place	Historic Building	Toledo
Burt's Theater	Historic Building	Toledo
Bush Street Historic District	Historic District	Toledo
Carlson Library	Library	Toledo
Catholic Diocese of Toledo-Charities	Community Center	Toledo
Central YMCA	Historic Building	Toledo
Chester J. Zablocki Senior Center	Community Center	Toledo
Coalition for Quality Education	Community Center	Toledo
Columbian House	Historic Building	Waterville
Commodore Perry Hotel	Historic Building	Toledo
Community Development Center of Lucas County	Community Center	Holland
Community Treatment Center	Community Center	Toledo
Connecting Point-24 Hr Assistance Center	Community Center	Toledo
Connecting Point-Crittenton Building	Community Center	Toledo
Connecting Point-East Bancroft Facility	Community Center	Toledo
Cordelia Martin Health Center/Daisy Smith Pediatrics Clinic	Community Center	Toledo
Covenant Youth Development	Community Center	Toledo
Dr. John A. Wright House	Historic Building	Toledo
Duns Scotus Library	Library	Sylvania
East Side Commercial Block	Historic Building	Toledo
East Toledo Family Center	Community Center	Toledo
East Toledo Family Center: Senior Center	Community Center	Toledo
East Toledo Historic District	Historic District	Toledo
Eastern YMCA	Community Center	Oregon
Eckenrode And Breisach Houses	Historic Building	Maumee
Edward D. Libbey House	Historic Building	Toledo
Eleanor M. Kahle Senior Center	Community Center	Toledo
Englewood Historic District	Historic District	Toledo
Fallen Timbers Battlefield	Historic Site	Maumee
Family Affair Partnership Inc	Community Center	Toledo
Family House	Community Center	Toledo
First Church of Christ, Scientist	Historic Building	Toledo
First Presbyterian Church of Maumee Chapel	Historic Building	Maumee
Forsythe--Puhl House	Historic Building	Maumee
Fort Industry Square	Historic Building	Toledo
Fort Miamis Site	Historic Site	Maumee
Fraternal Order of Police	Community Center	Toledo
Frederick Douglass Community Association	Community Center	Toledo
Friendship Park Senior Center	Community Center	Toledo
Gillett-Shoemaker-Welsh House	Historic Building	Waterville
Girl Scout Service Center	Community Center	Toledo

BUILT ENVIRONMENT ASSETS – CULTURAL RESOURCES		
Name	*Facility Type*	*City*
Governor's Inn	Historic Building	Maumee
Grace Community Center	Community Center	Toledo
Greater Toledo Urban League-Abrams Business Dev	Community Center	Toledo
Hancock Senior Center	Community Center	Oregon
Hanson House	Historic Building	Maumee
Heather Downs Library	Library	Toledo
Henry Reed Jr. House	Historic Building	Maumee
Hillcrest Hotel	Historic Building	Toledo
Holland Library	Library	Holland
House of Four Pillars	Historic Building	Maumee
Hull-Wolcott House	Historic Building	Maumee
Huntington Community Center	Community Center	Sylvania
Huron Street Medical Clinic	Community Center	Toledo
Huron--Superior Streets Warehouse--Produce Historic District	Historic District	Toledo
Interurban Bridge	Historic Site	Waterville
Inverness Club	Historic Building	Toledo
Ira Apartments	Historic Building	Toledo
Isaac R. Ludwig Historical Mill	Historic District	Neapolis
Isaac Hull Store	Historic Building	Maumee
J Frank Troy Senior Center	Community Center	Toledo
James C. Caldwell Community Center	Community Center	Toledo
Jewish Community Center YMCA	Community Center	Sylvania
Jewish Family Service Senior Adult Center	Community Center	Toledo
John Isham House and Farmstead	Historic Building	Waterville
Joseph K. Secor House	Historic Building	Toledo
Junior League of Toledo	Community Center	Toledo
Kent Library	Library	Toledo
King Road Library	Library	Toledo
Lagrange Library	Library	Toledo
Lasalle, Koch And Company Department Store	Historic Building	Toledo
Libby High School	Historic Building	Toledo
Liberty Whitcomb Haskins House	Historic Building	Waterville
Lighthouse Community Center	Community Center	Toledo
Linques Neighborhood Center	Community Center	Toledo
Locke Library	Library	Toledo
Lucas County Courthouse and Jail	Historic Building	Toledo
Lucas County Hospital and Nurse's Home	Historic Building	Toledo
Lutheran Social Services	Community Center	Toledo
Lyman Liggins Senior Center @ Grace United	Community Center	Toledo
Madison Avenue Historic District	Historic District	Toledo
Main Library	Library	Toledo
Margaret L. Hunt Senior Center	Community Center	Toledo
Maumee Historic District	Historic District	Maumee
Maumee Library	Library	Maumee
Maumee Senior Center	Community Center	Maumee
Maumee Sidecut	Historic Building	Maumee
Maumee Theater	Historic Building	Maumee
Maumee Uptown Historic District	Historic District	Maumee
Mayores Senior Center	Community Center	Toledo
Mildred Bayer Health Clinic	Community Center	Toledo

BUILT ENVIRONMENT ASSETS – CULTURAL RESOURCES		
Name	*Facility Type*	*City*
Monclova Community Center	Community Center	Monclova
Monroe Street Commercial Buildings	Historic Building	Toledo
Monroe Street Neighborhood Center @ Monroe Street Methodist Episcopal Church	Community Center	Toledo
Morehouse-Downes House	Historic Building	Waterville
Mott Library	Library	Toledo
National Alliance on Mental Illness of Greater Toledo	Community Center	Toledo
National Exchange Club	Community Center	Toledo
Neighborhood Health Association	Community Center	Toledo
Neighborhoods in Partnership	Community Center	Toledo
O'Grady Community Center	Community Center	Toledo
Ohio Theatre	Historic Building	Toledo
Old Central Post Office	Historic Building	Toledo
Old West End District	Historic District	Toledo
Oliver House	Historic Building	Toledo
Oregon Library	Library	Oregon
Owens Community College Learning Center	Community Center	Toledo
Park Place of Sylvania Community Center	Community Center	Sylvania
Peck Griswold House	Historic Building	Maumee
Peter Gendron House	Historic Building	Toledo
Point Place Library	Library	Toledo
Pray-Starkweather House	Historic Building	Waterville
Providence Center	Community Center	Toledo
Providence Historic District	Historic District	Neapolis
Pythian Castle	Historic Building	Toledo
R. Brand and Company	Historic Building	Toledo
Red Cross Greater Toledo Chapter Headquarters	Community Center	Toledo
Reynolds Corner Library	Library	Toledo
River East Community Health Center	Community Center	Toledo
Riverview Apartments	Historic Building	Toledo
Riverview Inn	Historic Building	Toledo
Saint Peter and Saint Paul Historic District--Oliver's Second Addition	Historic District	Toledo
Sanger Library	Library	Toledo
Secor Hotel	Historic Building	Toledo
Sight Center of NW Ohio: Toledo Society For The Blind	Community Center	Toledo
South Library	Library	Toledo
Southside Community Health Center	Community Center	Toledo
Spitzer Building	Historic Building	Toledo
Spring Grove Historic District	Historic Building	Toledo
St Joseph's Church-Maumee: Community Center	Community Center	Maumee
St Paul's Community Center	Community Center	Toledo
St. Ann Roman Catholic Church Complex	Historic Building	Toledo
St. Clair Street Historic District	Historic District	Toledo
St. Patrick's Catholic Church	Historic Building	Toledo
Standart-Simmons Hardware Company	Historic Building	Toledo
Summit YMCA	Community Center	Toledo
Sylvania Community Services Center	Community Center	Sylvania
Sylvania Library	Library	Sylvania
Sylvania Senior Center	Community Center	Sylvania
The Friendly Center Inc	Community Center	Toledo

BUILT ENVIRONMENT ASSETS – CULTURAL RESOURCES		
Name	*Facility Type*	*City*
Toledo Central City Neighborhood	Community Center	Toledo
Toledo Citadel Corps-Salvation Army	Community Center	Toledo
Toledo Club	Historic Building	Toledo
Toledo Heights Library	Library	Toledo
Toledo Muslim Community Center	Community Center	Toledo
Toledo New Hope Corps-Salvation Army	Community Center	Toledo
Toledo Olde Towne Historic District	Historic Building	Toledo
Toledo Traction Company Power Station	Historic Building	Toledo
Toledo Yacht Club	Historic Building	Toledo
Trinity Episcopal Church	Historic Building	Toledo
United States Courthouse and Custom House	Historic Building	Toledo
United Way Labor/Community Services	Community Center	Toledo
United Way of Greater Toledo	Community Center	Toledo
University YMCA	Community Center	Toledo
Valentine Theater Building	Historic Building	Toledo
Vistula Historic District	Historic Building	Toledo
Washington Library	Library	Toledo
Waterville Commercial District	Historic District	Waterville
Waterville Library	Library	Waterville
Wayman D. Palmer Community YMCA	Community Center	Toledo
West Toledo Branch YMCA	Community Center	Toledo
West Toledo Library	Library	Toledo
Westmoreland Historic District	Historic District	Toledo
WJ Murchison Community Center	Community Center	Toledo
Wolf Creek YMCA	Community Center	Maumee
Woodlawn Cemetery	Historic Site	Toledo
YMCA University of Toledo- Morse Fitness Center	Community Center	Toledo
Yondota Historic District	Historic District	Toledo
YWCA	Community Center	Toledo

Many of the assets outlined above can be included in more than one category; for example, power generating stations and water treatment plant can be considered part of the infrastructure, but are also critical facilities, because they provide services during emergencies. Schools house vulnerable populations but the buildings can also serve a critical need of sheltering in some situations.

Relevance to Hazard Mitigation

The assets shown above are important to the communities of Lucas County; these are the what mitigation actions or projects should strive to protect.

1.2.13 Disaster Declarations

When a hazard incident occurs in a state, and the capabilities exceed those of the state, after the preliminary damage assessment, the Governor can request that the President declare an emergency or a disaster.

- **Emergency Declarations**: The President can declare an emergency for any occasion or instance when the President determines federal assistance is needed. Emergency declarations supplement State and local or Indian tribal government efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe in any part of the United States. The total amount of assistance provided for in a single emergency may not exceed $5 million. If the emergency exceeds this amount, the President shall report to Congress.
- **Major Disaster Declarations**: The President can declare a major disaster for any natural event if the damage is of such severity that it is beyond the capabilities of state and local governments to respond. These can include any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought, or, regardless of cause, fire, flood, or explosion. A major disaster declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. Assistance available under a major disaster declaration includes individual, public, and hazard mitigation.

The following table summarizes the disaster declarations that included Lucas County since 1959. There have been no disaster declarations in the county since 2006 (FEMA).

EMERGENCY AND DISASTER DECLARATIONS IN LUCAS COUNTY

Declaration Number	*Event*	*Event Dates*	*Public Assistance Approved*	*Individual Assistance Approved*
DR-90	Floods	1/23/1959	$1,434,684	Not available
DR-191	Tornadoes and Severe Storms	4/14/1965	$275,548	Not available
DR-266	Tornadoes, Severe Storms, and Flooding	7/15/1969	$1,000,000	Not available
DR-362	Severe Storms and Flooding	11/24/1972	$615,863	Not available
DR-377	Severe Storms and Flooding	4/27/1973	$1,417,975	Not available
DR-436	Severe Storms and Flooding	5/31/1974	$858,824	Not available
EM-3055	Blizzards and Snowstorms	1/26/1978	$3,456,669	Not available
DR-653	Severe Storms and Flooding	03/12/1982 - 03/23/1982	$157,390	$268,167
DR-951	Flooding, Severe Storm, Tornadoes	07/12/1992 - 01/01/1992	$8,308,334	$2,081,117

EMERGENCY AND DISASTER DECLARATIONS IN LUCAS COUNTY				
Declaration Number	*Event*	*Event Dates*	*Public Assistance Approved*	*Individual Assistance Approved*
DR-1339	Severe Storms and Flooding	07/29/2000 - 08/02/2000	Not available	$7,898,840
EM-3187	Power Outage	08/14/2003 - 08/17/2003	$1,597,008.45	Not available
EM-3250	Hurricane Katrina Evacuation	08/29/2008 - 10/01/2005	$2,541,599.60	Not available
DR-1651	Severe Storms, Tornadoes, Straight Line Winds, and Flooding	06/21/2006 - 06/23/2006	Not available	$8,830,355.16

Sources: Ohio EMA Mitigation Branch & FEMA

1.3 CAPABILITIES

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

1.3.1 Existing Plans and Ordinances

Lucas County itself and the municipalities therein have a number of capabilities that can support mitigation efforts including comprehensive plans, building codes, subdivision and land use ordinances, zoning ordinances, and floodplain regulations. The county's consultant worked through the steering committee members with jurisdictional representatives to complete a "capabilities assessment." Representatives answered questions about the following plans, codes, and ordinances from the perspectives of their home jurisdictions.

The following table summarizes the jurisdictional capabilities of Lucas County and its jurisdictions according to the completed online surveys.

JURISDICTIONAL CAPABILITIES							
Jurisdiction	*Comprehensive Plan*	*Building Codes*	*Subdivision or Land Use Ordinance*	*Zoning Ordinance*	*Participates in the NFIP*	*Capital Budget Funds for Mitigation Projects*	*Public Works Budget for Mitigation projects*
Lucas County	Yes	Yes	Yes	Yes	Yes*	No	No
Berkey Village	N/A	N/A	N/A	N/A	Yes*	N/A	N/A
Holland Village	Yes	Yes	Yes	Yes	Yes	No	No
Maumee	Yes	Yes	Yes	Yes	Yes	No	No
Oregon	N/A	N/A	N/A	N/A	Yes*	N/A	N/A
Ottawa Hills Village	Unknown	No	Unknown	Yes	Yes*	N/A	N/A
Swanton Village	Yes	Yes	Yes	Yes	Yes	Yes	No
Sylvania	Yes	Yes	Yes	Yes	Yes*	No	No
Toledo	Yes	Yes	Yes	Yes	Yes	Yes	No
Waterville	Yes	Yes	Yes	Yes	Yes	No	No
Whitehouse Village	Yes	Yes	Yes	Yes	Yes*	Yes	Yes

N/A - No answer / Skipped question

** Jurisdiction responded in the survey that they did not or did not know if they participate in the NFIP – all jurisdictions in Lucas County participate in the NFIP*

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.

Building Codes

Building codes regulate construction standards for new construction and substantially renovated buildings. Standards can be adopted that require resistant or resilient building design practices to address hazard impacts common to a given community.

Subdivision and Land Use Development Ordinances

Subdivision and land development ordinances (SALDOs) are intended to 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 land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events.

Zoning Ordinances

Zoning ordinances allow for local communities to regulate the use of land in order 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 and/or require land development to consider specific hazard vulnerabilities.

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

Through administration of floodplain ordinances, municipalities can ensure that all new construction or substantial improvements to existing structures located in the floodplain are flood-proofed, dry-proofed, or built above anticipated flood elevations. Floodplain ordinances may also prohibit development in certain areas altogether. The National Flood Insurance Program (NFIP) establishes minimum ordinance requirements which must be met in order for that community to participate in the program. However, a community is permitted and encouraged to adopt standards which exceed NFIP requirements.

1.3.2 Capability Assessment

Administrative and Technical Capability

Administrative capability is described by an 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.

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).

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.

Self-Assessment

Representative members of the jurisdictions completed a self-assessment for their jurisdiction to serve as representative capabilities within the region to effectively implement hazard mitigation activities. As part of this process, the county consultant encouraged members to consider barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as high, moderate, or limited. The following table summarizes the results of the self-assessment survey as a percentage of the eight responses received.

CAPABILITY SELF-ASSSESSMENT			
Capability	*High*	*Moderate*	*Limited*
Planning & Regulatory	33.3%	33.3%	33.3%
Administrative & Technical	11.1%	27.7%	61.1%
Fiscal	0%	25%	75%
Political	6.6%	40%	53.3%

The 2018 self-assessment also included four questions to gauge community receptiveness to several types of mitigation strategies. The following table details the results.

SELF-ASSSESSMENT: PROJECT CONSIDERATIONS					
Sample Mitigation Strategy	*Very Willing*	*Willing*	*Neutral*	*Unwilling*	*Very Much Unwilling*
XYZ community guides development away from known hazard areas.	0%	40%	60%	0%	0%
XYZ community restricts public investments or capital improvements within hazard areas.	0%	20%	80%	0%	0%
XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.	0%	26.6%	73.3%	0%	0%
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 that establish buffers, install green infrastructure elements, etc.).	0%	26.6%	60%	6.6%	6.6%

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 are listed in Appendix 5 Citations.

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 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	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	USDHS FEMA. (2005). *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. Federal Government: Washington, D.C.	Used as general guidance for incorporating historical property and cultural protection.
Technical Information	USDHS FEMA. (2013). *Local mitigation planning handbook.* Federal Government: Washington, D.C.	Used as general guidance on revised mitigation planning process
Technical Information	USDHS FEMA. (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 (2014). *Enhanced Hazard Mitigation Plan.* State Government: Columbus, OH	Used as general guidance on existing plan integration for hazard mitigation
Plan	Lucas County EMA (2017). *Emergency Operations Plan*. Local Government. Toledo, OH.	Used as general guidance on existing plan integration for hazard mitigation
Plan	TMACOG (2015). *On the Move 2015-2045 Transportation Plan*. Quasi-Government. Toledo, OH	Used as general guidance on existing plan integration for hazard mitigation

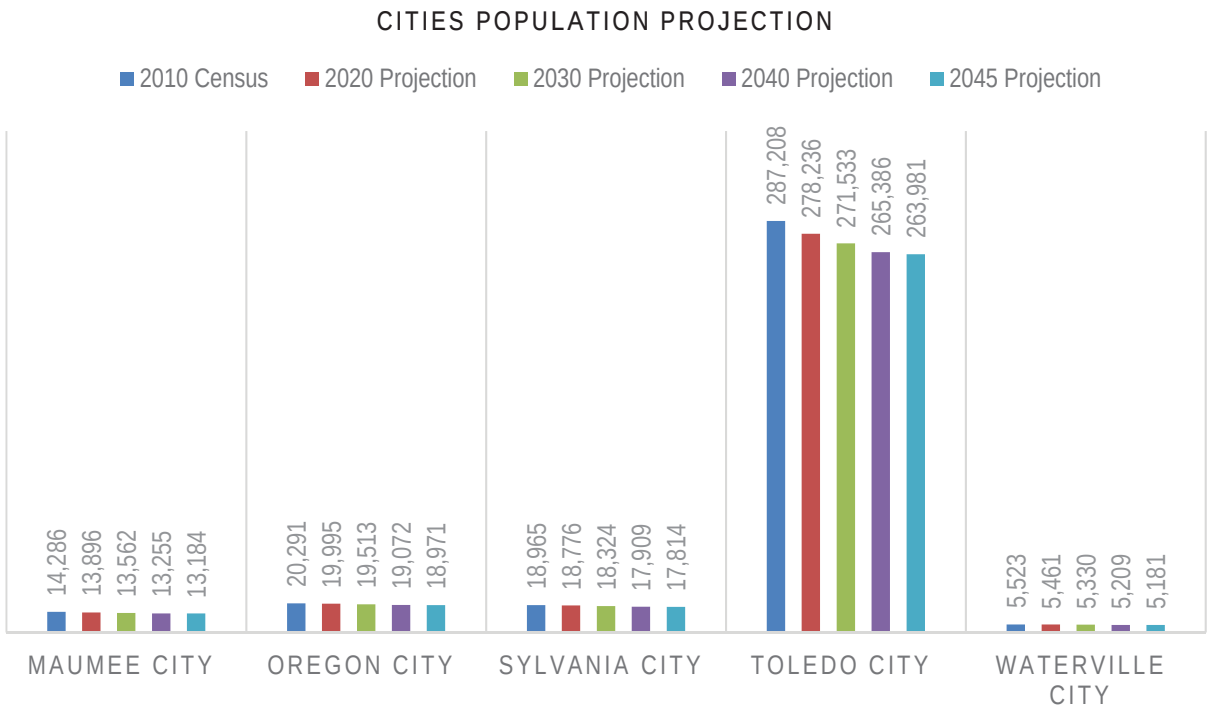
1.4 TRENDS AND PROJECTIONS

§ 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.

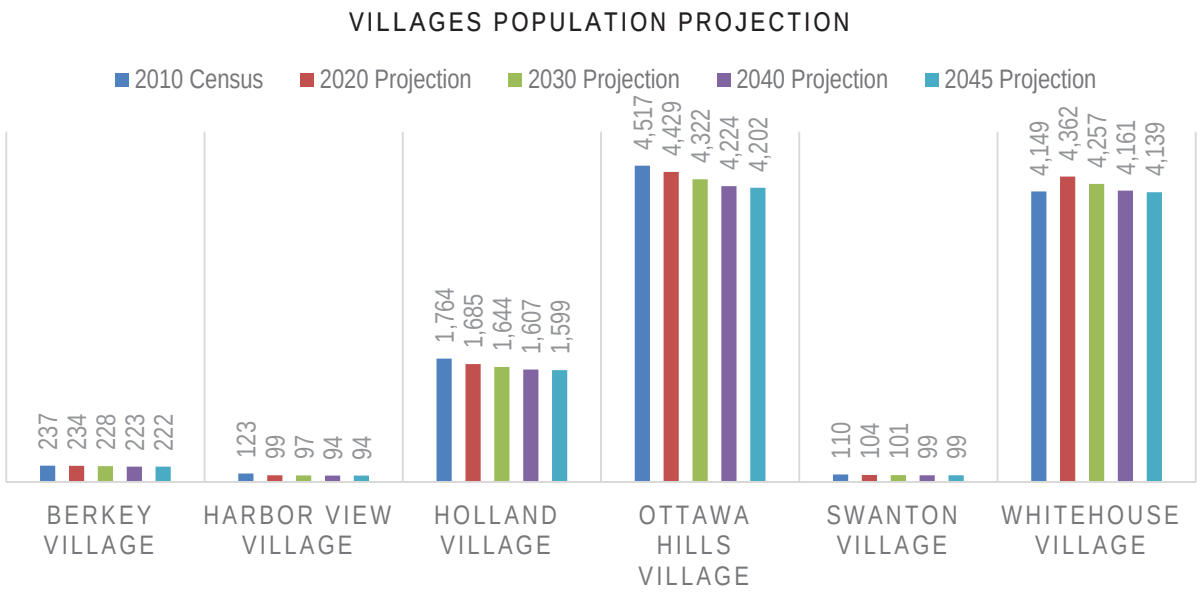
1.4.1 Population

The Toledo Metropolitan Area Council of Governments' (TMACOG) On the Move 2015-2045 Transportation Plan provides population projections calculated using figures from the 2010 Census and projected out to 2045 using recent population trends. According to information from the Ohio Department of Health, birth rates in northwest Ohio will steadily decline through 2045. This trend indicates a continuing increase in the average age of the region's population, with fewer children being born and a gradual lengthening in the average life expectancy (TMACOG, 2015).

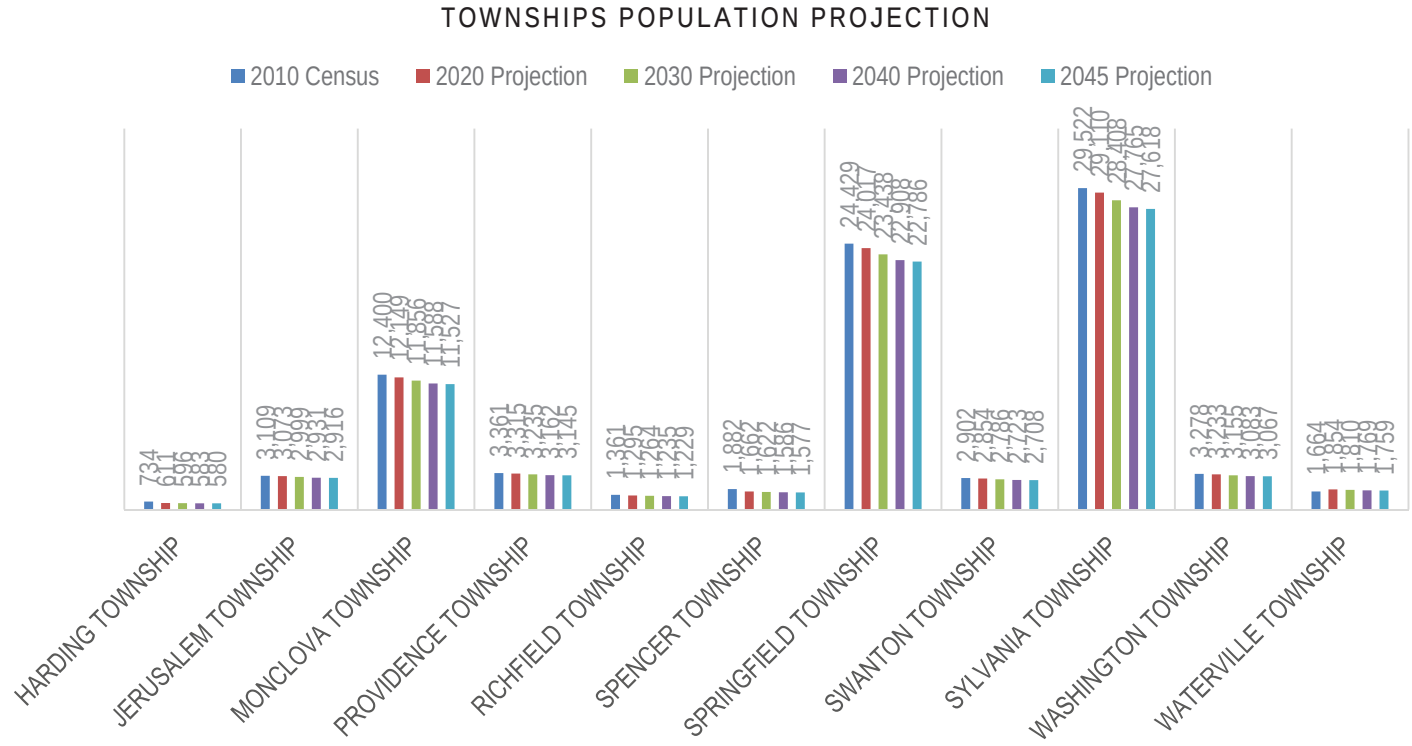
The following graphs illustrate the 2010 US Census information with projections for 2020, 2030, 2040, and 2045. The three graphs show the cities, the villages and the townships within Lucas County.



The above graph shows the population for all the cities declining over the years; Maumee by 7.7%, Oregon by 6.5%, Sylvania by 6%, Toledo by 8%, and Waterville by 6.1%. On average, the total population of the cities might reduce by 6.8%.



The graph above shows the population for all the villages declining over the years; Berkey Village is estimated to reduce its population by around 6.3%, Harbor View by 6%, Holland by 9.5%, Ottawa Hills by 6.9%, Swanton by 10%, and Whitehouse by 0.2%. The Village of Whitehouse indicates that it will have a slight increase of population before following the trend of the rest of the villages. On average, the total population of the villages might reduce by 6.48% overall.



The townships in Lucas County are projected to follow the same downward population trend as the cities and villages in the rest of the county.

1.4.2 Economic and Business Development

In Lucas County, the Toledo Regional Chamber of Commerce is developing the local workforce by working closely with its partners in education and businesses to build a pipeline of future employees for businesses in the Toledo Region. The goal is to have well prepared students graduate from high school to help make the region a preferred place for innovation and diverse talent. Representatives from a diverse variety of industries such as manufacturing, technology, construction trades, healthcare, financial services and others have taken part in the program and work closely with Toledo Public Schools, Washington Local Schools, and Sylvania Schools.

Also through the Toledo Regional Chamber of Commerce, TRAIN, the Toledo Region Academic and Industry Network, connects employers and educators to help increase awareness of current and future career opportunities that are available in the Toledo Region and to ensure education partners prepare students to take advantage of those opportunities. TRAIN is about connecting and coordinating existing resources, not developing new, in order to provide maximum exposure of opportunities to students and education professionals.

1.4.3 Transportation

TMACOG (Toledo Metropolitan Area Council of Governments) recently developed a plan that addresses the transportation problems in the region and addresses them through eight goals Each goal has projects and initiatives based on impacts to the region and its transportation system (TMACOG, 2015).

1. Safety: Reduce traffic-related fatalities and serious injuries across all modes.
2. Infrastructure condition: Maintain and improve the transportation system to a state of good repair.
3. Congestion reduction: Reduce congestion on the National Highway System (NHS)
4. System reliability: Improve the efficiency of the surface transportation system.
5. Freight movement: Strengthen freight access to national and international trade markets to support economic development
6. Environmental sustainability: Protect and enhance the community and natural environments.

7. Project delivery: Expedite project delivery to maximize effective use of public funds.
8. Personal mobility: Improve the quality, accessibility, and efficiency of the multimodal personal transportation system.

1.4.4 Land Use

As stated in the On the Move 2015-2045 Transportation Plan (TMACOG, 2015), expected future development patterns will likely reflect a continuation of recent trends, with the fastest residential growth occurring in western Lucas County (Sylvania Township, Springfield Township, Monclova Township, Waterville and Whitehouse). Higher density, residential development will continue in the vicinity of the University of Toledo to accommodate students who desire off-campus housing. Residential development will continue in Downtown Toledo and the Warehouse District as the demand for loft-type residences in the urban core continues to grow.

The bulk of new retail commercial development will likely occur in the Franklin Park Mall/Westgate area and Spring Meadows area in Lucas County. Office commercial development will likely remain concentrated in business parks such as Arrowhead in Maumee, but the planned ProMedica development in downtown Toledo will serve as a catalyst for additional investment in the downtown area, primarily involving the renovation and re-purposing of existing buildings.

New industrial development will likely occur in existing industrial areas adjacent to U.S. 23 and I-75 in Lucas County. Industrial development will also continue to expand in areas near the Port of Toledo and in industrial parks in Oregon. The Overland Industrial Park developed on the former Jeep site on Jeep Parkway and the land acquired by the City of Toledo for industrial purposes near the Fiat Chrysler Complex in North Toledo present additional opportunities for industrial growth.

1.4.5 Planned Development and Hazard Areas

When planning for new development, it is vital to consider the areas where new development will be located to avoid damages from hazardous events in the future. In Lucas County, the cities and villages plan to expand their transportation, commerce, and residential areas; to that end, the Lucas County Assessors office has developed a database of information on where development is planned in the near future, based on permits filed with the office. The following map shows these planned development areas in green.

2.0 RISK ASSESSMENT

§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.

A risk assessment analyzes "the potential for damage, loss, or other impacts created by the interaction of hazards with community assets" (FEMA, 2013). The risk assessment section contains information on identified hazards that threaten the region in profiles and the vulnerability of the area as it relates to its assets.

2.1 HAZARDS 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 the majority of their second meeting discussing the hazards that the communities in Lucas County had experienced in the last five to ten years. They reviewed the existing hazards list from the previous plan and decided to keep each hazard as they all still affect the county in one way or another. All of the hazards in the plan were natural hazards; they included severe winter storms, tornadoes, floods and flash floods, earthquakes, severe storms, droughts, lake surges, wildfires, temperature extremes, and landslides.

After extensive discussion and noticing that the county's EMA website includes non-natural hazards in their list of local hazards, the committee determined that they needed to expand the list to be more realistic and reflective of the hazards the county faces. The following is a table that outlines the full list of hazards for the Lucas County Hazard Mitigation Plan with a brief description of the reason for each hazard as well as if the hazard is new to this update or existing from the previous plan.

HAZARDS IDENTIFICATION	
Hazard	*Description*
CBRNE/Terrorism (Chemical, Biological, Radiological, Nuclear, Explosive)	Non-natural. New. This hazard includes *intentional* CBRNE and terrorism events within and around the county. The potential threat of a CBRNE or terrorist attack is always present.
Civil Disturbance	Non-natural. New. This hazard would include human-caused violent disturbance to the county including active shooters, riots, and other activities that go beyond day-to-day law enforcement activities but do not qualify as terrorism.
Coastal Erosion	Natural. Existing.
Dam/Levee Failure	Non-Natural. New. Dams and levees could be a potential problem due to the age and status of the dams. Lucas County has Class I dams (with the highest risk) within the county as well as in surrounding counties that could affect Lucas County.
Drought	Natural. Existing.
Earthquake	Natural. Existing.
Flood	Natural. Existing.
Harmful Algal Bloom	Natural. New. Lucas County has Lake Erie shores; in the past, there have been problems with harmful algal bloom, a natural hazard that can contaminate the water.
Hazmat	Non-natural. New. Major interstates and rail lines run through the county leaving it vulnerable to transportation accidents involving hazardous materials. Additionally, the county has fixed facilities that utilize or store hazardous materials.
Lake Surge	Natural. Existing
Landslide	Natural. Existing.

Pandemic	Natural. New. The committee recognizes the potential for a pandemic originating within the county as well as arriving from other locations to the county. In the past, the county has experienced some pandemic activity.
Severe Thunderstorms (Hail and Lightning)	Natural. Existing.
Severe Winter Storm	Natural. Existing.
Temperature Extremes	Natural. Existing.
Tornado	Natural. Existing.
Wind	Natural. Existing. The plan addressed this hazard previously, but the committee decided to make 'wind' its own profile due to several recent events that caused damage in the county.
Wildfire	Natural. Existing.

In total, there are 17 hazards that this plan will analyze in depth in Section 2.4 Hazard Profiles. There exist other hazards that this plan does not address; the following outlines the hazards and the reason they are not considered in the plan.

- **Avalanche:** Avalanches happen mainly in the western United States and Canada. The terrain and geography of Lucas County is not rugged or severe enough to have avalanches.
- **Hurricanes:** The Atlantic east coast, where hurricane paths are nearest, is approximately 560 miles away and the Pacific west coast is approximately 2,100 miles away and would not affect Lucas County.
- **Sea Level Rise:** Sea level rise occurs in the ocean; the Atlantic east coast is approximately 560 miles away and the Pacific west coast is approximately 2,100 miles away and would not affect Lucas County.
- **Tsunami:** Tsunamis occur in the ocean; the Atlantic east coast is approximately 560 miles away and the Pacific west coast is approximately 2,100 miles away and would not affect Lucas County. The closest relatable hazard to tsunamis in Lucas County is lake surge, which is addressed in this plan.
- **Volcano:** The closest monitored volcano is in Yellowstone National Park in Wyoming and is approximately 1,500 miles away and would not affect Lucas County.

2.2 RISK AND VULNERABILITY

§201.6(c)(2)(i)	[The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

§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.

2.2.1 Calculating Risk

One of the components of the risk assessment is to determine the risk of a hazard, determined by the probability of occurrence and the potential severity of the event. This process helps identify which hazards pose the most significant risk to Lucas County and its municipalities. The probability of an event happening is determined based on the number of events that have occurred within a certain timeframe. The timeframe is based on information available from different sources and varies depending on the data. Different sources provide data on the number of events throughout a period of years. This data is used to calculate the probability.

The Ohio State Hazard Analysis Resource and Planning Portal (SHARPP) categorizes the overall risk of each hazard utilizing seven topics that affect the community's vulnerability to a hazard. This plan recognizes the value of implementing several categories to determine the overall risk of a hazard. The following describes the categories utilized in this plan and how they are evaluated against the available data to score points and ultimately determine the risk.

- **Frequency**: The number of times a hazard occurs in a determined time; available historic data determines the time period. In most instances, to calculate this, the total occurrences, for example, 3 occurrences, is divided by the length of time in years that data is available, for example, 10 years. So, 3 occurrences/10 years equals 0.3. The table to the right translates the

FREQUENCY			
Value	*Score*	*Description*	*Definition*
.76 - >1.0	5	Excessive	Will occur during a year (SHARPP: hazard or event resulted in nine or more declarations)
.51 - .75	4	High	Likely to occur in a year (SHARPP: hazard or event resulted in six to eight declarations)
.26 - .50	3	Medium	May or may not occur in a year (SHARPP: hazard or event resulted in three to five declarations)
0 - .25	2	Low	Unlikely to occur in a year (SHARPP: hazard or event resulted in one to two declarations)
0	1	None	So unlikely that it can be assumed it will not occur in a year (SHARPP: hazards or events result in no local disaster declarations)

numeric values into the description of the frequency at which a hazard occurs. In the case of the example described here, the hazard would have a 'low' frequency. At times, no historic data is available of a hazard occurring; in this case, the hazard will receive the lowest possible points for the category (i.e., 1). This will be the method utilized to determine frequency. The SHARPP tool defines each level regarding the number of declarations.

- **Response**: Average response duration is the "time on the ground" or the time-period of response to a hazard, or event. Transportation accidents may last a few hours whereas a tire fire may last a week or a flood several weeks. Duration, therefore, may not always be indicative of the degree of damage but it remains an important planning factor.
- **Onset**: Average speed of onset may affect all other factors due to lack of warning or time to prepare for impact. The lead-time required protecting lives and property varies greatly with each event. For instance, a winter storm may develop so slowly that there is time to alert crews and pre-place plows, but flash floods can occur with little warning.
- **Magnitude**: Average magnitude is the geographic dispersion of the hazard. For instance, how much of the community would be impacted by a flood or hazardous material incident.
- **Business**: The impact on business refers to enduring the economic impact of the hazard on the community by an event. A score of one compares to a shutdown of critical facilities for less than 24 hours. Two equals a complete shutdown of critical facilities for one week. A score of three means a complete shutdown of critical facilities for at least two weeks. A score of four equals a complete shutdown of critical facilities for 30 days or more. This factor was developed and in keeping with the hazard analysis in the Ohio Standard Mitigation Plan developed by the Ohio EMA Mitigation Branch.
- **Human**: This factor relates to the number of lives potentially lost to a particular hazard agent. This factor can vary between jurisdictions based on economic, geographic, and demographics of the particular populations. Therefore, some generalization need be inflected on this factor. This factor was developed and in keeping with the hazard analysis in the Ohio Standard Mitigation Plan developed by the Ohio EMA Mitigation Branch.

- **Property**: This factor relates to the amount of property potentially lost to a particular hazard agent. This factor can vary between jurisdictions based on economics, geographic amount owned, and demographics of the particular populations. Therefore, some generalization need be inflected on this factor. This factor was developed and in keeping with the hazard analysis in the Ohio Standard Mitigation Plan developed by the Ohio EMA Mitigation Branch.

All calculations are based on historical occurrences and not on worst-case scenarios. In cases where no historical occurrences exist, a determination will be made based on other available data that varies across the hazards and is outlined in each hazard profile.

SHARPP 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	1 day	12-24 hours	Limited (10-25% of land area affected)	1 week	Low (some injuries)	10-25% of property affected
3	Medium	1 week	6-12 hours	Critical (25-50% of land area affected)	At least 2 weeks	Medium (multiple severe injuries)	25-50% of property affected
4	High	1 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 is ranked against the criteria outlined in the table above; based on this, each hazard can reach between 7 and 30 points, the highest and lowest possibilities; shown below.

Lowest Possible Points (Score)

Category	*Points*
Frequency	1
Response	1
Onset	1
Magnitude	1
Business	1
Human	1
Property	1
Total	**7**

Highest Possible Points (Score)

Category	*Points*
Frequency	5
Response	5
Onset	4
Magnitude	4
Business	4
Human	4
Property	4
Total	**30**

To calculate the overall risk of a hazard, the amount of points a hazard receives falls under a hazard risk category. The list below shows to which type of risk the hazard corresponds based on the points it receives from the above categories.

Range of Points (Score)	*Hazard Risk*
7 - 10	Lowest
11 - 15	Low
16 - 20	Medium
21 - 25	High
26 - 30	Highest

After planners developed the profiles for each hazard, they summarized the contents in the following tables. The first table outlines the points each hazard received for each of the analyzed risks. For example, CBRNE/Terrorism received 1 point for frequency, 3 for response, 4 for onset, 2 for magnitude, 2 for business, 3 for human, 2 for property, and a total of 17 points. The last column summarizes the loss estimate as explained in each hazard profile. Hazards in this table are listed alphabetically.

SUMMARY OF RISK ANALYSIS OF HAZARDS

Hazard	*Risk*	*Frequency*	*Response*	*Onset*	*Magnitude*	*Business*	*Human*	*Property*	*Total*	*Loss Estimate*
CBRNE/Terrorism	Medium	1	3	4	2	2	3	2	17	Not Available
Civil Disturbance	Low	2	2	2	1	2	2	2	13	Not Available
Coastal Erosion	Low	5	1	1	1	1	1	1	11	No losses
Dam/Levee Failure	Low	1	4	1	1	2	1	1	11	Not Available
Drought	Low	4	1	1	2	1	1	1	11	No losses
Earthquake	Lowest	1	1	4	1	1	1	1	10	$5,335,540,000 per event over 5.0 magnitude
Flood	Medium	4	4	3	1	2	1	3	18	$904,050,000 per event
Harmful Algal Bloom	Medium	5	5	1	2	2	1	1	17	Not Available
Hazardous Materials Incident	Medium	5	3	4	1	2	2	1	18	Over $541,000 per year
Lake Surge	Low	2	4	1	1	2	1	3	14	Approximately $300,000 per year
Landslide	Lowest	1	2	3	1	1	1	1	10	Approximately 850,000
Pandemic	Medium	4	3	1	3	1	4	1	17	Approximately $21,190,000 per year
Severe Thunderstorms & Hail	Low	3	3	1	3	1	1	1	13	Approximately $71,700 per event
Severe Winter Storm	Low	5	2	1	4	1	1	1	15	Approximately $313,000 per event
Temperature Extremes	Low	3	1	1	3	1	1	1	11	Approximately $15,000 per event
Tornado	High	2	4	4	1	4	2	4	21	Approximately $3,500,00 per event
Wildfire	Low	3	3	4	1	1	1	1	14	Approximately $84,000 per year
Wind	Low	2	2	2	2	1	1	1	11	Approximately $54,600 per event

The second table shows how each hazard ranks against the others within the defined criteria – overall risk, frequency, response, onset, magnitude, business, human, and property. The names of the hazards have been modified to fit the table; refer to the key below the table. In addition, colors are assigned to the risk and a grayscale for the number of points received in the category. For example, the highest risk of all the hazards is tornado, which is indicated in the first column in red. The highest amount of points received in frequency (second column) is 5, indicated by the dark grey, in which hazardous materials incidents, harmful algal blooms, and severe wither weather all received 5 points. The lighter greys indicate less points received.

HAZARD RANKINGS BASED ON RISK CRITERIA

Risk	*Frequency*	*Response*	*Onset*	*Magnitude*	*Business*	*Human*	*Property*
Tornado	Erosion	HAB	Tornado	Winter	Tornado	Pandemic	Tornado
Flood	Hazmat	Flood	Hazmat	Pandemic	Terrorism	Terrorism	Flood
Hazmat	HAB	Tornado	Wildfire	Thunder	HAB	Tornado	Lake Surge
Terrorism	Winter	Lake Surge	Terrorism	Temp. Ex.	Hazmat	Hazmat	Terrorism
HAB	Flood	Dam	Earthquake	Terrorism	Flood	Civil Dist.	Civil Dist.
Pandemic	Pandemic	Hazmat	Flood	Wind	Civil Dist.	HAB	Pandemic
Winter	Drought	Pandemic	Landslide	HAB	Lake Surge	Flood	Hazmat
Lake Surge	Wildfire	Wildfire	Civil Dist.	Drought	Dam	Lake Surge	HAB
Wildfire	Thunder	Thunder	Wind	Tornado	Winter	Dam	Dam
Civil Dist.	Temp. Ex.	Terrorism	HAB	Hazmat	Pandemic	Winter	Winter
Thunder	Tornado	Winter	Erosion	Wildfire	Thunder	Thunder	Thunder
Dam	Lake Surge	Civil Dist.	Lake Surge	Earthquake	Temp. Ex.	Temp. Ex.	Temp. Ex.
Drought	Civil Dist.	Wind	Dam	Flood	Wind	Wind	Wind
Temp. Ex.	Wind	Landslide	Pandemic	Landslide	Erosion	Erosion	Erosion
Wind	Terrorism	Erosion	Thunder	Civil Dist.	Drought	Drought	Drought
Erosion	Dam	Drought	Winter	Lake Surge	Wildfire	Wildfire	Wildfire
Earthquake	Earthquake	Temp. Ex.	Drought	Dam	Earthquake	Earthquake	Earthquake
Landslide	Landslide	Earthquake	Temp. Ex.	Erosion	Landslide	Landslide	Landslide

Key

CBRNE/Terrorism	Terrorism
Civil Disturbance	Civil
Coastal Erosion	Erosion
Dam/Levee Failure	Dam
Drought	Drought
Earthquake	Earthquake
Flood	Flood
Harmful Algal Bloom	HAB
Hazardous Materials Incident	Hazmat
Lake Surge	Lake Surge
Landslide	Landslide
Pandemic	Pandemic
Severe Thunderstorms & Hail	Thunder
Severe Winter Storm	Winter
Temperature Extremes	Temp. Ex
Tornado	Tornado
Wildfire	Wildfire
Wind	Wind

High
Medium
Low
Lowest

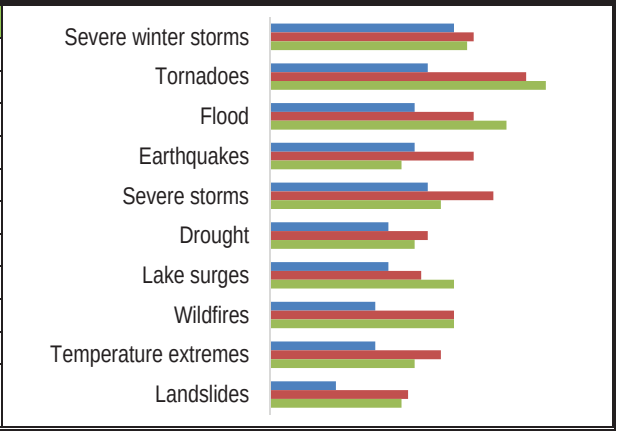
5 points scored
4 points scored
3 points scored
2 points scored
1 point scored

The hazards and how they impact Lucas County have changed over the years, whether it be in frequency, onset, magnitude or damages. The following table compares the hazards' risk in the previous plan (2013) to the hazards in this update. In 2013 the scale for

frequency and response was 1 – 4, where in this update the scale is 1 – 5 to align with SHARPP; these instances are noted in the table. Hazards not included in 2013 that are new to this update are not included in the table. *NOTE: Coastal erosion was not a stand-alone hazard in the 2013 plan.

2004, 2013, AND 2019 HAZARD RISK COMPARISON

Hazard	*2004*	*2013*	*2019*
Severe winter storms	14	15.5	15
Tornadoes	12	19.5	21
Flood	11	15.5	18
Earthquakes	11	15.5	10
Severe storms*	12	17	13
Drought	9	12	11
Lake surges	9	11.5	14
Wildfires	8	14	14
Temperature extremes	8	13	11
Landslides	5	10.5	10
* In 2013 this hazard received 4 points, the highest, for frequency, which in 2019 would be 5 points,			



2.2.2 Considering Vulnerability

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 a people; these can include income disparity, class, race or ethnicity, gender, age, disability, health, and literacy (Thomas & Phillips, 2013, p. 2, 3). The following is a brief description of how each of the aspects can contribute to vulnerability to disasters.

- **Income Disparity**: Income disparities produce different outcomes from disasters that can cause more human suffering, and requiring more external support.
- **Class**: Lower-income families tend to live in housing that suffers disproportionately during disasters.
- **Race or Ethnicity**: Warning messages tend to be issued in the dominant language with an expectation that people will take the recommended action immediately.
- **Gender**: Domestic and stranger violence increases after a disaster. Although women tend to be the ones most likely to secure relief aid for the family, they are underrepresented and underused in recovery efforts.
- **Age**: Elderly populations are frequently reluctant to seek assistance before and secure aid after a disaster out of concern that they may lose their independence.

- **Disability**: People with disabilities experience challenges in acquiring transportation to evacuate areas as well as to access appropriate shelters and post-disaster housing.
- **Health**: Disasters can disrupt access to care. Individuals on health services are faced with life-threatening circumstances if these services cannot be accessed. Disasters tend to exasperate chronic and mental health conditions.
- **Literacy**: Many emergency preparedness materials are available in written form. Few options exist for people with low reading levels, other languages, or cognitive abilities.

2.3 COMPLICATING VARIABLES

Direct, calculable consequences of disasters can include fatalities, injuries, and damages to humans, animals or property. However, disasters do not end there; there are several indirect effects, tangible and intangible, associated with disasters. 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 difficult to assign a specific dollar value and quantify accurately. For this analysis, the primary focus of loss estimates will be direct consequences of the given hazard.

Countless situations could occur that could result in a disruption to critical systems throughout Lucas County. Loosely-related variables can complicate some hazards; these are often considered *cascading hazards*. For example, high winds may cause sporadic damage throughout the county, but often 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 Lucas County could include (but not be limited to) the following.

- Damage to infrastructure (i.e., roads, bridges, tunnels, pipes, utility poles, etc.) and residences following flooding
- Flooding of downstream areas in the event of a dam 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
- Road closures and damage to residences resulting from land subsidence
- Population displacement before, during, or after an event that may be temporary or permanent

The complicating variables related to each hazard are described within the profiles. The information presented is based on worst-case scenario events; a single event may not always reach all impacts described. However, it is important to understand that the impacts of hazards go beyond what is 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.

2.3.1 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 of time, such as days or weeks. Climate, in contrast, refers to the atmospheric conditions of a geographical area over long periods of time, such as years, or even decades (Keller, Devecchio, 2015, pp. 406-407).

According to the U.S. Global Change Research Program (2016), there are weather and climate changes that have already been observed in the United States.

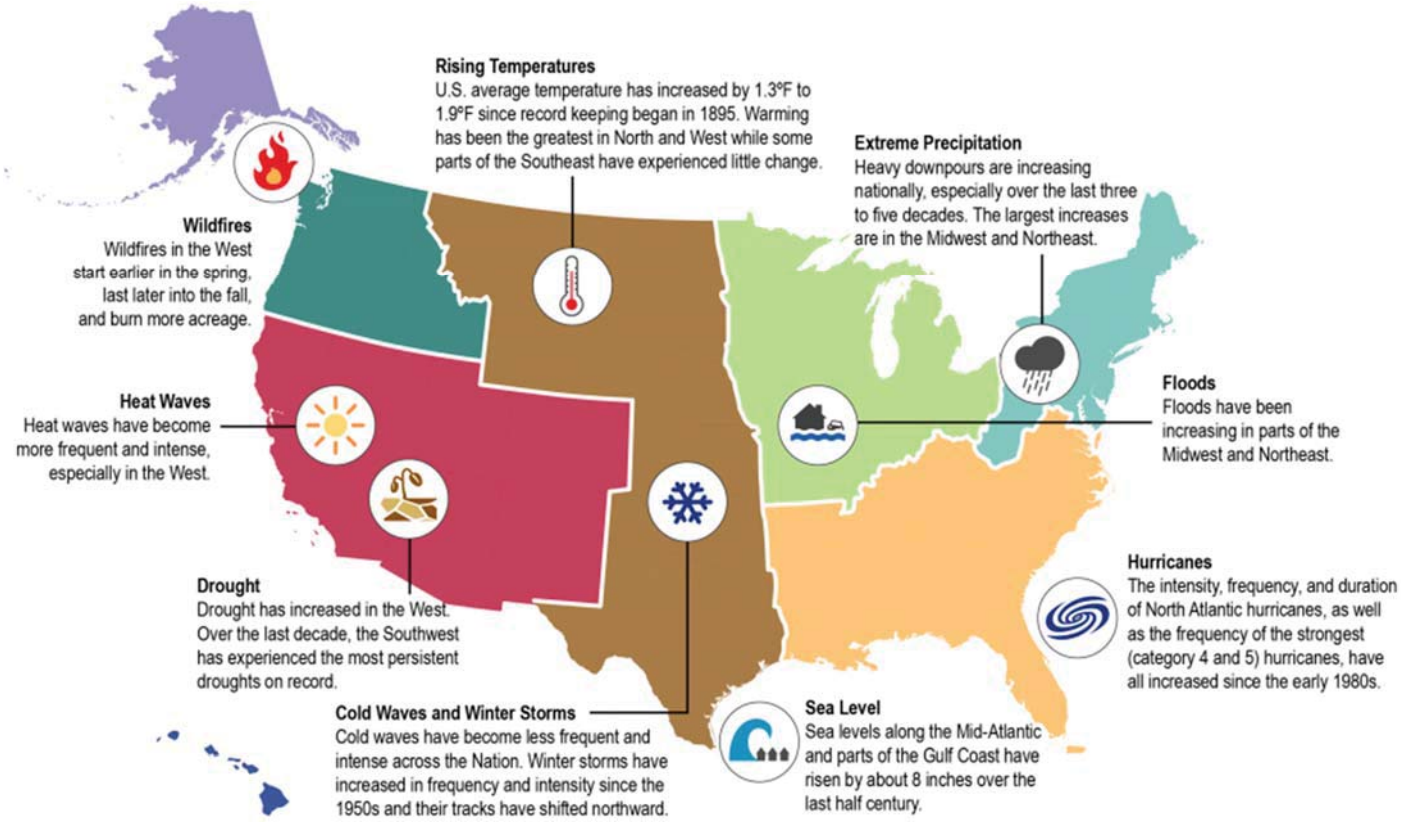
- Since recordkeeping began in 1895, the average U.S. temperature has increased by 1.3°F to 1.9°F with most of the increase happening since 1970. In addition, the first decade of the 2000s has been the warmest on record.
- The average precipitation across the U.S. has increased since 1900 with some areas 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; heat waves 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 seen to be

- 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 an increase of hurricane activity in the southeastern states.

In Ohio, the trend will be an increase in flooding which will lead to more events of hazards such as land subsidence, and possible dam failures or epidemics.



2.3.3 Public Health and Social Vulnerability

Understanding the overall health status of the community is important 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 defined as those individuals or groups of people who are more exposed to the risks of the impacts of a hazard because of their age, gender, income, occupation, disability, physical or mental health, literacy, income, 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, coastlines, 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.

Each hazard profile goes further into detail explaining how the hazard could affect public health and social vulnerability.

2.4 HAZARD PROFILES

The following sections contain a profile of each hazard considered by this plan, which provides details on how the hazard impacts the area. Within each profile, research and historical data informs the following elements.

- **Hazard Overview**: Defines the hazard and presents a brief summary table of the hazard.
- **Possible Causes**: Describes a variety of causes that can contribute to the occurrence of a hazard.
- **Impact and Vulnerability**: 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. The plan should describe vulnerability in terms of:

- **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.

- **Location and Extent**: Identifies the physical places in the region 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.

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

§ 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)(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;

- **Previous and Ongoing Mitigation Efforts:** Describes any efforts to reduce the impact of the particular hazard through legislation, planning, or structural projects.
- **Risk Assessment**: Details methods of calculating probability and severity of each hazard.
- **Map and Assets**: Graphically shows the geographic locations or populations in the county that are vulnerable to each hazard. This section also identifies the assets that fall under the hazard risk area. Although there is not a defined title for this section in the profiles, assets and maps are located where they are most fitting within the narrative.

§ 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.

The hazard profiles in this section are organized first by level of risk, from highest to lowest, then by the total number of points receive in all the categories, and finally, when hazards received the same amount of points, alphabetically. category. This presents the higher risk hazards to Lucas County first. The order of the profiles is the following.

1. Tornado
2. Flood
3. Hazardous Materials Incident
4. CBRNE / Terrorism
5. Harmful Algal Bloom
6. Pandemic
7. Severe Winter Storm
8. Lake Surge
9. Wildfire
10. Civil Disturbance
11. Severe Thunderstorms
12. Dam and Levee Failure
13. Drought
14. Temperature Extremes
15. Wind
16. Earthquake
17. Landslide

2.4.1 Tornado

HAZARD OVERVIEW

HIGHEST HIGH MEDIUM LOW LOWEST	A tornado is a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.			
	Period of Occurrence:	At any time, typically when warm and cold temperatures are present together	**State Risk Ranking:**	Frequency: Highly likely Impact: Critical Ranking: 4 - High
	Type of Hazard:	Natural	**Disaster Declarations:**	DR-191, DR-266, DR-951, DR-1651

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. Normally thunderstorms and associated tornadoes develop in warm, moist air in advance of strong eastward-moving cold fronts in late winter and early spring. Tornadoes can also occur along a "dryline" which separates very warm, moist air to the east from hot, dry air to the west. Both of these scenarios are common in the Central Plains. Another way that tornadoes can be created occurs when warm moist air flows upslope. Under the right temperature and moisture conditions, intense thunderstorms can produce tornadoes in higher terrain. Tornadoes can occur in every state, although the mid-west states have by far the greatest potential for this type of event. Tornadoes are ranked by intensity using the Enhanced Fujita (EF) Scale, replacing the original Fujita Scale devised by Dr. Theodore Fujita at the University of Chicago in 1971.

ENHANCED FUJITA SCALE		
#	*3-Second Gust (mph)*	*Examples of Possible Damage*
EF-0	45-78	**Light Damage.** Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to signboards.
EF-1	79-117	**Moderate Damage.** Surface peeled off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
EF-2	118-161	**Considerable Damage**. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
EF-3	162-209	**Severe Damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
EF-4	210-261	**Devastating Damage**. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
EF-5	262-317	**Incredible Damage**. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100-yards; trees debarked; incredible phenomena will occur.

FEMA's wind zone map of the United States classifies the territory into wind zones. As seen in the graphic to the right, the whole state of Ohio, and consequently Lucas County, are in Zone IV, which means that buildings should be designed for 3-second gusts of up to 250 mph.

POSSIBLE CAUSES

The causes of thunderstorm strength winds and tornadoes are thunderstorms. Wind is caused by differences in atmospheric pressure; when there is a difference in pressure, air moves higher resulting in wind. See Section 2.4.11 Severe Thunderstorms for more information.

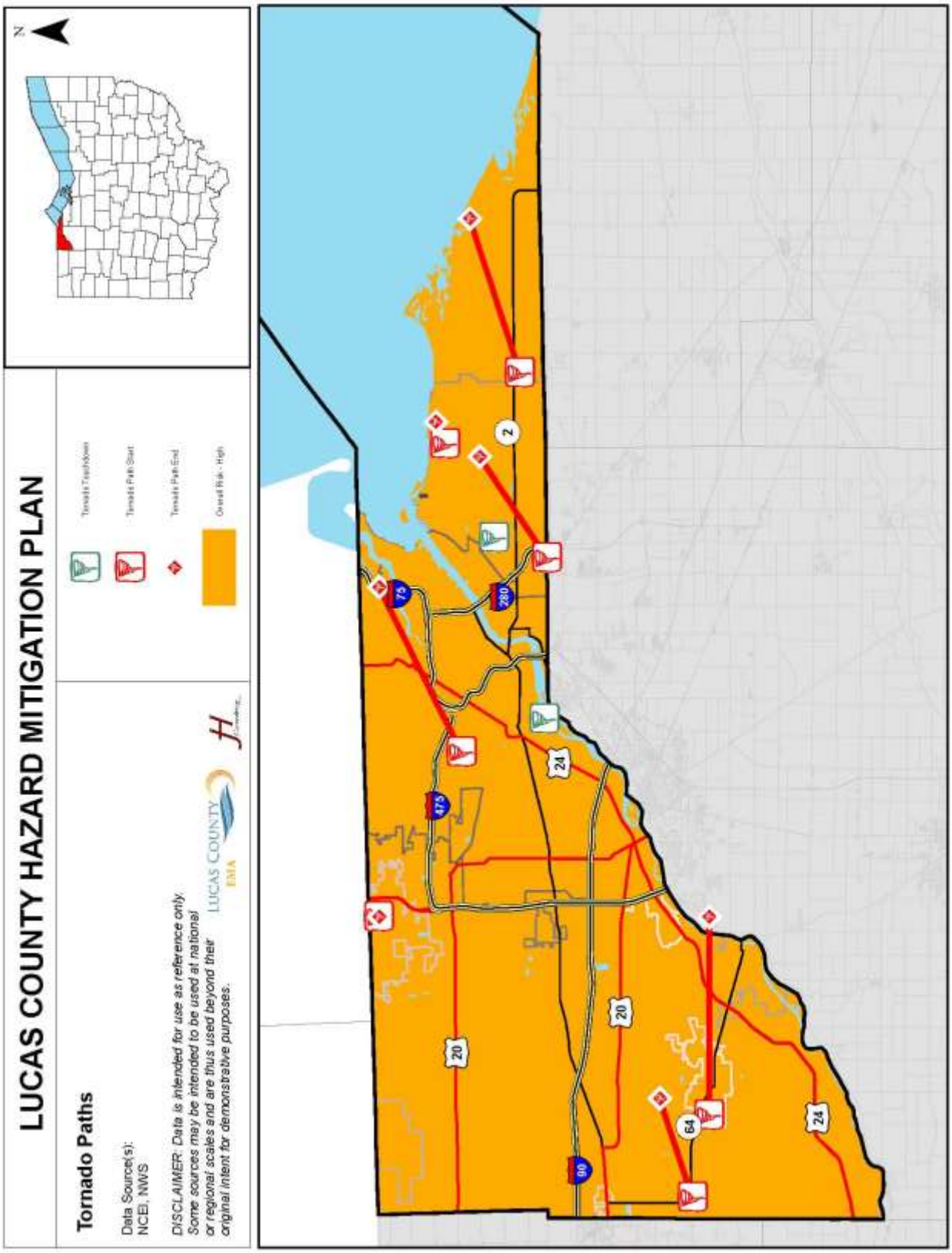
LOCATION AND EXTENT

In general, all areas in the county are equally at risk to severe wind and tornadoes even though tornadoes are localized events. Wind events typically span several counties and states at the same time, for varying durations.

HISTORICAL OCCURRENCES

The table below outlines the tornadoes that have occurred in Lucas County since 1965, according to the NCEI database. There have been nine tornadoes ranging from F0 to F4 magnitude. Five of the nine tornadoes have occurred during the month of April. The first event listed is in 1965, part of what is know as the Palm Sunday Tornado Outbreak. The 'Toledo Tornado' mostly impacted a six-mile-long stretch in the modern-day Washington Local School District. The twister touched down near Secor Road at its western end, before staying parallel to the Ottawa River, near Sylvania Avenue. Most agree that the worst damage took place from Telegraph to the Shoreland area, east of Interstate 75 (Cathey, 2018). The map on the following page shows the paths tornadoes have taken in the past in Lucas County.

TORNADO EVENTS			
Date	*Magnitude*	*Deaths*	*Injuries*
4/11/1965	F4	16	207
4/8/1980	F2	0	2
4/17/1981	F0	0	0
7/12/1992	F2	0	1
5/9/2000	F1	0	0
4/11/2008	EF1	0	0
6/5/2010	EF1	0	0
4/19/2011	EF0	0	0
11/17/2013	EF2	0	0


LUCAS COUNTY HAZARD MITIGATION PLAN
Tornado Paths
Data Source(s):
NCEI, NWS
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Tornado Touchdown
Tornado Path Start
Tornado Path End
Overall Risk - High
N
2
280
75
475
24
20
64
90

IMPACTS AND VULNERABILITY

While tornadoes are relatively short-lived in duration, they are intensely focused, making them one of the most destructive forces in nature. As previously discussed above, Lucas County is located in the "Zone IV" wind zone. This wind zone places Lucas County in a category that could experience severe tornadoes. Such winds would cause significant damage to structures, such as roofs torn off frame houses, mobile homes demolished, and boxcars pushed over.

Tornado winds can cause a variety of secondary, or cascading, hazard events. For instance, the wind may blow limbs from trees down knocking out electric power or blocking roadways. Wind often results in damages to roofs and other home finishings (such as siding, etc.). Damage and loss of life could be severe and overwhelm the ability of local responders to address the emergency.

It is impossible to predict where tornadoes will touch down in the future or what path they will take. Therefore, all assets in the county are at risk of a potential tornado. For a full list of assets, refer to section 1.2.12 Asset Inventory.

LOSS AND DAMAGES

The NCEI database keeps records of the losses and damages due to tornado events; according to the data, there has been $31,750,000 in damages from the nine tornadoes in Lucas County. The costliest was in 1965; this one cost $25 million. That same tornado caused 16 deaths and 207 injuries directly related to the event. Based on this data, the average cost per event has been $3.5 million.

PREVIOUS AND ONGOING MITIGATION EFFORTS

In the past five years, Lucas County has worked to build a tornado shelter at the Montessori school. They have completed that project and continue to seek additional opportunities for location and funding of new tornado shelters.

In addition, some mitigation projects from the previous plan relating to tornadoes have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of tornadoes.

- Develop weather spotter training courses and implement training within local fire and police departments.

- Educate the public to secure all loose items on decks, porches and in yards.
- Review all Lucas County and municipal building codes and recommend revisions for future construction to reflect best current standards for anchoring against straight line and tornado winds.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	2	Low	There have been 9 tornadoes in 56 years in Lucas County
Response	4	More than a month	Tornadoes cause devastating damage that takes up to a month or more to clean or remediate.
Onset	4	Less than 6 hours	Thunderstorm conditions are easily predictable, but tornadoes are quick to develop.
Magnitude	1	Localized (less than 10% of land are affected)	Although tornadoes could occur in any part of the county, the path they take is limited to a narrow stretch of land.
Business	4	More than 30 days	If businesses are affected by tornadoes, they could be affected for more than 30 days until repairs are made. It is also possible that businesses may not come back after they are destroyed by a tornado
Human	2	Low (some injuries)	Due to the upgrades in warning systems and shelter locations, it is possible that less people would get injured and could get to safety prior to a tornado passing through.
Property	4	More than 50% of property affected	When a tornado hits a property, it is likely that the majority of the structure could be gone or severely damaged.
Total	**21**	**High**	The risk of tornadoes to Lucas County, based on the points received, is high.

2.4.2 Flood

HAZARD OVERVIEW

A general or temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters or the rapid accumulation of runoff surface waters from any source.			
Period of Occurrence:	At any time, typically after prolonged periods of precipitation.	**State Risk Ranking:**	Frequency: Highly likely Impact: Critical Ranking: 4 - High
Type of Hazard:	Natural	**Disaster Declarations:**	DR-90, DR-266, DR-362, DR-377, DR-436, DR-653, DR-951, DR-1339, DR-1651

Floods are the most prevalent hazard in the United States. Each year, floods cause more property damage in the United States than any other type of natural disaster, killing an average of 150 people a year. Floods are described by their horizontal extents, the depth of the floodwaters and the probability of occurrence. Unfortunately, the probability of occurrence has historically been expressed in terms such as a "100-year flood", which the general public logically assumes means a flood that happens once in 100 years. In fact, the probability of occurrence is best interpreted as a percent chance of occurring. So, a 100-year flood is that flood level that has a 1% chance of occurring in any given year. The 100 year, or 1% flood, is often used for planning purposes. Smaller floods are more likely to occur; thus a 10-year flood has a 10% chance of occurring in any given year.

The NFIP is a governmental program administered through FEMA that, "aims to reduce the impact on private and public structures… by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations" (FEMA). Each jurisdiction participating in the NFIP has a designated NFIP coordinator, sometimes referred to as the floodplain manager. This individual maintains the jurisdiction's floodplain ordinance and ensures that development is compliant with that ordinance. Each local floodplain manager serves as the point of contact with FEMA regarding floodplain mapping. For more information on how each jurisdiction participates in the NFIP, refer to Appendix 1 Planning Documentation.

JURISDICTIONS PARTICIPATING IN NFIP					
Jurisdiction	*Type*	*Initial FHBM Identified*	*Initial FIRM Identified*	*Current Effective Map Date*	*Reg-Emer Date*
Lucas County (includes Washington Township)	County	05/20/1977	03/16/1983	03/16/2016	03/16/1983
Maumee	City	02/08/1974	03/28/1980	08/16/2011	03/28/1980
Oregon	City	08/01/1975	03/15/1978	08/16/2011	03/15/1978
Sylvania	City	12/14/1973	07/05/1977	03/16/2016	07/05/1977
Toledo	City	10/08/1976	06/04/1980	03/16/2016	06/04/1980
Waterville	City	04/05/1974	01/02/1981	08/16/2011	01/02/1981
Berkey	Village	N/A	10/06/2000	08/16/2011	03/08/2005
Harbor View	Village	08/08/1975	10/06/2000	08/16/2011	05/25/1978
Holland	Village	04/12/1974	09/22/1978	03/16/2016	09/22/1978
Ottawa Hills	Village	11/09/1973	06/04/1980	03/16/2016	06/04/1980
Swanton	Village	07/25/1975	02/15/1984	08/16/2011	04/09/1996
Whitehouse	Village	03/29/1974	05/19/1981	08/16/2011	05/19/1981

Source: FEMA NFIP

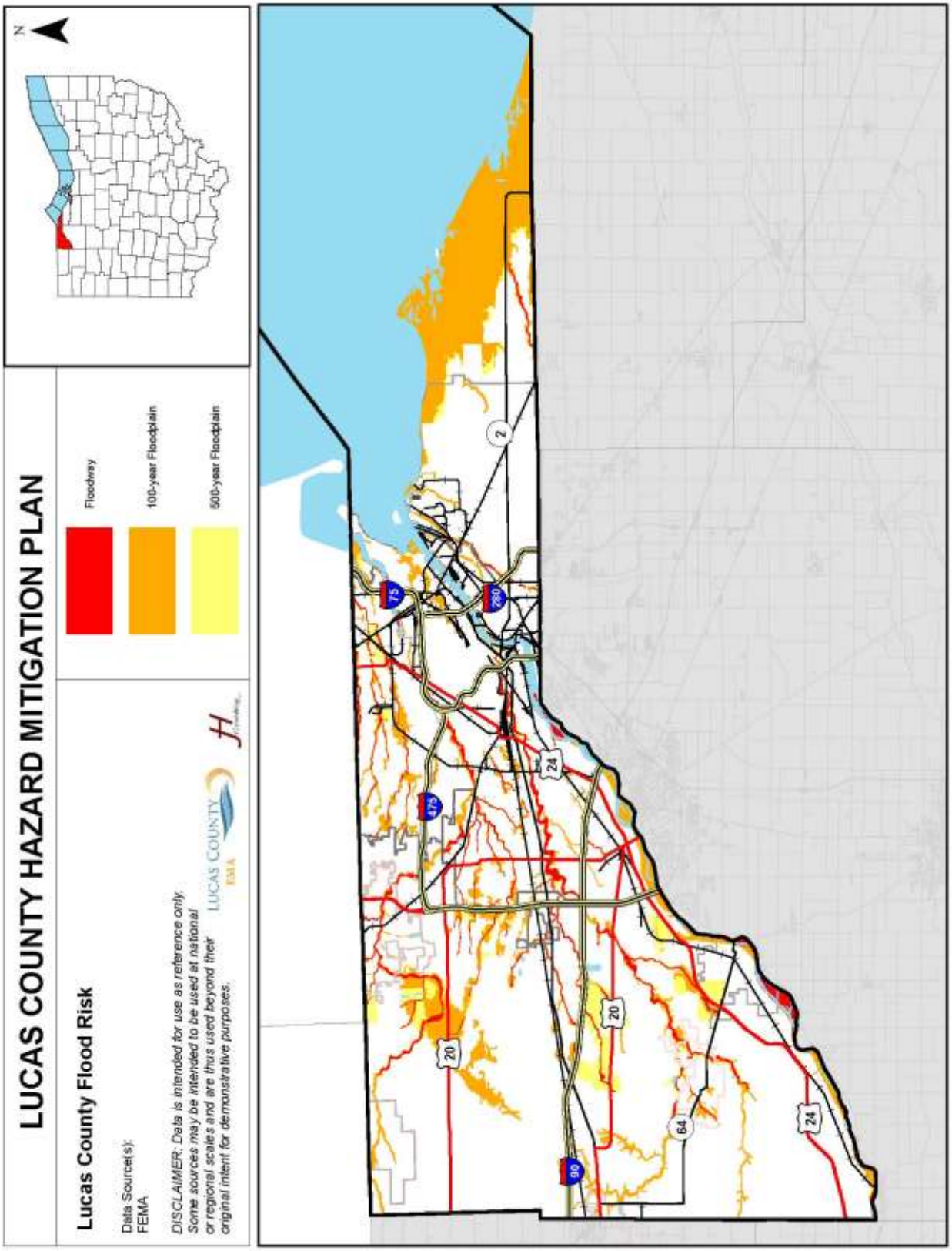
POSSIBLE CAUSES

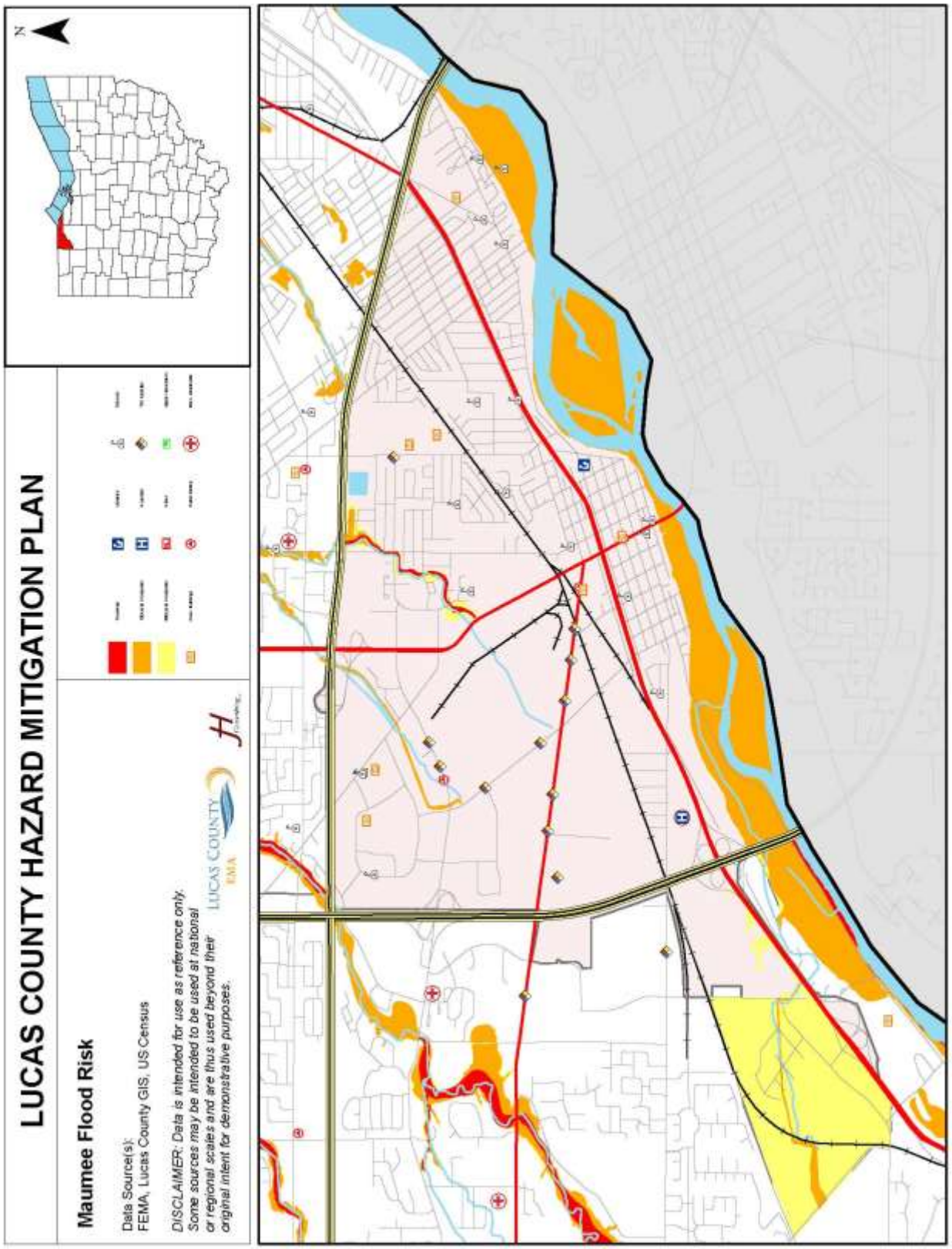
According to NOAA, some of the possible causes for flooding include the following.

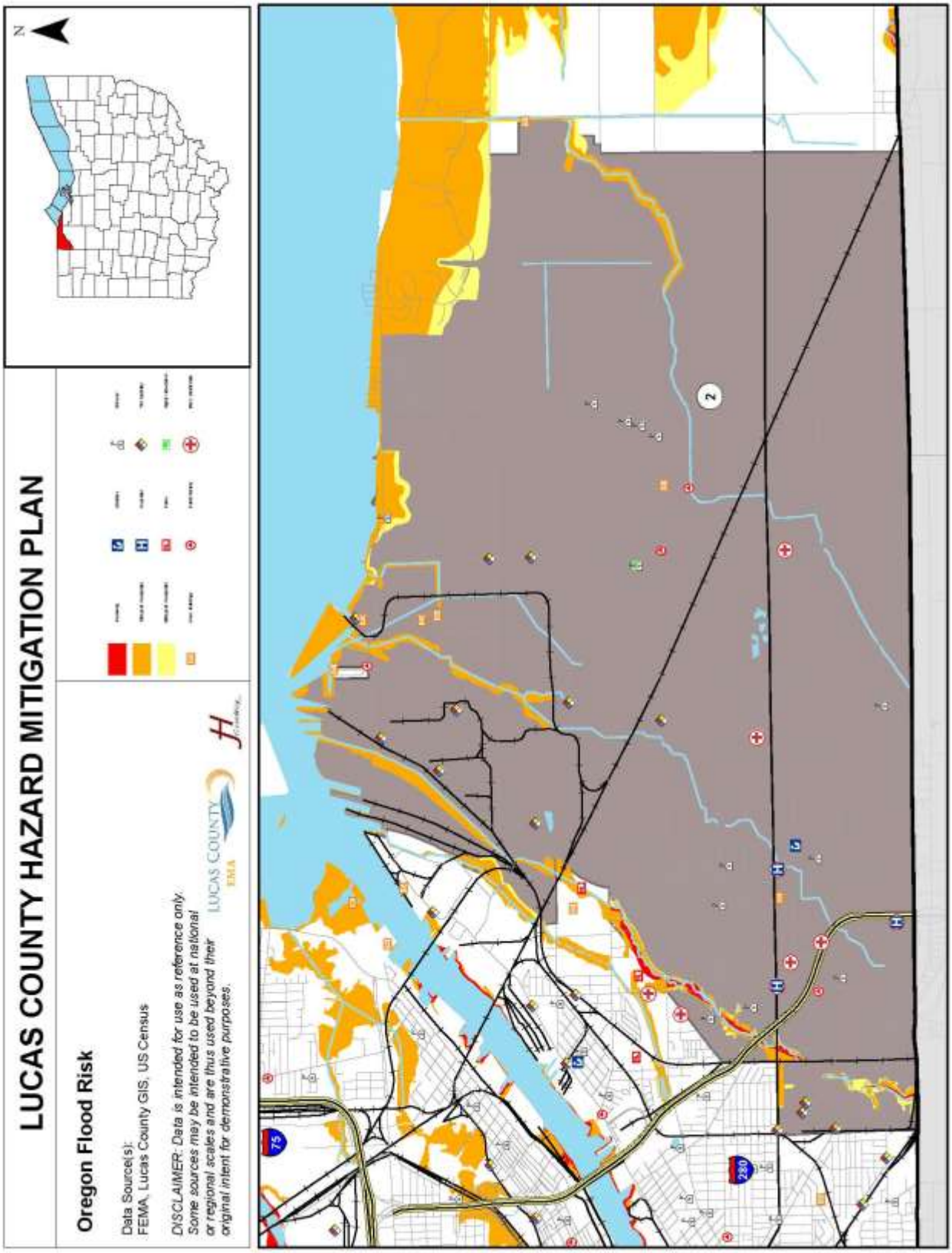
- **Excessive Rainfall:** This is the most common cause of flooding. Water accumulates quicker than the soil can absorb resulting in flooding.
- **Snowmelt**: It occurs when the major source of water involved is caused by melting snow. Unlike rainfall that can reach the soil almost immediately, the snowpack can store the water for an extended amount of time until temperatures rise above freezing and the snow melts.
- **Ice or Debris Jams**: Common during the winter and spring along rivers, streams and creeks. As ice or debris moves downstream, it may get caught on any sort of obstruction to the water flow. When this occurs, water can be held back, causing upstream flooding. When the jam finally breaks, flash flooding can occur downstream.
- **Dam Breaks or Levee Failure**: Dams can overtop, have excessive seepage or have structural failure. For more information on this topic see Section 2.4.12 Dam and Levee Failure.

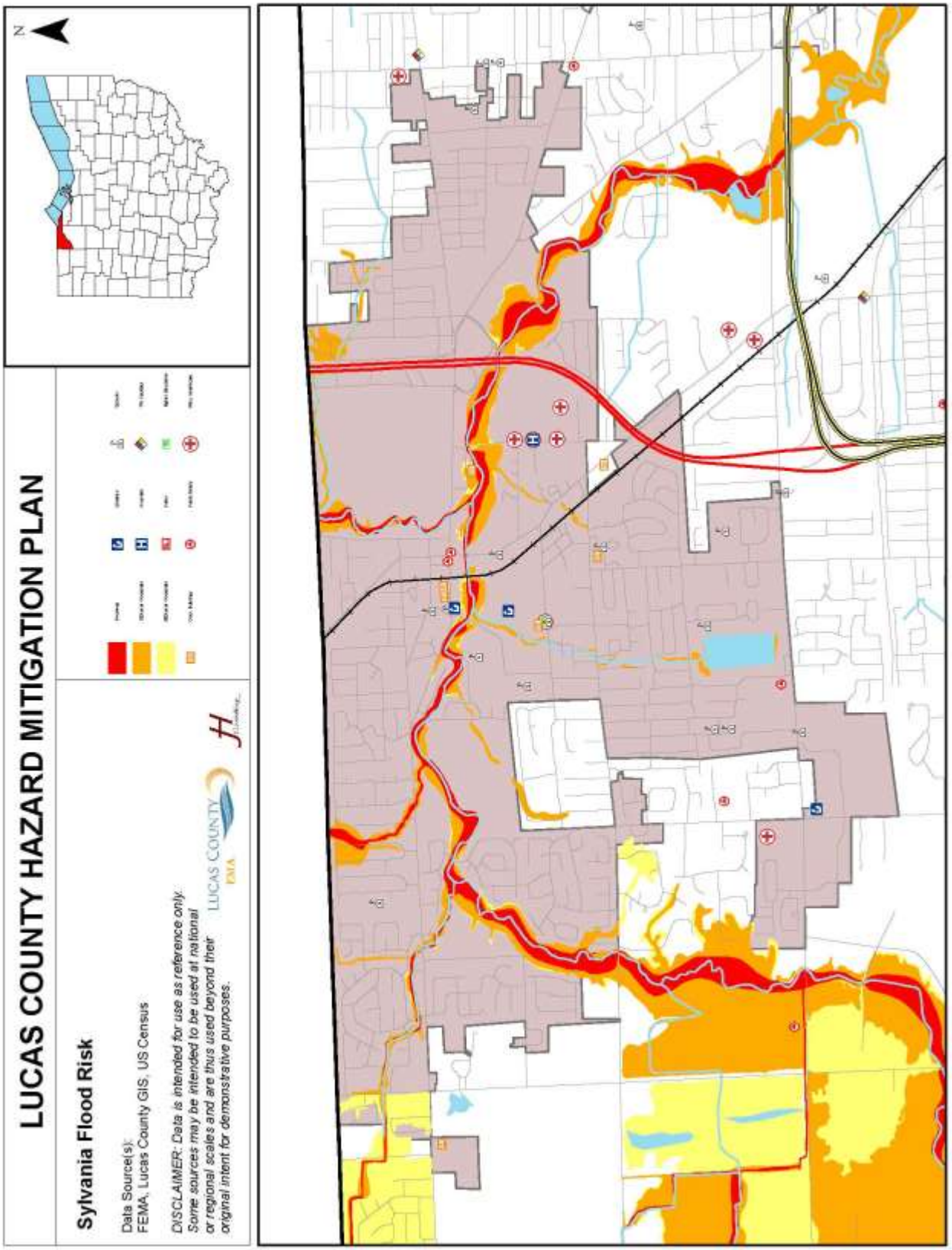
LOCATION AND EXTENT

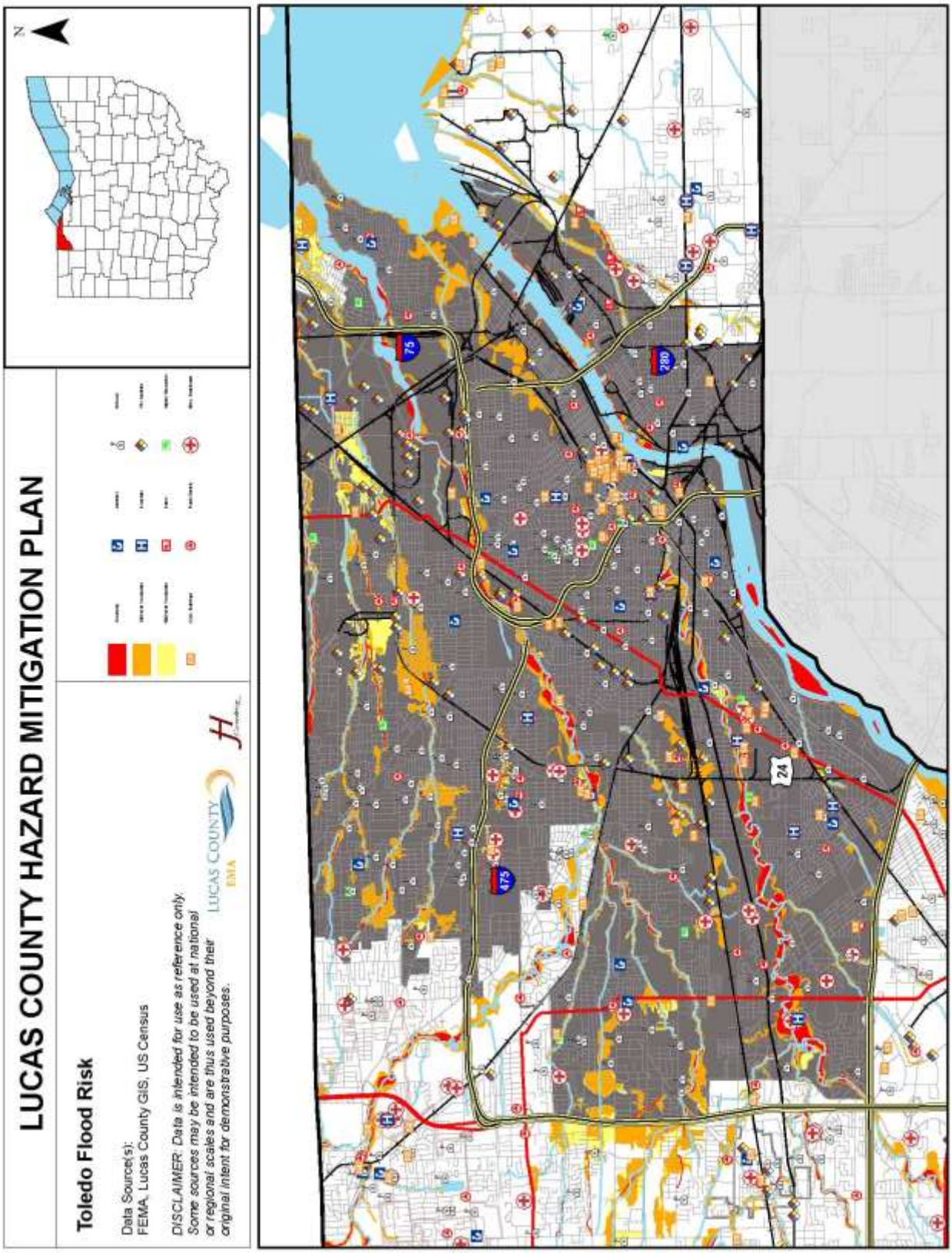
The following pages include maps of the location and extent of possible flooding in the county and each city and village. The red on the map represents the floodway, the orange the 100-year floodplain, and the yellow the 500-year floodplain. Assets are shown.

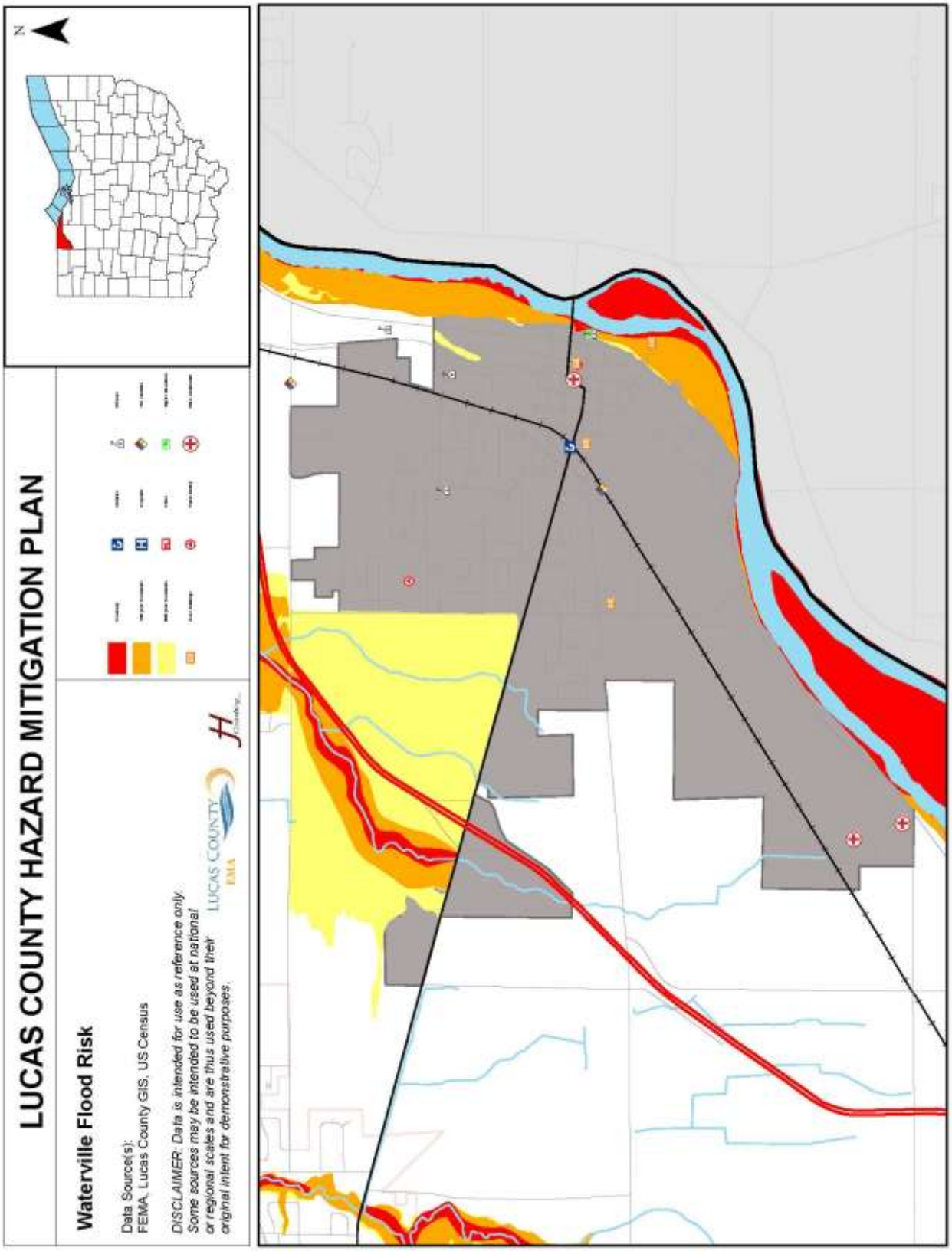

LUCAS COUNTY HAZARD MITIGATION PLAN
Lucas County Flood Risk
Data Source(s):
FEMA
DISCLAIMER: Data is intended for use as reference only.
Some sources may be intended to be used at national
or regional scales and are thus used beyond their
original intent for demonstrative purposes.
LUCAS COUNTY
EMA
Floodway
100-year Floodplain
500-year Floodplain
N
75
280
475
2
24
20
64
90

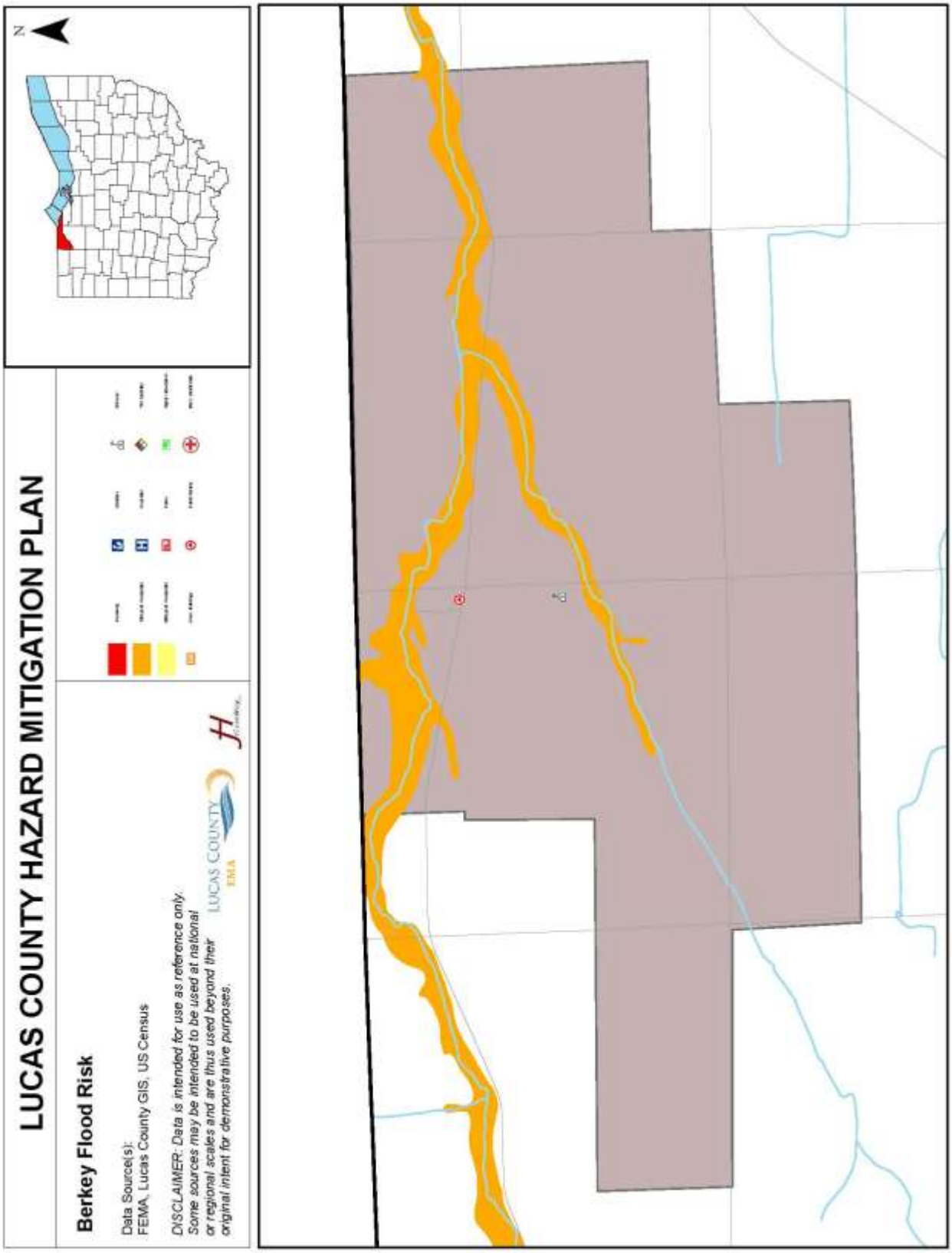

LUCAS COUNTY HAZARD MITIGATION PLAN
Maumee Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended for use as reference only.
Some sources may be intended to be used at national
or regional scales and are thus used beyond their
original intent for demonstrative purposes.
LUCAS COUNTY
EMA
N

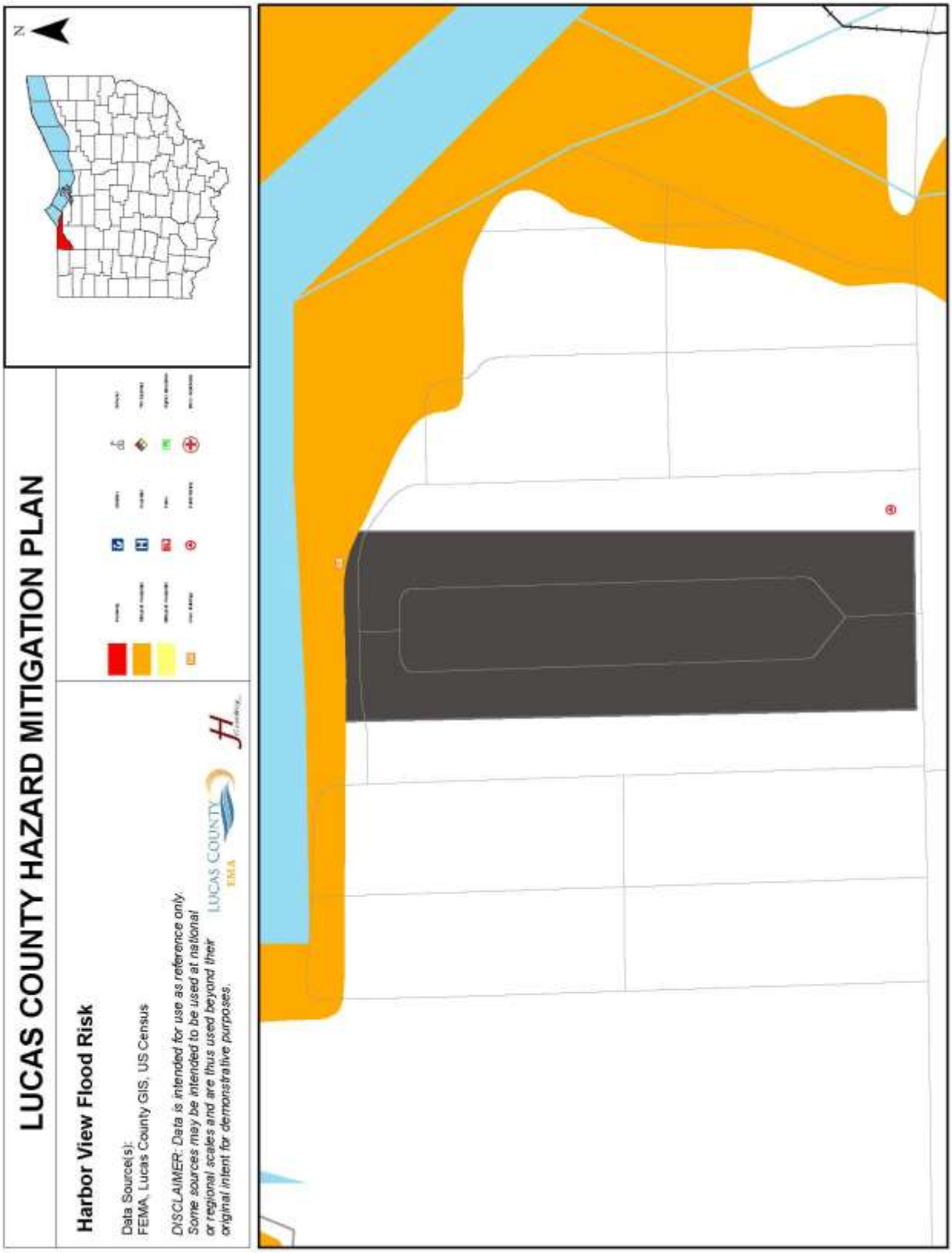

LUCAS COUNTY HAZARD MITIGATION PLAN
Oregon Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
LUCAS COUNTY EMA
N
75
280
2

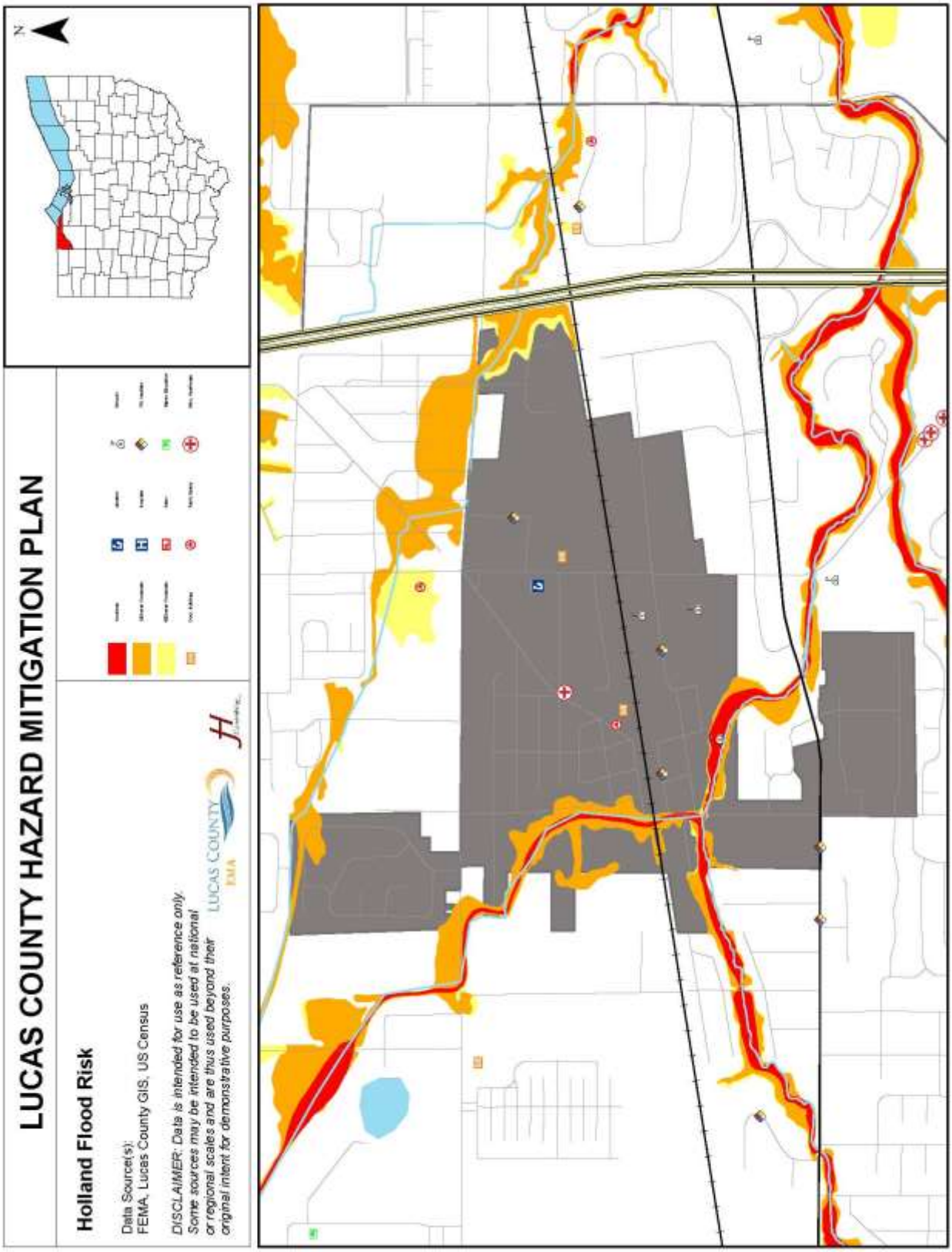

LUCAS COUNTY HAZARD MITIGATION PLAN
Sylvania Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
LUCAS COUNTY
EMA
N

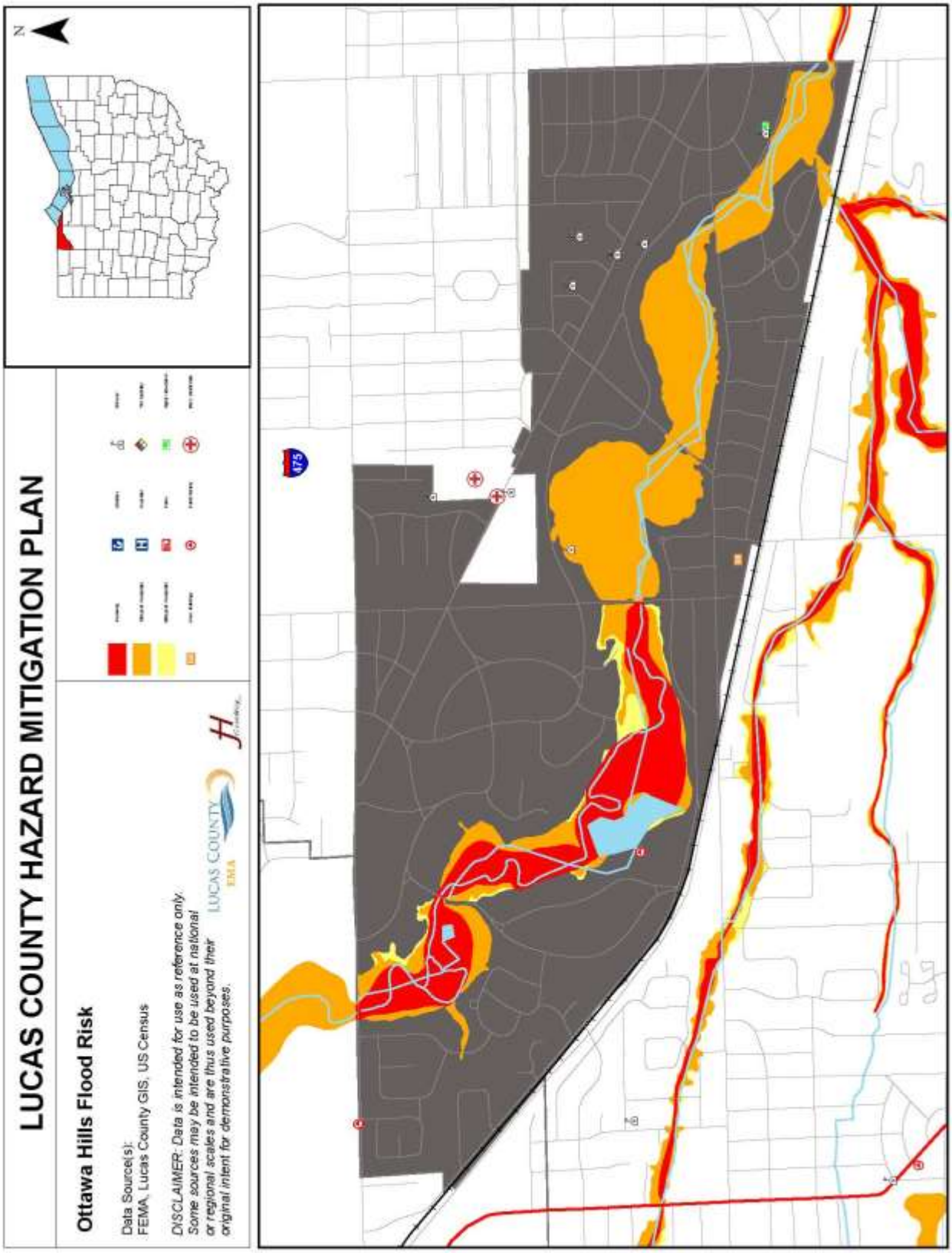

LUCAS COUNTY HAZARD MITIGATION PLAN
Toledo Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended for use as reference only.
Some sources may be intended to be used at national
or regional scales and are thus used beyond their
original intent for demonstrative purposes.
LUCAS COUNTY
EMA
N
75
280
475
24


LUCAS COUNTY HAZARD MITIGATION PLAN
Waterville Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
N

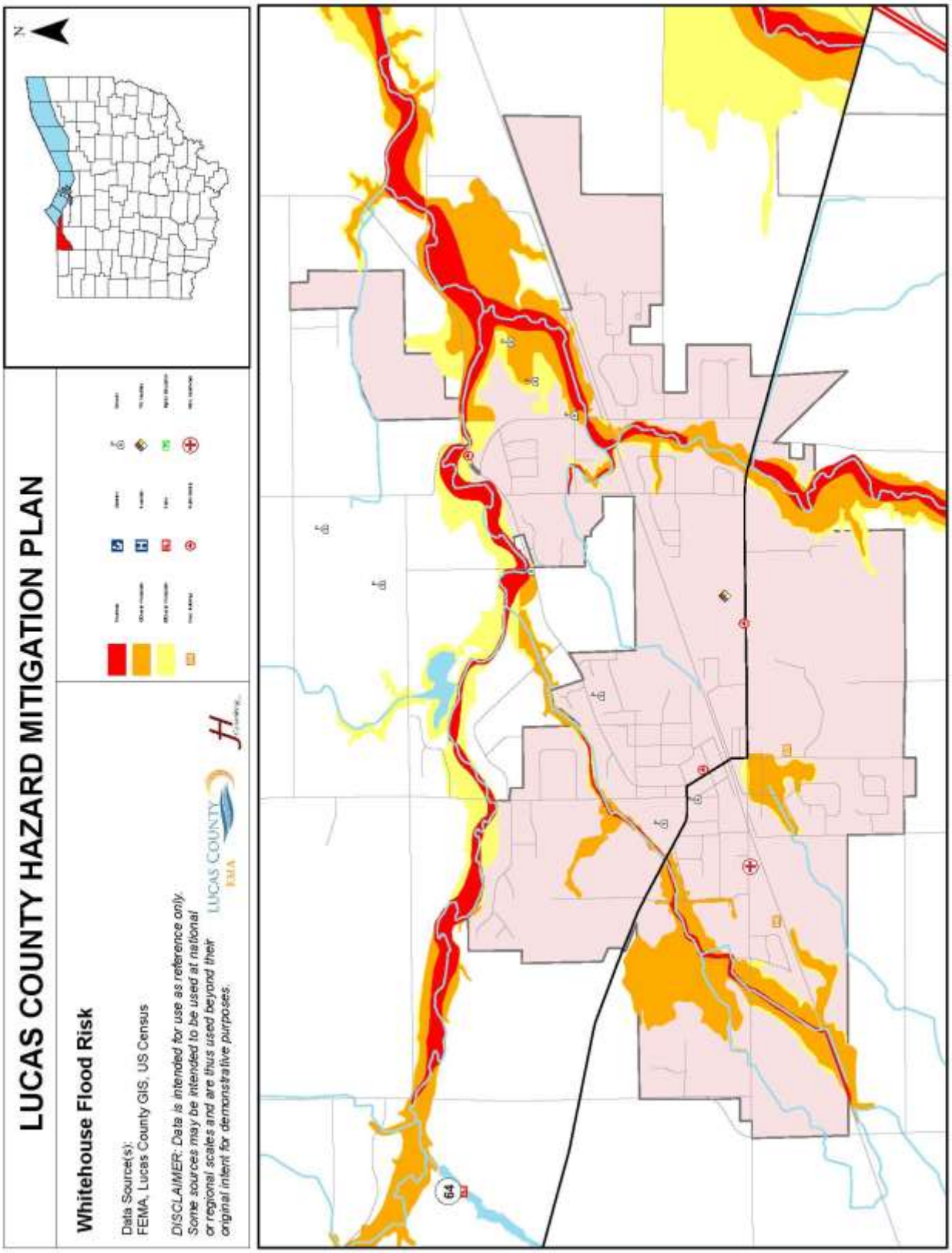

LUCAS COUNTY HAZARD MITIGATION PLAN
Berkey Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended for use as reference only.
Some sources may be intended to be used at national
or regional scales and are thus used beyond their
original intent for demonstrative purposes.
LUCAS COUNTY
EMA
N


LUCAS COUNTY HAZARD MITIGATION PLAN
Harbor View Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
N


LUCAS COUNTY HAZARD MITIGATION PLAN
Holland Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
N


LUCAS COUNTY HAZARD MITIGATION PLAN
Ottawa Hills Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
N
475

LUCAS COUNTY HAZARD MITIGATION PLAN
Swanton Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
N
90


LUCAS COUNTY HAZARD MITIGATION PLAN
Whitehouse Flood Risk
Data Source(s):
FEMA, Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
N
64

HISTORICAL OCCURRENCES

In Lucas County, according to the NCEI database, there have been 38 floods and flash flood events. The data indicates that there have been no injuries or deaths as a result of flooding events. However, damages have amounted to at least $62.4 million.

FLOOD EVENTS 1996 - 2018		
Event Date	*Event Type*	*Damage to Property*
4/25/1996	Flood	$0
5/18/1996	Flood	$0
2/22/1997	Flood	$0
2/27/1997	Flash Flood	$50,000
3/14/1997	Flood	$0
5/25/1997	Flood	$0
6/1/1997	Flash Flood	$70,000
6/2/1997	Flood	$75,000
6/21/1997	Flash Flood	$0
6/25/1997	Flash Flood	$0
6/30/1997	Flash Flood	$10,000
1/8/1998	Flood	$0
2/17/1998	Flash Flood	$70,000
2/18/1998	Flood	$0
3/10/1998	Flood	$0
3/22/1998	Flood	$0
4/10/1998	Flood	$50,000
8/25/1998	Flood	$0
1/23/1999	Flood	$75,000
4/17/1999	Flood	$0
4/23/1999	Flood	$0
7/17/1999	Flash Flood	$0
4/20/2000	Flash Flood	$0
7/29/2000	Flash Flood	$3,500,000
8/2/2000	Flash Flood	$0
8/5/2003	Flood	$50,000
8/28/2004	Flash Flood	$75,000
1/4/2005	Flood	$800,000
6/21/2006	Flash Flood	$42,000,000
7/12/2006	Flash Flood	$350,000
7/14/2006	Flash Flood	$250,000
7/27/2006	Flash Flood	$750,000
6/3/2007	Flash Flood	$1,000,000
6/3/2007	Flash Flood	$500,000
8/21/2007	Flood	$0
7/2/2008	Flash Flood	$2,500,000
3/12/2015	Flood	$1,300,000
6/26/2015	Flood	$9,000,000
Total		**$62,475,000**

The event that has caused most damage was a flash flood in June of 2006. Thunderstorms dumped torrential rainfall on Lucas County during the evening hours of June 21st. A peak rainfall total of 7.25 inches was measured near the University of Toledo. Devastating flash flooding occurred across the county with Toledo, Maumee and Sylvania especially hard hit. Roads and streets throughout the county were turned into rivers. Hundreds of vehicles became stranded in the flood waters and emergency responders performed dozens of boat rescues. Shantee Creek left its banks causing extensive damage. Many stores at the Franklin Park Mall and dozens of homes nearby were damaged by flooding after a drainage ditch along Monroe Street (State Route 51) overflowed. Floodwaters in these areas were reported to be several feet in depth. Extensive damage was also reported on Longwood Avenue. Dozens of roads and streets had to be closed with many of them under as much as four feet of water. Two homes were destroyed in Lucas County during this event with 125 homes sustaining major damage and around 200 homes suffering minor damage. An additional 1,000 homes sustained damage from basement or nuisance flooding. The City of Toledo alone spent over $250,000 responding to this event. Local officials stated that this was the worst flooding seen in the area since July 4th, 1969.

Since 1996, there have been 18 flash flood events, and 20 floods in Lucas County.

FLOOD AND FLASH FLOOD EVENTS BY YEAR																						
1996	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
2	9	7	4	3	0	0	1	1	5	4	3	1	0	0	0	0	0	0	2	0	0	0

IMPACTS AND VULNERABILITY

Hazards associated with flooding can be divided into: primary hazards that occur due to contact with water, cascading or secondary effects that occur because of the flooding, such as disruption of services and health impacts, and long-term or tertiary effects, such as changes in the position of river channels. The following table describes the types of effects of flooding.

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 o Drinking water supplies may become polluted, especially if sewerage treatment plants are flooded. o Gas and electrical service may be disrupted. o 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). • Destruction of wildlife habitat.

There are assets that are vulnerable to 100- and 500-year flooding in Lucas County and within the floodway. The following tables describes those that are most likely to be impacted by these types of floods. Planners generated these lists from GIS data where assets and the floodplains intersect. Some of these assets are not completely vulnerable; at times, an edge of the property, not necessarily the building itself, are within the floodplain and therefore not at risk.

ASSETS VULNERABLE TO FLOODING			
Asset	*City/Village*	*Type*	*Risk Location*
180th Air National Guard Headquarters	Monclova Township	Government Building	500-Year Floodplain
Agriculture Education Center	Toledo	Higher Ed	Floodway
Airport Urgent Care	Toledo	Urgent Care	100-Year Floodplain
Anthony Wayne Junior High School	Whitehouse	School	100-Year Floodplain
Arbors at Waterville	Waterville	Assisted Living	Floodway
Arbors at Waterville	Waterville	Nursing Home	Floodway
Board of Mental Retardation	Toledo	Government Building	100-Year Floodplain
Bowser-Morner, Inc.	Toledo	TRI	100-Year Floodplain
Buckeye Terminals, LLC – Toledo West Terminal	Toledo	TRI	100-Year Floodplain
Bureau of Motor Vehicles	Toledo	Government Building	100-Year Floodplain
Carlson Library	Toledo	Library	500-Year Floodplain
Central Trail Elementary School	Sylvania	School	500-Year Floodplain
Chrysler Parkway Annex	Toledo	TRI	100-Year Floodplain
Coast Guard	Toledo	Government Building	100-Year Floodplain
Collins Park WTP Sludge Lagoon A	Toledo	Dams	100-Year Floodplain
Concord Care Center of Toledo	Toledo	Assisted Living / Hospital	100-Year Floodplain
Connecting Point-Crittenton Building	Toledo	Community Centers	100-Year Floodplain
Crestview Club Apartments	Sylvania	Nursing Home	Floodway
DaVita Flower Hospital Dialysis	Sylvania	Dialysis	Floodway
DaVita Swan Creek Dialysis	Toledo	Dialysis	100-Year Floodplain
Department of Solid Waste Management	Toledo	Government Building	500-Year Floodplain
Doehler-Jarvis Toledo, Inc.	Toledo	TRI	500-Year Floodplain
Dog Warden	Toledo	Government Building	500-Year Floodplain
Dorr Community Residence	Holland	Developmental Disabilities	500-Year Floodplain
Dorr Elementary School	Toledo	School	500-Year Floodplain
Eleanor M. Kahle Senior Center	Toledo	Community Center	Floodway
Elmhurst Elementary School	Toledo	School	100-Year Floodplain
Erie Steel Treating, Inc.	Toledo	TRI	500-Year Floodplain
Fairview Skilled Nursing	Toledo	Assisted Living	100-Year Floodplain
Fallen Timbers Battlefield	Maumee	Historic	100-Year Floodplain
Flower Hospital	Sylvania	Acute Care	Floodway
Fort Miamis Site	Maumee	Historic	100-Year Floodplain
Fraternal Order of Police	Toledo	Community Center	Floodway
Hancock Senior Center	Oregon	Community Center	500-Year Floodplain
Harbor View Village Offices	Harbor View	Government Building	100-Year Floodplain
Harborside Healthcare at Point Place	Toledo	Hospital	100-Year Floodplain
Hospice of Northwest Ohio	Toledo	Nursing Home	Floodway
HQ 983rd Engineer Battalion	Springfield Township	Government Building	100-Year Floodplain

ASSETS VULNERABLE TO FLOODING			
Asset	*City/Village*	*Type*	*Risk Location*
Huron--Superior Streets Warehouse--Produce Historic District	Toledo	Historic	100-Year Floodplain
Interurban Bridge	Waterville	Historic	Floodway
Inverness Club	Toledo	Historic	Floodway
Isaac R. Ludwig Historical Mill	Neapolis	Historic	Floodway
Jerusalem Elementary School	Curtice	School	100-Year Floodplain
Josina Lott Residential	Toledo	Developmental Disabilities	Floodway
Larchmont Elementary School	Toledo	School	100-Year Floodplain
Libby High School	Toledo	Historic	Floodway
Luther Crest	Toledo	Assisted Living	Floodway
Luther Woods Apartments	Toledo	Nursing Home	Floodway
Lutheran Home at Toledo	Toledo	Assisted Living	100-Year Floodplain
Lutheran Village at Wolf Creek	Holland	Acute Care	Floodway
Lutheran Village of Wolf Creek	Toledo	Nursing Home	Floodway
Manufacturers Enameling Corp.	Toledo	TRI	100-Year Floodplain
Marksch Group Home	Holland	Nursing Home	100-Year Floodplain
Maumee Sidecut	Maumee	Historic	100-Year Floodplain
Medical College of Ohio	Toledo	Dialysis	Floodway
Medical College of Ohio Campus Police Department	Toledo	Public Safety	100-Year Floodplain
Medical College of Ohio Hospital	Toledo	Acute Care	Floodway
Merit House	Toledo	Assisted Living	100-Year Floodplain
Monclova Community Center	Monclova	Community Center	Floodway
Noris	Toledo	Public Safety	100-Year Floodplain
P&J Industries, Inc.	Toledo	TRI	100-Year Floodplain
Park Place of Sylvania Community Center	Sylvania	Community Center	500-Year Floodplain
Parks and Forestry Department	Toledo	Government Building	500-Year Floodplain
Peritoneal Dialysis Center	Toledo	Dialysis	100-Year Floodplain
Point Place Care & Rehab	Toledo	Nursing Home	100-Year Floodplain
ProMedica Goerlich Center	Sylvania	Nursing Home	Floodway
ProMedica Urgent Care	Toledo	Urgent Care	Floodway
Providence Historic District	Neapolis	Historic	Floodway
Rosary Care Center	Sylvania	Acute Care	Floodway
Saint Anne Mercy Hospital	Toledo	Acute Care	100-Year Floodplain
Sewer and Drainage Services Division	Toledo	Government Building	500-Year Floodplain
Springfield Township Fire Department Station 1	Holland	Public Safety	500-Year Floodplain
St Paul Surgical Center	Toledo	Surgery	500-Year Floodplain
Stateline Group Home	Toledo	Nursing Home	Floodway
Sunshine Inc of North West OH	Maumee	Developmental Disabilities	Floodway
Sunshine/Strayer Family Care	Maumee	Developmental Disabilities	100-Year Floodplain
Surgery Ctr at Regency Park	Toledo	Surgery	100-Year Floodplain
Swan Creek Healthcare Center	Toledo	Hospital	100-Year Floodplain
Swan Creek Retirement Village	Toledo	Assisted Living	Floodway
Sylvania Street Division	Sylvania	Government Building	100-Year Floodplain
Sylvania Township Fire Department Station 4	Sylvania	Public Safety	100-Year Floodplain
The Elizabeth Scott Community	Maumee	Assisted Living	100-Year Floodplain
Timberstone Junior High School	Sylvania	School	500-Year Floodplain
Toledo Air Guard Fire Department	Swanton	Public Safety	500-Year Floodplain
Toledo Clinic	Toledo	Surgery	Floodway

ASSETS VULNERABLE TO FLOODING			
Asset	*City/Village*	*Type*	*Risk Location*
Toledo Express Airport	Swanton	Airport	500-Year Floodplain
Toledo Traction Company Power Station	Toledo	Historic	100-Year Floodplain
Toledo Yacht Club	Toledo	Historic	100-Year Floodplain
United States Air Force Recruitment Post	Toledo	Government Building	100-Year Floodplain
University of Toledo Medical Center	Toledo	Hospital	100-Year Floodplain
Washington Township Administration	Washington Township	Government Building	500-Year Floodplain
Washington Township Police Department	Toledo	Public Safety	500-Year Floodplain
Waterville Township Police Department	Waterville	Public Safety	500-Year Floodplain
Waterville Water Pump	Waterville	Government Building	100-Year Floodplain
West Toledo Branch YMCA	Toledo	Community Center	Floodway
Wolf Creek YMCA	Maumee	Community Centers	100-Year Floodplain
Wynn Center	Oregon	School	500-Year Floodplain
YMCA University of Toledo- Morse Fitness Center	Toledo	Community Center	Floodway

LOSS AND DAMAGES

FEMA can estimate losses from flood to buildings in Lucas County through the HAZUS-MH program (provided by Ohio EMA). The program calculates the expected losses to buildings from a 100-year flood event. The following tables outline the expected building damages by occupancy and type and the building-related economic losses.

According to HAZUS-MH, the majority of buildings damaged would be residential; most of these can expect to receive between 1 and 50% of damage, while the program calculates that only six buildings would be substantially damaged from a 100-year flood event. The following table outlines the expected damages by occupancy.

EXPECTED BUILDING DAMAGE BY OCCUPANCY												
Occupancy	*1-10*		*11-20*		*21-30*		*31-40*		*41-50*		*Substantially*	
	Ct.	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	8	57	5	36	0	0	0	0	1	7	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	13	50	9	35	0	0	1	4	3	12	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	355	33	400	37	138	13	62	6	42	4	75	7
Total	**376**		**414**		**138**		**63**		**46**		**75**	

Very few buildings would receive any substantial damage from a 100-year flood; according to the program estimates, the only type of building type that would be affected would be those of wood construction. The majority of the building types would receive

between 1 and 50% damage. The following table outlines the expected damage by building type in Lucas County.

EXPECTED BUILDING DAMAGE BY BUILDING TYPE

Building Type	*1-10*		*11-20*		*21-30*		*31-40*		*41-50*		*Substantially*	
	Ct.	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*	*Ct.*	*%*
Concrete	5	56	3	33	0	0	0	0	1	11	0	0
Manufactured Housing	0	0	0	0	0	0	0	0	0	0	5	100
Masonry	64	36	73	41	20	11	7	4	7	4	7	4
Steel	10	50	7	35	0	0	1	5	2	10	0	0
Wood	294	33	326	37	118	13	55	6	35	4	63	7

Building-related losses include the building itself, its contents, the inventory, income, relocation costs, rental income losses, and lost wages. According to HAZUS-MH the highest overall loss would be to industrial buildings.

BUILDING-RELATED ECONOMIC LOSS ESTIMATES (MILLIONS OF DOLLARS)

Category	*Area*	*Residential*	*Commercial*	*Industrial*	*Others*	*Total*
Building Loss	Building	119.52	20.95	33.95	5.09	209.50
	Content	68.33	129.66	80.51	25.15	303.64
	Inventory	0.00	3.18	14.34	0.24	17.75
	Subtotal	**187.84**	**183.79**	**128.79**	**30.48**	**530.89**
Business Interruption	Income	2.57	96.52	2.28	12.89	114.26
	Relocation	36.46	25.91	2.94	5.08	70.39
	Rental Income	18.39	18.27	0.75	0.44	37.85
	Wage	6.04	98.10	3.64	42.89	150.66
	Subtotal	**63.46**	**238.80**	**9.61**	**61.29**	**373.16**
All	**Total**	**251.30**	**422.59**	**138.39**	**91.77**	**904.05**

When buildings experience more than one loss due to flooding, they can become repetitive or severe repetitive loss properties. There are two accepted definitions of repetitive loss and severe repetitive loss; one from the Flood Mitigation Assistance (FMA) grant and the other from the National Flood Insurance Program (NFIP). The following table outlines the definitions.

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	(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

REPETITIVE LOSS AND SEVERE REPETITIVE LOSS DEFINITIONS		
Program	*Repetitive Loss*	*Severe Repetitive Loss*
	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.	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.

According to Ohio Emergency Management Agency, in Lucas County, there have been 78 repetitive loss properties and eight severe repetitive loss properties. The following tables list the city, occupancy type, and payments for the properties.

RL/SRL PROPERTIES IN LUCAS COUNTY								
City	*Mitigated?*	*Insured?*	*Occupancy*	*Zone*	*Firm*	*Losses*	*Total Paid (Building + Contents)*	*Average Pay*
Repetitive Loss Properties								
Toledo	No	SDF	Single Family	AO	N	11	$147,016.54	$13,365.14
Toledo	No	SDF	Other Non-Residential	X	N	8	$118,751.80	$14,843.98
Waterville	No	SDF	Single Family	X	N	7	$86,129.55	$12,304.22
Holland	No	SDF	Single Family	A	N	6	$68,476.35	$11,412.73
Toledo	No	SDF	Condo	AE	N	5	$140,787.79	$28,157.56
Toledo	No	No	Single Family	A06	N	5	$35,356.34	$7,071.27
Toledo	No	No	Other Non-Residential	C	N	5	$58,830.47	$11,766.09
Toledo	No	SDF	Single Family	A	N	4	$118,158.06	$29,539.52
Toledo	No	No	Single Family	A	N	4	$63,250.98	$15,812.75
Sylvania	No	Yes	Single Family	AE	Y	4	$23,324.61	$5,831.15
Oregon	No	Yes	Single Family	A03	N	4	$15,082.36	$3,770.59
Toledo	No	No	Single Family	A06	N	4	$23,723.63	$5,930.91
Toledo	No	No	Single Family	A04	N	4	$21,902.46	$5,475.62
Grand Rapids	No	No	Single Family		N	4	$30,139.29	$7,534.82
Toledo	No	No	Single Family	AE	N	4	$31,406.58	$7,851.65
Waterville	No	No	Single Family	AE	N	4	$27,151.72	$6,787.93
Curtice	No	No	Single Family	EMG	N	3	$32,543.78	$10,847.93
Oregon	No	No	Single Family	A03	N	3	$19,902.49	$6,634.16
Oregon	No	Yes	Single Family	A03	N	3	$19,244.93	$6,414.98

RL/SRL PROPERTIES IN LUCAS COUNTY								
City	*Mitigated?*	*Insured?*	*Occupancy*	*Zone*	*Firm*	*Losses*	*Total Paid (Building + Contents)*	*Average Pay*
Oregon	No	Yes	Single Family	A	N	3	$11,743.96	$3,914.65
Toledo	No	No	Single Family	A	N	3	$26,531.51	$8,843.84
Toledo	No	Yes	Single Family	C	N	3	$93,115.20	$31,038.40
Toledo	No	No	Other Non-Residential	A03	N	3	$4,787.26	$1,595.75
Toledo	No	No	Single Family	A	N	3	$56,404.75	$18,801.58
Toledo	No	Yes	Single Family	AE	N	3	$22,273.59	$7,424.53
Toledo	No	Yes	Single Family	A	N	3	$22,281.08	$7,427.03
Toledo	No	Yes	Single Family	AE	N	3	$10,132.02	$3,377.34
Toledo	No	Yes	Single Family	AO	N	3	$21,833.61	$7,277.87
Toledo	No	Yes	Single Family	AE	N	3	$18,827.41	$6,275.80
Toledo	No	No	Single Family	A03	N	3	$12,050.56	$4,016.85
Toledo	No	No	Other Residential	A01	N	3	$241,675.05	$80,558.35
Toledo	No	No	Single Family	A03	N	2	$30,469.81	$15,234.91
Swanton	No	No	Single Family	X	N	2	$19,578.14	$9,789.07
Sylvania	No	Yes	Other Non-Residential	AE	N	2	$24,235.26	$12,117.63
Toledo	No	Yes	Single Family	A	N	2	$44,155.10	$22,077.55
Curtice	No	Yes	Single Family	AE	N	2	$16,399.51	$8,199.76
Sylvania	No	No	Single Family	C	N	2	$52,159.18	$26,079.59
Whitehouse	No	Yes	Single Family	AE	N	2	$78,840.49	$39,420.25
Sylvania	No	Yes	Single Family	AE	N	2	$27,827.86	$13,913.93
Holland	No	No	Single Family	AE	N	2	$9,724.40	$4,862.20
Toledo	No	Yes	Single Family	AE	N	2	$75,176.23	$37,588.12
Maumee	Yes	No	Single Family	A	N	2	$14,329.20	$7,164.60
Oregon	No	Yes	Single Family	X	N	2	$20,793.11	$10,396.56
Oregon	No	No	Single Family	X	N	2	$5,199.34	$2,599.67
Oregon	No	No	Single Family	B	N	2	$5,887.16	$2,943.58
Oregon	No	Yes	Other Residential	AE	N	2	$120,100.00	$60,050.00
Northwood	Yes	No	Single Family	A03	N	2	$12,295.00	$6,147.50
Toledo	No	No	Single Family	C	N	2	$3,362.51	$1,681.26
Toledo	No	No	Single Family	A03	N	2	$3,053.72	$1,526.86
Toledo	No	No	Single Family	AE	N	2	$16,641.67	$8,320.84
Toledo	No	No	Other Non-Residential	A	N	2	$12,568.48	$6,284.24
Toledo	No	Yes	Single Family	A	N	2	$17,053.22	$8,526.61
Toledo	No	Yes	Single Family	AE	N	2	$4,592.99	$2,296.50
Toledo	No	Yes	Single Family	AO	N	2	$10,495.87	$5,247.94
Toledo	No	No	Single Family	AE	N	2	$7,475.95	$3,737.98
Toledo	No	Yes	Single Family	AO	N	2	$15,255.00	$7,627.50
Toledo	No	No	Single Family	X	N	2	$24,201.42	$12,100.71
Toledo	No	No	Single Family	AE	N	2	$26,696.66	$13,348.33
Toledo	No	No	Single Family	AE	N	2	$29,038.71	$14,519.36
Toledo	No	Yes	Single Family	A05	N	2	$39,357.54	$19,678.77
Toledo	No	No	Single Family	AE	N	2	$38,319.68	$19,159.84
Toledo	No	No	Single Family	AE	N	2	$8,458.76	$4,229.38
Toledo	No	No	Single Family	A03	N	2	$5,178.32	$2,589.16
Toledo	No	Yes	Single Family	AO	N	2	$9,432.00	$4,716.00
Toledo	No	Yes	Other Non-	C	N	2	$4,858.00	$2,429.00

RL/SRL PROPERTIES IN LUCAS COUNTY								
City	*Mitigated?*	*Insured?*	*Occupancy*	*Zone*	*Firm*	*Losses*	*Total Paid (Building + Contents)*	*Average Pay*
			Residential					
Toledo	No	Yes	Single Family	A02	N	2	$26,915.21	$13,457.61
Toledo	No	No	Single Family	A01	N	2	$4,895.71	$2,447.86
Toledo	No	Yes	Single Family	AE	N	2	$23,454.30	$11,727.15
Toledo	No	No	Single Family	X	Y	2	$22,867.49	$11,433.75
Toledo	No	Yes	Single Family	A	N	2	$5,306.34	$2,653.17
Toledo	No	No	Single Family	AO	N	2	$29,599.30	$14,799.65
Toledo	No	No	Single Family	X	N	2	$15,737.99	$7,869.00
Toledo	No	Yes	Single Family	AO	N	2	$22,470.19	$11,235.10
Toledo	No	No	Single Family	A06	N	2	$16,141.30	$8,070.65
Toledo	No	No	Single Family	A	N	2	$11,148.28	$5,574.14
Toledo	No	No	Single Family	AE	N	2	$10,943.47	$5,471.74
Waterville	No	Yes	Single Family	C	N	2	$7,360.16	$3,680.08
Waterville	No	No	Single Family	X	N	2	$14,158.50	$7,079.25
						Total	**$2,667,044.26**	**$914,009.34**
Severe Repetitive Loss Properties								
Toledo	No	SDF	Condo	AE	N	5	$140,787.79	$28,157.56
Toledo	No	No	Single Family	A03	N	2	$30,469.81	$15,234.91
Holland	No	SDF	Single Family	A	N	6	$68,476.35	$11,412.73
Toledo	No	SDF	Single Family	A	N	4	$118,158.06	$29,539.52
Toledo	No	SDF	Single Family	AO	N	11	$147,016.54	$13,365.14
Waterville	No	SDF	Single Family	X	N	7	$86,129.55	$12,304.22
Toledo	No	SDF	Other Non-Residential	X	N	8	$118,751.80	$14,843.98
Toledo	No	No	Single Family	A	N	4	$63,250.98	$15,812.75
						Total	**$773,040.88**	**$140,670.81**

The city or community with the most repetitive loss and severe repetitive loss properties in total is Toledo, by far. This information is consistent with the amount of assets that are vulnerable in Lucas County to a 100- and a 500-year flood; the asset tables above describe the assets within the floodplains and the majority are in Toledo, as shown in the table here. The table to the right outlines the amount of RL/SRL properties by city. Grand Rapids, Curtice, and Northwood are communities that are technically in Wood County, across the Maumee River from Lucas County. These communities are included herein because the data provided by OEMA includes them under Lucas County.

RL/SRL PROPERTIES BY CITY		
City	*RL Properties*	*SRL Properties*
Curtice	2	0
Grand Rapids	1	0
Holland	2	1
Maumee	1	0
Northwood	1	0
Oregon	8	0
Swanton	1	0
Sylvania	4	0
Toledo	53	6
Waterville	4	1
Whitehouse	1	0

PREVIOUS AND ONGOING MITIGATION EFFORTS

The Village of Ottawa Hills' Environmental Task Force is reviewing and studying ways to slow the flow of the river to reduce erosion, as well as increase the use of the floodplain area, creating a wetlands buffer.

Some mitigation projects from the previous plan relating to floods have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of floods.

- Develop an educational program informing citizens within the flood zone of their location and/or proximity to streams.
- Educate citizens on viable flood protection options and methods appropriate for risk level. Partner with insurance companies to disseminate flood insurance information to citizens in flood prone areas.
- Develop a comprehensive communication system between the County and local governments with procedure templates describing warning systems.
- Ensure compliance and enforcement of Lucas County's Storm Water Management Plan and flood Zoning through fines and penalties.
- Identify hot spots or high priority projects involving multiple jurisdictions and organize stakeholders, develop a governance structure, identify and prioritize projects and Implement plans as funds become available.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	4	High	Between 1996 and 2018(52 years) there have been 38 flood and flash flood events.
Response	4	1 month	Depending on the severity, response can take less than or more than a month. Therefore, the average taken is one month.
Onset	3	6-12 hours	Floods can be predicted in advance as well as flash floods, in most

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
			cases, based on the location and amount of precipitation.
Magnitude	1	Localized (less than 10% of land area affected)	Floods are typically limited to the locations where it is known to flood. From time to time, there are new places that flood.
Business	2	1 week	The degree to which the businesses are affected will depend on the severity of the event.
Human	1	Minimum (minor injuries)	Because floods are predictable, the population has an opportunity to prepare for the event and stay out of harm's way.
Property	3	25-50% of property affected	Some buildings may suffer critical to catastrophic losses based on their location.
Total	**18**	**Medium**	The flooding risk in Lucas County, based on the points received, is medium.

2.4.3 Hazardous Materials Incident

HAZARD OVERVIEW

A chemical or biological material that may pose a threat to life, health, property, or the environment. For the purpose of this profile, the hazardous materials incidents include only those that are not intentional. For intentional hazardous materials incidents, refer to the terrorism / CBRNE profile.	
Period of Occurrence: At any time	**State Risk Ranking:** Not ranked
Type of Hazard: Human-caused	**Disaster Declarations:** None

A hazardous material may be defined as 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, 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. While most hazardous materials are stored and used at fixed sites, these materials are usually produced elsewhere and shipped to the fixed facility by rail car, truck, or onboard ships or barges. signs or placards denoting the hazard identify the vehicles carrying hazardous materials. However, the possibility of release is present at any time. Hazardous materials are constantly being moved in Ohio on interstate highways, the rail system and on shipping lanes in rivers and tributaries.

There are two major agencies that collect data as they relate to hazardous materials incidents the Pipeline and Hazardous Materials Safety Administration (PHMSA) governed by the U.S. Department of Transportation (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/or the environment, or any substance designated by the Environmental Protection Agency (EPA) to be reported if a designated quantity of the substance is spilled into the waters of the United States or is otherwise released into the environment.
- **Hazardous Chemicals**: If present at a chemical facility in certain amounts, these substances require a Material Safety Data Sheet (MSDS) 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.

POSSIBLE CAUSES

The hauling, storage, and use of hazardous materials play a vital role in the economy of our nation. These materials are stored and handled at fixed facilities and are transported over highway, railway, and water transportation systems, as well as pipelines. It is estimated that over four billion tons of hazardous materials are transported annually and that 100,000 trucks haul hazardous materials on the country's highways each day. Almost half of all freight trains carry hazardous materials. The majority of the transportation infrastructure utilized to move hazardous materials through Lucas County is located in the central portion of the county; this is also the most populated area of the county, and the location for the majority of the high hazard areas for natural hazards, thus increasing the chance of a release. 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 be released 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. Additional potential causes of hazardous material releases may include terrorist incident and illegal drug labs or dumping. Illegal drug labs present a special concern because each must be treated as a chemical hazard site and decontaminated before the property can be used again. Illegal drug labs can be set up in homes, apartments, vacant buildings, shacks in the forest or even in a van parked on the street.

LOCATION AND EXTENT

Hazardous materials spills, leaks, or accidents can occur anywhere in Lucas County. More specifically, they are more likely to happen on transportation pathways such as roads and 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. There are also gas transmission and hazardous liquid pipelines throughout Lucas County. Due to Lucas County's proximity to Lake Erie, where there is commercial water transportation of commodities, the lake is also a location where hazardous materials incidents could occur. There are currently 20 brownfield sites (former industrial or commercial sites where future use is affected by real or perceived environmental contamination) in Lucas County, according to the Ohio Environmental Protection Agency's brownfield inventory database. All but one of the sites are located in Toledo; one is located in Whitehouse.

The extent of the damage from hazmat can be localized to just a cleanup on the road, or widespread, to include hazardous materials reaching source water via storm drains, and the rivers and streams.

HISTORICAL OCCURRENCES

In total, there have been 245 incidents at fixed facilities, 824 highway or mobile incidents, 34 waterway incidents, 11 air incidents, 77 rail incidents, and 11 pipeline incidents involving hazardous materials. The total approximate (because not all incidents are reported) number of incidents in Lucas County between 2009 and 2018 are 1,202 incidents. The source of information for these incidents are the National Response Center (NRC) and the Pipeline and Hazardous Materials Safety Administration (PHMSA). The following outlines the findings.

- **Fixed Facilities**: According to the National Response Center (NRC) (run by the U.S. Coast Guard), there have been 204 incidents reported at fixed facilities between

2009 and 2018. The majority of these incidents are due to equipment failure, natural phenomenon, operator errors, over pressuring, intentional dumping, or are unknown or have other causes (not specified). Additionally, there were 41 reported storage tank incidents in Lucas County in the same time period.

- **Transportation**: Ohio was the fourth state with the highest number of incidents in the ten-year reporting period (2009-2018) with a total of 10,401 incidents (PHMSA, 2018).
  - Highway: According to PHMSA, there have been 752 highway incidents in Lucas County between 2009 and 2018; these account for 7.6% of the total highway incidents in the state.

HIGHWAY INCIDENTS IN LUCAS COUNTY 2009-2018											
City	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	***Total***
Maumee	48	51	44	46	43	34	55	66	55	49	**491**
Oregon	1	3	1	0	0	0	1	0	0	0	**6**
Toledo	43	20	28	14	12	23	12	26	37	26	**241**
Waterville	0	0	0	2	0	0	0	0	2	0	**4**
Holland	0	0	0	0	0	0	0	1	0	0	**1**
Ottawa Hills	3	1	0	0	0	0	0	0	0	0	**4**
Swanton	3	0	1	0	1	0	0	0	0	0	**5**
Total	**98**	**75**	**74**	**62**	**56**	**57**	**68**	**93**	**94**	**75**	**752**

Source: PHMSA, 2018

According to the NRC, there were 72 mobile incidents (indicating that they are related to transportation, including water and highway incidents) in Lucas County between 2009 and 2018. The main causes were due to equipment failure, operator error, or transportation accident.

  - Waterway: According to the NRC, here have been 34 incidents of unknown sheen in waterways between 2009 and 2017. Additionally, there have been 53 incidents involving vessels; the causes, from most to least frequent are vessel sinking, unknown or other (not specified), equipment failure, operator error, and natural phenomenon.
  - Air: According to PHMSA, there have been 11 air incidents in Lucas County between 2009 and 2018; these account for 4.5% of the total air incidents in the state.

AIR INCIDENTS IN LUCAS COUNTY 2009-2018											
City	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	***Total***
Maumee	1	0	1	0	0	2	0	0	1	0	**5**
Swanton	3	2	1	0	0	0	0	0	0	0	**6**
Total	**4**	**2**	**2**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**11**

Source: PHMSA, 2018

- Rail: According to PHMSA, there have been 9 rail incidents in Lucas County between 2009 and 2018; these account for 3.1% of the total rail incidents in the state.

RAIL INCIDENTS IN LUCAS COUNTY 2009-2018											
City	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	***Total***
Oregon	0	1	0	0	0	0	1	0	0	0	**2**
Toledo	3	0	2	0	0	1	0	1	0	0	**7**
Total	**3**	**1**	**2**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**9**

Source: PHMSA, 2018

  Data differs between PHMSA and the NRC; the NRC reports 68 rail incidents between 2009 and 2018. Many of the incidents may overlap. The causes of the incidents are mainly due to equipment failure, unknown or other (not specified), derailment, operator error, or transportation accident.

- **Pipeline:** According to the NRC, there have been 11 incidents involving pipelines between 2010 and 2018. Five of those incidents were due to equipment failure, one due to operator error, and the remainder are unknown.

IMPACTS AND VULNERABILITY

Due to the wide variety of substances that are 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 Lucas County as well as several other communities in the region. Officials from such operators as CSX Transportation concur. In a recent interview, the company's hazmat manager out of Pittsburgh noted that a significant problem associated with rail incidents, particularly those involving hazardous materials, is that a stopped train can block several roadway intersections, essentially cutting some areas off. These blocks not only hinder evacuation from those areas but also emergency services access to those areas.

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.

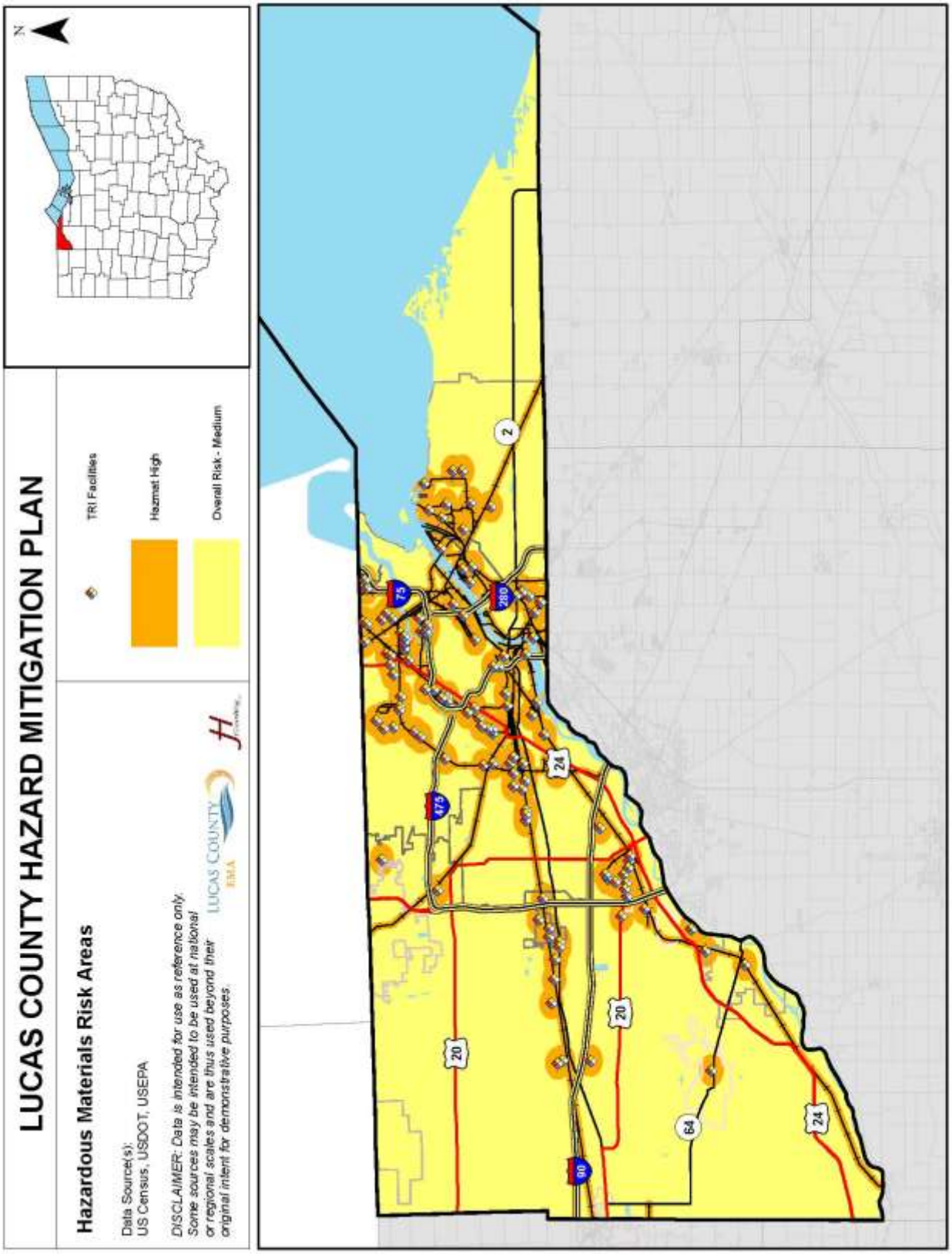
Many factors determine the impact of a potential incident including quick and solid decision-making by emergency officials, location and type of release, evacuation and shelter-in-place needs, public health concerns, and relevant economic considerations. Additionally, while most incidents are generally 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. In addition, an evacuation ordered on short-notice could cause serious problems for businesses requiring time to shut down specialized equipment.

There is also the monetary impact borne by responding public or private emergency response organizations. These 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.

The following map shows the vulnerable areas in the county – mainly along highways and railways in transportation and around TRI facilities.


LUCAS COUNTY HAZARD MITIGATION PLAN
Hazardous Materials Risk Areas
Data Source(s):
US Census, USDOT, USEPA
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
TRI Facilities
Hazmat High
Overall Risk - Medium
N
75
280
2
24
475
20
20
64
24
90

The areas shown are buffers around the TRI facilities (1/2 mile) and along highways and railways (800 feet). The following list of assets fall within the buffer zones of the TRI facilities, highways, and railways; there are more assets on this list than may actually be vulnerable. Because the contents of the TRI facilities are unknown, and because these buffers touch the property of the assets, it is difficult to accurately assess the vulnerability of each asset; a site-specific vulnerability analysis would be needed. TRI Facilities are not included in this list.

ASSETS VULNERABLE TO HAZARDOUS MATERIALS INCIDENTS		
Asset	*City/Village*	*Type*
Adelante Inc	Toledo	Community Center
Anthony Wayne Community YMCA	Waterville	Community Center
Apostolic Christian Academy	Toledo	School
Aurora L Gonzalez Community Center	Toledo	Government Building
Bay Park Community Hospital	Oregon	Acute Care
Berdan Building	Toledo	Historic
Beverly Elementary School	Toledo	School
Birmingham Elementary School	Toledo	School
Birmingham Historic District	Toledo	Historic
Birmingham Library	Toledo	Library
Board of Mental Retardation	Toledo	Government Building
Boys & Girls Clubs of Toledo	Toledo	Community Center
Brandville School	Oregon	Historic
Browning Masonic Community	Waterville	Acute Care
Catholic Diocese of Toledo-Charities	Toledo	Community Center
Central Academy of Ohio	Toledo	School
Community Treatment Center	Toledo	Community Center
Concord Care Center of Toledo	Toledo	Assisted Living
Connecting Point-24 hr Assistance Center	Toledo	Community Center
Country Brook Assisted Living	Toledo	Nursing Home
Covenant Youth Development	Toledo	Community Center
Crissey Elementary School	Holland	School
Darlington House	Toledo	Nursing Home
Darlington Nursing & Rehabilitation Center	Toledo	Acute Care
DaVita Point Place Dialysis	Toledo	Dialysis
Delores Place Assist. Living 2	Toledo	Nursing Home
Department of Public Safety, Liquor Enforcement	Springfield Township	Government Building
Department of Solid Waste Management	Toledo	Government Building
Department of Transportation	Toledo	Government Building
Dog Warden	Toledo	Government Building
East Side Commercial Block	Toledo	Historic
East Toledo Family Center	Toledo	Community Center
East Toledo Family Center: Senior Center	Toledo	Community Center
East Toledo Historic District	Toledo	Historic
Eastern YMCA	Oregon	Community Center
Eleanor M. Kahle Senior Center	Toledo	Community Center
Elizabeth Scott Community	Maumee	Acute Care
Elizabeth Scott Memorial Care Center	Maumee	Hospital

ASSETS VULNERABLE TO HAZARDOUS MATERIALS INCIDENTS		
Asset	*City/Village*	*Type*
Englewood Historic District	Toledo	Historic
Environmental Services	Toledo	Government Building
Eye Institute of NW Ohio	Maumee	Surgery
Fairgrounds	Maumee	Government Building
First Church of Christ, Scientist	Toledo	Historic
Focus Health Care of Ohio	Maumee	Acute Care
Food Service	Toledo	School
Fort Industry Square	Toledo	Historic
Franciscan Care Center	Toledo	Assisted Living
Gateway Middle School	Maumee	School
Gateway School	Toledo	School
Glenn Adult Foster Care	Toledo	Nursing Home
Greater Toledo Urgent Cares - Sylvania	Toledo	Urgent Care
Heartland Holly Glen	Toledo	Assisted Living
Heartland of Waterville	Waterville	Assisted Living
Heartland-Holy Glen	Toledo	Nursing Home
Heartland-Waterville	Waterville	Nursing Home
Henderson House	Toledo	Assisted Living
Holland Police Department	Holland	Public Safety
Holland Village Administration	Holland	Government Building
HQ 983rd Engineer Battalion	Springfield Township	Government Building
Huron--Superior Streets Warehouse--Produce Historic District	Toledo	Historic
Innovative Dialysis of Toledo	Toledo	Dialysis
Interurban Bridge	Waterville	Historic
Isaac R. Ludwig Historical Mill	Neapolis	Historic
J Frank Troy Senior Center	Toledo	Community Center
Jewish Community Center YMCA	Sylvania	Community Center
Jewish Family Service Senior Adult Center	Toledo	Community Center
Job and Family Services	Toledo	Government Building
Joseph K. Secor House	Toledo	Historic
L. Hollingworth School for The Talented And Gifted	Toledo	School
LCIC Office	Toledo	Government Building
Leverette Elementary School	Toledo	School
Libby High School	Toledo	Historic
Liberty Whitcomb Haskins House	Waterville	Historic
Lifestar Ambulance	Toledo	Public Safety
Locke Library	Toledo	Library
Lucas County Court of Appeals	Toledo	Government Building
Lucas County E-9-1-1	Toledo	Public Safety
Lucas County Emergency Medical Services Lifesquad 1	Toledo	Public Safety
Lucas County Emergency Medical Services Lifesquad 6	Sylvania	Public Safety
Lucas County Emergency Medical Services Lifesquad 7	Maumee	Public Safety
Lucas County Sanitary Engineer	Springfield Township	Government Building
Lucas County Vehicle Maintenance	Toledo	Government Building
Lutheran Homes Society	Holland	Nursing Home
Lutheran Village at Wolf Creek	Holland	Acute Care
Lutheran Village of Wolf Creek	Toledo	Nursing Home
Lyman Liggins Senior Center @ Grace United	Toledo	Community Center
Marshall Elementary School	Toledo	School

ASSETS VULNERABLE TO HAZARDOUS MATERIALS INCIDENTS		
Asset	*City/Village*	*Type*
Maumee City Office Building	Sylvania	Government Building
Maumee Fire Division Station 1	Maumee	Public Safety
Maumee Sewer Division	Maumee	Government Building
Mayores Senior Center	Toledo	Community Center
McKinley Elementary School	Toledo	School
Medcorp Incorporated Emergency Medical Services	Toledo	Public Safety
Medical College of Ohio	Toledo	Dialysis
Medical College of Ohio Hospital	Toledo	Acute Care
Mercy Occupational Health	Oregon	Urgent Care
Monroe Street Commercial Buildings	Toledo	Historic
Moretha's A C F	Toledo	Nursing Home
Morris Family Home #2	Toledo	Nursing Home
Norfolk Southern Railway Police Department	Toledo	Public Safety
NORIS	Toledo	Public Safety
Northwest Ohio Development Ctr	Toledo	Developmental Disabilities
Northwest Ohio Regional School Improvement Team	Toledo	Higher Ed
Northwest Ohio Urgent Care	Maumee	Urgent Care
Notre Dame Academy	Toledo	School
Oakleaf Village	Toledo	Assisted Living
ODPS Investigative Unit Toledo	Holland	Public Safety
Old West End District	Toledo	Historic
Oliver House	Toledo	Historic
Orchard Villa	Oregon	Assisted Living
Oregon Fire Department Station 2	Oregon	Public Safety
Ottawa Hills Fire and Rescue Department	Toledo	Public Safety
Ottawa Hills Police Department	Ottawa Hills	Public Safety
Ottawa Hills Village Administration	Ottawa Hills	Government Building
Owens Community College Learning Center	Toledo	Community Center
Pearson Center	Toledo	School
Pelham Manor	Toledo	Assisted Living
Peter Gendron House	Toledo	Historic
Phenix Adult Family Home	Toledo	Nursing Home
Phenix Adult Family Home 2	Toledo	Nursing Home
Pickett Academy	Toledo	School
Port of Toledo	Toledo	Government Building
RCG Arrowhead Dialysis Center	Maumee	Dialysis
Reconstructive & Aesthetic	Toledo	Surgery
River East Community Health Center	Toledo	Community Center
Riverside Elementary School	Toledo	School
Riverview Apartments	Toledo	Historic
Rosary Care Center	Sylvania	Acute Care
Rosary Care Center	Sylvania	Nursing Home
Saint Charles Mercy Hospital	Oregon	Acute Care
Saint Luke's Hospital	Maumee	Acute Care
Saint Peter and Saint Paul Historic District	Toledo	Historic
Shining Star Adult Care Center	Toledo	Nursing Home
Sixth District Court of Appeals	Toledo	Government Building
Solid Waste Division	Toledo	Government Building
Spring Grove Historic District	Toledo	Historic
Spring Meadows Community	Holland	Nursing Home

ASSETS VULNERABLE TO HAZARDOUS MATERIALS INCIDENTS		
Asset	*City/Village*	*Type*
St Charles Mercy Hospital	Oregon	Urgent Care
St Joseph School	Sylvania	School
St Pius X Elementary School	Toledo	School
St. Ann Roman Catholic Church Complex	Toledo	Historic
St. Patrick's Catholic Church	Toledo	Historic
Standart-Simmons Hardware Company	Toledo	Historic
Stranahan Elementary School	Toledo	School
Summit YMCA	Toledo	Community Center
Sunrise Center Group Home	Toledo	Nursing Home
Surgi Care	Maumee	Surgery
Sylvan Elementary School	Sylvania	School
Sylvania Municipal Court	Sylvania	Government Building
Sylvania Township Fire Department Station 1	Sylvania	Public Safety
Sylvania Township Offices	Sylvania Township	Government Building
Tender Care Group Home	Toledo	Nursing Home
The Elizabeth Scott Community	Maumee	Assisted Living
The Friendly Center Inc	Toledo	Community Center
Toledo Edison	Oregon	Government Building
Toledo Fire And Rescue Department Station 17	Toledo	Public Safety
Toledo Fire And Rescue Department Station 5	Toledo	Public Safety
Toledo Fire And Rescue Department Station 9	Toledo	Public Safety
Toledo Junior Academy	Toledo	School
Toledo Muslim Community Center	Toledo	Community Center
Toledo School of P N	Toledo	Higher Ed
Village Meadows 50 Club	Holland	Nursing Home
Vistula Historic District	Toledo	Historic
Warren Densmore Building	Toledo	Government Building
Water Distribution	Toledo	Government Building
Waterville Library	Waterville	Library
Waterville Township Administration	Waterville	Government Building
West Toledo Branch YMCA	Toledo	Community Center
Wildwood Surgical Ctr	Toledo	Surgery
Wolf Creek YMCA	Maumee	Community Center
Woodlawn Cemetery	Toledo	Historic
YMCA University of Toledo- Morse Fitness Center	Toledo	Community Center
Yondota Historic District	Toledo	Historic

LOSS AND DAMAGES

The NRC does not provide losses or damages; PHMSA does at a state level but not at a county level. The amount of total damages in Ohio between 2009 and 2018 is $36,127,278. That is roughly $3.6 million per year for all hazardous materials incidents reported by PHMSA. Calculating that Lucas County accounts for 7.6% of highway incidents, 4.5% of air incidents, and 3.1% of rail incidents, these can be added to have a representative percentage of all incidents, which is 15.2%. Although not accurate but for the

sake of assigning a value, based on averages and damages, Lucas County could amount to approximately $541,909 per year, or about $5 million over 10 years.

PREVIOUS AND ONGOING MITIGATION EFFORTS

Lucas County has a Hazmat Response Plan; the plan includes detailed information on Tier II reporting facilities and gets updated annually. In addition, the county has a very active LEPC membership.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	5	Excessive	There have been approximately 1,202 hazardous materials incidents in 10 years.
Response	3	1 week	Depending on the event, the response time can be from less than half a day to more than a month. However, most incidents are small enough to be contained and cleaned within a week.
Onset	4	Less than 6 hours	For the most part, hazardous materials incidents are unpredictable, unless there is a known failure that can be fixed.
Magnitude	1	Localized (less than 10% of land area affected)	Hazardous materials incidents are limited to the location where the hazardous material is located (e.g., the factory, the rail, the highway, the pipeline, etc.) and tend to affect a small land area.
Business	2	1 week	The majority of hazardous materials incidents may be able to be taken care of within one day, however, the potential for wide-spread damage is possible.
Human	2	Low (some injuries)	There are a variety of injuries that could occur as a result of a hazardous materials incidents, ranging from no effect to death. However, most hazmat incidents will incur minor injuries; due to the potential for deaths, the level of danger was increased from minimum to low.
Property	1	Less than 10% of property affected	Unless the hazmat incident is significant and causes an explosion, the releases or spills will typically be localized and cause little to no damage to property
Total	**18**	**Medium**	The hazardous materials incident risk to Lucas County, based on the points received, is medium.

2.4.4 CBRNE/Terrorism

HAZARD OVERVIEW

The unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof in furtherance of political or social objections.			
Period of Occurrence:	At any time	**State Risk Ranking:**	Not ranked
Type of Hazard:	Human-caused	**Disaster Declarations:**	None

This profile is intentionally generalized. The Lucas County Emergency Management Agency has identified several potential terrorist-related targets throughout the county and maintain files of such information separately from this document.

Terrorism is a form of violence aimed at a public audience. The Federal Bureau of Investigation (FBI) defines terrorism as "the unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof in furtherance of political or social objections." More importantly, it is necessary to understand that the objective of terrorism is not destruction or death; it is the psychological impact on the targeted population and world opinion. Disruption to public services, economies, and social patterns, or a feeling of insecurity is the desired goal.

Terrorism can be categorized as either domestic or international. Domestic terrorism incidents are acts conceived of and carried out by U.S. citizens within the U.S. borders. Examples of domestic terrorism include environmental groups like the Animal Liberation Front (ALF), groups opposing abortion, animal rights groups opposing the fur trade, or the Oklahoma City bombing of the Murrah Building. International terrorism originates from groups based outside the U.S. and may be perpetrated against U.S. interests abroad or within the territorial boundaries of the U.S. Examples would be Al-Qaeda and sympathizer groups.

Terrorism is not always accomplished on a "grand scale," as is the case with international terrorists who are attempting to coerce the federal government. Such terrorism, while technically a hazard in Lucas County, is more unlikely than what is known as "domestic terrorism." Domestic terrorism can involve disgruntled employees (in the case of large industrial plants), angry parents (at schools), upset citizens (at government facilities),

etc. Domestic terrorists may often only intend to harm a single individual or a small group of individuals, but the threat of their actions can be highly disruptive.

There are a variety of methods to carry out a terrorist attack. CBRNe is a relatively new concept; it is short for Chemical, Biological, Radiological, Nuclear, and explosives. Before CBRN became common, the term NBC (Nuclear, Biological, Chemical) was used to identify these types of weapons, mainly in a military setting. The radiological threat became more relevant when terrorist groups expressed interest in CBRN weapons. The addition of 'e' for explosives is the latest extension of the acronym; it reflects a trend in counterterrorism, where professionals dealing with either CBRN or explosives are increasingly joining forces while operating under a single umbrella (IB Consultancy, n.d.).

- **(C) Chemical**: Chemical weapons are naturally occurring or human-made liquids, gasses, or solids that exhibit toxic effects on humans, animals, plants, or property upon exposure (Haddow, Bullock, & Coppola, 2014, p. 58).
- **(B) Biological:** Biological agents are either live organisms or the toxins produced by live organisms, either naturally occurring or genetically engineered, that can kill or incapacitate people, livestock, and crops; there are three types of biological agent categories, bacteria, viruses, and toxins (Haddow, Bullock, & Coppola, 2014, p. 59). Typical biological agents generally include anthrax, botulism, brucellosis, plague, smallpox, tularemia, and viral hemorrhagic fevers (CDC, n.d.).
- **(R) Radiological**: Radiological agents are those that cause harm by exposing victims to the damaging energy emitted by unstable radioactive materials; the most common sources of radiological materials are research laboratories, medical institutions, and hazardous waste containment facilities (Haddow, Bullock, & Coppola, 2014, p. 60).
- **(N) Nuclear**: Nuclear agents are those that cause great harm through the activation of a fission or fusion chain reaction; a nuclear blast is an explosion that emits intense light, heat, and damaging pressure and disperses radioactive debris over a widespread area, leading to the contamination of air, water, and ground surfaces for miles around (Haddow, Bullock, & Coppola, 2014, p. 60).
- **(E) Explosive or Enhanced Conventional Weapons or Enhanced Improvised Explosives:** Some agencies do not include the "E" in their classification and simply use "CBRN." Explosives are material containing an incredible amount of stored energy, after initiation or detonation it causes a rapid, sudden expansion. The

dispersion of some of the CBRN materials may be based on the use of explosives (IB Consultancy, n.d.).

A **cyber-attack or cyberterrorism** is the deliberate creation and exploitation of fear through violence or the threat of violence in the pursuit of political change (Brickey, 2012) through the use of computers and information technology to cause widespread fear in society.

POSSIBLE CAUSES

There is no single cause of acts of violence; it is typically a non-rational, complicated, intertwined, series of reasons that have the outcome of violence. In his article *Causes of Terrorism*, Nick Grothaus lays out the most common causes cited by leaders in the field of counterterrorism. These categories may apply to other types of violence not related to terrorism.

- **Ethno-Nationalism:** The desire of a population to break away from a government or ruling power and create a state of their own.
- **Alienation/Discrimination:** Individuals or groups face discrimination leading to further feelings of isolation. These people may become jaded towards society and feel excluded.
- **Religion:** Religion as a part of terrorism has been mainly attributed to Islamic fundamentalism although other religions have also had involvement in terrorist activities. For example, Christian Fundamentalists target abortion clinics, the Aryan Nation and the Church of Christ, Christians target the Jews and minorities (Post, 2007, pp. 211-212).
- **Socio-Economic Status:** Individuals and groups may be driven by a sense of relative deprivation and lack of upward mobility within society.
- **Political Grievances:** A lack of political inclusiveness or grievances against a certain political order may cause individuals to join or create terrorist groups.

LOCATION AND EXTENT

Due to the high unpredictability of terrorist acts, any location could be a target of an attack. The extent of damages or impact from an attack is also unpredictable. Potential terrorist targets tend to be located in urban areas such as the Toledo metro area. However, contrary to this, there is some evidence that terrorist organizations prefer rural safe houses

from which to operate. The rural environment offers an environment for the terrorists that are more difficult to observe. Some potential targets could include the following.

- Government facilities and/or personnel
- Stadiums
- Public meeting places
- Railroad facilities
- Dams
- Water and wastewater treatment facilities

FirstEnergy operates the Davis-Besse Nuclear Power Station located in Oak Harbor, about 21 miles southeast of Toledo (NRC, n.d.). The location puts the easternmost part of Lucas County within the 10-mile radius emergency planning zone (EPZ) and all of Lucas County within the 50-mile radius EPZ.

IMPACTS AND VULNERABILITY

Some individuals may experience severe stress symptoms following a violent incident. In general, individuals who lived through any type of terrorist attack could experience the following (Nation Center for PTSD, 2010).

- **Intrusive Re-Experiencing:** Terrifying memories, nightmares, and flashbacks.
- **Extreme Emotional Numbing:** Inability to feel emotions, feeling empty.
- **Extreme Attempts to Avoid Disturbing Memories:** Such as through substance abuse.
- **Hyperarousal:** Panic attacks, rage, extreme irritability, intense agitation, acting out with violence.
- **Severe Anxiety:** Debilitating worry, extreme helplessness, compulsions or obsessions.
- **Severe Depression:** Loss of ability to feel hope, pleasure, or interest; feeling worthless, suicidal ideations or intent.
- **Dissociation:** Fragmented thoughts, spaced out, unaware of surroundings, amnesia.

Treatment and support are critical to recovery. For most, the memories will not go away, but survivors can learn to manage responses to their memories. There are several

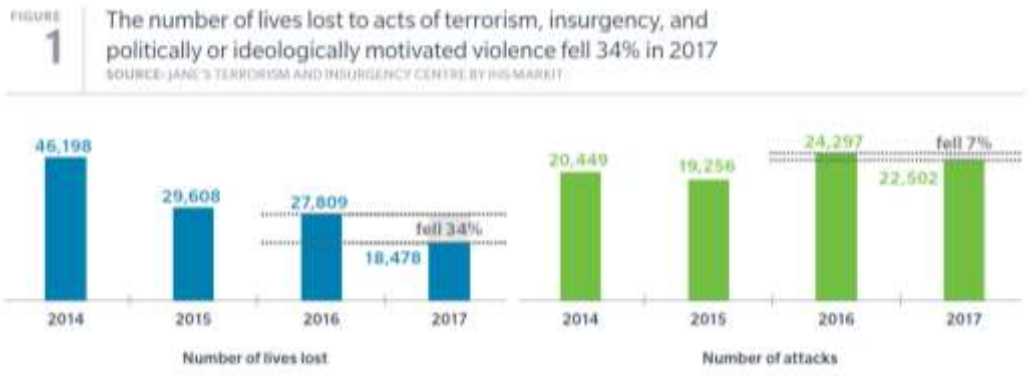
methods for that can be used to help survivors cope including, psychotherapy, medication, support groups and self-care (Riggs, 2017).

Specific injuries or illness from CBRNE terrorist attacks can vary. Effects of a radiological incident would produce injuries from heat, force of the explosion, debris, and radiological dust. The health risks of exposure to radioactive material are dependent upon several factors: the amount of radiation received, known as the dose, and the length of time over which the dose is received. Radiation generally penetrates the body when exposed to beta particles and gamma rays. Beta particles can be a hazard to both bare skin and eyes by causing burns. If ingested or inhaled, damage to internal organs will occur. Gamma radiation travels several hundred feet in open air and penetrates most objects. Gamma rays penetrate tissue farther than do beta or alpha particles. Gamma rays can cause death. Alpha particles do not damage living tissue when outside the body; however, when alpha-emitting atoms are inhaled or swallowed, they especially are damaging because they transfer relatively large amounts of ionizing energy to living cells. Damage to internal organs will occur in these victims. Chemicals are usually introduced into the body by inhalation, absorption, ingestion, or inoculation. They can be rapidly acting and have immediate or delayed effects: miosis, rhinorrhea, respiratory distress, skin burn, eye irritation, upper airway injury, pulmonary problems, unconsciousness, circulation failure (Ramesh & Kumar, 2010). Biological injuries or illnesses will depend on the type of agent utilized in the attack.

Because of the unpredictable nature of CBRNE / terrorism attacks, all assets in Lucas County could be potential targets for attacks. For a full list of assets, refer to Section 1.2.12 Asset Inventory.

HISTORICAL OCCURRENCES

According to the Marsh *2018 Terrorism Risk Insurance Report*, the number of lives lost to terrorist attacks globally has decreased steadily since 2014, while the number of attacks has increased slightly since the same year (Marsh & McLennan Companies, 2018).



The U.S. population has largely been spared the impacts of international terrorism until recently. The devastation which occurred at the World Trade Center in New York City and the Alfred Murrah Building in Oklahoma City illustrates the need to plan for potential threats within our own communities. Domestically, the distribution of anthrax spores using the United States Postal System as a delivery mechanism caused concern nationwide for several weeks. The bomb detonated at the Atlanta Olympics in 1996 resulted in an investigation/manhunt that lasted years. Richard Reid (a.k.a., the shoe bomber) disrupted air travel and changed security measures in airports.

As yet, no coordinated or widespread cyberattack has had a crippling effect on the U.S. infrastructure. However, while the number of random Internet cyberattacks has been increasing, the data collected to measure the trends for cyberattacks cannot be used to accurately determine if a terrorist group, or terrorist-sponsoring state, has initiated any of them (Wilson, 2005).

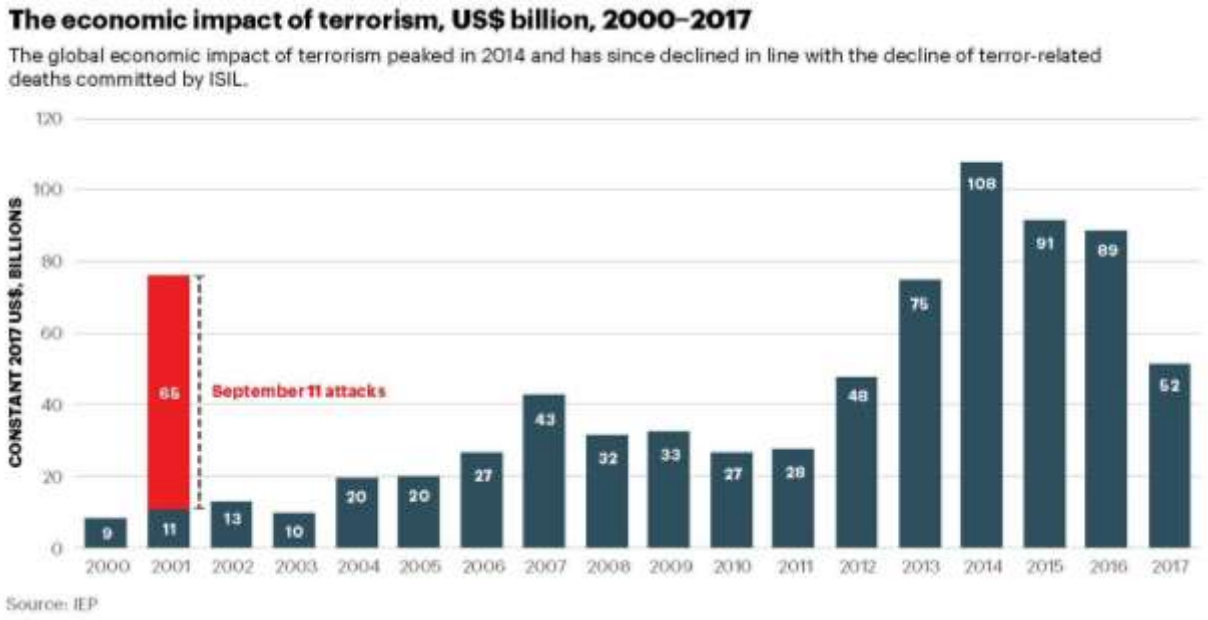
In November of 2011, the Davis-Besse nuclear power plant informed the governor that there were indications of cracking in the reinforced concrete shield building due to hydro-demolition, but the crack did not affect the reactor containment vessel (NRC, n.d.).

On December 10, 2018, two suspects, a man and a woman, not connected, were arrested for plotting attacks in public places. The suspects were inspired by events at the Tree of Live Synagogue in Pittsburgh a month earlier, the shooting at Columbine High School in Colorado, and the Charleston, South Carolina church shooter. The police arrested both suspects after purchasing equipment to carry out attacks. The police had been monitoring them on social media for several months. The woman planned to commit mass murder in a Toledo area bar, blow up a pipeline, damage a livestock farm and set livestock free, and link up with other anarchists. The man planned to attack the area's synagogues and was in the process of becoming a recruiter for ISIS (Snyder & Skebba, 2018).

LOSS AND DAMAGES

A terrorist event would, at a minimum, cripple the region. The effects of a terrorist incident are not only monetary; they are often emotional and symbolic. The communities throughout the region are rural and small. Any mass loss of life would take an emotional toll on the affected and nearby communities. According to the Institute for Economics and Peace (2018), 75% of the economic impact of terrorism is attributed to deaths; the remainder is split into gross domestic product (GDP) loss (25%), property destruction (2%), and injuries (1%).

Globally, countries have incurred billions of dollars in costs from terrorism. The graph below shows the economic impact over the years. It is nearly impossible to calculate the costs of terrorism at a local level; therefore, planners will not attempt to estimate the cost of terrorism and intentional CBRNE incidents.



PREVIOUS AND ONGOING MITIGATION EFFORTS

The Toledo-Lucas County Health Department and Hospital Council of Northwest Ohio are prepared to respond to any type of CBRNE event in Lucas County. Fire/EMS are the primary officials that would respond to a CBRNE incident and the health department's primary role is to provide insight and best practices for PPE or long-term effects of the incident to the public's health (environmental concerns, water quality, potential exposure to the public, etc.).

The hospitals and hospital council will be working to plan and treat individuals who were exposed to the CBRNE incident. Over the last 16 years of ASPR preparedness funding, the hospitals have increased their training and exercising for CBRNE events, and in some cases have purchased specialized equipment for preparedness and response to such events.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research

presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points, and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	1	None	There have been no terrorist attacks carried out in Lucas County
Response	3	One week	Terrorist attacks could be minimal or catastrophic. Due to no terrorist attacks occurring in Lucas County, the score was set at an intermediate level.
Onset	4	Less than 6 hours	Due to the unpredictable nature of terrorist attacks, the onset for this hazard is high.
Magnitude	2	Limited (10-25% of land area affected)	Typically, terrorism will target specific locations, which would not affect a large part of the county.
Business	2	1 week	If a terrorist attack occurred at a building, the targeted building would be incapacitated for a long period, however, surrounding businesses, considered here, may only be out for a week.
Human	3	Medium (multiple severe injuries)	In general, there are more severe injuries than deaths in terrorist attacks. However, there is always a possibility of death.
Property	2	10-25% of property affected	Depending on the size of the property that is attacked, the damage will vary. This estimate is conservative.
Total	**17**	**Medium**	The CBRNE/terrorism risk to Lucas County, based on the points received, is medium.

2.4.5 Harmful Algal Bloom

HAZARD OVERVIEW

Harmful algal blooms are algae that grow out of control and produce toxic or harmful effects.	
Period of Occurrence: Typically, during the summer months	**State Risk Ranking:** Not ranked
Type of Hazard: Natural and human-caused	**Disaster Declarations:** None

Harmful algal blooms (HABs) occur when colonies of algae — simple plants that live in the sea and freshwater — grow out of control and produce toxic or harmful effects on people, fish, shellfish, marine mammals and birds. Ranging from microscopic, single-celled organisms to large seaweeds, algae are simple plants that form the base of food webs. Sometimes, however, their roles are more sinister. Under the right conditions, algae may grow out of control — and a few of these "blooms" produce toxins that can kill living organisms. Other algae are nontoxic, but eat up all of the oxygen in the water as they decay, clog the gills of fish and invertebrates, or smother corals and submerged aquatic vegetation. Still others discolor water, form huge, smelly piles on beaches or contaminate drinking water. Collectively, these events are called harmful algal blooms, or HABs (NOAA, n.d.).

POSSIBLE CAUSES

HABs occur naturally, but human activities that disturb ecosystems play a role in their more frequent occurrence and intensity. Increased nutrient loadings and pollution, food web alterations, introduced species, water flow modifications and climate change all play a role.

Studies show that many algal species flourish when wind and water currents are favorable. In other cases, HABs may be linked to "overfeeding." This occurs when nutrients (mainly phosphorus and nitrogen) from sources such as lawns and agriculture flow into bays, rivers, and the sea, and build up at a rate that "overfeeds" the algae that exist normally in the environment. Some HABs appear in the aftermath of natural phenomena like sluggish water circulation, unusually high-water temperatures, and extreme weather events like hurricanes, floods, and drought (NOAA, n.d.).

Even though HAB is a natural phenomenon, Alex Read (2014) who writes for the Socialist Worker, states that, unlike many of the natural disasters of the last several years, there is nothing natural about this. Harmful algal blooms are not a result of some natural cycle of these bacteria. These are a result of excess farm and industrial runoff, under treated sewage from lake communities, and the depletion of the flora and fauna that would normally consume or otherwise keep these blooms in check.

LOCATION AND EXTENT

Harmful algal bloom develops in Lake Erie, at the easternmost part of Lucas County; however, the HAB can spread throughout the Maumee River that is southeast of the county. Damages can extend to the whole county, especially those who rely on city water due to having water intakes near Lake Erie.

IMPACTS AND VULNERABILITY

Nutrient pollution and harmful algal blooms cause major environmental damage as well as serious health problems in people and animals (EPA, 2018).

- **Human Health**: Harmful algal blooms create toxins and compounds that are dangerous to health. There are several ways that people (and pets) can be exposed to these compounds.
    - Direct exposure to toxic algae: Drinking water can be a source of exposure to chemicals caused by nutrient pollution. Drinking, accidentally swallowing or swimming in water affected by a harmful algal bloom can cause rashes, stomach or liver illness, respiratory problems, or neurological affects.
    - Nitrates: Nitrates are compounds found in fertilizer that often contaminate drinking water in agricultural areas. Infants who drink water too high in nitrates can become seriously ill and even die. Symptoms include shortness of breath and blue-tinted skin, a condition known as blue baby syndrome.
    - Byproducts of water treatment: Stormwater runoff carries nutrients directly into rivers, lakes and reservoirs which serve as sources of drinking water. When disinfectants used to treat drinking water react with toxic algae, harmful chemicals called dioxins can be created. These byproducts have been linked to reproductive and developmental health risks and even cancer.

- **Environmental**: Nutrient pollution fuels the growth of harmful algal blooms which devastate aquatic ecosystems.
    - Direct exposure to algae: Harmful algal blooms sometimes create toxins that can kill fish and other animals. After being consumed by small fish and shellfish, these toxins move up the food chain and hurt larger animals like sea lions, turtles, dolphins, birds, manatees, and fish. Even if algal blooms are not toxic, they can hurt aquatic life by blocking out sunlight and clogging fish gills.
    - Dead zones or hypoxia: Nutrient pollution can create dead zones, areas in water with little or no oxygen where aquatic life cannot survive, also known as hypoxia. These areas are caused by algal blooms consuming oxygen as they die and decompose. Aquatic animals must leave the affected area or die. Young fish and seafloor dwellers like crabs and clams are most likely to die in hypoxic areas.
    - Acid rain: Acid rain, caused by nutrient pollution in the air, damages lakes, streams, estuaries, forests and grasslands across the country.
    - Air pollution: Airborne nitrogen compounds like nitrogen oxides contribute to the formation of other air pollutants such as ground-level ozone, a component of smog which can restrict visibility. Wind and weather can carry ozone many miles from urban to rural areas. Ozone pollution can damage trees and harm the appearance of vegetation and scenic areas.

- **Economic**: Nutrient pollution has diverse and far-reaching effects on the U.S. economy, impacting tourism, property values, commercial fishing, recreational businesses and many other sectors that depend on clean water.
    - Drinking water costs: Nitrates and algal blooms in drinking water sources can drastically increase treatment costs. It can also cost billions of dollars to clean up polluted water bodies. Every dollar spent on protecting sources of drinking water saves in water treatment costs.
    - Tourism losses: The tourism industry loses close to $1 billion each year, mostly through losses in fishing and boating activities, as a result of water bodies that have been affected by nutrient pollution and harmful algal blooms. Airborne nutrient pollution can also affect visibility at popular outdoor destinations like national parks. This kind of pollution can also damage buildings and other structures, especially those made of marble and limestone.

- Commercial fishing and shellfish losses: Fishing and shellfish industries are hurt by harmful algal blooms that kill fish and contaminate shell fish. Annual losses to these industries from nutrient pollution are estimated to be in the tens of millions of dollars.
- Real estate losses: Clean water can raise the value of a nearby home by up to 25 percent. Waterfront property values can decline because of the unpleasant sight and odor of algal blooms.

HISTORICAL OCCURRENCES

Harmful algal bloom has been an annual problem around Toledo, Sandusky and the Erie Islands, when blue-green algae produces a toxic cyanobaceteria (Johnston, 2017).

In the 1970s and 80s, the United States and Canadian governments capped household detergent phosphates, reining in factory pollutants and spending $8 billion to upgrade lakeside sewage plants. Phosphorus levels plunged by two thirds, and the algae subsided. But in the mid-1990s, it began creeping back.

A professor at the Lake Erie Center at the University of Toledo said that 2002 was the last year that the lake didn't have much of a bloom; 2008, 2009 and 2010 were bad years for algal blooms. Then there was 2011, which was the wettest spring on record. That summer's algae bloom, mostly poisonous blue-green algae called Microcystis, sprawled nearly 120 miles, from Toledo to past Cleveland. It produced lake-water concentrations of microcystin, a liver toxin, that were 1,200 times World Health Organization limits, tainting the drinking water for 2.8 million consumers. (Wines, 2013).

In 2014 municipal officials asked the 500,000 residents served by the city's water system to stop using tap water after the toxins were found at a city water treatment plant (Fitzsimmons, 2014).

The image of the right is from 2017; it illustrates the maps that NOAA provides for harmful algal bloom forecasts and status. As is seen on the map, the worst rankings (highest, in yellow and red) are mainly located near

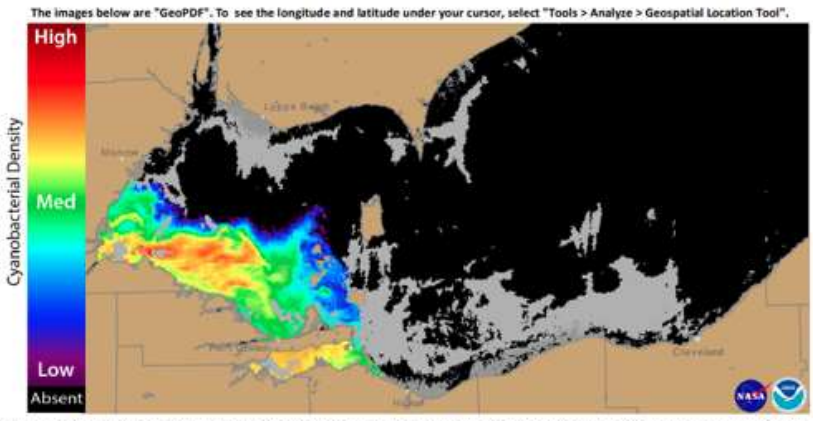
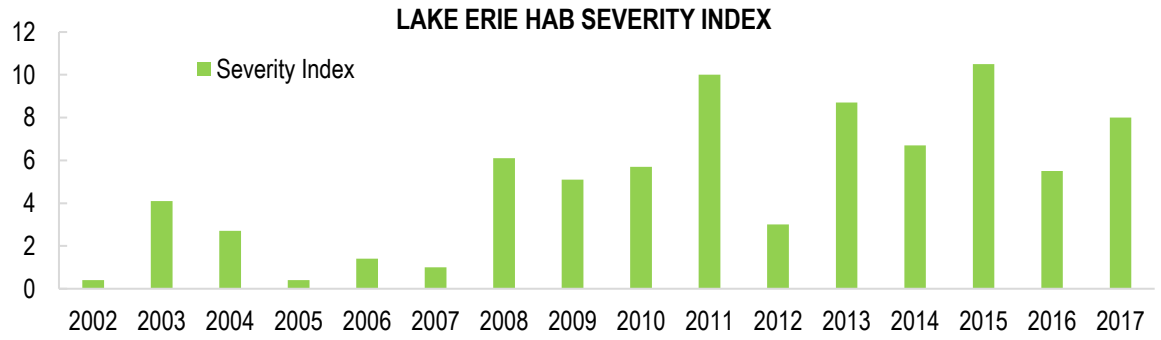


Figure 1. Cyanobacterial Index from modified Copernicus Sentinel 3 data collected 11 September, 2017 at 11:44 EST. Grey indicates clouds or missing data. The estimated threshold for cyanobacteria detection is 20,000 cells/mL.

Lucas County.

Through the Ohio Sea Grant, Ohio State University, the National Oceanic and Atmospheric Administration, Heidelberg University, University of Michigan, Limno Tech, and North Carolina State University, work together to forecast the HAB in Lake Erie. The chart below shows the rating, on a scale from zero to 10 (severity can exceed 10) for the HABs in Lake Erie since 2002.



LOSS AND DAMAGES

See economic impact section above. It is still unclear what the actual harmful algal bloom damages have been to Lucas County as there is not an agency or organization tracking this data.

PREVIOUS AND ONGOING MITIGATION EFFORTS

The City of Toledo actively works with the Ohio EPA to ensure the public water supply is safe and the Collins Park Water Treatment Plant and distribution system is operating within all regulatory requirements and health guidelines (City of Toledo, n.d.).

- Toledo chemists and operators are on duty 24 hours a day testing and monitoring the water treatment process from the intake crib in Lake Erie through to the Collins Park Water Treatment Plant and into the distribution system.
- During HAB season Toledo has an advance warning system of buoys and data collection devices in Lake Erie for early detection of harmful algal bloom conditions which allows adjustment of water treatment methods starting at the intake crib and throughout the treatment process at the Collins Park Water Treatment Plant.
- Toledo has dramatically improved its ability to treat HABs through enhanced chemical feed and disinfection capabilities and other Ohio-EPA-approved upgrades

to the Collins Park Water Treatment Plant. The Plant is in year 6 of a 10-year $500 million plan of capital improvements.

After the HAB that shut down the water service for Toledo and surrounding areas, Whitehouse created a localized response plan to distribute water to affected residents without the need of any other jurisdictional help. Equipment was purchased (water bladders capable of holding around 1,000 gallons, and a water distribution system capable of filling various sized containers). Also, Whitehouse initiated agreements with local water transportation companies that, in the event of need, would be able to off load water to us as a first stop in the morning. The water station would be manned by village employees (fire department). Currently, in an effort to reduce the byproduct of drinking water treatment (total trihalomethanes or TTHM), the Village of Whitehouse is installing a device in the water tower that reduces or eliminates TTHM; it is currently in the end phase of installation.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	5	Excessive	Harmful algal bloom occurs annually in Lake Erie and has the potential to cause trouble to the Toledo area in Lucas County and surrounding counties.
Response	5	More than a month	Scientists, water department workers, and environmentalists work together for months to solve HAB problems that arise every year.
Onset	1	Over 24 hours	HAB can be forecasted based on a variety of factors well before the HAB becomes a problem
Magnitude	2	Limited (10-25% of land area affected)	HAB is in Lake Erie and possibly in the Maumee River; which are only at the edges of the county
Business	2	1 week	It is possible that businesses could be affected due to the inability to utilize water; this could affect restaurants, hotels, tourism, and other types of business in the area.
Human	1	Minimum (minor injuries)	Because water quality is constantly tested, officials can issue warnings in time for the population to react and avoid harm.
Property	1	Less than 10% of property affected	HAB typically does not affect property.
Total	**17**	**Medium**	The harmful algal bloom risk to Lucas County, based on the points received, is medium.

2.4.6 Pandemic

HAZARD OVERVIEW

A sudden increase in the number of cases of a disease above what is normally expected in a certain area.	
Period of Occurrence: At any time	**State Risk Ranking:** Not ranked
Type of Hazard: Natural	**Disaster Declarations:** None

According to the Centers for Disease Control and Prevention (CDC), there are various levels that refer to the amount or extent of a disease occurrence (CDC, 2012).

- **Endemic** refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area; it is the amount of a particular disease that is usually present in a community or baseline.
- **Sporadi**c refers to a disease that occurs infrequently and irregularly.
- **Hyper endemic** refers to persistent, high levels of disease occurrence.
- **Cluster** refers to an aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.
- **Epidemic** refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. Epidemics occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts. More specifically, an epidemic may result from:
  - a recent increase in amount or virulence of the agent,
  - the recent introduction of the agent into a setting where it has not been before,
  - an enhanced mode of transmission so that more susceptible persons are exposed,
  - a change in the susceptibility of the host response to the agent, and/or
  - factors that increase host exposure or involve introduction through new portals of entry.

- **Outbreak** carries the same definition of epidemic but is often used for a more limited geographic area.
- **Pandemic** refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people.

Some diseases are so rare in a given population that a single case warrants an epidemiologic investigation (e.g., rabies, plague, polio), other diseases occur more commonly so that only deviations from the norm warrant investigation. For this plan, diseases considered are limited to Class A and Class B Reportable Infectious Diseases, according to the Ohio Administrative Code Chapter 3701-3.

POSSIBLE CAUSES

Epidemics can develop with little or no warning and quickly erode the capacity of local medical care providers. A fast-developing epidemic can last several days and extend into several weeks. In some extreme cases, they can last for several months. An epidemic can occur at any time of the year, but the warm summer months, when bacteria and microorganism growth are at their highest, present the greatest risk.

LOCATION AND EXTENT

A pandemic can affect all parts of Lucas County but is more probable to occur in densely populated areas, such as the cities and higher-population villages. Additionally, outbreaks could occur in particularly large, multi-unit residential developments and facilities at which a large workforce is employed.

HISTORICAL OCCURRENCES

There have been no instances of the following reportable diseases in Lucas County since 2010: Anaplasmosis, anthrax, botulism, chancroid, chikungunya virus, cholera, dengue, diphtheria, ehrlichiosis, encephalitis, hepatitis E, herpes (congenital), HIV/AIDS, influenza A, LaCrosse virus disease, measles, middle east respiratory virus (MERS), plague, poliomyelitis, Q fever, rabies (human), rubella, severe acute respiratory syndrome (SARS), smallpox, syphilis, tetanus, toxic shock syndrome, trichinosis, tularemia, typhoid fever, typhus fever, viral hemorrhagic fever, or yellow fever.

The following table outlines the reportable diseases that have been present in Lucas County between 2010 and 2016.

TOLEDO-LUCAS COUNTY HEALTH DEPARTMENT REPORTABLE DISEASES										
Reportable Disease	*Class*	*Type*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	***Total Cases***
Amebiasis	B	Enteric	0	1	1	1	0	0	0	**3**
Brucellosis	B	Zoonotic	1	0	0	0	0	0	0	**1**
Campylobacteriosis	B	Enteric	71	73	47	49	57	31	43	**371**
Chlamydia	B	STI	3,034	2,641	3,231	2,267	3,210	2,359	3,027	**19,769**
Coccidioidomycosis	B	Other Reportable	2	3	1	1	0	1	2	**10**
Creutzfeldt-Jakob Disease	B	Other Reportable	0	0	0	0	0	0	1	**1**
Cryptosporidiosis	B	Enteric	45	20	17	14	19	18	20	**153**
Cytomegalovirus - congenital	B	Other Reportable	0	0	0	0	1	1	3	**5**
E. coli (all)	B	Enteric	7	5	5	4	10	2	0	**33**
Giardiasis	B	Enteric	23	18	9	13	7	15	20	**105**
Gonococcal	B	STI	1,095	693	995	819	1,349	805	1,197	**6,953**
Haemophilus influenzae (invasive disease)	B	Vaccine Preventable	8	5	8	9	5	14	5	**54**
Hemolytic uremic syndrome (HUS)	B	Enteric	0	0	1	0	0	0	0	**1**
Hepatitis A	B	Hepatitis	6	0	0	1	2	2	1	**12**
Hepatitis B (acute and chronic)	B	Hepatitis	156	134	58	52	42	89	104	**635**
Hepatitis C (acute and chronic)	B	Hepatitis	2,143	468	237	292	242	443	356	**4,181**
Influenza hospitalization	B	Vaccine Preventable	242	117	322	161	59	121	11	**1,033**
Legionnaires' disease	B	Other Reportable	10	10	6	18	4	7	7	**62**
Listeriosis	B	Enteric	1	0	1	3	2	0	0	**7**
Lyme disease	B	Zoonotic	7	2	2	3	1	6	1	**22**
Malaria	B	Zoonotic	1	2	1	2	0	1	0	**7**
Meningitis, aseptic	B	Other Reportable	57	55	38	55	46	73	37	**361**
Meningitis, bacterial	B	Other Reportable	8	6	7	6	7	2	8	**44**
Meningococcal Disease	A	Vaccine Preventable	0	0	1	0	1	3	2	**7**
Mumps	B	Vaccine Preventable	2	0	1	0	1	1	0	**5**
Mycobacterial disease	B	Other Reportable	31	35	39	32	27	28	28	**220**
Pertussis	B	Vaccine Preventable	11	9	26	36	6	14	33	**135**
Psittacosis	B	Zoonotic	11	0	0	0	0	0	0	**11**
Salmonellosis	B	Enteric	53	43	37	53	52	81	47	**366**
Shingellosis	B	Enteric	67	13	19	7	11	31	42	**190**
Spotted Fever Rickettsiosis	B	Zoonotic	3	1	0	1	0	2	0	**7**
Staphylococcal aureus (VISA)	B	Other Reportable	0	0	0	0	0	0	1	**1**
Streptococcal disease, Group A invasive	B	Other Reportable	17	10	15	13	12	19	20	**106**
Streptococcal disease, Group B in newborn	B	Other Reportable	4	3	0	4	3	3	3	**20**
Streptococcal toxic shock syndrome	B	Other Reportable	5	0	0	0	5	4	6	**20**

TOLEDO-LUCAS COUNTY HEALTH DEPARTMENT REPORTABLE DISEASES										
Reportable Disease	*Class*	*Type*	*2016*	*2015*	*2014*	*2013*	*2012*	*2011*	*2010*	***Total Cases***
Streptococcus pneumoniae	B	Other Reportable	28	37	28	46	43	48	58	**288**
Tuberculosis	B	Other Reportable	3	8	2	7	4	4	4	**32**
Varicella	B	Vaccine Preventable	3	0	13	12	13	17	27	**85**
Vibrio Parahaemolyticus infection	B	Enteric	0	0	0	2	1	0	0	**3**
West Nile Virus	B	Zoonotic	0	5	0	8	4	6	0	**23**
Yersiniosis	B	Enteric	1	2	1	1	2	1	0	**8**
Zika Virus	B	Zoonotic	2	N/A	N/A	N/A	N/A	N/A	N/A	**2**

The Toledo-Lucas County Health Department keeps records on confirmed, probable, and suspected community, foodborne, healthcare-associated, institutional, and zoonotic outbreaks. In 2014 there were 28 confirmed, probable, and suspect outbreaks that the epidemiology staff investigated with 581 ill people; in 2015 there were 25 cases with 341 ill; in 2016 there were 28 cases with 353 ill.

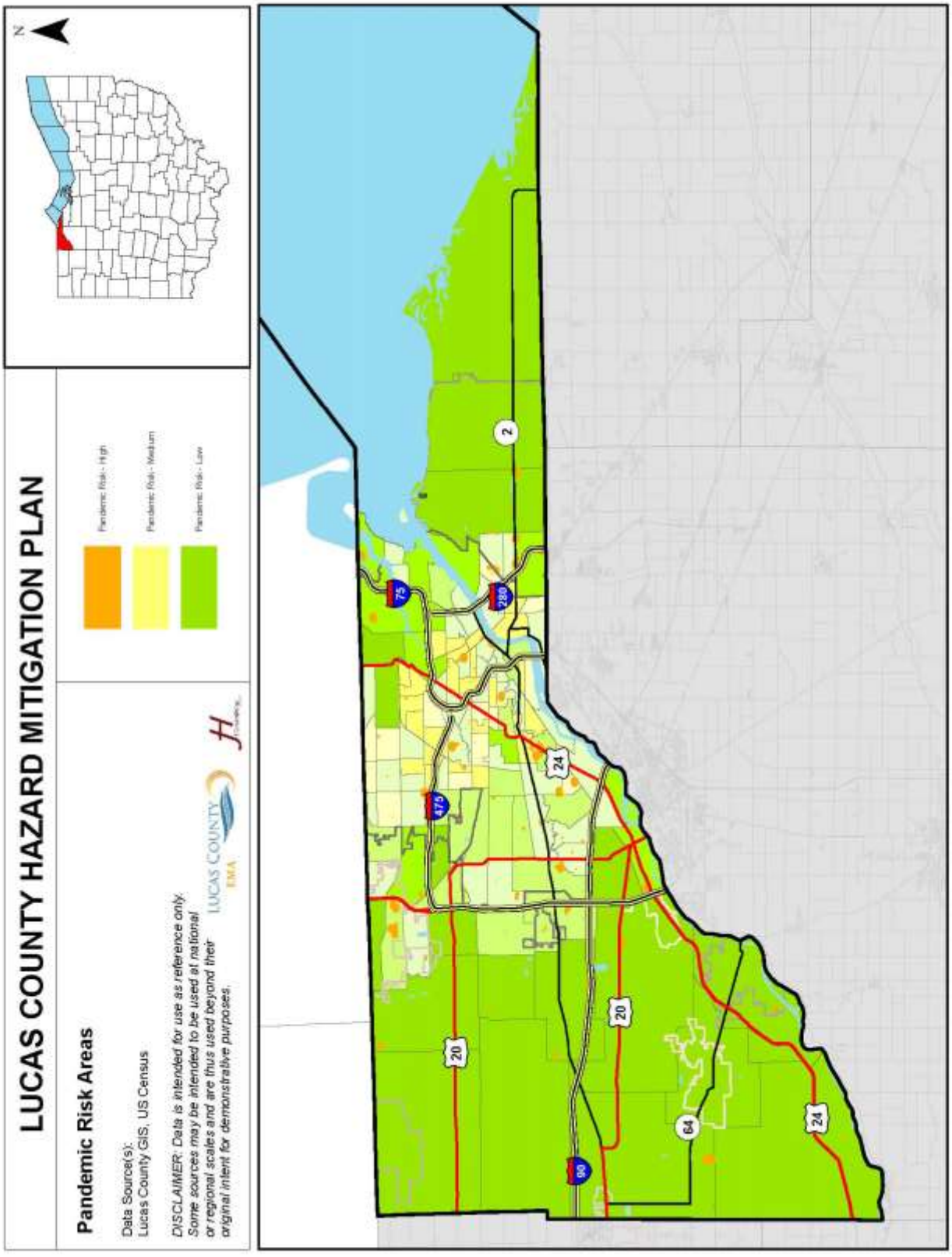
IMPACTS AND VULNERABILITY

Major concerns during an epidemic or outbreak include the ability of local health care providers to provide medical attention to everyone who becomes ill, and the ability to identify the source or what is causing the population to become ill.

Cascading effects of epidemics can include the following.

- Illness or death
- Civil disturbance
- Distrust of government
- Poor water quality
- Temporary loss of income

Diseases can affect any age group; however, they can more easily affect the youngest and oldest populations. The map on the following page uses the U.S. Census tracts to determine the areas where risks of pandemics are high. Planners identified the younger and older population to show their general location on the map. Areas with green have a low risk of pandemic (typically because there are open fields with no population); lighter green to yellow shades are at a medium risk and areas in orange are high risk areas (these orange areas take hospitals and nursing homes into account).


LUCAS COUNTY HAZARD MITIGATION PLAN
Pandemic Risk Areas
Data Source(s):
Lucas County GIS, US Census
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Pandemic Risk - High
Pandemic Risk - Medium
Pandemic Risk - Low
N
2
75
280
475
24
20
64
90

LOSS AND DAMAGES

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 billion in lost earnings. By population, Lucas County represents 0.13% of the United States. Since seasonal influenza primarily impacts the human population, using Lucas County's composition of the U.S. as a multiplier (i.e., 0.0013) and applying it to the potential economic impact, lost earnings in Lucas County could reach a staggering $21,190,000 each year. Though that number appears high, it equates to approximately $78 per year for each person listed by the U.S. Census Bureau as "in civilian labor force" for the county. Pandemics rarely affect structure they affect people and, at times, the operations of critical facilities, businesses, and other community assets.

It is important to note that this figure presented does not include the costs of prevention that the Toledo-Lucas County Health Department and local hospitals and healthcare providers incur to prevent and treat the various diseases. Prevention costs can greatly reduce the occurrence or severity of a pandemic.

PREVIOUS AND ONGOING MITIGATION EFFORTS

The Toledo-Lucas County Health Department continually works to mitigate pandemics in Lucas County. Over the past few years, these efforts include, but are not limited to the following.

- Throughout 2018 the health department established memorandums of understanding (MOUs) with county hospitals to become close point of dispensing (POD) sites
- In March of 2018, they received training from FEMA to become a strategic national stockpile (SNS) education trainer at the Center for Domestic Preparedness
- In November of 2017 they conducted POD training with the Lucas County Medical Reserve Corps
- In February of 2017, the health department held a tabletop exercise with TLCHD staff about PODs and in May they conducted a full-scale POD exercise
- In November of 2016, TLCHD personnel received FEMA training about strategic national stockpile (SNS) at the Center for Domestic Preparedness

RISK ASSESSMENT

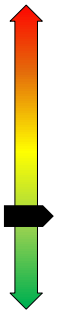
The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research

presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	4	High	There have been several outbreaks each year, but there have not been confirmed pandemics, which are more wide-spread.
Response	3	1 week	Mobilization of points of dispensing sites can occur within hours, however, getting medication to the population who needs it may take about a week. If a pandemic is severe enough, it could require people to be quarantined and could last several weeks to months.
Onset	1	Over 24 hours	The health departments monitor the cases they and other healthcare facilities receive. Data will indicate if there is a pandemic in advance.
Magnitude	3	Critical (25-50% of land area affected)	Although the land itself is not affected, the spread of diseases can affect a large part of the territory through the population.
Business	1	Less than 24 hours	Businesses could be affected if the employees become ill. However, if they are not, the impact to businesses is minimal.
Human	4	High (multiple deaths)	The potential for multiple deaths during a pandemic is high, especially before the disease is contained.
Property	1	Less than 10% of property affected	Property will not be affected by pandemic.
Total	**17**	**Medium**	The pandemic risk to Lucas County, based on the points received, is medium.

2.4.7 Severe Winter Storm

HAZARD OVERVIEW



A combination of heavy snow, blowing snow and/or dangerous wind chills that could be threatening to life or property.			
Period of Occurrence:	At any time, typically during winter months	**State Risk Ranking:**	Frequency: Highly likely Impact: Critical Ranking: 4 - High
Type of Hazard:	Natural	**Disaster Declarations:**	EM-3055

During the winter, there are many instances of cold weather, snow and storms. This profile considers only those winter storms that are damaging enough to be considered *severe*; these include blizzards and ice storms.

- **Blizzards**: Blizzards are severe winter storms that have low visibilities, also known as whiteouts, for an extended period of time due to high winds blowing falling snow or snow on the ground (ground blizzards) (Keller, DeVecchio, 2015). Ground blizzards are preceded by unseasonably warm air, which can cause people to let their guard down. People may venture outside without proper winter clothing. This relatively warm weather does not last long. The ground blizzard occurs when an Arctic cold front move through the region, causing temperatures to drop and winds to increase, often reaching gusts of 50 to 60 mph. If there are several inches of deep fresh snow on the ground, this strong wind will quickly pick up the snow and create whiteout conditions (NWS, n.d.). In the U.S. storms that produce blizzards typically come from the North Pacific and come onto land along the west coast. The different routes these storms can take are called storm tracks; storm tracks are named for geographic origin or the direction of the prevailing winds (e.g., Alberta Clipper, and Nor'easter). Sustained wind or frequent gusts to 35 mpg or greater and considerable falling and/or blowing snow reducing visibility to less than ¼ mile are the conditions for defining a blizzard (NWS & FEMA, 2001).
    - **Alberta Clippers**: Alberta Clippers are winter "storms that often form over the providence of Alberta, Canada, east of the Rocky Mountains" (Rice, 2015). Typically, this type of storm moves quickly to the southeast across the northern

Plains and finally to the Atlantic Coast. These storms usually are drier and have less snow but extremely cold temperatures.

- **Nor'easter:** A Nor'easter is a storm along the East Coast of the U.S., so called because the winds over the coastal area are generally progressing northeastward and typically attain maximum intensity near New England and the Maritime Provinces of Canada. These storms may occur at any time of year but are most frequent and most violent between September and April. They nearly always bring precipitation in the form of heavy rain or snow, as well as winds of gale force, rough seas, and, occasionally, coastal flooding to the affected regions. The warm waters of the Gulf Stream help keep the coastal waters relatively mild during the winter, which in turn helps warm the cold winter air over the water. This difference in temperature between the warm air over the water and cold Arctic air over the land is the fuel that feeds Nor'easters (NWS, n.d.).

- **Ice Storms**: Ice storms are prolonged periods of freezing rain where ice can accumulate on cold surfaces (Keller, DeVecchio, 2015).

The Weather Channel (TWC) has named some severe winter storms, similar to the naming of hurricanes, since 2012. However, the National Weather Service (NWS) does not officially name winter storms and issued a statement requesting their offices and other news channels to refrain from naming storms (Panovich, 2012). The naming of hurricanes makes sense because they are well-defined storms which follow a path that can be tracked and predicted. Hurricanes affect a specific area of impact in all four quadrants, located around the eye. By contrast, winter storms are often erratic, affecting different areas unevenly; they often develop, dissipate, and reform with two to three centers, often delivering snow in only one quadrant, while places not too far away from a blizzard may experience rain or fog, or nothing at all. As a result, the public will not know what action to take when there is a "named" storm or may take the wrong action (AccuWeather, 2012).

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. Paul Kocin and Louis Uccellini of the National Weather Service developed the Northeast Snowfall Impact Scale (NESIS) that characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch snowfall accumulations and greater. The index differs from other meteorological indices in that it uses population information in addition to meteorological

measurements. Thus, NESIS indicates a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories (NOAA, n.d.).

NORTHEAST SNOWFALL IMPACT SCALE (NESIS)		
Category	*NESIS Value*	*Description*
1	1-2.499	Notable
2	2.5-3.99	Significant
3	4-5.99	Major
4	6-9.99	Crippling
5	10.0+	Extreme

POSSIBLE CAUSES

In the winter months, weather patterns continue throughout the area; these can generate storms. However, three elements that must be present to generate a winter storm (NSSL, n.d.).

- **Cold Air**: Below freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.
- **Lift**: Something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountainside.
- **Moisture**: To form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

LOCATION AND EXTENT

Generally, severe winter weather will affect all counties across the region very similarly. Winter weather can encompass several jurisdictions, counties, and states at the same time for varying durations and severity.

HISTORICAL OCCURRENCES

The following table outlines the winter weather events NCEI reports; it includes heavy snow, ice storm, winter storm, and winter weather. Between 1996 and 2018, there

have been 37 events. Three events stand out due to the amount of property damage they caused (according to NCEI data. The following describes these events in more detail.

On January 30, 2002, freezing rain developed to the north of a warm front extending east. Up to one-half inch of ice accumulation occurred in Lucas. Scattered power outages resulted from downed power lines and trees. In Lucas County alone, over 400 trees and limbs were downed. Two dozen homes and 19 vehicles were damaged by these fallen trees. A total of 106,000 customers lost power at some point during this storm.

On February 22, 2003, precipitation initially began as rain but quickly changed to snow during the afternoon hours. Once the snow began, it quickly intensified and whiteout conditions were reported during the evening hours. Total snow accumulations ranged from around six inches in southern Hancock and western Erie Counties to nine inches in Lucas County. Strong northerly winds with occasional gusts to 40 mph accompanied the snow and caused considerable blowing and drifting. Drifts as high as 3 to 5 feet were observed in Lucas and Wood Counties.

On December 22, 2004, a potent winter storm affected northwestern Ohio. The snow began in the Findlay area around mid-morning and spread north into the Toledo area during the evening. The snow intensified during the late evening hours with heavy snow then continuing through daybreak. Snowfall rates of around an inch per hour occurred during the early morning hours of the 23rd with visibilities less than one quarter mile at times. Northerly winds behind the low increased during the evening hours of the 22nd and this caused much blowing and drifting as well. Drifts two to three feet deep were common. Snowfall totals from this event ranged from 7 to 10 inches in Lucas County. Accumulations a little further east in north-central Ohio were nearly two feet at some spots. Officially, 7.9 inches of snow fell at Toledo Express Airport (Lucas County). Travel was nearly impossible

SEVERE WINTER WEATHER EVENTS	
Event Date	*Event Type*
3/19/1996	Heavy Snow
3/13/1997	Ice Storm
1/2/1999	Winter Storm
3/5/1999	Heavy Snow
3/9/1999	Heavy Snow
3/11/2000	Winter Storm
12/11/2000	Ice Storm
12/13/2000	Winter Storm
1/30/2002	Ice Storm
3/24/2002	Winter Storm
3/26/2002	Winter Storm
12/24/2002	Heavy Snow
2/22/2003	Heavy Snow
1/4/2004	Winter Storm
1/26/2004	Winter Storm
12/22/2004	Winter Storm
1/5/2005	Ice Storm
1/7/2005	Winter Storm
1/22/2005	Winter Storm
12/8/2005	Heavy Snow
2/13/2007	Winter Storm
12/9/2007	Ice Storm
12/15/2007	Winter Storm
2/25/2008	Winter Storm
3/21/2008	Heavy Snow
12/19/2008	Winter Storm
1/9/2009	Winter Storm
1/27/2009	Winter Storm
2/9/2010	Winter Storm
2/1/2011	Winter Storm
12/14/2013	Heavy Snow
1/1/2014	Winter Storm
1/5/2014	Winter Storm
2/4/2014	Heavy Snow
3/12/2014	Winter Storm
2/1/2015	Winter Storm
4/8/2016	Winter Storm

during the peak of this event. Hundreds of accidents occurred and it took several days for road crews to clean up after this event.

IMPACTS AND VULNERABILITY

According to the NSSL (n.d.), most deaths from winter storms are not directly related to the storm itself; people die in traffic accidents on icy roads, of heart attacks while shoveling snow, or of hypothermia from prolonged exposure to cold. During severe winter storms, everyone is potentially at risk; the actual threat depends on specific situations. Recent observations show that of injuries related to ice and snow, about 70% occur in automobiles, about 25% are people caught out in the storm, and the majority of victims are males over 40 years old. Of injuries related to exposure to cold, 50% are people over 60 years old, over 75% are males, and about 20% occur in the home.

Another reason these blizzards are dangerous is the cold temperatures that follow behind the Arctic front. Anyone stranded in their vehicle or forced to walk outside is at risk of frostbite or hypothermia (NWS, n.d.).

Heavy accumulations of ice can bring down trees and topple utility poles and communication towers. Ice can disrupt communications and power for days while utility companies repair extensive damage. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NWS, n.d.).

LOSS AND DAMAGES

According to NCEI data, the storms described in the historical occurrences have caused a combined damage of $11,580,000. It also reports 2 injuries in January of 1999. On average, the cost per event has been approximately $313,000.

PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to severe winter storms have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of severe winter storms.

- Coordinate with the American Red Cross to establish heating centers for at-risk citizens/residences, provide winter storm kits and design a public information

campaign that includes educating citizens about snow winter storm warnings, alternative forms of heating, and family/individual emergency communications plans.

- Work with critical facilities to develop emergency communications plans and emergency power backup plans.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

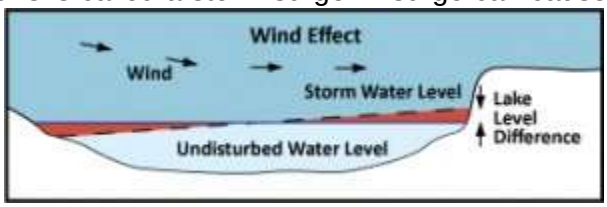
RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	5	Excessive	There have been 37 severe winter events between 1996 and 2018.
Response	2	1 day	Response time typically takes about a day for clearing roads after the event is over.
Onset	1	Over 24 hours	These weather events are predictable.
Magnitude	4	Catastrophic (more than 50% of the land area affected)	Winter storms are wide-spread events that cover the parts of the county or several counties at a time.
Business	1	Less than 24 hours	After roads are cleared, most businesses would be able to reopen if they closed.
Human	1	Minimum (minor injuries)	Due to the predictability of these events, the population can get to a safe location in time.
Property	1	Less than 10% of property affected	Some damage to property could include burst pipes and roof damage, but the structure would largely remain intact.
Total	**15**	**Low**	The risk of severe winter storms to Lucas County, based on the points received, is low.

2.4.8 Lake Surge

HAZARD OVERVIEW

HIGHEST HIGH MEDIUM LOW LOWEST	Lake surges are a difference in water level of several feet between both ends of the lake.	
	Period of Occurrence:	**State Risk Ranking:** Frequency: Highly likely Impact: Negligible Ranking: 3 - Medium
	Type of Hazard: Natural	**Disaster Declarations:** None

When a storm first moves over one of the Great Lakes, typically the temperature drops and the wind changes direction; this disturbs the water in the lake and causes it to move in the same direction the storm is moving. For example, when a storm moves from west to east, water is moved from the western side to the eastern end of the lake. The water level in the eastern end of the lake is raised; this is called a storm surge. A surge can cause a difference in water level of several feet between both ends of the lake. Storm surges may cause seiches. The word seiche is French for "to sway back and forth." After a storm moves past the lake, and the wind and pressure are no longer pushing the water, the piled-up water moves toward the opposite end of the lake. The water sloshes from one end of the lake to the other a few times until the water level is returned to normal. The water sloshing back and forth is called a seiche. Often a seiche can be spotted because the water level will be high along the shore and within a relatively short period of time, the water level will then drop, sometimes leaving bottomlands exposed. Seiches may "slosh" back and forth like this several times before reaching equilibrium (University of Michigan, n.d.).



Lake Erie produces the largest seiches of the Great Lakes. This is due to its orientation and shallowness. Seiches are usually minor and are mistaken for tidal activity; however, the NWS begins to issue advisories when they are expected to be over two feet (Sousounis, 2014). Severe and deadly seiche events are rare on the Great Lakes. Minor seiches could cause damage to property right on the lakefront, including cottages and boats.

The water level of Lake Erie is subject to seasonal and yearly fluctuation. Generally, water levels are higher in the spring and lower in the fall. The seasonal change is typically 1 to 2 feet. Year-to-year change may be greater depending on regional climate conditions. In Lake Erie, there are varying sizes of average waves; in Lucas County, the average height of a wave is around 1.9 feet +/- 0.9 feet (Coastal Management Program, 2011).

POSSIBLE CAUSES

According to the University of Michigan, there are factors that influence storm surges and seiches in the Great Lakes; these can include the following.

- **Wind**: Sustained high winds from one direction
- **Atmospheric Pressure** (also known as barometric pressure): The pressure at any point in an atmosphere due solely to the weight of the atmospheric gases. Changes in atmospheric pressure add to the effect of wind
- **Basin Size, Shape and Depth**: Basin characteristics can affect frequency and severity of storm surges and seiches. For example, storm surges and seiches are common on Lake Erie due to its east-west orientation, prevailing westerly winds and shallow depth at its western end

LOCATION AND EXTENT

Lake Erie near Toledo, Ohio is quite different than Lake Erie near Buffalo. The water is shallow and the land surrounding the western end of the lake is flat and lies at about the same elevation as the lake surface. During a storm, water in Lake Erie can move toward Buffalo in a large surge. When this water displacement happens, a large area of Maumee Bay, near Toledo, can actually dry up. Recreational boats docked in Maumee Bay have been known to sit on the lake bottom when this happens. Commercial boating is disrupted and the water supply for some towns is cut off as well. When the water comes rushing back into Maumee Bay, boats and docks may be damaged. The rushing water may push boats underneath docks. In addition, when a water surge is pushed toward Toledo, the western end of Lake Erie water will spill out of the lake, flooding the land. Such floods have caused a lot of damage to property around Toledo (University of Michigan, n.d.).

The map on the following page shows the lake surge areas, based on the 100-year floodplain in Lucas County.

LUCAS COUNTY HAZARD MITIGATION PLAN
Lake Surge Risk Areas
Data Source(s):
FEMA
DISCLAIMER: Data is intended 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.
LUCAS COUNTY
EMA
Lake Surge Risk Areas
N
75
280
2

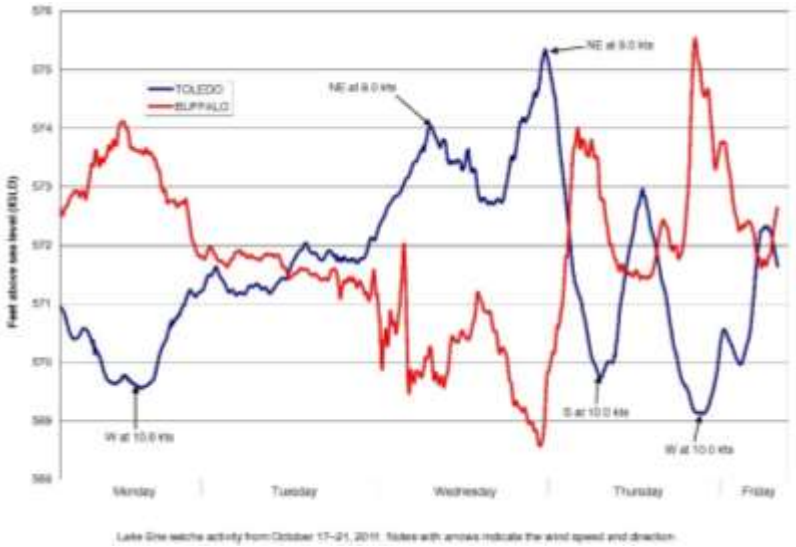
HISTORICAL OCCURRENCES

The National Oceanic and Atmospheric Administration (NOAA) keeps records of lake surges and seiches on the National Center for Environmental Information (NCEI). According to NCEI, there have been only seven events reported and these occurred in 1997 and 1998.

LAKE SURGES AND SEICHES IN LUCAS COUNTY		
Event Date	*Event Type*	*Damage*
3/13/1997	Storm Surge/Tide	$100,000
6/1/1997	Storm Surge/Tide	$25,000
2/4/1998	Storm Surge/Tide	$75,000
2/17/1998	Storm Surge/Tide	$100,000
3/20/1998	Storm Surge/Tide	$100,000
4/9/1998	Storm Surge/Tide	$200,000
11/10/1998	Seiche	$0
Total Damage		**$600,000**

Source: NCEI

However, there have been other events of lake surges in Lucas County since 1998. Planners found evidence of news articles describing lake surge events in Lake Erie in October of 2011 (illustrated to the right), November of 2015, and March of 2017. The graph on the right illustrates the water level of Lake Erie at Toledo (blue) and Buffalo (red) during a seiche event. The two likes are almost exactly opposite, indicating that the water was going back and forth for several days before returning to normal conditions.



IMPACTS AND VULNERABILITY

According to the University of Michigan, small-scale seiches and surges may not be noticed, but those that have significant water movement can cause water levels to change by several feet in moments, they can cause anchored ships to bang together, reach more than 10 feet, and take anywhere from 15 minutes to longer than 8 hours to slosh back and forth. In addition to causing damage to shorelines and structures, storm surges and resulting seiches may impact biology of lakes by pulling nutrients from sediments into the nepheloid layer (the nepheloid layer is a turbid, nutrient-loaded, particle-rich zone above the lake floor).

According to GIS mapping data, the only asset that is vulnerable to lake surges is the Jerusalem Elementary School in Curtice.

LOSS AND DAMAGES

According to data from NCEI, the total damage of lake surges and seiches in Lucas County is approximately $600,000 in two years, or $300,000 annually. According to the *State of Ohio Enhanced Hazard Mitigation Plan* (2014), the total building exposure value in Lucas County is $2,545,448,000 with an estimated property loss of $548,900,000, and estimated business interruption cost of $3,260,000; this is the worst-case scenario.

PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to lake surges have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of lake surges.

- Monitor lake levels to rapidly warn residents of potential surge flooding.
- Establish emergency response plans to evacuate people from lake surge areas.
- Establish a chain of command to take charge in event of lake surge evacuation.
- Identify evacuation Reception Centers stocked with necessary supplies for emergency lake surge evacuation.
- In conjunction with the Department of Health, develop a pamphlet and public information program informing the public of preventative measures to take to avoid water-borne illness related to lake surge.

In 2018, local officials worked with FEMA to update flood maps in coastal areas as part of the RiskMAP activities. Twenty of the flood maps in Lucas County received updates, resulting in changes for three jurisdictions (Toledo, Oregon, and Lucas County [i.e., Jerusalem and Washington Townships]). As a result of the project, these 20 maps now show V zones for wave action flood hazard areas. According to the county floodplain management officials, the V zones extend approximately 10’ to 20’ inland, which means that there were minimal new exposures. The updated maps were in preliminary status as of the writing of this plan; local officials expect them to become final in March 2020.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research

presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	2	Low	It is possible that there are several seiche waves throughout the year, but the severity of these are not enough to cause devastating damage.
Response	4	1 month	Because the effects of lake surge can be very similar to those of floods, depending on the severity, response can take less than or more than a month.
Onset	1	Over 24 hours	Weather conditions that cause lake surges can typically be predicted in advance.
Magnitude	1	Localized (less than 10% of land area affected)	Lake surges cause floods that are typically limited to the locations where it is known to flood. From time to time, there are new places that flood.
Business	2	1 week	The degree to which the businesses are affected will depend on the severity of the event.
Human	1	Minimum (minor injuries)	Because floods and weather events are predictable, the population has an opportunity to prepare for the event and stay out of harm's way.
Property	3	25-50% of property affected	Some buildings may suffer critical to catastrophic losses based on their location.
Total	**14**	**Low**	The lake surge risk in Lucas County, based on the points received, is low.

2.4.8A Coastal Erosion

HAZARD OVERVIEW

Coastal erosion is the gradual wearing and carrying away of land or beach materials by wave action, water, wind, general weather conditions, and tidal currents.			
Period of Occurrence:	Largely gradual, though some occurrences can be immediate following a seiche wave, etc.	**State Risk Ranking:**	Frequency: Highly likely Impact: Negligible Ranking: 3 - Medium
Type of Hazard:	Natural	**Disaster Declarations:**	None

Coastal hazards are a constant threat to the 95,000 miles of U.S. coastline, Ohio contains 262 miles of Lake Erie's coastline. Lucas County contains 37 miles of Ohio's Lake Erie coastline (RiskMAP CCO, 2018). In the Great Lakes region, flooding and rising lake levels cause serious property damage, endanger public safety, and degrade environmental quality. Economic losses exceed tens of millions of dollars per year. The Lake Erie shoreline of Ohio is undergoing widespread recession. According to the Ohio Coastal Management Program (OCMP), approximately 95% of Ohio's Lake Erie shore is eroding with 43% of the shore now beachless. Nearly 2,500 structures are within 50 feet of the destruction. In Lucas County, though not exclusively a result of lake surge, local officials often realize coastal erosion during lake surge periods.

POSSIBLE CAUSES

Coastal erosion results from beach-lake interaction coupled with human activity. The beach system is one that is considered to be in dynamic equilibrium, which means that sand is moved from one location to another, but does not leave the system. For example, winter storms and other storm surges may remove significant amounts of sand, creating steep, narrow beaches. In the summer, gentle waves return the sand, widening beaches and creating gentle slopes. Sand movement will not be consistent year after year in the same location because there are so many factors involved in coastal erosion, including human activity, sea or lake level rise, seasonal fluctuations, and climate change.

Wind, waves, and longshore currents are the driving forces behind coastal erosion. This removal and deposition of sand permanently changes beach shape and structure. Sand may be transported to landside dunes, deep ocean trenches, other beaches, and deep ocean

bottoms. Coastal erosion poses many problems to coastal communities in that valuable property is frequently lost to this dynamic beach-ocean system. Additionally, human activity may accelerate the process of coastal erosion through poor land use methods. Thus, issues of beach restoration and erosion control are at the forefront in coastal communities. Factors that can cause shoreline erosion include the following.

- **Bluff Recession**: An eroded beach leaves the base of the bluff vulnerable to wave attack. As waves break father inshore, they weaken and erode the base of the bluff, which is known as undercutting. Once the base area is eroded, upper bluff soils and vegetation lose their support and slide to the base of the bluff.
- **High Lake Levels**: High levels cause waves to break father inshore, eroding the beach and lower bluff areas. High lake levels are primarily the result of increased precipitation in the upper Great Lakes Watershed.
- **High Winds**: High winds during storms also cause water levels to reach above-normal levels. During storms, high winds force the water surface higher at the downwind end of the lake. As the storm passes, this pent-up water is released and moves toward the opposite end of the lake. The wind-driven wave buildup, known as a seiche, can cause severe flooding along the shoreline.
- **Human Activities**: Activities such as construction of marinas and groins block the natural movement of beach sediment by wave action. While some human activities can lessen coastal erosion, larger structures may cause currents to carry sediment offshore to deeper water, rather than transport it farther down the beach.

Lake Erie's shoreline can be protected in a number of ways. Structures, when properly placed, can protect the shoreline in two ways. In the water, they help trap and retain sediment. On land, they protect the shoreline against constant wave attack. Breakwaters are usually composed of stone or rocks and are placed a short distance offshore. By breaking the full force of incoming waves, they promote the accumulation of sediment between the structure and the eroding beach. In order to avoid erosion to down-drift beaches, the area behind the breakwater should be partially filled with sand after construction.

Groins are structures that extend perpendicular from the shore. Groins interrupt the natural movement of beach sediment by trapping and retaining sand on the up-drift side of the groin. The area on the up-drift side should be filled after construction to avoid erosion to down-drift beaches. Revetments are structures placed in the beach profile or along the base of bluffs to absorb the energy of incoming waves. These structures protect only the land

immediately behind them and not adjacent areas. If placed in the water, revetments do not encourage sediment buildup and little, if any, beach will develop.

The following table is the Saffir-Simpson Scale, which illustrates the correlation between wind speed, storm surge, and the expected damage from coastal storms.

Category	Wind Speed	Storm Surge (ft. above normal sea level)	Expected Damage
1	74-95 mph	4-5 ft.	**Minimal**: Damage is done primarily to shrubbery and trees, unanchored mobile homes, and some signs. No real damage is done to structures.
2	96-110 mph	6-8 ft.	**Moderate**: Some trees are toppled, some roof coverings are damaged, and major damage is done to mobile homes.
3	111-130 mph	9.12 ft.	**Extensive**: Large trees are toppled, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	131-155 mph	13-18 ft.	**Extreme**: Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; some curtain walls fail.
5	> 155 mph	>18 ft.	**Catastrophic**: Roof damage is considerable and widespread, window and door damage is severe; there are extensive glass failures and entire buildings could fail.

LOCATION AND EXTENT

A coastal erosion area is designated land adjacent to Lake Erie that officials anticipate losing to coastal erosion within 30 years absent preventive measures. The original designations were issued in 1998 (ODNR, 2019). Coastal erosion areas in Lucas County are as follows (https://gis.ohiodnr.gov/MapViewer/?config=cea).

Frame	Average Recess Rate (ft.)		Average Anticipated Distance (ft.)		Coastal Erosion Areas	
	1998	2018	1998	2018	1998	2018
186	10.4	0.0	312.6	0.0	27	0
187	9.0	0.0	271.3	0.0	27	0
188	2.2	0.0	66.0	0.0	22	0
190	1.7	0.0	50.0	0.0	16	0
191	13.9	0.0	415.3	0.4	30	0
199	0.0	0.0	0.0	0.0	0	0
200	0.0	0.0	0.0	0.0	0	0
201	0.0	0.0	0.0	0.0	0	0
202	0.0	0.0	0.0	0.0	0	0
203	0.0	0.0	0.0	0.0	0	0
204	1.8	51.8	0.2	6.6	8	4
207	0.8	0.0	25.1	0.0	3	0
210	0.0	0.0	0.7	0.0	0	0
212	0.1	0.0	1.6	0.0	0	0
213	4.2	0.2	124.8	6.0	23	4
216A	2.5	0.0	75.7	0.0	19	0
216B	0.2	0.0	5.8	0.0	5	0
217	0.4	0.0	11.5	0.0	5	0
218	3.8	0.0	115.8	0.0	14	0
219	16.3	0.0	474.7	0.0	29	0
220	4.2	0.0	130.6	0.1	24	0
221	14.7	0.0	439.6	0.0	22	0
222	14.9	0.0	445.5	0.0	24	0
223	5.7	0.0	172.3	0.7	25	0
224	2.0	0.0	61.3	0.0	10	0
225	1.3	0.0	40.2	0.6	10	0
226	0.2	0.0	6.0	0.0	7	0
227	0.2	0.0	6.1	0.0	4	0
228	0.4	0.0	12.7	0.6	5	0
229	0.0	0.0	0.4	0.0	0	0
230	0.0	0.0	0.0	0.0	0	0
231	0.0	0.0	0.0	0.2	0	0
232	0.0	0.0	3.2	0.0	2	0
236	1.2	0.0	36.0	0.0	21	0
237	0.1	0.0	2.4	0.0	3	0
238	0.1	0.0	2.4	0.0	0	0
239	0.0	0.0	0.7	0.0	0	0
240	0.0	0.0	0.0	0.0	0	0
241	0.1	0.0	1.8	0.0	3	0
242	0.0	0.0	0.0	0.0	0	0
AVERAGES	**2.8**	**1.3**	**82.8**	**0.4**	**10**	**0**

HISTORICAL OCCURRENCES

The Ohio Department of Natural Resources (ODNR) Office of Coastal Management maintains the Lake Erie Shore Erosion Management Plan. According to ODNR's website, erosion rates for Lucas County have been as follows. "Long-term recession rates cover the

years 1877 to 1973 with the short-term rates representing data from 1973 to 1990" (http://coastal.ohiodnr.gov/erosion).

County	Long-Term Distance (ft.)	Long-Term Rate (ft/yr)	Short-Term Distance (ft.)	Short-Term Rate (ft/yr)
Lucas County	520	5.4	46	2.7
Maumee Bay	61	2.0	21	1.2

IMPACTS AND VULNERABILITY

There are numerous impacts from coastal erosion. The ODNR reports three fatalities from when eroded shorelines collapsed without warning. Public parks, utilities and infrastructure can also experience erosion-related damage (2019, http://geosurvey.ohiodnr.gov/lake-erie-geology/erosion-and-research/erosion-problems). Lucas County has 8.62 miles of publicly-accessible coastline and 15 access sites, and coastal erosion could impact all of these community resources.

Coastal erosion has received attention in recent years due to the dramatic changes in Lake Erie's water level. The Toledo Blade reported record low water levels between 1999 and 2013 (Henry, 2019). At that time, water levels began to rise. While rising water levels likely benefit the Great Lakes shipping industry, they can also lead to "more erosion, less beachfront property, and more skirmishes over private property rights" (Henry, 2014).

LOSS AND DAMAGES

Though there are environmental and economic impacts to erosion (discussed above), local officials expect minimal structural damage as a result of the hazard. When compiling the table above that detailed average recession rates for all Lucas County panels, planners counted the number of structures located within 2018 coastal erosion areas (CEAs). In 2018, Lucas County had a total of eight CEAs, and there were no structures located within those areas.

PREVIOUS AND ONGOING MITIGATION EFFORTS

As with other lakeshore communities in Ohio, Lucas County officials have supported the Ohio Department of Natural Resources, Office of Coastal Management *Lake Erie Shore Erosion Management Plan* (LESEMP). This document targets lakefront property owners and provides information for addressing erosion-related issues.

Additionally, the City of Toledo has explored green infrastructure mitigation solutions for flooding (in general) through a grant from the U.S. Environmental Protection Agency's Great Lakes Shorelines Cities Green Infrastructure Grants program. Of the two projects approved, one was a series of green infrastructure projects within Cullen Park, the westernmost access point to Lake Erie. The Cullen Park project included the installation of filter strips with stand and plants to filter pollutants, porous pavement, and vernal pools. Though this project targeted flooding, they contribute to the overall naturalization of the shoreline.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	5	Will occur in a year	Coastal erosion varies, but it is an on-going phenomena
Response	1	Less than half a day	Local officials monitor coastal erosion accordingly, but a "response" is typically unnecessary
Onset	1	Over 24 hours	Local officials are aware that coastal erosion occurs continuously
Magnitude	1	Localized (Less than 10% of land area affected)	In Lucas County, coastal erosion only impacts shoreline communities
Business	1	Less than 24 hours	There are no structures, including commercial structures, located in current coastal erosion areas (CEAs)
Human	1	Minimum (minor injuries)	There have been no reported coastal erosion injuries *in Lucas County*
Property	1	Less than 10% of property affected.	There are no structures located incurrent CEAs
Total	**11**	**Low**	The coastal erosion risk to Lucas County, based on the points received, is low.

2.4.9 Wildfire

HAZARD OVERVIEW

A wildland fire is a large, destructive fire that spreads quickly over woodland or brush areas.			
Period of Occurrence:	Typically, during dry weather months	**State Risk Ranking:**	Frequency: Likely Impact: Limited Ranking: 3 - Medium
Type of Hazard:	Natural and human-caused	**Disaster Declarations:**	None

A wildfire is an unplanned, unwanted fire burning in a natural area, such as a forest, grassland, or prairie. As building development expands, homes and businesses may encroach areas susceptible to wildfires. Wildfires can cause death or injury to people and animals, damage or destroy structures, and disrupt community services including transportation, gas, power, communications, etc. (Ready.gov, 2018). There are three main types of wildfires, but they can also be classified by what part of the forest they burn in. These types of wildfires are listed below (Borealforest.org, 2018).

- **Smoldering Fire:** Fire that emits smoke but has no flame and is rarely self-sustained.
- **Flaming Combustion:** Flames are present, and charcoal forms in the absence of oxygen.
- **Glowing Combustion:** A later stage of fire with a slower rate of combustion and blue flame.

Officials classify wildfires by the part of the forest in which they occur. These types are listed below.

- **Ground Fires:** Fires that occur on the ground, often below the leaves.
- **Surface Fires:** Fires that occur on the surface of the forest up to 1.3 meters high.
- **Crown Fires:** The most dangerous fire that can spread the fastest. They occur in the tops of trees. This type of fire can depend on surface fires to burn the crowns, be active in which they occur at the same rate as a surface fire, or be the most destructive, independent fire that can jump from crown to crown.

POSSIBLE CAUSES

According to the National Park Service, humans cause approximately 90% of wildfires in the U.S. Human-caused fires stem from campfires being left unattended, burning debris or trash, not adequately extinguishing and discarding cigarettes, and intentional arson. Carelessness by individuals can quickly ignite a wooded area and spread before the fire dies.

Nature can also strike forested regions; lightning is notorious for creating wildfires. Lightning can come in two forms: hot and cold. Cold lighting is an intense electrical current that has a short duration. Hot lightning has less electrical current but occurs for an extended period. Hot lightning bolts usually start wildfires due to the length of the flash that occurs. The flash connects with dry areas long enough to ignite (USDHS, 2018).

Three elements are needed for a wildfire to occur: fuel, oxygen, and heat. Wildfires require a flammable material to fuel flame. These materials can come in different forms such as trees, grasses, brush, and sometimes structures like homes or buildings. Air supplies oxygen that fire requires to burn. Heat sources help ignite wildfires when fuel temperatures rise to a hot enough state that it ignites (National Geographic, 2018).

LOCATION AND EXTENT

Wildfires can occur anywhere in the country. Ohio has a low rate of wildfires compared to other states. With only 410 fires reported in 2016, it is unlikely an extreme wildfire event will occur in Lucas County (National Interagency Fire Center, 2016).

Wildfires can have extremely devastating effects on communities. With billions of dollars spent to suppress wildfires, the extent of wildfires is endless. There is a potential for flooding, debris flows, landslides and many other environmental impacts, as well as health and economic concerns for residents in the area. Wildfires may significantly deplete the resources that help flourish life for not only humans but also wildlife as well. Surrounding communities may experience cascading effects from impacted areas. Residents may have to travel farther and into neighboring communities for necessities, housing, and employment (USGS, 2015).

Lucas County has the Maumee State Forest, which has 3,194 acres spanning Fulton, Henry, and Lucas Counties.

HISTORICAL OCCURRENCES

Although county level data is not available for wildfires, data is available for the State of Ohio. The following table summarizes the data presented in the historical year-end fire statistics from the National Interagency Fire Center. As the numbers indicate, even though there are more wildland fires, less acres are burnt as a result than the acres of the prescribed burns. For the sake of finding an approximate number of fires and burnt acres for Lucas County, the numbers have been averaged to per-county. There are 88 counties in Ohio, which means that on average, each county has around 37 wildfires with 238 acres burnt and 6 prescribed fires with 342 acres burnt within the last 10 years.

OHIO WILDLAND AND PRESCRIBED FIRES				
Year	*Wildland*		*Prescribed*	
	Fires	*Acres*	*Fires*	*Acres*
2008	348	1,078	213	6,767
2009	1,164	10,962	15	4,487
2010	571	4,218	16	1,927
2011	246	1,203	4	1,476
2012	309	1,250	11	1,617
2013	31	152	3	1,789
2014	63	681	7	3,031
2015	69	548	5	2,328
2016	410	116	218	4,352
2017	68	733	70	2,308
Total	**3,279**	**20,941**	**562**	**30,082**

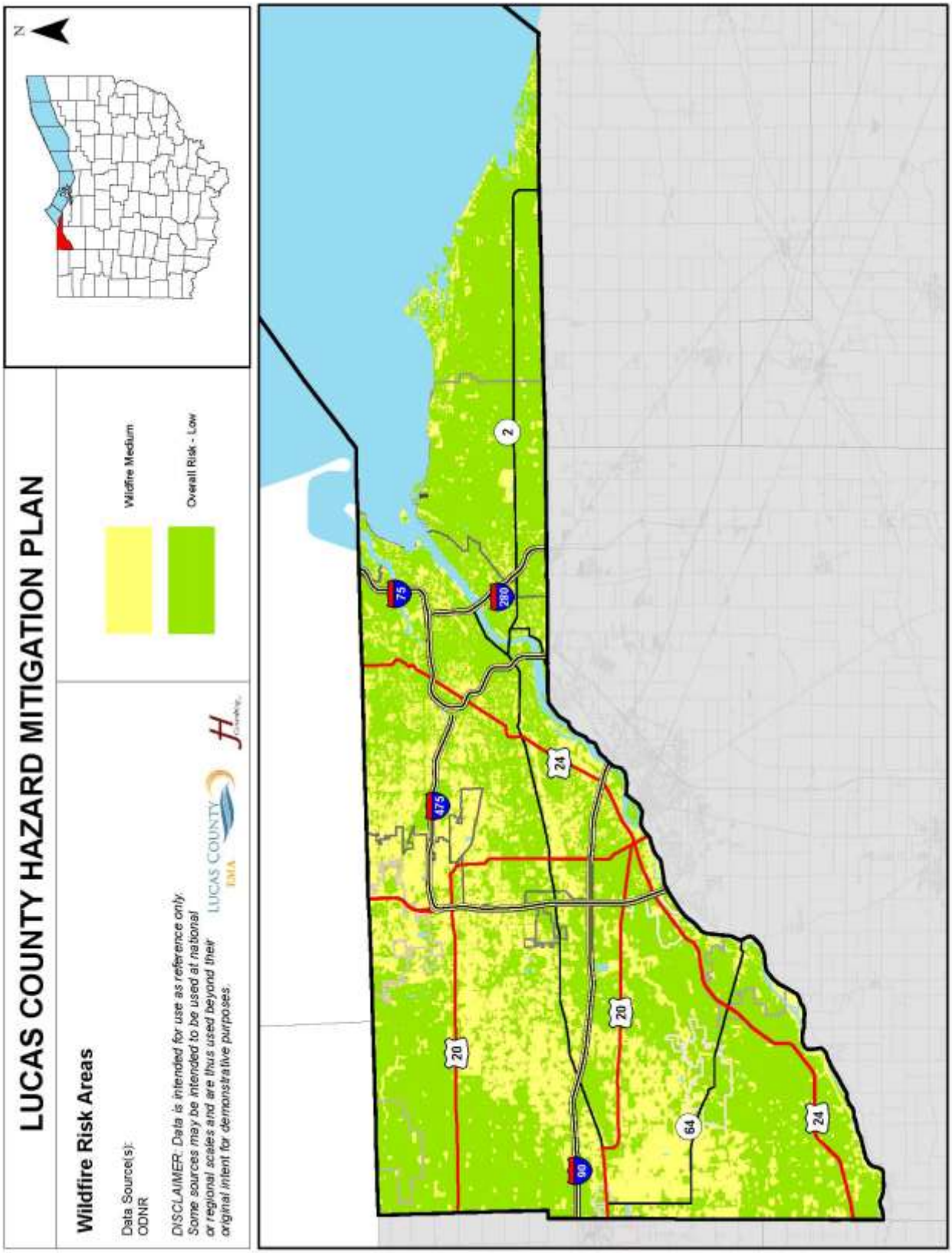
Source: National Interagency Fire Center

The previous two versions of this plan did not have concrete data on historical occurrences of wildfires, therefore, this plan will consider the data presented above as a base for historical occurrences.

IMPACTS AND VULNERABILITY

Impacts may cover large areas with extensive burning, embers traveling more than a mile away from the wildfire itself, and smoke causing health issues for people far away from the fire. Wildfires damage watersheds, and leave areas prone to flooding and mudslides for many years. Wildfires can occur at any time throughout the year, but the potential is always higher during periods with little or no rainfall, which make brush, grass, and trees dry and burn more efficiently. High winds can also contribute to spreading the fire (USDHS, 2018).

Areas that are affected by wildfires are usually charred on the ground, causing all organic matter to die. Nutrients from the soil will be gone, and measures would be necessary to rehabilitate the area. Fires can contaminate the area when runoff from rain leads burnt materials into waterways. Lastly, wildfires can have a major impact on wildlife and humans. When a wildfire occurs, habitats vanish, and there is a lessened supply of food for those animals that survive. Like animals, humans can also lose their homes and assets such as food. The devastation may force residents to relocate and result in economic difficulties for residents and the affected area (Auburn University, 2018).


LUCAS COUNTY HAZARD MITIGATION PLAN
Wildfire Risk Areas
Data Source(s):
ODNR
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Wildfire Medium
Overall Risk - Low
N
75
280
475
24
20
20
64
90
24
2

The previous map shows the areas that have low or medium risk of wildfires. The data presented is based on the land cover information available; the yellow areas have forests or parks while the green areas are mainly fields for crops. The following table lists the assets that are in these vulnerable areas. Not all assets may be in a vulnerable location, but the property where the buildings are located may be.

ASSETS VULNERABLE TO WILDFIRES		
Asset	*City/Village*	*Type*
180th Air National Guard Headquarters	Monclova Township	Government Building
Ability Center of Greater Toledo	Sylvania	Community Center
Advanced Specialty Hospital of Toledo	Toledo	Acute Care
Ahepa 118 Apartments	Toledo	Assisted Living
Airport Urgent Care	Toledo	Urgent Care
Alexis Gardens	Toledo	Assisted Living
American Red Cross Greater Toledo Area Chapter - HQ	Toledo	Misc Healthcare
Ann Grady Center	Holland	Developmental Disabilities
Anthony Wayne Community YMCA	Waterville	Community Center
Apostolic Christian Academy	Toledo	School
Arbors at Sylvania	Toledo	Assisted Living
Arbors at Toledo	Toledo	Nursing Home
Arbors at Waterville	Waterville	Assisted Living
Ashley's Manor Residential	Toledo	Nursing Home
Autism Society of Northwest Ohio	Toledo	Community Center
Barbara Jean McDonagh Home	Toledo	Developmental Disabilities
Birckhead Place Historic District	Toledo	Historic
Birmingham Historic District	Toledo	Historic
Bittersweet Farms	Whitehouse	Developmental Disabilities
Bowsher High School	Toledo	School
Brandville School	Oregon	Historic
Briggs Home, LLC	Toledo	Nursing Home
Bronson Place	Toledo	Historic
Brookside Ambulance Service / Rumpf Ambulance	Toledo	Public Safety
Bush Street Historic District	Toledo	Historic
C T Quality Care	Toledo	Nursing Home
Chell's Gardens Assist. Living	Toledo	Nursing Home
Christie's Homes	Toledo	Nursing Home
Chrysler Toledo North Assembly Plant	Toledo	TRI
Community Care at Waterford	Toledo	Assisted Living
Community Development Center of Lucas County	Holland	Community Center
Connecting Point-Crittenton Building	Toledo	Community Center
Creative Products, Inc.	Holland	TRI
Crestview Club Apartments	Sylvania	Nursing Home
Crossgates Preschool	Toledo	School
Damas Care LLC	Toledo	Nursing Home
DaVita Flower Hospital Dialysis	Sylvania	Dialysis
Delores Place Assisted Living	Toledo	Nursing Home
East Toledo Family Center	Toledo	Community Center
East Toledo Historic District	Toledo	Historic
Eber Community Residence	Holland	Developmental Disabilities

ASSETS VULNERABLE TO WILDFIRES		
Asset	*City/Village*	*Type*
Eckenrode and Breisach Houses	Maumee	Historic
Edgewood Nursing Home	Toledo	Nursing Home
Edward D. Libbey House	Toledo	Historic
Eileen Community Residence	Toledo	Developmental Disabilities
Eleanor M. Kahle Senior Center	Toledo	Community Center
Endoscopy Center	Toledo	Surgery
Englewood Historic District	Toledo	Historic
Evergreen Lake Dam	Swanton	Dam
Everwood Community Residence	Toledo	Developmental Disabilities
Fallen Timbers Battlefield	Maumee	Historic
Family House	Toledo	Community Center
First Presbyterian Church Of Maumee Chapel	Maumee	Historic
Flower Hospital	Sylvania	Acute Care
Fort Miamis Site	Maumee	Historic
Franciscan Care Center	Toledo	Assisted Living
Franciscan Services Corp	Sylvania	Misc Healthcare
Fraternal Order of Police	Toledo	Community Center
Frederick Douglass Community Association	Toledo	Community Center
Fresenius Kidney Care Toledo	Toledo	Dialysis
Friendship Park Senior Center	Toledo	Community Center
Genesis Health Care	Sylvania	Nursing Home
Gillett-Shoemaker-Welsh House	Waterville	Historic
Glendale-Feilbach Elementary School	Toledo	School
Goerlich Center Nursing Home	Sylvania	Misc Healthcare
Grove Patterson Academy	Toledo	School
Hadley Home	Toledo	Nursing Home
Hanson House	Maumee	Historic
Hazel's Group Home	Toledo	Nursing Home
Heartland Holly Glen	Toledo	Assisted Living
Heartland of Oregon	Oregon	Assisted Living
Henry Reed Jr. House	Maumee	Historic
High Point Commons Retirement	Whitehouse	Assisted Living
Holland Library	Holland	Library
Hospice of Northwest Ohio	Toledo	Nursing Home
House Of Four Pillars	Maumee	Historic
Huntington Community Center	Sylvania	Community Center
Innovative Dialysis of Toledo	Toledo	Dialysis
Inverness Club	Toledo	Historic
Jean Scott Furney Home	Toledo	Developmental Disabilities
Jewish Community Center YMCA	Sylvania	Community Center
John Isham Farmstead	Waterville	Historic
Johns Manville International Inc.	Waterville	TRI
Josina Lott Residential	Toledo	Developmental Disabilities
Junior League of Toledo	Toledo	Community Center
Kingston Care Center-Sylvania	Sylvania	Assisted Living
Kingston Residence of Sylvania	Sylvania	Acute Care
Laurels of Toledo	Toledo	Nursing Home
Lial Catholic School	Whitehouse	School
Libby High School	Toledo	Historic
Liberty Nursing Centers	Toledo	Assisted Living

ASSETS VULNERABLE TO WILDFIRES		
Asset	*City/Village*	*Type*
Liberty Whitcomb Haskins House	Waterville	Historic
Lifestar Ambulance Service	Oregon	Public Safety
Lighthouse Community Center	Toledo	Community Center
Live Love Laugh Companion Care	Toledo	Nursing Home
Lourdes College	Sylvania	Higher Ed
Luther Crest	Toledo	Assisted Living
Luther Hills Apartments	Oregon	Nursing Home
Luther Ridge Apartments	Oregon	Nursing Home
Luther Woods Apartments	Toledo	Nursing Home
Lutheran Home at Toledo	Toledo	Assisted Living
Lutheran Homes Society	Holland	Nursing Home
Lutheran Housing Services	Toledo	Nursing Home
Lutheran Social Services	Toledo	Community Center
Lutheran Village at Wolf Creek	Holland	Acute Care
Lutheran Village of Wolf Creek	Toledo	Nursing Home
Lyman Liggins Senior Center @ Grace United	Toledo	Community Center
Marksch Group Home	Holland	Nursing Home
Marria's 2 Adult Family Home	Toledo	Nursing Home
Maumee Historic District	Maumee	Historic
Maumee Library	Maumee	Library
Maumee Sidecut	Maumee	Historic
Maumee Uptown Historic District	Maumee	Historic
Maumee Valley Country Day School	Toledo	School
Mayores Senior Center	Toledo	Community Center
Mccord Junior High School	Sylvania	School
Medical College of Ohio	Toledo	Dialysis
Medical College of Ohio Hospital	Toledo	Acute Care
Mercy Occupational Health	Oregon	Urgent Care
Michael Mes Manor	Toledo	Nursing Home
Monclova Community Center	Monclova	Community Center
Monclova Old Town Hall	Monclova Township	Government Building
Monclova Township Administration	Monclova Township	Government Building
Montessori Day School	Toledo	School
Moretha's A C F	Toledo	Nursing Home
Morgan Adult Care, Inc	Toledo	Nursing Home
Morris Family Home #2	Toledo	Nursing Home
Morrison Adult Care Facility	Toledo	Nursing Home
National Exchange Club	Toledo	Community Center
New Beginning Res. Care	Toledo	Nursing Home
Northwest Ohio Development Ctr	Toledo	Developmental Disabilities
Northwest Ohio Urgent Care	Toledo	Urgent Care
NW Ohio Endoscopy Center	Toledo	Surgery
Oakleaf Village	Toledo	Assisted Living
Old West End District	Toledo	Historic
Old West End Historic District (Boundary Increase/Decrease)	Toledo	Historic
Oras Residential Facility	Toledo	Nursing Home
Ottawa Hills Fire and Rescue Department	Toledo	Public Safety
Outpatient Surgi-Unit, Inc	Toledo	Surgery
Overton Adult Family Living	Toledo	Nursing Home
Parkway Surgery Ctr	Toledo	Surgery

ASSETS VULNERABLE TO WILDFIRES		
Asset	*City/Village*	*Type*
Peck Griswold House	Maumee	Historic
Phenix Adult Family Home	Toledo	Nursing Home
Phenix Adult Family Home 2	Toledo	Nursing Home
Pray-Starkweather House	Waterville	Historic
Pristine Senior Living	Toledo	Nursing Home
ProMedica Goerlich Center	Sylvania	Nursing Home
ProMedica Urgent Care	Toledo	Urgent Care
ProMedica Urgent Care	Toledo	Urgent Care
Promedica Urgent Care - Sylvania	Sylvania	Urgent Care
Providence Historic District	Neapolis	Historic
Quality Community Living #3	Toledo	Nursing Home
Reconstructive & Aesthetic	Toledo	Surgery
Red Cross Greater Toledo Chapter Headquarters	Toledo	Community Center
Regency Health Care	Sylvania	Acute Care
Richards Community Residence	Toledo	Developmental Disabilities
Rimer Enterprises Inc	Waterville	TRI
Riverview Apartments	Toledo	Historic
Rosary Care Center	Sylvania	Acute Care
Saint Anne Mercy Hospital	Toledo	Acute Care
Saint Charles Mercy Hospital	Oregon	Hospital
Saint Luke's Hospital	Maumee	Acute Care
Saint Peter and Saint Paul Historic District	Toledo	Historic
Sanger Library	Toledo	Library
Schindler Elevator Corporation	Holland	TRI
Senior Star at West Park Place	Toledo	Assisted Living
Serenity Gardens of Sylvania	Sylvania	Nursing Home
Spencer Township Fire and Rescue	Holland	Public Safety
Spring Meadows Community	Holland	Nursing Home
St Charles Mercy Hospital	Oregon	Urgent Care
St Joseph School East Campus	Sylvania	School
St Pius X Elementary School	Toledo	School
St. George Urgent Care	Maumee	Urgent Care
St. Patrick's Catholic Church	Toledo	Historic
Stateline Group Home	Toledo	Nursing Home
Sunbridge Healthcare	Sylvania	Assisted Living
Sunrise Center Group Home	Toledo	Nursing Home
Sunset House	Toledo	Assisted Living
Sunshine Inc of Northwest Ohio	Maumee	Nursing Home
Sunshine/Bancroft Family Home	Toledo	Developmental Disabilities
Sunshine/Garden Family Home	Maumee	Developmental Disabilities
Sunshine/King Road Family Home	Toledo	Developmental Disabilities
Sunshine/Ragan Woods Care	Toledo	Developmental Disabilities
Sunshine/Strayer Family Care	Maumee	Developmental Disabilities
Sunshine/Vanderbilt Family	Toledo	Developmental Disabilities
Surgery Ctr at Regency Park	Toledo	Surgery
Surgi Care	Maumee	Surgery
Swan Creek Retirement Village	Toledo	Assisted Living
Swanton Water Plant	Swanton	Government Building
Sylvania Children's Center	Toledo	School
Sylvania Community Services Center	Sylvania	Community Center

ASSETS VULNERABLE TO WILDFIRES		
Asset	*City/Village*	*Type*
Sylvania Senior Center	Sylvania	Community Center
The Laurels of Toledo	Toledo	Assisted Living
Toledo Citadel Corps-Salvation Army	Toledo	Community Center
Toledo Clinic	Toledo	Surgery
Toledo Fire and Rescue Department Station 19	Toledo	Public Safety
Toledo Heights Library	Toledo	Library
Toledo Hospital	Toledo	Acute Care
Toledo Hospital Dialysis Unit	Toledo	Dialysis
Toledo Junior Academy	Toledo	School
Toledo Lucas County Port Authority Fire Department	Swanton	Public Safety
Toledo Muslim Community Center	Toledo	Community Center
Toledo Olde Towne Historic District	Toledo	Historic
Toledo OSHP	Swanton	Public Safety
Toledo Yacht Club	Toledo	Historic
U.S. Renal Care - Wildwood	Toledo	Dialysis
United Way Labor/Community Services	Toledo	Community Center
Ursuline Convent	Toledo	Nursing Home
Vicki's Home Care	Toledo	Nursing Home
Victorian Manor 3, Inc	Toledo	Nursing Home
Vistula Historic District	Toledo	Historic
Waterford Commons Nursing Ctr	Toledo	Nursing Home
Wayman D. Palmer Community YMCA	Toledo	Community Center
West Side Montessori	Toledo	School
West Toledo Branch YMCA	Toledo	Community Center
West Toledo Urgent Care	Toledo	Urgent Care
Westmoor Retirement Living Ctr	Toledo	Nursing Home
Westmoreland Historic District	Toledo	Historic
Whitehouse Country Manor	Whitehouse	Assisted Living
Wildwood Surgical Ctr	Toledo	Surgery
WJ Murchison Community Center	Toledo	Community Center
Wolf Creek YMCA	Maumee	Community Center
Woodlands At Sunset House	Ottawa Hills	Nursing Home
Woodlawn Cemetery	Toledo	Historic
YMCA University of Toledo- Morse Fitness Center	Toledo	Community Center
Yondota Historic District	Toledo	Historic
Zeigler Collingwood Home	Toledo	Nursing Home
Zion Lutheran Day School	Toledo	School

LOSS AND DAMAGES

Due to the unavailability of county-level data, there is no estimated loss total for Lucas County. In 2017, the most recent year available, Ohio reported that 733 acres of land burned due to wildfires; the 10-year average is 238 acres per county, or 23.8 acres burnt per year per county. For every acre burned nationally, approximately $3,568 worth losses occurred. These estimates would total to $84,918 worth of damages per county in Ohio (National Interagency Fire Center, 2016).

PREVIOUS AND ONGOING MITIGATION EFFORTS

The Ohio Department of Natural Resources Division of Forestry's *Annual Work Plan for Maumee State Forest* (2018) prioritizes prescribed fires on the forest grounds. For the 2018/2019 seasons, they have prioritized four areas for preventative burns. The plan also states that they will provide training to fire personnel to ensure compliance with the division's fire manual.

Some mitigation projects from the previous plan relating to wildfires have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of wildfires.

- Use controlled burns to decrease the amount of fuel load in the identified moderate and high wildfire hazard areas.
- Increase media coverage of threat and evacuation procedures during peak wildfire times of the year, distribute informational packages in high and moderate wildfire risk areas, and increase enforcement of existing open burning laws.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	3	Medium	On average, there have been 37 wildfires (prescribed fires not considered as they are in and of themselves a mitigating action) in Lucas County in the last 10 years. At this time, there is not a way to confirm. Therefore, this will be the number considered for the frequency of wildfires in the county.
Response	3	1 week	Because there is no data on the amount or severity of wildfires in Lucas County, the median is considered for response time.
Onset	4	Less than 6 hours	For prescribed burns, officials know well in advance; for wildfires, there is no advance notice as typically, they are caused by human activity and accidents.
Magnitude	1	Localized (less than 10% of land area affected)	Wildfires have burnt 238 acres of land within the past 10 years with 37 wildfires. On average this is about 6.4 acres per fire.
Business	1	Less than 24 hours	Businesses are typically not near the location of wildfires and therefore not affected.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Human	1	Minimum (minor injuries)	Typically, the types of wildfires in Lucas County will have little to no injuries.
Property	1	Less than 10% of property affected	The number of acres burnt per fire is minimal.
Total	**14**	**Low**	The risk from wildfires to Lucas County, based on the points received, is low.

2.4.10 Civil Disturbance

HAZARD OVERVIEW

Civil disturbance events include active assailants (also called active shooters), bomb threats, and riots.	
Period of Occurrence: At any time	**State Risk Ranking:** Not ranked
Type of Hazard: Human-Caused	**Disaster Declarations:** None

As the nation has seen an upswing in violent acts (ABC, 2017), it is necessary to profile types of violence and the potential impacts they could have in Lucas County. Civil disturbances, for this plan, encompass those acts that law enforcement does not consider routine. In this plan, civil disturbance will include the following topics.

- **Active Assailant**: "An active assailant is an armed person(s) who uses any type of weapon to inflict serious harm and/or deadly physical force on others in public and continues to do so while having access to additional victims. Examples of active assailant attacks include an active shooter incident, mass stabbings, explosives, vehicle-as-a-weapon, fire-as-a-weapon, and so forth. (These are also known as active shooter events, hostile incidents, mass violence attacks, rampage violence, spree killings, and so forth.)" (North Carolina Active Assailant and Active Shooter Work Group, 2017).
- **Bomb Threat**: An actual or rumored threat of a bomb. Most bomb threats that are called to an office or person are intended to disrupt normal business and activities and do not usually involve a bomb. Nonetheless, every bomb threat must be considered real until authorities investigate and determine it is safe (Ohio State University, n.d.)
- **Riots**: Group protests that become or have the potential to become violent. A riot is a violent offense against public order involving three or more people; it involves a gathering of persons for an illegal purpose. It is the most elementary form of collective violence and it is also referred to as "social unrest". Riots can include such events as gang violence, coups, rebellions, and revolutions (Encyclopedia Britannica, 2018).

POSSIBLE CAUSES

Not all protests end in violence, the majority of protesting is peaceful. Violence is usually caused by the "crowd psychology," when in a crowd an individual is more likely to act like others, which means a few looking to engage violent behavior can sway a large group to act violently (Sarkis, 2011). If a terrorist is seeking self-glory, executing a preacher, priest, or rabbi will bring more attention that executing an average civilian. Houses of worship including churches and synagogues are more often than ever before, hiring security forces and/or training their members how to prepare for and survive an attack (Mauro, 2016).

LOCATION AND EXTENT

Active assailants can target any location or community asset; historically, there have been active assailants in malls, schools, universities, workplaces, government buildings, and places of worship. Bomb threat targets are no different. The location itself of the people inside could be the intended target. Typically, the event or incident is limited to a specific location or building. Riots are not typically location-targeted events and generally occur in the streets of a city or village; they can be localized to just one city block, or spread in pockets nation-wide.

IMPACTS AND VULNERABILITY

Survivors of violence will most likely experience common stress reactions lasting several days to a few weeks. These reactions can include the following:

- **Emotional Reactions:** Shock, fear, grief, anger, guilt, shame, helplessness, numbness, sadness.
- **Cognitive Reactions:** Confusion, indecisiveness, worry, shortened attention span, trouble concentrating.
- **Physical Reactions:** Tension, fatigue, edginess, insomnia, body aches, easily startled, tachycardia, nausea, loss of appetite.
- **Interpersonal Reactions:** distrust, conflict, withdrawal, irritability, loss of intimacy, feeling abandoned.

Deciding which groups are vulnerable is challenging. There will always be variation between groups and the people within them in relation to the risks they face (Brown, 2004). However, the elderly, children, homeless persons, people with disabilities, religious groups and members of the LGBT community experience higher rates of exposure to violence (Phillips, Thomas, Fothergill, Blinn-Pike, 2010).

Between 2003 and 2013, the elderly reported 56% of all violent crimes (USDOJ, 2014). A 2009 study showed that almost 40% of all American children were victims of two or more violent acts (DOJ, 2009). In 2010, there were 113 violent acts against the homeless reported; twenty-four of the attacks were fatal (National Coalition for the Homeless, 2012). An analysis of the 2011 FBI hate-crime statistics show "LGBT people are more than twice as likely to be the target of a violent hate crime as Jews or black people" (Potok, 2011).

HISTORICAL OCCURRENCES

In 1968, after the death of Dr. Martin Luther King, Jr., students from Scott High School demanded the American flag be flown at half-staff. The school declined, and students responded by taking to the streets, stoning vehicles, and destroying property. The mayor put the City of Toledo under a 10-day curfew (Henry, 2018).

Since 2000, there have been 13 incidents of active shooters or assailants in Ohio, one of which occurred in Toledo. On January 26, 2005, at 8:34 p.m., a 54-year-old man, armed with a shotgun, returned from his lunch break and began shooting in Daimler Chrysler's Toledo North Assembly plant. He took a woman hostage before beginning to shoot at his co-workers. One person was killed; two were wounded. The shooter committed suicide before police arrived (FBI, 2000 – 2017).

Also, in 2005, the National Socialist Movements (NSM), a neo-Nazi organization, planned a march to protest African-American gang activity. Local anarchist organizations, and the Anti-Racist Action group planned a counter protest to cancel the NSM rally. At that rally, the protest turned violent and led to rioting, street fighting, vandalism, and looting. Several people were injured and dozens were arrested (Feehan, 2017 & Wikipedia, 2018,).

On December 13, 2018, there were widespread bomb threats to several businesses via email across the country; Lucas County businesses were included in the threats. The email demanded a $20,000 deposit in Bitcoins into the perpetrator's account (13ABC, 2018). As of the writing of this plan, the motivation of the perpetrator is unknown.

LOSS AND DAMAGES

Estimating the economic impact of a violent disturbance is a difficult task. Initial impact can be measured in immediate costs such as response to the event and closed businesses. The full economic impact would include long-term costs.

A large-scale event could significantly affect industry and/or government and privately-owned infrastructure. An incident involving wastewater, drinking water or chemical facilities

could have long-term environmental effects. The potential losses due to these variables makes it difficult to quantify the cost of repair or replacement of infrastructure.

PREVIOUS AND ONGOING MITIGATION EFFORTS

The most recent update (2017) of the Lucas County Emergency Operations Plan includes a Civil Unrest appendix. The Toledo Police has a Mobile Field Force that responds to and controls incidents of civil disorder.

RISK ASSESSMENT

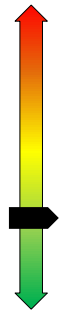
The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	2	Low	In the City of Toledo, there have been two riots, one active shooter incident, and a collection of bomb threats. There have been four civil disturbance events in Lucas County since 1968; (4 events / 50 years = 0.08 events per year). However, since there have been more events in recent years, calculations will be considered from the earliest in recent history, since 2000 (3 events / 18 years = 0.16 events per year). Even by calculating the all-time events and the recent events, the percentage of occurrence in a year still falls within the same range, according to the chart in section 2.2.1 Calculating Risk.
Response	2	1 day	Events typically resolve within one or two days.
Onset	2	12 - 24 hours	At times, authorities can monitor certain groups' events and plan for riots. Other times, such as with active assailants or bomb threats, authorities do not know much if any information prior to the event.
Magnitude	1	Localized (less than 10% of land area affected)	10% of the land area in Lucas County would be approximately 60 square miles. These types of events are localized and limited to one or a few buildings and city blocks.
Business	2	1 week	Riots and carried-out bomb threats can cause damage to businesses that could last over 30 days. However, bomb threats and active assailant events could only close a business for a day to a week. Therefore, the assigned points reflect the most plausible scenario.
Human	2	Low (some injuries)	Riots may cause some injuries, but bomb threats do not cause injuries. Possible injuries or death would come from active assailants and a bomb threat that was carried out.
Property	2	10 - 25% of property affected	During riots, store fronts may have damage in the form of broken windows and doors, and destruction of merchandise. In extreme

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
			cases, this could also include fire damage. Bomb threats do not cause any damage to property, however, an explosion, depending on its intensity, can cause great damage to a building. Active assailant's damage to buildings is typically minimal.
Total	**13**	**Low**	The civil disturbance hazard risk to Lucas County, based on the points received, is low.

2.4.11 Severe Thunderstorms and Hail

HAZARD OVERVIEW



A severe thunderstorm is one that produces a tornado, winds in excess of 58 mph, or hail of 1" diameter or larger.			
Period of Occurrence:	At any time, typically during the summer months	**State Risk Ranking:**	Frequency: Highly likely Impact: Critical Ranking: 4 - High
Type of Hazard:	Natural	**Disaster Declarations:**	DR-191, DR-266, DR-362, DR-377, DR-436, DR-653, DR-951, DR-1339, DR-1651

A thunderstorm is a local storm that is produced by a cumulonimbus cloud, accompanied by lightning and thunder, often accompanied by gusty winds, heavy rain, and occasionally by hail, and sometimes is violent at the surface (NWS, FEMA, 2001).

TYPES OF THUNDERSTORMS				
Type	*Description*	*Duration*	*Wind Speeds*	*Associated Hazards*
Single Cell	Uncommon	20 - 30 minutes		• 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)	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		• 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

Sources: IS-271 Anticipating Hazardous Weather and Community Risk
Keller & DeVecchio, 2015
National Weather Service, 2009

A thunderstorm that produces a tornado, winds of at least 58 mph (50knots), and/or hail at least 1" in diameter is a severe thunderstorm (NWS, 2009). Thunderstorm-associated natural hazards include lightning, hail, heavy rain, damaging winds, and tornadoes. This profile includes descriptions on lightning and hail; sections 2.4.1 and 2.4.15 describe tornadoes and severe winds associated with thunderstorms. Because the potential damage

severe winds and tornadoes cause and the difference in mitigation actions relating to the hazard, this profile does not include a detailed description of them. Furthermore, the IS-271 FEMA course *Anticipating Hazardous Weather and Community Risk* describes thunderstorms and tornadoes separately.

- **Lightning**: Lightning is a giant spark of electricity between the atmosphere and the ground. In the initial stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground; however, when the differences in the charges becomes too great, this insulating capacity of the air breaks down, and there is a rapid discharge of electricity known as lightning (NWS). Individual lightning strikes occur with no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, p.51.) 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.
- **Hail**: Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice; the drops of ice can move upwards and downwards within the draft and become larger. When the hailstone is heavy enough, it will fall to the ground (NSSL, n.d.). In 1986, Jonathan Webb, a member of the Tornado and Storm Research Organization (TORRO) in England, developed the TORRO Hailstorm Intensity Scale as a way to measure and categorize hailstorms (Voss Law Firm, n.d.).

TORRO HAILSTORM INTENSITY SCALE					
Intensity		*Typical Hail Diameter (mm)*	*Typical Hail Diameter (in)*	*Typical Damage*	*Example Size Description*
H0	Hard Hail	5	Up to 0.33	No damage.	Pea
H1	Potentially Damaging	5-15	0.33 – 0.60	Slight general damage to plants, crops.	Mothball
H2	Significant	10-20	0.60 – 0.80	Significant damage to fruit, crops, vegetation.	Marble, Grape, Dime
H3	Severe	20-30	0.80 – 1.2	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored.	Walnut, Nickel to Quarter
H4	Severe	25-40	1.2 – 1.6	Widespread glass damage, vehicle bodywork damage.	Pigeon's egg > squash ball
H5	Destructive	30-50	1.6 – 2.0	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries.	Golf ball > Pullet's egg

TORRO HAILSTORM INTENSITY SCALE					
Intensity		*Typical Hail Diameter (mm)*	*Typical Hail Diameter (in)*	*Typical Damage*	*Example Size Description*
H6	Destructive	40-60	2.0 – 2.4	Bodywork of grounded aircraft dented, brick walls pitted.	Hen's egg
H7	Destructive	50-75	2.4 – 3.0	Severe roof damage, risk of serious injuries.	Tennis ball > Cricket ball
H8	Destructive	60-90	3.0 – 3.5	(Severest recorded in the British Isles) Severe damage to aircraft bodywork.	Large orange > Soft ball
H9	Super Hailstorms	75-100	3.5 – 4.0	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open.	Grapefruit
H10	Super Hailstorms	>100	4.0+	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open.	Melon

POSSIBLE CAUSES

Hail forms when water droplets are carried upward into extremely cold areas of the atmosphere. Hailstones grow by colliding with super cooled water drops. Super cooled water will freeze on contact with ice crystals, frozen raindrops, or dust. Thunderstorms that have a strong updraft keep lifting hailstones up toward the top of the cloud where they continue to grow. The hail eventually falls when the updraft can no longer lift the weight of the hailstone. Hail cannot form without an extremely cold upper atmosphere (NSSL, 2018).

Lightning is an electrical currents that start from the clouds. When the ground is hot, it heats the air above it; as the warm air rises, water vapor cools and forms into a cloud. When the warm air continues to rise, the cloud will grow. The top of the cloud has a temperature below freezing, which means water vapor turns to ice. As the water vapor freezes, the cloud becomes a thundercloud, and the frozen particles collide with each other creating an electric charge. Positively charged particles will rise to the upper part of the cloud, and the negatively charged particle will sink to the lower portion of the cloud. When the charges grow large enough, a spark or lightning will occur. This process may vary. Cloud-to-ground lightning occurs where the cloud is negatively charged, and the ground is positively charged, thus making a spark (Plant-science.com, 2018).

LOCATION AND EXTENT

Severe weather is a hazard that can affect all areas and jurisdictions of the county. Lucas, as well as surrounding counties and states, is at similar risk of exposure to these types of severe summer weather events. Severe summer weather events have the potential

of lasting seconds (i.e., lightning), a few minutes (i.e., tornadoes), several hours (i.e., thunderstorms, hailstorms, etc.), or even days (i.e., high winds).

HISTORICAL OCCURRENCES

The following table outlines the 75 hail (1" in diameter or larger) and lightning events related to severe thunderstorms. On occasion, there are more than one event in one day, possibly as well, in different locations around the county. The second column notes the number of events NCEI recorded for the day. If there was more than one hail event in one day, the sizes are noted in the last column for each event recorded.

HAIL AND LIGHTNING EVENTS IN LUCAS COUNTY

Event Date	*Number of Events on the Event Date*	*Event Type*	*Hail Size (in.)*
6/9/1966	2	Hail	1 / 2.5
7/12/1966	1	Hail	1
5/12/1970	1	Hail	1.5
2/22/1971	1	Hail	1.75
6/15/1974	1	Hail	1.75
4/28/1981	1	Hail	1.75
6/10/1983	1	Hail	1
6/3/1985	1	Hail	1
5/6/1986	3	Hail	1 / 1 / 1
7/25/1986	1	Hail	1
4/22/1988	1	Hail	1.75
5/9/1988	1	Hail	2
7/23/1988	1	Hail	1.25
3/27/1991	1	Hail	3
7/20/1992	1	Hail	1
10/14/1992	2	Hail	1 / 1.25
9/2/1993	1	Hail	2.5
11/2/1995	1	Hail	1
8/3/1997	1	Hail	1.75
5/17/1999	1	Hail	1.75
5/17/1999	1	Lightning	N/A
6/12/1999	1	Lightning	N/A
6/13/1999	1	Hail	1
7/14/2000	1	Hail	1
8/2/2000	2	Hail	1 / 1.75
4/7/2001	2	Hail	1 / 1.75
6/19/2001	2	Hail	1.25 / 1.25
5/25/2002	1	Hail	1.75
3/20/2003	1	Hail	1
6/21/2006	3	Hail	1.75 / 1 / 1
5/1/2007	3	Hail	1.25 / 1.75 / 1.75
6/21/2008	2	Hail	1 / 1
6/26/2008	1	Hail	1
6/25/2009	1	Hail	1

HAIL AND LIGHTNING EVENTS IN LUCAS COUNTY			
Event Date	*Number of Events on the Event Date*	*Event Type*	*Hail Size (in.)*
5/5/2010	4	Hail	1.25 / 1 / 1.25 / 1
5/7/2010	1	Hail	1.75
5/25/2011	1	Hail	1.5
8/18/2011	6	Hail	2 / 2 / 1 / 1 / 1 / 2
3/15/2012	2	Hail	1 / 1
6/18/2012	2	Hail	1
7/1/2012	6	Hail	2 / 1.75 / 1.75 / 1 / 1 / 1
7/10/2013	1	Hail	1.75
5/7/2014	1	Hail	1
6/18/2014	3	Hail	1 / 1 / 1
3/27/2016	1	Hail	1
9/4/2017	1	Hail	1

IMPACTS AND VULNERABILITY

There are many impacts of severe summer weather. Here are a few listed under each category.

- **Lightning:** Can cause injury and even death. In some cases, lightning is known to cause fires in structures and open land or forests.
- **Hailstorms:** Can cause injury to humans and animals if directly exposed, damage to vegetation and infrastructure.
- **Tornadoes:** Cause damage to trees, property; they can also cause severe injury and death.
- **Wind:** Causes respiratory illnesses, damage to the vegetation (fallen trees), and can cause damage to infrastructure due to flying debris.
- **Thunderstorms:** Include all of the above-mentioned impacts.

As with all hazards, severe summer weather hazards can also affect the mental health of the population causing anxiety, panic attacks, and post-traumatic stress. Vulnerable populations can include those who are unable to evacuate during a severe weather event, those with health issues that may be exacerbated, as well as children and elderly adults. If poor populations are unable to obtain necessary shelter during an event, they will be at higher risk and may be more vulnerable to the effects of that event.

LOSS AND DAMAGES

The following table outlines only the events that have losses or injuries associated with them. These are based on the data from the historical occurrences listed previously

from the NCEI database. There are 31 events that have costs associated with them; on average, each event with damages associated, costs $71,700.

DAMAGE TO PROPERTY FROM HAIL AND LIGHTNING					
Event Date	*Event Type*	*Hail Size (in.)*	*Deaths*	*Injuries*	*Damage to Property*
9/2/1993	Hail	2.5	0	0	$500,000
5/17/1999	Lightning	N/A	0	0	$150,000
4/7/2001	Hail	1.75	0	0	$50,000
6/19/2001	Hail	1.25	0	0	$25,000
6/19/2001	Hail	1.25	0	0	$20,000
5/25/2002	Hail	1.75	0	0	$25,000
3/20/2003	Hail	0.75	0	0	$2,000
3/20/2003	Hail	1	0	0	$5,000
3/20/2003	Hail	0.75	0	0	$2,000
3/20/2003	Hail	0.75	0	0	$2,000
3/20/2003	Hail	0.75	0	0	$2,000
4/4/2003	Hail	0.75	0	0	$5,000
5/10/2003	Hail	0.88	0	0	$2,000
6/21/2006	Hail	1.75	0	0	$15,000
6/21/2006	Hail	1	0	0	$4,000
6/21/2006	Hail	1	0	0	$4,000
5/1/2007	Hail	1.25	0	0	$15,000
5/1/2007	Hail	1.75	0	0	$50,000
5/1/2007	Hail	1.75	0	0	$50,000
6/25/2009	Hail	1	0	0	$20,000
5/5/2010	Hail	1.25	0	0	$5,000
5/5/2010	Hail	1.25	0	0	$15,000
5/7/2010	Hail	1.75	0	0	$25,000
5/25/2011	Hail	1.5	0	0	$30,000
8/18/2011	Hail	2	0	0	$250,000
8/18/2011	Hail	2	0	0	$150,000
8/18/2011	Hail	2	0	0	$250,000
7/1/2012	Hail	2	0	0	$200,000
7/1/2012	Hail	1.75	0	0	$50,000
7/1/2012	Hail	1.75	0	0	$50,000
7/10/2013	Hail	1.75	0	0	$250,000
Totals			**0**	**1**	**$2,223,000**

Source: NCEI

PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to severe thunderstorms have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists

the projects that Lucas County has worked on in the past five years to mitigate the negative effects of severe thunderstorms.

- Implement improved severe weather forecasting and warning systems.
- Provide back-up power generators for individual jurisdictions for use in maintaining power at critical facilities during severe storm events.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	3	Medium	There have been 75 events between 1966 and 2018.
Response	3	1 week	Severe thunderstorm effects can last anywhere from a day to over a week. For this reason, it is categorized as a one-week response.
Onset	1	Over 24 hours	Weather events such as these can be predicted in advance.
Magnitude	3	Critical (25-50% of land area affected)	Weather can affect all parts of the county at a time, or just occur in localized areas.
Business	1	Less than 24 hours	Businesses typically will not close during severe thunderstorm events. There is potential, however, that businesses could close due to damage to the building or property.
Human	1	Minimum (minor injuries)	Because these events are predictable, people can move to safe locations in time to not be injured.
Property	1	Less than 10% of property affected	The main items affected on a property will be the roofs of buildings and cars, but not the structure itself.
Total	**13**	**Low**	The risk of severe thunderstorms to Lucas County, based on the points received, is low.

2.4.12 Dam/Levee Failure

HAZARD OVERVIEW

A dam is a barrier built across a waterway to control the flow or raise the level of water. A dam failure occurs when the barrier constructed across the waterway fails or otherwise does not obstruct or restrain the flow of water, which can rapidly result in a large area of completely inundated land.			
Period of Occurrence:	At any time, typically after a prolonged period of rain causing damages or a prolonged period of drought causing erosion.	**State Risk Ranking:**	Frequency: Possible Impact: Critical Ranking: 3 - Medium
Type of Hazard:	Technological	**Disaster Declarations:**	None

There are approximately 90,580 dams in the United States, the majority of which are privately owned; state and local authorities, public utilities, and federal agencies own others. Currently, the average age of the dams in the country is 56 years. The American Society of Civil Engineers calculates the status of these dams and generates a grade; the grade of the U.S. dams is 'D', and 17% of all dams are classified as high-hazard (ASCE, 2017).

The benefits of dams and levees are numerous: they provide water for drinking, navigation, and agricultural irrigation, and save lives by preventing or reducing floods. Dams and levees are man-made structures designed to obstruct or restrain waters that may cause flooding downstream. These structures are generally made with concrete or earthen materials.

In terms of emergency management, dam failures are categorized as either *sunny day failures* or *rainy-day failures*. *Sunny day failures* occur during a non-flooding situation with the reservoir near normal pool level. *Rainy day failures* usually involve periods of rainfall and flooding, and can exacerbate inadequate spillway capacity. Improper design of a spillway or operation of gates during high flows can lead to excessive water pressure and subsequent failure as well. Even though both types of failures can be disastrous, it can be assumed that a *sunny day failure* would be more catastrophic due to its unanticipated occurrence and the lack of time to warn residents downstream (State of Ohio, 2014 p3 184).

According to Ohio Administrative Code Rule 1501:21-13-01, dams fall under one of four classes (ODNR, n.d.). For impacts from each dam class, see the impacts and vulnerability section below.

- **Class I:** Dams having a total storage volume greater than 5,000 acre-feet or a height of greater than 60 feet.
- **Class II:** Dams having a total storage volume greater than 500 acre-feet or a height of greater than 40 feet.
- **Class III:** Dams having a total storage volume greater than 50 acre-feet or a height of greater than 25 feet.
- **Class IV:** Dams having a total storage volume of 50 acre-feet or less or a height of 25 feet or less. Class IV dams are exempt from permit requirements. *NOTE: Class IV dams appear as "Other" in the remainder of this profile.

POSSIBLE CAUSES

There are three types of failures of earthen dams: overtopping, seepage or piping, and structural failure (ODNR, n.d.).

- **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 causes 34% of dam failures.
- **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 structural failure of embankments. Large cracks in an appurtenance or the embankment, major settlement, and major slides will require emergency measures to ensure safety, especially if the problems occur suddenly. Foundation defects and slope instability are the cause of 30% of dam failures.
- 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 or its foundation, 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. Seepage or piping causes 20% of dam failures.

The three types of failures 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.

LOCATION AND EXTENT

Lucas County has one Class I dam and four Class II dams (outlined below), and 15 dams classified as "other" and not listed here. As noted above, *other* represents Class IV, non-permitted dams.

DAMS AND LEVEES IN LUCAS COUNTY

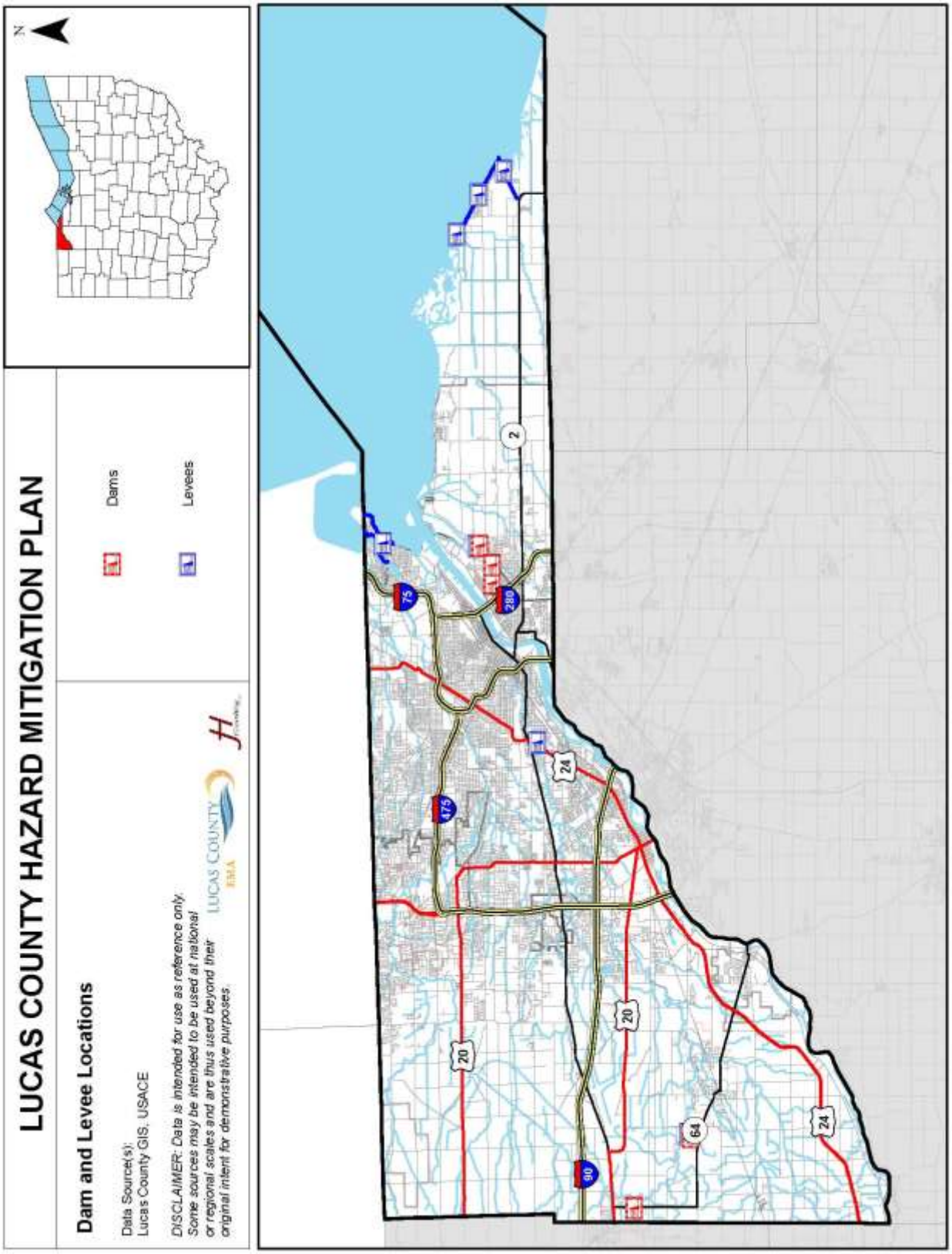
Dam Name	*Type*	*Class / Risk*	*Location*	*Owner*	*Type of Impoundment*
Collins Park WTP Sludge Lagoon E *	Dam	Class II	Washington Township	City of Toledo	Upground, earth fill
Collins Park WTP Sludge Lagoon A *	Dam	Class II	Washington Township	City of Toledo	Upground, earth fill
Collins Park WTP Sludge Lagoon B & C *	Dam	Class I	Washington Township	City of Toledo	Upground, earth fill
Swanton Upground Reservoir *	Dam	Class II	Swanton Township	Village of Swanton	Upground, earth fill
Evergreen Lake Dam	Dam	Class II	Swanton Township	Metropolitan Park District of the Toledo area	Dam and Spillway, earth fill
Swan Creek Levee (Glencove)	Levee	N/A	Toledo	Federal	Urban
Ottawa River Levee (Point Place Levee System)	Levee	Low	Toledo	Federal	Urban
Reno Beach (Lake Erie Shoreline Levee)	Levee	Low†	Jerusalem Township	Federal	Agricultural
South Shore Park Levee 1, 2, & 3	Levee	N/A††	Oregon Township	Federal	Agricultural
Unincorporated Areas 19, 54, 59, 104, & 105	Levee	N/A†	Jerusalem Township	Federal	Agricultural

Source: ODNR, State of Ohio Enhanced HMP (2014), National Levee Database
** Dam has an Emergency Action Plan (if no indication, unknown if the dam has an EAP)*
† Levee listed as "Not Screened" in the National Levee Database; however, narrative in the database indicates a "relatively low risk" and that the levee is "expected to perform as designed"
†† Levee listed as "Not Screened" in the National Levee Database with no accompanying narrative

The identification of an emergency action plan (EAP) for the dams listed in the above table came from the U.S. ACE's National Inventory of Dams (NID) (https://nid-test.sec.usace.army.mil/ords/f?p=105:113:3939368110425::NO:::). That site indicated the presence of an emergency action plan for Collins Park WTP Sludge Lagoons A, B & C, and Swanton Upground Reservoir. The NID does not make EAPs available; the EAPs were also not readily available to the Lucas County Emergency Management Agency (LCEMA). Since EAPs are foundations to mitigation and preparedness for dam failures, the LCEMA added a mitigation project in this plan to obtain the four EAPs referenced by the NID as well as work with other dam operators to determine whether other facilities in the county have EAPs.

The levee risk information comes from the National Levee Database. Levees with a "low" classification have a low likelihood of inundation as well as a low likelihood for loss of life and economic or environmental consequences. Those with "very low" or no verdict classifications also should not expect inundation or loss of life. Recommended actions for these levees include routine monitoring and communicating risk characteristics to the community (along with education as to the differences between flood watches and warnings and evacuation procedures).

The map on the following page shows the location of each dam and levee. The levees are mainly along the Lake Erie shore and the creeks or rivers that flow to the lake.


LUCAS COUNTY HAZARD MITIGATION PLAN
Dam and Levee Locations
Data Source(s):
Lucas County GIS, USACE
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Dams
Levees
N
75
280
475
24
20
64
90
2

IMPACTS AND VULNERABILITY

The potential downstream hazards are defined as the resultant downstream damage should the dam fail, including probable future development. The potential downstream hazards are broken into four classes, which coincide with the class of dam defined by height and storage as discussed above.

POTENTIAL DOWNSTREAM HAZARDS	
Class	*Description*
Class I	• Probable loss of life • Structural damage to high value property (i.e., homes, industries, major public utilities).
Class II	• Disruption of a public water supply or wastewater treatment facility, release of health hazardous industrial or commercial waste, or other health hazards • Flooding of residential, commercial, industrial, or publicly 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 as determined by the chief • Damage or disruption to railroads or public utilities • Damage to downstream class I, II or III dams or levees, or other dams or levees of high value. Damage to dams or levees can include, but is not limited to, overtopping of the structure
Class III	• Property losses including but not limited to rural buildings not otherwise described, and class IV dams and levees not otherwise listed as high-value property. At the request of the dam owner, the chief may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property • Damage or disruption to local roads including but not limited to roads not otherwise listed as major roads.
Class IV	• Losses restricted mainly to the dam.

Uncontrolled floodwaters are one of the most powerful and destructive forces in nature. Dams that are not designed to withstand major storms or are in a state of disrepair may be destroyed, increasing flood damage downstream. The potential for damage due to dam failure is increasing along with the increased amount of residential and commercial development within the hydraulic shadow of dams. In many cases, existing dams will need to be modified to keep downstream areas safe from catastrophic flooding.

The biggest threat or vulnerability of the sludge lagoon dams at the Collins Park water treatment plant are the animals that dig into the embankments and erosion of the embankments from weather.

HISTORICAL OCCURRENCES

Research conducted indicates that there have been no recent dam or levee failures in Lucas County. The *State of Ohio Enhanced Hazard Mitigation Plan* (2014), indicates that there has been one dam failure at the Swanton upground reservoir in 1970, but it was repaired.

LOSS AND DAMAGES

According to Ohio Division of Natural Resources, there have been seven notable dam failure events nationwide since 1889, the latest one occurring in 2006. The damages ranged from $17 million to $400 million, with an average per-event damage of $139 million dollars. Fatalities range from 3 to 2,209, however, there has been a significant decrease in the number of deaths since the first reported failure. None of these notable events occurred in Ohio. The *State of Ohio Enhanced Hazard Mitigation Plan* (2014) outlines the dam incidents and failures in Ohio from 1852 to 2014. The state is divided into three regions; Lucas County falls under Region 1. According to the data, there have been 10 incidents or failures within the region; one within Lucas County. There is no data on the one failure of the Swanton Upground Reservoir in Lucas County; consequently, the average loss to be expected based on past occurrences would be $0. However, if a dam or levee failed, the damages would amount to the sum of the cost to replace the dam or levee and losses of property from the failure.

Although there is no additional data supporting evidence of losses or damages from the failure in 1970, it is safe to estimate that there could be an incident in a Lucas County dam due to the presence of class I dams. The typical 'dam failure' brings images of large dams' walls bursting and flooding everything in its path downstream causing catastrophic destruction. However, the more plausible event is one that occurs on a daily basis; there are animals that can begin to dig through embankments in the lagoons and cause some damage. However, these are repaired immediately upon discovery to avoid the failure of a wall. The WTP sludge lagoons are considered Class I and II dams; while an inundation study was not conducted for this plan, the City of Toledo Water Treatment Department keeps and has access to approved Emergency Action Plans (EAPs) for the lagoons they manage.

The National Levee Database contains information about the people at risk, structures at risk, and the property value of the structures at risk. The following table outlines this information.

LEVEE RISKS			
Levee Name	*People at Risk*	*Structures at Risk*	*Property Value at Risk*
Swan Creek Levee (Glencove)	211	89	$23,900,000
Ottawa River Levee (Point Place Levee System)	2,364	1,225	$275,000,000
Reno Beach (Lake Erie Shoreline Levee)	1,018	459	$171,000,000
South Shore Park Levee 1	331	145	$64,200,000

LEVEE RISKS			
Levee Name	*People at Risk*	*Structures at Risk*	*Property Value at Risk*
South Shore Park Levee 2	444	176	$73,000,000
South Shore Park Levee 3	11	6	$2,500,000
Unincorporated Areas 19 *	0	0	$0
Unincorporated Areas 54 *	3	1	$417,000
Unincorporated Areas 59 *	0	0	$0
Unincorporated Areas 104 *	2	1	$417,000
Unincorporated Areas 105 *	2	2	$8,290,000
Total	**4,386**	**2,104**	**$618,724,000**

** Levee is in Lucas and Ottawa Counties*
Source: National Levee Database

PREVIOUS AND ONGOING MITIGATION EFFORTS

The City of Toledo's Division of Water Treatment conducts daily inspections of all their sludge lagoons at the water treatment plant at Collins Park. When they find erosion or evidence of animals digging through the dam embankments, they repair them immediately to ensure the structure is safe. In addition. The Division of Water Treatment keeps plans Emergency Action Plans for each dam (lagoon) except Lagoon D, which is not covered under ODNR regulations.

The City of Toledo has been conducting improvements over the last three years to achieve compliance with new regulations FEMA issued. In addition, the USACE and FEMA have been working to bring the Point Place levee system along the Ottawa River, Mudjaw Creek, and Maumee River into compliance (City of Toledo, n.d.).

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	1	None	There have been no historical events of dam or levee failure in Lucas County
Response	4	1 month	Potentially, if a dam were to fail, repairs might take up to a month.
Onset	1	Over 24 hours	When dams fail, they typically show signs well before failure.
Magnitude	1	Localized (less than 10% of land area affected)	Dams have specific locations, if they fail, they would affect a small area in comparison with the rest of the county.
Business	2	1 week	The businesses affected would be those which are directly in the path of the dams or the businesses that own the dams.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Human	1	Minimum	Due to advanced signs of failure, it is possible to remove people from the area and avoid any harm.
Property	1	Less than 10% of property affected	There are currently no estimates on the damages to properties from dam and levees in Lucas County.
Total	**11**	**Low**	The dam/levee failure risk to Lucas County, based on the points received, is low.

2.4.13 Drought

HAZARD OVERVIEW

A drought is a period of abnormally dry weather which persists long enough to produce a serious hydrological imbalance.			
Period of Occurrence:	At any time, typically after a period of prolonged absence of precipitation	**State Risk Ranking:**	Frequency: Likely Impact: Negligible Ranking: 2 - Low
Type of Hazard:	Natural	**Disaster Declarations:**	None

Drought is defined as 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 being 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 and are not identified until they are already under way. 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. 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 ground water table. Consequently, there is a decrease in groundwater discharge to streams and lakes. A prolonged hydrological drought will affect the water supply.
- **Socioeconomic Drought:** A lack of water that begins to affect people's daily lives.

The Palmer Drought Severity Index (PDSI) is a widely used measure of drought to track moisture conditions. The PDSI is defined as "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 expected or 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 University of Nebraska-Lincoln, U.S. Department of Commerce, and NOAA developed another measurement of droughts named the U.S. Drought Monitor (USDM). The table to the 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	

POSSIBLE CAUSES

Precipitation falls in uneven patterns across the country; the amount of precipitation at a particular location varies from year to year, but over a period of years, the average amount is fairly 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 needed for plant growth, such as in the early summer. When little or no rain falls, soils can dry out and plants can die. When rainfall is less than normal for several weeks, months, or years the flow of streams and rivers declines, water levels in lakes and reservoirs fall, and the depth to water in wells increases. If dry weather persists and water-supply problems develop, the dry period can become a drought (USGS, 2016).

LOCATION AND EXTENT

Droughts are a region-wide hazard that can affect all areas and jurisdictions within the region. Droughts are widespread events that may extend to several states in varying degrees of severity. Within Lucas County, the extent of a drought would be equal or very similar given the region's geography and environmental qualities. A drought can vary in

severity throughout the year; what starts out as a mild drought can reach severe or extreme drought status and then return to a mild drought. This process could take weeks or even months and the effects could be felt even months after the drought conditions are over.

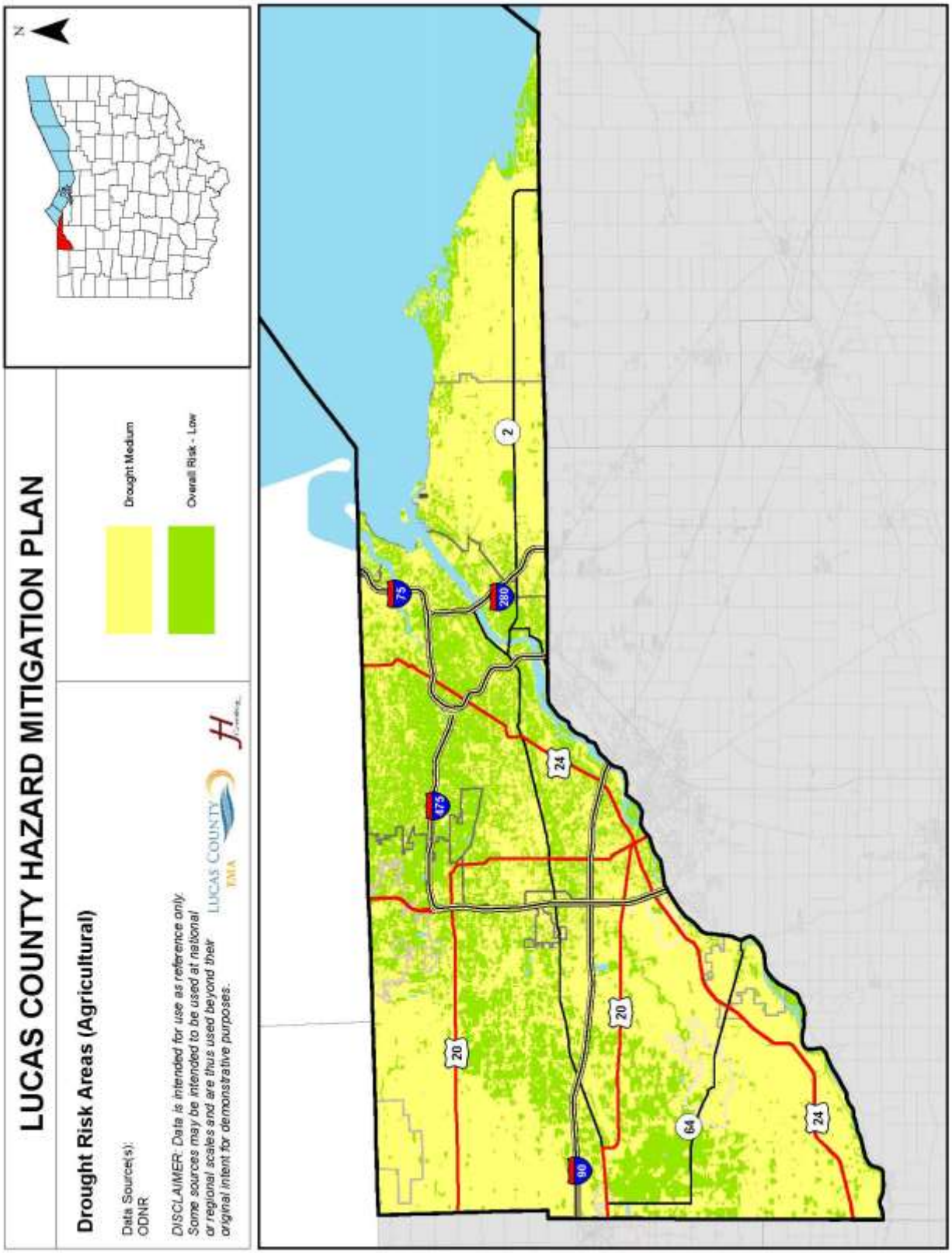
IMPACTS AND VULNERABILITY

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 (hydroelectric and nuclear power generation, for example) and growing food crops. As droughts reduce available water sources, local officials will need to closely monitor water usage to maintain enough for critical uses.

According to the U.S. Drought Monitor, there are possible impacts from each level of drought; these are described below.

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
D1 Moderate Drought	• Some damage to crops, pastures streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2 Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3 Extreme Drought	• Major crop/pasture losses Widespread water shortages or restrictions
D4 Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

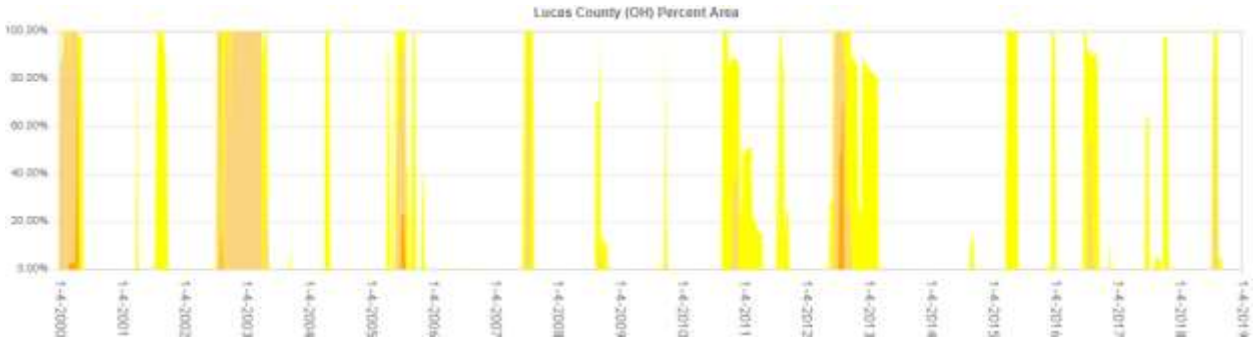
The map on the following page illustrates the areas that are more susceptible to agricultural droughts (in yellow). The data represents the land cover and it is opposite of the risk areas seen in Section 2.4.9 Wildfires. The main areas that would be affected in this case are those that have crop lands.


LUCAS COUNTY HAZARD MITIGATION PLAN
Drought Risk Areas (Agricultural)
Data Source(s):
ODNR
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Drought Medium
Overall Risk - Low
N
2
75
280
475
24
20
64
90

HISTORICAL OCCURRENCES

According to the National Center for Environmental Information (NCEI) database, there are five events of drought in Lucas County; one presents in August of 1996 and the other four present every month for the months of June, July, August, and September of 1999. This suggests that there were not four individual droughts, but rather one period of drought that lasted four months, bringing the total amount of drought events down to two. Further, the USDA Farm Service Agency indicates that Lucas County received a disaster declaration in 2012 (for drought and excessive heat in February and March and fast tracked in June) (https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index). The Toledo Blade reported on the drought attributing its cause to heat and lack of rain, and noted excessive heat connected with the event (e.g., Toledo experiencing three days in July of temperatures in excess of 100° F) (Linkhorn, 2012).

The U.S. Drought Monitor, kept by the University of Nebraska-Lincoln, provides more detailed information about drought since 2000. The illustration below is a graphical representation of the time and severity of droughts presented in Lucas County between 2000 and 2018 (for detailed information on the significance of the colors, see the previous section). Interestingly, 2012 does not present in this illustration.



The following table outlines the total consecutive weeks that Lucas County has spent in drought conditions. Typically, the levels of severity will overlap, rather than be separate events; this is because droughts begin as abnormally dry conditions, and slowly increase in severity and then drop to abnormally dry conditions before returning to normal. In Lucas County, there have only been abnormally dry (D0) conditions, moderate drought (D1), and severe drought (D2); there have not been any extreme drought (D3) or exceptional drought (D4) conditions.

CONSECUTIVE DROUGHT WEEKS IN LUCAS COUINTY 2000-2018			
Drought Condition	*Total Consecutive Weeks*	*Most Consecutive Weeks*	*Total Events*
D0 – Abnormally Dry	274	44	24
D1 – Moderate Drought	92	31	10
D2 – Severe Drought	15	8	3
D3 – Extreme Drought	0	0	0
D4 – Exceptional Drought	0	0	0

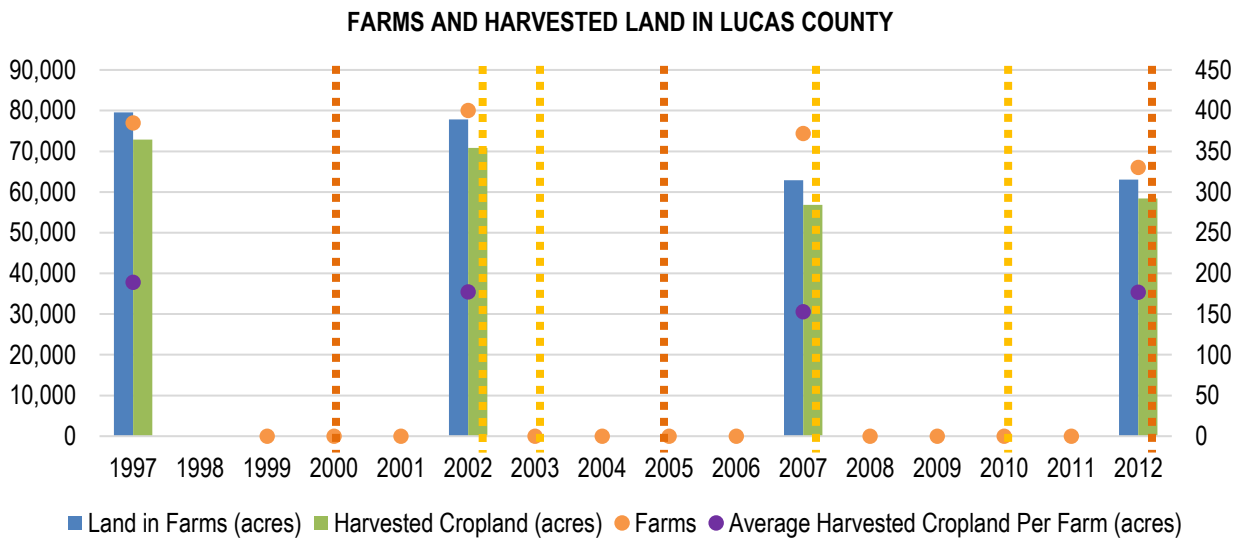
Source: U.S. Drought Monitor

LOSS AND DAMAGES

The USDA keeps data about agriculture through the 5-year censuses; the following table outlines the number of farms in Lucas County at every past census year since 1997 as well as the harvested cropland. As described above, there have been moderate or severe droughts in 1996, 1999, 2000, 2002, 2003, 2005, 2007, 2010, 2012, 2016, and 2018.

USDA CENSUS OF AGRICULTURE HARVESTED CROPLAND AND FARMS					
Census Year	*Farms*	*Land in Farms (acres)*	*Harvested Cropland (acres)*	*Average Harvested Cropland Per Farm (acres)*	*Market Value of Agricultural Products Sold*
1997	385	79,583	72,880	189.2	$60,875,000
2002	400	77,823	70,853	177.1	$41,452,000
2007	372	62,906	56,865	152.8	$47,888,000
2012	330	63,022	58,387	176.9	$66,172,000

The data indicates that over the years, there has been a steady decline in the land of farms in acres. However, there can be no correlation drawn between the occurrence of drought and the decrease of farm land or harvested acres. Even with the decline of average harvested cropland and number of farms, the market value of agricultural products sold has increased, indicating that drought has not affected the crops in Lucas County on a macro scale. Therefore, the losses related to drought are $0. The graph below shows the data in the table graphically; the dotted lines represent the years of moderate or severe drought.



PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to drought have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of drought.

- Encourage water conservation through public outreach programs prior to a drought event.
- Establish economic incentives for private investment in water conservation.
- Implement and distribute Drought Dos and Don'ts to the general public.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	4	High	There have been 24 events of at least abnormally dry conditions in Lucas County. However, there have been only been 11 events in which moderate or severe drought conditions presented in 18

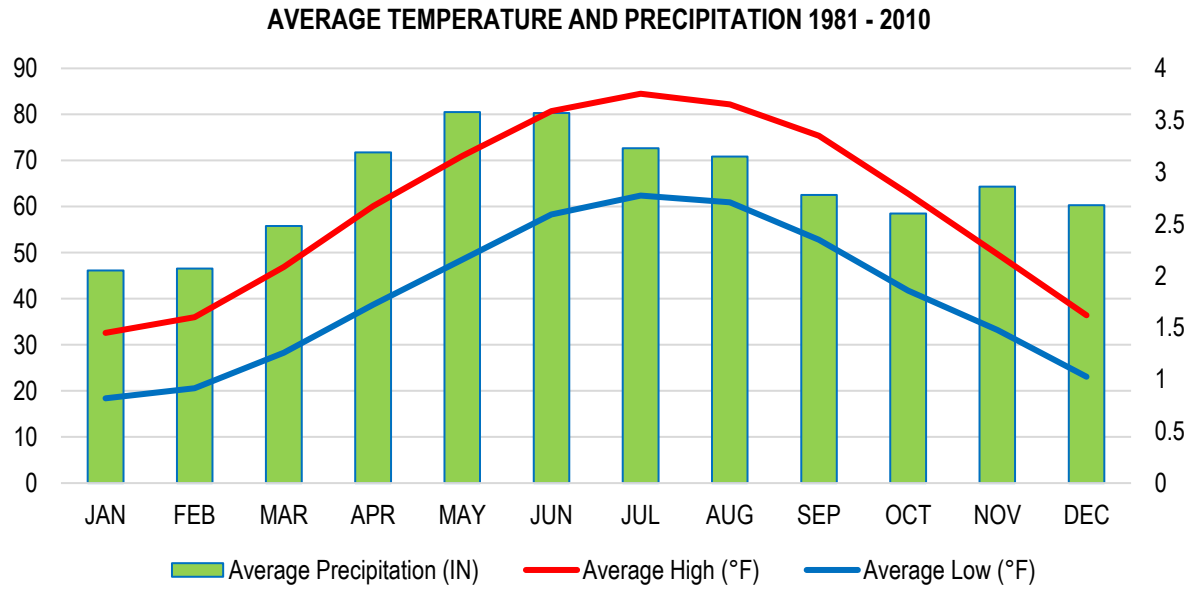
			years. That averages to 0.6 events per year.
Response	1	Less than half a day	There is little response involved in drought in the traditional sense of the word.
Onset	1	Over 24 hours	Drought conditions are a result of prolonged periods of no or below average precipitation. This is a good indicator that drought conditions may present in the area.
Magnitude	2	Limited (10-25% of land area affected)	In 2012 there were 63,022 acres (98.4 square miles) of cropland. Lucas County has 596 square miles of land. If a severe drought were to affect Lucas County, the total agricultural area affected would be 16.4% of the total land area.
Business	1	Less than 24 hours	For the majority of the businesses, drought will not affect the operations. The only ones affected could be those that depend on agriculture.
Human	1	Minimum (minor injuries)	Drought conditions, such as the ones in Lucas County, do not cause injury to humans.
Property	1	Less than 10% of property affected.	Drought conditions do not affect structures and is therefore given the lowest possible points.
Total	**11**	**Low**	The drought risk to Lucas County, based on the points received, is low.

2.4.14 Temperature Extremes

HAZARD OVERVIEW

HIGHEST HIGH MEDIUM LOW LOWEST	Temperature extremes, for the purpose of this profile, includes hot and cold temperatures.			
	Period of Occurrence:	At any time, typically during winter or summer months.	**State Risk Ranking:**	(Extreme Summer Weather) Frequency: Likely Impact: Negligible Ranking: 2 - Low
	Type of Hazard:	Natural	**Disaster Declarations:**	None

Extreme temperatures (hot and cold) are a new hazard the committee included in this update cycle. Extreme temperatures, for this profile, will include both hot and cold temperature extremes. 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) can generate reports of monthly "normals" at its different stations. The data chosen for the region is from the Toledo Express Airport. The following graphic shows average ranges of temperature from 1981 to 2010. Every month has a high and low average temperature in degrees Fahrenheit. Extreme temperatures would be those either 10 degrees above or below the average high or low temperatures.



Heat

Temperatures vary widely over the course of a year, but each season has average temperature ranges associated with them. Summer and winter have, generally, the highest and lowest range of temperatures, respectively. When the temperature is consistently greater than the normal in summer, meteorologists refer to it as a heat wave, which means, "temperatures of ten or more degrees above the average high temperature persist across the geographic region for several days or weeks" (Haddow, Bullock, & Coppola, 2014, p.51). These conditions can be a contributor to drought conditions when combined with a lack of rainfall. Excessive heat has a history of being deadly. In the United States, "more than 1,500 die from exposure to excessive heat" (Haddow, Bullock, & Coppola, 2014, p.52). These conditions can also have serious impacts on crops, causing below average harvests. Repeated years of extreme temperatures can easily cause significant economic impacts on agricultural industries. The National Centers for Environmental Information (NCEI) tracks two types of extreme heat temperatures.

- **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).

Cold

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 on the next page 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. NCEI tracks two types of extreme cold 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. The polar vortex is a large area of low pressure and cold air surrounding both of the Earth's poles. It always exists near the poles, but weakens in summer and strengthens in winter. The term "vortex" refers to the counter-clockwise flow of air that helps keep the colder air near the Poles. Many times, during winter in the northern hemisphere, the polar vortex will expand, sending cold air southward with the jet stream. This occurs fairly regularly during wintertime and is often associated with large outbreaks of Arctic air in the United States.

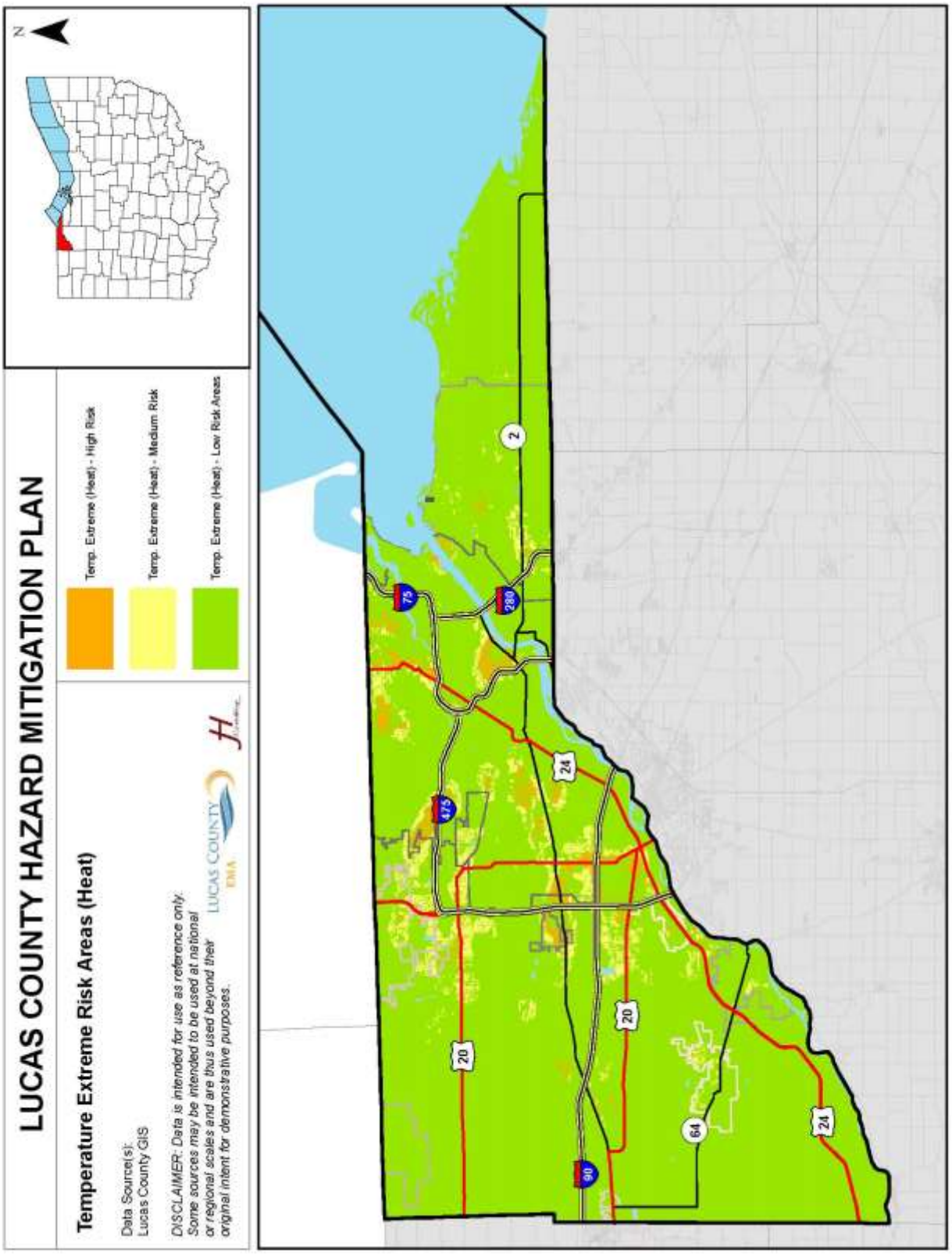
POSSIBLE CAUSES

Weather patterns throughout the year naturally cause temperatures to rise and fall in the summer and winter months due to the inclination of the Earth towards the sun. However, the extreme temperatures that have been experienced in the last decade are attributable to climate change.

LOCATION AND EXTENT

Extreme temperatures, hot and cold, affect each jurisdiction within Lucas County equally. Though the temperatures may vary slightly from day to day, the overall average of all the county's temperatures and susceptibility to extremes is very similar.

Urban areas can experience the heat island effect; this effect occurs on the surface and in the atmosphere. Dry surfaces exposed to the sun such as pavement and roofs can reach temperatures of 50-90° hotter than the air, while more rural areas maintain surface temperatures similar to those of the air (EPA, n.d.).


LUCAS COUNTY HAZARD MITIGATION PLAN
Temperature Extreme Risk Areas (Heat)
Data Source(s):
Lucas County GIS
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Temp. Extreme (Heat) - High Risk
Temp. Extreme (Heat) - Medium Risk
Temp. Extreme (Heat) - Low Risk Areas
N
2
75
280
475
24
20
20
64
24
90

The map on the previous page shows the locations where buildings are clustered and could potentially create heat island effects and feel hotter than normal. These areas where the yellow and orange colors (medium and high risk, respectively) are correspond mainly to the cities and villages.

HISTORICAL OCCURRENCES

There have been few temperature extreme events in Lucas County over the years. The table to the right lists the events on the NCEI database. There gave been only two heat events and eight cold events.

TEMPERATURE EXTREME EVENTS	
Event Date	*Event Type*
2/2/1996	Cold/Wind Chill
1/10/1997	Cold/Wind Chill
6/6/1999	Heat
7/1/1999	Heat
1/15/2009	Extreme Cold/Wind Chill
3/27/2012	Extreme Cold/Wind Chill
1/6/2014	Extreme Cold/Wind Chill
1/28/2014	Extreme Cold/Wind Chill
1/8/2015	Cold/Wind Chill
2/15/2015	Extreme Cold/Wind Chill

IMPACTS AND VULNERABILITY

The majority of the impacts of extreme temperatures affect the population's health rather than damage buildings. Some of the effects extreme temperatures could have on structures are minor compared to other hazards. Effects on buildings and infrastructure could include broken pipes, cracks in roads or bridges due to expansion and contraction, and power outages. In addition to impacts on health, extreme temperatures can also cause damages to transportation infrastructure, agriculture, energy, and water resources.

Extreme heat can cause a wide range of health problems or even make existing health problems worse. Some of the milder symptoms include discomfort, skin eruptions and heat fatigue which can lead to heat cramps, heat exhaustion, and heat stroke. Occasionally some people may require medical attention. Prolonged exposure to extreme heat can even cause death (CDC).

Sweating cools the body through evaporation. However, high relative humidity retards evaporation, robbing the body of its ability to cool itself. When heat gain exceeds the level the body can remove, body temperature begins to rise, and heat-related illnesses and disorders may develop.

Approximately 400 people die each year from exposure to heat, according to the Centers for Disease Control and Prevention (CDC). Our bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and as a last resort, by panting, when blood is heated above 98.6°F.

HEAT RISKS	
Heat Index	*Possible heat disorders for people in higher risk groups*
130°F or higher	Heatstroke/sunstroke is highly likely with continued exposure.
105-130°F	Sunstroke, heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.
90-105°F	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
80-90°F	Fatigue possible with prolonged exposure and/or physical activity.

Problems arising from prolonged exposure to the cold can include hypothermia, frostbite and non-freezing cold injuries such as chilblains and trench/immersion foot. Sunburn is also possible during extremely cold weather events (Army Public Health Center).

COLD RISKS		
Stage	*Core Temperature*	*Signs and Symptoms*
Mild Hypothermia	99-97°F	Normal, shivering may begin.
	97-95°F	Cold sensation, goose bumps, unable to perform complex tasks with hands, shivering can be mild to severe, hands numb.
Moderate Hypothermia	95-93°F	Shivering, intense, muscles incoordination becomes apparent, movements slow and labored, stumbling pace, mild confusion, may appear alert. Use sobriety test, if unable to walk a 9 meter (30 foot) straight line, the person is hypothermic.
	93-90°F	Violent shivering persists, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, frequently stumbles, difficulty speaking, signs of depression, withdrawn.
Severe Hypothermia	90-86°F	Shivering stops, exposed skin blue of puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness
	86-82°F	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation.
	82-78°F	Unconscious, a heartbeat, and respiration erratic, a pulse may not be obvious.
	78-75°F	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.

Source: Canadian Centre for Occupational Health and Safety

Although extreme temperatures affect everyone in the region, some people may be more vulnerable to their effects. For example, the homeless population could be more at risk simply for being exposed to the elements; children and the elderly population may be more susceptible to changes in temperature as well as the poor if they cannot afford to keep cool during an extreme heat event or to stay warm during an extreme cold event.

LOSS AND DAMAGES

According to the NCEI database, there have only been two events that have caused property damage in the total amount of $155,000. For the purpose of estimating a per-event

cost, if the total damage amount is divided by the total number of events, each event would cause approximately $15,000 in damages.

PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to temperature extremes have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of temperature extremes.

- Develop plans for the protection and care of animals during extended periods of extreme heat or cold.
- Establish a Fire Advisory System to identify "fire risk." during extended periods of extreme heat or cold.
- Coordinate with service support groups to provide a list of "Cooling/Warming Centers" for use during extended periods of extreme heat or cold to at risk citizens.
- Provide Emergency Preparedness information and resources relative to extreme temperature events to the public through an active educational outreach program with specific plans and procedures for Senior Citizens and the Disabled.

RISK ASSESSMENT

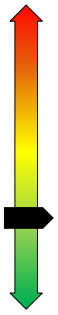
The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	3	Medium	There have been 10 extreme temperature events between 1996 and 20108.
Response	1	Less than half a day	There is typically little to no response for these events.
Onset	1	Over 24 hours	These types of weather events can be predicted.
Magnitude	3	Critical (25-50% of land area affected)	With the urban heat island effect, it is possible that when temperatures are high, they may feel higher in denser areas
Business	1	Less than 24 hours	Businesses will typically not be affected by temperature changes.
Human	1	Minimum (minor injuries)	Due to the predictability of these events, people can take measures before they are in a dangerous situation.
Property	1	Less than 10% of property	Damages to property would typically involve burst pipes due to cold

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
		affected	and possible power outages
Total	**11**	**Low**	The risk of temperature extremes to Lucas County, based on the points received, is low.

2.4.15 Wind

HAZARD OVERVIEW



Straight-line winds (derechos), downbursts, microburst, and gust fronts all are part of wind events.			
Period of Occurrence:	At any time	**State Risk Ranking:**	Frequency: Highly likely Impact: Critical Ranking: 4 - High
Type of Hazard:	Natural	**Disaster Declarations:**	DR-1651

Severe wind is non-tornadic, damaging winds from thunderstorms include four common types (NWS & FEMA, 2001).

- **Straight-Line Winds or Derechos**: Winds having little or no curvature or rotation, capable of affecting a larger geographic area than a tornado.
- **Downbursts**: Localized downward gusts of air from a thunderstorm. These winds can be very damaging on and near the ground and tend to cover areas of just a few miles.
- **Microbursts**: Minimized downbursts affecting areas less than 2.5 miles in diameter. Microbursts induce a strong wind shear and can produce winds over 150 mph.
- **Gust Fronts**: Cool, gusty air that flows out of the base of a thunderstorm and spreads along the ground ahead of the thunderstorm cell.

One of the first scales to estimate wind speeds and the effects was created by Britain's Admiral Sir Francis Beaufort (1774-1857). He developed the scale in 1805 to help sailors estimate the winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths (NOAA, n.d.).

BEAUFORT WIND SCALE					
Force	*Wind Speed*			*Appearance of Wind Effects*	
	(mph)	*(knots)*	*Description*	*On the Water*	*On Land*
0	0-1	0-1	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	4-7	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move

BEAUFORT WIND SCALE					
Force	*Wind Speed*			*Appearance of Wind Effects*	
	(mph)	*(knots)*	*Description*	*On the Water*	*On Land*
3	8-12	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	13-18	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	19-24	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	25-31	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	32-38	38-33	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	39-46	34-40	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	47-54	41-47	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	55-63	48-55	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	64-72	56-63	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility more reduced	
12	72-83	64-71	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

POSSIBLE CAUSES

Cold air molecules are closer to each other and are in low pressure while warm or hot air molecules are further distanced and in high pressure. Air masses move from high pressure areas to low pressure areas, caused by differences in temperature; the larger the difference between the pressure or temperature of two masses of air, the quicker the movement will be and cause wind (NOAA, SciJinks, 2019). Since the Earth is rotating, however, the air does not flow directly from high to low pressure, but it is deflected to the right (in the Northern Hemisphere; to the left in the Southern Hemisphere), so that the wind flows mostly around the high- and low-pressure areas. The closer the high- and low-pressure areas are together, the stronger the "pressure gradient", and the stronger the winds. Wind can be thought of one way that the atmosphere moves excess heat around. Directly or indirectly, wind forms for the primary purpose of helping to transport excess heat either away from the surface of the Earth, where sunlight causes an excess of energy buildup, or from warm regions (usually the tropics) to cooler regions (usually the higher latitudes) (Weather Street, 2013).

LOCATION AND EXTENT

Wind is a phenomenon that occurs all around the globe. Wind events can encompass several jurisdictions, counties, and states at the same time for varying durations and severity.

HISTORICAL OCCURRENCES

According to NCEI, there have been 298 high wind, strong wind, and thunderstorm wind events since 1956. However, not all these events meet the 58 mph or higher wind speed in order to be considered severe. As wind is a daily occurrence, this section only considers severe wind. The following table lists the events from 2000 to present.

WIND EVENTS		
Event Date	*Event Type*	*Magnitude (mph)*
6/30/2005	Thunderstorm Wind	63
8/9/2007	Thunderstorm Wind	61
6/6/2008	Thunderstorm Wind	65
7/5/2012	Thunderstorm Wind	77
8/4/2012	Thunderstorm Wind	61

IMPACTS AND VULNERABILITY

Severe wind events can cause a variety of secondary, or cascading, hazard events. For instance, the wind may blow limbs from trees down knocking out electric power or blocking roadways. Wind often results in damages to roofs and other home finishings (such as siding, etc.). Damage and loss of life could be severe and overwhelm the ability of local responders to address the emergency.

LOSS AND DAMAGES

According to data from NCEI, the 298 events referenced above have caused $15,077,500 in damages, one death, and two injuries, even though they have not qualified as severe. Between 1956 and 1999, there were 6 deaths and one injury; the cost was $1,213,000. Although this cost seems high, the average per event cost is approximately $54,600.

PREVIOUS AND ONGOING MITIGATION EFFORTS

Lucas County Emergency Management Agency and the Lucas County Sheriff's Office have a public notification alert system that alerts residents during events for winds in excess of 75 miles per hour.

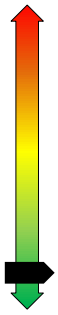
RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	2	Low	There have been 298 wind events between 1956 and 2018. However, only 5 of them were severe.
Response	2	1 day	Most wind events will have a response time of less than one day.
Onset	2	12-24 hours	Wind events can be forecasted
Magnitude	2	Limited (10-25% of land area affected)	Wind events will occur all over the county but may only cause damage in select areas.
Business	1	Less than 24 hours	Unless there is damage to the building, businesses would typically remain open during wind events.
Human	1	Minimum (minor injuries)	Due to the predictability of these events, it is possible for people to prepare in advance and stay out of harm's way.
Property	1	Less than 10% of property affected.	Damage from wind typically will include damage to windows and roofs of buildings.
Total	**11**	**Low**	The wind risk to Lucas County, based on the points received, is low.

2.4.16 Earthquake

HAZARD OVERVIEW



An earthquake is the moving or shaking of the Earth's tectonic plates due to built-up pressure.			
Period of Occurrence:	At any time	**State Risk Ranking:**	Frequency: Possible Impact: Limited Ranking: 2 – Low
Type of Hazard:	Natural and human-caused	**Disaster Declarations:**	None

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, most were felt in the local region surrounding the epicenter, and 14 of these have caused "minor to moderate" damage in Ohio.

Earthquakes move or shake the earth in three different directions depending on the plate movements: convergent, divergent, and transform generating primary and secondary waves. There are three common ways to measure an earthquake:

- **Richter Scale**: Developed in 1935, the Richter scale measures the scale and severity of an earthquake, the magnitude of an earthquake can range between 0 and 10. The effects of an earthquake can extend far beyond the site of its occurrence.
- **Modified Mercalli Scale**: The modified Mercalli scale measures earthquakes based on their intensity on the surface. This scale uses roman numerals I through XII to denote detection and damage levels associated with an earthquake.
- **Peak Ground Acceleration (PGA):** PGA is "the maximum ground acceleration that occurred during earthquake shaking at a location. PGA is equal to the amplitude of the largest absolute acceleration recorded on an accelerogram at a site during a particular earthquake" (Douglas, 2003).

The table to the right shows the relation between the Richter scale (magnitude) and Modified Mercalli Scale.

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

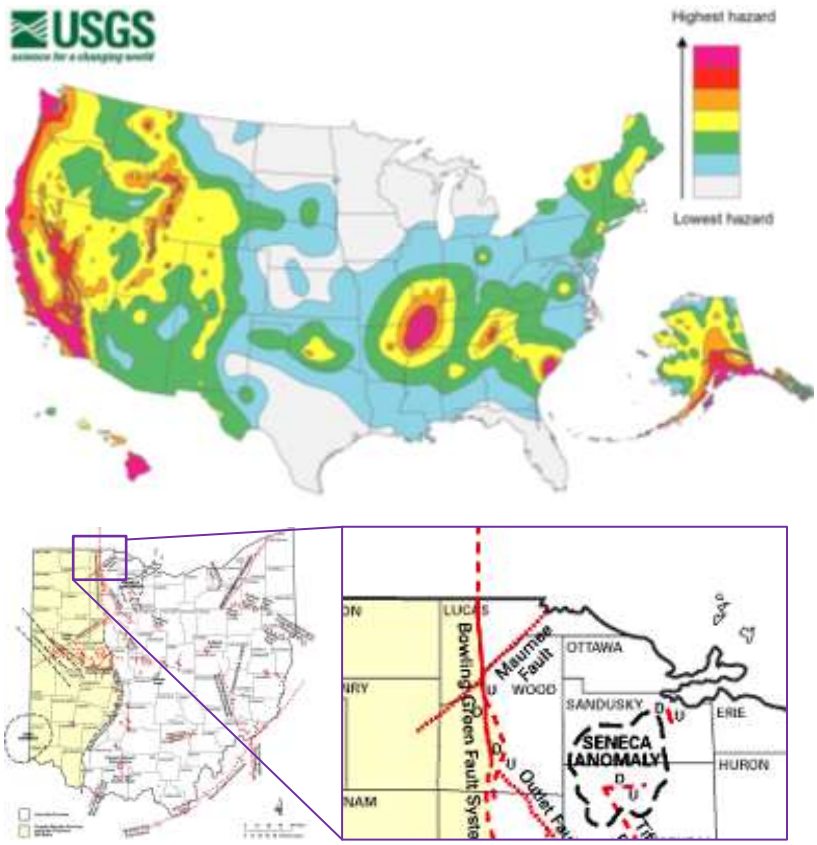
POSSIBLE CAUSES

The Earth is made up of tectonic plates; the boundary lines where these tectonic plates meet are called faults. Friction along the boundaries or faults causes the rocks to stress and strain. “When the stress of the rocks exceed their strength, that is, their ability to withstand the force, the rock rupture and are permanently displaced along the fault plane” (Keller & Devecchio, 2015) causing earthquakes that reach and affect the infrastructure on the surface.

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

The U.S. has areas that are prone to earthquakes; the coasts of California, Oregon and Washington are more vulnerable to seismic activity due to the presence of the Ballenas, Brothers, and the San Andreas Faults on the west coast. Also of note is the New Madrid Seismic Zone located in Arkansas, Missouri, and Tennessee. On the east coast, there is the Eastern Tennessee Seismic Zone that stretches from Alabama to Virginia.



The USGS (2014) has a map of the US that identifies the highest and lowest hazard zones for earthquakes. In it, it shows the majority of the State of Ohio mostly as low risk; this includes Lucas County. The southernmost, west, and northeastern most parts of the state have only a slightly higher risk of earthquake hazards. Lucas County is considered a low risk area for natural earthquakes. However, Ohio has several minor fault lines as shown in the illustration above. The closest to Lucas County are the Bowling Green Fault System and the Maumee Fault Line. The Bowling Green Fault, a geological feature unique to the Great Lakes region, passes through Farnsworth Metropark. The 100-mile-long fault, which runs from south of Findlay into southern Michigan, is exposed at the Maumee River in the bedrock and in the river rapids when the water is low. A fault, sometimes associated with earthquakes, is a fracture in a rock formation where movement has occurred (The Historical Marker Database, 2016).

IMPACTS AND VULNERABILITY

The severity of an earthquake is 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 risk of fire immediately following an earthquake is often high because of broken electrical lines and gas mains. In recent years, officials in most of the world's major cities have installed devices that shut

these services down automatically if an earthquake strikes. Other hazards that may result from an earthquake are utility and communications failures.

The impacts to a community from earthquake events include injuries to citizens and public safety officials, damage to property, lost revenue and economic damages, increased demand on public safety and infrastructure related services. Ground shaking from earthquakes can collapse buildings and bridges, disrupt gas, electric, and phone service, and sometimes trigger landslides, flash floods, fires, and tsunamis.

HISTORICAL OCCURRENCES

According to ODNR, there have been five earthquakes in Lucas County since 1926; the table below lists these in order of magnitude. The USGS has recorded four earthquakes events originating in Lake Erie (three) and Sandusky County (one) since 2007; the search conducted requested data from 1995 to 2018, the earliest was in 2007. They ranged in magnitude from 2.5 to 2.8.

ODNR REGISTERED EARTHQUAKES

Date	*Magnitude*	*MMI*	*Township*
6/12/1953	3.5	IV	Washington
10/28/1926	3.4	III	Washington
10/28/1926	3.1	IV	Washington
1/18/1948	2.9	III	Washington
10/10/1993	2	III	Washington

Source: ODNR

LOSS AND DAMAGES

All USGS and OhioSeis descriptions of earthquakes indicate that there have been no major losses or damages to structures or people, only minor damage such as cracked plaster or glass.The effects of a potential earthquake striking Lucas County were analyzed using the HAZUS-MH program from the Federal Emergency Management Agency. The scenario depicts a 5.0 earthquake (the lowest possible magnitude to use in the program) located at the county seat. The following tables describe the expected building damages by occupancy type and the building-related economic loss estimates.

LUCAS COUNTY EXPECTED BUILDING DAMAGE BY OCCUPANCY (HAZUS)

	None		*Slight*		*Moderate*		*Extensive*		*Complete*	
	Count	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*
Agriculture	214	0.25	81	0.17	98	0.30	53	0.50	14	0.48
Commercial	3,243	3.82	2,129	4.38	2,641	7.96	1,438	12.67	400	13.54
Education	111	0.13	67	0.14	84	0.25	39	0.36	12	0.41
Government	94	0.11	57	0.12	78	0.23	35	0.33	11	0.38
Industrial	991	1.17	574	1.18	804	2.42	470	4.42	136	4.60
Other Residential	12,547	14.78	7,456	15.33	5,746	17.31	2,103	19.78	533	18.05
Religion	317	0.37	184	0.38	185	0.56	94	0.88	29	0.97
Single Family	67,401	79.37	38,091	78.32	23,548	70.96	6,492	61.06	1,819	61.58
TOTAL	**84,917**		**48,637**		**33,184**		**10,184**		**2,953**	

LUCAS 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	8.52	235.15	18.74	10.58	**272.99**
	Capital Related	0.00	3.61	186.32	11.54	2.65	**204.12**
	Rental	46.35	51.89	101.90	6.60	6.21	**212.95**
	Relocation	171.44	39.18	180.40	25.68	42.83	**459.53**
	Subtotal	217.79	103.20	703.77	62.57	62.27	**1,149.60**
Capital Stock Losses	Structural	273.55	78.14	230.67	82.02	40.80	**705.19**
	Non-Structural	950.04	431.33	615.10	247.59	119.54	**2,363.60**
	Content	351.95	129.86	339.57	176.45	65.21	**1,063.03**
	Inventory	0.00	0.00	9.79	43.88	0.46	**54.12**
	Subtotal	1,757.54	639.32	1,195.13	549.94	226.01	**4,185.94**
TOTAL		**1,793.33**	**742.52**	**1,898.90**	**612.50**	**288.29**	**5,335.54**

PREVIOUS AND ONGOING MITIGATION EFFORTS

Some mitigation projects from the previous plan relating to earthquakes have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of earthquakes.

- Work with engineers and architects to survey existing buildings and infrastructure and develop recommendations for seismic resiliency.
- Provide Emergency Preparedness information and resources relative to earthquake events to the public through an active education and outreach program.
- Develop emergency plans for evacuation of communities in the event that an earthquake occurs that are up to date and are utilizing the latest information available.

RISK ASSESSMENT

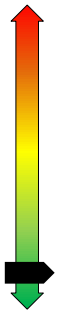
The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	1	None	In Lucas County there have been five earthquakes since 1926. Outside of Lucas County (felt in the county) there have been 4 since 2007. That is a total of 9 in 92 years.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Response	1	Less than half a day	Earthquake events are few and far between and the magnitude registered causes little to no damage,
Onset	4	Less than 6 hours	Earthquakes are difficult to predict and there is little to no warning prior to an occurrence.
Magnitude	1	Localized (less than 10% of land area affected)	Even though earthquakes impact the whole county, historical events have had minimal impact.
Business	1	Less than 24 hours	Because impacts and damages would be minimal, businesses would not need to close; it is possible that the majority of the residents would not feel an earthquake
Human	1	Minimum (minor injury)	Earthquakes of the historic magnitude in Lucas County would cause no injuries.
Property	1	Less than 10% of property affected	Earthquakes of the historic magnitude in Lucas County have caused no property damage.
Total	**10**	**Lowest**	The earthquake risk to Lucas County, based on the points received, is the lowest.

2.4.17 Landslide

HAZARD OVERVIEW



A downward movement of a slope and materials under the force of gravity.			
Period of Occurrence:	At any time, could be after periods of prolonged precipitation or drought that causes erosion	**State Risk Ranking:**	Frequency: Highly likely Impact: Limited Ranking: 4 - High
Type of Hazard:	Natural	**Disaster Declarations:**	None

Landslides cause damage and loss of life through several processes including pushing, crushing or burying objects in their path and the damming of rivers and waterways (Haddow, Bullock, & Coppola, 2014, pg.46). This section will profile the following: landslides, mudflows, and rockfalls.

- **Landslides:** Landslides occur when areas of relatively dry rock, soil or debris move uncontrollably down a slope. Landsides may be localized or massive in size and can move at high rates of speed.
- **Mudflows:** Mudflows are water saturated rivers of earth, rock, and debris. Mudflows develop when water rapidly accumulates in the material, such as during heavy rainfall or rapid snowmelt. Mudflows can develop and move quickly, giving little to no warning.
- **Rockfalls:** Rockfalls occur when rocks or other materials detach from a slope or cliff and descend in a freefall, rolling or bouncing manner. Rockfalls can occur naturally, through faults and seismic activity, or as a product of human activity, such as blasting.

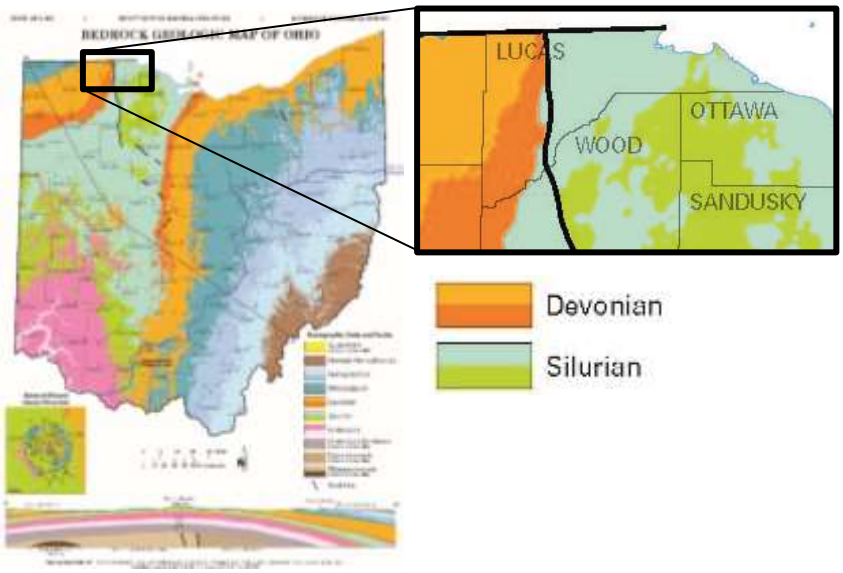
POSSIBLE CAUSES

Land movements can be secondary effects of heavy rainfall and earthquakes (WHO). Some of the causes attributed to land movements can include:

- intense deforestation and soil erosion,
- construction of human settlement in landslide-prone areas,
- roads or communications lines in mountain areas,
- building with weak foundations,

- buried pipelines,
- mining, and
- lack of understanding of landslide hazards, and lack of warning systems.

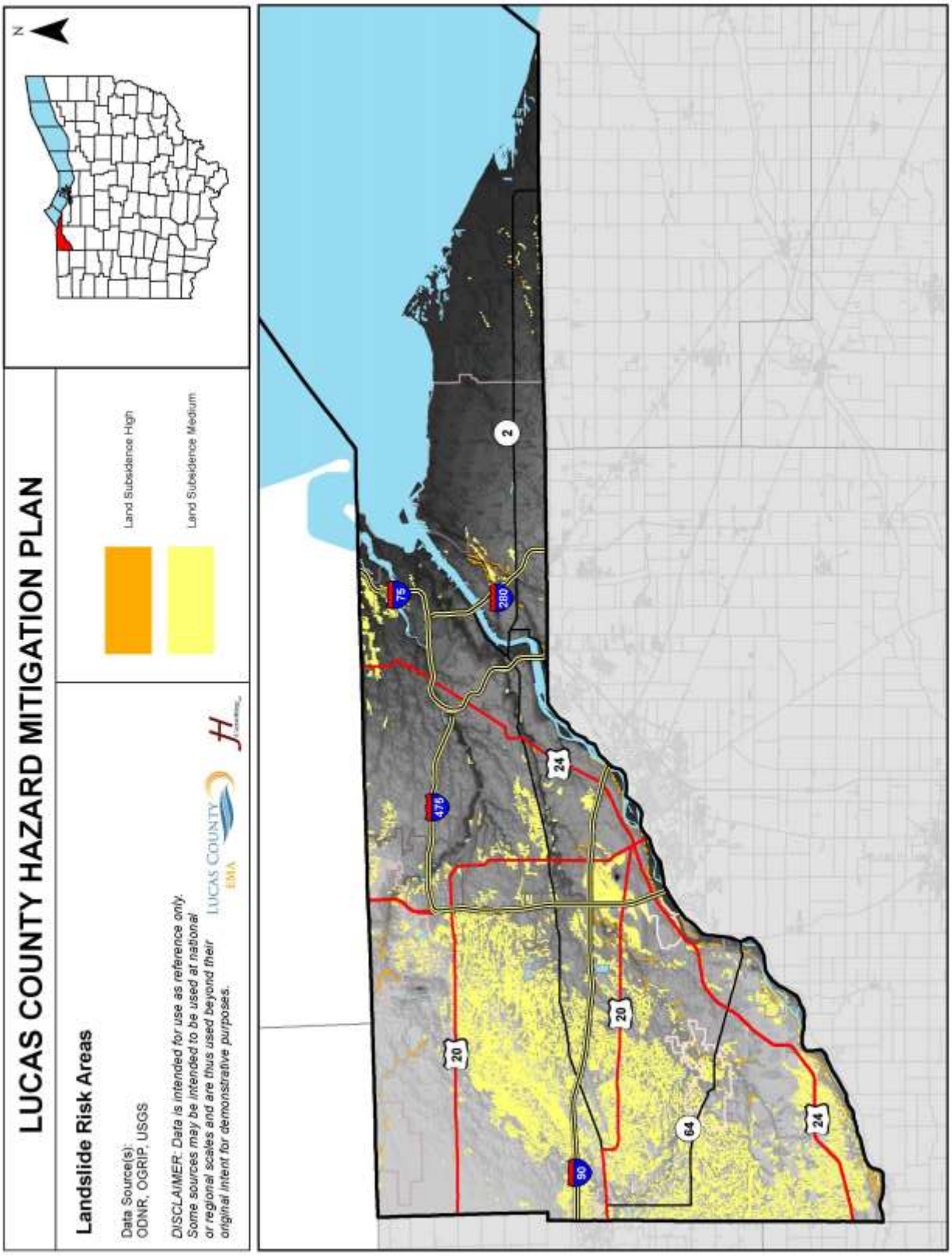
LOCATION AND EXTENT



Lucas County has two different types of bedrock, Devonian and Silurian. The Devonian is mainly in the western part of the county and is characterized by having mainly shale and siltstone with some sandstone and limestone and dolomite; the Silurian is in the central and eastern part of the county and has dolomite, anhydrite, gypsum, salt, and shale with some limestone. There was a period of widespread erosion between the Devonian (about 359 to 407 million years ago) and the Silurian (about 416 to 435 million years ago).

Maps such as the one in the *State of Ohio Enhanced Hazard Mitigation Plan* show Lucas County as having a high landslide incidence near Maumee and Whitehouse. However, it appears that the risk is not as high or wide-spread as the map in the state plan indicates; the USGS maps the soil types and marks them as eroded or severely eroded. These areas are minimal and are located mainly around Maumee, the northern county border and the Maumee River along the southern part of the county. The location of occurrence of landslides in Lucas County would be mainly in areas of slopes, typically along roadsides and the river. The extent of damages would be localized to a small area where the landslide occurs.

Because there is little historical data on landslides, the way to plan for the avoidance of these is to identify the areas that could potentially be vulnerable to landslides. These vulnerable locations include areas near rivers with steeper slopes, and in the area where the type of soil is unstable. Comparing the map above to the map on the next page, the medium risk of land subsidence corresponds mainly to where there is Devonian geology.


LUCAS COUNTY HAZARD MITIGATION PLAN
Landslide Risk Areas
Data Source(s):
ODNR, OGRIP, USGS
DISCLAIMER: Data is intended 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.
LUCAS COUNTY EMA
Land Subsidence High
Land Subsidence Medium
N
75
280
2
475
24
20
20
64
24
90

HISTORICAL OCCURRENCES

There are only two known occurrences of landslides in Lucas County due to its terrain being mostly flat. The first occurred in Toledo in January of 2007. The second also occurred in Toledo in January of 2017; the slide closed the two lanes of US Route 20 (Rimel, 2017).

IMPACTS AND VULNERABILITY

Direct impact of landslides includes trauma and suffocation by entrapment. Landslides usually have high mortality and few injuries. Short and long-term mental health effects are also not uncommon (WHO, 2017). Landslide morbidity is associated with untreated wounds, traumatic injuries, and disruption of water, sanitation shelter, and food supply. Those with chronic medical conditions are also of concern as loss of healthcare infrastructure, in the path of the slide, means patients will go untreated (Luber & Lemery, 2015). Although there have not been any instances of large, catastrophic landslides in Lucas County, the potential for damage is present. Landslides can cause death, injuries, trauma, and suffocation from entrapment. Short and long-term mental health have been observed. Depending on the location, these events could cause loss or damage to homes, infrastructure, and critical facilities and block whole communities off. There is a potential for loss of property value, livestock and crops (WHO).

The following table lists the assets that are at a medium and high risk of landslides, based on the GIS and asset location cross-reference. These are in reference to the previous map with the different types of soils.

ASSETS VULNERABLE TO LANDSLIDES

Asset	*City/Village*	*Type*	*Risk*
Addison Heights	Maumee	Nursing Home	Medium
Alexis Gardens	Toledo	Assisted Living	Medium
Anatrace Products, LLC	Maumee	TRI	Medium
Ann Grady Center	Holland	Developmental Disabilities	Medium
Arbors at Sylvania	Toledo	Assisted Living	Medium
Arbors at Waterville	Waterville	Misc Healthcare	High
Arrowhead Surgical Center	Maumee	Surgery	Medium
Bittersweet Farms	Whitehouse	Developmental Disabilities	Medium
Board of Mental Retardation	Maumee	Government Building	Medium
Browning Masonic Community	Waterville	Acute Care	Medium
Collins Park WTP Sludge Lagoons B & C	Oregon	Dam	High
Comfort Line	Toledo	TRI	Medium
Community Development Center of Lucas County	Holland	Community Center	Medium
Country Brook Assisted Living	Toledo	Nursing Home	Medium
Creative Products, Inc.	Holland	TRI	Medium
Crestview Club Apartments	Sylvania	Nursing Home	High

ASSETS VULNERABLE TO LANDSLIDES			
Asset	*City/Village*	*Type*	*Risk*
Crissey Elementary School	Holland	School	Medium
Dana Corp. Spicer Driveshaft Division	Toledo	TRI	Medium
DaVita Flower Hospital Dialysis	Sylvania	Dialysis	High
Delores Place Assist. Living 3	Toledo	Nursing Home	Medium
Dynea USA, Inc.	Toledo	TRI	Medium
East Toledo Family Center	Toledo	Community Center	High
East Toledo Family Center: Senior Center	Toledo	Community Center	High
Eber Community Residence	Holland	Developmental Disabilities	Medium
Endoscopy Center	Toledo	Surgery	Medium
Fallen Timbers Battlefield	Maumee	Historic	High
Flower Hospital	Sylvania	Acute Care	High
Focus Health Care of Ohio	Maumee	Acute Care	Medium
Forsythe--Puhl House	Maumee	Historic	High
Fort Miamis Site	Maumee	Historic	High
Foundation Park Care Center	Toledo	Assisted Living	Medium
Fresh Products, LLC	Toledo	TRI	Medium
Genesis Health Care	Sylvania	Nursing Home	Medium
Government Office	Maumee	Government Building	Medium
Greenfield Health Systems	Toledo	Dialysis	Medium
HA International, LLC	Toledo	TRI	Medium
Hazel's Group Home	Toledo	Nursing Home	Medium
Heartland of Waterville	Waterville	Assisted Living	Medium
Heartland of Waterville Nursing Home	Waterville	Nursing Home	Medium
Henderson House	Toledo	Assisted Living	Medium
Holland Library	Holland	Library	Medium
Holloway Elementary School	Holland	School	Medium
Horizon Science Academy	Toledo	School	Medium
Hospice of Northwest Ohio	Toledo	Nursing Home	High
HQ 983rd Engineer Battalion	Springfield Township	Government Building	Medium
Inverness Club	Toledo	Historic	Medium
Issac Hull Store	Maumee	Historic	High
John Isham Farmstead	Waterville	Historic	High
Josina Lott Residential	Toledo	Developmental Disabilities	Medium
Kern-Liebers USA, Inc.	Holland	TRI	Medium
Kingston Care Center Sylvania	Sylvania	Nursing Home	Medium
Kingston Residence of Sylvania	Sylvania	Acute Care	Medium
Lial Catholic School	Whitehouse	School	Medium
Linde Gas, LLC – Maumee	Maumee	TRI	Medium
Lucas County EMS Life Squad 10	Holland	Public Safety	Medium
Luther Grove	Toledo	Nursing Home	High
Luther Ridge Apartments	Oregon	Nursing Home	High
Lutheran Home Assisted Living	Toledo	Nursing Home	High
Lutheran Home at Toledo	Toledo	Assisted Living	High
Lutheran Housing Services	Toledo	Nursing Home	Medium
MAGNA T.E.A.M. SYSTEMS	Toledo	TRI	Medium
Marksch Group Home	Holland	Nursing Home	Medium
Maumee Fire Division Station 2	Maumee	Public Safety	Medium
Maumee Sidecut	Maumee	Historic	High
Medical College of Ohio	Toledo	Dialysis	Medium
Medical College of Ohio Hospital	Toledo	Acute Care	Medium

ASSETS VULNERABLE TO LANDSLIDES			
Asset	*City/Village*	*Type*	*Risk*
Michael Mes Manor	Toledo	Nursing Home	Medium
Monclova Community Center	Monclova	Community Center	High
Monclova Maintenance Building	Monclova Township	Government Building	Medium
Oakleaf Village	Toledo	Assisted Living	Medium
Ohio Air National Guard 180th Fighter Wing HQ	Swanton	Public Safety	Medium
Optivue	Maumee	Surgery	Medium
Parkcliffe Advanced Care	Toledo	Acute Care	Medium
Parkcliffe Alzheimer's	Toledo	Nursing Home	Medium
Parkcliffe Community	Toledo	Assisted Living	Medium
ProMedica Goerlich Center	Sylvania	Nursing Home	High
ProMedica Urgent Care	Toledo	Urgent Care	Medium
RCG Arrowhead Dialysis Center	Maumee	Dialysis	Medium
Regency Health Care	Sylvania	Acute Care	Medium
Rexam Beverage Can Company	Whitehouse	TRI	Medium
Reynolds Elementary School	Toledo	School	Medium
Ridgewood Manor	Maumee	Assisted Living	Medium
Rosary Care Center	Sylvania	Acute Care	High
Spartan Chemical Co, Inc.	Maumee	TRI	Medium
Specialty Gases of America, Inc.	Toledo	TRI	Medium
Spencer Township Administration	Spencer Township	Government Building	Medium
Spencer Township Fire and Rescue	Holland	Public Safety	Medium
Spring Meadows Community	Holland	Nursing Home	Medium
Springfield Township Fire Department Station 2	Holland	Public Safety	Medium
Springfield Township Fire Department Station 3	Maumee	Public Safety	Medium
St. George Urgent Care	Maumee	Urgent Care	Medium
Sun Chemical GPI	Maumee	TRI	Medium
Sunbridge Healthcare	Sylvania	Assisted Living	Medium
Sunshine Inc of Northwest Ohio	Maumee	Nursing Home	Medium
Sunshine/Kit Family Care Home	Maumee	Developmental Disabilities	Medium
Swan Cove Retirement Apartments	Toledo	Misc Healthcare	Medium
Swan Creek Retirement Village	Toledo	Assisted Living	Medium
Swan Pointe Care Center	Maumee	Assisted Living	Medium
Swanton Upground Reservoir	Swanton	Dam	Medium
Sylvania Community Services Center	Sylvania	Community Center	High
Sylvania Senior Center	Sylvania	Community Center	Medium
Sylvania Township Police Department	Sylvania	Public Safety	Medium
Toledo Air Guard Fire Department	Swanton	Public Safety	Medium
Toledo Aviation Center	Swanton	School	Medium
Toledo Lucas County Port Authority Fire Department	Swanton	Public Safety	Medium
U.S. Air Force Toledo	Swanton	TRI	Medium
U.S. Renal Care - Sylvania	Sylvania	Dialysis	Medium
United States Air Force Recruitment Post	Toledo	Government Building	Medium
Waterville Commercial District	Waterville	Historic	High
Waterville Fire Department	Waterville	Public Safety	Medium
Waterville Police Department	Waterville	Public Safety	High
West Side Montessori	Toledo	School	Medium
Whitehouse Village Administration Offices	Whitehouse	Government Building	Medium
Whitehouse Country Manor	Whitehouse	Assisted Living	Medium
Wildwood Environmental Academy	Maumee	School	Medium
YMCA University of Toledo- Morse Fitness Center	Toledo	Community Center	Medium

LOSS AND DAMAGES

Losses and damages from landslides in Lucas County would likely include the costs or clearing the landslide (personnel and equipment), rerouting traffic from blocked roads, and stabilization of the slope after it is cleared. In the U.S., the annual estimate of losses that landslides cause is about $2 to $4 billion; this estimate includes instances of large landslides in the west coast, where occurrences are more severe. There is no data on the cost of landslides from the local governments of Lucas County. The *State of Ohio Enhanced Hazard Mitigation Plan* (2014) indicates that costs of landslides in Lucas County have cost approximately $850,000 to $1.8 million.

PREVIOUS AND ONGOING MITIGATION EFFORTS

In the Village of Ottawa Hills, officials have reduced erosion by planting trees and vegetation in at-risk river bank areas. They monitor areas that have already had plantings done and they look at the storm sewer outfalls to ensure erosion of the river bank is not occurring near them. The village has also lined areas of the river bank with ricks where there are sharp curves.

Some mitigation projects from the previous plan relating to landslides have been removed from the active list; this is because they have been completed or have become part of the daily activities of county, city, or village departments. The following lists the projects that Lucas County has worked on in the past five years to mitigate the negative effects of landslides.

- Erect a series of warning signs along roadways were slips and slides are a possibility.
- Coordinate with Agencies involved in roadway construction to require that new lakeside/riverfront roadways be designed to hold soil in place.

RISK ASSESSMENT

The following table gives one to five or one to four points (see Section 2.2 Risk and Vulnerability for description and ranking of categories) for each category, based on research presented in this hazard profile. At the end, it adds the total points for all the categories, which informs the overall hazard ranking for the county. The highest amount of points the hazard can reach is 30 points and the lowest is 7.

RISK CALCULATION			
Category	*Points*	*Description*	*Determination Method*
Frequency	1	None	There have only been two minor reported events in Lucas County since 2007.
Response	2	1 day	Minor slips like ones seen in Lucas County can be cleaned up in about a day.
Onset	3	6-12 hours	At times, it is possible to predict a slide if the weather has been or will be especially wet for a long period of time.
Magnitude	1	Localized (less than 10% of land area affected)	In Lucas County, slips are localized to risk areas and affect a small portion of the land when it does occur.
Business	1	Less than 24 hours	Typically, businesses will not be affected by landslides, unless they are in the direct path of the occurrence.
Human	1	Minimum (minor injuries)	There have been no reported injuries due to landslides in Lucas County.
Property	1	Less than 10% of property affected.	In general, there are no buildings on the slopes where slips can occur, leaving the damage to buildings to a minimum; the damaged elements would be the slope itself and what is below.
Total	**10**	**Lowest**	The landslide risk to Lucas County, based on the points received, is lowest.

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.
§ 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 mitigation plan, it outlines the action items or projects for each jurisdiction within Lucas County that is included in this plan, and each project identifies the agency responsible for completing the project as well as a general timeline for completion.

3.1 MITIGATION GOALS

§ 201.6(c)(3)(i)	A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

"Mitigation goals are general guidelines that explain what the community wants to achieve with the plan. They are usually broad policy-type statements that are long-term, and they represent visions for reducing or avoiding losses from the identified hazards" (FEMA, 2013).

Goals represent what the community seeks to achieve through mitigation plan implementation; they provide broad policy-type statements that are long-term; they represent the visions of reducing or avoiding losses from the identified hazards; goals are clear and agreed upon. The committee reviewed the goals from the 2013 plan and noticed that there were one or more goals for each hazard, making a total of 29 goals for the plan. Upon inspecting each goal, the committee determined that the goals were repetitive and did not address broader issues. The consultant asked some leading questions such as why mitigation is important, and what the priorities should be. After some discussion, the committee came up with a list of five themes that would be the goals for the updated plan.

- Reduce loss
- Health and safety
- Warning, information, outreach, and education
- Identification of risk areas
- Protect citizenry

The committee then formulated their keywords into a more concrete idea to create goals. The committee decided upon three main goals toward which all mitigation projects would work.

1. Reduce loss of life, property, and damage to the environment in identified hazard risk areas.
2. Ensure the health and safety of the citizens, officials, responders, and transient population from hazards that affect the area.
3. Educate the public before incidents or events and improve capabilities for hazard notification and warning during emergencies.

3.2 MITIGATION ACTIONS

§ 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.

"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 mission and goals. 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).

There are four primary types of mitigation actions: local plans and regulations; structure and infrastructure projects; natural systems protection; and education and awareness programs. Projects that fall under these types of actions aim to reduce or even eliminate long-term risk from identified hazards; they lessen the need for preparedness, response, or recovery activities in the future. However, there are other projects that will inevitably fall under preparedness activities because mitigation activities are difficult, or impractical.

For this plan every city and village has at least two mitigation actions they will be responsible for implementing. The townships will fall under the county's jurisdiction and are therefore classified under Lucas County; when projects are specific to a township, they will be identified as the primary agency responsible for the action or project.

3.2.1 Project Prioritization

During the various meetings the planning committee held, they spoke about different priorities they had regarding resilience and reducing harm from hazards. The committee created a list of 10 criteria that they scored from highest priority to least, according to what they thought was most important to consider when implementing a mitigation project. The following table shows the resultant priority based on the score the committee members gave each criterion.

The highest priority criterion receives a score of 10 points, the lowest receives one point. Each mitigation project is rated against the list of 10 criteria and the highest number of points any one project can receive is 55; that is, if the project meets all the criteria and

receives points for each criterion. If the project addresses the specific criterion, it receives the points attributed to that criterion (e.g. 5 points); if the project does not address the specific criterion, it does not receive any points (i.e. 0 points). At the end, all the criteria points are added and result in a total number or score for the project; this will inform the overall priority of the project within all the other projects for the jurisdiction.

The following table shows the results of the project prioritization that committee members completed. Under the names, criterion is ranked from 1 to 10, 1 being the highest priority. To calculate the priority, the highest would be the criterion with the least amount of average points.

PROJECT PROPROTIZATION DESCRIPTION AND RESULTS													
Criteria and Description	*Doug Fee*	*Dan Baker*	*Joey Sink-Oiler*	*Shelley Hoelzer-Spahn*	*Holly Ball*	*John Wenzlick*	*Joe Fausnaugh*	*Kevin Bernhard*	*Patrick Wambo*	*Lucas County EMA*	Sum	Average	Priority
Vulnerable Populations	The project attempts to lower risk for vulnerable populations (ageing population, children, disabled, etc.)												
	1	3	2	7	2	3	3	7	1	6	35	3.5	2
High Severity Hazard	The project addresses a high severity hazard												
	5	4	4	4	5	2	4	4	2	3	37	3.7	3
Ongoing Project	The project is already in progress either from the previous hazard mitigation plan or from another plan												
	10	7	6	6	7	10	2	1	7	4	60	6	6
More Than One Hazard	The project attempts to address more than one hazard												
	6	10	7	2	6	7	5	6	4	2	55	5.5	5
Cost Effective	The benefit of the project outweighs the cost												
	2	6	3	1	4	5	6	2	10	5	44	4.4	4
High Probability Hazard	The project addresses a high probability hazard												
	4	8	1	3	1	1	1	5	3	1	28	2.8	1
Ease of Implementation	The implementation of the project does not anticipate many challenges or is already well-supported												
	7	5	9	5	9	9	7	3	8	7	69	6.9	7
Positive Environmental Impacts	The project does not affect the environment in a negative way												
	9	9	5	10	3	8	8	8	6	9	75	7.5	10
In-County/Jurisdiction Capability	The county or jurisdiction has sufficient funds to implement the project on its own without having to apply for grants, sufficient equipment and technical knowledge, and sufficient personnel to implement the project												
	3	2	8	8	8	6	9	10	9	10	73	7.3	8
Encourages Partnerships	The project brings two or more partners together to implement the project beyond regular operations												
	8	1	10	9	10	4	10	9	5	8	74	7.4	9

Below is a table that outlines the criteria from highest to lowest priority. For the project prioritization itself, the projects will be ranked against this list. If the project addresses the criterion, it will receive the corresponding points; if the project does not address the criterion established, it will not receive the points. See below for an example.

CRITERIA IN ORDER OF PRIORITY WITH EXAMPLE				
Criteria	*Priority*	*Points*	*Example Project*	*Points Received*
High probability hazard	1	10	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during a severe storm event, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	10
Vulnerable populations	2	9		0
High severity hazard	3	8		8
Cost effective	4	7		7
More than one hazard	5	6		6
Ongoing project	6	5		5
Ease of implementation	7	4		4
In-county/jurisdiction capability	8	3		3
Encourages partnerships	9	2		2
Positive environmental impacts	10	1		1
Total Points	N/A	55	N/A	46

Previously, the projects or action/mitigation items were prioritized by hazard group; for example, if flood had three projects, those three projects would be ranked against each other. Now, because all jurisdictions are included, and many projects can address several hazards at once, they are prioritized by jurisdiction; for example, if one jurisdiction, Lucas County, has 15 projects listed, they will be ranked against each other, and exclude other jurisdictions' projects. The project prioritization can be found in Appendix 4 Project Prioritization.

If projects receive the same points from the criteria, they are considered tied and therefore given the same priority. For example, if two projects tie with 50 points, they may be in first place, or priority one; both projects are given priority number one, and the next project would be priority three to account for the second project tied for first place.

3.2.2 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. The plan should identify current development patterns and trends as well as areas where future development should and should not occur. The plan should include policies and ordinances that steer development away from hazard-prone areas, such as floodplains, to avoid putting people and property at risk. In some cases, local plans 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. Emergency managers, planners and others in a community should coordinate in preparing plans to ensure consistency across plans; that is, consistent goals, policies, and strategies. Local ordinances and review processes influence the way land and buildings are developed and built. Examples include:
  - Comprehensive plans
  - Land use ordinances
  - Subdivision regulations
  - Development review
  - Building codes and enforcement
  - NFIP Community Rating System
  - Capital improvement programs
  - Open space preservation
  - Stormwater management regulations and master plans
  - Plans, ordinances, policies and regulations should be mutually reinforcing. All should leave to the development of a more sustainable, resilient community.

- **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. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program. Examples include:
  - 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 and also preserve or restore the functions of natural systems. Examples include:
  - 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 regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions. Examples include:
  - 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 Actions**: Mitigation actions reduce or eliminate long-term risk and 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. Examples include:

- Creating mutual aid agreements with neighboring communities to meet emergency response needs.
- Purchasing radio communications equipment for the Fire Department.
- Developing procedures for notifying citizens of available shelter locations during and following an event.

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 take the place of or meet the federal mitigation planning 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.

LUCAS COUNTY HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
LC-01	Review existing warning siren coverage and recommend new locations if and where there are coverage gaps. Utilize grant funding wherever possible to purchase new warning sirens.	6	Tornado	Ongoing project from 2013 HMP	Structural projects	Local funds	Over $1,000,000	5 years	LCEMA	City and Village administrators
LC-02	Develop a program to identify those existing mobile homes and older buildings throughout Lucas County that have the most potential for anchoring against straight and tornado force winds.	6	Tornado	Ongoing project from 2013 HMP	Structural projects	Local funds	Over $100,000	3 years	LCEMA	Building regulators, local fire and law enforcement agencies, builders associations, manufacturers of mobile homes.
LC-03	Initiate damage assessment training for emergency response personnel to include building inspection personnel that encompasses structural, electrical, plumbing and heating expertise, which would be invaluable in storm damage assessment. Establish a triage-like procedure for initial evaluation of structural and mechanical damage to structures caused by severe storms.	2	All hazards	Ongoing project from 2013 HMP	Preparedness and response actions	OEMA	$25,000	2 to 3 years	LC EMA	City and Village administrators
LC-04	Establish a uniform damage reporting procedure for all jurisdictions to utilize in Lucas County with Lucas County Emergency Management Agency as the clearinghouse for damage assessment data following a severe storm event.	2	All hazards	Ongoing project from 2013 HMP	Preparedness and response actions	OEMA	$10,000	1 year	LC EMA	City and Village administrators
LC-05	Survey all floodplain areas currently recognized by FEMA adjacent to creeks and streams to ensure flash flood-prone areas are included.	10	Flash Floods	Ongoing project from 2013 HMP	Local plans and regulations	PDM	$100,000	1 year	LC Floodplain Manager, LC Engineer	Cities, villages, and townships
LC-06	Rebuild, replace and upgrade any and all storm drainage systems deemed inadequate to handle flash flooding events.	17	Flash Floods	Ongoing project from 2013 HMP	Structural projects	HMGP, ODNR	$1,000,000	3 to 5 years	LC EMA, LC Engineer	Cities, villages, and townships
LC-07	Investigate current roadways located in flash flood-prone areas to ensure compliance with current standards for design year floods.	5	Flash Floods	Ongoing project from 2013 HMP	Local plans and regulations	Local Funds, ODOT	$1,000,000	1 to 3 years	LC Engineer	ODNR
LC-08	Develop and pass roadway construction ordinances to ensure future roadway projects comply with current standards for design year floods.	15	Flash Floods	Ongoing project from 2013 HMP	Local plans and regulations	Local Funds	$10,000	2 to 4 years	LC EMA	Cities, villages, and townships
LC-09	Develop a countywide tree management program to reduce the probability of damage to existing above-ground utilities from severe winter storm events that includes provisions to encourage the planting of species that are less susceptible to damage and ensures that trees are planted sufficiently far from above-ground utility lines and buildings.	1	Severe Winter Storms, Severe thunderstorms	Ongoing project from 2013 HMP	Local plans and regulations	Local funds	Program development has minimal cost	Less than 1 year	LCEMA, Utility companies	City and village administrators, local utilities/public works
LC-10	Identify and protect high and moderate wildfire risk areas and critical facilities.	25	Wildfires	Ongoing project from 2013 HMP	Natural systems protection	Local funds	Unknown	1 year	LC Fire Chief's Association	Local fire departments, LC EMA
LC-11	Coordinate with all jurisdictions to develop a vulnerability assessment for wildfires, and implement a plan for completing them.	25	Wildfires	Ongoing project from 2013 HMP	Local plans and regulations	HMGP, PDM	$100,000	1 to 3 years	LC Fire Chief's Association	Local fire departments, LC EMA
LC-12	Enhance and expand training and awareness of the fire departments in wildfire hazard areas and provide specialized equipment for controlling and extinguishing wildfires.	29	Wildfires	Ongoing project from 2013 HMP	Education programs	USFA, local funds	$250,000	Less than 1 year	LC Fire Chief's Association	Local fire departments
LC-13	Establish water hauling programs for livestock during extreme drought.	28	Drought	Ongoing project from 2013 HMP	Natural systems protection	Local Funds	Unknown	1 year	LC Soil & Water	OSU Extension, cities, villages, townships
LC-14	Determine lake surge prone areas to create lake buffer zones.	23	Lake Surges	Ongoing project from 2013 HMP; supports 2018 RiskMap efforts in Toledo, Oregon, Jerusalem Twp., and Washington Twp.	Natural systems protection	ODNR, local funds	Unknown	3 to 5 years	LC EMA, ODNR	Toledo, Harbor View, Jerusalem Township, Washington Township administrators
LC-15	Install riparian buffers and conduct wetland restoration with Official Development Assistance (ODA) grant funds	11	Floods	New project for 2019	Structural projects	ODA	$350 per acre	1 to 3 years	LC Soil & Water	N/A

LUCAS COUNTY HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
LC-16	Promote practices that help keep MS4s clear such as mulching/mowing leaves into lawns to keep debris/trash off roads and prevent them from getting into storm drains	15	Floods	New project for 2019	Education programs	OEPA	Minimal	1 year	LC Soil & Water	N/A
LC-17	Implement rain barrels or rain gardens to retain water to reduce flooding on private and public lands	11	Floods	New project for 2019	Structural projects	Alternative Stormwater Infrastructure Loan Program	Up to $70 per barrel	3 years	LC Soil & Water	N/A
LC-18	Conduct public outreach for the management of pastures and manure on horse farms in Lucas County to protect landowners and downstream neighbors from human health risks during a flood.	4	Floods	New project for 2019	Education programs	Surface Water Improvement Fund, USDA	Minimal	2 years	LC Soil & Water	N/A
LC-19	Reduce the risk of harmful algal blooms by reducing nutrient loading through cover crops, filter strips, habitat restoration, and drainage water management that will also make local agricultural production more resilient during drought	24	Harmful algal bloom, drought	New project for 2019	Local plans and regulations	USDA, Lake Erie Fund, Ohio Lake Erie Conservation Reserve Enhancement Program	Minimal	3 years	LC Soil & Water	N/A
LC-20	Review and revise the county's floodplain regulations to include riparian setback for more than ditches in a floodplain	11	Floods	New project for 2019	Local plans and regulations	Surface Water Improvement Fund, Water Resource Restoration Sponsor Program	Minimal	2 years	LC Engineering	N/A
LC-21	Require subdivision and commercial regulations to include on-site retention stormwater basins	8	Floods	New project for 2019	Local plans and regulations	Local funds, OEPA	Minimal	1 year	LC Engineering	N/A
LC-22	Perform removal and thinning operations in the pine stands located at Oak Openings Metropark to prevent wildfires.	25	Wildfires	New project for 2019	Natural systems protection	ODNR	Minimal	2 years	LC Metroparks	N/A
LC-23	Build a tornado safe room at Whispering Winds Mobile Home Park and the County Campground LLC. Identify other locations in the county which could utilize residential and community safe rooms.	22	Tornado	Ongoing project from 2013 HMP	Structural projects	OEMA	Cost will vary based on size of shelter	5 years	LC EMA	LC Engineer, Providence Township trustees, Townships
LC-24	Ten Mile Creek improvement	17	Floods	Ongoing project from 2013 HMP	Structural projects	ODNR, local funds	$1,000,000	3 to 5 years	LC Engineer	LC Floodplain Manager, ODNR
LC-25	Prairie Creek Improvements (Bancroft to Ten Mile Creek)	17	Floods	Ongoing project from 2013 HMP	Structural projects	ODNR, local funds	$250,000	3 to 5 years	LC Engineer	LC Floodplain Manager, ODNR
LC-26	Swan Creek improvements	17	Floods	Ongoing project from 2013 HMP	Structural projects	ODNR, local funds	$500,000	3 to 5 years	LC Engineer	LC Floodplain Manager, ODNR
LC-27	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	14	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	LC Floodplain Manager	LC Engineer, Townships
LC-28	Provide training to appropriate jurisdictional officials on NFIP participation and responsibilities.	9	Floods	New project for 2019	Education programs	Local funds	Minimal	1 to 2 years	LC Floodplain Manager	Jurisdictional floodplain managers, city and village officials
LC-29	Obtain copies of emergency action plans for the four dams noted by the NID as well as other dam facilities in the county.	21	Dam/Levee Failure	New project for 2019	Local plans and regulations	Local funds	Minimal	3 years	LC EMA	N/A

MAUMEE HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
MM-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	2	Severe thunderstorms, severe winter storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	City Council	LCEMA, Townships
MM-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	1	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
MM-03	Accurately identify and map areas that have potential flood mitigation value.	3	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	City Council, Floodplain Manager, Assessor	LC Engineering, LC GIS
MM-04	Identify areas that have unique flooding and storm related issues.	4	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
MM-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	6	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
MM-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	8	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
MM-07	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	5	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
MM-08	Identify appropriate locations and build residential and community safe rooms.	7	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	City Council, City Engineer	LC EMA, LC Engineer

OREGON HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
OR-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	1	Severe thunderstorms, severe winter storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	City Council	LCEMA, Townships
OR-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	2	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
OR-03	Accurately identify and map areas that have potential flood mitigation value.	6	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	City Council, Floodplain Manager, Assessor	LC GIS
OR-04	Identify areas that have unique flooding and storm related issues.	4	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
OR-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	7	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
OR-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	9	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
OR-07	Flood relief and erosion control project	2	Floods, landslides	Ongoing project from 2013; supports 2018 RiskMap efforts	Structural projects	Local Funds, ODNR	Unknown	3 years	Oregon Engineer	LC Soil & Water
OR-08	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	5	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
OR-09	Identify appropriate locations and build residential and community safe rooms.	8	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	City Council, City Engineer	LC EMA, LC Engineer

SYLVANIA HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
SY-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	1	Severe thunderstorms, severe winter storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	City Council	LCEMA, Townships
SY-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	4	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
SY-03	Accurately identify and map areas that have potential flood mitigation value.	5	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	City Council, Floodplain Manager, Assessor	LC GIS
SY-04	Identify areas that have unique flooding and storm related issues.	2	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
SY-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	9	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
SY-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	8	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
SY-07	Purchase and install a backup generator for critical facilities at Maple Drive and Sylvania Avenue	3	All hazards	Ongoing project from 2013	Structural projects	Local Funds, OEMA	$25,000 per generator	1 year	City Administrator	LC EMA
SY-08	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	6	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
SY-09	Identify appropriate locations and build residential and community safe rooms.	7	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	City Council, City Engineer	LC EMA, LC Engineer

TOLEDO HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
TO-01	Develop building codes that address enforcement of lake surge resistance measures.	11	Lake Surges	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019; supports 2018 RiskMap efforts	Local plans and regulations	Local Funds	Minimal	3 to 5 years	City Building and Zoning	City council, LC Engineer, LC EMA
TO-02	Partner with other lake-side cities and villages to develop system of dikes to protect most vulnerable infrastructure within lake surge floodplain and where applicable, develop lake buffer zones.	12	Lake Surges	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Structural projects	FEMA, OEMA	Over $1,000,000	3 to 5 years	City Council, City Engineer	LC Engineer, LC EMA, ODNR
TO-03	Bancroft Outfall – Constructed 2017-2018. Project intended to increase capacity of the storm sewer system	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-04	Tifft Ditch Improvements LOMR – Effective Nov. 30, 2018. Project revised and updated the regulatory floodplain maps	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-05	Jamison Ditch Improvements phase I – Construction 2018 -2019. Project intended to increase capacity of the storm sewer system	2	Floods	New project for 2019	Structural projects	OEPA	$2,420,000	3 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-06	South Ave Storm Sewer Improvements – Construction 2019. Project intended to increase capacity of the storm sewer system	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-07	Jamison Ditch Improvements phase II – Construction 2019. Project intended to increase capacity of the storm sewer system	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-08	Silver Creek Ditch Improvements Phase III – Construction 2020. Project intended to increase capacity of the storm sewer system and provide two staged ditch. A two staged ditch allows for bank overflows to occur within the confines of the ditch. It can reduce bank scouring, results in a more sustainable ditch and restore some of the beneficial natural processes within the ditch.	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-09	Silver Creek Phase IV Design - Completing a stormwater drainage study for known problem areas	2	Floods	New project for 2019	Structural projects	OEPA	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-10	City requires that all site developments with 2,500 sf or more of earth disturbance require on site stormwater management practices for flood control and water quality. Site development projects are reviewed by Engineering Services for compliance	2	Floods	New project for 2019	Structural projects	Local funds	Over $1,000,000	3 to 5 years	Toledo Environmental Services	LC Engineering, LCEMA
TO-11	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	1	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
TO-12	Identify appropriate locations and build residential and community safe rooms.	10	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	City Council, City Engineer	LC EMA, LC Engineer

WATERVILLE HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
WA-01	Accurately identify and map areas that have potential flood mitigation value.	1	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	City Council, Floodplain Manager, Assessor	LC GIS
WA-02	Acquire and demolish an identified repetitive loss property. Consider other properties in the city to be acquired and demolished due to repetitive flooding.	3	Floods	New project for 2019	Structural projects	HMGP	$200,000	Less than 1 year	Village floodplain manager	LCEMA, OEMA, FEMA
WA-03	Purchase and install a standby generator for the municipal building	2	All hazards	New project for 2019	Structural projects	PDM	$35,000 for generator, plus installation	1 to 3 years	Village council	LCEMA
WA-04	Evaluate the best location for a new tornado siren as well as the need for additional sirens. The previous siren was struck by lightning and the city is expanding. Consider installing a separate lightning rod to avoid future damage.	4	Tornado	New project for 2019	Structural projects	Local funds, PDM, NWS Severe Weather Program	$25,000	1 to 2 years	City council, first responders	LC EMA
WA-05	Identify appropriate locations and build residential and community safe rooms.	5	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	City Council, City Engineer	LC EMA, LC Engineer

BERKEY HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
BK-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	1	Severe thunderstorms, severe winter storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	Village Council	LCEMA, Townships
BK-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	2	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
BK-03	Accurately identify and map areas that have potential flood mitigation value.	5	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Village Council, Floodplain Manager, Assessor	LC GIS
BK-04	Identify areas that have unique flooding and storm related issues.	3	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
BK-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	6	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
BK-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	8	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
BK-07	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	4	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
BK-08	Identify appropriate locations and build residential and community safe rooms.	7	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	Village Council, Village Engineer	LC EMA, LC Engineer

HOLLAND HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
HL-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	2	Severe Storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	Village Council	LCEMA, Townships
HL-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	1	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
HL-03	Accurately identify and map areas that have potential flood mitigation value.	3	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Village Council, Floodplain Manager, Assessor	LC GIS
HL-04	Identify areas that have unique flooding and storm related issues.	3	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
HL-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	6	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
HL-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	8	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
HL-07	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	5	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
HL-08	Identify appropriate locations and build residential and community safe rooms.	7	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	Village Council, Village Engineer	LC EMA, LC Engineer

OTTAWA HILLS HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
OH-01	Continue planting vegetation in at-risk areas to prevent erosion of the river bank.	4	Landslides	New project for 2019	Natural systems protection	Surface Water Improvement Fund, Water Resource Restoration Sponsor Program	$350 per acre	3 years	Village of Ottawa Hills Refuse, Recycling and Streets Department	ODNR
OH-02	Install a tornado warning siren in conjunction with Sylvania Township and the Toledo Area Metroparks	2	Tornadoes	New project for 2019	Structural projects	USDA Rural Development	$25,000	1 to 2 years	Village of Ottawa Hills Fire Department	Sylvania Township, Toledo Area Metroparks, LCEMA
OH-03	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	1	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
OH-04	Identify appropriate locations and build residential and community safe rooms.	2	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	Village Council, Village Engineer	LC EMA, LC Engineer

SWANTON HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
SW-01	Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during hazard events, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.	1	Severe Storms	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Education programs	ODNR	Over $25,000	3 to 5 years	Village Council	LCEMA, Townships
SW-02	Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	2	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	2 to 3 years	City Council	LC Planning and Engineering, LC Soil & Water,
SW-03	Accurately identify and map areas that have potential flood mitigation value.	5	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Village Council, Floodplain Manager, Assessor	LC GIS
SW-04	Identify areas that have unique flooding and storm related issues.	3	Floods	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local funds	$10,000	Less than 1 year	Floodplain Manager, Engineer,	LC EMA, LC Engineer, LC GIS
SW-05	Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.	6	Drought, wildfires	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	1 to 3 years	Local fire department	LCEMA, Townships
SW-06	Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems and develop sample ordinances of water conservation	8	Drought	Ongoing project from 2013 HMP, general project - assigned to jurisdiction in 2019	Local plans and regulations	Local Funds	Minimal	3 years	Public utility	LC Soil & Water
SW-07	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	4	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
SW-08	Identify appropriate locations and build residential and community safe rooms.	7	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	Village Council, Village Engineer	LC EMA, LC Engineer

WHITEHOUSE HAZARD MITIGATION PROJECTS										
Project ID	*Project / Action Item*	*Project Priority*	*Hazard(s) Addressed*	*Status*	*Mitigation Type*	*Potential Funding Source*	*Cost Estimate*	*Timeline for Completion*	*Coordinating Agency*	*Support Agency(ies)*
WH-01	Evaluate need for new warning siren for tornadoes in new neighborhoods in the village to ensure efficiency.	2	Tornado	New project for 2019	Structural projects	Local funds	Minimal	Less than 1 year	Village council, first responders	LC EMA
WH-02	Implement an active shooter plan and training for first responders and appropriate officials. Purchase appropriate personal protective equipment and train village employees on the plan.	3	Civil Disturbance	New project for 2019	Education programs, local plans and regulations	COPS (DOJ)	$1,000 for train the trainer class, cost of PPE will depend on quantity and type	1 to 2 years	Village law enforcement	Village council, surrounding law enforcement agencies
WH-03	Identify flood-prone properties; acquire and demolish, elevate, or rebuild with mitigation reconstruction.	1	Floods	New project for 2019	Structural Projects	HMGP, FMA, PDM	Cost will vary based on location and mitigation action.	3 to 5 years	Floodplain Manager	LC Engineer, LCEMA
WH-04	Identify appropriate locations and build residential and community safe rooms.	4	Tornado	New project for 2019	Structural projects	OEMA, PDM	Cost will vary based on size of shelter	5 years	Village Council, Village Engineer	LC EMA, LC Engineer

4.0 PLAN MAINTENANCE

The plan maintenance section of the hazard mitigation plan includes methods of how the committee and the jurisdictions will monitor, evaluate, and update the plan, how they will integrate existing plans with hazard mitigation, and how they will continue to involve the public in the five-year cycle of this plan.

4.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

§ 201.6(c)(4)(i)	A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

The committee understands that "the mitigation plan is a living document that guides action over time. As conditions change, new information becomes available, or actions progress over the life of the plan, plan adjustments may be necessary to maintain its relevance" (FEMA, 2013). To that end, the committee discussed the strategy to maintain the plan in the next five years after the official adoption and before the next update. They determined the following.

This plan must be updated every five years, but monitored, evaluated, and updated regularly. The committee decided that the best course of action to evaluate, monitor, and update the plan in the next five years would be to hold an annual committee meeting and keep a running tally of incidents and projects. LCEMA will also ask the jurisdictions to keep them informed of projects as they apply for grants and continue to develop their strategies.[i]

At their annual meetings the committee can update different sections of the plan according to what is relevant at the time. For example, review and revise the hazard profiles due to an incident or declaration, or review and update the project list due to a completion or delay of a project.

The following is an example of the timeline and agenda for the meetings during the monitoring and evaluating period between this plan and the next update.

MONITORING, EVALUATING, AND UPDATING THE PLAN		
Year	*Example Agenda Items*	*Prior to Annual Meeting*
Year 1 2020	• Ensure all jurisdictions have signed the resolution adopting the plan. Place a copy of all resolutions in Appendix 6 • Record all emergency declarations and significant events in the county as well as damage caused (public assistance, federal reimbursements, damage assessments, injuries, illnesses, deaths) • Review and update the list of mitigation projects to reflect status • Discuss and plan for 2020 public involvement in hazard mitigation activities or outreach	• Send out resolutions for jurisdictions to sign • Send out invitations to committee members • Request and receive mitigation status updates from each jurisdiction
Year 2 2021	• Record all emergency declarations and significant events in the county as well as damage caused (public assistance, federal reimbursements, damage assessments, injuries, illnesses, deaths) • Review and update the list of mitigation projects to reflect status • Discuss and plan for 2021 public involvement in hazard	• Send out invitations to committee members • Request and receive mitigation status updates from each jurisdiction • Compile report on public outreach outcomes

MONITORING, EVALUATING, AND UPDATING THE PLAN		
Year	*Example Agenda Items*	*Prior to Annual Meeting*
	mitigation activities or outreach	
Year 3: 2022	• Record all emergency declarations and significant events in the county as well as damage caused (public assistance, federal reimbursements, damage assessments, injuries, illnesses, deaths) • Review and update the list of mitigation projects to reflect status • Discuss and plan for 2022 public involvement in hazard mitigation activities or outreach	• Send out invitations to committee members • Request and receive mitigation status updates from each jurisdiction • Compile report on public outreach outcomes
Year 4: 2023	• Record all emergency declarations and significant events in the county as well as damage caused (public assistance, federal reimbursements, damage assessments, injuries, illnesses, deaths) • Review and update the list of mitigation projects to reflect status • Discuss and plan for 2023 public involvement in hazard mitigation activities or outreach • Apply for and secure funding for 2024 plan update	• Send out invitations to committee members • Request and receive mitigation status updates from each jurisdiction • Compile report on public outreach outcomes
Year 5: 2025	• Record all emergency declarations and significant events in the county as well as damage caused (public assistance, federal reimbursements, damage assessments, injuries, illnesses, deaths) • Review and update the list of mitigation projects to reflect status • Begin the 2024 Lucas County Hazard Mitigation Plan update	• Send out invitations to committee members • Request and receive mitigation status updates from each jurisdiction • Compile report on public outreach outcomes

At the end of each meeting, Lucas County Emergency Management Agency, as the holder of this document, should update the appropriate section in Appendix 7 Annual Monitoring. At a minimum, each year should have a copy of:

- the invitation letter or email,
- a sign in sheet for the meeting,
- the public outreach report for the previous year,
- a copy of any reports received by the jurisdictions regarding progress or status of the mitigation activities in their community,
- a record of hazard occurrences with details such as dates, locations, severity, damage, injuries, etc., and
- meeting minutes.

[i] Although the Village of Harbor View is not currently a participant of this plan, because they are within the geographical boundaries of Lucas County, they will be invited to participate in all meetings relating to this plan.

4.2 PLAN INTEGRATION

§ 201.6(c)(4)(ii)	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.

There is a variety of plans that the county and individual jurisdictions have that can organically integrate hazard mitigation projects in them; some already have. All plans identify certain problems and propose solutions within a community. If these plans reference each other and work together to make a community safer, more attractive to residents, commerce, and industries, and healthier overall, then they will work together to create a more resilient community. This is where hazard mitigation actions can aide in making communities safer by lessening the impacts of a variety of hazards.

The different plans are described below in more detail. In general, each section describes who each plan relates to hazard mitigation; when appropriate, the sections identify specific mitigation actions within the existing plans.

Comprehensive Plans

As mentioned in Section 1.3 Capabilities, comprehensive plans guide the location, type, and extent of future development. In them, they describe a variety of projects that can relate to mitigation. The following table outlines the general elements that comprehensive plans incorporate and how they relate directly to hazard mitigation.

COMPREHENSIVE PLAN CONCEPT INTEGRATION	
Plan Element	*Relevance to Hazard Mitigation*
Goals & Objectives	Definition*: *This section establishes goals and objectives that serve as a guide for the development and economic and social well-being of the local jurisdictions. The goals and objectives tell the world how the community wants to function and look in the future.* This section provides an opportunity for local officials to acknowledge the reciprocal benefits of hazard mitigation to community-level comprehensive planning. This section also serves as a statement of the community's stance on resilience at it moves forward.
Land Use	Definition: *The land use element outlines the most appropriate and desirable patterns of growth and development.* This section can include risk areas as key points of information for consideration as to these appropriate and desirable patterns. Incorporating mitigation in this section does not automatically imply banning development from all high hazard areas; rather, it can identify those areas where certain types of resilient construction techniques would be beneficial.

COMPREHENSIVE PLAN CONCEPT INTEGRATION	
Plan Element	*Relevance to Hazard Mitigation*
Transportation	Definition: *The transportation element describes and presents transportation patterns and includes the entire spectrum of transportation facilities (transit, roads, bicycle and pedestrian amenities, and transit-oriented development) applicable to the jurisdiction.* This section can recognize the importance of the transportation infrastructure to overall emergency and disaster preparedness. Within such a discussion, maintaining critical arterial routes can be prioritized as a mitigative measure.
Community Facilities	Definition: *The community facilities element identifies the location, character and extent of public and semi-public buildings, lands, and facilities.* This section provides another perspective from which to consider high-risk areas.
Development Regulations	Definition: *The development regulations section identifies development tools that are the best available mechanisms to implement the plan, including streamlined review for development in designated growth areas.* This section can discuss how local ordinances and regulations can be amended to account for hazard risks. As with the land use element, these regulations may recommend or require certain types of resilient construction.
Sensitive Areas	Definition: *The sensitive areas element sets goals, objectives, principles, policies, and standards to protect sensitive areas from the adverse effects of development. The Land Use Article requires jurisdictions to protect streams and their buffers; the 100-year floodplain; habitats of threatened and endangered species; and steep slopes, wetlands, and agricultural and forest lands intended for resource protection or conservation.* This section gives communities the option of designating high risk areas as sensitive areas.
Implementation	Definition: *Recognizing the importance of designing land development regulations that implement the plan, this section is supposed to address recommendations for land development regulations.* This section can include a series of actions that may be duplicated in the hazard mitigation plan (and vice versa). It allows communities to acknowledge those initiatives that overlap both community development and hazard mitigation goals.
Development Capacity Analysis	Definition: *This section is an estimate of the total amount of development that may be built in an area under a certain set of assumptions, including land use laws and policies (e.g., zoning), environmental constraints, etc.* This section can include high risk areas as a type of environmental constraint.
Municipal Growth	Definition: *This element requires municipalities to identify areas for future growth consistent with their long-range visions.* This section supports the multi-jurisdictional approach of this hazard mitigation plan by integrating discussions of high-risk areas and their relation to areas targeted for future growth. It also provides space to consider such measures as resilient construction in municipal areas.
Water Resources	Definition: *This element identifies drinking water supplies needed by projected populations.* This section supports the continued operation of critical infrastructure, particularly water systems. By identifying drinking water supply needs and potential upgrades necessary to meet those needs, this section gives local officials the opportunities to discuss upgrades and other means of ensuring reliability of water during emergencies.

Source: Maryland Department of Planning

Land Use Plan

Land use plans ensure adherence to the jurisdictions' floodplain, zoning, building, subdivision, and other relevant ordinances and consider the implementation of storm water management projects. Land use plans can also incorporate or consider the implementation of green infrastructure/low-impact development into site-specific projects (e.g., use of porous pavement, tree planting initiatives, planter boxes, bio swales, etc.).

One example of land use plans is the Village of Holland's *Land Use Policy Plan*; in it, it states one of its overall goals is to protect the health, safety, and welfare of the citizens. Other goals include redirecting truck traffic away from residential neighborhoods; although this is mainly for noise purposes, limiting truck traffic that would probably be carrying hazardous materials through residential areas, is beneficial to the overall health, safety, and welfare of the citizens, as stated in their overall goal. Another strategy includes reducing the large pavement areas utilized for parking and including landscaped areas; even though this would be more visually appealing, doing this would limit the amount of stormwater runoff from the large paved areas and would encourage on-site retention through vegetation. An explicit strategy that the village encourages is to conserve floodplain areas, heavily forested areas, stream corridors, and other areas with unique features for future parks and recreation; this directly addresses a wide variety of hazards and promotes natural systems protection.

Emergency Operations Plan

Emergency operations plans (EOPs) ensure consistency between updated hazard analyses and the risk assessment portion of the plan. They also consider mitigation projects as part of the overall cycle of emergency management. EOPs establish and maintain effective response programs, support continuity of critical infrastructure and key resources, and identify specific risk areas for certain hazards.

Lucas County/Toledo recently updated their emergency operations plan in 2017. It includes appendices for several hazards: severe thunderstorm and tornado, flooding, earthquake, hazardous materials release, homeland security, severe winter storms, etc. Each one of the annexes assigns roles and responsibilities to the different partners working in response.

Transportation Planning

Transportation plans can ensure hazards are acknowledged in long-range transportation planning and consider response elements to the hazards identified in the mitigation plan, as appropriate, with respect to transportation (e.g., evacuation). These plans also ensure that planned transportation projects do not add to vulnerabilities (e.g., ensure projects utilize proper drainage, are properly elevated, etc.) and can consider the incorporation of green infrastructure/low-impact development as transportation projects are undertaken (e.g., permeable pavements, green streets and alleys, etc.).

In Lucas County, the *On the Move 2015-2045 Transportation Plan* (TMACOG, 2015) outlines the transportation projects for the region. The planning team considered the *Lucas County Hazardous Materials Plan* and looked for opportunities for coordination with transportation planning. Their planning guidelines included determining if a county hazard mitigation plan existed to remain consistent with the plan as well as address the impacted resources.

Floodplain Ordinances

The entire purpose of floodplain ordinances is to mitigate the effect of floods in an area where flooding is prone to occur and therefore relate closely to hazard mitigation activities. Floodplain ordinances support resiliency by ensuring new development and redevelopment stays clear of known hazard areas or is built in such a way as to withstand the effects of known hazards. Ordinances protect green spaces in special flood hazard areas (SFHAs). For specific information on floodplain ordinances and National Flood Insurance Program (NFIP) participation refer to sections 1.3 Capabilities and 2.4.2 Flood.

Watershed Plans

Watershed plans identify site-specific flooding concerns and other water quality issues and provide a means for consideration of low-impact development options for flood mitigation.

4.3 CONTINUED PUBLIC INVOLVEMENT

§ 201.6(c)(4)(iii) Discussion on how the community will continue public participation in the plan maintenance process.

The committee recognizes the need to continually involve the public in the maintenance of this plan. To that end, the committee has decided to organize or participate in a variety of activities where they can reach the public and include them in the status of mitigation activities and the plan itself. Public outreach activities can include the following.

- Have a "plan reveal" after FEMA has approved the plan; have a press release and a presentation in front of the Lucas County Commissioners
- Create poster presentations or information available for the public at community preparedness events after the annual committee meetings
- Distribute preparedness coloring books from FEMA and the Red Cross
- Partner in the Safe-T-City program with the police department
- Set up booths at the Lucas County employee wellness event
- Have the plan available on various websites and at the LCEMA office
- Conduct an online public survey about hazards after a significant event to determine readiness and educate for precautionary measures

Any committee member can and should conduct public events as part of their regular agency's activities and include information on hazard mitigation. For example, the Toledo-Lucas County Health Department could hold a health fair at a school at which they educate the students about measures to prevent spreading diseases (this would relate to one of the hazards in this plan: pandemics); another example could be that the Lucas County Engineer and Floodplain Manager set up a booth at a homeowner's or builders' conference where they have material that explains the benefits of stronger building materials or elevated foundations (this could relate to several hazards: flooding, severe storms, wind, or earthquakes). All the events and their outcomes should be documented and forwarded to LCEMA for record keeping. LCEMA can present all the received reports at the annual meetings.

5.0 APPENDICES

This section contains supporting documentation for the hazard mitigation plan. In it, the following appendices are included.

Appendix 1: Planning Documentation
Appendix 2: Public Involvement
Appendix 3: Inactive Projects
Appendix 4: Project Prioritization
Appendix 5: Citations
Appendix 6: Plan Adoption
Appendix 7: Annual Monitoring

APPENDIX A
PLANNING DOCUMENTATION

This appendix contains meeting invitations, agendas, presentations, minutes, and sign in sheets, as well as any other documentation for meetings. It also includes jurisdictional visits and TMACOG newsletter information.

The raw capabilities survey data is included with a summary of how each jurisdiction participates in the NFIP.

COMMITTEE MEETING 1

May 2, 2018

Lucas County Emergency Management Agency

LUCAS COUNTY HAZARD MITIGATION PLAN

PLANNING COMMITTEE MEETING #1

AGENDA

Date:	Thursday, May 3, 2018
Time:	10:00 a.m.
Estimated Duration:	120 minutes
Location:	Lucas County Emergency Management Agency 2144 Monroe Street Toledo, OH 43604

1. Welcome & Introductions
2. The hazard mitigation plan
   - Mitigation planning process
   - Planning committee roles & responsibilities
3. Project review
   - Projects and strategies update from the existing plan
4. Goals and objectives
5. Public involvement
6. Schedule for next meetings
7. Adjournment

Hazard Mitigation Planning Committee Sign-in Sheets

Signature	Date	First Name	Last Name	Agency	Email	Phone
	5-3-18	Philip	Cook	City of Toledo Police	philip.cook@toledo.oh.gov	419-245-1135
	05/03/18	Patrick	Trejchel	Hospital Council of NW Ohio	ptrejchel@hcno.org	419-842-0800 Ext. 127
		Robert	Reed	Village of Holland Police	police.chief@hollandohio.com	419-865-7105
	5-3-18	Shelley	Hoelzer-Spahn	City of Toledo Water Treatment	shelley.hoelzer@toledo.oh.gov	419-245-1477
	5/3/18	Dan	Baker	Toledo-Lucas County Health Dept	bakerd@co.lucas.oh.us	419-213-4152
		John	Wenzlick	Village of Ottawa Hills Police	wenzlickj@ottawahills.org	419-536-2570
		Michael	Wolever	Village of Swanton	sfd@villageofswantonohio.us; mikewolever@gmail.com	419-467-8811
		Barry	Cousino	Springfield Township Fire	barry.cousino@sprignfieldfire.com	419-865-4136 Ext 8
		Danilynn	Miller	City of Sylvania Police	sgt.miller@sylvaniapolice.com	419-885-0469
	5-3-18	Patrick	Wambo	City of Waterville Fire	pwambo@waterville.org	419-878-8198
	5/3/18	Joey	Sink-Oiler	Lucas Soil & Water	jsink@co.lucas.oh.us	419-893-1966
	5/3/18	Bob	Neubert	Lucas County Engineers Office	rneubert@co.lucas.oh.us	419-213-2832
		Kari	Gerwin	TMACOG	kurt@tmacog.org	419-241-9155 Ext. 126
		Kevin	Bernhard	Monclova Township Fire	chiefbernhard@monclovatwp.org	419-865-9423 Ext. 2012
	5/3/18	Matt	Krause	LCEMA	mkrause@co.lucas.oh.us	419-213-6503
	5/3/18	Pat	Moomey	LCEMA	pmoomey@co.lucas.oh.us	419-213-6506
		Aletha	Reshan	LCEMA	areshan@co.lucas.oh.us	419-213-6504
		Greg	Bonfiglio	LCES	gbonf@co.lucas.oh.us	419-213-6534
		Bruce	Wholf	City of Maumee	wholf-bruce@maumee.org	419-897-7076
	5-3-18	Jim	Gilmore	City of Oregon	jgilmore@oregonohio.org	419-698-7071
		Josh	Hartbarger	Village of Whitehouse Fire	jhartbarger@whitehouseoh.gov	419-262-6502
	5/3/18	Michelle	Hughes-Tucker	CoT Environmental Services	MICHELLE.TUCKER@toledo.oh.gov	419-936-3754
	5/3/18	Joe	Fausnaugh	Metroparks of the Toledo Area	joe.fausnaugh@metroparkstoledo.com	419-407-9744
		Lisa	Ward	CoT Parks, Rec, & Forestry	lisa.ward@toledo.oh.gov	419-262-6243
	5/3/18	Tina	Mack	LC Auditor's Office	tnmack@co.lucas.oh.us	419-213-4430 ext 4430
	5/3/18	Doug	Fee	American Red Cross	doug.fee@redcross.org	419-277-8087
		Meg	Adams	FirstEnergy	mkadams@firstenergycorp.com	419-249-5394
		Holly	Ball	OSU Extension - Lucas County	ball.2129@osu.edu	419-213-2029

LUCAS COUNTY HAZARD MITIGATION PLAN 2018 UPDATE

Lucas County Emergency Management Agency
May 3, 2018 ~ 10:00 a.m.
2144 Monroe Street
Toledo, OH 43604

WELCOME AND INTRODUCTIONS

OVERVIEW OF HAZARD MITIGATION AND THE PLANNING PROCESS

What is hazard mitigation?

Federal Emergency Management Agency (FEMA):

- oversees the hazard mitigation process at the local, regional, state, and national levels, and
- defines mitigation as, "the effort to reduce loss of life and property by lessening the impact of disasters" (FEMA.gov, 2016).

OVERVIEW OF HAZARD MITIGATION AND THE PLANNING PROCESS

The Hazard Mitigation Plan

The Hazard Mitigation Plan

- Planning Process
- Description of the planning area
  - Capabilities
  - Development trends
- Risk Assessment
  - Hazard profiles
  - Assets inventory
- Action plan
  - Goals
  - Strategies (projects/actions)
- Plan maintenance
- Appendices

OVERVIEW OF HAZARD MITIGATION AND THE PLANNING PROCESS

Steering Committee Roles & Responsibilities

- Committee Review – Will need to meet regularly to work through the document in order to complete the timeline.
- Additional contact with committee members will be made by phone, through email, and teleconferences as needed.
- Committee members will be asked to complete tasks specific to the plan requirements.
- JHC planning staff will be primarily responsible for research and document drafting.

OVERVIEW OF HAZARD MITIGATION AND THE PLANNING PROCESS

Estimated Project Schedule

April 2018 — December 2018

In-person meetings ~ Phone calls ~ Workshops
Activities ~ Surveys ~ Conference calls ~ Research
Mapping ~ Analysis ~ Historical data ~ Reviews
Partnerships ~ Plan integration ~ Development

PROJECT REVIEW

- Review 2013 action items
- Give update of status of each action item

GOALS
Overview

The plan must include hazard mitigation goals that :

- represent **what the community seeks to achieve** through mitigation plan implementation,
- provide **broad** policy-type statements that are **long-term**,
- represent visions of **reducing or avoiding losses** from the identified hazards, and
- are **clear** and agreed upon.

GOALS

- Review existing goals
- Why is mitigation important to you?
- How have your priorities for mitigation changed in the past five years?

GOALS
Activity

- Form groups
- Discuss and write three goals for the hazard mitigation plan
- Select a spokesperson to present to the committee
- Selection of new goals for the plan

SURVEYS

- Jurisdictional capabilities survey
https://www.surveymonkey.com/r/LucasHMP-Capabilities
  - Only for jurisdictional representatives
  - One person to complete survey per jurisdiction
- Public survey
https://www.surveymonkey.com/r/LucasHMP-Public1
  - To be posted online (websites, social media)

MEETING SCHEDULE

- Second committee meeting


THANK YOU!

LUCAS COUNTY HAZARD MITIGATION PLAN

2013 ACTION ITEMS

TORNADOES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Review existing warning siren coverage and recommend new locations if and where there are coverage gaps. Utilize grant funding wherever possible to purchase new warning sirens.	Y - locations/Date (ongoing projects)	
Review existing public shelters and recommend new locations if and where there are coverage gaps in meeting the above stated objective.	Redcross	
Develop a program to provide information and building specifications on "Safe Rooms" for communities most susceptible to injury or loss of life resulting from future tornado events.	Y - Montessori	
Develop weather spotter training courses and implement training within local fire and police departments.	Y - yearly NWS	
Work with local governments to coordinate public awareness campaigns on tornado safety and preparedness in their local newspapers and government newsletters.	Redcross + Billboards TV Appearances Social Media posts) yearly	
Keep up-to-date lists of addresses with shelters, to assist Fire departments, Emergency Services agencies and communities and to coordinate the distribution of these lists to the appropriate local government officials.	Redcross	
Determine how to accommodate individuals with special needs both in the emergency plan for the shelter and in the design of the shelter, including complying with the American with Disabilities Act (ADA.)	Redcross	
Educate the public to secure all		

Action Item	How and when was this action completed?	If not completed, why?
loose items on decks, porches and in yards.		
Work with individual jurisdictions that have identified a need for "Safe Rooms" to secure design and funding for individual project.	Montessori School	
Develop a program to identify those existing mobile homes and older buildings throughout Lucas County that have the most potential for anchoring against straight and tornado force winds.		
Review all Lucas County and municipal building codes and recommend revisions for future construction to reflect best current standards for anchoring against straight line and tornado winds.		

SEVERE STORMS

Action Item	How and when was this action completed?	If not completed, why?
Refrain from planting trees in and around utility lines, or plant low growing species that will not interfere with the lines. Place a higher priority on tree trimming/maintenance along utility easements.		
Implement improved severe weather forecasting and warning systems.	Outdoor warning sirens updated / Mass notification system	
Provide a secure and reliable emergency wireless communication system for use by elderly or disabled citizens to reduce chance of isolation in a severe storm event and the aftermath.	WEAS / Lucas County Alerts	
Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during a severe storm event, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.		
Improve severe storm detection techniques and initiate storm alerts earlier to allow citizens more time to prepare their structures for severe storm events.	NWS	
Initiate damage assessment training for emergency response personnel to include building inspection personnel that encompasses structural, electrical, plumbing and heating expertise, which would be invaluable in storm damage assessment. Establish a triage-like procedure for initial evaluation of structural and mechanical damage to structures caused by severe storms.		
Establish a uniform damage reporting procedure for all jurisdictions to utilize in Lucas County with Lucas County Emergency Management Agency as the clearinghouse for damage		

Action Item	How and when was this action completed?	If not completed, why?
assessment data following a severe storm event.		
Provide back-up power generators for individual jurisdictions for use in maintaining power at critical facilities during severe storm events.	1ST energy State resources	

SEVERE WINTER STORMS

Action Item	How and when was this action completed?	If not completed, why?
Coordinate with the American Red Cross to establish heating centers for at-risk citizens/residences, provide winter storm kits and design a public information campaign that includes educating citizens about snow winter storm warnings, alternative forms of heating, and family/individual emergency communications plans.	ARC Lucas cty Alerts News cast appearances Social Medias	
Work with critical facilities to develop emergency communications plans and emergency power backup plans.	Schools Healthcare facilities	
Develop a countywide tree management program to reduce the probability of damage to existing above-ground utilities from severe winter storm events that includes provisions to encourage the planting of species that are less susceptible to damage and ensures that trees are planted sufficiently far from above-ground utility lines and buildings.		
Develop and adopt countywide winter maintenance procedures that include snow trapping devices, "smart salting" techniques, and applying deicing chemicals before severe winter storms happen.		

EARTHQUAKES

Action Item	How and when was this action completed?	If not completed, why?
Work with engineers and architects to survey existing buildings and infrastructure and develop recommendations for seismic resiliency.		
Designate pedestrian safe zones to prohibit public access in areas directly below damaged infrastructures until repairs can be made.		
Provide Emergency Preparedness information and resources relative to earthquake events to the public through an active education and outreach program.	Social Media posts County website information	
Provide outreach to inform citizens of the need to plan and prepare for all hazards to reduce the impact of an earthquake disaster and aid the recovery.	Social Media posts County website	
Develop emergency plans for evacuation of communities in the event that an earthquake occurs that are up to date and are utilizing the latest information available.	Lucas Cty EOP update	

WILDFIRES

Action Item	How and when was this action completed?	If not completed, why?
Increase media coverage of threat and evacuation procedures during peak wildfire times of the year, distribute informational packages in high and moderate wildfire risk areas, and increase enforcement of existing open burning laws.		
Enhance and expand training and awareness of fire departments in wildfire hazard areas and provide specialized equipment for controlling and extinguishing of wildfires.		
Identify and protect high and moderate wildfire risk areas and critical facilities.		
Coordinate with all jurisdictions to develop a vulnerability assessment for wildfires, and implement a plan for completing them.		
Use controlled burns to decrease the amount of fuel load in the identified moderate and high wildfire hazard areas.		

TEMPERATURE EXTREMES

Action Item	How and when was this action completed?	If not completed, why?
Provide Emergency Preparedness information and resources relative to extreme temperature events to the public through an active educational outreach program with specific plans and procedures for Senior Citizens and the Disabled.		
Develop plans for the protection and care of animals during extended periods of extreme heat or cold.		
Establish a Fire Advisory System to identify "fire risk." during extended periods of extreme heat or cold.	News Broadcasts Email blast to Police/Fire chiefs	
Coordinate with utilities and transportation authorities to improve rapid communications between emergency services and the private sector when basic services might be disrupted during extended periods of extreme heat or cold.		
Review fire safety ordinances for open burning and the use of liquid fuel and electric space heaters.		
Coordinate with service support groups to provide a list of "Cooling/Warming Centers" for use during extended periods of extreme heat or cold to at risk citizens.	ARC	

Bob Neubert - LCE

LUCAS COUNTY HAZARD MITIGATION PLAN

2013 ACTION ITEMS

TORNADOES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Review existing warning siren coverage and recommend new locations if and where there are coverage gaps. Utilize grant funding wherever possible to purchase new warning sirens.		
Review existing public shelters and recommend new locations if and where there are coverage gaps in meeting the above stated objective.		
Develop a program to provide information and building specifications on "Safe Rooms" for communities most susceptible to injury or loss of life resulting from future tornado events.		
Develop weather spotter training courses and implement training within local fire and police departments.		
Work with local governments to coordinate public awareness campaigns on tornado safety and preparedness in their local newspapers and government newsletters.		
Keep up-to-date lists of addresses with shelters, to assist Fire departments, Emergency Services agencies and communities and to coordinate the distribution of these lists to the appropriate local government officials.		
Determine how to accommodate individuals with special needs both in the emergency plan for the shelter and in the design of the shelter, including complying with the American with Disabilities Act (ADA.)		
Educate the public to secure all		

Action Item	How and when was this action completed?	If not completed, why?
loose items on decks, porches and in yards.		
Work with individual jurisdictions that have identified a need for "Safe Rooms" to secure design and funding for individual project.		
Develop a program to identify those existing mobile homes and older buildings throughout Lucas County that have the most potential for anchoring against straight and tornado force winds.		
Review all Lucas County and municipal building codes and recommend revisions for future construction to reflect best current standards for anchoring against straight line and tornado winds.		

FLOODS - Bob Neubert LFM

Action Item	How and when was this action completed?	If not completed, why?
Work with the National Weather Service and local media to provide the most effective warning system to alert citizens in flood prone areas and on low-lying roadways of the intensity.		
Streamline the planning process for citizens to receive flood fighting information and provide information and assistance.		
Develop an educational program informing citizens within the flood zone of their location and/or proximity to streams.	LUCAS COUNTY WEB GIS MAP	
Educate citizens on viable flood protection options and methods appropriate for risk level. Partner with insurance companies to disseminate flood insurance information to citizens in flood prone areas.	CALL IN CASE BY CASE	
Discuss formation of a policy that guides or further restricts development around flood prone areas and areas of high flood mitigation values (wetlands, floodplain corridors, upland storage, closed depressional basins and areas of high filtration potential).	PARTIAL RIPIRIAN SETBACKS	
Develop a comprehensive communication system between the County and local governments with procedure templates describing warning systems.		
Accurately identify and map areas that have potential flood mitigation value.	LCE - TOWNSHIPS	
Identify areas that have unique flooding and storm related issues.	LCE - TOWNSHIPS	
Ensure compliance and enforcement of Lucas County's Storm Water Management Plan and flood Zoning through fines and penalties.	COUNTY - Townships	
Identify hot spots or high priority projects involving multiple	LCE - TOWNSHIPS	

Action Item	How and when was this action completed?	If not completed, why?
jurisdictions and organize stakeholders, develop a governance structure, identify and prioritize projects and Implement plans as funds become available.		
Seek funding and implement stormwater improvement projects to protect existing county infrastructure.	TRIED- UNSUCESSFULL	
Provide education for units of government and citizens.	AS NEEDED	

FLASH FLOODS N/A

Action Item	How and when was this action completed?	If not completed, why?
Survey all floodplain areas currently recognized by FEMA adjacent to creeks and streams to ensure flash flood-prone areas are included.	NONE	
Rebuild replace and upgrade any and all storm drainage systems deemed inadequate to handle flash flooding events.	NONE	
Investigate current roadways located in flash flood-prone areas to ensure compliance with current standards for design year floods.	NONE	
Develop and pass roadway construction ordinances to ensure future roadway projects comply with current standards for design year floods.	NONE	

SEVERE WINTER STORMS

Action Item	How and when was this action completed?	If not completed, why?
Coordinate with the American Red Cross to establish heating centers for at-risk citizens/residences, provide winter storm kits and design a public information campaign that includes educating citizens about snow winter storm warnings, alternative forms of heating, and family/individual emergency communications plans.		
Work with critical facilities to develop emergency communications plans and emergency power backup plans.		
Develop a countywide tree management program to reduce the probability of damage to existing above-ground utilities from severe winter storm events that includes provisions to encourage the planting of species that are less susceptible to damage and ensures that trees are planted sufficiently far from above-ground utility lines and buildings.		
Develop and adopt countywide winter maintenance procedures that include snow trapping devices, "smart salting" techniques, and applying deicing chemicals before severe winter storms happen.	LCE - TOWNSHIPS BOB NEUBERT	

EARTHQUAKES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Work with engineers and architects to survey existing buildings and infrastructure and develop recommendations for seismic resiliency.		
Designate pedestrian safe zones to prohibit public access in areas directly below damaged infrastructures until repairs can be made.		
Provide Emergency Preparedness information and resources relative to earthquake events to the public through an active education and outreach program.		
Provide outreach to inform citizens of the need to plan and prepare for all hazards to reduce the impact of an earthquake disaster and aid the recovery.		
Develop emergency plans for evacuation of communities in the event that an earthquake occurs that are up to date and are utilizing the latest information available.		

LUCAS COUNTY HAZARD MITIGATION PLAN

2013 ACTION ITEMS

TORNADOES

Action Item	How and when was this action completed?	If not completed, why?
Review existing warning siren coverage and recommend new locations if and where there are coverage gaps. Utilize grant funding wherever possible to purchase new warning sirens.		
Review existing public shelters and recommend new locations if and where there are coverage gaps in meeting the above stated objective.		
Develop a program to provide information and building specifications on "Safe Rooms" for communities most susceptible to injury or loss of life resulting from future tornado events.	Hospitals?	
Develop weather spotter training courses and implement training within local fire and police departments.	At least one in Lucas within last 2 yrs - not sure collectively	
Work with local governments to coordinate public awareness campaigns on tornado safety and preparedness in their local newspapers and government newsletters.		
Keep up-to-date lists of addresses with shelters, to assist Fire departments, Emergency Services agencies and communities and to coordinate the distribution of these lists to the appropriate local government officials.	ARC?	
Determine how to accommodate individuals with special needs both in the emergency plan for the shelter and in the design of the shelter, including complying with the American with Disabilities Act (ADA.)	EMA incorporated into county EOP? May have been exercised within last 5 yrs - not sure	
Educate the public to secure all		

Action Item	How and when was this action completed?	If not completed, why?
loose items on decks, porches and in yards.		
Work with individual jurisdictions that have identified a need for "Safe Rooms" to secure design and funding for individual project.		
Develop a program to identify those existing mobile homes and older buildings throughout Lucas County that have the most potential for anchoring against straight and tornado force winds.		
Review all Lucas County and municipal building codes and recommend revisions for future construction to reflect best current standards for anchoring against straight line and tornado winds.		

SEVERE STORMS

Action Item	How and when was this action completed?	If not completed, why?
Refrain from planting trees in and around utility lines, or plant low growing species that will not interfere with the lines. Place a higher priority on tree trimming/maintenance along utility easements.		
Implement improved severe weather forecasting and warning systems.		
Provide a secure and reliable emergency wireless communication system for use by elderly or disabled citizens to reduce chance of isolation in a severe storm event and the aftermath.	WEAS? (EMA)	
Encourage implementation of tree trimming and maintenance programs for private property owners to protect health & safety during a severe storm event, and distribute literature to the general public educating them on proper tree planting techniques, including safe distances from structures and utility lines.		
Improve severe storm detection techniques and initiate storm alerts earlier to allow citizens more time to prepare their structures for severe storm events.		
Initiate damage assessment training for emergency response personnel to include building inspection personnel that encompasses structural, electrical, plumbing and heating expertise, which would be invaluable in storm damage assessment. Establish a triage-like procedure for initial evaluation of structural and mechanical damage to structures caused by severe storms.		
Establish a uniform damage reporting procedure for all jurisdictions to utilize in Lucas County with Lucas County Emergency Management Agency as the clearinghouse for damage		

Action Item	How and when was this action completed?	If not completed, why?
assessment data following a severe storm event.		
Provide back-up power generators for individual jurisdictions for use in maintaining power at critical facilities during severe storm events.		

SEVERE WINTER STORMS

Action Item	How and when was this action completed?	If not completed, why?
Coordinate with the American Red Cross to establish heating centers for at-risk citizens/residences, provide winter storm kits and design a public information campaign that includes educating citizens about snow winter storm warnings, alternative forms of heating, and family/individual emergency communications plans.		
Work with critical facilities to develop emergency communications plans and emergency power backup plans.		
Develop a countywide tree management program to reduce the probability of damage to existing above-ground utilities from severe winter storm events that includes provisions to encourage the planting of species that are less susceptible to damage and ensures that trees are planted sufficiently far from above-ground utility lines and buildings.	Tree Toledo might ~~would~~ be a good place to start asking these questions.	
Develop and adopt countywide winter maintenance procedures that include snow trapping devices, "smart salting" techniques, and applying deicing chemicals before severe winter storms happen.		

EARTHQUAKES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Work with engineers and architects to survey existing buildings and infrastructure and develop recommendations for seismic resiliency.		
Designate pedestrian safe zones to prohibit public access in areas directly below damaged infrastructures until repairs can be made.		
Provide Emergency Preparedness information and resources relative to earthquake events to the public through an active education and outreach program.		
Provide outreach to inform citizens of the need to plan and prepare for all hazards to reduce the impact of an earthquake disaster and aid the recovery.		
Develop emergency plans for evacuation of communities in the event that an earthquake occurs that are up to date and are utilizing the latest information available.		

WILDFIRES

Action Item	How and when was this action completed?	If not completed, why?
Increase media coverage of threat and evacuation procedures during peak wildfire times of the year, distribute informational packages in high and moderate wildfire risk areas, and increase enforcement of existing open burning laws.		
Enhance and expand training and awareness of fire departments in wildfire hazard areas and provide specialized equipment for controlling and extinguishing of wildfires.		
Identify and protect high and moderate wildfire risk areas and critical facilities.		
Coordinate with all jurisdictions to develop a vulnerability assessment for wildfires, and implement a plan for completing them.		
Use controlled burns to decrease the amount of fuel load in the identified moderate and high wildfire hazard areas.	The Nature Conservancy does this in the Toledo Area	

TEMPERATURE EXTREMES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Provide Emergency Preparedness information and resources relative to extreme temperature events to the public through an active educational outreach program with specific plans and procedures for Senior Citizens and the Disabled.		
Develop plans for the protection and care of animals during extended periods of extreme heat or cold.		
Establish a Fire Advisory System to identify "fire risk." during extended periods of extreme heat or cold.		
Coordinate with utilities and transportation authorities to improve rapid communications between emergency services and the private sector when basic services might be disrupted during extended periods of extreme heat or cold.		
Review fire safety ordinances for open burning and the use of liquid fuel and electric space heaters.		
Coordinate with service support groups to provide a list of "Cooling/Warming Centers" for use during extended periods of extreme heat or cold to at risk citizens.		

DROUGHTS

Action Item	How and when was this action completed?	If not completed, why?
Provide guidance to jurisdictions on potential new sources of water during extreme drought.		
Reduce risk of fire damage during extreme drought with restrictions on open burning and campfires.		
Review policies on non-essential residential and commercial uses of water to maintain existing supply and integrity of systems.		
Establish water hauling programs for livestock during extreme drought.		
Establish a data management system to identify drought-related agricultural losses so subsidy programs can be utilized to their full advantage.		
Encourage water conservation through public outreach programs prior to a drought event.	Lucas Soil + Water 419-893-1966 Ext. 0#	
Establish economic incentives for private investment in water conservation.		
Implement and distribute Drought Dos and Don'ts to the general public.		
Organize drought informational meeting for the public and media.		
Develop sample ordinances of water conservation.		

LAKE SURGES

Action Item	*How and when was this action completed?*	*If not completed, why?*
Monitor lake levels to rapidly warn residents of potential surge flooding.		
Establish emergency response plans to evacuate people from lake surge areas.		
Establish a chain of command to take charge in event of lake surge evacuation.		
Identify evacuation Reception Centers stocked with necessary supplies for emergency lake surge evacuation.		
In conjunction with the Department of Health, develop a pamphlet and public information program informing the public of preventative measures to take to avoid water-borne illness related to lake surge.		
Determine lake surge prone areas to create lake buffer zones.		
Develop building codes that address enforcement of lake surge resistance measures.		
Develop system of dikes to protect most vulnerable infrastructure within lake surge floodplain and where applicable, develop lake buffer zones.		
Develop back up emergency power plan for critical facilities during lake surge events.		
Employ in-lake early warning technologies to combat lake surge losses before they happen.		
Create effective milestones or warning measuring points to evaluate the possibility/probability for surge flooding.		

LUCAS COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #1
MEETING MINUTES

Date:	Thursday, May 3, 2018
Time:	10:00 a.m.
Duration:	90 minutes
Location:	Lucas County Emergency Management Agency 2144 Monroe Street Toledo, OH 43604

On Thursday, May 3, 2018 the *Lucas County Hazard Mitigation Plan* committee met for the first time to initiate the several month process of updating the plan. The Lucas County Emergency Management Agency (LCEMA), as the custodial agency of the plan, secured the services of JH Consulting, LLC of West Virginia (the consultant) to assist in the update of the plan.

The consultant gave a brief overview of the requirements for hazard mitigation plans and the process by which this plan will be updated. Hazard mitigation plans are required under 44 CFR 201.6 and must be updated every five years to remain eligible for mitigation grant funding. In the plan there are several required elements, including:

- a description of the planning process,
- public and jurisdictional involvement,
- a description of the planning area (climate, geography, economy, transportation, etc.) to include development trends,
- a risk assessment that addresses the hazard that the county faces,
- an action plan that includes strategies that will reduce the vulnerability of the county and jurisdictions to the hazards identified, and
- a plan for evaluating, monitoring, and updating the plan.

Committee members will be expected to attend meetings, to be liaisons to their agencies and jurisdictions within the county, to participate in activities and discussions, review draft documents, and to maintain contact with the LCEMA and the consultant

throughout the process. The consultant will be responsible for scheduling and running the committee meetings, reviewing the previous plan to present possible changes to the committee, keeping in contact with the committee, researching hazards, documenting the planning process, and creating the plan document.

The estimated timeline for completion of this plan update is from April 2018 to December 2018 at which point the consultant will submit the final version of the document to the Ohio Emergency Management Agency (OEMA). There will be approximately three additional in-person committee meetings and teleconferences will be scheduled as necessary throughout the project.

During the first meeting, the committee reviewed the 2013 plan action items and took time to update the status of each project according to their knowledge and experience with the projects. The consultant will send a digital version of the projects to the committee members for their continued updating as there was limited time to review all the projects. Committee members are encouraged to send the consultant any pertinent updates regarding the projects as soon as possible. At the end of this process, each project will need to have an updated status; this can include the categorizations of ongoing, deleted, deferred, or completed. All completed, deleted, and deferred projects will be removed from the 2018 list and any projects that are ongoing will be included in the active 2018 list of projects.

The hazard mitigation plan must have goals. Goals represent what the community seeks to achieve through mitigation plan implementation; they provide broad policy-type statements that are long-term; they represent the visions of reducing or avoiding losses from the identified hazards; goals are clear and agreed upon. The committee reviewed the goals from the 2013 plan and noticed that there were one or more goals for each hazard, making a total of 29 goals for the plan. Upon inspecting each goal, the committee determined that the goals were repetitive and did not address broader issues. The consultant asked some leading questions such as why mitigation is important, and what the priorities should be. After some discussion, the committee came up with a list of five themes that would be the goals for the updated plan.

- Reduce loss
- Health and safety
- Warning, information, outreach, and education
- Identification of risk areas
- Protect citizenry

To finalize, the consultant presented links to two surveys. The first is for jurisdictions to fill out; it includes questions about their capabilities: rules, regulations, and ordinances; administrative, technical, and financial capabilities. The second survey is for public involvement. The committee must reach out to the public to request input on the plan; for this reason, the consultant suggested an online survey that can be shared via social media, agency webpages, and in newsletters. Any agency that posts the survey should screenshot the post and send the picture to the consultant for inclusion in the plan. The results of this survey will be shared with the committee to make decisions on hazards and mitigation actions throughout this plan update process.

The link for the jurisdictional capabilities survey is (***not*** for sharing with the public)
https://www.surveymonkey.com/r/LucasHMP-Capabilities

The link for the first public survey is
https://www.surveymonkey.com/r/LucasHMP-Public1

The committee members set the next in-person meeting date for Thursday, June 28, 2018 at 10:00 a.m. in the same location, the LCEMA conference room on the third floor.

In the meantime, if anyone has any questions, you are encouraged to direct them to your planner, Amy at JHC or to Pat or Matt at LCEMA.

Amy Heimberger, AEM
Emergency Preparedness Planner

JH Consulting, LLC
29 East Main Street, Suite 1
Buckhannon, WV 26201

Tel: 304-473-1009
Fax: 304-473-1099
Cell: 617-921-7130
Email: aheimberger@jhcpreparedness.com
www.jhcemergencypreparedness.com

COMMITTEE MEETING 2

June 28, 2018

Lucas County Emergency Management Agency

LUCAS COUNTY HAZARD MITIGATION PLAN

PLANNING COMMITTEE MEETING #1

AGENDA

Date:	Thursday, June 28, 2018
Time:	10:00 a.m.
Estimated Duration:	90-120 minutes
Location:	Lucas County Emergency Management Agency 2144 Monroe Street Toledo, OH 43604

1. Welcome & Introductions
2. Overview of goals from previous meeting
3. Hazards
   - Current list update
   - Risk assessment matrix
   - Hazard experiences
4. Projects update
5. Capabilities survey
6. Public outreach
   - Online survey
   - Other?
7. Schedule for next meetings
8. Adjournment

LUCAS COUNTY HAZARD MITIGATION PLAN

STEERING COMMITTEE MEETING 2

Thursday, June 28, 2018 ~ 10:00 a.m.
Sign In Sheet

	Name	Affiliation	Email
1.	DANIELYNN MILLER	SYLVANIA P.D.	SGT.MILLER@SYLVANIAPOLICE.COM
2.	Shelley Hoelzer-Spahn	City of Toledo Water Treatment	shelley.hoelzer@toledo.oh.gov
3.	Dan Baker	Lucas Co. Health Dept.	bakerd@co.lucas.oh.us
4.	Tina Mack	LC Auditor	tnmack@co.lucas.oh.us
5.	Meg Adams	Toledo Edison, FirstEnergy	mkadams@firstenergycorp.com
6.	John Wenzlick	OTTAWA HILLS P.D.	wenzlickj@ottawahills.org
7.	Joy Sink-Diler	Lucas Soil+Water	jsink@co.lucas.oh.us
8.	Alethia Reshan	Lucas County EMA	areshan@co.lucas.oh.us
9.	Amy Heimberger	JHC	aheimberger@jhcpreparedness.com
10.	Patricia Mooney	Lucas County EMA	pmooney@co.lucas.oh.us
11.	HANNAH SCHWARTZ	LUCAS COUNTY EMA	HSCHWARTZ@CO.LUCAS.OH.US
12.	Matt Krause	" "	mkrause@co.lucas.oh.us
13.			
14.			
15.			
16.			

LUCAS COUNTY
HAZARD MITIGATION PLAN
2018 UPDATE

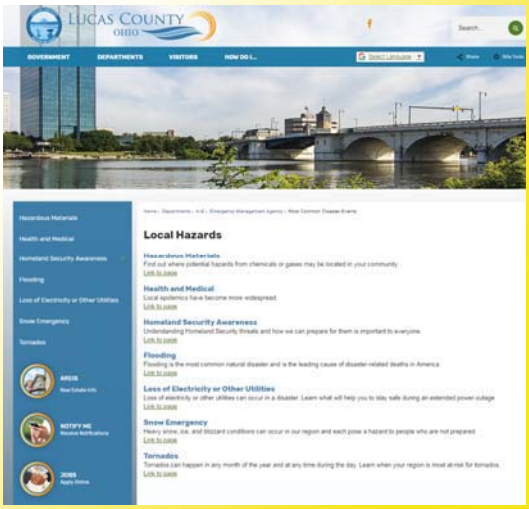
Lucas County Emergency Management Agency
June 28, 2018 ~ 10:00 a.m.
2144 Monroe Street
Toledo, OH 43604

HAZARD MITIGATION GOALS

- Reduce loss or life, property, and damage to the environment in identified hazard risk areas.
- Ensure the health and safety of the citizens, officials, responders, and transient population from hazards that affect the area.
- Create outreach and education campaigns for the public before incidents or events and improve capabilities for hazard warning and information during emergencies.

HAZARDS

- Severe winter storm
- Tornado
- Floods
- Earthquake
- Severe storm
- Drought
- Lake surge
- Wildfire
- Temperature extremes
- Landslide



HAZARDS

Probability vs. Severity

PROBABILITY: High → Low

Description	*Definition*
Frequent	Will occur at least once, possibly several times during a year
Probable	Likely to occur within a year
Occasional	May or may not occur in a year
Remote	Unlikely but possible to occur in a year
Improbable	So unlikely it can be assumed occurrence may not be experienced

SEVERITY: High → Low

Description	*Definition*
Catastrophic	Death or major structural loss
Critical	Severe injury, severe illness or marginal structural damage
Marginal	Minor injury, minor illness or structural damage
Negligible	Less than minor injury, illness or structural damage.

HAZARDS

Risk Assessment Matrix

RISK ASSESSMENT MATRIX

SEVERITY	PROBABILITY				
	Frequent	*Probable*	*Occasional*	*Remote*	*Improbable*
Catastrophic	Very High	Very High	High	Moderate	Low
Critical	High	High	Moderate	Low	Very Low
Marginal	High	Moderate	Low	Very Low	Very Low
Negligible	Moderate	Low	Low	Very Low	Very Low

SURVEYS

- Jurisdictional capabilities survey

https://www.surveymonkey.com/r/LucasHMP-Capabilities

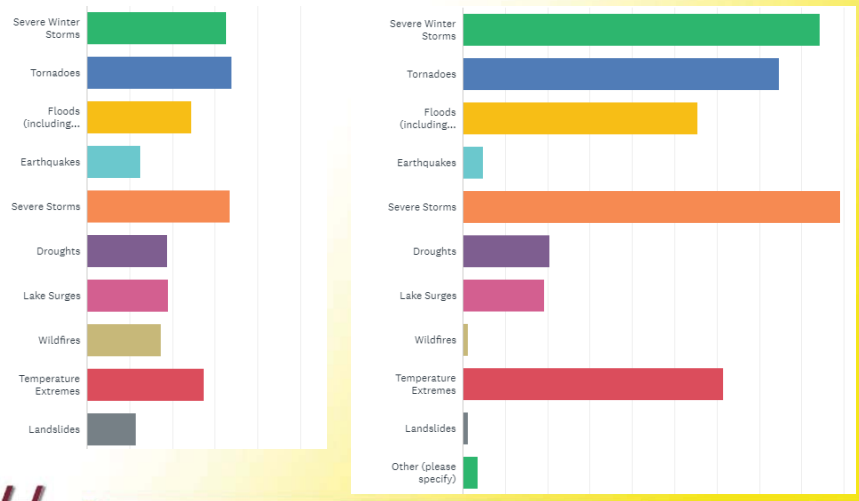
  - Only for jurisdictional representatives
  - One person to complete survey per jurisdiction

- Public survey

https://www.surveymonkey.com/r/LucasHMP-Public1

  - To be posted online (websites, social media)

PUBLIC SURVEY #1



MEETING SCHEDULE

- Third committee meeting
- Public meetings

THANK YOU!

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Flood	Annual	~~Effs~~ water damage to homes from Ottawa River flooding (generally just + basement flooding)	
Wind	Annual	community has many mature trees which have damaged homes/ vehicles during strong wind	trim / remove / replace old trees
Harmful Algal Bloom	few years ago (4 or 5)	undrinkable water due to algal contamination	better monitoring / cleaning of water. Reduce blooms / backup water provider / new provider

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Pandemic	2009	-H1N1 flu affects US & Lucas County - Several deaths & resources hardships	- Educational & public media
Harmful Algal Bloom	Aug. 2014	- Loss of potable water to City of Toledo & other CoT water customers	- Educational public media - Plans for how to distribute water to residents & caregivers

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Harmful Algal Bloom	2014	Test failure - water distribution east side	Education Work with Farmers & Industry use of chemicals
Dam/levees	2018	Wall collapse on lagoon being reconstructed - equipment damage only	Check ground support -animal destruction to walls
Train Derailment	2017	East side electrical outage Damage to electrical transformer/towers	

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Lake Surge	2018	Multiple homes flooded in Oregon, oh on Lake Erie Shore.	Flood barriers could protect against it.
HAB Harmful Algal Bloom	2014	water supply shutdown for 4 days-	Investments in water plant

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
HAB	2015	HAB Considered toxic enough to have a DO NOT DRINK ADVISORY – no Toledo water	Better equipment, etc @ Water plant
Wind	2014?	Derecho wind storm – Death (1)	Public EDUCATION
Flood	2012?	Rainstorm – Flooded part of City –	Move home owners from flood prone sites – make it into greenspace – install Dikes

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Flooding	2011, 2015	Crop loss	tiling of fields / water control structures / improved waterways
Harmful Algal Blooms	2011, 2015, 2017 < notes significantly	Drinking water affected / Public Health concerns / Risks / Chemicals added to deal w/ issues	Reduce Phosphorous Reductions from farms / Combine Sewer overflows Reduction by improving infastructure Carbon reduction

LUCAS COUNTY HAZARD MITIGATION PLAN

HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	Date or Year	What happened?	How could the impacts be avoided in the future?
Civil Disturbance		Riots x 1 - fights - clashes - injuries? - property damage?	- permits for protestors - boundaries set up for opposing groups - More than enough numbers of first responders - pre-emptive work w/ media / social media to create awareness for non-participants to stay clear of area - command / control
wind Derecho	2015?	- Damage to homes/ property - Road closures/ downed trees - Loss of power - cascading effects / fatality	- power lines buried instead of overhead (I realize this is not feasible feasible) - public awareness/education/ awareness of impending weather

LUCAS COUNTY HAZARD MITIGATION PLAN
HAZARD EXPERIENCES

Please fill out the following table to the best of our knowledge about three to five hazards you have experienced from the agreed upon list in the past five years in your community. Be as specific as possible.

Hazard	*Date or Year*	*What happened?*	*How could the impacts be avoided in the future?*
WIND	2017	HIGH WINDS STRAIGHT LINE WINDS LOSS OF TREES POWER POLES & LINES	CLEARANCE OF TREES NEAR LINES
H. ALGAL BLOOM	2015?	H. ALGAL BLOOM WENT INTO INTAKE IN TOLEDO WHERE OUR SUBURBAN AREA GETS WATER FROM. WATER RESTRICTIONS IN PLACE.	FIND CAUSE AND REDUCE BLOOMS ON LAKE

LUCAS COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #2
MEETING MINUTES

Date:	Thursday, June 28, 2018
Time:	10:00 a.m.
Duration:	120 minutes
Location:	Lucas County Emergency Management Agency 2144 Monroe Street Toledo, OH 43604

On Thursday, June 28, 2018, the *Lucas County Hazard Mitigation Plan* committee met for the second time to continue the process of updating the plan. The committee mainly reviewed and discussed goals and hazards.

The hazard mitigation goals, ones that the projects will work towards, that the committee agreed upon are the following.

1. Reduce loss of life, property, and damage to the environment in identified hazard risk areas.
2. Ensure the health and safety of the citizens, officials, responders, and transient population from hazards that affect the area.
3. Educate the public before incidents or events and improve capabilities for hazard notification and warning during emergencies.

The main focus of the meeting was to review the existing list of hazards and update it according to recent events and new information. The last plan contained only natural hazards: severe winter storm, tornado, floods, earthquake, severe storm, drought, lake surge, wildfire, temperature extremes, and landslide. The county's EMA website includes non-natural hazards in their list of local hazards. Because of this, and because the committee recognized that non-natural hazards also threaten the county, the committee included new hazards in the list. The following is a table that outlines the new list of hazards for the Lucas County Hazard Mitigation Plan with a brief description of the reason for each hazard.

Hazard	*Description*
CBRNE/Terrorism (Chemical, Biological, Radiological, Nuclear, Explosive)	Non-natural. New. This hazard includes *intentional* CBRNE and terrorism events within and around the county.
Civil Disturbance	Non-natural. New. This hazard would include human-caused violent disturbance to the county including active shooters, riots, and other activities that go beyond day-to-day law enforcement activities.
Dam/Levee Failure	Non-Natural. New. Dams and levees could be a potential problem due to the age and status of the dams. Lucas County has Class I dams (with the highest risk) within the county as well as in surrounding counties that could affect Lucas County.
Drought	Natural. Existing.
Earthquake	Natural. Existing.
Flood	Natural. Existing.
Harmful Algal Bloom	Natural. New. Lucas County has Lake Erie shores; in the past, there have been problems with harmful algal bloom, a natural hazard that can contaminate the water.
Hazmat	Non-natural. New. Major interstates and rail lines run through the county leaving it vulnerable to transportation accidents involving hazardous materials. Additionally, the county has fixed facilities that utilize or store hazardous materials.
Lake Surge	Natural. Existing
Landslide	Natural. Existing.
Pandemic	Natural. New. The committee recognizes the potential for a pandemic originating within the county as well as arriving from other locations to the county. In the past, the county has experienced some pandemic activity.
Severe Thunderstorms (Hail and Lightning)	Natural. Existing.
Severe Winter Storm	Natural. Existing.
Temperature Extremes	Natural. Existing.
Tornado	Natural. Existing.
Wind	Natural. Existing. The plan addressed this hazard previously, but the committee decided to make 'wind' its own profile due to several recent events that caused damage in the county.
Wildfire	Natural. Existing.

After finalizing the hazard list, the consultant reviewed the method by which risk is assessed. The risk assessment matrix is a table that identifies the severity and the probability of occurrence for each hazard and determines its risk to the county. The committee discussed and wrote down events that they recalled occurring in the past few years, what the impacts were, and if there was any way to reduce the impacts going forward.

The consultant then reviewed the standings for the online surveys, the capabilities

survey for the jurisdictions to complete, and the public survey to be shared on social media. The public survey, as of June 26, had 83 responses. According to the survey, the public is most concerned with severe storms, tornadoes, severe winter storms, and temperature extremes. Although an online public survey is one good way to garner public involvement, an in-person meeting will still be necessary throughout the process. The committee members suggested getting on the schedule for the next TMACOG (Toledo Metropolitan Area Council of Governments) meeting in August as well as running public meetings during business hours and the evening at the EMA training room.

The next committee meeting will be on Wednesday, July 18, 2018, at 1:30 pm; this meeting will be a conference call and will focus on other plans that can be integrated into this hazard mitigation plan as well as this plan's maintenance throughout the 5-year cycle.

The meeting's PowerPoint presentation slides are attached.

COMMITTEE MEETING 3

July 17, 2018

Lucas County Emergency Management Agency

LUCAS COUNTY HAZARD MITIGATION PLAN

PLANNING COMMITTEE MEETING #3

AGENDA

Date:	Wednesday, July 18, 2018
Time:	1:30 p.m.
Estimated Duration:	45 minutes
Location:	Online/Teleconference
	https://global.gotomeeting.com/join/957146957
	Phone number: 1 866 899 4679 (Toll Free) or +1 (669) 224-3319
	Access Code: 957-146-957

1. Assets
   - People
   - Economy
   - Natural environment
   - Built environment
     - Infrastructure
     - Critical facilities
     - High potential loss facilities
     - Cultural resources

2. Plan integration
3. Plan maintenance
4. Surveys
   - Public survey update https://www.surveymonkey.com/r/LucasHMP-Public1
   - Capabilities survey https://www.surveymonkey.com/r/LucasHMP-Capabilities only for jurisdictions

5. Schedule for next meetings
   - TMACOG meeting on August 1?
   - Public meetings

LUCAS COUNTY HAZARD MITIGATION PLAN
STEERING COMMITTEE MEETING 3
July 17, 2018
Attendance (Web conference)

Name	*Agency/Affiliation*	*Email*	*Phone*	*Meeting 07/17/2018*
Shelley Hoelzer-Spahn	City of Toledo Water Treatment	shelley.hoelzer@toledo.oh.gov	419-245-1477	Attended
Abby Buchhop	LCEMA	abuchhop@co.lucas.oh.us		Attended
Matt Krause	LCEMA	mkrause@co.lucas.oh.us	419-213-6503	Attended
Pat Moomey	LCEMA	pmoomey@co.lucas.oh.us	419-213-6506	Attended
Joey Sink-Oiler	Lucas Soil & Water	jsink@co.lucas.oh.us	419-893-1966	Attended
Kevin Bernhard	Monclova Township Fire	chiefbernhard@monclovatwp.org	419-865-9423 Ext. 2012	Attended
Holly Ball	OSU Extension - Lucas County	ball.2129@osu.edu	419-213-2029	Attended
John Wenzlick	Village of Ottawa Hills Police	wenzlickj@ottawahills.org	419-536-2570	Attended

LUCAS COUNTY HAZARD MITIGATION PLAN

PLANNING COMMITTEE MEETING #3

MINUTES

Date:	Wednesday, July 18, 2018
Time:	1:30 p.m.
Duration:	45 minutes
Location:	Online/Teleconference

The planning committee for the Lucas County Hazard Mitigation Plan update met on Wednesday, July 18, 2018 via teleconference. This is the third time the committee has met as part of the update process. The meeting focused on discussions regarding county assets, plan integration, plan maintenance, surveys and scheduling the next meetings.

One of the recommendations from FEMA's *Local Hazard Mitigation Planning Handbook* is to include the local assets. These assets get plotted on a map and are juxtaposed with hazard areas to identify assets that are at risk. Currently, there is not an asset list in the plan and therefore would need to be created. The committee determined that the Lucas County EMA and GIS departments will be able to assist in creating the list. The following is a summary of the type of assets that can be included in the list.

ASSET LIST CATEGORIES		
People	• Concentrations of residents and employees • Visiting populations • Access and functional needs populations • Locations that provide health or social services critical to disaster recovery	
Economy	Major employers, primary economic sectors, and commercial centers whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.	
Built Environment	Infrastructure	Systems that are critical for life safety and economic viability. • Transportation • Power • Communication • Water and wastewater systems.
	Critical Facilities	Structures and institutions necessary for a community's response to and recovery from emergencies. • Hospitals and medical facilities • Police and fire stations • Emergency operations centers • Evacuation shelters

ASSET LIST CATEGORIES		
		• Schools • Airport/heliport
	High Potential Loss Facilities	• Nuclear power plants • Dams • Military and civil defense installations • Locations housing hazardous materials
	Cultural Resources	Cultural or historic assets that are unique or irreplaceable. • Museums • Geological sites • Concert halls • Parks • Stadiums
Natural Environment	Most valuable areas that can provide protective functions that reduce the magnitude of hazard events. Critical habitat areas and other environmental features that are important to protect.	

Plan integration is essential to the success of mitigation projects; the more times a project is referenced, the higher the chance it has to be completed. Likewise, mitigation actions can be included across a broad spectrum of county, city, and regional plans. The consultant gave examples of different plans that could be included with hazard mitigation projects; these include comprehensive plans, emergency operations plans, etc. One member of the committee offered an example for United Way; they have a Volunteer Reception Plan. The consultant will present a possible list of plans for approval by the committee.

This plan must be updated every five years, according to FEMA. The committee decided that the best course of action to evaluate, monitor, and update the plan in the next five years would be to hold an annual committee meeting and keep a running tally of incidents and projects. LCEMA will also ask the jurisdictions to keep them informed of projects as they apply for grants and continue to develop their strategies.

At their annual meetings the committee can update different sections of the plan according to what is relevant at the time. For example, review and revise the hazard profiles due to an incident or declaration, or review and update the project list due to a completion or delay of a project.

The consultant encourages everyone to post the public survey link on their social media and agency or jurisdictional websites (https://www.surveymonkey.com/r/LucasHMP-Public1). The following is a brief summary of the results so far.

- The public survey has 106 responses as of the date of this meeting.
- The majority of people are concerned with severe winter storms, tornadoes, and severe storms, followed by extreme temperatures and floods.
- In the past 10 years, the public reports that severe storms and severe winter storms have happened the most, followed closely by tornadoes and temperature extremes.
- People have the opportunity to include their own responses about hazards that have occurred in the past 10 years and the most common response was water crisis.
- The majority of respondents are from unincorporated areas of Lucas County and Toledo.

All cities, villages and townships representatives should take the capabilities survey online. This survey is designed to gather information about rules, regulations, and ordinances in the jurisdiction, as well as political, technical, administrative, and fiscal capabilities to implement mitigation projects. The link is the following – remember, this is not a public survey - https://www.surveymonkey.com/r/LucasHMP-Capabilities .

Public meetings will need to be scheduled. The LCEMA checked for availability at their training center. The committee decided to hold two meetings on Tuesday, August 21, one during business hours, the other after business hours. One committee member suggested the possibility of having a public meeting at the downtown library. The consultant offered to send information about the meeting for posting it on social media and printing in newspapers to anyone who wanted it.

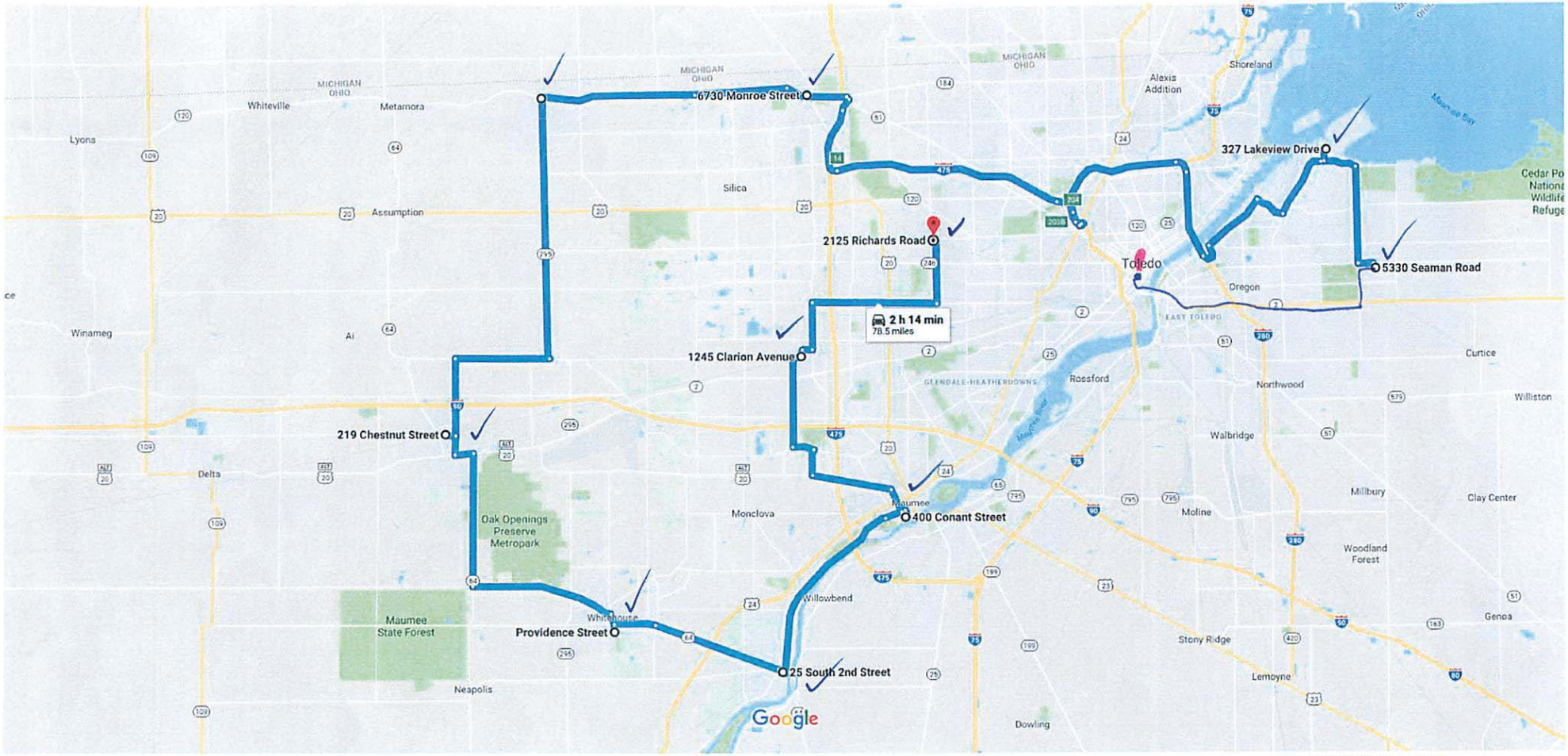
The next meeting for the steering committee is scheduled for Thursday, August 23, 2018 at 10:00 a.m. at the Lucas County EMA conference room.

JURISDICTIONAL VISITS

August 22, 2018

Google Maps 5330 Seaman Road, Oregon, OH to 2125 Richards Road, Ottawa Hills, OH

Drive 78.5 miles, 2 h 14 min



via N Wynn Rd
2 h 14 min without traffic

2 h 14 min
78.5 miles

Toledo
Oregon
Harbor View
Sylvania
Berkey
Swanton
Whitehouse
Waterville
Maumee

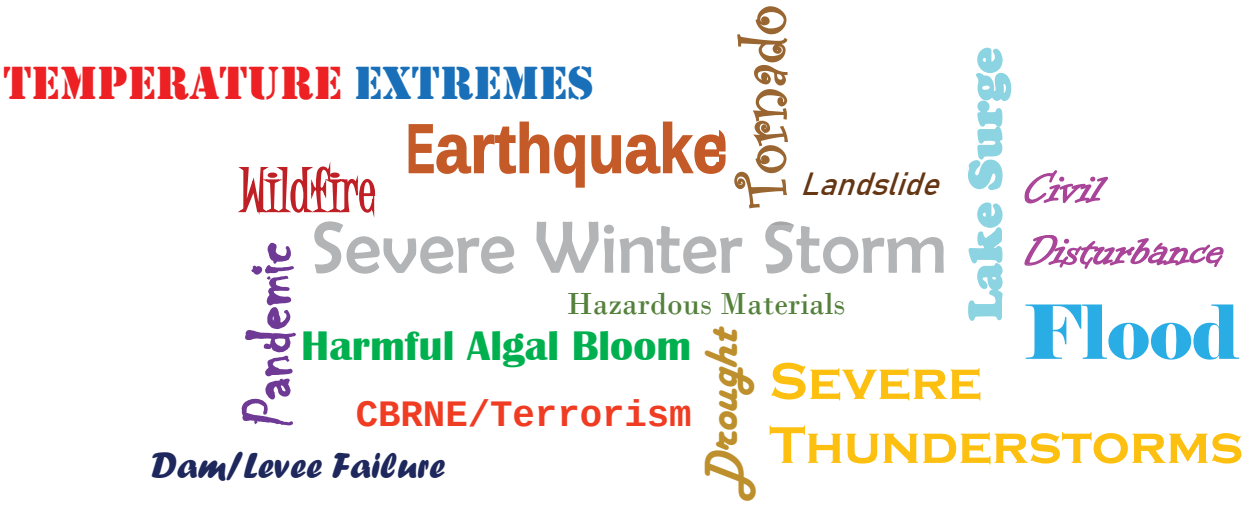
Holland
Ottawa Hills

LUCAS COUNTY HAZARD MITIGATION PLAN UPDATE 2018

Lucas County has begun the process of updating the hazard mitigation plan. This plan must be updated every five years according to the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* and the *Disaster Mitigation Act of 2000*; regulatory requirements are outlined in chapter 44 of the Code of Federal Regulations (CFR) §201.6.

Mitigation is the reduction of the loss of life and property, human suffering, economic disruptions, and disaster assistance cost resulting from disasters. Mitigation activities are implemented *before* a disaster.

Hazards are sources of potential damage, harm or adverse health effects on something or someone. In Lucas County, the planning committee in charge of the update established a list of *potential hazards* in the area.



Surveys are used for different reasons. Currently, there are two public surveys available and one for jurisdictional representatives to complete. You may post the following two links on your social media to garner public input (feel free to take it yourself as well!). The first one is www.surveymonkey.com/r/LucasHMP-Public1 and the second link is www.surveymonkey.com/r/LucasHMP-Public2 . The jurisdictional survey, one that only your jurisdictional representative will complete, will ask you about the rules, regulations, plans, and ordinances you already have in place. Please take a few minutes to complete this short survey: www.surveymonkey.com/r/LucasHMP-Capabilities

Contact Matt Krause at Lucas County EMA mkrause@co.lucas.oh.us or Amy Heimberger Lopez from JH Consulting aheimberger@jhcpreparedness.com for more information on this project.

Did you know?
For every $1 invested in mitigation, $6 can be saved down the road?

LUCAS COUNTY EMA

FEMA

Fact Sheet

Federal Insurance and Mitigation Administration

LOCAL HAZARD MITIGATION PLANNING

Hazard Mitigation Planning for Resilient Communities

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

Hazard mitigation is best accomplished when based on a comprehensive, long-term plan developed before a disaster strikes. Mitigation planning is the process used by state, tribal, and local leaders to understand risks from natural hazards and develop long-term strategies that will reduce the impacts of future events on people, property, and the environment.

The Local Mitigation Planning Process

The mitigation plan is a community-driven, living document. The planning process itself is as important as the resulting plan because it encourages communities to integrate mitigation with day-to-day decision making regarding land use planning, floodplain management, site design, and other functions. Mitigation planning includes the following elements:

Public Involvement – Planning creates a way to solicit and consider input from diverse interests, and promotes discussion about creating a safer, more disaster-resilient community. Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies, businesses, civic groups, environmental groups, and schools.

Risk Assessment – Mitigation plans identify the natural hazards and risks that can impact a community based on historical experience, estimate the potential frequency and magnitude of disasters, and assess potential losses to life and property. The risk assessment process provides a factual basis for the activities proposed in the mitigation strategy.

Mitigation Strategy – Based on public input, identified risks, and available capabilities, communities develop mitigation goals and objectives as part of a strategy for mitigating hazard-related losses. The strategy is a community's approach for implementing mitigation activities that are cost-effective, technically feasible, and environmentally sound as well as allowing strategic investment of limited resources.

Disaster Mitigation Act of 2000

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000, is intended to "reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters."

Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through the Hazard Mitigation Assistance Programs. The regulatory requirements for local hazard mitigation plans can be found at Title 44 Code of Federal Regulations §201.6.

For more information about FEMA's Hazard Mitigation Assistance Grants, visit: www.fema.gov/hazard-mitigation-assistance.

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

Benefits of Hazard Mitigation

Mitigation is an investment in your community's future safety and sustainability. Mitigation planning helps you take action now, before a disaster, to reduce impacts when a disaster occurs. Hazard mitigation planning helps you think through how you choose to plan, design, and build your community and builds partnerships for risk reduction throughout the community. Consider the critical importance of mitigation to:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Maintain community continuity and strengthen the social connections that are essential for recovery.
- Prevent damage to your community's unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Having a hazard mitigation plan will increase awareness of hazards, risk, and vulnerabilities; identify actions for risk reduction; focus resources on the greatest risks; communicate priorities to state and federal officials; and increase overall awareness of hazards and risks.

Mitigation Activities for Risk Reduction

Possible mitigation activities may include:

Adoption and enforcement of regulatory tools, including ordinances, regulations, and building codes, to guide and inform land use, development, and redevelopment decisions in areas affected by hazards.

Acquisition or elevation of flood-damaged homes or businesses retrofit public buildings, schools, and critical facilities to withstand extreme wind events or ground shaking from earthquakes.

Creating a buffer area by protecting natural resources, such as floodplains, wetlands, or sensitive habitats. Additional benefits to the community may include improved water quality and recreational opportunities.

Implement outreach programs to educate property owners and the public about risk and about mitigation measures to protect homes and businesses.

Mitigation Plan Implementation & Monitoring

History shows that hazard mitigation planning and the implementation of risk reduction activities can significantly reduce the physical, financial, and emotional losses caused by disasters. Putting the plan into action will be an ongoing process that may include initiating and completing mitigation projects and integrating mitigation strategies into other community plans and programs. Monitoring the plan's implementation helps to ensure it remains relevant as community priorities and development patterns change.

Planning Guidance, Tools, and Resources

FEMA provides a variety of guidance, tools, and resources to help communities develop hazard mitigation plans. These resources and more can be found online at: www.fema.gov/hazard-mitigation-planning-resources.

- Hazard mitigation planning laws, regulations, and policies guide development of state, local, and tribal FEMA-approved hazard mitigation plans.
- The Local Mitigation Planning Handbook is the official guide for governments to develop, update, and implement local plans. The Handbook includes guidance, tools, and examples communities can use to develop their plans.
- Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards provides ideas for mitigation actions.
- Visit www.fema.gov/hazard-mitigation-planning-training for more information on available online and in-person mitigation planning training.

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

MITIGATION PROJECT IDEAS

Types of Mitigation Actions

1. Local Planning and Regulations
2. Structure and Infrastructure Projects
3. Natural Systems Protection
4. Education and Awareness Programs

General examples are planning and zoning, floodplain protection, property acquisition and relocation, or public outreach projects.

FLOODING

Local Planning & Regulations: Comprehensive planning and floodplain management can mitigate flooding by influencing development.

- **Objective:** INCORPORATE FLOOD MITIGATION IN LOCAL PLANNING.
  - **Strategy:** Pass and enforce an ordinance that regulates dumping in streams and ditches.

Structure & Infrastructure Projects: Rainwater and snowmelt can cause flooding and erosion in developed areas.

- **Objective:** IMPROVE STORM WATER DRAINAGE SYSTEM CAPACITY.
  - **Strategy:** Require developers to construct on-site retention basins for storm water and as a firefighting water source.

Natural Systems Protection: Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate flooding.

- **Objective:** PROTECT & RESTORE NATURAL FLOOD MITIGATION FEATURES.
  - **Strategy:** Establish and manage riparian buffers along rivers and streams.

Education & Awareness Programs: Support mitigation by educating property owners regarding options for mitigating their own properties.

- **Objective:** EDUCATE PROPERTY OWNERS ABOUT FLOOD MITIGATION TECHNIQUES.
  - **Strategy:** Educate the public about securing debris, propane tanks, yard items, or stored objects that might otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters.

SEVERE WEATHER

Local Planning & Regulations: Adopt regulations governing residential construction to prevent wind and other weather damage.

- **Objective:** ADOPT & ENFORCE BUILDING CODES.
  - **Strategy:** Review building codes and structural policies to ensure they are adequate to protect older structures from severe weather damage.

Structure & Infrastructure Projects: Power lines can be protected from the impacts of severe weather.

- **Objective:** PROTECT POWER LINES.
  - **Strategy:** Install redundancies and loop feeds.

Education & Awareness Programs: Support mitigation by lessening impacts to a community's vulnerable populations.

- **Objective:** ASSIST VULNERABLE POPULATIONS.
  - **Strategy:** Identify specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages.

MULTIPLE HAZARDS

Local Planning & Regulations: Understanding community vulnerability and level of risk is important to identify and prioritize mitigation alternatives.

- **Objective:** ASSESS COMMUNITY RISK.
  - **Strategy:** Develop and maintain a database to track community vulnerability (i.e., exposure in known hazard areas).

Structure & Infrastructure Projects: Lessening damage to structures supports mitigation.

- **Objective:** PROTECT STRUCTURES.
  - **Strategy:** Retrofit fire and police stations to become hazard resistant.

Education & Awareness Programs: Encouraging private mitigation reduces the potential strain on public sources.

- **Objective:** PROMOTE PRIVATE MITIGATION EFFORTS.
  - **Strategy:** Use outreach programs to: (a) advise homeowners of risks to life, health, and safety; (b) facilitate technical assistance programs that address measures citizens can take; or (c) facilitate funding for mitigation measures.

EARTHQUAKE

Local Planning & Regulations: Support mitigation by better understanding and assessing local vulnerability to earthquakes.

- **Objective:** MAP AND ASSESS COMMUNITY VULNERABILITY TO SEISMIC HAZARDS.
  - **Strategy:** Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and homes with cripple wall foundations.

Structure & Infrastructure Projects: Reduce potential damage to critical facilities and infrastructure from future seismic events through structural upgrades.

- **Objective:** PROTECT CRITICAL FACILITIES & INFRASTRUCTURE.
  - **Strategy:** Require bracing of generators, elevators, and other vital equipment at hospitals.

Education & Awareness Programs: Support mitigation through increasing awareness of the hazard.

- **Objective:** INCREASE EARTHQUAKE RISK AWARENESS.
  - **Strategy:** Offer GIS hazard mapping online for residents and design professionals.

LAND SUBSIDENCE

Local Planning & Regulations: Support mitigation by ensuring that development efforts consider the soil conditions of an area.

- **Objective:** MANAGE DEVELOPMENT IN HIGH-RISK AREAS.
  - **Strategy:** Restrict develop in areas with soil that is considered poor or unsuitable for development.

Structure & Infrastructure Projects: To prevent property loss, acquire and demolish or relocate buildings and infrastructure in high-risk areas.

- **Objective:** REMOVE EXISTING STRUCTURES FROM SUBSIDENCE HAZARD AREAS.
  - **Strategy:** Identify and offer buyouts and other incentives for property owners who relocate from subsidence-prone areas.

Education & Awareness Programs: Support mitigation by increasing residents' knowledge of subsidence.

- **Objective:** EDUCATE RESIDENTS ABOUT SUBSIDENCE.
  - **Strategy:** Promote community awareness of subsidence risks and impacts.

DROUGHT

Local Planning & Regulations: Monitoring drought conditions can provide early warning for policymakers and planners to make decisions.

- **Objective:** MONITOR DROUGHT CONDITIONS.
  - **Strategy:** Identify local drought indicators, such as precipitation, temperature, surface water levels, soil moisture, etc. Establish a regular schedule to monitor and report conditions on at least a monthly basis.

Structure & Infrastructure Projects: Improving water supply and delivery systems helps to save water.

- **Objective:** RETROFIT WATER SUPPLY SYSTEMS.
  - **Strategy:** Develop new or upgrade existing water delivery systems to eliminate breaks and leaks.

Natural Systems Protection: Certain landscaping and civil design techniques can encourage a drought-tolerant landscape.

- **Objective:** ENHANCE LANDSCAPING & DESIGN MEASURES.
  - **Strategy:** Use permeable driveways and surfaces to reduce runoff and promote groundwater discharge.

Education & Awareness Programs: Encourage practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts.

- **Objective:** EDUCATE FARMERS ON SOIL & WATER CONSERVATION PRACTICES.
  - **Strategy:** Encourage rotation of crops by growing a series of different types of crops on the same fields every season to reduce soil erosion.

COMMITTEE MEETING 4

August 23, 2018

Lucas County Emergency Management Agency

LUCAS COUNTY HAZARD MITIGATION PLAN

STEERING COMMITTEE MEETING 4

Thursday, August 23, 2018 ~ 10:00 a.m.
Sign In Sheet

	Name	Affiliation	Email
1.	Kari Gerwin	TMACOG	kari_gerwin@yahoo.com
2.	Beatrice Miringu	COT-	beatrice.miringu@toledo.oh.gov
3.	MICHELLE HUGHES TUCKER	COT	michelle.tucker@toledo.oh.gov
4.	Abby Buchhop	LCEMA	abuchhop@co.lucas.oh.us
5.	Greg Bonfiglio	LC911	gbonf@co.lucas.oh.us
6.	Phil Cook	TPD	Philip.Cook@toledo.oh.gov
7.	PATRICK WAMBO	WATERVILLE CITY FD	pwambo@waterville.org
8.	JOSH HARTBARGER	WHITEHOUSE	jhartbarger@whitehouseoh.gov
9.	Alethea Reshan	LCEMA	areshan@co.lucas.oh.us
10.	Dan Baker	Lucas Co. Hlth. Dept.	dbaker@co.lucas.oh.us
11.	Matt Krause	Lucas Cty EMA	mkrause@co.lucas.oh.us
12.	Tina Mack	LC Auditor	tnmack@co.lucas.oh.us
13.	Joe Fausnaugh	Metroparks	joe.fausnaugh@metroparkstoledo.com
14.	Amy H López	JH Consulting	
15.			
16.			

LUCAS COUNTY HAZARD MITIGATION PLAN
PLANNING COMMITTEE MEETING #4

MINUTES

Date: Thursday, August 23, 2018
Time: 10:00 a.m.
Duration: 120 minutes
Location: Lucas County Emergency Management Agency
2144 Monroe Street
Toledo, OH 43604

On Thursday, August 23, 2018, the planning committee met for the fourth time.

The consultant reviewed the five-year cycle for the update of the hazard mitigation plan so the full committee was familiar with the process.

LCEMA mentioned that they had a list of fire stations to add to the assets list but were still working on the remainder of the list. The committee discussed the types of assets they would include: critical facilities, government buildings, schools, fire stations, etc. In general, the list will include pump stations, bridges, roads, railways. In terms of adding economic assets, the committee decided to add the top employers for the county rather than top employers for each jurisdiction because the top employers in the county are more likely to pull employees from all over the county and would affect more people.

The consultant gave a brief overview of the public meetings held earlier that week; twelve people attended the first meeting at 1:30 p.m. and six attended the second public meeting at 6:30. As for the public surveys, there are two; the first relates to hazards and has 110 responses as of this meeting and the second relates to hazard mitigation actions. Committee members suggested pushing out the survey to the public via text messages. However, Lucas County EMA only sends out life safety information. Some committee members have received surveys via text message from the Toledo Police Department. LCEMA is going to check about getting the survey distributed via email to people who have signed up for Lucas County Alerts but would rather utilize each jurisdiction's notification system to send out the survey information. The committee decided to hold off on pushing out survey information until the draft version of the plan is ready for public view. At that time,

the notification can mention the plan as well as the survey.

Continued public involvement will include:

- Have a poster presentations or information available for the public at community preparedness events after the annual committee meetings.
- Distributing preparedness coloring books from FEMA and the Red Cross
- Safe-T-City with the police department
- Lucas County employee wellness event
- Have a "plan reveal" after FEMA has approved the plan; press release possibly or a presentation in front of the Lucas County Commissioners
- Have the plan available on various websites
- Any event will be documented and forwarded to LCEMA for record keeping

The consultant spent the day on Wednesday, August 22, 2018 visiting each jurisdiction in Lucas County. Each jurisdiction should have mitigation projects in the plan. The county has many projects already that are ongoing; the committee should consider only adding projects for the new hazards that they identified in previous meetings. All the current (2013) projects will be listed in the plan; if they are ongoing or still being considered for implementation, they will be included in the 'active' list along with any new projects. Projects that have been completed or are no longer feasible for implementation will be included on the 'inactive' project list in an appendix.

The committee decided to prioritize projects based on various factors including probability, severity, resiliency, ability to implement, etc. The consultant will send a full list to the committee for their review and prioritization. Once committee members fill out their personal rankings of the criteria and return them to the consultant, the consultant will average out the results and create the final list of project priorities.

This plan is important because it helps protect property and promotes public safety, because it is more realistic than the previous one regarding projects that can be implemented, be responsive and resilient to disasters and emergencies, and strengthening partnerships.

Public Surveys Links:

Public survey #1: https://www.surveymonkey.com/r/LucasHMP-Public1

Public survey #2: https://www.surveymonkey.com/r/LucasHMP-Public2

TMACOG NEWSLETTER

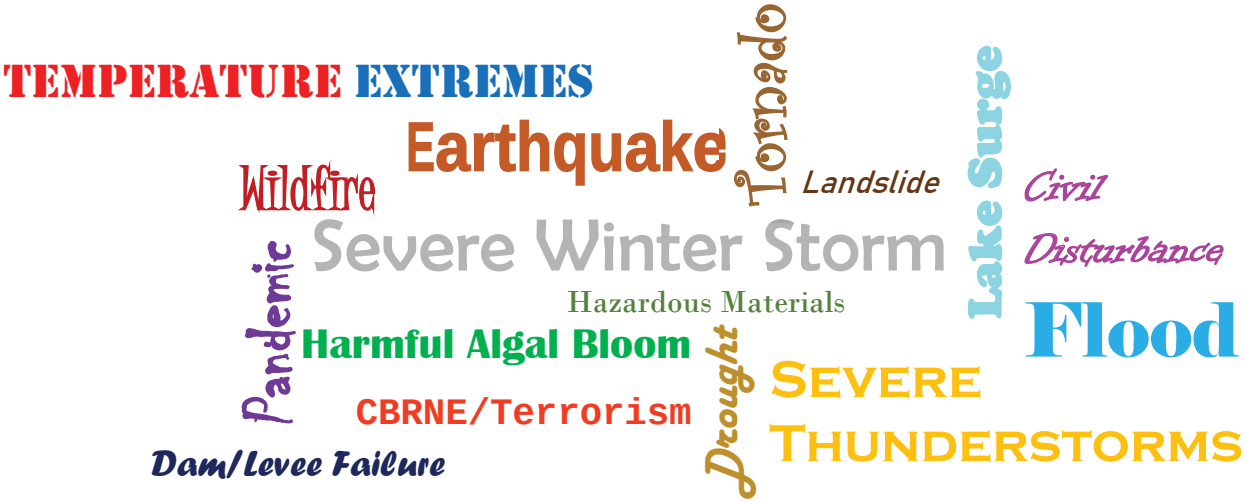
October 2018 Newsletter

LUCAS COUNTY HAZARD MITIGATION PLAN UPDATE 2018

Lucas County is in the process of updating the hazard mitigation plan. This plan must be updated every five years according to the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* and the *Disaster Mitigation Act of 2000*; regulatory requirements are outlined in chapter 44 of the Code of Federal Regulations (CFR) §201.6.

Mitigation is the reduction of the loss of life and property, human suffering, economic disruptions, and disaster assistance cost resulting from disasters. Mitigation activities are implemented *before* a disaster.

Hazards are sources of potential damage, harm or adverse health effects on something or someone. In Lucas County, the planning committee in charge of the update established a list of *potential hazards* in the area.



How does all this apply to you? FEMA requires participation from every jurisdiction in the County for the plan. To achieve participation in the plan, there are several things you can do.

- Complete the online capabilities survey for your jurisdiction; this is not a public survey and is intended for completion by jurisdictional representatives. Use the following link to get to the survey: www.surveymonkey.com/r/LucasHMP-Capabilities
- Tell us about the ongoing problems you see in your community that result from any of the hazards listed above. See the attached worksheet.
- Send the filled out worksheet back to Matt or Amy by Monday October 22, 2018. If you need any assistance or explanations, do not hesitate in contacting Matt or Amy.

Contact Matt Krause | Lucas County EMA | mkrause@co.lucas.oh.us or
Amy Heimberger Lopez | JH Consulting | aheimberger@jhcpreparedness.com

Did you know?
For every $1 communities invest in mitigation, they will save $6 down the road?

JH Consulting LLC

LUCAS COUNTY EMA

FEMA

Fact Sheet

Federal Insurance and Mitigation Administration

LOCAL HAZARD MITIGATION PLANNING

Hazard Mitigation Planning for Resilient Communities

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

Hazard mitigation is best accomplished when based on a comprehensive, long-term plan developed before a disaster strikes. Mitigation planning is the process used by state, tribal, and local leaders to understand risks from natural hazards and develop long-term strategies that will reduce the impacts of future events on people, property, and the environment.

The Local Mitigation Planning Process

The mitigation plan is a community-driven, living document. The planning process itself is as important as the resulting plan because it encourages communities to integrate mitigation with day-to-day decision making regarding land use planning, floodplain management, site design, and other functions. Mitigation planning includes the following elements:

Public Involvement – Planning creates a way to solicit and consider input from diverse interests, and promotes discussion about creating a safer, more disaster-resilient community. Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies, businesses, civic groups, environmental groups, and schools.

Risk Assessment – Mitigation plans identify the natural hazards and risks that can impact a community based on historical experience, estimate the potential frequency and magnitude of disasters, and assess potential losses to life and property. The risk assessment process provides a factual basis for the activities proposed in the mitigation strategy.

Mitigation Strategy – Based on public input, identified risks, and available capabilities, communities develop mitigation goals and objectives as part of a strategy for mitigating hazard-related losses. The strategy is a community's approach for implementing mitigation activities that are cost-effective, technically feasible, and environmentally sound as well as allowing strategic investment of limited resources.

Disaster Mitigation Act of 2000

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000, is intended to "reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters."

Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through the Hazard Mitigation Assistance Programs. The regulatory requirements for local hazard mitigation plans can be found at Title 44 Code of Federal Regulations §201.6.

For more information about FEMA's Hazard Mitigation Assistance Grants, visit: www.fema.gov/hazard-mitigation-assistance.

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

Benefits of Hazard Mitigation

Mitigation is an investment in your community's future safety and sustainability. Mitigation planning helps you take action now, before a disaster, to reduce impacts when a disaster occurs. Hazard mitigation planning helps you think through how you choose to plan, design, and build your community and builds partnerships for risk reduction throughout the community. Consider the critical importance of mitigation to:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Maintain community continuity and strengthen the social connections that are essential for recovery.
- Prevent damage to your community's unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Having a hazard mitigation plan will increase awareness of hazards, risk, and vulnerabilities; identify actions for risk reduction; focus resources on the greatest risks; communicate priorities to state and federal officials; and increase overall awareness of hazards and risks.

Mitigation Activities for Risk Reduction

Possible mitigation activities may include:

Adoption and enforcement of regulatory tools, including ordinances, regulations, and building codes, to guide and inform land use, development, and redevelopment decisions in areas affected by hazards.

Acquisition or elevation of flood-damaged homes or businesses retrofit public buildings, schools, and critical facilities to withstand extreme wind events or ground shaking from earthquakes.

Creating a buffer area by protecting natural resources, such as floodplains, wetlands, or sensitive habitats. Additional benefits to the community may include improved water quality and recreational opportunities.

Implement outreach programs to educate property owners and the public about risk and about mitigation measures to protect homes and businesses.

Mitigation Plan Implementation & Monitoring

History shows that hazard mitigation planning and the implementation of risk reduction activities can significantly reduce the physical, financial, and emotional losses caused by disasters. Putting the plan into action will be an ongoing process that may include initiating and completing mitigation projects and integrating mitigation strategies into other community plans and programs. Monitoring the plan's implementation helps to ensure it remains relevant as community priorities and development patterns change.

Planning Guidance, Tools, and Resources

FEMA provides a variety of guidance, tools, and resources to help communities develop hazard mitigation plans. These resources and more can be found online at: www.fema.gov/hazard-mitigation-planning-resources.

- Hazard mitigation planning laws, regulations, and policies guide development of state, local, and tribal FEMA-approved hazard mitigation plans.
- The Local Mitigation Planning Handbook is the official guide for governments to develop, update, and implement local plans. The Handbook includes guidance, tools, and examples communities can use to develop their plans.
- Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards provides ideas for mitigation actions.
- Visit www.fema.gov/hazard-mitigation-planning-training for more information on available online and in-person mitigation planning training.

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

NEW AND EXISTING MITIGATION PROJECTS FOR THE LUCAS COUNTY HAZARD MITIGATION PLAN UPDATE

Please fill out the following table as completely as you can. These will be your jurisdiction's new mitigation projects for the plan. Please fill out ***at least two*** problems you have identified.

Hazard of concern	*Reasons for concern*	*Impacts or destruction from hazard*	*What has been done?*	*What should be done?*	*Can your jurisdiction do this or would it require outside help? From whom?*
a. Ex. Flood	*Ex. The storm sewers back up causing flooding throughout the town.*	*Ex. Main St. floods every time it rains for over two hours and causes the street to be closed to traffic. Businesses are impacted by the loss in revenue from the lack of access.*	*Ex. We have identified the problem areas within the stormwater system that need maintenance/rebuilding.*	*Ex. We will build retention basins in several locations to help with the amount of water reaching the drains.*	*Ex. The town's public works department can do the physical work, but does not have the funding. Would require outside funds from grants.*
b. Ex. Heavy Snow	*Ex. The buildings in our town are very old and may not handle the increased amount of snow we've seen in the recent years.*	*Ex. Two residences' roofs have collapsed due to the heavy snow load.*	*Ex. New construction is now required to address the higher snow loads.*	*Ex. Any reconstruction of old residences will be required to follow current building code standards to reduce the impacts. We will encourage residents to reinforce their homes.*	*Ex. Yes, the town's building inspector can enforce the codes by issuing or not issuing permits for any type of construction. No additional funding is required.*
1.					
2.					

Hazard of concern	*Reasons for concern*	*Impacts or destruction from hazard*	*What has been done?*	*What should be done?*	*Can your jurisdiction do this or would it require outside help? From whom?*
3.					
4.					
5.					
6.					
7.					

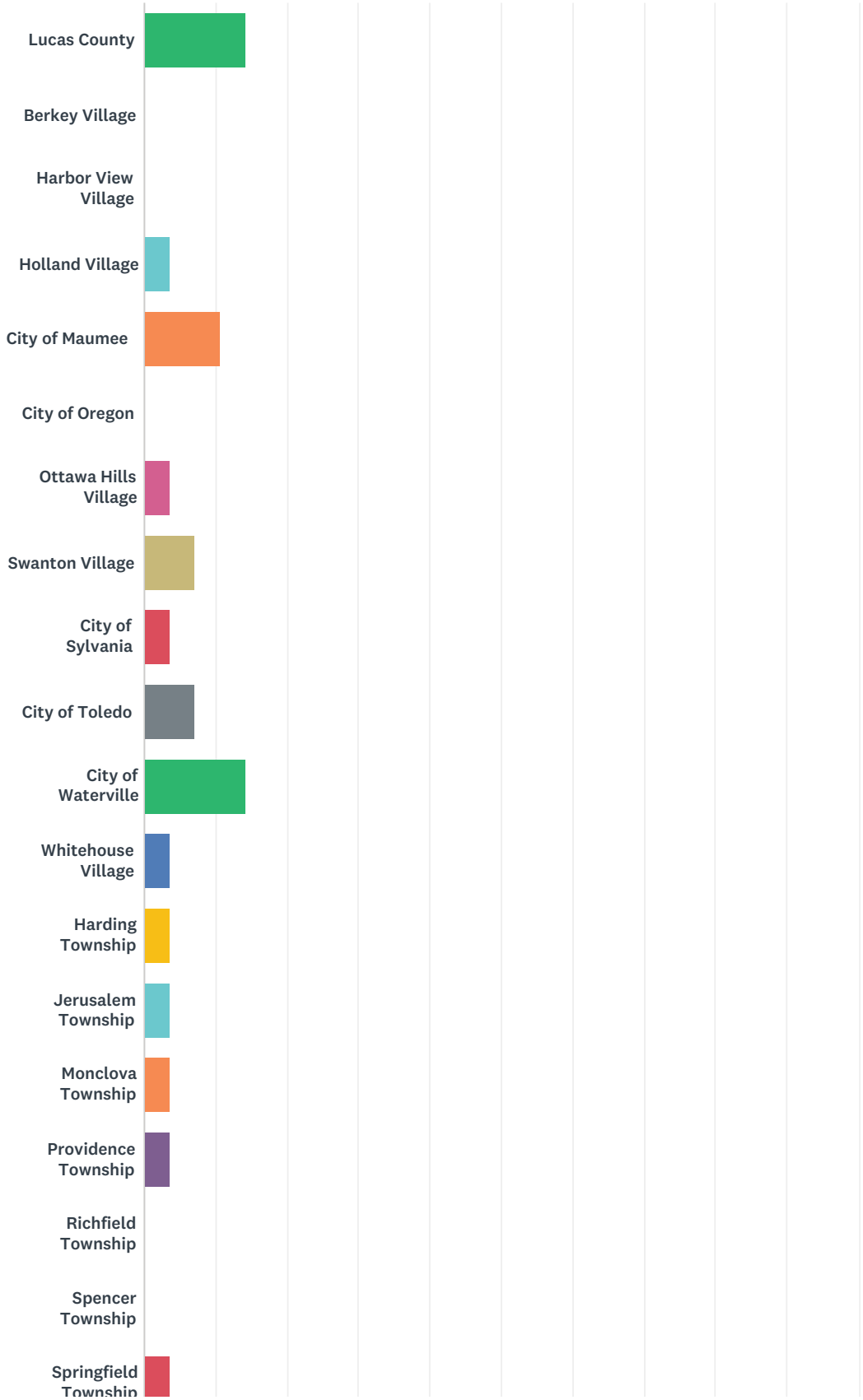
CAPABILITIES SURVEY

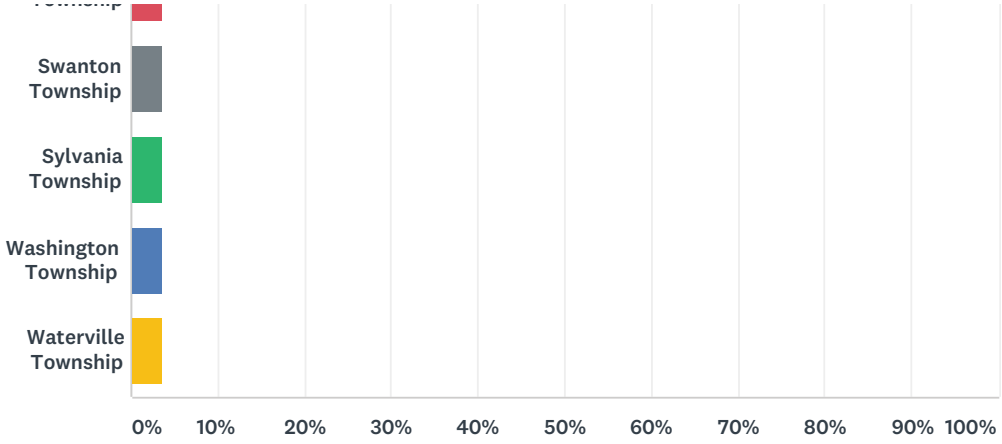
Raw survey data

Summary of NFIP participation

Q1 What is the name of your jurisdiction?

Answered: 28 Skipped: 0





ANSWER CHOICES	RESPONSES	
Lucas County	14.29%	4
Berkey Village	0.00%	0
Harbor View Village	0.00%	0
Holland Village	3.57%	1
City of Maumee	10.71%	3
City of Oregon	0.00%	0
Ottawa Hills Village	3.57%	1
Swanton Village	7.14%	2
City of Sylvania	3.57%	1
City of Toledo	7.14%	2
City of Waterville	14.29%	4
Whitehouse Village	3.57%	1
Harding Township	3.57%	1
Jerusalem Township	3.57%	1
Monclova Township	3.57%	1
Providence Township	3.57%	1
Richfield Township	0.00%	0
Spencer Township	0.00%	0
Springfield Township	3.57%	1
Swanton Township	3.57%	1
Sylvania Township	3.57%	1
Washington Township	3.57%	1
Waterville Township	3.57%	1
TOTAL		28

Q2 Please provide your name and email address/phone number so that we may contact you with any questions about this survey.

Answered: 28 Skipped: 0

ANSWER CHOICES	RESPONSES	
Name	100.00%	28
Company	0.00%	0
Address	0.00%	0
Address 2	0.00%	0
City/Town	0.00%	0
State/Province	0.00%	0
ZIP/Postal Code	0.00%	0
Country	0.00%	0
Email Address	100.00%	28
Phone Number	100.00%	28

#	NAME	DATE
1	Chief Michael Wolever	11/13/2018 10:58 AM
2	Michael Hampton	10/30/2018 7:06 AM
3	Linda Rossler, Zoning Inspector	10/29/2018 2:54 PM
4	Michael Wolever	10/29/2018 10:39 AM
5	Harold Grim	10/23/2018 2:11 PM
6	Larry Buckenmeyer	9/24/2018 5:49 PM
7	Michael Ramm	9/24/2018 3:36 PM
8	Jeremiah Floyd	9/24/2018 3:13 PM
9	Cynthia Burkey	9/24/2018 1:45 PM
10	Joshua Hartbarger	9/24/2018 1:45 PM
11	Lorie Haslinger	9/24/2018 1:43 PM
12	Abby Arnold	9/24/2018 1:01 PM
13	David LaGrange	8/29/2018 8:02 AM
14	James Bagdonas	8/28/2018 2:38 PM
15	Robert Reed	8/23/2018 9:41 AM
16	Bruce Wholf	8/13/2018 10:25 AM
17	Ronald Kay	6/25/2018 11:20 AM
18	Richard Bingham	6/21/2018 12:23 PM
19	Patrick Wambo	6/12/2018 2:19 PM
20	Tony Parasiliti	6/11/2018 12:56 PM
21	BRANDON LOBOSCHEFSKI	6/8/2018 9:24 AM

22	Ken Bucher	6/8/2018 7:30 AM
23	David LaGrange	6/7/2018 7:25 AM
24	Kevin Bernhard	6/6/2018 4:05 PM
25	Sgt. Danilynn Miller	5/29/2018 1:57 PM
26	Ohio State University Extension-Lucas County	5/22/2018 7:21 AM
27	Bruce Wholf	5/7/2018 12:11 PM
28	John Wenzlick	5/7/2018 11:56 AM
#	**COMPANY**	**DATE**
	There are no responses.	
#	**ADDRESS**	**DATE**
	There are no responses.	
#	**ADDRESS 2**	**DATE**
	There are no responses.	
#	**CITY/TOWN**	**DATE**
	There are no responses.	
#	**STATE/PROVINCE**	**DATE**
	There are no responses.	
#	**ZIP/POSTAL CODE**	**DATE**
	There are no responses.	
#	**COUNTRY**	**DATE**
	There are no responses.	
#	**EMAIL ADDRESS**	**DATE**
1	sfd@villageofswantonohio.us	11/13/2018 10:58 AM
2	mhampton@springfieldtownship.net	10/30/2018 7:06 AM
3	zoning@twp.Jerusalem.oh.us	10/29/2018 2:54 PM
4	mikewolever@gmail.com	10/29/2018 10:39 AM
5	hgrim@monclovatwp.org	10/23/2018 2:11 PM
6	larryjb@embarqmail.com	9/24/2018 5:49 PM
7	mramm@sylvaniatownshipfire.com	9/24/2018 3:36 PM
8	Jeremiahfloyd21@yahoo.com	9/24/2018 3:13 PM
9	cyn.burkey@gmail.com	9/24/2018 1:45 PM
10	jhartbarger@whitehouseoh.gov	9/24/2018 1:45 PM
11	Lorie.haslinger@toledo.oh.gov	9/24/2018 1:43 PM
12	abby.arnold@toledo.oh.gov	9/24/2018 1:01 PM
13	wpdchief@waterville.org	8/29/2018 8:02 AM
14	jbagdonas@waterville.org	8/28/2018 2:38 PM
15	police.chief@hollandohio.com	8/23/2018 9:41 AM
16	wholf-bruce@maumee.org	8/13/2018 10:25 AM
17	ronald.kay@wtfd.net	6/25/2018 11:20 AM
18	bcjrz@yahoo.com	6/21/2018 12:23 PM
19	pwambo@waterville.org	6/12/2018 2:19 PM

20	tparasiliti@jtfire.com	6/11/2018 12:56 PM
21	loboschefski-brandon@maumee.org	6/8/2018 9:24 AM
22	kbucher@monclovatwp.org	6/8/2018 7:30 AM
23	wpdchief@waterville.org	6/7/2018 7:25 AM
24	chiefbernhard@monclovatwp.org	6/6/2018 4:05 PM
25	sgt.miller@sylvaniapolice.com	5/29/2018 1:57 PM
26	ball.2129@osu.edu	5/22/2018 7:21 AM
27	wholf-bruce@maumee.org	5/7/2018 12:11 PM
28	wenzlickj@ottawahills.org	5/7/2018 11:56 AM
#	**PHONE NUMBER**	**DATE**
1	419-825-1455	11/13/2018 10:58 AM
2	419-865-0239	10/30/2018 7:06 AM
3	4192604299	10/29/2018 2:54 PM
4	4194678811	10/29/2018 10:39 AM
5	419-865-9662	10/23/2018 2:11 PM
6	4198268484	9/24/2018 5:49 PM
7	14193434599	9/24/2018 3:36 PM
8	4192970973	9/24/2018 3:13 PM
9	4193569624	9/24/2018 1:45 PM
10	4192626502	9/24/2018 1:45 PM
11	419-245-3221	9/24/2018 1:43 PM
12	419.939.2483	9/24/2018 1:01 PM
13	419-878-8184	8/29/2018 8:02 AM
14	419-878-8100	8/28/2018 2:38 PM
15	419-865-7105	8/23/2018 9:41 AM
16	419-897-7076	8/13/2018 10:25 AM
17	4193505198	6/25/2018 11:20 AM
18	4198789991	6/21/2018 12:23 PM
19	(419) 878-8198	6/12/2018 2:19 PM
20	419-261-4998	6/11/2018 12:56 PM
21	4198977055	6/8/2018 9:24 AM
22	4198786942	6/8/2018 7:30 AM
23	4198788184	6/7/2018 7:25 AM
24	419-865-7859	6/6/2018 4:05 PM
25	419-885-0469	5/29/2018 1:57 PM
26	4192134254	5/22/2018 7:21 AM
27	419-897-7076	5/7/2018 12:11 PM
28	419-536-2570	5/7/2018 11:56 AM

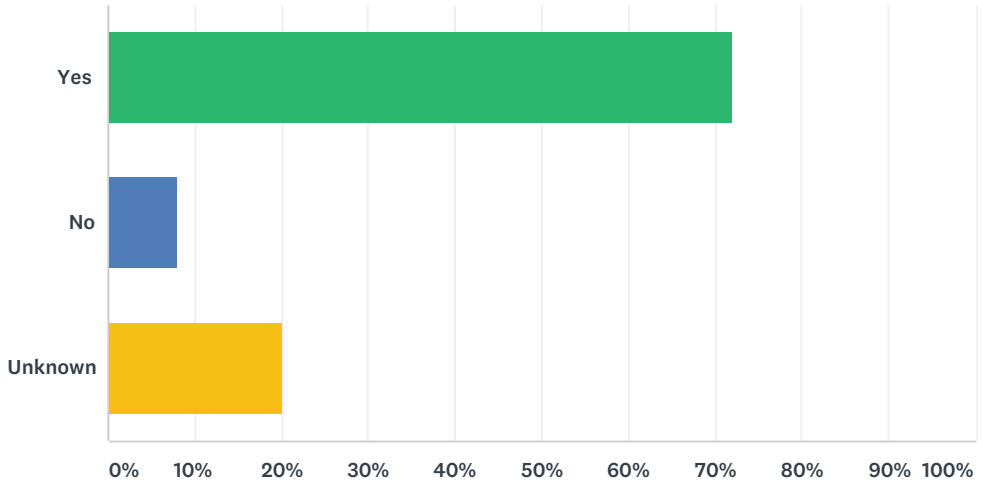
Q3 If you represent a department within that jurisdiction's government structure, what is the name of your department?

Answered: 26 Skipped: 2

#	RESPONSES	DATE
1	Swanton Fire and Rescue Department	11/13/2018 10:58 AM
2	Administration	10/30/2018 7:06 AM
3	Zoning	10/29/2018 2:54 PM
4	Swanton Fire and Rescue	10/29/2018 10:39 AM
5	Administration	10/23/2018 2:11 PM
6	Trustee	9/24/2018 5:49 PM
7	Sylvania Township Fire Dept.	9/24/2018 3:36 PM
8	Providence Township Fire and Rescue	9/24/2018 3:13 PM
9	Township Trustee	9/24/2018 1:45 PM
10	Joshua Hartbarger	9/24/2018 1:45 PM
11	Engineering Services	9/24/2018 1:43 PM
12	Waterville Police Department	8/29/2018 8:02 AM
13	Administration	8/28/2018 2:38 PM
14	Division Of Building & Zoning Inspection	8/13/2018 10:25 AM
15	Washington Township Fire Department	6/25/2018 11:20 AM
16	Waterville Township PD	6/21/2018 12:23 PM
17	City of Waterville Fire Department	6/12/2018 2:19 PM
18	Jerusalem Twp. Fire Rescue	6/11/2018 12:56 PM
19	Maumee Fire Division	6/8/2018 9:24 AM
20	Road Maintenance	6/8/2018 7:30 AM
21	City of Waterville Police Department	6/7/2018 7:25 AM
22	Fire / EMS	6/6/2018 4:05 PM
23	Sylvania Police Division	5/29/2018 1:57 PM
24	Ohio State University Extension-Lucas County	5/22/2018 7:21 AM
25	Division of Building & Zoning Inspection	5/7/2018 12:11 PM
26	Police Department	5/7/2018 11:56 AM

Q4 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 including the location, type and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities and housing needs over time.Does your jurisdiction have or participate in a comprehensive plan?

Answered: 25 Skipped: 3

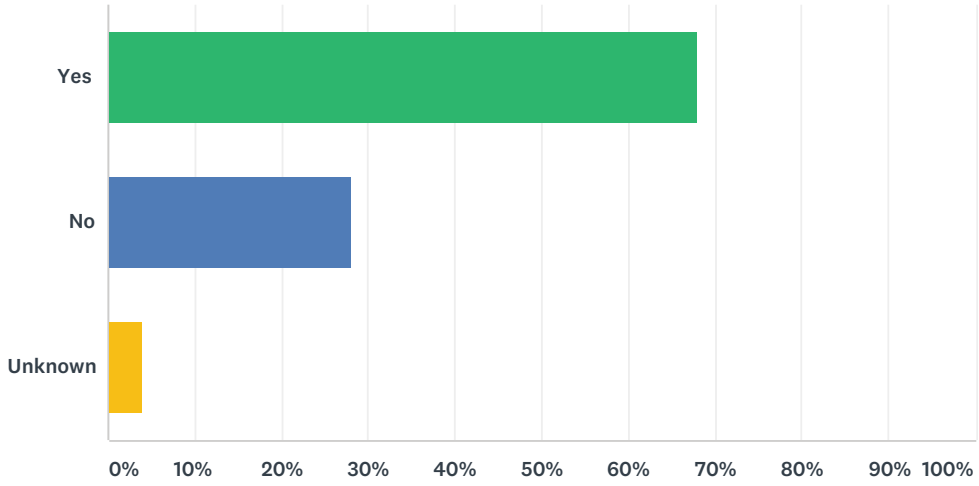


ANSWER CHOICES	RESPONSES	
Yes	72.00%	18
No	8.00%	2
Unknown	20.00%	5
TOTAL		25

#	PLAN NAME (IF APPLICABLE):	DATE
1	Currently updating plan	10/30/2018 7:07 AM
2	Monclova Township Land Use Plan	10/23/2018 2:49 PM
3	Waterville Comprehensive Plan - July 2012	8/28/2018 2:40 PM
4	Lucas County	8/23/2018 9:42 AM
5	Monclova Township Land Use Plan	6/6/2018 4:05 PM
6	Maumee Zoning/Building Code and Maumee Master Plan	5/7/2018 12:13 PM

Q5 Building codes regulate construction standards for new construction and substantially renovated buildings. Does your jurisdiction have a building code in place?

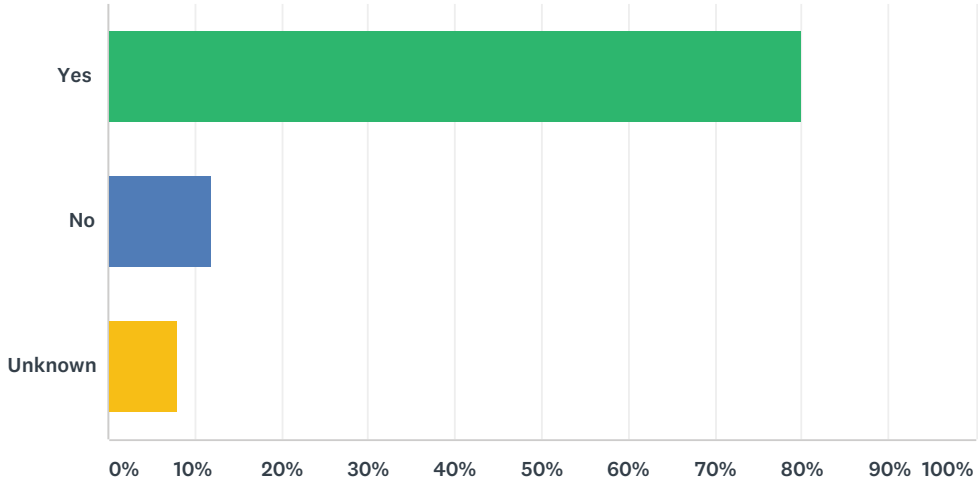
Answered: 25 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	68.00%	17
No	28.00%	7
Unknown	4.00%	1
TOTAL		25

Q6 Subdivision and land development ordinances (SALDOs) are intended to 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 land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events.Does your jurisdiction have a subdivision and/or land use ordinance?

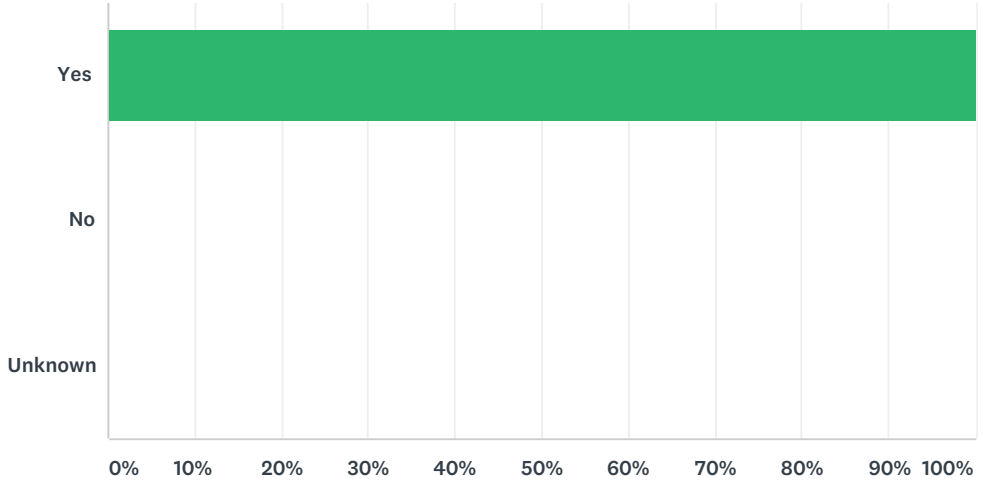
Answered: 25 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	80.00%	20
No	12.00%	3
Unknown	8.00%	2
TOTAL		25

Q7 Zoning ordinances allow for local communities to regulate the use of land in order to protect the interests and safety of the general public. Zoning ordinances can be designed to address unique conditions or concerns in a given community.Does your jurisdiction have a zoning ordinance?

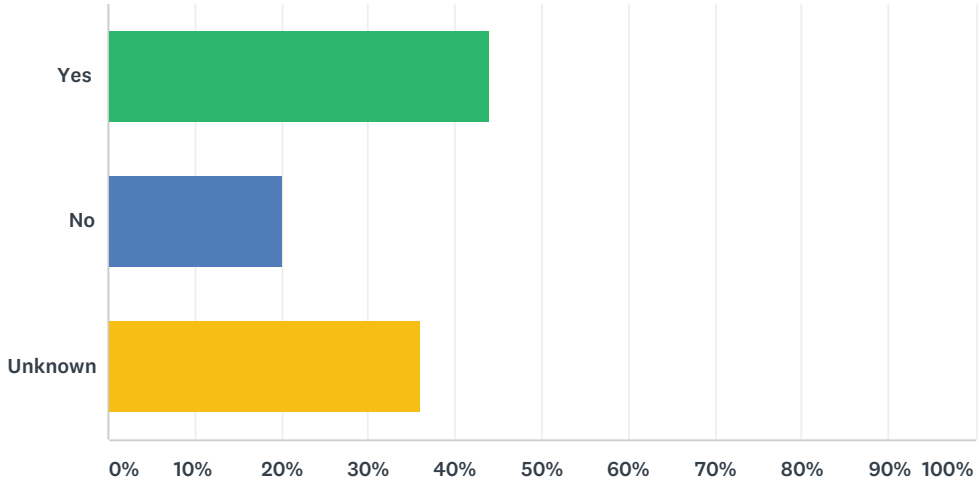
Answered: 25 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	100.00%	25
No	0.00%	0
Unknown	0.00%	0
TOTAL		25

Q8 Does your municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital FIRM (DFIRM)?

Answered: 25 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	44.00%	11
No	20.00%	5
Unknown	36.00%	9
TOTAL		25

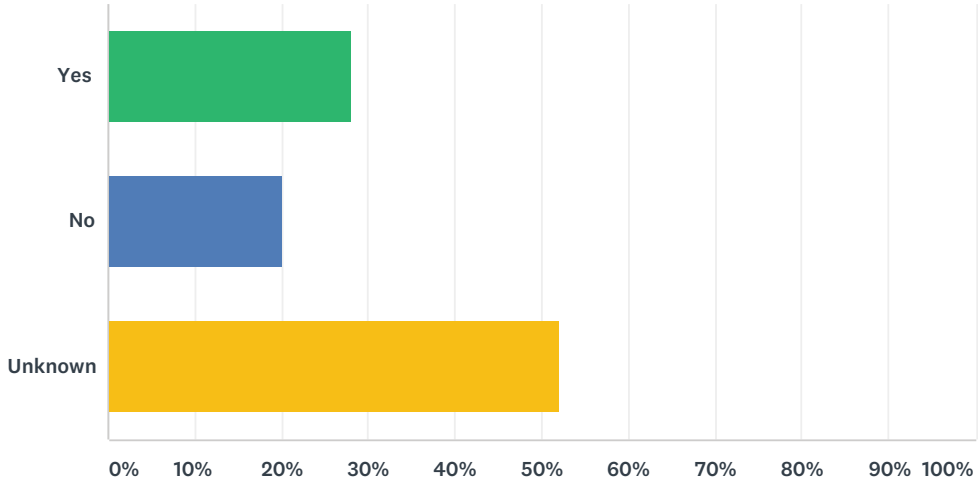
Q9 How do you make DFIRM/FIRM information available (e.g., docs placed in libraries, on our website, etc.)?

Answered: 10 Skipped: 18

#	RESPONSES	DATE
1	available on line	11/13/2018 11:04 AM
2	DFIRM/FIRM information is available for public viewing at the Division of Building Inspection and at the Division of Engineering Services	9/24/2018 1:45 PM
3	Available at Municipal Building	8/28/2018 2:40 PM
4	public posting in municipal building, Lucas County website link	8/23/2018 9:43 AM
5	AT the Inspection Office.	8/13/2018 10:26 AM
6	Documents held at township office	6/25/2018 11:22 AM
7	Not sure	6/21/2018 12:23 PM
8	Through City Administration	6/12/2018 2:21 PM
9	city website	6/8/2018 9:25 AM
10	At the Maumee Municipal Building.	5/7/2018 12:14 PM

Q10 Has your municipality adopted the most current DFIRM/FIRM and flood insurance study (FIS)?

Answered: 25 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	28.00%	7
No	20.00%	5
Unknown	52.00%	13
TOTAL		25

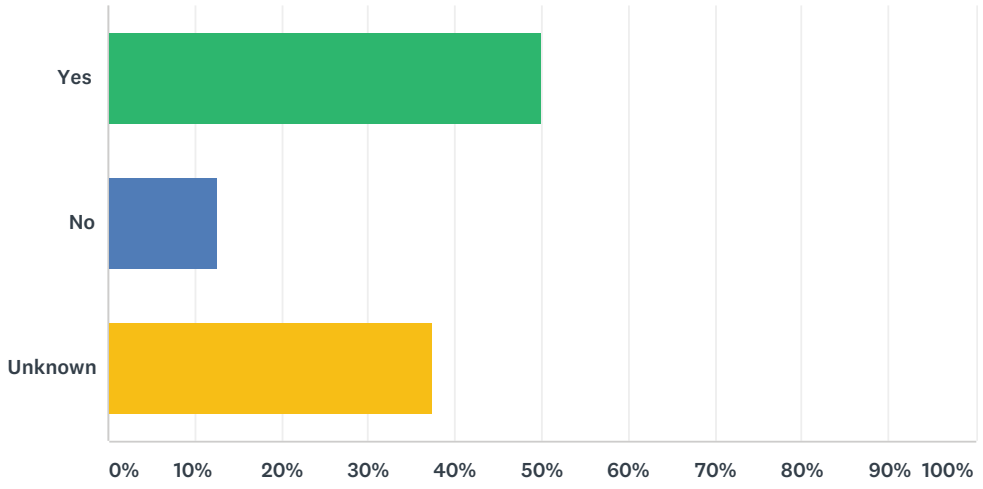
Q11 If approved, state the date of adoption.

Answered: 6 Skipped: 22

#	RESPONSES	DATE
1	2011	11/13/2018 11:05 AM
2	March 16,2016	9/24/2018 1:47 PM
3	6-27-2011	8/28/2018 3:23 PM
4	August 2016	8/23/2018 9:43 AM
5	August 1, 2011	8/13/2018 10:39 AM
6	FIRM Flood Insurance Rate Map. Lucas County Ohio and Incorporated Areas August 16, 2011	5/7/2018 12:16 PM

Q12 Does your municipality support requests for map updates?

Answered: 24 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	50.00%	12
No	12.50%	3
Unknown	37.50%	9
TOTAL		24

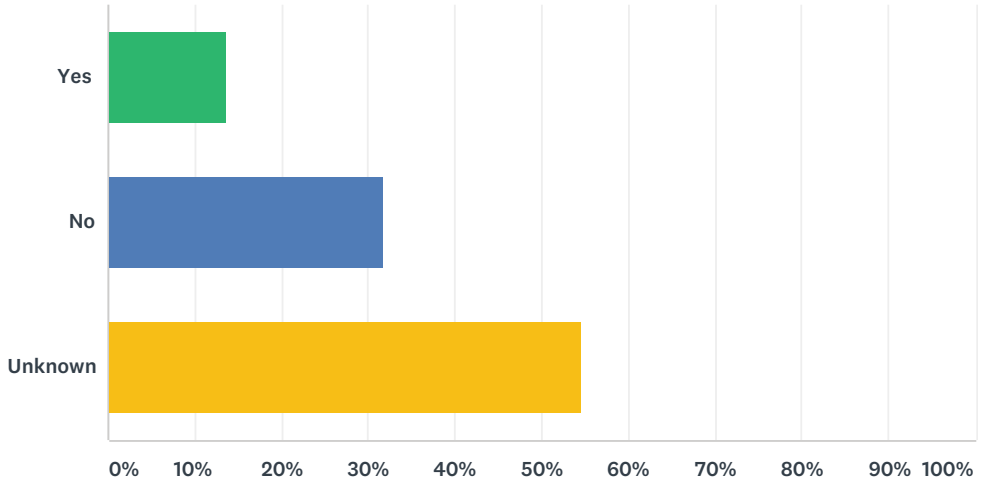
Q13 How does your department support requests for map updates?

Answered: 9 Skipped: 19

#	RESPONSES	DATE
1	yes	11/13/2018 11:05 AM
2	We paid for an update when we were asked.	9/24/2018 5:53 PM
3	Provide requested information	9/24/2018 1:46 PM
4	Direct to resources for FEMA submittal	8/23/2018 9:44 AM
5	Through LOMR and LOMA	8/13/2018 10:40 AM
6	Not sure	6/21/2018 12:24 PM
7	Through City Administration	6/12/2018 2:22 PM
8	bldg and zoning dept.	6/8/2018 9:26 AM
9	Typically, the requests are for map ammendments/ LOMA	5/7/2018 12:17 PM

Q14 Does your municipality share with FEMA any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?

Answered: 22 Skipped: 6



ANSWER CHOICES	RESPONSES	
Yes	13.64%	3
No	31.82%	7
Unknown	54.55%	12
TOTAL		22

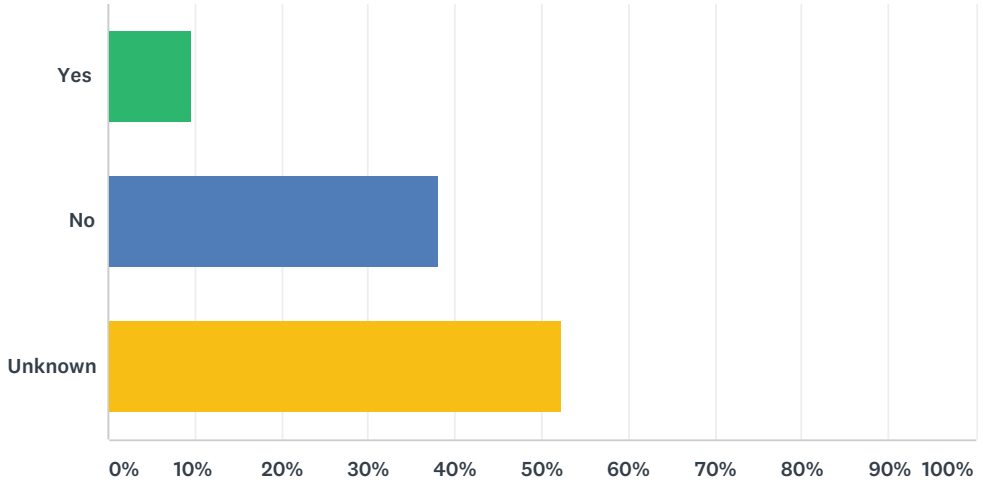
Q15 How do you share this information with FEMA?

Answered: 3 Skipped: 25

#	RESPONSES	DATE
1	It is a requirement placed on the applicant of the Flood Hazard Development Permit.	9/24/2018 1:49 PM
2	Have not had a development proposal of this type to date.	8/28/2018 3:25 PM
3	Through Lucas County	8/23/2018 9:44 AM

Q16 Does your municipality provide technical assistance with local floodplain determinations?

Answered: 21 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes	9.52%	2
No	38.10%	8
Unknown	52.38%	11
TOTAL		21

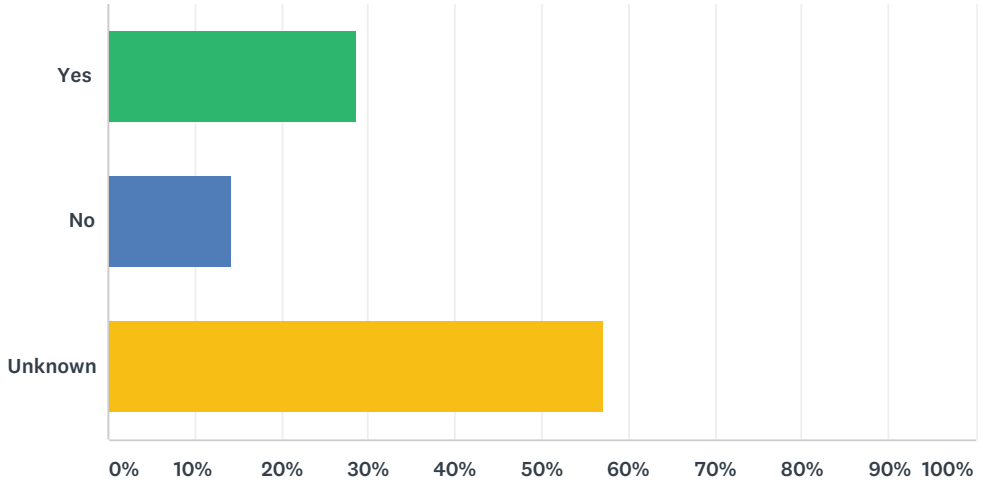
Q17 What type(s) of technical assistance do you provide?

Answered: 2 Skipped: 26

#	RESPONSES	DATE
1	Provide assistance to property owners and residents to help determine FIRM and FIS information	9/24/2018 1:50 PM
2	Review of the existing maps and assisting the landowner in determining if a request for revision applies within the district in which they are located.	5/7/2018 12:19 PM

Q18 Does your municipality maintain a record of approved Letters of Map Change?

Answered: 21 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes	28.57%	6
No	14.29%	3
Unknown	57.14%	12
TOTAL		21

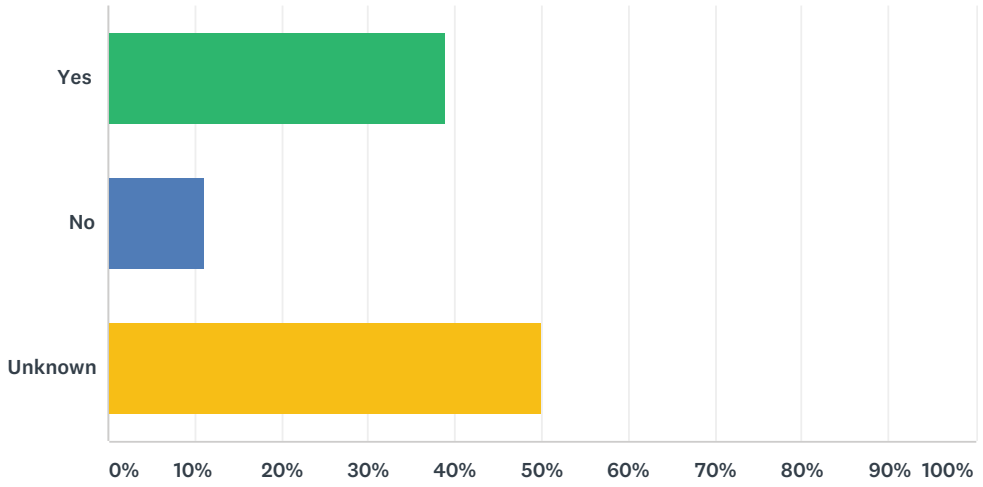
Q19 Which office is responsible for maintaining records of Letters of Map Change?

Answered: 5 Skipped: 23

#	RESPONSES	DATE
1	Barb Knisely	9/24/2018 1:47 PM
2	Public Works Department/Zoning Office	8/28/2018 3:25 PM
3	Zoning	8/23/2018 9:44 AM
4	Division of Building and Zoning	8/13/2018 10:41 AM
5	Division of Building and Zoning Inspection.	5/7/2018 12:21 PM

Q20 Has your municipality adopted a compliant floodplain management ordinance that, at a minimum: regulates development in special flood hazard areas (SFHAs); utilizes any base flood elevation (BFE) and floodway data (and/or requires BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres); identify measures to keep all new and substantially-improved construction reasonably safe from flooding or above the BFE; and documents and maintains records of elevation data for new or substantially-improved structures?

Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
Yes	38.89%	7
No	11.11%	2
Unknown	50.00%	9
TOTAL		18

Q21 What office is responsible for issuing permits for all proposed development in SFHAs?

Answered: 7 Skipped: 21

#	RESPONSES	DATE
1	Village ADMINISTRATOR	11/13/2018 11:08 AM
2	Division of Building Inspection	9/24/2018 1:53 PM
3	Zoning	8/28/2018 3:26 PM
4	Zoning	8/23/2018 9:45 AM
5	Division of Building and Zoning	8/13/2018 10:44 AM
6	Service Department	5/29/2018 2:01 PM
7	Division of Building and Zoning Inspection	5/7/2018 12:25 PM

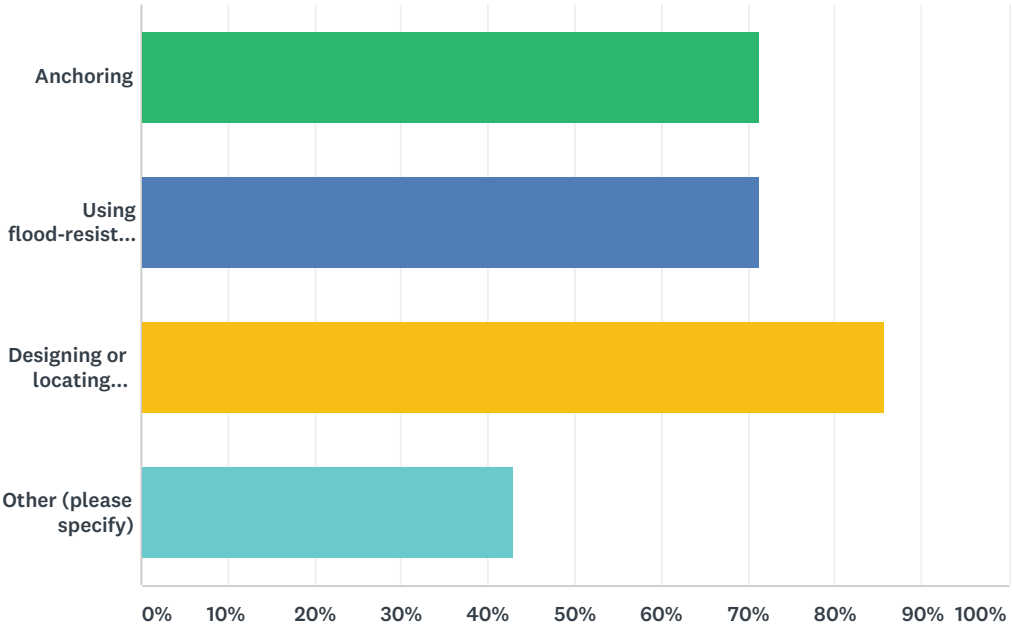
Q22 What office is responsible for obtaining, reviewing, and utilizing (or requiring) BFE and floodway data for regulated developments?

Answered: 7 Skipped: 21

#	RESPONSES	DATE
1	VILLAGE ADMINISTRATOR	11/13/2018 11:08 AM
2	Division of Building Inspection	9/24/2018 1:53 PM
3	Zoning	8/28/2018 3:26 PM
4	Zoning	8/23/2018 9:45 AM
5	Division of Building and Zoning	8/13/2018 10:44 AM
6	Service Department	5/29/2018 2:01 PM
7	Division of Building and Zoning Inspection	5/7/2018 12:25 PM

Q23 What measures does your municipality encourage to keep new and substantially-improved construction reasonably safe from flooding to or above the BFE?

Answered: 7 Skipped: 21



ANSWER CHOICES	RESPONSES	
Anchoring	71.43%	5
Using flood-resistant materials	71.43%	5
Designing or locating utilities and service facilities to prevent water damage	85.71%	6
Other (please specify)	42.86%	3
Total Respondents: 7		

#	OTHER (PLEASE SPECIFY)	DATE
1	Design prepared through a design professional	8/13/2018 10:44 AM
2	unknown	5/29/2018 2:01 PM
3	The City of Maumee is located on the Maumee River. There are very few structures located within the BFE. Additional, the current maps do not provide elevations therefore, copies of licensed surveys are kept in the office for reference along the river.	5/7/2018 12:25 PM

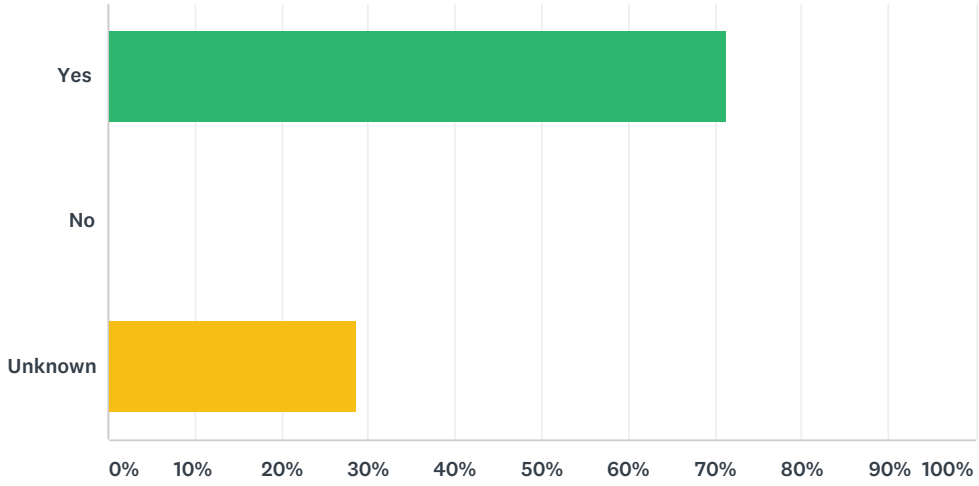
Q24 What office is responsible for identifying and recommending these measures?

Answered: 7 Skipped: 21

#	RESPONSES	DATE
1	VILLAGE ADMINISTRATOR	11/13/2018 11:08 AM
2	Division of Building Inspection	9/24/2018 1:53 PM
3	Zoning	8/28/2018 3:26 PM
4	Village Engineer	8/23/2018 9:45 AM
5	Division of Building and Zoning	8/13/2018 10:44 AM
6	Service Department	5/29/2018 2:01 PM
7	Division of Building and Zoning.	5/7/2018 12:25 PM

Q25 Does your municipality enforce its floodplain ordinance by monitoring compliance and taking remedial action to correct violations?

Answered: 7 Skipped: 21



ANSWER CHOICES	RESPONSES	
Yes	71.43%	5
No	0.00%	0
Unknown	28.57%	2
TOTAL		7

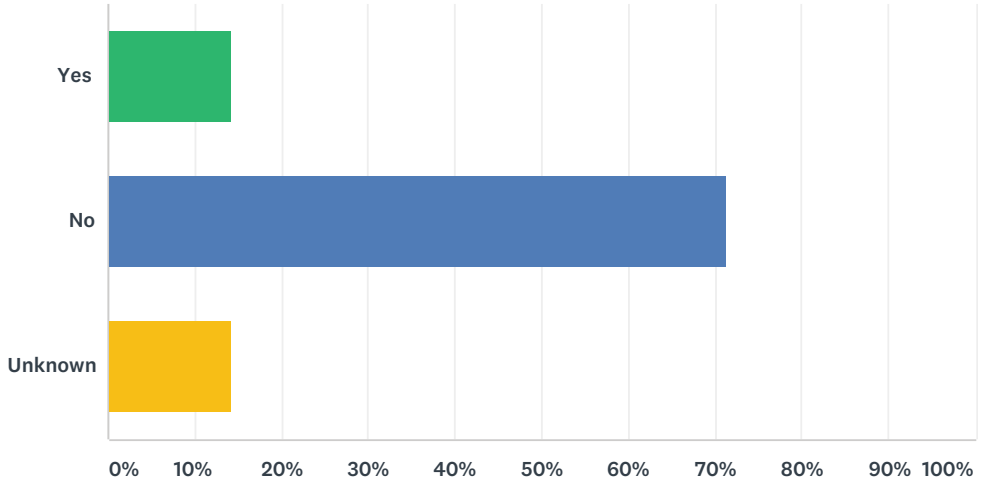
Q26 How do you monitor for compliance? What types of remedial actions are taken?

Answered: 5 Skipped: 23

#	RESPONSES	DATE
1	Confirm with current mapping	11/13/2018 11:09 AM
2	Site Inspections, Violation Letters if needed	8/28/2018 3:27 PM
3	No issues in last 25 years	8/23/2018 9:45 AM
4	Elevation certificates prior to construction and completion of construction. Site visits throughout the project.	8/13/2018 10:45 AM
5	Visit the site . Require licensed surveys prior to any type of construction and at the completion of the project for grading and finish floor elevations.	5/7/2018 12:28 PM

Q27 Has your municipality considered adopting activities that extend beyond minimum requirements? Examples include: Participation in the Community Rating System (CRS); Prohibition of production or storage of chemicals in the SFHA; Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in the SFHA; Prohibition of certain types of residential housing (e.g., manufactured housing) in the SFHA; and Floodplain ordinances that prohibit any new residential or non-residential structures in the SFHA.

Answered: 7 Skipped: 21



ANSWER CHOICES	RESPONSES	
Yes	14.29%	1
No	71.43%	5
Unknown	14.29%	1
TOTAL		7

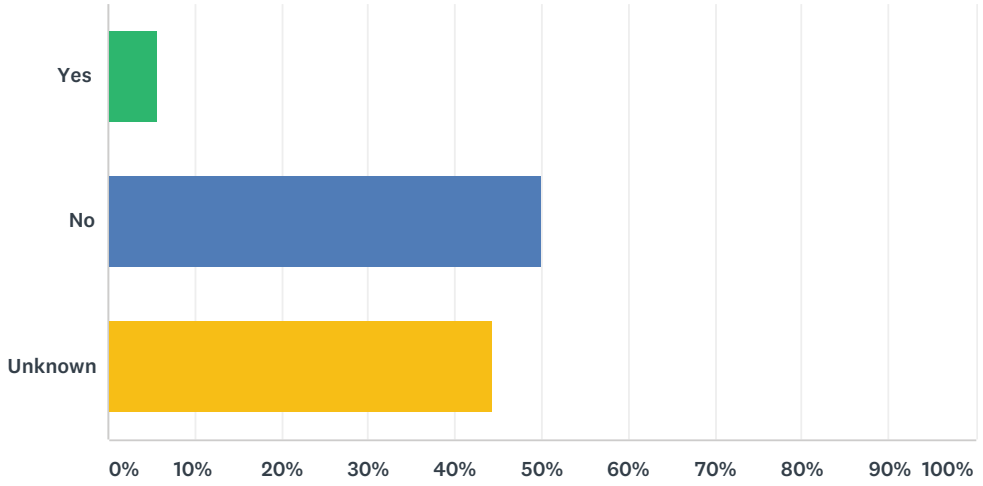
Q28 What activities have you considered or implemented?

Answered: 1 Skipped: 27

#	RESPONSES	DATE
1	Compensatory Cut required for fill placed in the Floodplain	9/24/2018 1:55 PM

Q29 Does your municipality educate community members about the availability of flood insurance?

Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
Yes	5.56%	1
No	50.00%	9
Unknown	44.44%	8
TOTAL		18

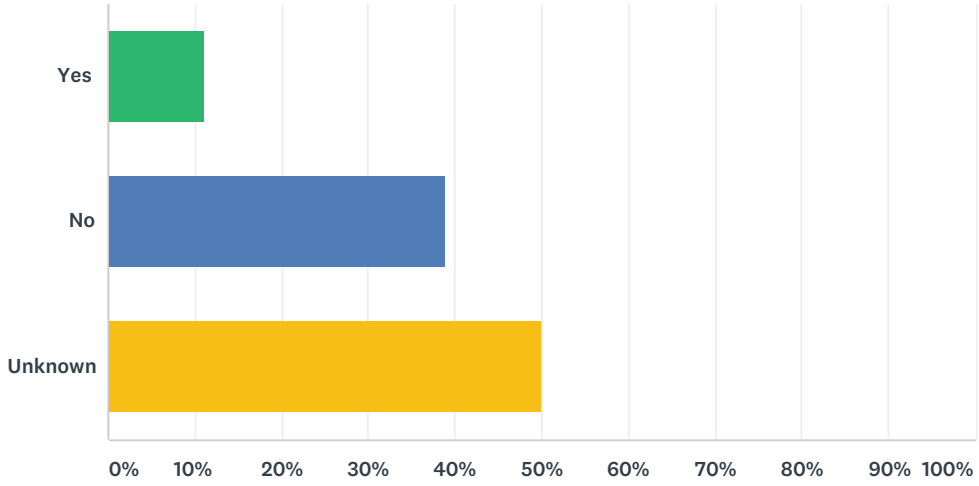
Q30 How do you educate community members about flood insurance?

Answered: 1 Skipped: 27

#	RESPONSES	DATE
1	If asked by a resident or property owner inquiring	9/24/2018 1:56 PM

Q31 Does your municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?

Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
Yes	11.11%	2
No	38.89%	7
Unknown	50.00%	9
TOTAL		18

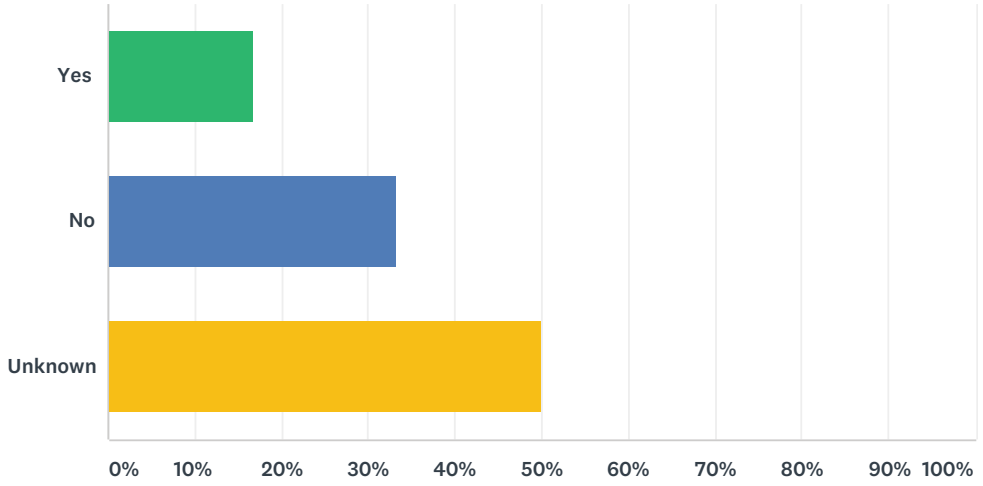
Q32 How do you inform property owners?

Answered: 2 Skipped: 26

#	RESPONSES	DATE
1	Letters	9/24/2018 1:56 PM
2	During the last revision to the FIRM Maps, A public meeting was held for all jurisdictions and property owner to attend. Maps were presented and Q & A were completed during this meeting.	5/7/2018 12:33 PM

Q33 Does your municipality provide general assistance to community members regarding insurance issues?

Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
Yes	16.67%	3
No	33.33%	6
Unknown	50.00%	9
TOTAL		18

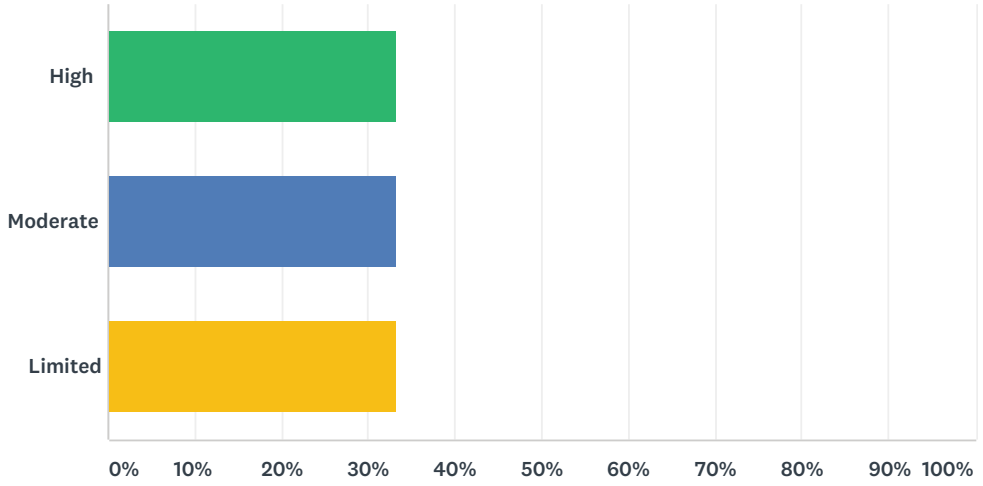
Q34 What type of assistance do you provide?

Answered: 3 Skipped: 25

#	RESPONSES	DATE
1	Advice on basic questions; contact insurance agent	11/13/2018 11:11 AM
2	Fire Department ISO ratings	9/24/2018 4:02 PM
3	Data and Information	9/24/2018 1:47 PM

Q35 As with all community and economic development and emergency preparedness planning efforts, there may be a number of barriers to full implementation. With respect to these planning and regulatory capabilities, barriers may include a lack of personnel to enforce existing regulations, a reluctance on the part of the public to participate in planning, etc. You can likely think of several others for your jurisdiction.Given the combination of these barriers with the presence of the plans and regulatory elements that have been surveyed thus far, how would you label your jurisdiction's ability to fully meet the planning and regulatory capability?

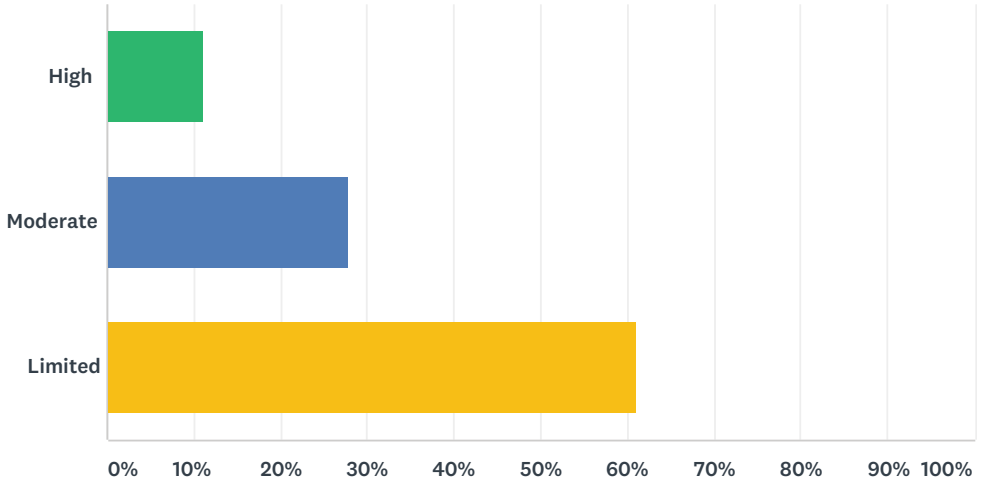
Answered: 3 Skipped: 25



ANSWER CHOICES	RESPONSES	
High	33.33%	1
Moderate	33.33%	1
Limited	33.33%	1
TOTAL		3

Q36 Administrative capability is described by an 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 in order to effectively execute mitigation activities.Common examples of skill sets and technical personnel needed for hazard mitigation include the following. Planners with knowledge of land development/management practices Engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g., building inspectors) Planners or engineers with an understanding of natural and/or human-caused hazards Emergency managers Floodplain managers Land surveyors Scientists familiar with hazards in the community Staff with education or expertise to assess community vulnerability to hazards Personnel skilled in geographic information systems (GIS) Given these examples and your knowledge of your jurisdiction paid staff and contacting capabilities, how would you rate your jurisdiction's ability with respect to the administrative and technical capability?

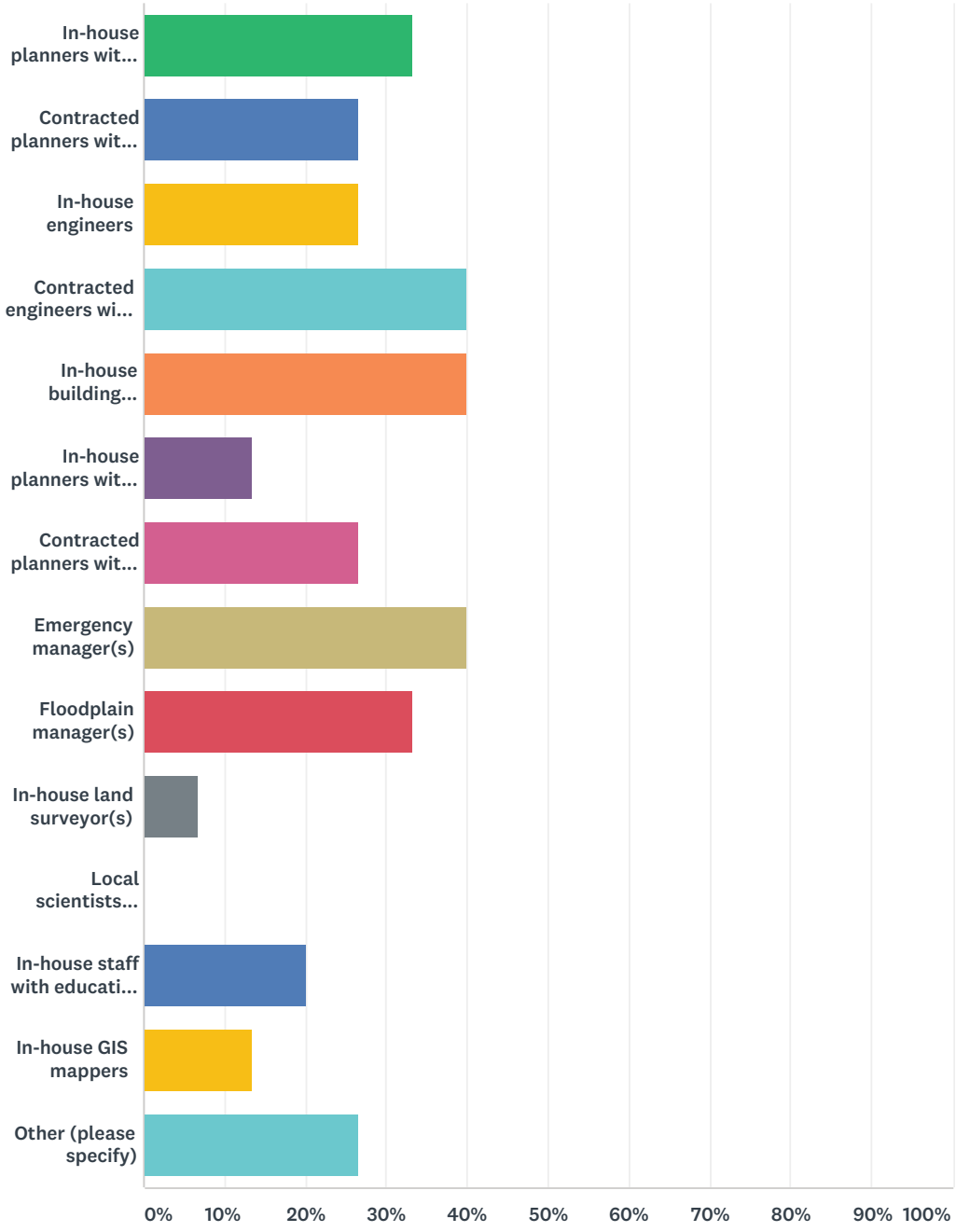
Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
High	11.11%	2
Moderate	27.78%	5
Limited	61.11%	11
TOTAL		18

Q37 To which types of specialized staff do you have access?

Answered: 15 Skipped: 13



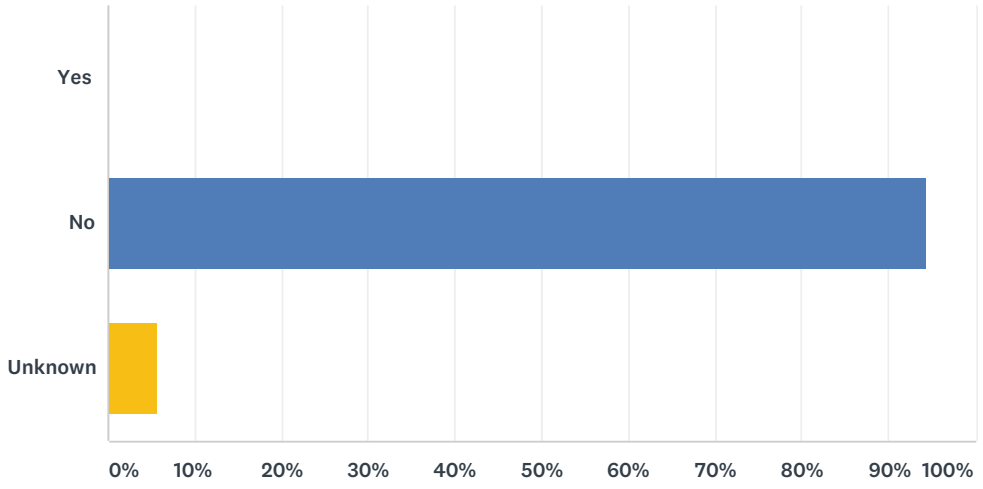
ANSWER CHOICES	RESPONSES	
In-house planners with knowledge of land development/management practices	33.33%	5
Contracted planners with knowledge of LOCAL land development/management practices	26.67%	4
In-house engineers	26.67%	4
Contracted engineers with intimate LOCAL knowledge	40.00%	6
In-house building inspectors	40.00%	6

In-house planners with an understanding of natural and/or human-caused hazards	13.33%	2
Contracted planners with an understanding of LOCAL natural and/or human-caused hazards	26.67%	4
Emergency manager(s)	40.00%	6
Floodplain manager(s)	33.33%	5
In-house land surveyor(s)	6.67%	1
Local scientists familiar with hazards in your community (e.g., staff at a local/nearby university)	0.00%	0
In-house staff with education or expertise to assess vulnerability to hazards	20.00%	3
In-house GIS mappers	13.33%	2
Other (please specify)	26.67%	4
Total Respondents: 15		

#	OTHER (PLEASE SPECIFY)	DATE
1	Zoning Inspector	10/30/2018 7:11 AM
2	We use Lucas County as our in house Staff for most of these positions	9/24/2018 4:06 PM
3	N/A	9/24/2018 3:39 PM
4	Lucas county Engineers	6/11/2018 1:05 PM

Q38 Does your jurisdiction have a paid grants specialist on its payroll?

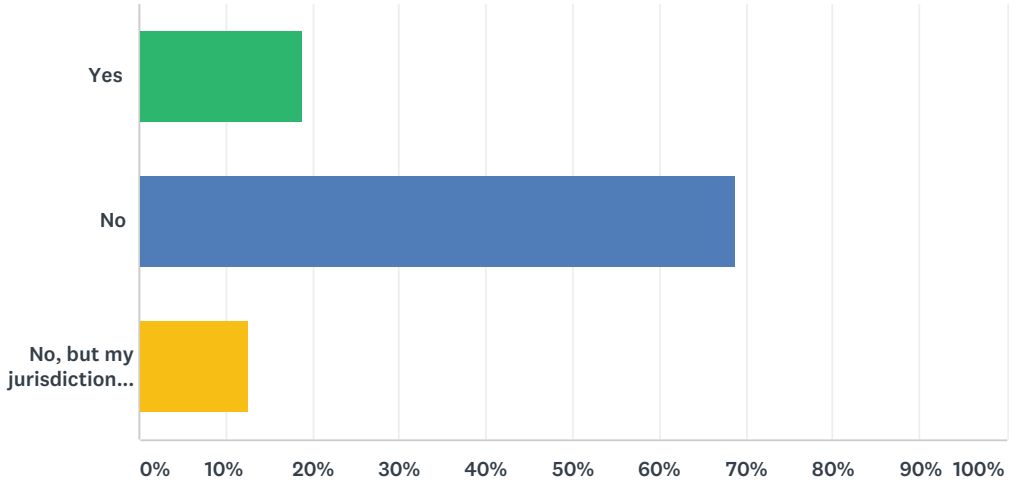
Answered: 18 Skipped: 10



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	94.44%	17
Unknown	5.56%	1
TOTAL		18

Q39 Does your jurisdiction have available funds in its CAPITAL BUDGET that could be used for mitigation projects?

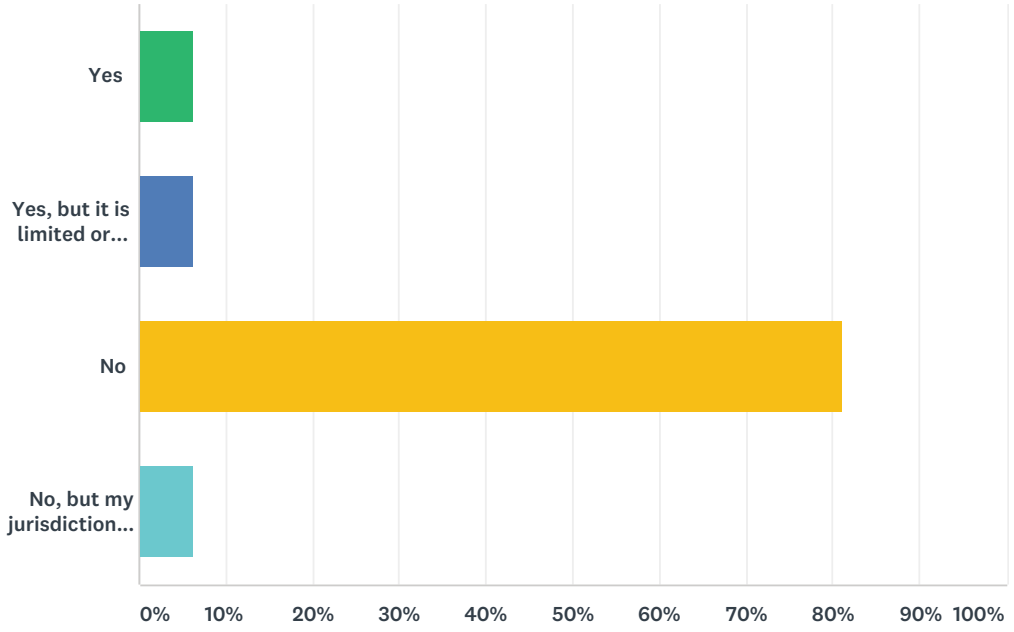
Answered: 16 Skipped: 12



ANSWER CHOICES	RESPONSES	
Yes	18.75%	3
No	68.75%	11
No, but my jurisdiction would be willing to consider it in future budgets	12.50%	2
TOTAL		16

Q40 Does your jurisdiction have available funds in its PUBLIC WORKS BUDGET that could be used for mitigation projects?

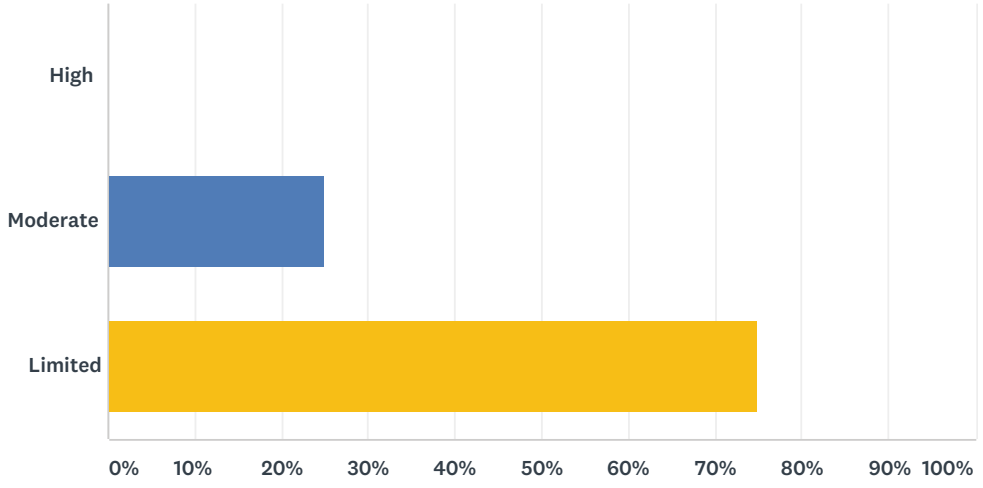
Answered: 16 Skipped: 12



ANSWER CHOICES	RESPONSES	
Yes	6.25%	1
Yes, but it is limited or would be comprised of in-kind services	6.25%	1
No	81.25%	13
No, but my jurisdiction would be willing to consider it in future budgets	6.25%	1
TOTAL		16

Q41 In addition to existing, in-house fiscal resources such as available capital or public works funds, mitigation projects can be supported through partnerships with other jurisdictions, the procurement of grants, etc. Given these options as well as the availability of capital and public works funds (as evidenced by your responses above), how would you rate your jurisdiction's fiscal capabilities to support hazard mitigation?

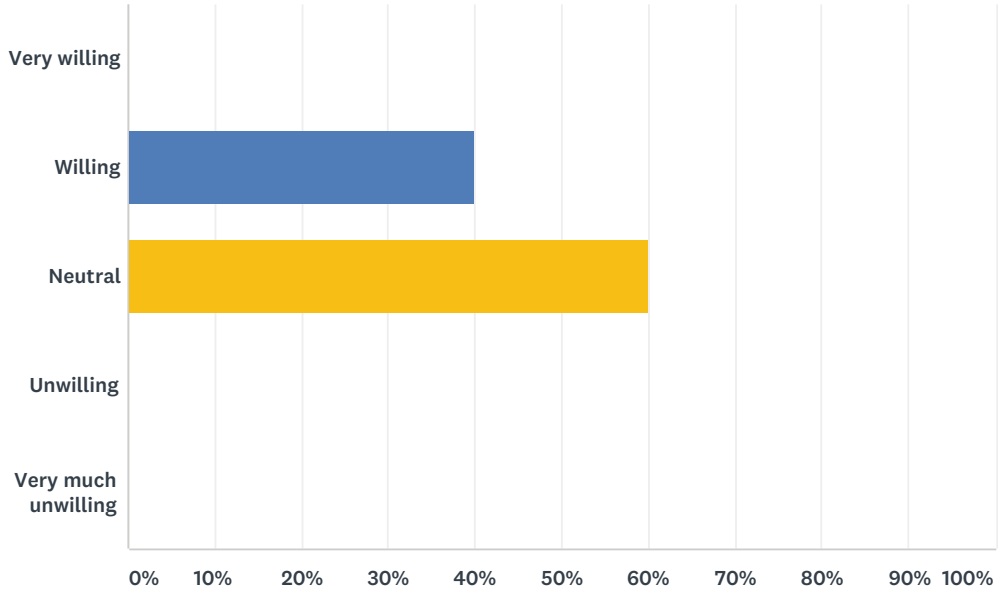
Answered: 16 Skipped: 12



ANSWER CHOICES	RESPONSES	
High	0.00%	0
Moderate	25.00%	4
Limited	75.00%	12
TOTAL		16

Q42 The following is an example of a hazard mitigation strategy.XYZ community guides development away from known hazard areas.Based on your knowledge of your community, it would be _____ to implement such a strategy.

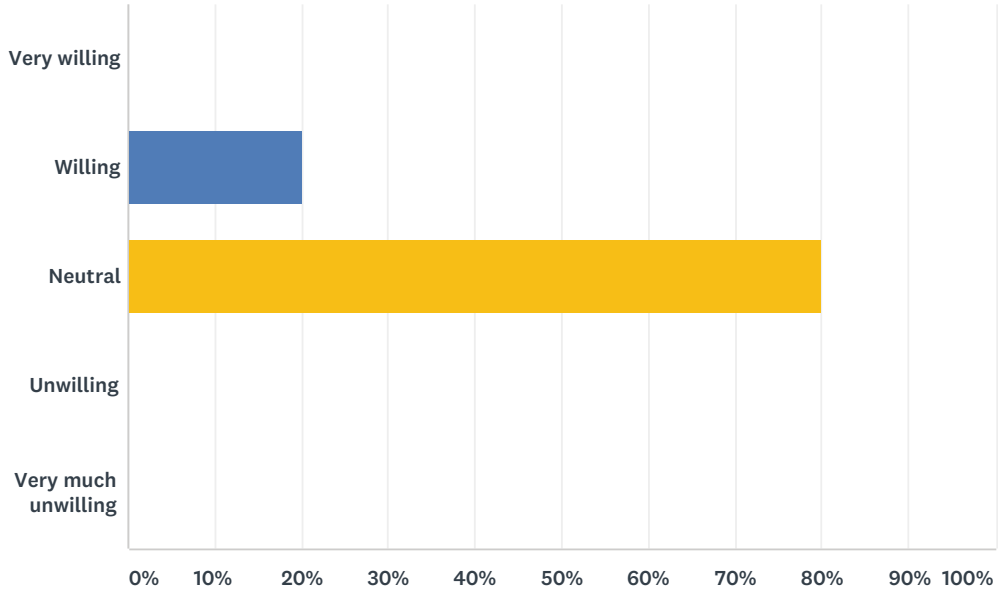
Answered: 15 Skipped: 13



ANSWER CHOICES	RESPONSES	
Very willing	0.00%	0
Willing	40.00%	6
Neutral	60.00%	9
Unwilling	0.00%	0
Very much unwilling	0.00%	0
TOTAL		15

Q43 The following is an example of a hazard mitigation strategy.XYZ community restricts public investments or capital improvements within hazard areas.Based on your knowledge of your community, it would be _____ to implement such a strategy.

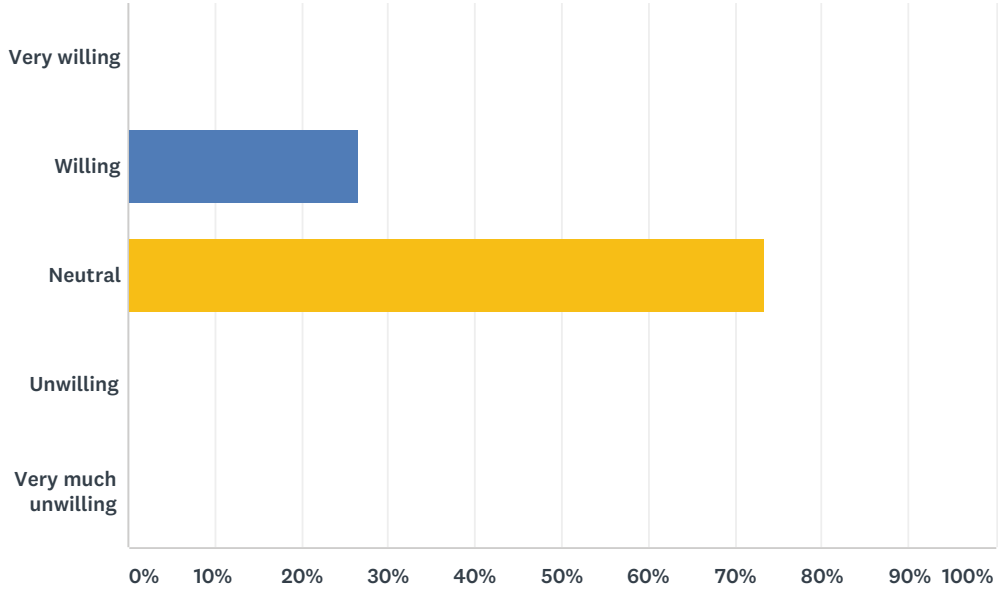
Answered: 15 Skipped: 13



ANSWER CHOICES	RESPONSES	
Very willing	0.00%	0
Willing	20.00%	3
Neutral	80.00%	12
Unwilling	0.00%	0
Very much unwilling	0.00%	0
TOTAL		15

Q44 The following is an example of a hazard mitigation strategy.XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.Based on your knowledge of your community, it would be _____ to implement such a strategy.

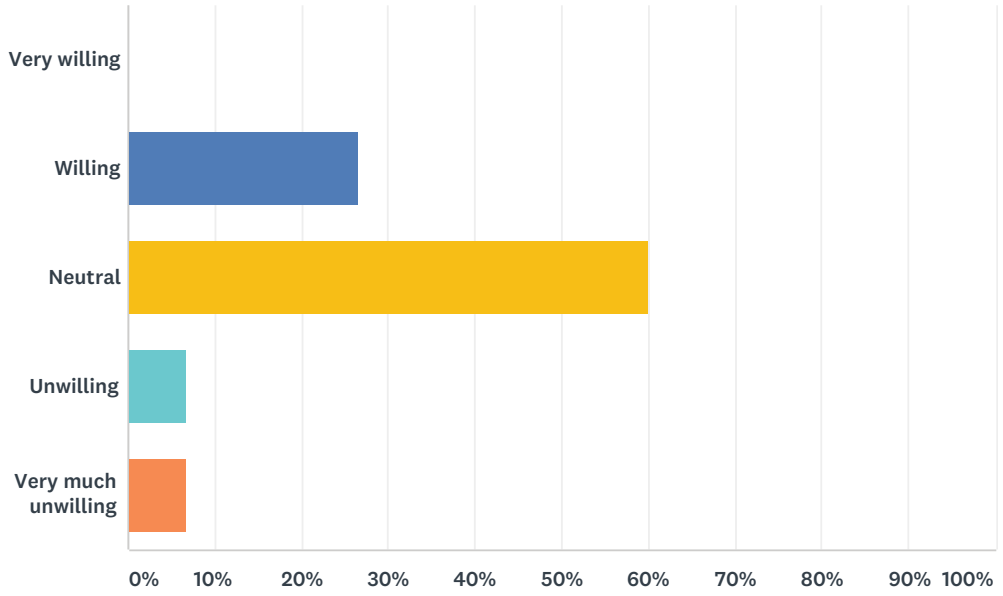
Answered: 15 Skipped: 13



ANSWER CHOICES	RESPONSES	
Very willing	0.00%	0
Willing	26.67%	4
Neutral	73.33%	11
Unwilling	0.00%	0
Very much unwilling	0.00%	0
TOTAL		15

Q45 The following is an example of a hazard mitigation strategy.XYZ communities 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 that establish buffers, install green infrastructure elements, etc.).Based on your knowledge of your community, it would be _____ to implement such a strategy.

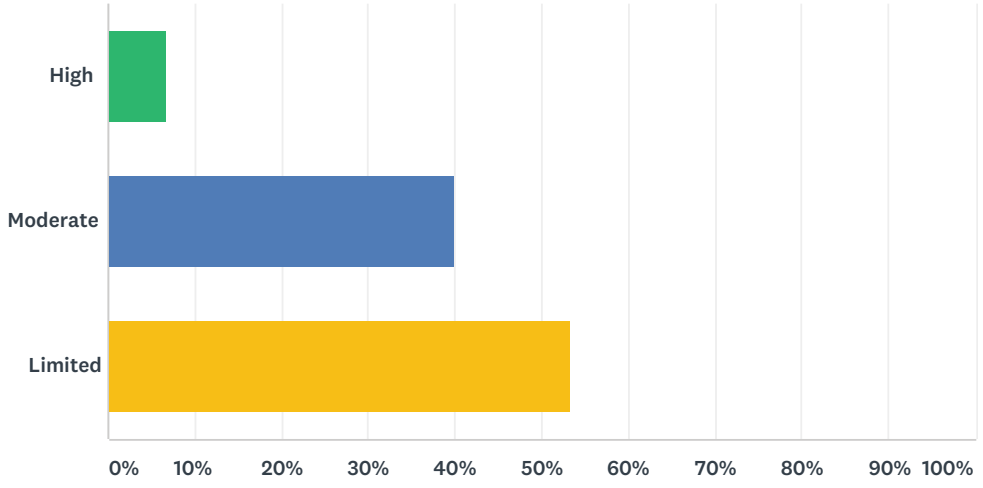
Answered: 15 Skipped: 13



ANSWER CHOICES	RESPONSES	
Very willing	0.00%	0
Willing	26.67%	4
Neutral	60.00%	9
Unwilling	6.67%	1
Very much unwilling	6.67%	1
TOTAL		15

Q46 The political capability can be one of the most difficult to evaluate due to the strong feelings it can elicit. After thinking about your responses to the preceding four questions, how would you rank your jurisdiction's political capabilities?NOTE: A "High" capability refers to a situation where there is significant political will to implement hazard mitigation policies and priorities.

Answered: 15 Skipped: 13



ANSWER CHOICES	RESPONSES	
High	6.67%	1
Moderate	40.00%	6
Limited	53.33%	8
TOTAL		15

Q47 Thank you for taking the time to complete this survey.Please use this space to make any comments relative to capabilities that were not included in the preceding survey. You may also leave any general thoughts you may have about the implementation of hazard mitigation throughout the county, cities, and villages in Lucas County.

Answered: 0 Skipped: 28

#	RESPONSES	DATE
	There are no responses.	

LUCAS COUNTY JURISDICTIONAL NFIP PARTICIPATION SUMMARY												
Survey Question	*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
Does your community maintain accessible copies of an effective FIRM or DFIRM?	Unknown	Yes	N/A	Unknown	Yes	Yes	N/A	N/A	Yes	No	Yes	Unknown
How do you make DFIRM/FIRM information available (e.g. docs placed in libraries, on website, etc.)?	N/A	At the Maumee municipal building	N/A	N/A	Information is available for public viewing at the Division of Building Inspection and the Division of Engineering Services	Through city administration	N/A	N/A	Public posting in municipal building, Lucas County website link	N/A	Available online	N/A
Has the community adopted the most current DFIRM/FIRM and FIS?	Unknown	Yes	N/A	Unknown	Yes	Unknown	N/A	N/A	Yes	No	Yes	Unknown
If approved, state the date of adoption.	N/A	August 16, 2011	N/A	N/A	March 16, 2016	N/A	N/A	N/A	August, 2016	N/A	2011	N/A
Does your community support requests for map updates?	Unknown	Yes	N/A	Unknown	Yes	Yes	N/A	N/A	Yes	Unknown	Yes	Yes
How does your community support requests for map updates?	N/A	Typically, the requests are for map amendments/LOMA	N/A	N/A	N/A	N/A	N/A	N/A	Direct to resources for FEMA submittal	N/A	N/A	Provide requested information
Does your community share any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data with FEMA?	Unknown	No	N/A	Unknown	Yes	Unknown	N/A	N/A	Yes	No	N/A	Unknown
How do you share this information with FEMA?	N/A	N/A	N/A	N/A	It is a requirement placed on the applicant of the Flood Hazard Development Permit	N/A	N/A	N/A	Through Lucas County	N/A	N/A	N/A
Does your community provide technical assistance with local floodplain determinations?	Unknown	Yes	N/A	Unknown	Yes	Unknown	N/A	N/A	No	No	No	Unknown
What type(s) of technical assistance do you provide?	N/A	Review the existing maps and assisting the landowner in determining if a request for revision applies within the district in which they are located	N/A	N/A	Provide assistance to property owners and residents to help determine FIRM and FIS information	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Does your community maintain a record of approved Letters of Map Change?	Unknown	Yes	N/A	Unknown	Yes	Unknown	N/A	N/A	Yes	Unknown	No	Yes
Which office is responsible for maintaining records of Letters of Map Change?	N/A	Division of Building and Zoning Inspection	N/A	N/A	N/A	N/A	N/A	N/A	Zoning	N/A	N/A	Barb Knisely
Has your community adopted a compliant floodplain management ordinance that, at a minimum: regulates development in special flood hazard areas (SFHAs);utilizes any base flood elevation (BFE) and floodway data (and/or requires BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres);identify measures to keep all new and substantially-improved construction reasonably safe from flooding or above the BFE; and documents and maintains records of elevation data for new or substantially-improved structures?	Unknown	Yes	N/A	Yes	Yes	Unknown	N/A	N/A	Yes	N/A	Yes	Unknown

LUCAS COUNTY JURISDICTIONAL NFIP PARTICIPATION SUMMARY													
Survey Question		*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
	What office is responsible for issuing permits for all proposed development in SFHAs?	N/A	Division of Building and Zoning Inspection	N/A	Service Department	Division of Building Inspection	N/A	N/A	N/A	Zoning	N/A	Village administrator	N/A
	What office is responsible for obtaining, reviewing, and utilizing (or requiring) BFE and floodway data for regulated developments?	N/A	Division of Building and Zoning Inspection	N/A	Service Department	Division of Building Inspection	N/A	N/A	N/A	Zoning	N/A	Village administrator	N/A
What measures does your community encourage to keep new and substantially-improved construction reasonably safe from flooding to or above the BFE?		N/A	Anchoring, using flood-resistant materials, designing or locating utilities and service facilities to prevent water damages. The City of Maumee is located on the Maumee River. There are very few structures located within the BFE. Additionally, the current maps do not provide elevations, therefore, copies of licensed surveys are kept in the office for reference along the river.	N/A	Unknown	Anchoring, using flood-resistant materials, designing or locating utilities and service facilities to prevent water damages.	N/A	N/A	N/A	Anchoring, using flood-resistant materials, designing or locating utilities and service facilities to prevent water damages.	N/A	Designing or locating utilities and service facilities to prevent water damages.	N/A
	What office is responsible for identifying and recommending these measures?	N/A	Division of Building and Zoning Inspection	N/A	Service Department	Division of Building Inspection	N/A	N/A	N/A	Village Engineer	N/A	Village administrator	N/A
Does your community enforce its floodplain ordinance by monitoring compliance and taking remedial action to correct violations?		N/A	Yes	N/A	Unknown	Unknown	N/A	N/A	N/A	Yes	N/A	Yes	N/A
	How do you monitor for compliance? What types of remedial actions are taken?	N/A	Visit the site. Require licensed surveys prior to any type of construction and at the completion of the project for grading and finish flood elevations	N/A	N/A	N/A	N/A	N/A	N/A	No issues in the last 25 years	N/A	Confirm with current mapping	N/A
Has your community considered adopting activities that extend beyond minimum requirements? Examples include: Participation in the Community Rating System (CRS); Prohibition of production or storage of chemicals in the SFHA; Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in the SFHA; Prohibition of certain types of residential housing (e.g., manufactured housing) in the SFHA; and Floodplain ordinances that prohibit any new residential		N/A	No	N/A	Unknown	Yes	N/A	N/A	N/A	No	N/A	No	N/A

LUCAS COUNTY JURISDICTIONAL NFIP PARTICIPATION SUMMARY													
Survey Question		*Lucas County*	*Maumee*	*Oregon*	*Sylvania*	*Toledo*	*Waterville*	*Berkey*	*Harbor View*	*Holland*	*Ottawa Hills*	*Swanton*	*Whitehouse*
or non-residential structures in the SFHA.													
	What activities have you considered or implemented?	N/A	N/A	N/A	N/A	Compensatory Cut required for fill placed in the floodplain	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Does your community educate community members about the availability of flood insurance?		Unknown	No	N/A	No	Yes	Unknown	N/A	N/A	No	N/A	No	Unknown
	How do you educate community members about flood insurance?	N/A	N/A	N/A	N/A	If asked by a resident or property owner inquiring	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Does your community inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?		Unknown	Yes	N/A	No	Yes	Unknown	N/A	N/A	No	N/A	No	Unknown
	How do you inform property owners?	N/A	During the last revision to the FIRM maps, a public meeting was held for all jurisdictions and property owners to attend. Maps were presented and Q & A were completed during this meeting	N/A	N/A	Letters	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Does your community provide general assistance to community members regarding insurance issues?		Unknown	No	N/A	No	Unknown	Unknown	N/A	N/A	No	N/A	Yes	Yes
	What type of assistance do you provide?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Advice on basic questions, contact insurance agent.	Data and information

APPENDIX 2
PUBLIC INVOLVEMENT

This appendix contains meeting advertisements, agendas, presentations, minutes, and sign in sheets, as well as any other documentation for public meetings. The media attended the meetings and reported on it that day; the articles are included. It also contains advertisements for the online public survey and the results of the survey.

PUBLIC MEETINGS

August 21, 2018

1:30 PM & 6:30 PM

Lucas County Emergency Services Training Center

Lucas County Emergency Management Agency

Like Follow Share ...

Lucas County Emergency Management Agency

@lucascoema

- Home
- Posts
- Videos
- Photos
- About
- Community
- Info and Ads

Create a Page

Lucas County Emergency Management Agency
Yesterday at 10:15 AM ·

Lucas County Emergency Management Agency, as part of the Lucas County Hazard Mitigation Planning Committee, will hold two public meetings on August 21, 2018, in the Lucas County Emergency Services Training Center, located at 2127 Jefferson Ave, Toledo, OH 43604. The first meeting will be at 1:30 p.m. and the second will be at 6:30 p.m.

The purpose of the meetings is to review updates to the county's hazard mitigation plan. Members of the public will be given the opportunity t...
See More

NOTICE OF PUBLIC MEETINGS

Lucas County Emergency Management Agency, as part of the Lucas County Hazard Mitigation Planning Committee, will hold two public meetings on August 21, 2018, in the Lucas County Emergency Services Training Center, located at 2127 Jefferson Ave, Toledo, OH 43604. The first meeting will be at 1:30 p.m. and the second will be at 6:30 p.m.

The purpose of the meetings is to review updates to the county's hazard mitigation plan. Members of the public will be given the opportunity to comment on the natural and man-made hazards most affecting them. Those with a concern about flooding, weather events, harmful algal bloom, pandemics, and other emergency events or disasters in the local area are encouraged to attend and share their stories. This is an opportunity to speak to officials who will be implementing measures to attempt to reduce the impacts of hazards in your community.

The Lucas County Hazard Mitigation Plan was last updated in 2013. Every five years the county must update this plan per federal requirements in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000.

We look forward to seeing you there!

Lucas County Emergency Management Agency

@lucascoema

- Home
- Posts
- Videos
- Photos
- About
- Community
- Info and Ads

Create a Page

Like | Follow | Share | ...

Posts

Lucas County Emergency Management Agency
20 hrs ·

Please see our flier on our upcoming public meetings for the update of the Countywide Hazard Mitigation Plan. We hope to see you there!

4 1 Share

Britain calls shooting that hurt 10 'attempted murder'

Manchester police: Most hit in legs with shotgun

NEW YORK TIMES

MANCHESTER, England — Police are investigating a shooting that injured at least 10 people early Sunday as "an attempted murder."

Officers are working on the premise that a shotgun was used, an official said.

The shooting occurred before dawn, shortly after revelers attended the first day of an annual Caribbean carnival in the Moss Side area of Manchester.

"It is unclear at this stage what the motive, what the reason behind this attack, was," Wasim Chaudhry, the chief superintendent of the Greater Manchester Police, said at a news conference on Sunday.

"However, we've got to be clear, it would be obvious to any particular person that discharging a firearm in a large crowd like this is completely reckless."

Mr. Chaudhry earlier said the shooting "could have had devastating consequences with families and friends losing loved ones."

The wounded ranged in age from 12 to their 50s and mostly suffered injuries to their legs and some required surgery, he said at the news conference.

Authorities said one man was in serious but stable condition and that nine others, including two children, had pellet-type wounds.

"A large number" of unarmed and armed officers responded at 2:30 a.m. to reports of gunfire as crowds milled about after the Manchester carnival, police said.

A spokesman for the Manchester police, Detective Superintendent Debbie Dooley, said officers were searching the area for clues, interviewing witnesses, and reviewing video from surveillance cameras.

"Those living or visiting the area will understandably be concerned by this incident," she said, "and we will have extra officers patrolling the area throughout the morning and into the coming days."

Video on social media showed panicked crowds after the shooting. Later Sunday morning, Claremont Road, where the shooting took place, was littered with debris — and what appeared to be nitrous oxide canisters. It remained cordoned off by police.

The shooting occurred as officials in Britain have struggled to deal with a rise in crime, including acid and knife attacks.

"Guns have no place on our streets," Mr. Chaudhry said.

The two-day Manchester carnival in Alexandra Park is commemorating the 70th anniversary of the arrival of the Windrush generation, a group of people from the Caribbean who arrived in Britain on the Empire Windrush, a passenger liner, after they were encouraged to move to the country to fill a labor shortage.

In May, 2017, Manchester was rocked by a terrorist bombing at Manchester Arena, where Salman Abedi, a British citizen of Libyan descent, detonated explosives packed with nails, bolts, and ball bearings at an Ariana Grande concert.

RUSSIA RIVER FESTIVAL

ASSOCIATED PRESS

People steer their stand-up paddleboards along the Fontanka River during a stand-up paddle-surfing festival in St.Petersburg, Russia. In addition to the paddleboarders, more than 600 swimmers from 13 countries took part in an event circling the St. Petersburg island that holds the Peter and Paul Fortress.

THE WORLD

BLADE NEWS SERVICES

U.S. advisers arrive to assist Afghan forces

KABUL, Afghanistan — The

Italy and Malta to let rescue vessels dock, ships might be unwilling to get involved because they fear they will be

The opposition-run Syrian Civil Defense, first responders also known as the White Helmets, said the blast in the vil-

Bannon defends Boris Johnson, saying he didn't need to apologize

ASSOCIATED PRESS

LONDON — Republican strategist Steve Bannon weighed into British politics Sunday during an interview in which he defended former Foreign Secretary Boris Johnson's comments about Muslim face veils and praised a controversial British far-right leader.

Bannon

The former aide to President Trump said Mr. Johnson had "nothing to apologize for" and should not "bow at the altar of political correctness" after he was criticized for saying women who wear burqas look like "letterboxes" and "bank robbers."

Mr. Johnson made the comments in a newspaper column that argued against banning full-face veils, as Denmark has done.

"Excuse me, didn't he actually support the wearing of the veil?" Mr. Bannon told the Sunday Times.

"His entire argument revolves around not wanting to ban the burqa, but arguing that he agrees that it's an oppressive garment and that there is no scriptural basis for it in the Qur'an, which is true. I think the substance got lost because of his throwaway line."

Mr. Johnson has been criticized by Muslim groups and politicians, including Prime Minister Theresa May, who urged him to apologize.

Mr. Johnson's representatives have said he won't apologize.

"The hysterical mainstream media can never separate the 'signal from the noise'— fortunately, the populists can," Mr. Bannon said.

Mr. Bannon has said he wants to establish a Europe-wide movement uniting populist and nationalist voters in the European elections next year. He has said he plans to spend 70 percent of his time in Europe following the November midterm election in the United States.

Mr. Johnson, a former mayor of London, quit as foreign minister last month in a dispute over the country's departure from the European Union.

Mr. Bannon suggested that Mr. Johnson need not copy Mr. Trump to be successful.

"Boris just needs to be Boris — true to his nature and his calling — and I think he has potential to be a great prime minister, not a good one," he said.

Mr. Bannon also praised another controversial U.K. figure — Tommy Robinson, founder of the now-defunct English Defense League.

Mr. Robinson, 35, whose real name is Stephen Yaxley Lennon, is a self-styled commentator who has given Britain's far-right media the verve it has lacked.

NOTICE OF PUBLIC MEETINGS

Lucas County Emergency Management Agency, as part of the Lucas County Hazard Mitigation Planning Committee, will hold two public meetings on August 21, 2018, in the Lucas County Emergency Services Training Center, located at 2127 Jefferson Ave, Toledo, OH 43604. The first meeting will be at 1:30 p.m. and the second will be at 6:30 p.m.

The purpose of the meetings is to review updates to the county's hazard mitigation plan. Members of the public will be given the opportunity to comment on the natural and man-made hazards most affecting them. Those with a concern about flooding, weather events, harmful algal bloom, pandemics, and other emergency events or disasters in the local area are encouraged to attend and share their stories. This is an opportunity to speak to officials who will be implementing measures to attempt to reduce the impacts of hazards in your community.

The Lucas County Hazard Mitigation Plan was last updated in 2013. Every five years the county must update this plan per federal requirements in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000.

We look forward to seeing you there!

Russia, 4 ot

NEW YORK TIMES

MOSCOW — The five countries with shorelines on the Caspian Sea agreed Sunday to a formula for dividing up the world's largest inland body of water and its potentially vast oil and gas resources.

The leaders of Russia, Iran, Kazakhstan, Azerbaijan, and Turkmenistan signed the Convention on the Legal Status of the Caspian Sea, which the Kremlin said "reflected a balance of interests" of the seashore nations.

Landlocked and less salty than the ocean, the Caspian Sea was regarded by Iran and the Soviet Union — until the Soviet collapse — as a lake, with a border neatly dividing the two countries' territories.

But when new seaside nations emerged, they sought either their own zones of Caspian territory or a new approach to governing the sea that would classify it as international water with territorial zones and neutral areas, though it has no outlet to the world's oceans.

The pact signed at a summit in Kazakhstan on Sunday takes both approaches in a compromise treating the surface as international water and dividing the seabed into territorial zones.

Iran President Hassan Rouhani said, however, that dividing the seabed and its mineral wealth would require additional agreements.

Russia, the sea's main naval power, had opposed splitting

THE BLADE

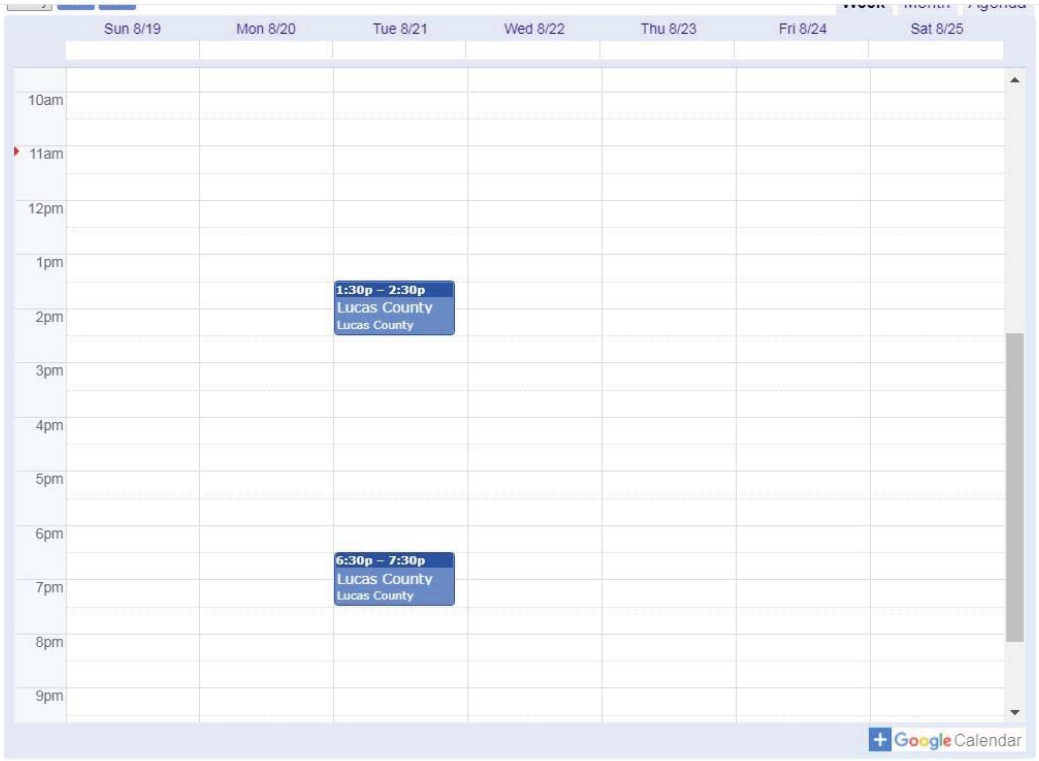
Allan Block, Chairman

Kurt G. Franck, President / General Manager, Executive Editor

Lucas Soil & Water Conservation District
Written by Lucas Swcd [?] · August 14, 2018 at 11:00 AM ·

If you are interested in learning more about the Lucas County Hazard Mitigation Plan Update of 2018, consider attending one of the public meetings held on August 21st by the Lucas County Emergency Management Agency. It is also an opportunity for you to voice ideas and concerns on the natural and man-made hazards most affecting you.

LUCAS SOIL & WATER CONSERVATION DISTRICT



LUCAS COUNTY HAZARD MITIGATION PLAN

PUBLIC MEETING #1

Tuesday, August 21, 2018 ~ 1:30 p.m.
Sign-In Sheet

	Name	Affiliation	Email
1.	Allen Manrow	Lucas County Amature Radio Emergency service	W8ALM @ ARRL. Net
2.	Bob Neubert	Lucas County Engineer	rneubert@co.lucas.oh.us
3.	Josh Hartbarger	WHITEHOUSE FIRE / VILLAGE	Jhartbarger @wh.tehouseoh.gov
4.	DANIEL HUNT	MOBILITY MANAGEMENT/TARTA	DHunt@TARTA.com
5.	Joey Sink-Oiler	Lucas Soil + Water	jsink@co.lucas.oh.us
6.	Doug Whiting	Citizen	—
7.	PATRICK WAMBO	CITY of WATERVILLE FD	Pwambo@waterville.org
8.	Matt Krause	Lucas County EMA	mkrause@co.lucas.oh.us
9.	Dan Baker	Lucas County Hlth. Dept.	baker-d@co.lucas.oh.us
10.	Abby Buchhop	Lucas Co EMA	abuchhop@co.lucas.oh.us
11.	Patricia Mooney	Lucas County EMA	pmooney@co.lucas.oh.us
12.	Amy H Lopez	JH Consulting	aheinberger@jhcpreparedness.com
13.			
14.			
15.			
16.			

LUCAS COUNTY HAZARD MITIGATION PLAN

PUBLIC MEETING #2

Tuesday, August 21, 2018 ~ 6:30 p.m.
Sign-In Sheet

	Name	Affiliation	Email
1.	Patricia Mooney	LC EMA	pmooney@co.lucas.oh.us
2.	Amy H López	JH Consulting	aheinberger@jhcpreparedness.com
3.	Michelle Hughes Tucker	COT	michelle.~~hughes~~tucker@toledo.oh.gov
4.	Tim Gray	Lucas Co Skywarn/ARES	boxcar@toast.net
5.	Matt Krause	Lucas County EMA	mkrause@co.lucas.oh.us
6.	Hannah Schwark	Lucas County EMA	hschwark@co.lucas.oh.us
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

LUCAS COUNTY HAZARD MITIGATION PLAN PUBLIC MEETING

LUCAS COUNTY EMA

Lucas County Emergency Services Training Center
2127 Jefferson Avenue
Toledo, OH 43604
Tuesday, August 21, 2018 ~ 1:30 & 6:30 p.m.

WHAT IS A HAZARD?

DANGER

LIFE – INFRASTRUCTURE - PROPERTY

HAZARDS

Survey Says…

CONCERN	OCCURRENCES
Severe thunderstorm -	- Severe winter storm
Severe winter storm -	- Severe thunderstorm
Tornadoes -	- Tornadoes
Temperature extremes -	- Temperature extremes
Flood -	- Drought
Droughts -	- Lake surges
Lake surges -	- Earthquakes

THE HAZARD MITIGATION PLAN

The Hazard Mitigation Plan

- Planning Process
- Description of the planning area
- Risk Assessment
  - Hazard profiles
  - Assets inventory
  - Development trends
- Action plan
  - Goals
  - Strategies (projects)
- Plan maintenance
- Appendices

HAZARDS REVIEW

This….	can cause…	this…
• CBRNE/Terrorism • Civil Disturbance • Dam/Levee Failure • Drought • Earthquake • Flood • Harmful Algal Bloom • Hazardous Materials Incident • Lake Surge • Landslide • Pandemic • Severe Thunderstorms • Severe Winter Storms • Temperature Extremes • Tornadoes • Wildfire • Wind	→	• Power Outages • Groundwater Pollution • Flooding • Fires • Hazardous Materials Incident • Illness, injury and/or death • Economic loss • Population displacement • Erosion • Infrastructure decay • Dam failure

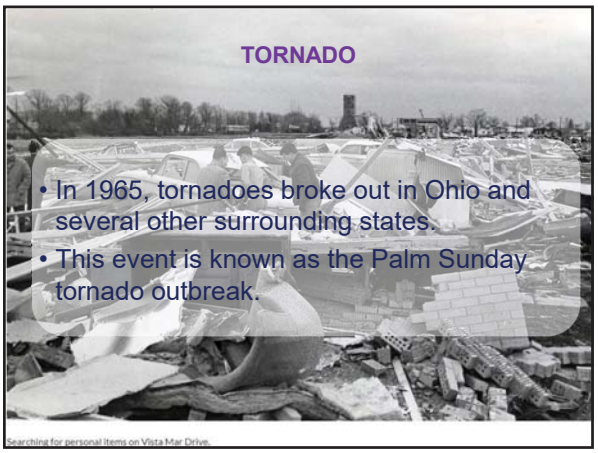
HARMFUL ALGAL BLOOM

- In 2014, there was harmful algal bloom in Lake Erie.
- Caused water advisory and required residents to buy bottled water.

HAZARDOUS MATERIALS INCIDENT

- In 2015, the Argo oil barge started to leak into Lake Erie.
- The Argo sank in the lake due to high winds and large waves in 1937.

TORNADO



- In 1965, tornadoes broke out in Ohio and several other surrounding states.
- This event is known as the Palm Sunday tornado outbreak.

TORNADO

- In 2018, an EF0 tornado touched down in the county.
- There was damage to trees, homes, and vehicles.

MITIGATION

Effort to reduce or eliminate the negative impacts of hazards.

WHAT ABOUT YOU?

- What are your experiences with hazards?
- Have you seen the amount of hazardous events increase or decrease over the years as a result of mitigation?
- Is there a particular area in your community that would benefit from mitigation?

THANK YOU!

LUCAS COUNTY
HAZARD MITIGATION PLAN UPDATE

Lucas County is in the process of updating its Hazard Mitigation Plan. This document is required by FEMA, reviewed by the State of Ohio and FEMA, and is updated every 5 years.

There are many benefits to completing this plan; a few of these include the following.

- Protecting public safety and preventing loss of life and injury
- Reducing harm to existing and future development
- Maintaining community continuity and strengthening the social connections, essential for recovery
- Preventing damage to your community's unique economic, cultural, and environmental assets
- Minimizing operational downtime and accelerating recovery of government and businesses after disasters
- Reducing the costs of disaster response and recovery and the exposure to risk for first responders
- Helping accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency

WE WANT TO HEAR FROM YOU!

The Lucas County Emergency Management Agency is requesting your assistance in the completion of this plan. Please take a few minutes to complete an online survey about the hazards your community faces.

www.surveymonkey.com/r/LucasHMP-Public1
www.surveymonkey.com/r/LucasHMP-Public2

We appreciate your input!

WHAT IS A HAZARD?
A hazard is a risk or a danger. These can include natural hazards (floods, earthquakes, tornadoes, hail, winter weather, drought, etc.) or technological or human-caused (dam failures, hazardous materials spills, etc.).

@LucasCoEma

@lucascoema

LUCAS COUNTY EMA

LUCAS COUNTY
HAZARD MITIGATION PLAN UPDATE

Lucas County is in the process of updating its Hazard Mitigation Plan. This document is required by FEMA, reviewed by the State of Ohio and FEMA, and is updated every 5 years.

There are many benefits to completing this plan; a few of these include the following.

- Protecting public safety and preventing loss of life and injury
- Reducing harm to existing and future development
- Maintaining community continuity and strengthening the social connections, essential for recovery
- Preventing damage to your community's unique economic, cultural, and environmental assets
- Minimizing operational downtime and accelerating recovery of government and businesses after disasters
- Reducing the costs of disaster response and recovery and the exposure to risk for first responders
- Helping accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency

WE WANT TO HEAR FROM YOU!

The Lucas County Emergency Management Agency is requesting your assistance in the completion of this plan. Please take a few minutes to complete an online survey about the hazards your community faces.

www.surveymonkey.com/r/LucasHMP-Public1
www.surveymonkey.com/r/LucasHMP-Public2

We appreciate your input!

WHAT IS A HAZARD?
A hazard is a risk or a danger. These can include natural hazards (floods, earthquakes, tornadoes, hail, winter weather, drought, etc.) or technological or human-caused (dam failures, hazardous materials spills, etc.).

@LucasCoEma

@lucascoema

LUCAS COUNTY EMA

LUCAS COUNTY
HAZARD MITIGATION PLAN UPDATE

Lucas County is in the process of updating its Hazard Mitigation Plan. This document is required by FEMA, reviewed by the State of Ohio and FEMA, and is updated every 5 years.

There are many benefits to completing this plan; a few of these include the following.

- Protecting public safety and preventing loss of life and injury
- Reducing harm to existing and future development
- Maintaining community continuity and strengthening the social connections, essential for recovery
- Preventing damage to your community's unique economic, cultural, and environmental assets
- Minimizing operational downtime and accelerating recovery of government and businesses after disasters
- Reducing the costs of disaster response and recovery and the exposure to risk for first responders
- Helping accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency

WE WANT TO HEAR FROM YOU!

The Lucas County Emergency Management Agency is requesting your assistance in the completion of this plan. Please take a few minutes to complete an online survey about the hazards your community faces.

www.surveymonkey.com/r/LucasHMP-Public1
www.surveymonkey.com/r/LucasHMP-Public2

We appreciate your input!

WHAT IS A HAZARD?
A hazard is a risk or a danger. These can include natural hazards (floods, earthquakes, tornadoes, hail, winter weather, drought, etc.) or technological or human-caused (dam failures, hazardous materials spills, etc.).

@LucasCoEma

@lucascoema

LUCAS COUNTY EMA

LUCAS COUNTY
HAZARD MITIGATION PLAN UPDATE

Lucas County is in the process of updating its Hazard Mitigation Plan. This document is required by FEMA, reviewed by the State of Ohio and FEMA, and is updated every 5 years.

There are many benefits to completing this plan; a few of these include the following.

- Protecting public safety and preventing loss of life and injury
- Reducing harm to existing and future development
- Maintaining community continuity and strengthening the social connections, essential for recovery
- Preventing damage to your community's unique economic, cultural, and environmental assets
- Minimizing operational downtime and accelerating recovery of government and businesses after disasters
- Reducing the costs of disaster response and recovery and the exposure to risk for first responders
- Helping accomplish other community objectives, such as capital improvements, infrastructure protection, open space preservation, and economic resiliency

WE WANT TO HEAR FROM YOU!

The Lucas County Emergency Management Agency is requesting your assistance in the completion of this plan. Please take a few minutes to complete an online survey about the hazards your community faces.

www.surveymonkey.com/r/LucasHMP-Public1
www.surveymonkey.com/r/LucasHMP-Public2

We appreciate your input!

WHAT IS A HAZARD?
A hazard is a risk or a danger. These can include natural hazards (floods, earthquakes, tornadoes, hail, winter weather, drought, etc.) or technological or human-caused (dam failures, hazardous materials spills, etc.).

@LucasCoEma

@lucascoema

LUCAS COUNTY EMA

Lucas Co. holds emergency hazard meetings with the public

Lucas Co. holds emergency hazard meetings with the public

By | August 21, 2018 at 4:11 PM EST - Updated August 23 at 12:52 PM

LUCAS COUNTY (WTOL) - Members of Lucas County were able to voice their concerns about the natural disasters that worry them in meetings on Tuesday.

Be it flooding, pandemics, algal blooms, or any other hazard, the Lucas County Emergency Management Agency wants to find ways to mitigate potential disasters.

"We're working on our plan for mitigation, hazard mitigation. And so we have to, as one of the regulations, have public meetings to allow input from the public on some of the disasters and things that they see as being important for the county," said Patricia Moomey, Director of the Lucas County Emergency Management Agency,

The Lucas County Hazard Mitigation Plan was last updated in 2013, one year before Toledo's water crisis, and must be updated every five years.

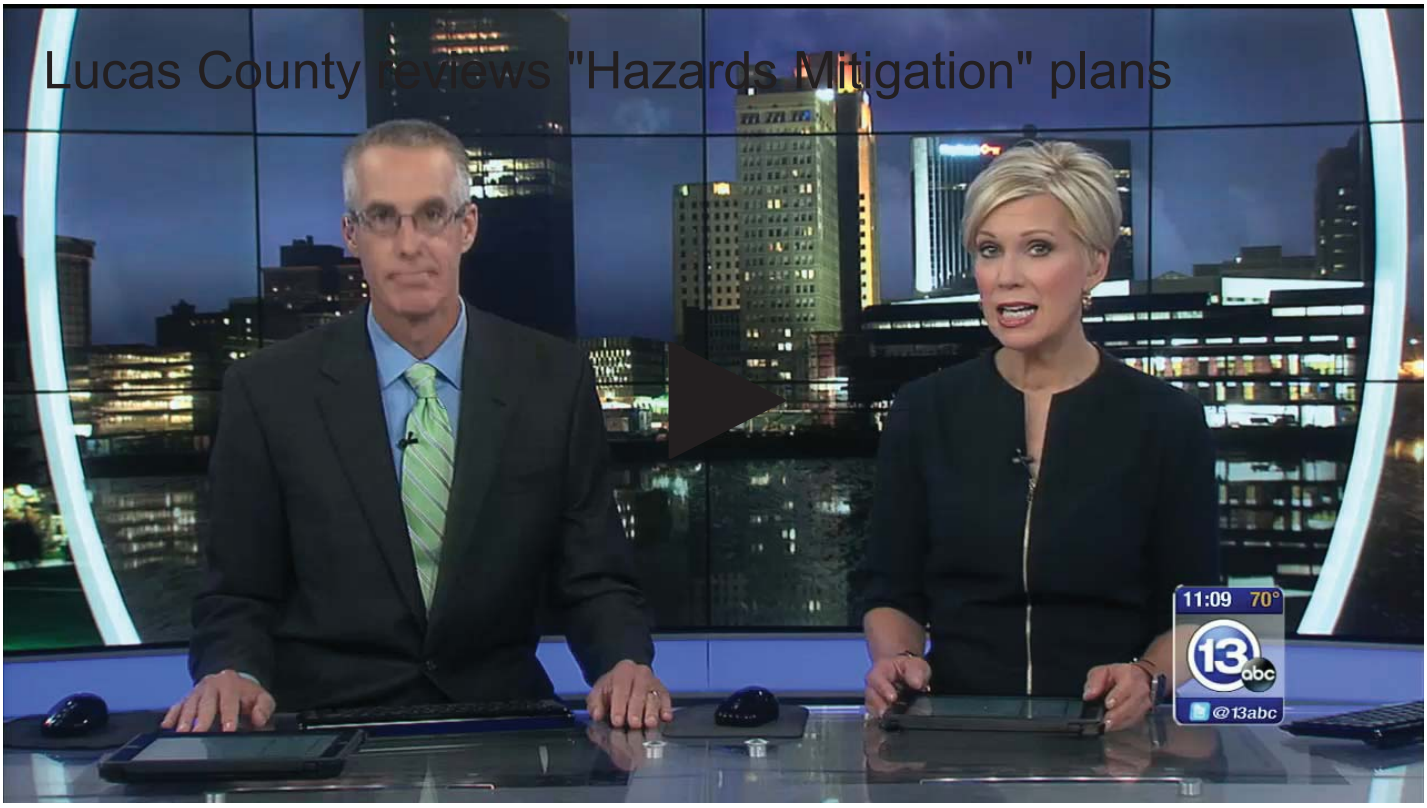
Some community members said that they want want their skills to be made available in an emergency.

"I'm here today because amateur radio plays a critical role in every single emergency we've had from the Wildlands Fires to the hurricanes to any other disaster, so we want to make sure that amateur radio is definitely represented for all emergency communications needs," said Allen Manrow from Lucas County Amateur Radio Emergency Services.

Through a grant, Lucas County employs a consulting firm to help plan for ways to mitigate hazards. The firm's emergency preparedness planner explains the economic impact of planning ahead.

"When you spend $1 in any kind of grant mitigation projects, you'll save $6 down the line so that's a good thing to know," said Amy Heimberger Lopez, Emergency Preparedness Planner from JH Consulting.

Lucas County reviews plans for disaster response, seeks public input



By Michael Bratton | Posted: Tue 11:13 PM, Aug 21, 2018 | Updated: Tue 11:40 PM, Aug 21, 2018

TOLEDO, Ohio (WTVG) - Heavy rain, significant snowfall and toxic algae are things that Lucas County residents are seemingly faced with every year.

Thanks to a team of emergency experts there's plans in place to handle virtually any disaster that comes our way.

"It's always important for everybody to know about the possible risks of where you live," said director of the Lucas County Emergency Management Agency Patricia Moomey.

By law each county in Ohio keeps what's called a "hazard mitigation plan," and they're required to be reviewed every five years.

Tuesday county leaders met up to do just that and identify necessary safety updates.

"We kinda' go over what the status is of the county, what the historic occurrences are of the hazards and kind of determine what we need to do from there," said contracted emergency preparedness planner Amy Heimberger Lopez.

According to EMA leaders, everything from active shooter situations to flood waters are considered hazards.

"What you're doing is diminishing the hazards, the impacts from that," said Heimberger Lopez. "So loss of life, economic loss, displacement, power outages. That kind of stuff."

Over the last five years alone, plan developers say they've seen an increase in natural disasters that create issues. Some of those recently include a tornado in Oregon and springtime flooding along Lake Erie.

Leaders say planning for even the smallest problem can spare people from headache when they happen.

"You can have mitigations from the smallest point of even having a homeowner know what areas they should trim in their trees and things to help stop any damage from wind," said Moomey.

While they do their best to prepare for the worst, Lucas County emergency officials say they also need your help to keep everyone safe.

"We have the ability for citizens to come in and give us comments, some of their possible stories of issues that they've seen and that type of thing," said Moomey.

Lucas County EMA currently has a survey that residents can take to identify hazards in their communities. We've posted a link to that in the sidebar of this story.

ONLINE PUBLIC SURVEY

Survey #1

Available to the public in April, 2018

139 responses by December, 2018

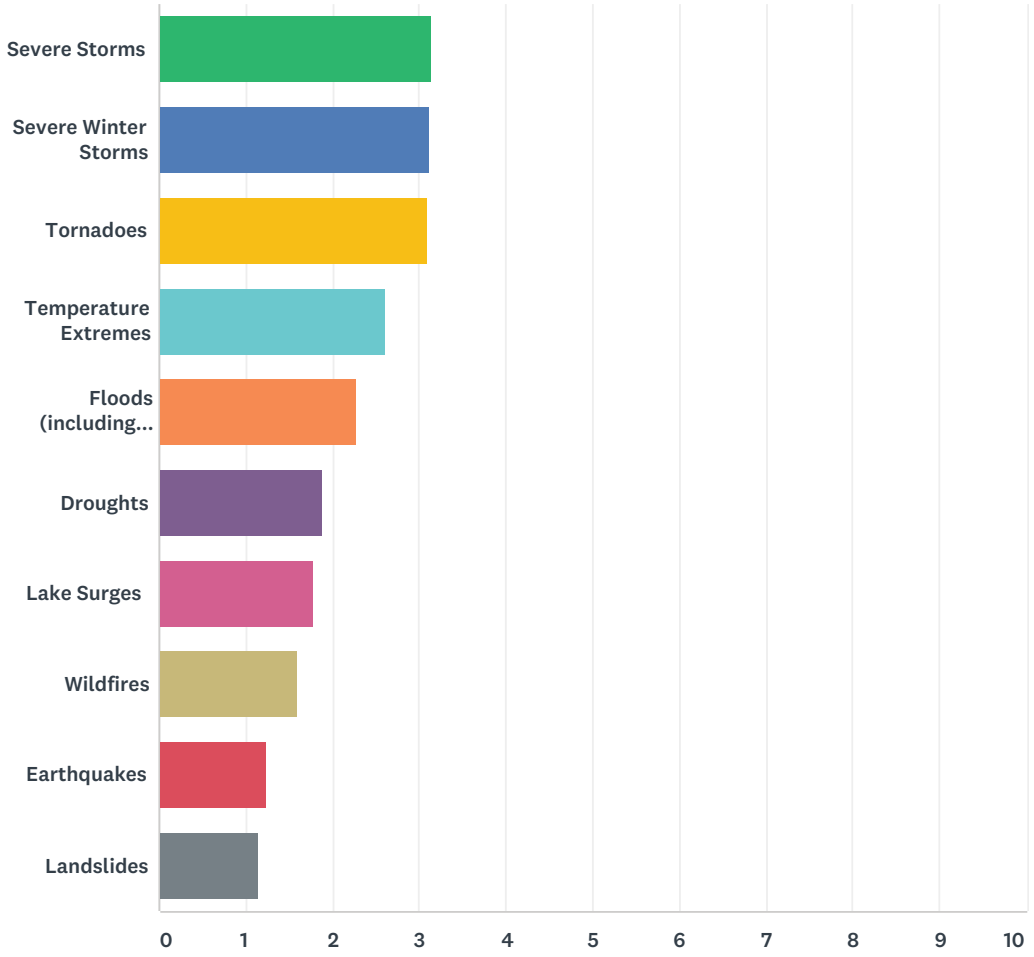
Survey #2

Available to the public in August, 2018

32 responses by December, 2018

Q1 Please indicate how concerned you are about the following hazards, specifically where you live.

Answered: 139 Skipped: 0

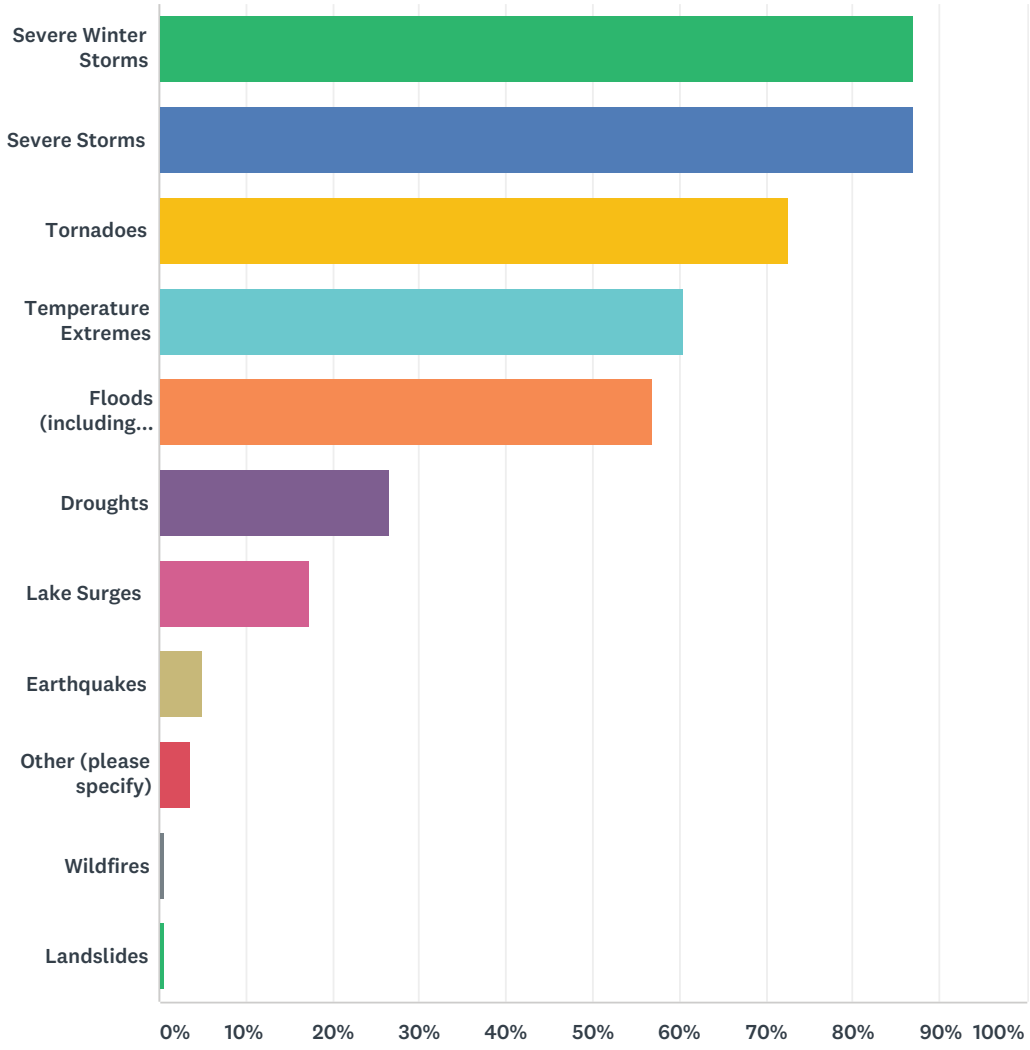


	NOT AT ALL CONCERNED	SOMEWHAT CONCERNED	CONCERNED	VERY CONCERNED	TOTAL	WEIGHTED AVERAGE
Severe Storms	1.45% 2	20.29% 28	40.58% 56	37.68% 52	138	3.14
Severe Winter Storms	2.17% 3	22.46% 31	36.96% 51	38.41% 53	138	3.12
Tornadoes	2.92% 4	21.90% 30	37.23% 51	37.96% 52	137	3.10
Temperature Extremes	11.68% 16	34.31% 47	34.31% 47	19.71% 27	137	2.62
Floods (including flash floods)	18.12% 25	44.20% 61	28.26% 39	9.42% 13	138	2.29
Droughts	33.09% 45	50.74% 69	11.76% 16	4.41% 6	136	1.88
Lake Surges	49.64% 68	29.93% 41	13.87% 19	6.57% 9	137	1.77

Wildfires	57.35% 78	27.21% 37	13.24% 18	2.21% 3	136	1.60
Earthquakes	77.37% 106	21.17% 29	1.46% 2	0.00% 0	137	1.24
Landslides	86.03% 117	12.50% 17	1.47% 2	0.00% 0	136	1.15

Q2 In the past 10 years, which hazards do you recall having occurred in your community? (Check all that apply)

Answered: 139 Skipped: 0

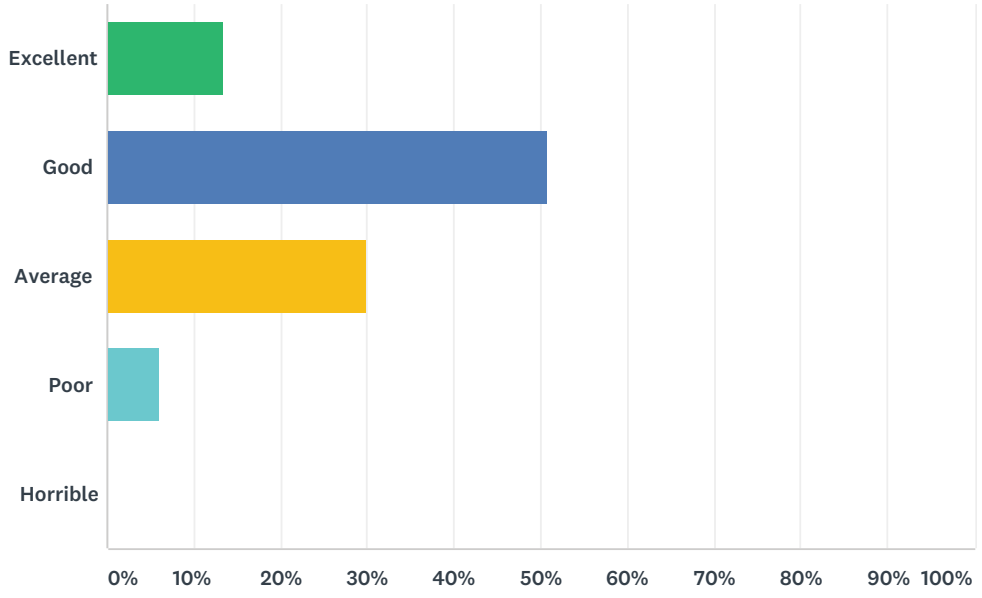


ANSWER CHOICES	RESPONSES	
Severe Winter Storms	87.05%	121
Severe Storms	87.05%	121
Tornadoes	72.66%	101
Temperature Extremes	60.43%	84
Floods (including flash floods)	56.83%	79
Droughts	26.62%	37
Lake Surges	17.27%	24
Earthquakes	5.04%	7
Other (please specify)	3.60%	5

Wildfires	0.72%	1
Landslides	0.72%	1
Total Respondents: 139		

Q3 Think back to a recent hazard occurrence (any from questions 1 or 2.) How would you rate your community's ability to handle the hazard event?

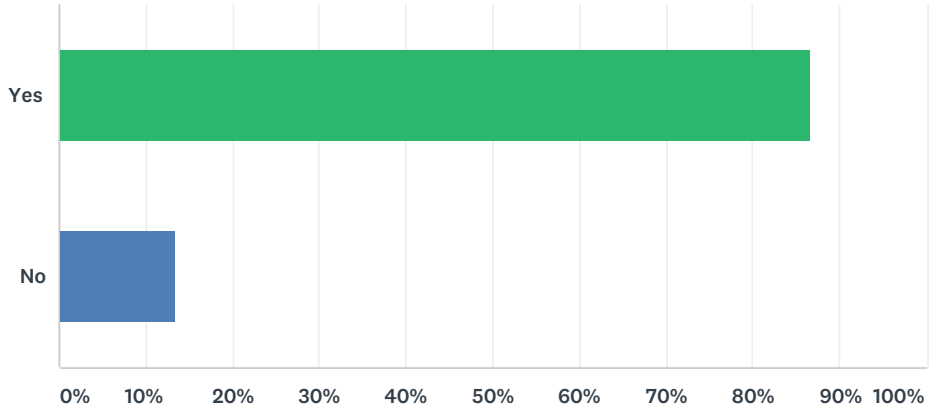
Answered: 134 Skipped: 5



ANSWER CHOICES	RESPONSES	
Excellent	13.43%	18
Good	50.75%	68
Average	29.85%	40
Poor	5.97%	8
Horrible	0.00%	0
TOTAL		134

Q4 During this event did you receive information or warnings from local media (TV, Radio, Text) or social media (Facebook/Twitter) that was either from or forwarded from your local public officials / emergency management officials?

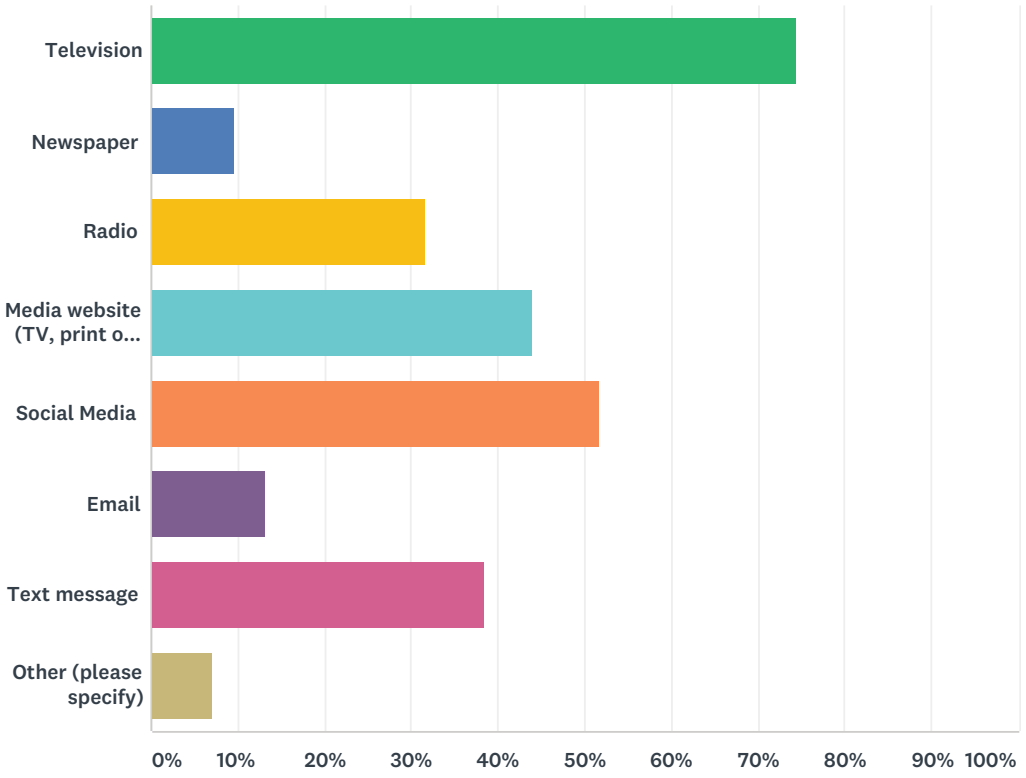
Answered: 134 Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	86.57%	116
No	13.43%	18
TOTAL		134

Q5 How did you receive this information?

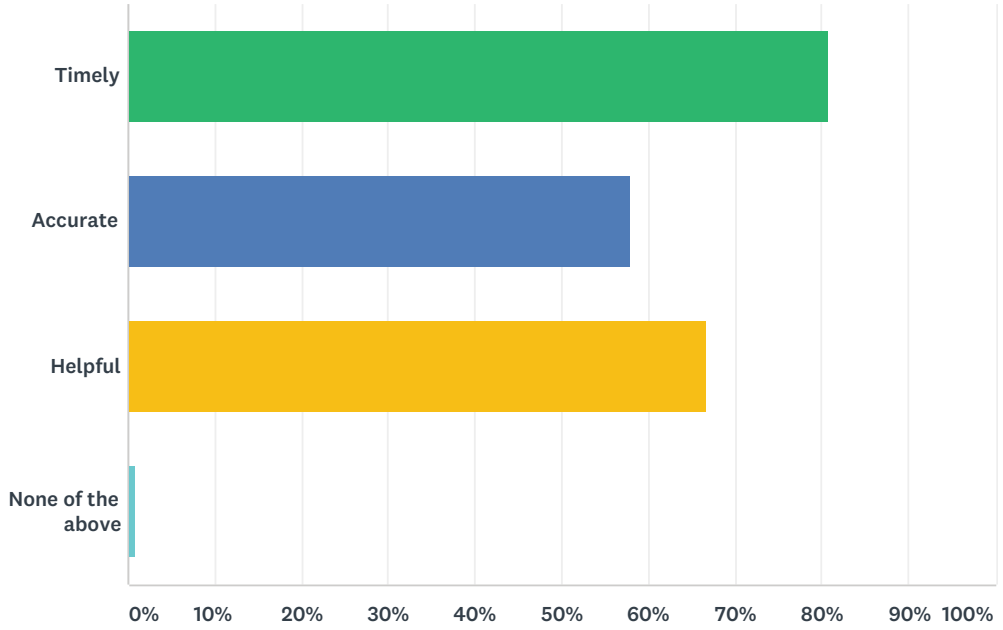
Answered: 114 Skipped: 25



ANSWER CHOICES	RESPONSES	
Television	74.56%	85
Newspaper	9.65%	11
Radio	31.58%	36
Media website (TV, print or radio)	43.86%	50
Social Media	51.75%	59
Email	13.16%	15
Text message	38.60%	44
Other (please specify)	7.02%	8
Total Respondents: 114		

Q6 Was this information timely, accurate and helpful? (choose as many as apply)

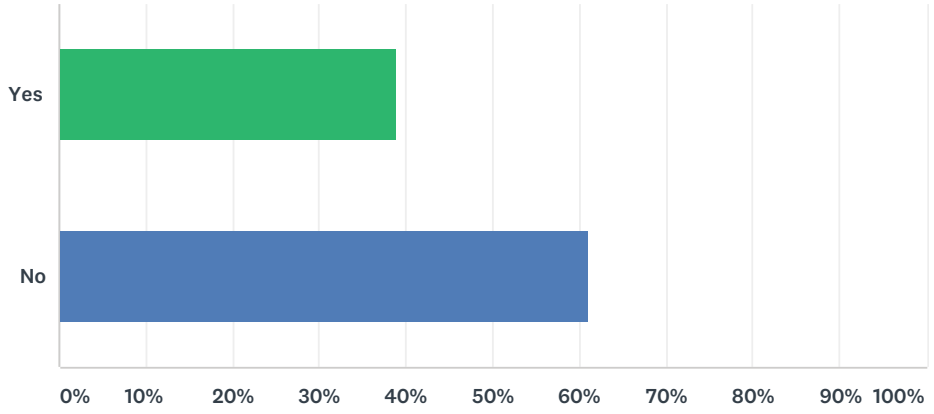
Answered: 114 Skipped: 25



ANSWER CHOICES	RESPONSES	
Timely	80.70%	92
Accurate	57.89%	66
Helpful	66.67%	76
None of the above	0.88%	1
Total Respondents: 114		

Q7 Do you follow Lucas County Emergency Management Agency on social media?

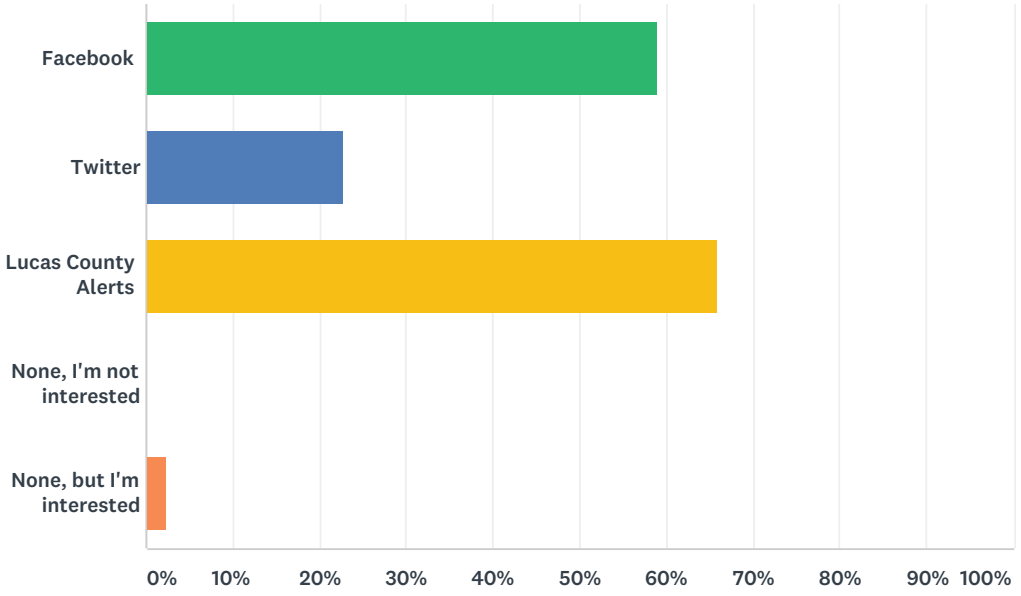
Answered: 113 Skipped: 26



ANSWER CHOICES	RESPONSES	
Yes	38.94%	44
No	61.06%	69
TOTAL		113

Q8 On which platforms do you follow Lucas County Emergency Management Agency?

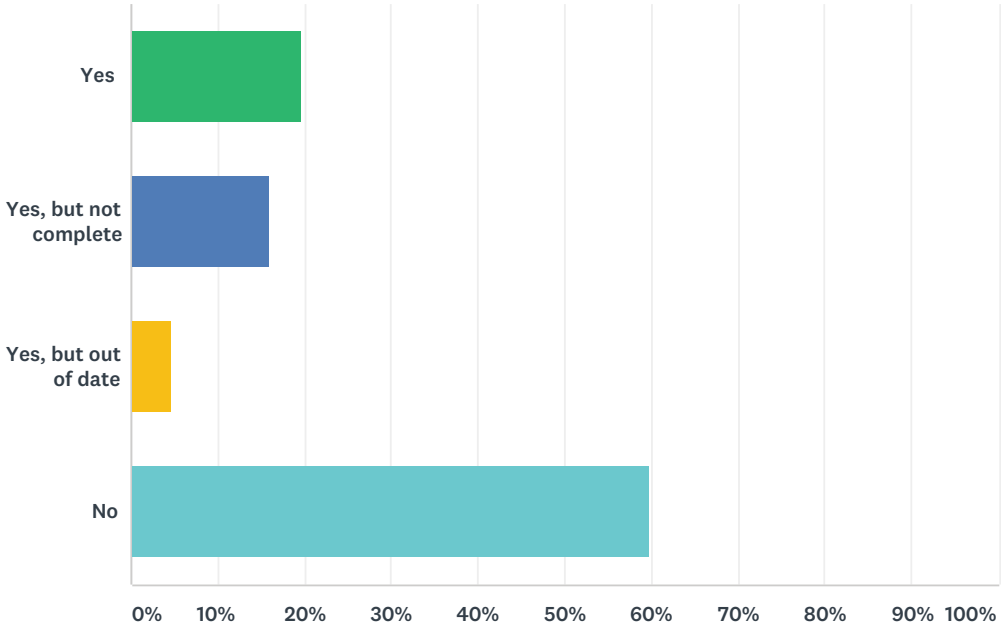
Answered: 44 Skipped: 95



ANSWER CHOICES	RESPONSES	
Facebook	59.09%	26
Twitter	22.73%	10
Lucas County Alerts	65.91%	29
None, I'm not interested	0.00%	0
None, but I'm interested	2.27%	1
Total Respondents: 44		

Q9 Do you / does your household have a 72-hour kit? (http://www.ready.gov/build-a-kit)

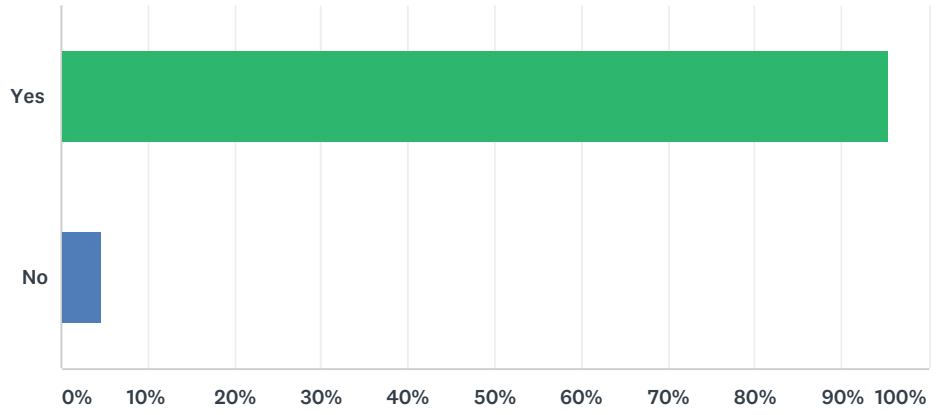
Answered: 132 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes	19.70%	26
Yes, but not complete	15.91%	21
Yes, but out of date	4.55%	6
No	59.85%	79
TOTAL		132

Q10 Do you have homeowners/renters insurance?

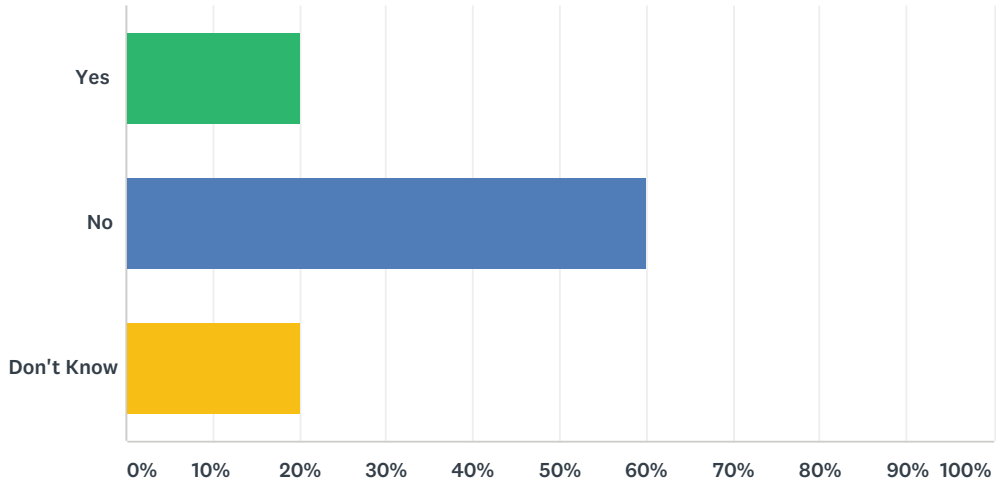
Answered: 132 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes	95.45%	126
No	4.55%	6
TOTAL		132

Q11 Does your homeowner/renters insurance include flood insurance?

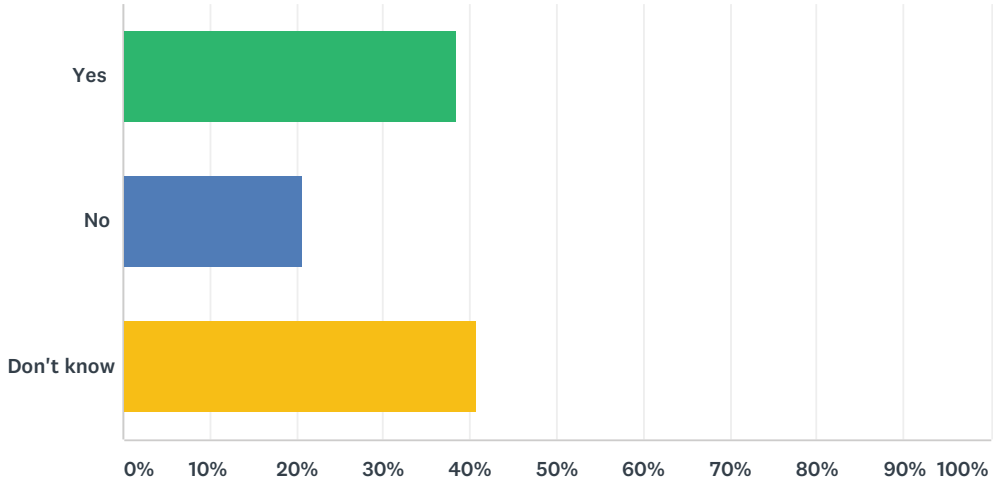
Answered: 125 Skipped: 14



ANSWER CHOICES	RESPONSES	
Yes	20.00%	25
No	60.00%	75
Don't Know	20.00%	25
TOTAL		125

Q12 Does your policy include sewer back up insurance (or have a sewer back up policy rider)?

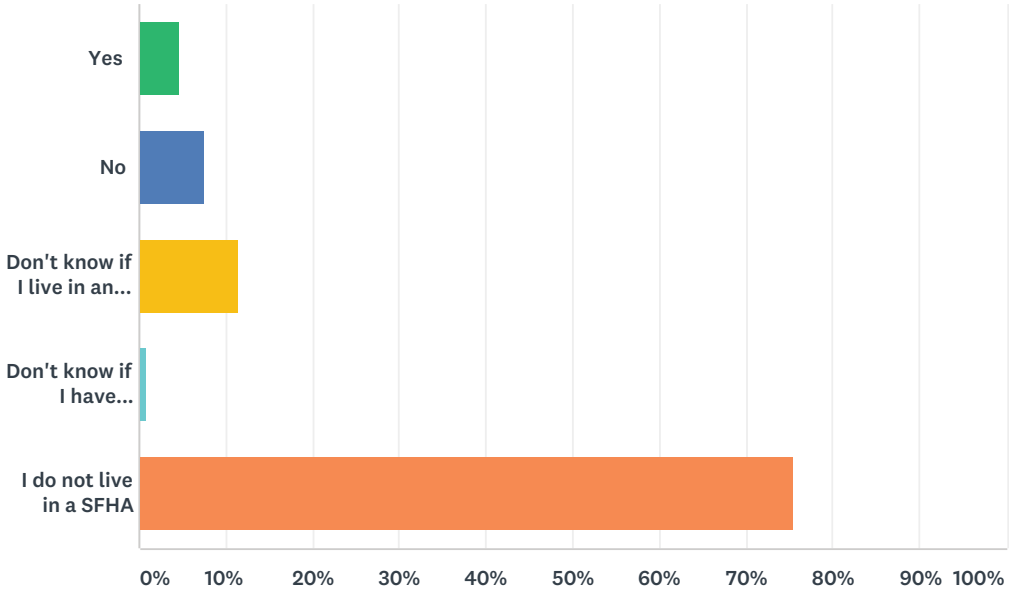
Answered: 125 Skipped: 14



ANSWER CHOICES	RESPONSES	
Yes	38.40%	48
No	20.80%	26
Don't know	40.80%	51
TOTAL		125

Q13 If you live in a Special Flood Hazard Area (SFHA), do you have floodplain insurance?

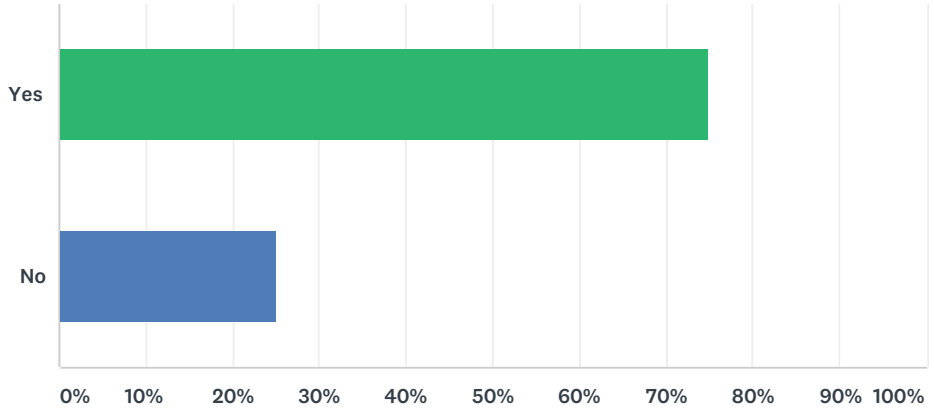
Answered: 131 Skipped: 8



ANSWER CHOICES	RESPONSES	
Yes	4.58%	6
No	7.63%	10
Don't know if I live in an SFHA	11.45%	15
Don't know if I have floodplain insurance	0.76%	1
I do not live in a SFHA	75.57%	99
TOTAL		131

Q14 Are you willing to spend your money on mitigation activities for your home?

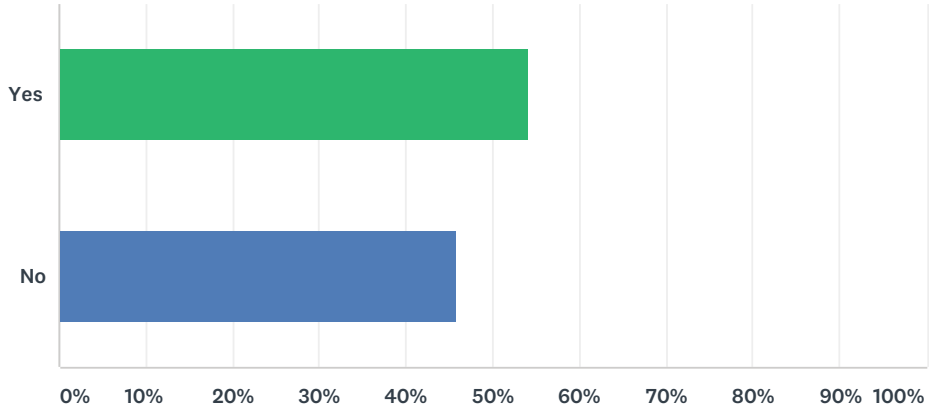
Answered: 131 Skipped: 8



ANSWER CHOICES	RESPONSES	
Yes	74.81%	98
No	25.19%	33
TOTAL		131

Q15 Have you performed any improvements to your home to reduce your risk from a hazard?

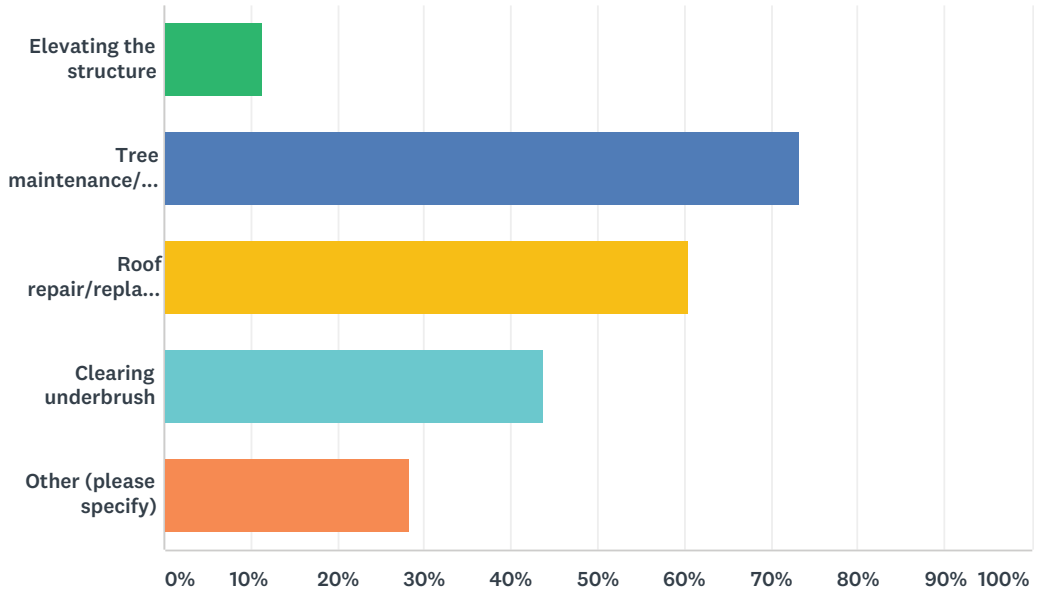
Answered: 131 Skipped: 8



ANSWER CHOICES	RESPONSES	
Yes	54.20%	71
No	45.80%	60
TOTAL		131

Q16 Please indicate what improvements you have made:

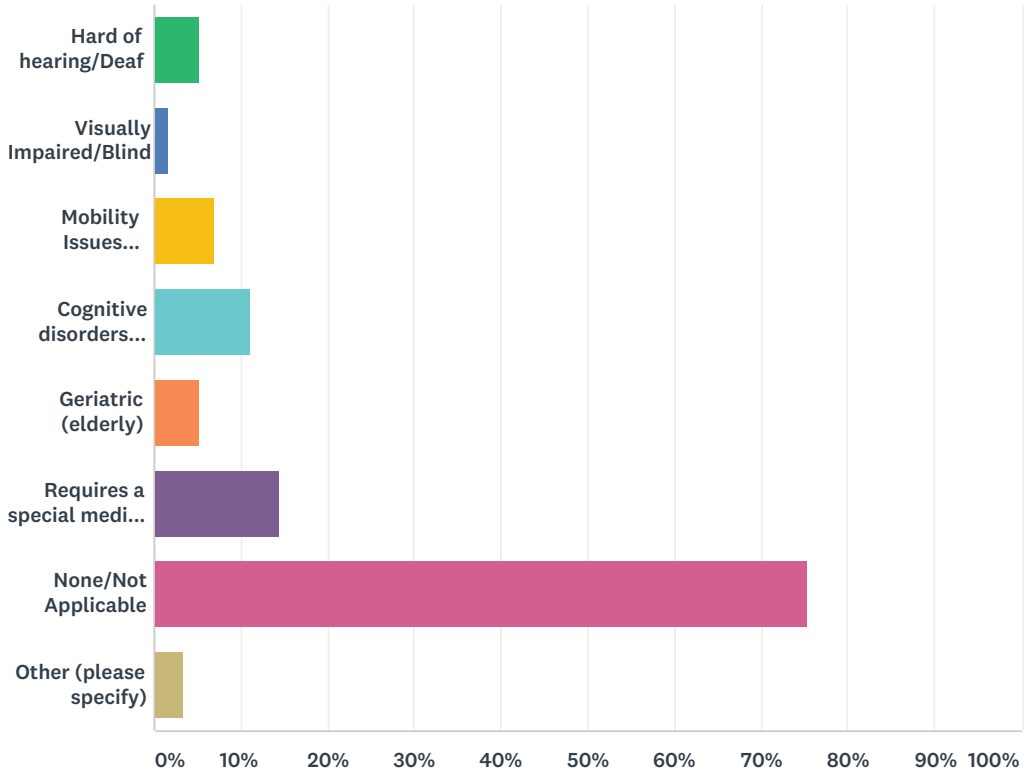
Answered: 71 Skipped: 68



ANSWER CHOICES	RESPONSES	
Elevating the structure	11.27%	8
Tree maintenance/removal	73.24%	52
Roof repair/replacement	60.56%	43
Clearing underbrush	43.66%	31
Other (please specify)	28.17%	20
Total Respondents: 71		

Q17 Do you, or someone who resides in your residence, have a special need that emergency service providers should be aware of in an emergency? (Please pick all the apply)

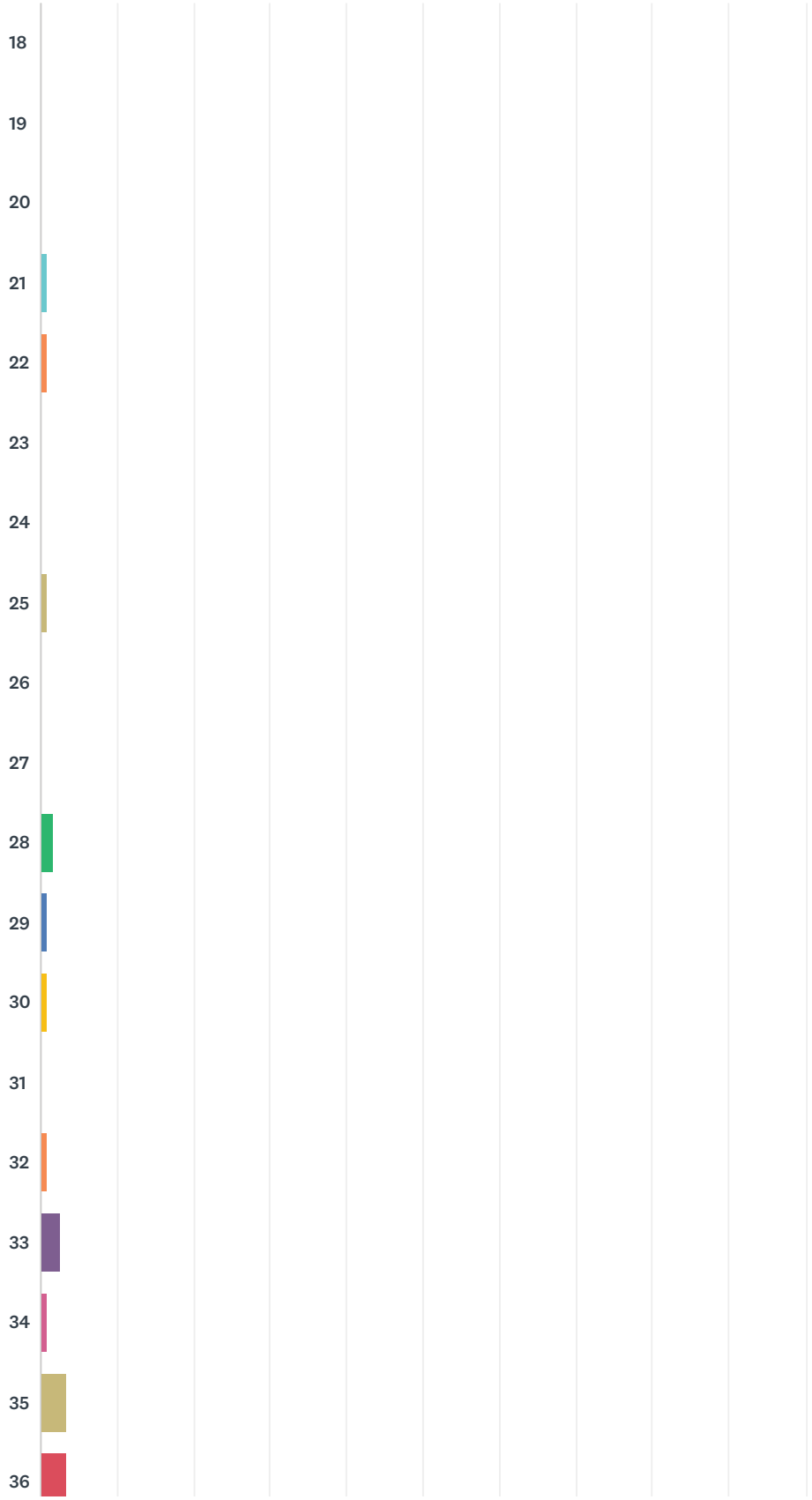
Answered: 117 Skipped: 22

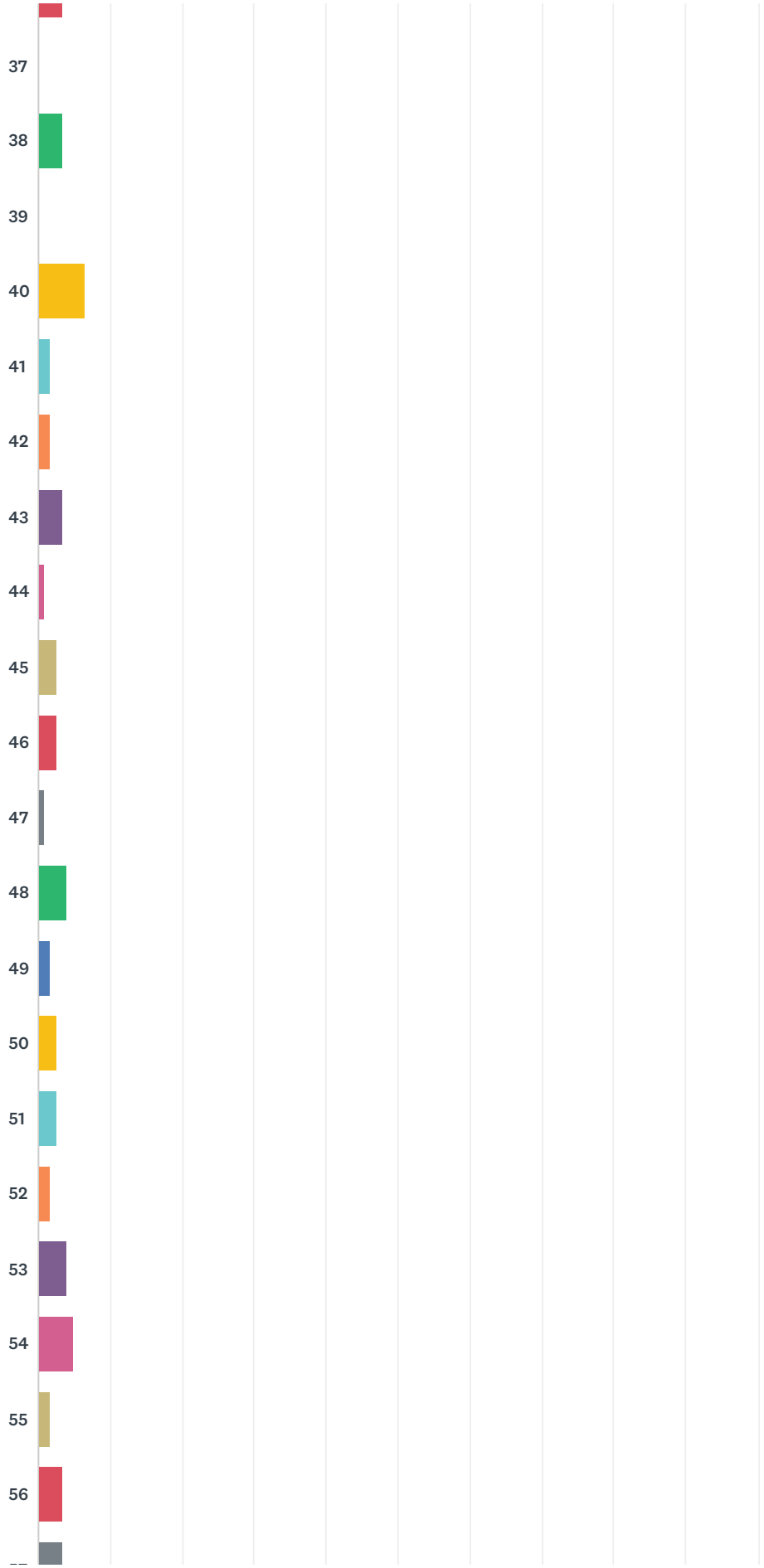


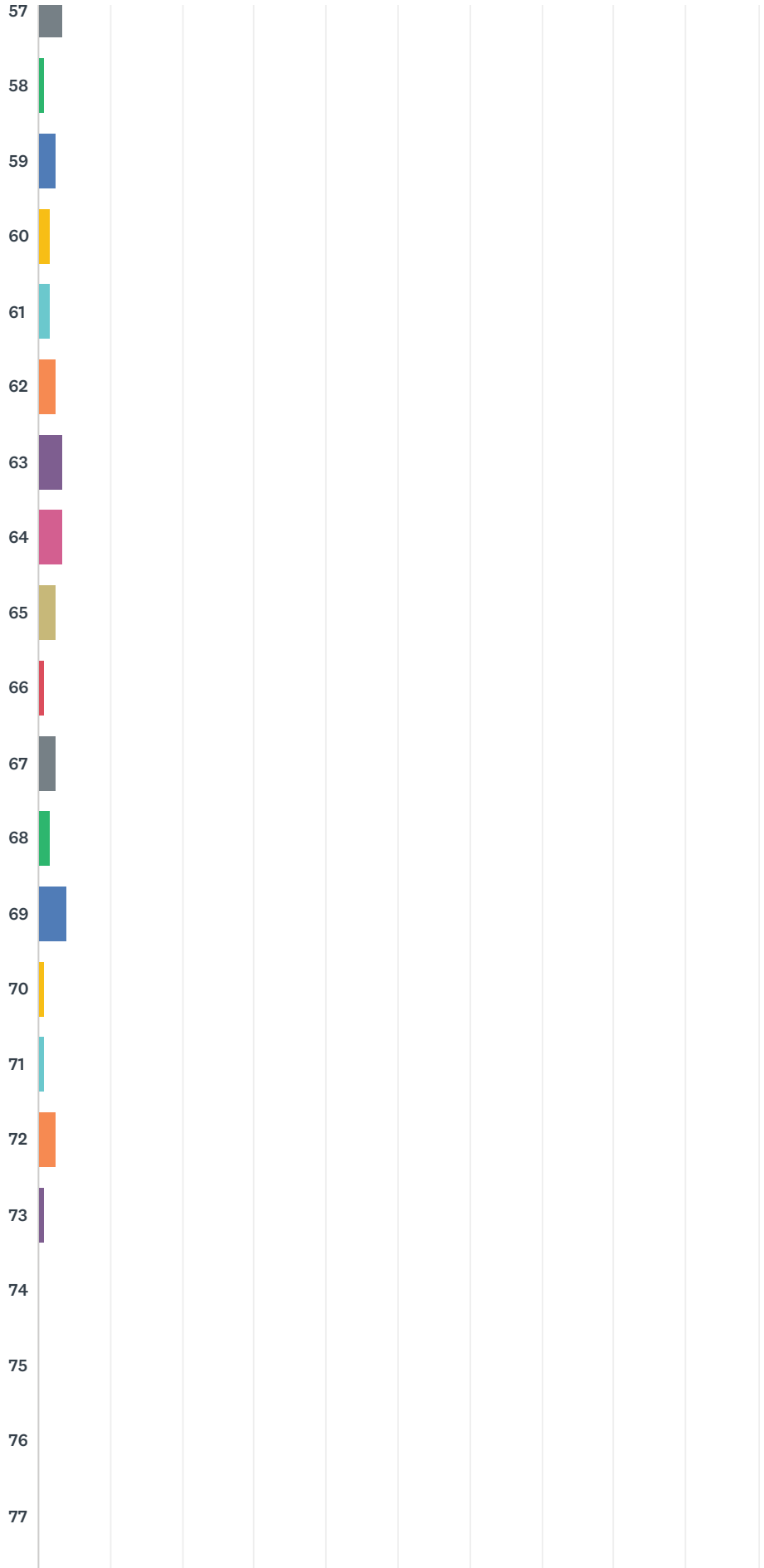
ANSWER CHOICES	RESPONSES	
Hard of hearing/Deaf	5.13%	6
Visually Impaired/Blind	1.71%	2
Mobility Issues (non-ambulatory, confined to a wheelchair, requires the use of a can or walker)	6.84%	8
Cognitive disorders (includes autism, depression, etc.)	11.11%	13
Geriatric (elderly)	5.13%	6
Requires a special medical device (such as a Ventilator, CPAP machine, or drugs that require refrigeration [I.E. insulin])	14.53%	17
None/Not Applicable	75.21%	88
Other (please specify)	3.42%	4
Total Respondents: 117		

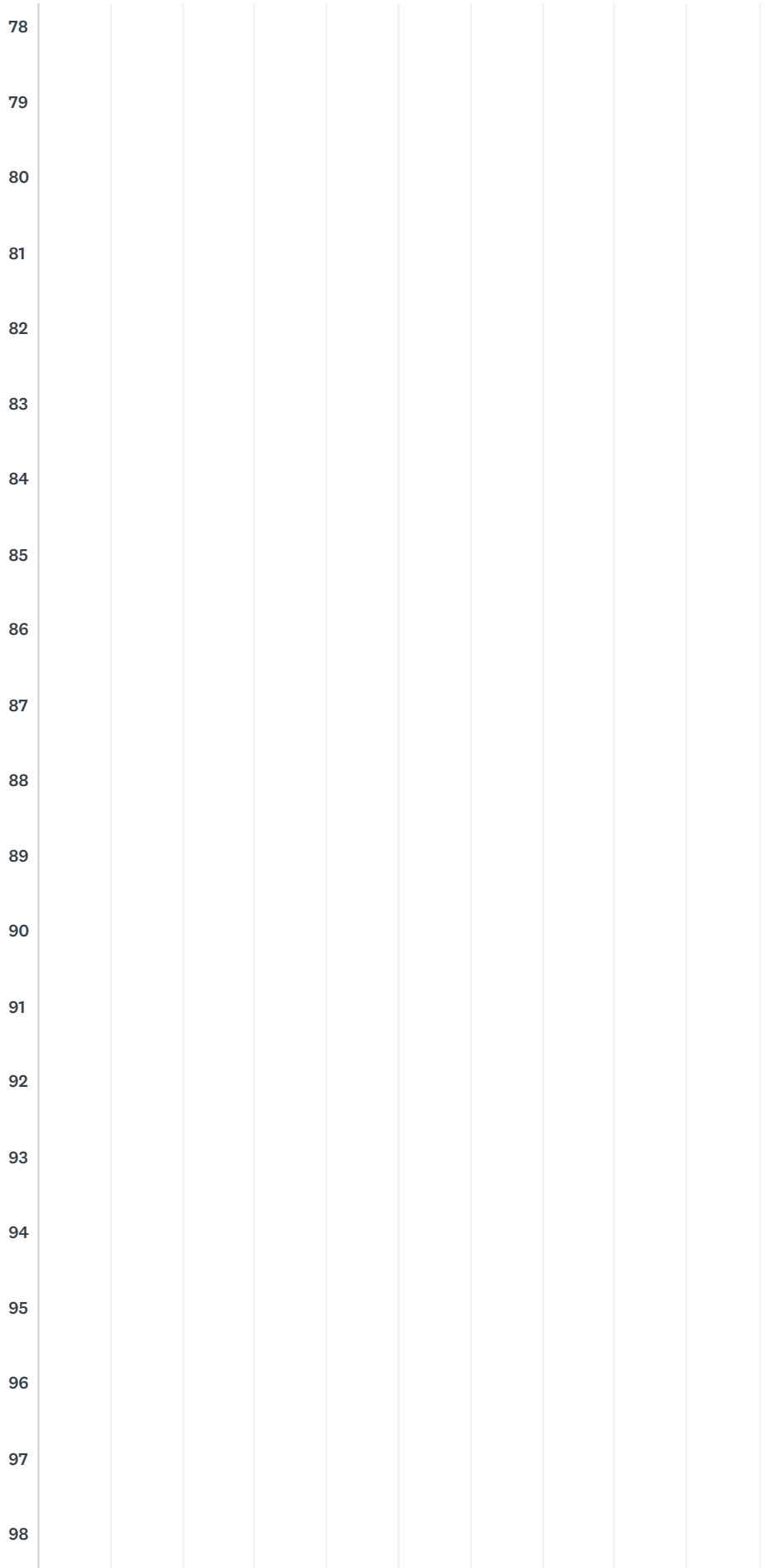
Q18 Please provide your age

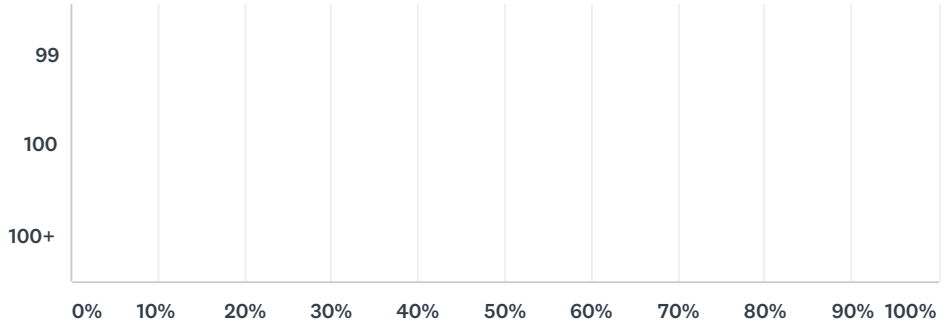
Answered: 123 Skipped: 16




37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56


57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77


78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98



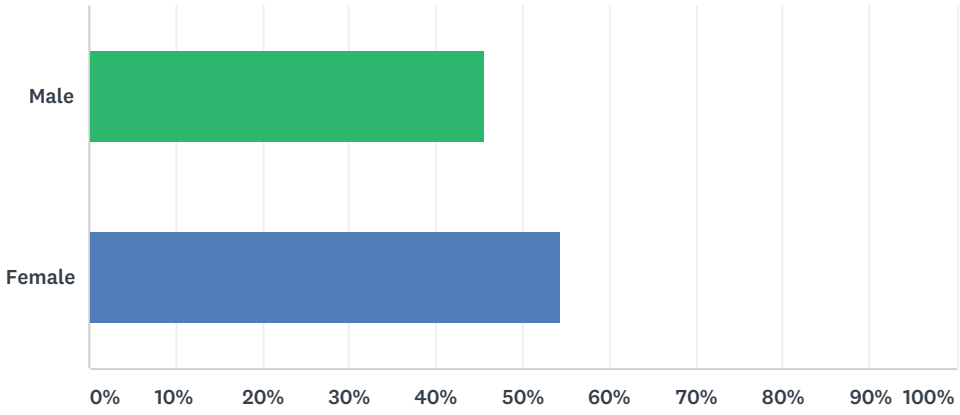
ANSWER CHOICES	RESPONSES	
18	0.00%	0
19	0.00%	0
20	0.00%	0
21	0.81%	1
22	0.81%	1
23	0.00%	0
24	0.00%	0
25	0.81%	1
26	0.00%	0
27	0.00%	0
28	1.63%	2
29	0.81%	1
30	0.81%	1
31	0.00%	0
32	0.81%	1
33	2.44%	3
34	0.81%	1
35	3.25%	4
36	3.25%	4
37	0.00%	0
38	3.25%	4
39	0.00%	0
40	6.50%	8
41	1.63%	2
42	1.63%	2
43	3.25%	4

44	0.81%	1
45	2.44%	3
46	2.44%	3
47	0.81%	1
48	4.07%	5
49	1.63%	2
50	2.44%	3
51	2.44%	3
52	1.63%	2
53	4.07%	5
54	4.88%	6
55	1.63%	2
56	3.25%	4
57	3.25%	4
58	0.81%	1
59	2.44%	3
60	1.63%	2
61	1.63%	2
62	2.44%	3
63	3.25%	4
64	3.25%	4
65	2.44%	3
66	0.81%	1
67	2.44%	3
68	1.63%	2
69	4.07%	5
70	0.81%	1
71	0.81%	1
72	2.44%	3
73	0.81%	1
74	0.00%	0
75	0.00%	0
76	0.00%	0
77	0.00%	0

78	0.00%	0
79	0.00%	0
80	0.00%	0
81	0.00%	0
82	0.00%	0
83	0.00%	0
84	0.00%	0
85	0.00%	0
86	0.00%	0
87	0.00%	0
88	0.00%	0
89	0.00%	0
90	0.00%	0
91	0.00%	0
92	0.00%	0
93	0.00%	0
94	0.00%	0
95	0.00%	0
96	0.00%	0
97	0.00%	0
98	0.00%	0
99	0.00%	0
100	0.00%	0
100+	0.00%	0
TOTAL		123

Q19 Gender

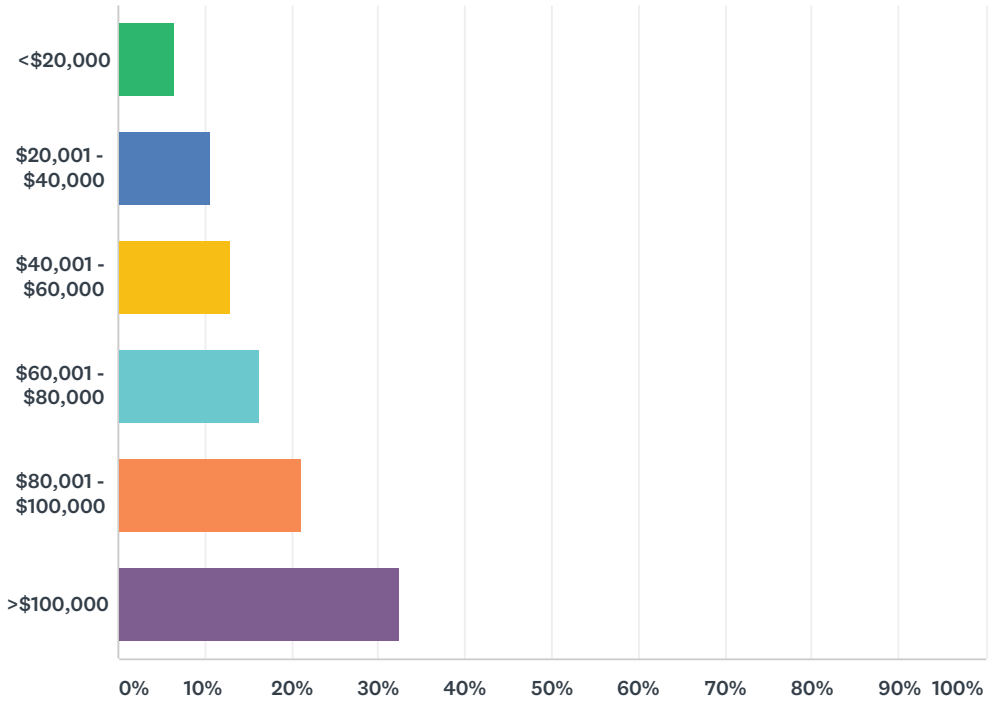
Answered: 123 Skipped: 16



ANSWER CHOICES	RESPONSES	
Male	45.53%	56
Female	54.47%	67
TOTAL		123

Q20 Please indicate your household income:

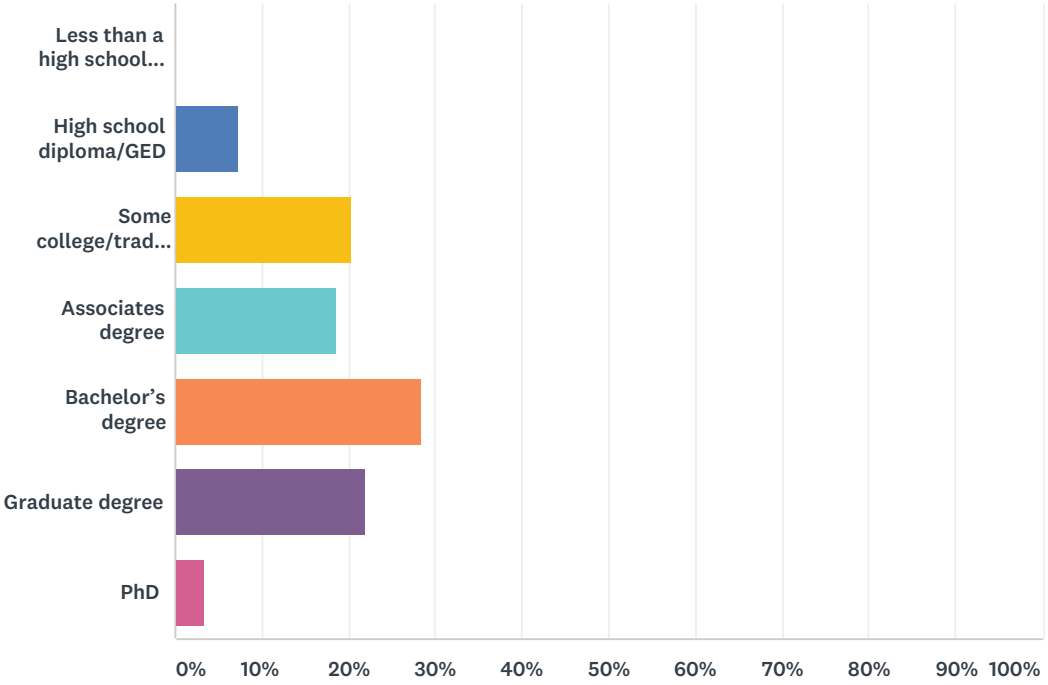
Answered: 123 Skipped: 16



ANSWER CHOICES	RESPONSES	
<$20,000	6.50%	8
$20,001 - $40,000	10.57%	13
$40,001 - $60,000	13.01%	16
$60,001 - $80,000	16.26%	20
$80,001 - $100,000	21.14%	26
>$100,000	32.52%	40
TOTAL		123

Q21 Please indicate your level of education

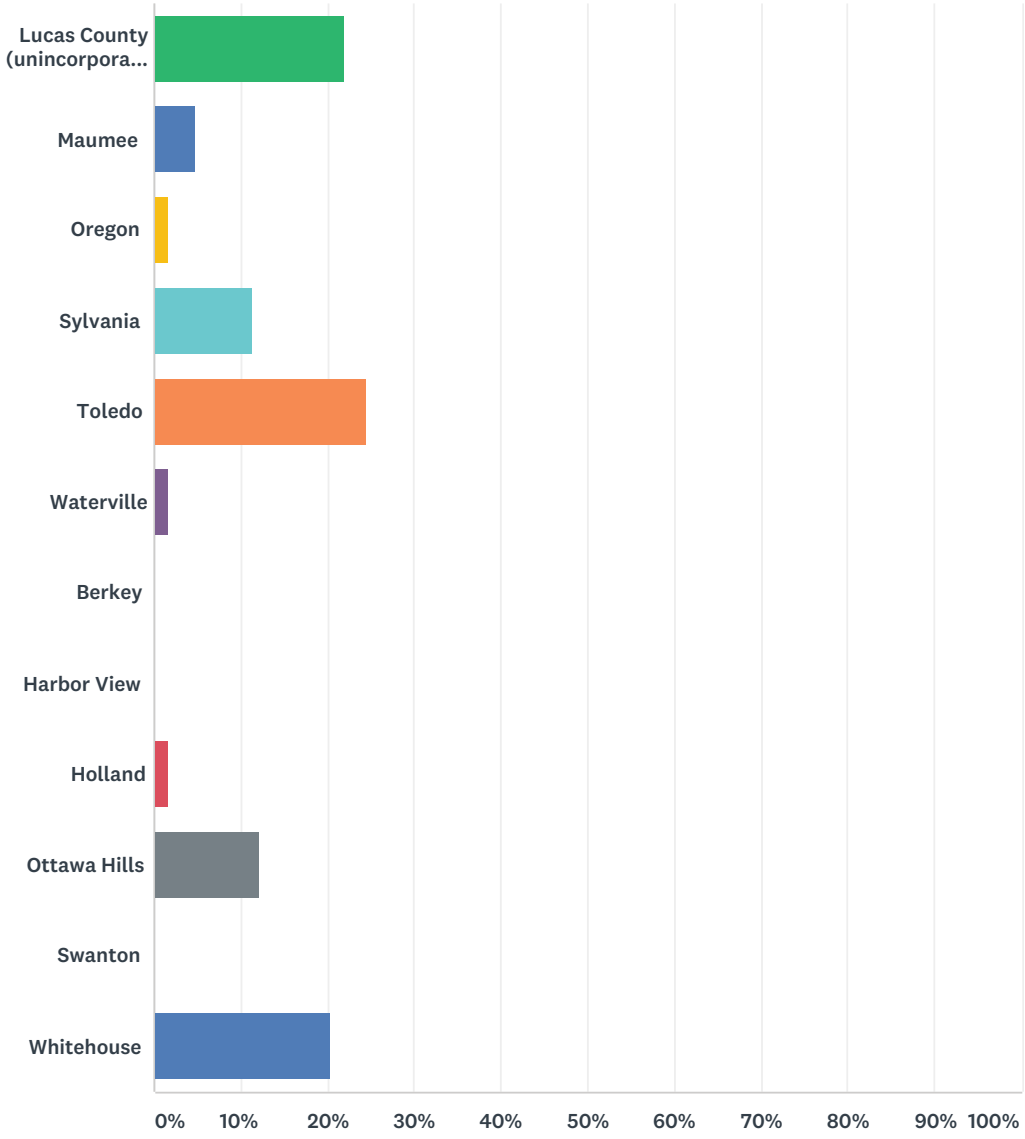
Answered: 123 Skipped: 16



ANSWER CHOICES	RESPONSES	
Less than a high school diploma	0.00%	0
High school diploma/GED	7.32%	9
Some college/trade school	20.33%	25
Associates degree	18.70%	23
Bachelor's degree	28.46%	35
Graduate degree	21.95%	27
PhD	3.25%	4
TOTAL		123

Q22 In which municipality do you reside?

Answered: 123 Skipped: 16

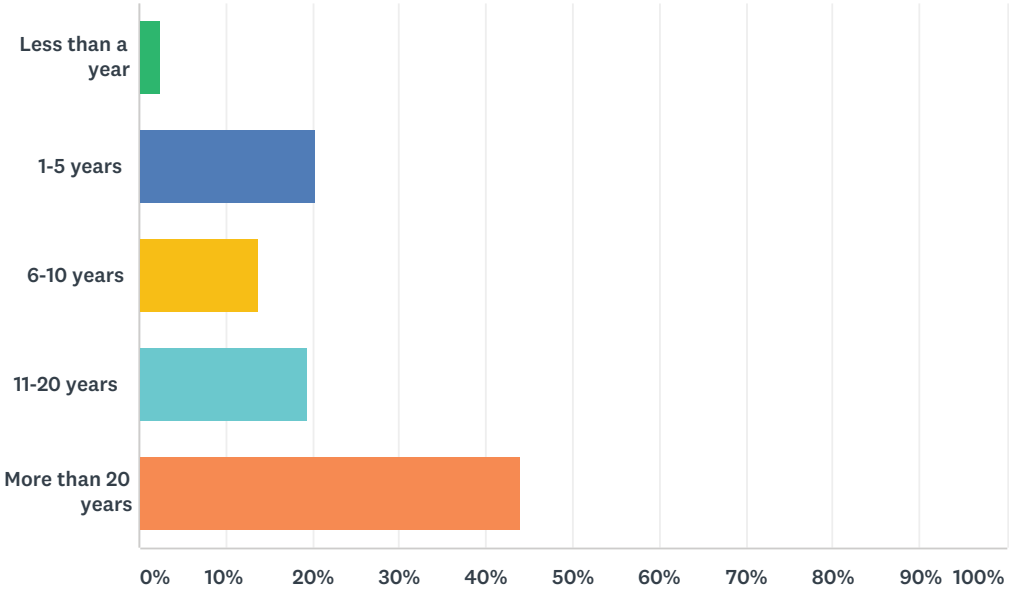


ANSWER CHOICES	RESPONSES	
Lucas County (unincorporated area/township)	21.95%	27
Maumee	4.88%	6
Oregon	1.63%	2
Sylvania	11.38%	14
Toledo	24.39%	30
Waterville	1.63%	2
Berkey	0.00%	0
Harbor View	0.00%	0

Holland	1.63%	2
Ottawa Hills	12.20%	15
Swanton	0.00%	0
Whitehouse	20.33%	25
TOTAL		123

Q23 How long have you resided in your community?

Answered: 123 Skipped: 16



ANSWER CHOICES	RESPONSES	
Less than a year	2.44%	3
1-5 years	20.33%	25
6-10 years	13.82%	17
11-20 years	19.51%	24
More than 20 years	43.90%	54
TOTAL		123

Q24 If you would like to take part in additional surveys regarding potential hazard mitigation projects please provide a valid email address.

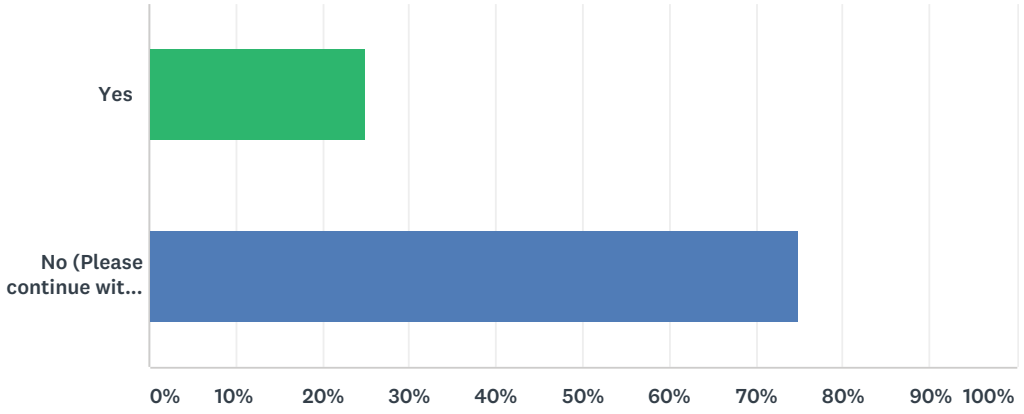
Answered: 20 Skipped: 119

Q25 Please share any other comments you have

Answered: 9 Skipped: 130

Q1 Did you respond to the previous survey about risks and vulnerabilities?

Answered: 32 Skipped: 0



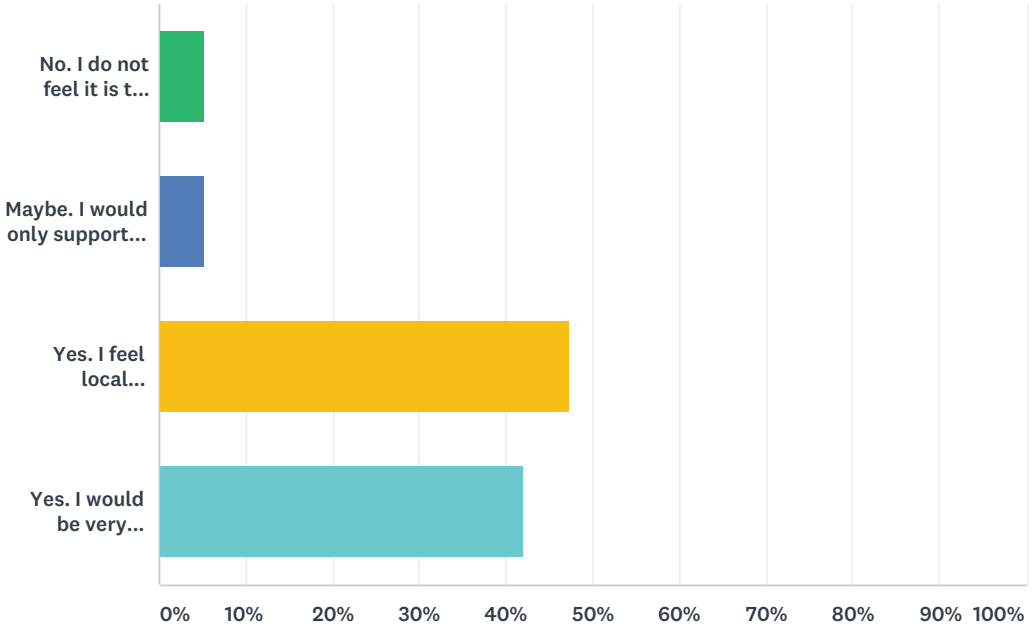
ANSWER CHOICES	RESPONSES	
Yes	25.00%	8
No (Please continue with this survey even if you did not respond to the previous survey!)	75.00%	24
TOTAL		32

Q2 Our mitigation plan seeks to outline projects to reduce the negative impacts from these types of hazards. What do you feel our priorities should be?

Answered: 16 Skipped: 16

Q3 Would you be supportive of additional regulatory efforts to encourage or require mitigation actions?

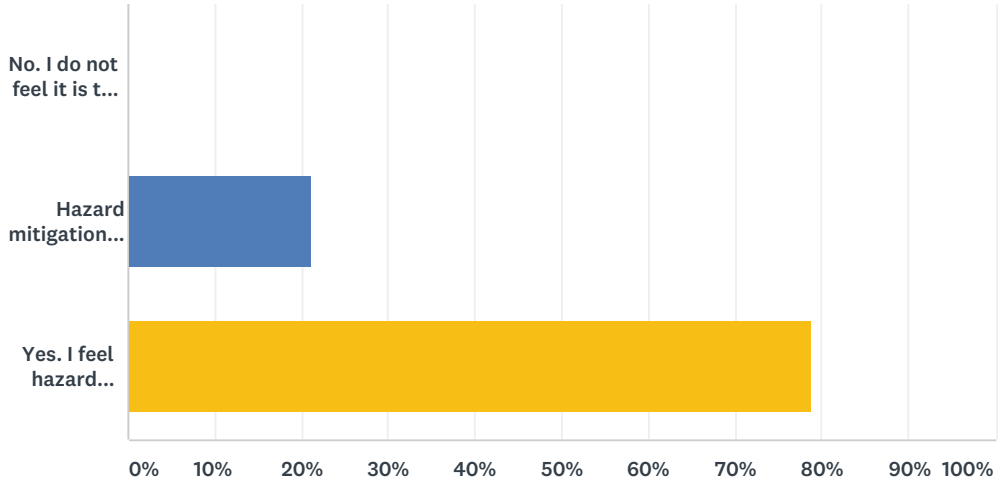
Answered: 19 Skipped: 13



ANSWER CHOICES	RESPONSES	
No. I do not feel it is the role of local government to encourage or require hazard mitigation.	5.26%	1
Maybe. I would only support encouragement of mitigation actions.	5.26%	1
Yes. I feel local government has a role in protecting publicly-owned assets and infrastructure.	47.37%	9
Yes. I would be very supportive of such efforts and feel that hazard mitigation should be mandatory.	42.11%	8
TOTAL		19

Q4 Would you be supportive of the use of tax dollars for grant programs, construction of mitigating infrastructure, etc.?

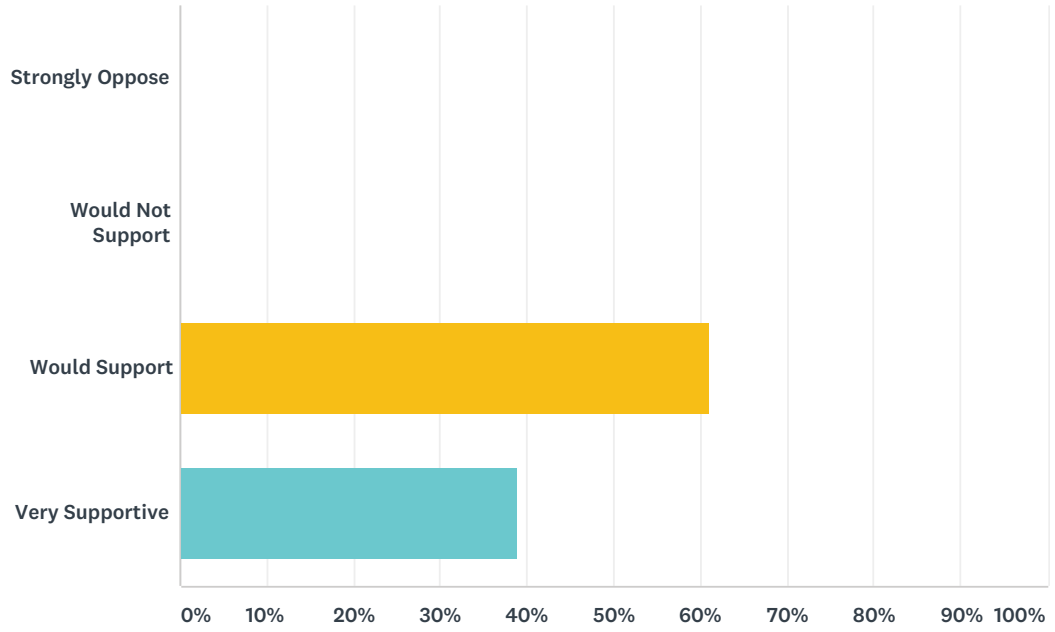
Answered: 19 Skipped: 13



ANSWER CHOICES	RESPONSES	
No. I do not feel it is the role of government to encourage or require hazard mitigation.	0.00%	0
Hazard mitigation efforts should be funded entirely by property owners, whether those owners are public or private entities or individuals.	21.05%	4
Yes. I feel hazard mitigation could be a beneficial use of tax dollars.	78.95%	15
TOTAL		19

Q5 Upgrading water systems to eliminate breaks and leaks.

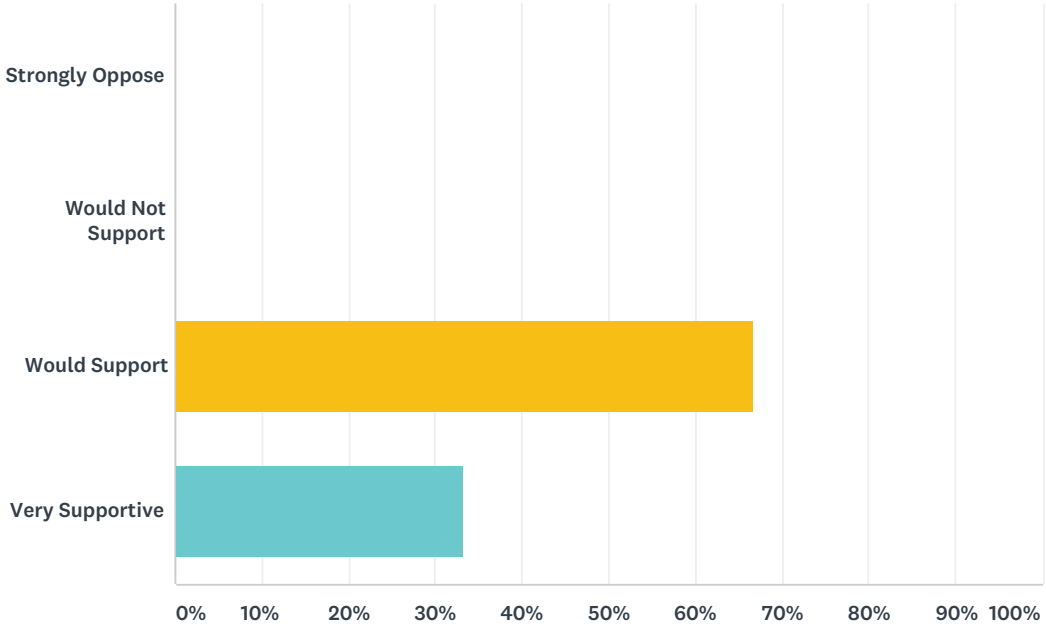
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	0.00%	0
Would Support	61.11%	11
Very Supportive	38.89%	7
TOTAL		18

Q6 Grant programs or regulatory efforts to address stormwater problems.

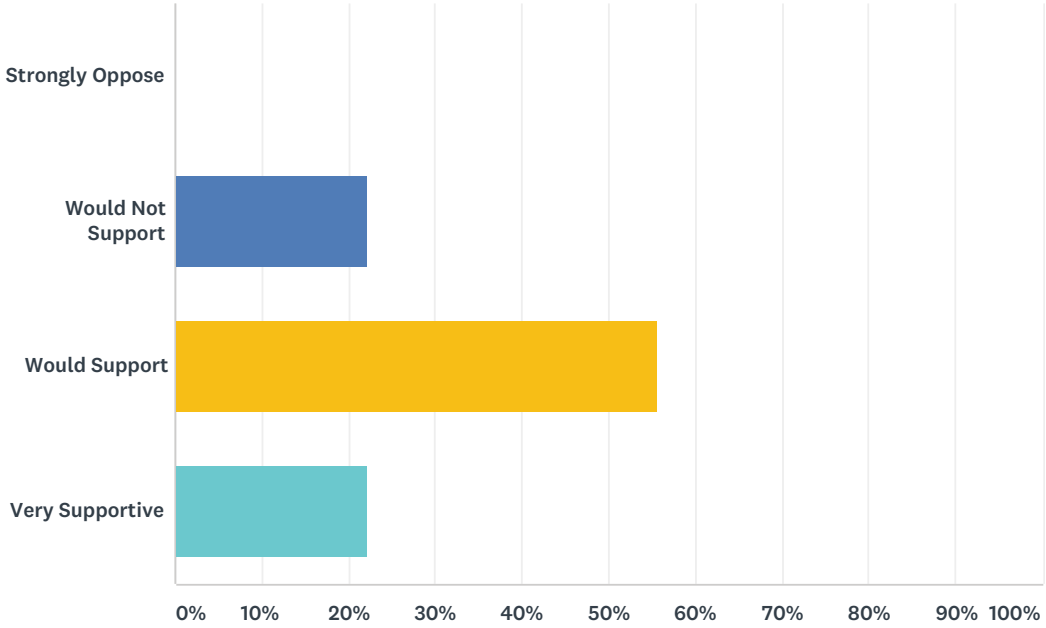
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	0.00%	0
Would Support	66.67%	12
Very Supportive	33.33%	6
TOTAL		18

Q7 Regulatory-driven water conservation during drought conditions.

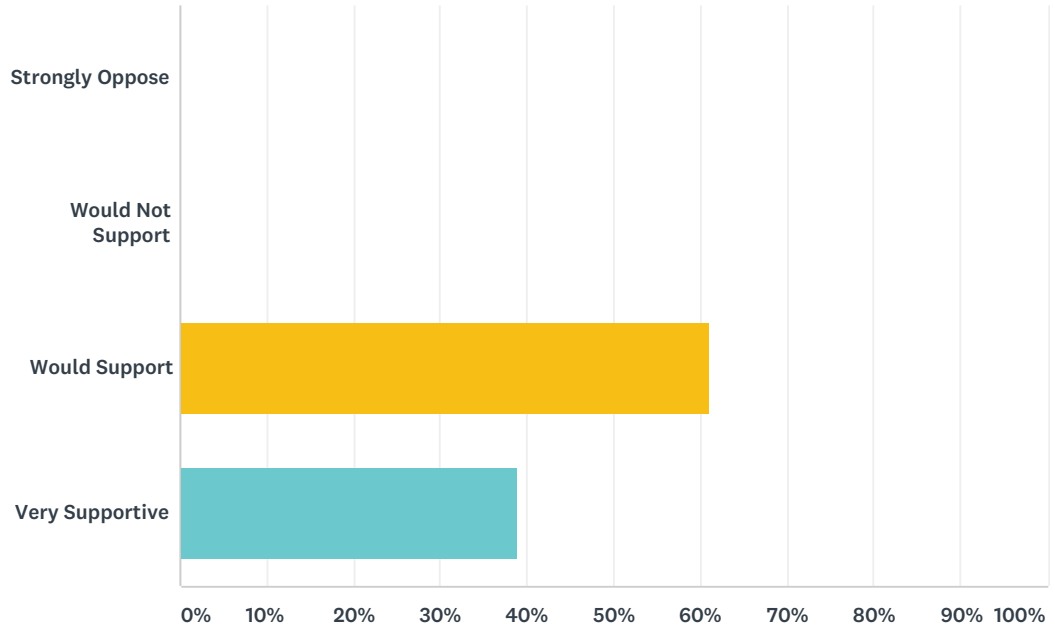
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	22.22%	4
Would Support	55.56%	10
Very Supportive	22.22%	4
TOTAL		18

Q8 Educate residents on personal mitigation opportunities.

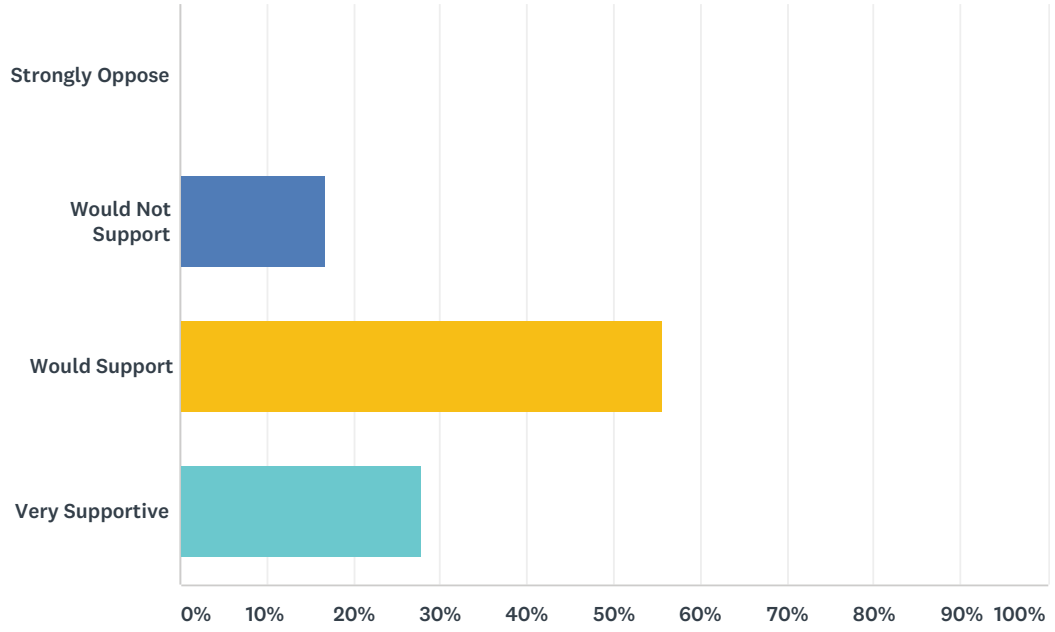
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	0.00%	0
Would Support	61.11%	11
Very Supportive	38.89%	7
TOTAL		18

Q9 Provide grants or other incentive programs to encourage the installation of generators at public facilities, businesses, etc.

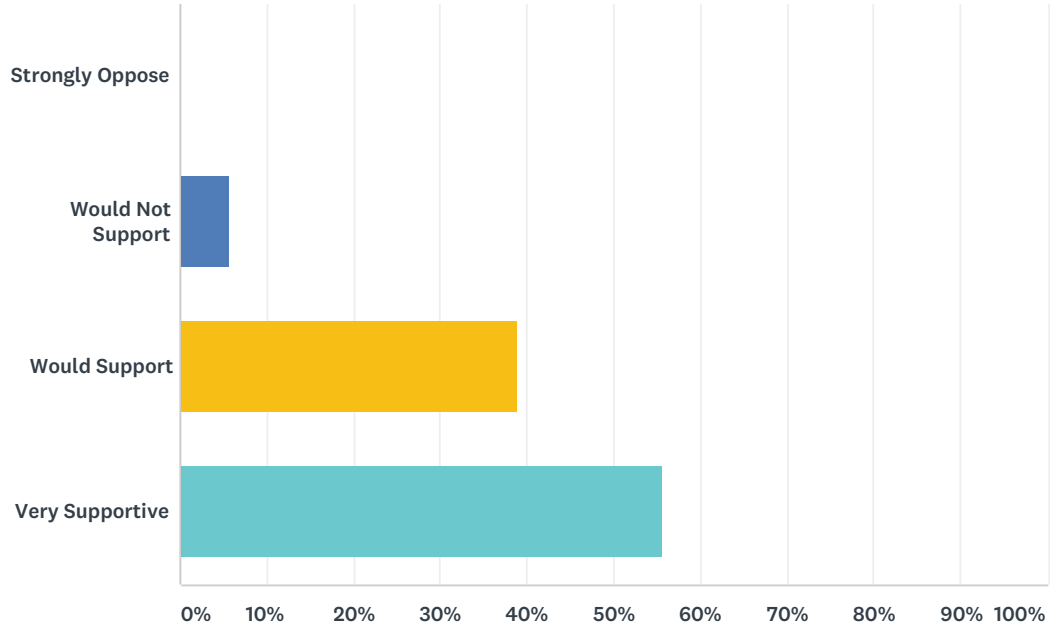
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	16.67%	3
Would Support	55.56%	10
Very Supportive	27.78%	5
TOTAL		18

Q10 Regulate the types of development permitted in areas highly vulnerable to various hazards.

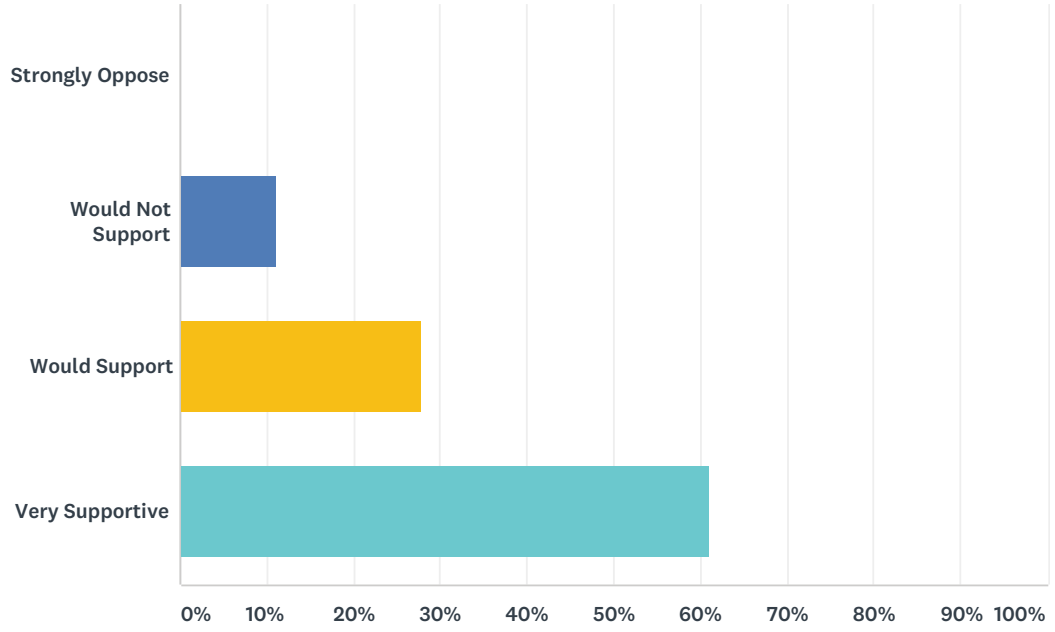
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	5.56%	1
Would Support	38.89%	7
Very Supportive	55.56%	10
TOTAL		18

Q11 Provide grants or incentives to encourage tree planting in or along parking areas, streets, etc.

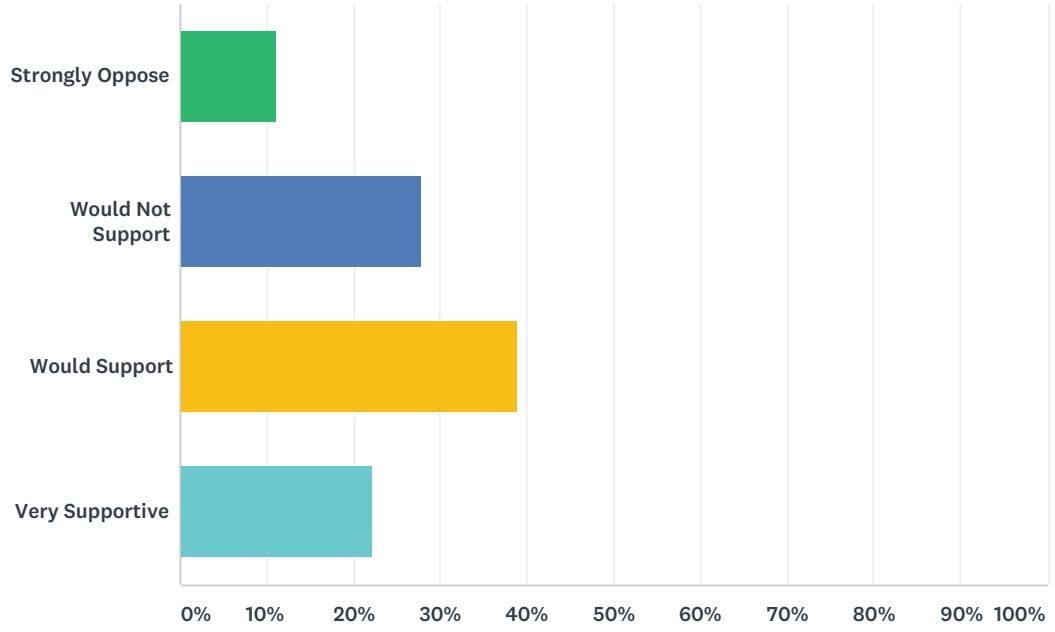
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Would Not Support	11.11%	2
Would Support	27.78%	5
Very Supportive	61.11%	11
TOTAL		18

Q12 Provide grants or incentives to residents to encourage elevation of flood-prone homes.

Answered: 18 Skipped: 14



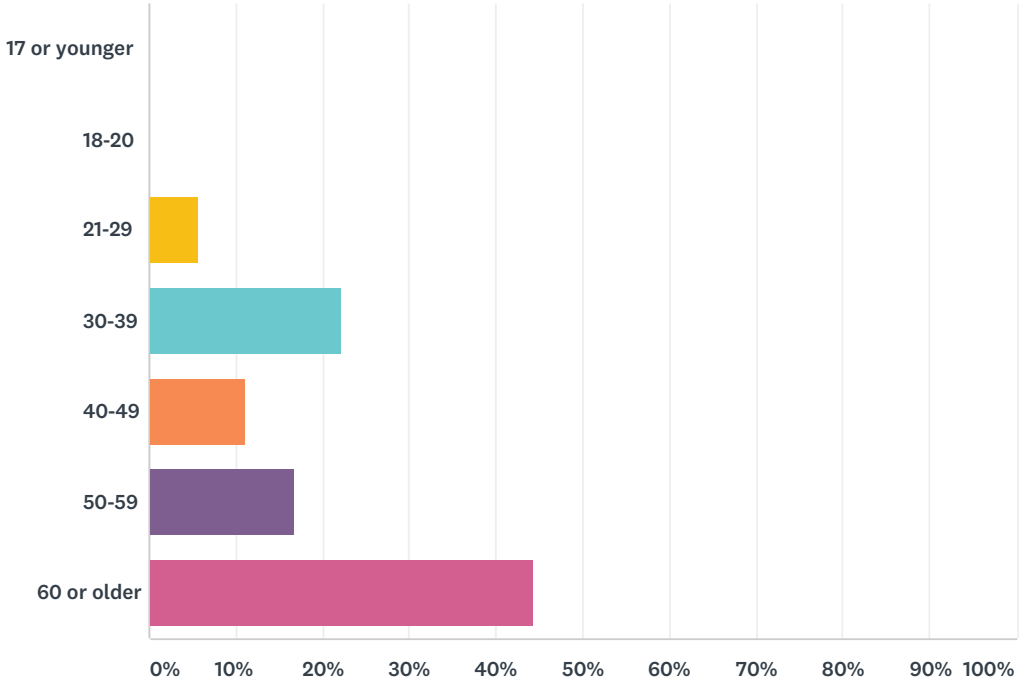
ANSWER CHOICES	RESPONSES	
Strongly Oppose	11.11%	2
Would Not Support	27.78%	5
Would Support	38.89%	7
Very Supportive	22.22%	4
TOTAL		18

Q13 What other mitigation actions not mentioned above (if any) would you support?

Answered: 5 Skipped: 27

Q14 What is your age?

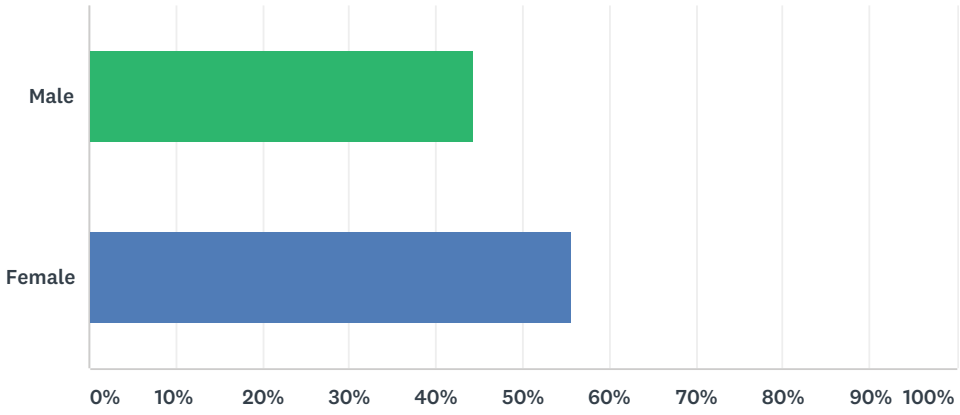
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
17 or younger	0.00%	0
18-20	0.00%	0
21-29	5.56%	1
30-39	22.22%	4
40-49	11.11%	2
50-59	16.67%	3
60 or older	44.44%	8
TOTAL		18

Q15 Are you male or female?

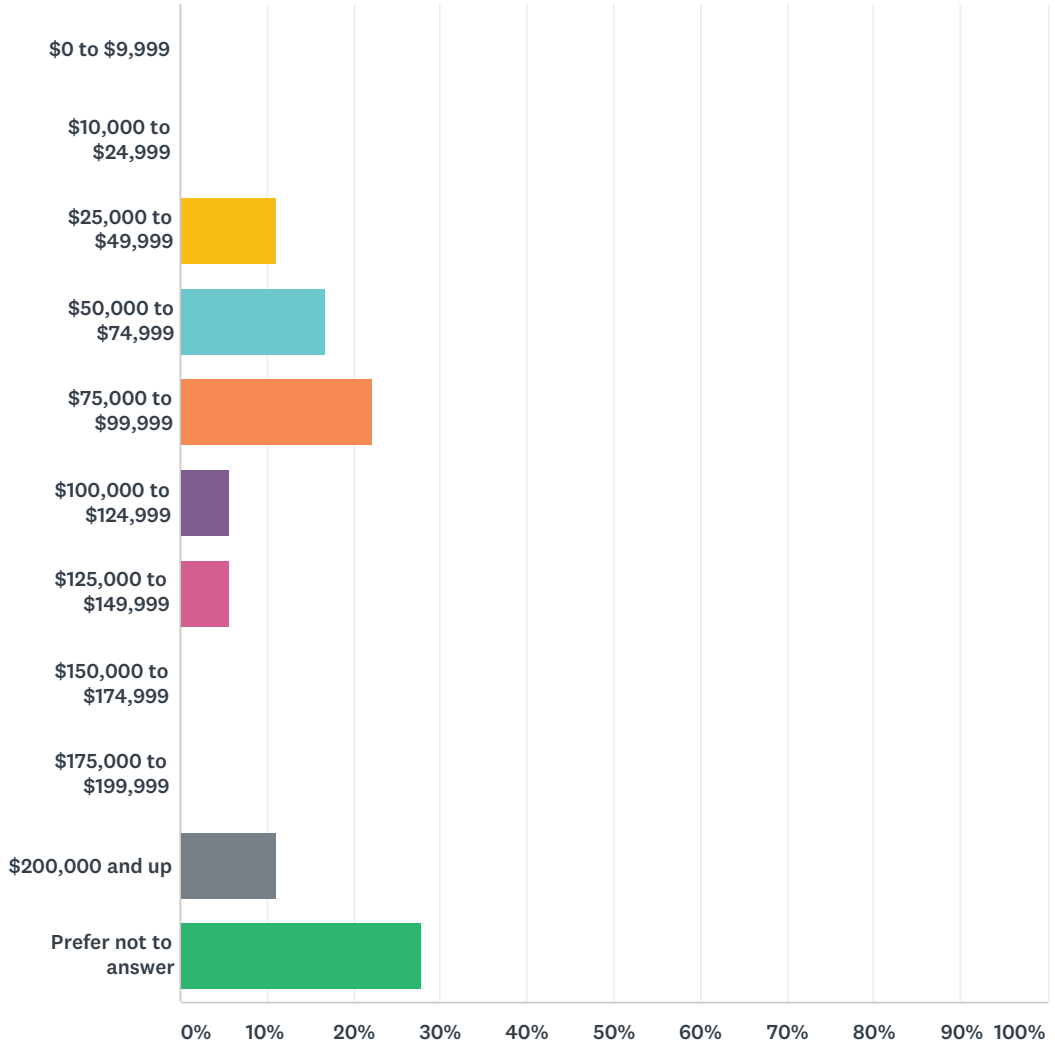
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Male	44.44%	8
Female	55.56%	10
TOTAL		18

Q16 How much total combined money did all members of your HOUSEHOLD earn last year?

Answered: 18 Skipped: 14

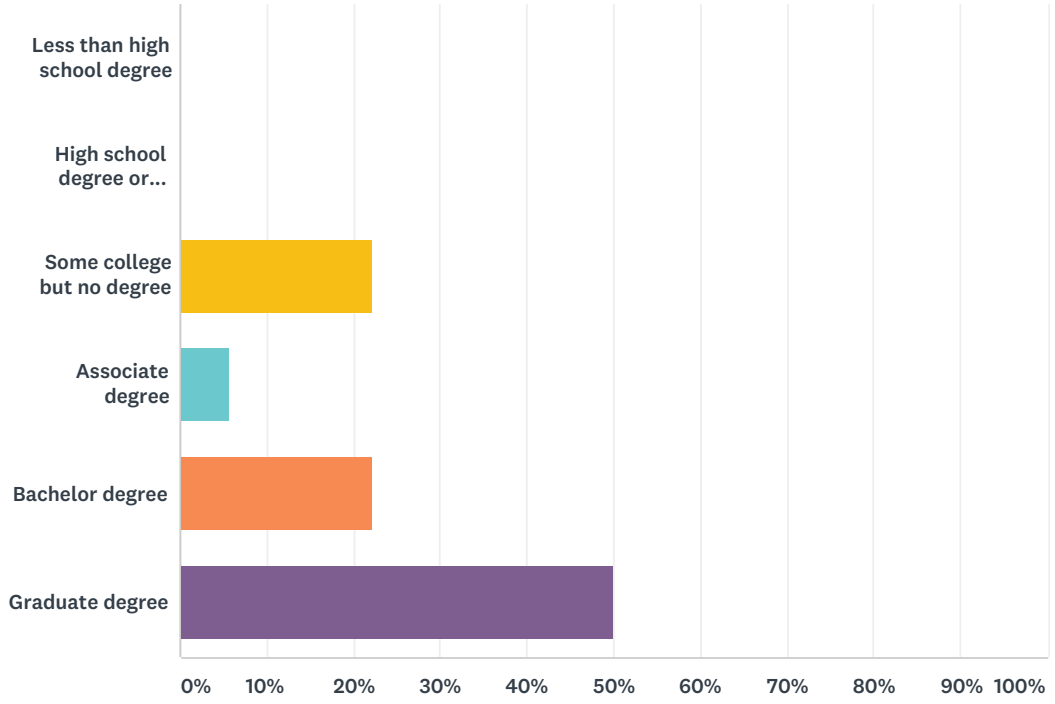


ANSWER CHOICES	RESPONSES	
$0 to $9,999	0.00%	0
$10,000 to $24,999	0.00%	0
$25,000 to $49,999	11.11%	2
$50,000 to $74,999	16.67%	3
$75,000 to $99,999	22.22%	4
$100,000 to $124,999	5.56%	1
$125,000 to $149,999	5.56%	1
$150,000 to $174,999	0.00%	0
$175,000 to $199,999	0.00%	0

$200,000 and up	11.11%	2
Prefer not to answer	27.78%	5
TOTAL		18

Q17 What is the highest level of school you have completed or the highest degree you have received?

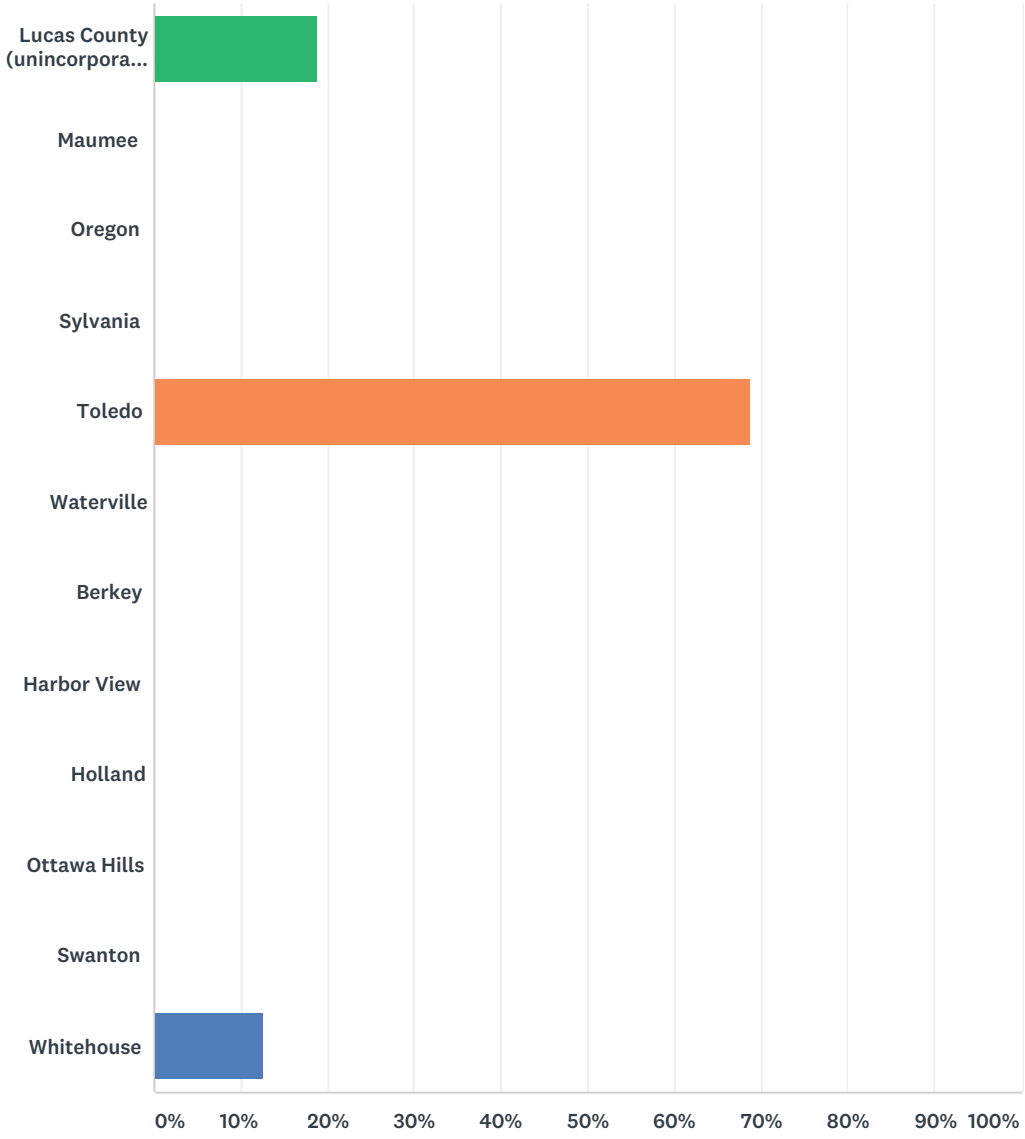
Answered: 18 Skipped: 14



ANSWER CHOICES	RESPONSES	
Less than high school degree	0.00%	0
High school degree or equivalent (e.g., GED)	0.00%	0
Some college but no degree	22.22%	4
Associate degree	5.56%	1
Bachelor degree	22.22%	4
Graduate degree	50.00%	9
TOTAL		18

Q18 In what community do you live?

Answered: 16 Skipped: 16

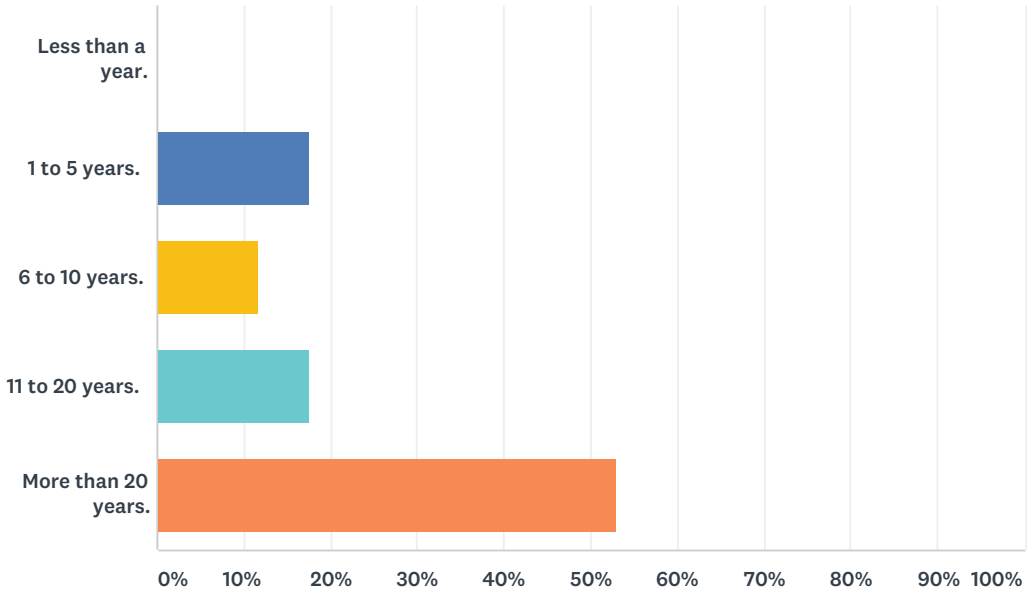


ANSWER CHOICES	RESPONSES	
Lucas County (unincorporated area)	18.75%	3
Maumee	0.00%	0
Oregon	0.00%	0
Sylvania	0.00%	0
Toledo	68.75%	11
Waterville	0.00%	0
Berkey	0.00%	0
Harbor View	0.00%	0

Holland	0.00%	0
Ottawa Hills	0.00%	0
Swanton	0.00%	0
Whitehouse	12.50%	2
TOTAL		16

Q19 How long have you resided in your community?

Answered: 17 Skipped: 15



ANSWER CHOICES	RESPONSES	
Less than a year.	0.00%	0
1 to 5 years.	17.65%	3
6 to 10 years.	11.76%	2
11 to 20 years.	17.65%	3
More than 20 years.	52.94%	9
TOTAL		17

Q20 Please share any other comments you have.

Answered: 5 Skipped: 27

APPENDIX 3
INACTIVE PROJECTS

This appendix contains the projects from 2004 and 2013 that are no longer active in the 2019 update of this plan.

DELETED/COMPLETED/DEFERRED 2013 ACTION ITEMS

The following tables describe the action items that the committee deleted, completed, or deferred from the 2013 plan.

2013 INACTIVE TORNADO ACTION ITEMS	
Action Item	*Notes*
Review existing public shelters and recommend new locations if and where there are coverage gaps in meeting the above stated objective.	This action item was deleted from the active project list because it is part of the regular tasks of the Red Cross.
Develop a program to provide information and building specifications on "Safe Rooms" for communities most susceptible to injury or loss of life resulting from future tornado events.	This action item was deleted from the active project list because Ohio EMA currently provides workshops.
Develop weather spotter training courses and implement training within local fire and police departments.	This action item was deleted from the active project list because the Lucas County EMA sponsors annual Weather Spotter Classes with the National Weather Service. Classes are open to everyone.
Work with local governments to coordinate public awareness campaigns on tornado safety and preparedness in their local newspapers and government newsletters.	This action item was deleted from the active project list because it has become part of the regular activities of the Red Cross, and there are regular public awareness campaigns via billboards, television appearances, and social media posts.
Keep up-to-date lists of addresses with shelters, to assist Fire departments, Emergency Services agencies and communities and to coordinate the distribution of these lists to the appropriate local government officials.	This action item was deleted from the active project list because this task is part of the regular Red Cross activities.
Determine how to accommodate individuals with special needs both in the emergency plan for the shelter and in the design of the shelter, including complying with the American with Disabilities Act (ADA.)	This action item was deleted from the active project list because it is part of the regular Red Cross activities; they inspect each property for ADA compliance.
Educate the public to secure all loose items on decks, porches and in yards.	This action item was deleted from the active project list because it has become part of routine community outreach before and during hazard events.
Work with individual jurisdictions that have identified a need for "Safe Rooms" to secure design and funding for individual project.	This action item was deleted from the active project list because since the last update of this plan, the Montessori School has installed a safe room with a grant.
Review all Lucas County and municipal building codes and recommend revisions for future construction to reflect best current standards for anchoring against straight line and tornado winds.	This action item was deleted from the active project list because this is a regular activity for county code enforcement officials.

2013 INACTIVE SEVERE STORMS ACTION ITEMS	
Action Item	*Notes*
Refrain from planting trees in and around utility lines, or plant low growing species that will not interfere with the lines. Place a higher priority on tree trimming/maintenance along utility easements.	This action item was deleted from the active project list because it has been combined with other similar projects to provide a comprehensive approach to maintaining trees relative to all hazards.
Implement improved severe weather forecasting and warning systems.	This action item was deleted from the active project list because it is part of the daily NWS tasks. In addition, Lucas County now regularly utilizes a Wireless Emergency Notification System (WENS) through Lucas County Alerts.
Provide a secure and reliable emergency wireless communication system for use by elderly or disabled citizens to reduce chance of isolation in a severe storm event and the aftermath.	This action item was deleted from the active project list because Lucas County utilizes WENS and this action has been completed.
Improve severe storm detection techniques and initiate storm alerts earlier to allow citizens more time to prepare their structures for severe storm events.	This action item was deleted from the active project list because this is part of the NWS's daily activities and Lucas County EMA partners with the NWS to issue warnings.
Provide back-up power generators for individual jurisdictions for use in maintaining power at critical facilities during severe storm events.	This action item was deleted from the active project list because it has been combined with other projects on this list to provide a more comprehensive approach to maintaining power relative to all hazards. In addition, the State of Ohio can provide these power generating assets upon request.

2013 INACTIVE FLOOD ACTION ITEMS	
Action Item	*Notes*
Work with the National Weather Service and local media to provide the most effective warning system to alert citizens in flood prone areas and on low-lying roadways of the intensity.	This action item was deleted from the active project list because this has become part of the regular activities at Lucas County EMA. LCEMA utilizes Lucas County Alerts (a WENS) to keep the public informed.
Streamline the planning process for citizens to receive flood fighting information and provide information and assistance.	This action item was deleted from the active project list because this has become part of the regular activities at Lucas County EMA. LCEMA utilizes Lucas County Alerts (a WENS) to keep the public informed.
Develop an educational program informing citizens within the flood zone of their location and/or proximity to streams.	This action item was deleted from the active project list because the Lucas County website, the GIS department and LCEMA routinely provide this type of information.
Educate citizens on viable flood protection options and methods appropriate for risk level. Partner with insurance companies to disseminate flood insurance information to citizens in flood prone areas.	This action item was deleted from the active project list because Lucas County regularly updates its social medial pages and website to educate the public on flood hazards and mitigation measures.
Develop a comprehensive communication system between the County and local governments with procedure templates describing warning systems.	This action item was deleted from the active project list because all jurisdictional first responder agencies are all on one countywide radio system.
Ensure compliance and enforcement of Lucas County's Storm Water Management Plan and flood Zoning through	This action item was deleted from the active project list because this is part of the Lucas County Engineers

2013 INACTIVE FLOOD ACTION ITEMS	
Action Item	*Notes*
fines and penalties.	regular tasks.
Identify hot spots or high priority projects involving multiple jurisdictions and organize stakeholders, develop a governance structure, identify and prioritize projects and Implement plans as funds become available.	This action item was deleted from the active project list because this is part of the Lucas County Engineers regular tasks.
Provide education for units of government and citizens.	This action item was deleted from the active project list because Lucas County EMA provides updates on social media about hazards and protection measures.
Partner with insurance companies to disseminate flood insurance information to citizens in flood prone areas	This action item was deleted from the active project list.
Seek funding and implement stormwater improvement projects to protect existing county infrastructure.	This action item was deleted because it has become part of the daily activities of the county water department.

2013 INACTIVE SEVERE WINTER STORMS ACTION ITEMS	
Action Item	*Notes*
Coordinate with the American Red Cross to establish heating centers for at-risk citizens/residences, provide winter storm kits and design a public information campaign that includes educating citizens about snow winter storm warnings, alternative forms of heating, and family/individual emergency communications plans.	This action item was deleted from the active project list because this is part of the Red Cross' regular activities. In addition, LCEMA utilizes Lucas County Alerts, appears on newscasts, and updates their social media regularly. The Red Cross opens warming shelters as needed.
Work with critical facilities to develop emergency communications plans and emergency power backup plans.	This action item was deleted from the active project list because hospitals now have HAM radios for use as backup communications. This project is complete.
Develop and adopt countywide winter maintenance procedures that include snow trapping devices, "smart salting" techniques, and applying deicing chemicals before severe winter storms happen.	This action item was deleted from the active project list because ODOT is utilizing brine instead of salt for pretreatment. This project is complete.

2013 INACTIVE EARTHQUAKE ACTION ITEMS	
Action Item	*Notes*
Work with engineers and architects to survey existing buildings and infrastructure and develop recommendations for seismic resiliency.	This action item was deleted from the active project list because this task is part of the Lucas County Engineer's regular activities.
Designate pedestrian safe zones to prohibit public access in areas directly below damaged infrastructures until repairs can be made.	This action item was deleted from the active project list because this task is part of the Lucas County Engineer's regular activities.
Provide Emergency Preparedness information and resources relative to earthquake events to the public through an active education and outreach program.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website.
Provide outreach to inform citizens of the need to plan and prepare for all hazards to reduce the impact of an earthquake disaster and aid the recovery.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website.
Develop emergency plans for evacuation of communities in the event that an earthquake occurs that are up to date and	This action item was deleted from the active project list because the Lucas County Emergency Operations

are utilizing the latest information available.	Plan (EOP) has an evacuation annex. This project is complete.

2013 INACTIVE WILDFIRE ACTION ITEMS	
Action Item	*Notes*
Use controlled burns to decrease the amount of fuel load in the identified moderate and high wildfire hazard areas.	This action item was deleted from the active project list because The Nature Conservancy does this as part of their regular activities.
Increase media coverage of threat and evacuation procedures during peak wildfire times of the year, distribute informational packages in high and moderate wildfire risk areas, and increase enforcement of existing open burning laws.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website.

2013 INACTIVE TEMPERATURE EXTREMES ACTION ITEMS	
Action Item	*Notes*
Provide Emergency Preparedness information and resources relative to extreme temperature events to the public through an active educational outreach program with specific plans and procedures for Senior Citizens and the Disabled.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website.
Develop plans for the protection and care of animals during extended periods of extreme heat or cold.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website.
Establish a Fire Advisory System to identify "fire risk." during extended periods of extreme heat or cold.	This action item was deleted from the active project list because this is part of the LCEMA's regular activities through social media and the county website. The fire and police chiefs partner in this endeavor.
Coordinate with utilities and transportation authorities to improve rapid communications between emergency services and the private sector when basic services might be disrupted during extended periods of extreme heat or cold.	This action item was deleted from the active project list because the Lucas County EOP provides for communications during all hazards.
Review fire safety ordinances for open burning and the use of liquid fuel and electric space heaters.	This action item was deleted from the active project list because this is part of the fire chiefs' regular activities.
Coordinate with service support groups to provide a list of "Cooling/Warming Centers" for use during extended periods of extreme heat or cold to at risk citizens.	This action item was deleted from the active project list because this is part of the Red Cross' regular activities.

2013 INACTIVE DROUGHTS ACTION ITEMS	
Action Item	*Notes*
Provide guidance to jurisdictions on potential new sources of water during extreme drought.	This action item was deleted from the active project list because this is part of Lake Erie Water's regular activities.
Establish a data management system to identify drought-related agricultural losses so subsidy programs can be utilized to their full advantage.	This action item was deleted from the active project list because this is part of the Farm Service Agency's regular activities.
Encourage water conservation through public outreach	This action item was deleted from the active project list

2013 INACTIVE DROUGHTS ACTION ITEMS	
Action Item	*Notes*
programs prior to a drought event.	because this is part of Lucas County Soil and Water and local water departments' regular activities through social media, newscasts, and websites.
Establish economic incentives for private investment in water conservation.	This action item was deleted from the active project list because the committee decided to eliminate this project.
Implement and distribute Drought Dos and Don'ts to the general public.	This action item was deleted from the active project list because this is part of LCEMA's regular activities through social media and the county website.
Organize drought informational meeting for the public and media.	This action item was deleted from the active project list because the committee recognizes that meetings are not always a successful outreach strategy, so they utilize social media, newscasts, and the county website.
Develop sample ordinances of water conservation	This action item was deleted from the active project list because the committee decided to eliminate the project.

2013 INACTIVE LAKE SURGES ACTION ITEMS	
Action Item	*Notes*
Monitor lake levels to rapidly warn residents of potential surge flooding.	This action item was deleted from the active project list because this is part of the NWS's regular activities. LCEMA partners with the NWS to send out alerts via Lucas County Alerts.
Establish emergency response plans to evacuate people from lake surge areas.	This action item was deleted from the active project list because the Lucas County EOP includes an evacuation annex. This project is complete.
Establish a chain of command to take charge in event of lake surge evacuation.	This action item was deleted from the active project list because Lucas County responding agencies follow the Incident Command System (ICS).
Identify evacuation Reception Centers stocked with necessary supplies for emergency lake surge evacuation.	This action item was deleted from the active project list because the Lucas County EOP includes an evacuation annex and the Red Cross runs shelters as needed as part of regular activities.
In conjunction with the Department of Health, develop a pamphlet and public information program informing the public of preventative measures to take to avoid water-borne illness related to lake surge.	This action item was deleted from the active project list because the Lucas County Health Department and EMA utilize social media and the website to inform the public of all hazards.
Employ in-lake early warning technologies to combat lake surge losses before they happen.	This action item was deleted from the active project list because this is part of the NWS's regular activities. They have buoys in Lake Erie to monitor the water.
Create effective milestones or warning measuring points to evaluate the possibility/probability for surge flooding.	This action item was deleted from the active project list because this is part of the NWS's regular activities. LCEMA partners with the NWS to alert citizens.
Develop back up emergency power plan for critical facilities during lake surge events.	This action item was deleted from the active project list because power plans are developed for all hazards.

2013 INACTIVE LANDSLIDES ACTION ITEMS	
Action Item	*Notes*
Erect a series of warning signs along roadways were slips and slides are a possibility.	This action item was deleted from the active project list because ODOT and appropriate departments in Lucas County do this on an as needed basis.
Coordinate with Agencies involved in roadway construction to require that new lakeside/riverfront roadways be designed to hold soil in place.	This action item was deleted from the active project list because this is part of ODOT's regular activities.

2013 JURISDICTIONAL INACTIVE ACTION ITEMS		
Jurisdiction	*Action Item*	*Notes*
Toledo	Improve City of Toledo Stormwater Management Plan	This item was deleted because the City of Toledo's Department of Environmental Services
Lucas County	Swan Creek study	This item was removed from the active list because no details are available about the project.
Lucas County	Ten-Mile Creek study	This item was removed from the active list because no details are available about the project.
Lucas County	Prairie Creek study	This item was removed from the active list because no details are available about the project.
Lucas County	Shantee Creek study	This item was removed from the active list because no details are available about the project.
Toledo / Lucas County	Watershed assessment and management plan for the Lower Maumee River watershed	This item was removed because the Lucas County Environmental Services regularly develops and implements plans
Toledo	Silver Creek phase I construction – culverts	This project was deleted – the most recent phase is phase IV on the active list, indicating that this project has been completed.
Toledo	Mayor Ditch, Heldman to Corp. limits	This project is complete.
Toledo	Eisenbraum Ditch Phase 2 design/acquisition	This project is complete.
Toledo	Silver Creek Phase 2	This project is complete.
Toledo	Eisenbraum Ditch Phase 2 Construction – Wyndale Road to Talmadge Road	This project is complete.
Lucas County Stormwater District	Hill Ditch retention pond (Elmer at I-475)	This project was deleted because it was a concept project and will likely not be built.
Lucas County Stormwater District	Heldman Ditch retention pond (Hill at I-475)	This project was deleted because it was a concept project and will likely not be built.
Lucas County Stormwater District	Eisenbraum Ditch retention pond (Flanders at Alexis)	This project was deleted because it was a concept project and will likely not be built.
Lucas County Stormwater District	Prairie Ditch retention pond (Secor Park)	This project was deleted because it was a concept project and will likely not be built.
Lucas County Stormwater District	Swan Creek retention pond (Keener at Lose Road)	This project was deleted because it was a concept project and will likely not be

2013 JURISDICTIONAL INACTIVE ACTION ITEMS		
Jurisdiction	*Action Item*	*Notes*
		built.
Village of Waterville	Waterworks Park Ballfield Relocation	This project is complete.
Springfield Township	Tornado saferoom at Westside Montessori School	This project is complete.
Oregon	Big Ditch improvements project	This project has been deleted because the city did not have information about the project
Toledo	Waterway improvements Ten Mile Creek / Ottawa River from Secor Road to Central Avenue	This project has been deleted because the city did not have information about the project

DELETED/COMPLETED/DEFERRED 2004 ACTION ITEMS

The following tables describe the action items that were deleted in the 2004 plan. These are outlined in the 2013 plan under table *7c. Mitigation action items removed since the 2004 CANHMP*.

2004 INACTIVE TORNADO ACTION ITEMS	
Action Item	*Notes*
Develop an educational program for contractors on ways to stabilize existing & future mobile homes against straight line & tornado winds.	This program is provided by the Board of Building Standards and local Contractor's Assn.
Identify existing culturally or socially significant structures & critical facilities within Lucas County that have the most potential for losses from tornado events & identify needed structural upgrades & perform upgrades.	Upon review any listing of significant structions and critical facilities at risk to Tornadoes would encompass the entire County. While such structures have been identified no funding was available to perform upgrades.

2004 INACTIVE FLOODS ACTION ITEMS	
Action Item	*Notes*
Survey property owners to determine interest & assess cost. Assist local units of government to identify funding sources to acquire & remove or otherwise protect existing homes in the floodplain.	This is an action item for Local flood plain managers in each respective jurisdiction.
Implement a voluntary program of flood protection & property acquisition & relocation for high-risk residences and repetitive loss properties.	This is an action item for Local flood plain managers in each respective jurisdiction.
Evaluate areas that need a flood warning system constructed.	National Weather Service, NOAA and USGS Hydrological Survey data was used to determine likely flood zones. The areas identified were not subject to abrupt flood events negating the need for a dedicated early warning system.
Explore options for improving the ability of local units of government to report flooding, receive information, response & request assistance.	Current plans and procedures provide for the reporting, assessment and information sharing to respond and recover from a flood event.
Develop criteria for defining & evaluation "flood mitigation value".	This is a requirement of State and Federal jurisdictions.

2004 INACTIVE FLASH FLOODS ACTION ITEMS	
Action Item	*Notes*
Work with ODNR and the Local Floodplain Manager to develop detailed inundation mapping and inventory of area downstream of Class I dam.	There are no Class 1 Dams in Lucas County.
Request funds or grants to buy out residences located in identified flash flood-prone areas.	Lucas County has no identified "Flash" Flood prone areas.

2004 INACTIVE LAKE SURGES ACTION ITEMS	
Action Item	*Notes*
Create/maintain the use of storm dikes.	This is an ongoing program monitored by local flood plain managers and the Corps of Engineers.
Establish pumping systems to allow removal of surge water.	Dedicated pumps have been provided or are in place to relieve storm water surge.
Develop a system to periodically dredge Lake Erie Western Basin to decrease force and increase surge volume capacity.	This is a responsibility of State and Federal jurisdictions.
Advise future development of critical facilities to be located outside of the lake surge areas.	The current Lake Erie Storm Surge area is presently identified as a Conservancy District in order to limit development.
Investigate feasibility of building protective wall to prevent rise of lake levels that cause surge flooding and damage roadways.	Existing dikes are in place to protect roads and other infrastructure in identified Lake Surge prone areas.

2004 INACTIVE SEVERE STORMS ACTION ITEMS	
Action Item	*Notes*
Purchase portable generators and deploy them as miniature sub-stations to rapidly assist in the reconnection of priority power and communications assets after a severe storm event.	Not practical or feasible.
Reposition as many utility lines as possible underground. Encourage, through legislation/zoning regulations, all new utility lines to be placed underground. Place deflectors on key utility lines that are more likely to accumulate ice or snow.	This is a responsibility of State Agencies and Departments and outside of local control.
Purchase portable generators and deploy them as miniature sub-stations to help rapidly restore power to at risk citizens after a severe storm event & the aftermath.	Back-up power in place at critical facilities.
Implement a research program that identifies the location, number, and specific physical assistance required during a severe storm event for disabled and senior citizens.	A joint working group led by the University of Toledo's Geography Department conducted a study in 2005 that identified potential special needs populations. Local emergency response organizations will use routine warning and notification systems as no reverse 9-1-1 systems exist in Lucas County.
Analyze all of the residential codes adopted throughout Lucas County and recommend modifications, if needed, to local jurisdictions to remove code deficiencies relating to wind loads, snow loads and electrical grounding.	This is a responsibility of State Agencies and Departments and outside of local control.
Expand distribution points of severe weather alerts to the general public.	Severe weather alert capabilities have expanded with new technologies in both the public and private sectors.
Make information available to contractors and homeowners of mobile homes on ways to anchor their structures sufficiently to minimize damage from severe storms.	Information and standards are made available by each jurisdiction.
Recommend discontinuing the practice of constructing flat roofed buildings in Lucas County. Design and recommend an alteration to existing flat roofs that eliminate or minimize buildup of snow ice, hail, and water.	This is a responsibility of State Agencies and Departments and outside of local control.
Identify historic and architecturally significant buildings, as well as critical facilities throughout Lucas County that could suffer damage from severe storms and recommend potential structural upgrades, and then perform upgrades.	Upon review any listing of significant structions and critical facilities at risk to Tornadoes would encompass the entire County. While such structures have been identified no funding was available to perform upgrades.

2004 INACTIVE WINTER STORMS ACTION ITEMS	
Action Item	*Notes*
Develop and adopt home and business codes that include provisions for impact-resistant roofing materials.	This is a responsibility of State Agencies and Departments and outside of local control.
Develop a real-time information system for monitoring pavement and weather conditions that can be synchronized with snow removal machinery for more accurate, efficient and timely snow removal.	Automated web-based system is used for most State and Federal highways. Local jurisdictions utilize a real-time active assessment protocol to support decision-making.
Develop and adopt future development codes to include provisions for buried power and communication lines, especially for critical facilities.	This is a responsibility of State Agencies and Departments and outside of local control.
Work with community groups to identify potential at-risk citizens/residences and use the Reverse 9-1-1 System to contact those identified citizens/residences.	A joint working group led by the University of Toledo's Geography Department conducted a study in 2005 that identified potential special needs populations. Local emergency response organizations will use routine warning and notification systems as no reverse 9-1-1 systems exist in Lucas County.
Lessen the occurrence of power outages and associated repair costs by developing an informational program to encourage local utility companies to bury their transmission lines underground.	This is a responsibility of State Agencies and Departments and outside of local control.
Develop and include safety strategies for severe winter storm events in driver education classes.	Current training and education programs exist within the private sector.

2004 INACTIVE EARTHQUAKE ACTION ITEMS	
Action Item	*Notes*
Inspect, remove or repair existing ornamentation on older masonry buildings, and design safe zones to prohibit public access in areas directly below aging structures.	This is a responsibility of State Agencies and Departments and outside of local control.
Upgrade existing commercial/industrial building codes for large span structures.	This is a responsibility of the State and Local Board of Building Standards.
Improve systems for isolating and rerouting utilities where possible.	This is a responsibility of State Agencies and Departments and outside of local control.
Develop countywide construction regulations preventing construction in areas with unconsolidated sandy soils.	This is a responsibility of State Agencies and Departments.
Develop emergency plans for underground utilities and surface transportation networks in the event that an earthquake occurs that are up to date and are utilizing the latest information available.	This is a responsibility of State Agencies and Departments and outside of local control.
Develop technical assistance information programs for homeowners teaching them how to seismically strengthen their houses against earthquake damage.	Technical assistance is available through FEMA programs available to the general public.

2004 INACTIVE DROUGHT ACTION ITEMS	
Action Item	*Notes*
Implement a water metering and leak detection program.	Municipal water systems are capable of isolating major leaks and will respond to evidence of smaller out-flows.
Provide farmers with list of livestock watering locations during extreme drought.	Not applicable due to negligible livestock operations.
Advise water suppliers on assessing vulnerability of existing supply systems.	Not applicable.

2004 INACTIVE DROUGHT ACTION ITEMS	
Action Item	*Notes*
Establish a countywide drought information center.	Not applicable.

2004 INACTIVE WILDFIRE ACTION ITEMS	
Action Item	*Notes*
Develop an educational public awareness campaign informing citizens of land management and landscaping options to limit wildfire spread.	Applicable to specific regions during extreme dry periods when the fire risk is high. Restrictions on open burning including recreational fires are in place.
Amend existing building codes to require fire resistant roofing and exterior coverings on all structures in high or moderate wildfire risk areas.	This is a responsibility of the State and Local Board of Building Standards.
Develop an educational program for builders and developers teaching them fire protection and prevention options.	This program is provided by the Board of Building Standards and local Contractor's Assn.

2004 INACTIVE LANDSLIDE ACTION ITEMS	
Action Item	*Notes*
Coordinate with Agencies involved in roadway construction to require that new lakeside/riverfront roadways be designed to hold soil in place.	All roadway projects are reviewed for potential risk of soil subsidence or land slide.
Develop and adopt future roadway development regulations that include the use of grading to increase slope stability.	Not Applicable.
Develop and implement building restrictions in landslide-prone riverbank and lakeside areas that include provisions to increase soil stability through vegetative plantings.	Not Applicable.
Develop and adopt building codes to include landslide preventative regulations.	This is a responsibility of State Agencies and Departments.

2004 INACTIVE TEMPERATURE EXTREMES ACTION ITEMS	
Action Item	*Notes*
Review plans for lessening agricultural damage and recovery during extended periods of extreme heat.	This is a responsibility of State Agencies and Departments.

APPENDIX 4

PROJECT PRIORITIZATION

This appendix contains documentation of the prioritization of the active projects.

LUCAS COUNTY	Possible Points	LC-01	LC-02	LC-03	LC-04	LC-05	LC-06	LC-07	LC-08	LC-09	LC-10	LC-11	LC-12	LC-13	LC-14
High probability hazard	10	0	0	10	10	10	10	10	10	10	0	0	0	0	0
Vulnerable populations	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0
High severity hazard	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0
Cost effective	7	7	7	7	7	7	0	7	0	7	0	7	0	0	7
More than one hazard	6	0	0	6	6	0	0	0	0	6	0	0	0	0	0
Ongoing project	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Ease of implementation	4	4	4	4	4	0	0	4	0	4	4	0	0	0	4
In-county/jurisdiction capability	3	3	3	0	0	0	0	3	3	3	3	0	0	3	0
Encourages partnerships	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	0	0	0	0	1	1	0	0	1	0	0	0	1	1
Total Points	55	38	38	42	42	33	26	39	28	46	14	14	7	11	19
Project priority		6	6	2	2	10	17	5	15	1	25	25	29	28	23

LUCAS COUNTY	Possible Points	LC-15	LC-16	LC-17	LC-18	LC-19	LC-20	LC-21	LC-22	LC-23	LC-24	LC-25	LC-26	LC-27	LC-28	LC-29
High probability hazard	10	10	10	10	10	0	10	10	0	0	10	10	10	10	10	0
Vulnerable populations	9	0	0	0	9	0	0	0	0	9	0	0	0	9	0	0
High severity hazard	8	8	8	8	8	0	8	8	0	8	8	8	8	8	8	8
Cost effective	7	7	7	7	7	7	7	7	7	0	0	0	0	0	7	7
More than one hazard	6	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
Ongoing project	5	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0
Ease of implementation	4	4	0	4	4	0	4	4	4	0	0	0	0	0	4	4
In-county/jurisdiction capability	3	0	0	0	0	0	0	3	0	0	0	0	0	0	3	3
Encourages partnerships	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1
Total Points	55	32	28	32	41	16	32	35	14	24	26	26	26	30	34	25
Project priority		11	15	11	4	24	11	8	25	22	17	17	17	14	9	21

MAUMEE	Possible Points	MM-01	MM-02	MM-03	MM-04	MM-05	MM-06	MM-07	MM-08
High probability hazard	10	10	10	10	10	0	0	10	0
Vulnerable populations	9	0	9	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8
Cost effective	7	7	7	7	7	7	0	0	0
More than one hazard	6	6	0	0	0	6	0	0	0
Ongoing project	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	0	4	4	4	0	0	0
In-county/jurisdiction capability	3	0	3	3	3	3	3	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	1	1	1	0	1	1	1	0
Total Points	55	43	45	40	39	28	11	30	19
Project priority		2	1	3	4	6	8	5	7

OREGON	Possible Points	OR-01	OR-02	OR-03	OR-04	OR-05	OR-06	OR-07	OR-08	OR-09
High probability hazard	10	10	10	10	10	0	0	10	10	0
Vulnerable populations	9	0	0	0	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8	8
Cost effective	7	7	7	0	0	7	7	0	0	0
More than one hazard	6	6	0	0	0	6	0	6	0	0
Ongoing project	5	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	0	0	4	0	0	0	0	0
In-county/jurisdiction capability	3	3	3	0	3	3	0	3	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	0	0	0	0	0	0	1	1	0
Total Points	55	45	35	25	32	23	14	35	30	19
Project priority		1	2	6	4	7	9	2	5	8

SYLVANIA	Possible Points	SY-01	SY-02	SY-03	SY-04	SY-05	SY-06	SY-07	SY-08	SY-09
High probability hazard	10	10	10	10	10	0	0	10	10	0
Vulnerable populations	9	0	0	0	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8	8
Cost effective	7	7	7	0	7	0	7	7	0	0
More than one hazard	6	6	0	0	0	6	0	6	0	0
Ongoing project	5	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	0	4	4	0	0	0	0	0
In-county/jurisdiction capability	3	0	3	3	3	3	3	0	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	1	1	0	0	1	1	0	1	0
Total Points	55	43	36	32	39	17	18	38	30	19
Project priority		1	4	5	2	9	8	3	6	7

TOLEDO	Possible Points	TO-01	TO-02	TO-03	TO-04	TO-05	TO-06	TO-07	TO-08	TO-09	TO-10	TO-11	TO-12
High probability hazard	10	0	0	10	10	10	10	10	10	10	10	10	0
Vulnerable populations	9	0	0	0	0	0	0	0	0	0	0	9	9
High severity hazard	8	0	0	8	8	8	8	8	8	8	8	8	8
Cost effective	7	0	0	7	7	7	7	7	7	7	7	0	0
More than one hazard	6	0	0	0	0	0	0	0	0	0	0	0	0
Ongoing project	5	5	5	0	0	0	0	0	0	0	0	0	0
Ease of implementation	4	4	0	0	0	0	0	0	0	0	0	0	0
In-county/jurisdiction capability	3	3	0	0	0	0	0	0	0	0	0	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	0	1	1	1	1	1	1	1	1	1	1	0
Total Points	55	14	8	28	28	28	28	28	28	28	28	30	19
Project priority		11	12	2	2	2	2	2	2	2	2	1	10

WATEVILLE	Possible Points	WA-01	WA-02	WA-03	WA-04	WA-05
High probability hazard	10	10	10	10	0	0
Vulnerable populations	9	0	0	0	0	9
High severity hazard	8	8	8	8	8	8
Cost effective	7	7	7	7	7	0
More than one hazard	6	0	0	6	0	0
Ongoing project	5	5	0	0	0	0
Ease of implementation	4	4	0	0	4	0
In-county/jurisdiction capability	3	3	0	0	0	0
Encourages partnerships	2	2	2	2	2	2
Positive environmental impacts	1	0	1	0	0	0
Total Points	55	39	28	33	21	19
Project priority		1	3	2	4	5

BERKEY	Possible Points	BK-01	BK-02	BK-03	BK-04	BK-05	BK-06	BK-07	BK-08
High probability hazard	10	10	10	10	10	0	0	10	0
Vulnerable populations	9	0	0	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8
Cost effective	7	7	7	0	0	7	7	0	0
More than one hazard	6	6	0	0	0	6	0	0	0
Ongoing project	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	0	0	4	0	0	0	0
In-county/jurisdiction capability	3	3	3	0	3	3	0	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	0	0	0	0	0	0	1	0
Total Points	55	45	35	25	32	23	14	30	19
Project priority		1	2	5	3	6	8	4	7

HOLLAND	Possible Points	HL-01	HL-02	HL-03	HL-04	HL-05	HL-06	HL-07	HL-08
High probability hazard	10	10	10	10	10	0	0	10	0
Vulnerable populations	9	0	0	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8
Cost effective	7	7	7	7	7	7	0	0	0
More than one hazard	6	0	0	0	0	6	0	0	0
Ongoing project	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	4	0	0	4	4	0	0
In-county/jurisdiction capability	3	0	3	3	3	3	3	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	1	1	0	0	1	0	1	0
Total Points	55	37	40	35	35	28	14	30	19
Project priority		2	1	3	3	6	8	5	7

OTTAWA HILLS	Possible Points	OH-01	OH-02	OH-03	OH-04
High probability hazard	10	0	0	10	0
Vulnerable populations	9	0	9	9	9
High severity hazard	8	0	8	8	8
Cost effective	7	7	0	0	0
More than one hazard	6	0	0	0	0
Ongoing project	5	0	0	0	0
Ease of implementation	4	4	0	0	0
In-county/jurisdiction capability	3	3	0	0	0
Encourages partnerships	2	2	2	2	2
Positive environmental impacts	1	1	0	1	0
Total Points	55	17	19	30	19
Project priority		4	2	1	2

SWANTON	Possible Points	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07	SW-08
High probability hazard	10	10	10	10	10	0	0	10	0
Vulnerable populations	9	0	0	0	0	0	0	9	9
High severity hazard	8	8	8	8	8	0	0	8	8
Cost effective	7	7	7	0	0	7	7	0	0
More than one hazard	6	6	0	0	0	6	0	0	0
Ongoing project	5	5	5	5	5	5	5	0	0
Ease of implementation	4	4	0	0	4	0	0	0	0
In-county/jurisdiction capability	3	3	3	0	3	3	0	0	0
Encourages partnerships	2	2	2	2	2	2	2	2	2
Positive environmental impacts	1	0	0	0	0	0	0	1	0
Total Points	55	45	35	25	32	23	14	30	19
Project priority		1	2	5	3	6	8	4	7

WHITEHOUSE	Possible Points	WH-01	WH-02	WH-03	WH-04
High probability hazard	10	0	0	10	0
Vulnerable populations	9	9	0	9	9
High severity hazard	8	8	8	8	8
Cost effective	7	7	7	0	0
More than one hazard	6	0	0	0	0
Ongoing project	5	0	0	0	0
Ease of implementation	4	0	4	0	0
In-county/jurisdiction capability	3	3	3	0	0
Encourages partnerships	2	2	2	2	2
Positive environmental impacts	1	0	0	1	0
Total Points	55	29	24	30	19
Project priority		2	3	1	4

APPENDIX 5
CITATIONS

Section 1.0 Introduction

City of Maumee. (n.d.). Letter from the mayor. Retrieved November 9, 2018, from http://www.maumee.org/city_government/letter_from_the_mayor.php

City of Oregon. (n.d.). Oregon on the go. Retrieved November 12, 2018, from https://oregononthego.org/history

City of Sylvania. (n.d.). About Sylvania. Retrieved November 12, 2018, from https://www.cityofsylvania.com/visitors/sylvania/

City of Toledo. (n.d.). History of the water treatment plant. Retrieved November 5, 2018, from https://toledo.oh.gov/services/public-utilities/water-treatment/history-of-the-water-treatment-plant/

City of Waterville. (n.d.). History. Retrieved November 12, 2018, from https://waterville.org/history/

FEMA. (2018, October 1). Critical facility. Retrieved from https://www.fema.gov/critical-facility

FEMA. (n.d.). Critical facilities and higher standards fact sheet. Retrieved from https://www.fema.gov/media-library-data/1436818953164-4f8f6fc191d26a924f67911c5eaa6848/FPM_1_Page_CriticalFacilities.pdf

FEMA. (n.d.). IS-913a: Critical infrastructure security and resilience: achieving results through partnerships and collaboration. Retrieved from https://emilms.fema.gov/IS0913a/groups/664.html

LocalWiki. (n.d.). Largest employers - Toledo. Retrieved November 9, 2018, from https://localwiki.org/toledo/Largest_Employers

Merriam-Webster. (n.d.). Definition of infrastructure. Retrieved from https://www.merriam-webster.com/dictionary/infrastructure

National Centers for Environmental Information (NCEI). (n.d.). 1981-2010 normals. Retrieved October 10, 2018, from https://www.ncdc.noaa.gov/cdo-web/datatools/normals

National Park Service. (2015, February 26). Cultural resources. Retrieved from https://www.nps.gov/acad/learn/management/rm_culturalresources.htm

National Preservation Institute. (n.d.). What are "cultural resources"? Retrieved from

https://www.npi.org/NEPA/what-are

Ohio Department of Transportation. (n.d.). Ohio rail map. Retrieved March 8, 2018, from https://www.dot.state.oh.us/maps/Pages/OhioRailMapRail.aspx

Ohio Department of Transportation. (n.d.). Ohio rail map. Retrieved November 6, 2018, from https://www.dot.state.oh.us/maps/Pages/OhioRailMapRail.aspx

Ohio Development Services Agency. (2018). Ohio County Profiles: Lucas County. Retrieved from The Office of Research website: https://development.ohio.gov/files/research/C1049.pdf

Ohio History Central. (n.d.). Lucas County. Retrieved August 15, 2018, from http://www.ohiohistorycentral.org/w/Lucas_County

Ohio History Central. (n.d.). Maumee River. Retrieved from http://www.ohiohistorycentral.org/w/Maumee_River

Station Indes. (n.d.). Toledo television stations. Retrieved November 7, 2018, from https://www.stationindex.com/tv/markets/toledo

TMACOG, & Stormwater Coalition. (2013, April). Preparing gardens for spring rains. Retrieved from http://www.tmacog.org/tmacog_publications.htm

TMACOG, & Stormwater Coalition. (n.d.). Change in the weather, change stormwater strategies. Retrieved from http://www.tmacog.org/tmacog_publications.htm

TMACOG. (2015, July). *On the move*. Retrieved from http://www.tmacog.org/onthemove/

Toledo.com. (n.d.). Things to do in Toledo. Retrieved October 16, 2018, from http://www.toledo.com/area-directory/things-to-do-in-toledo/

University of Wisconsin Population Health Institute (UWPHI). (2017). County health rankings and road maps. Retrieved from http://www.countyhealthrankings.org

US EPA. (2018, October 3). About Maumee River AOC. Retrieved from https://www.epa.gov/great-lakes-aocs/about-maumee-river-aoc

USDHS. (2013). *Local mitigation planning handbook*. Retrieved from FEMA website: http://www.fema.gov Ohio Development Services Agency. (2018). *Ohio County Profiles: Lucas County*. Retrieved from The Office of Research website: https://development.ohio.gov/files/research/C1049.pdf

USGS. (2018, November 13). Water data for the nation. Retrieved from https://waterdata.usgs.gov/nwis

Village of Ottawa Hills. (n.d.). History and tradition. Retrieved November 12, 2018, from https://ottawahills.org/page/history

Village of Swanton. (n.d.). Community profile. Retrieved November 12, 2018, from

http://villageofswantonohio.us/residents/community-profile/

World Radio Map. (n.d.). Radio stations in Toledo, Ohio. Retrieved November 12, 2018, from http://worldradiomap.com/us-oh/toledo

Section 2.0 Risk Assessment

Clements, B., & Casani, J. A. (2009). *Disasters and public health: Planning and response*. Burlington, MA: Butterworth-Heinemann/Elsevier.

Crimmins, A., Balbus, J., Gamble, L., Beard, C. B., Bell, J. E., Dodgen, D., … Ziska, L. (2016). *The impacts of climate change on human health in the United States: a scientific assessment*. Retrieved from U.S. Global Change Research Program website: https://health2016.globalchange.gov/downloads#climate-change-and-human-health

Keller, E. A., & DeVecchio, D. E. (2015). *Natural hazards. Earth's processes as hazards, disasters, and catastrophes* (4th ed.). Santa Barbara, CA: Pearson.

Linkhorn, T. (2012). Area drought likely to rank among worst: Crop damage to show up later in higher food prices. *Toledo Blade*. Online. Retrieved from https://www.toledoblade.com/State/2012/07/22/Area-drought-likely-to-rank-among-worst.html

McGee, S., Frittman, J., Ahn, S., & Murray, S. (2014). Risk relationships and cascading effects in critical infrastructures: implications for the hyogo framework. Retrieved from United Nations Office for Disaster Risk Reduction (UNISDR) website: https://www.preventionweb.net/english/hyogo/gar/2015/en/bgdocs/McGee%20et%20al., %202014.pdf

Noji, E. K. (2000). The public health consequences of disasters. *Prehospital and Disaster Medicine*, 21-31.

Pescaroli, G., & Alexander, D. (2015). A definition of cascading disasters and cascading effects: going beyond the "toppling dominos" metaphor. Planet@Risk, 3(1). Retrieved from https://planet-risk.org/index.php/pr/article/view/208/355

Scott, R. (2016, March 30). Will your business recover from disaster? Retrieved from https://www.forbes.com/sites/causeintegration/2014/09/04/will-your-business-recover-from-disaster/#4d5f66db295c

Shoaf, K. L., & Rottman, S. J. (2000). Public health impact of disasters. *Australian Journal of Emergency Management*, 58-63.

Thomas, D., & Phillips, B. D. (2013). *Social vulnerability to disasters* (2nd ed.). Boca Raton,

FL: CRC.

U. S. Department of Homeland Security. (2011). A whole community approach to emergency management: principles, themes, and pathways for action (FDOC 104-008-1). Retrieved from FEMA website: https://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011__2_.pdf

U. S. Department of Homeland Security. (2013). Local mitigation planning handbook. Retrieved from FEMA website: http://www.fema.gov

World Economic Forum. (2017). The global risks report 2017 (12). Retrieved from http://www3.weforum.org/docs/GRR17_Report_web.pdf

CBRNE/Terrorism

California Hospital Association. (n.d.). CBRNE. Retrieved November 16, 2018, from https://www.calhospitalprepare.org/cbrne-0

Grothaus, N. (n.d.). Causes of Terrorism. Retrieved from http://handofreason.com/2011/featured/causes-of-terrorism

Haddow, G. D., Bullock, J. A., & Coppola, D. P. (2014). *Introduction to emergency management* (5th ed.). Waltham, MA: Elsevier.

IB Consultancy. (n.d.). CBRNe. Retrieved November 16, 2018, from https://web.archive.org/web/20120326015203/ib-consultancy.eu/cbrne/

Institute for Economics and Peace. (2018). Global terrorism index. Retrieved from http://visionofhumanity.org/indexes/terrorism-index/

Marsh & McLennan Companies. (2018). *Terrorism risk insurance report*. Retrieved from http://marsh.com

Nuclear Regulatory Commission. (n.d.). Davis-Besse nuclear power station, unit 1. Retrieved November 16, 2018, from https://www.nrc.gov/info-finder/reactors/davi.html

Post, J. M. (2009). Killing in the name of other gods. In *The mind of the terrorist: the psychology of terrorism from the IRA to al-Qaeda* (pp. 211-212). New York, NY: Palgrave Macmillan.

Ramesh, A., & Kumar, S. (2010). Triage, monitoring, and treatment of mass casualty events involving chemical, biological, radiological, or nuclear agents. *Journal of Pharmacy and BioAllied Sciences*, *2*(3), 239-247. doi:10.4103/0975-7406.68506

Snyder, K., & Skebba, J. (2018, December 10). 2 from Toledo area arrested, accused of plotting mass attacks. Retrieved from https://www.toledoblade.com/local/police-

fire/2018/12/10/fbi-arrest-national-security-threats-planned-attack-on-toledo-synagogue/stories/20181210103

Wilson, C. (2005, April 1). Computer attack and cyberterrorism. Retrieved from https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/c/computer-attack-cyberterrorism-crs.html

Civil Disturbance

13ABC. (2018, December 13). Multiple police agencies respond to threats throughout the area. Retrieved from https://www.13abc.com/content/news/Multiple-police-agencies-respond-to-bomb-threats-throughout-the-area-502716692.html

Brickey, J. (2017, November 15). Defining cyberterrorism: Capturing a broad range of activities in cyberspace. Retrieved from https://ctc.usma.edu/defining-cyberterrorism-capturing-a-broad-range-of-activities-in-cyberspace/

Encyclopedia Britannica. (2018, April 11). Riot. Retrieved from https://www.britannica.com/topic/riot

Feehan, J. (2017, August 14). Toledo area no stranger to KKK, Nazi rallies. Retrieved from http://www.toledoblade.com/local/2017/08/14/Toledo-area-no-stranger-to-KKK-Nazi-rallies.print

Henry, T. (2018, February 18). 1968: how the year that shook America rattled Toledo. Retrieved from http://www.toledoblade.com/local/2018/02/18/1968-How-the-year-that-shook-America-rattled-Toledo.print

North Carolina Active Assailant and Active Shooter Work Group. (2017, January 20). White paper for the integrated public safety response to the active shooter/active assailant. Retrieved from http://www.iaem.com/documents/State-of-North-Carolina-Active-Assailant-White%20Paper-02Aug2017.pdf

Ohio State University. (n.d.). Bomb Threat. Retrieved November 13, 2018, from https://dps.osu.edu/bomb-threat

Wikipedia. (2018, September 22). 2005 Toledo riot. Retrieved from https://en.wikipedia.org/wiki/2005_Toledo_riot

Coastal Erosion

Henry. T. (2014). End to low water levels predicted for Great Lakes by U.S. scientists. *The Toledo Blade.* Online. Retrieved from

https://www.toledoblade.com/local/2014/12/11/End-to-low-water-levels-predicted-for-Great-Lakes-by-U-S-scientists.html

Henry, T. (2019). Lake Erie's surging water levels imperil property values, tourism. *The Toledo Blade.* Online. Retrieved from https://www.toledoblade.com/local/environment/2019/05/12/great-lakes-water-levels-lake-erie-surging-higher-affect-water-quality-tourism-property-values/stories/20190507172

NOAA, Office for Coastal Management. (2019). Peer-to-peer case study: Building momentum for green infrastructure implementation. Online. Retrieved from https://coast.noaa.gov/digitalcoast/training/toledo-green-infrastructure.html

Ohio Department of Natural Resources, Office of Coastal Management. (2019). Lucas county. Online. Retrieved from http://coastal.ohiodnr.gov/golucascounty

Ohio Division of Geological Survey. (2019). The Lake Erie coastal erosion problem in Ohio. Online. Retrieved from http://geosurvey.ohiodnr.gov/lake-erie-geology/erosion-and-research/erosion-problems

Dam/Levee Failure

City of Toledo. (n.d.). Levee systems. Retrieved from https://toledo.oh.gov/services/public-service/streets-bridges-harbor/levee-systems/

Ohio Department of Natural Resources. (n.d.). Dam Safety. Retrieved from http://water.ohiodnr.gov/safety/dam-safety

U. S. Army Corps of Engineers. (2019). National inventory of dams. Online. Retrieved from https://nid-test.sec.usace.army.mil/ords/f?p=105:113:3939368110425::NO:::

U. S. Department of Interior. (2009). Economic consequences methodology for dam failure scenarios (EC-2009-01). Retrieved from Bureau of Reclamation Technical Service Center website: https://www.usbr.gov/tsc/techreferences/economics/TMEC200901.pdf

USDHS. (2005). *Technical manual for dam owners: impacts of plants on earthen dams* (534). Retrieved from FEMA website: https://www.fema.gov/media-library-data/20130726-1446-20490-2338/fema-534.pdf

Drought

National Drought Mitigation Center. (n.d.). U.S. drought monitor. Retrieved September 12, 2018, from http://droughtmonitor.unl.edu/

U. S. Department of Agriculture. (2019). Disaster designation information. Online. Retrieved from https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index

WHO. (n.d.). Drought, technical hazard sheet. Retrieved from http://www.who.int/hac/techguidance/ems/drought/en/

Earthquake

Rubinstein, J. L., & Mahani, A. B. (2015). Myths and facts on wastewater injection, hydraulic fracturing, enhanced oil recovery, and induced seismicity. *Seismological Research Letters*, *84*(4), 1-8. doi:10.1785/0220150067

The Historical Marker Database. (2016, June 16). Bowling Green Fault Historical Marker. Retrieved from https://www.hmdb.org/marker.asp?marker=93223

Flood

FEMA. (2017, February 22). The National Flood Insurance Program. Retrieved from https://www.fema.gov/national-flood-insurance-program

USDHS. (2007). Selecting appropriate mitigation measures for flood prone structures (551). Retrieved from FEMA website: https://www.fema.gov/media-library-data/20130726-1609-20490-5083/fema_551.pdf

WHO. (n.d.). Flooding and communicable diseases fact sheet. Retrieved from http://www.who.int/hac/techguidance/ems/flood_cds/en/

Harmful Algal Bloom

Dierkes, C. (2018, February 23). NOAA and Partners Issue 2016 Seasonal Harmful Algal Bloom Forecast from Ohio State's Stone Lab. Retrieved from https://ohioseagrant.osu.edu/news/2016/i9phb/2016-habs-forecast-summary

Egan, D. (2014, August 4). Toxic algal bloom shuts off water, but green slime limited so far to Toledo. Retrieved from https://www.cleveland.com/outdoors/index.ssf/2014/08/toxic_algal_bloom_shuts_off_wa.html

Environmental Protection Agency. (2018, July 19). Harmful algal blooms. Retrieved from https://www.epa.gov/nutrientpollution/harmful-algal-blooms#effect

Fitzsimmons, E. G. (2017, December 20). Tap water ban for Toledo residents. Retrieved

from https://www.nytimes.com/2014/08/04/us/toledo-faces-second-day-of-water-ban.html

Johnston, L. (2017, September 27). 2017 harmful algal bloom blossoms across Lake Erie, as Toledo mayor wants water designated 'impaired'. Retrieved from https://www.cleveland.com/metro/index.ssf/2017/09/2017_harmful_algal_bloom_bloss.html

National Oceanic and Atmospheric Administration. (n.d.). What is a harmful algal bloom? Retrieved December 19, 2018, from https://www.noaa.gov/what-is-harmful-algal-bloom

Read, A. (2014, August 7). Toledo is a warning sign. Retrieved from http://socialistworker.org/2014/08/07/toledo-is-a-warning-sign

Wines, M. (2018, October 19). Spring rain, then foul algae in ailing Lake Erie. Retrieved from https://www.nytimes.com/2013/03/15/science/earth/algae-blooms-threaten-lake-erie.html

Hazmat

Ohio Environmental Protection Agency. (n.d.). Ohio brownfield inventory database. Retrieved December 31, 2018, from https://epa.ohio.gov/derr/SABR/brown_dtb/brownfieldinventory

PHMSA. (2018). Yearly incident summary reports. Retrieved December 31, 2018, from https://portal.phmsa.dot.gov/analyticsSOAP/saw.dll?Dashboard

United States Coast Guard. (2018). *2009 - 2018 reports*. Retrieved from National Response Center website: http://nrc.uscg.mil/

Lake Surge

Ellison, G. (2015, December 3). Storm-churned Lake Erie sediments swirl weeks after seiche. Retrieved from https://www.mlive.com/news/index.ssf/2015/12/storm-churned_lake_erie_sedime.html

Ferguson, R. (2017, June 23). Tsunamis on the Great Lakes? Researchers are looking into it | The Star. Retrieved from https://www.thestar.com/news/queenspark/2017/06/23/tsunamis-on-the-great-lakes-researchers-are-looking-into-it.html

Johnson, N. (2018, April 5). Wind plays havoc across Niagara. Retrieved from https://www.wellandtribune.ca/news-story/8373697-wind-plays-havoc-across-niagara/

Parker, A. (2017, March 8). Wind whips up a seiche on Lake Erie. Retrieved from https://www.wkbw.com/weather/wind-whips-up-a-seiche-on-lake-erie

Schwab, D. (1978, June 21). *Simulation and forecasting of Lake Erie storm surges*. Retrieved from https://www.glerl.noaa.gov/pubs/fulltext/1978/19780003.pdf

Tuninson, J. (2015, December 3). Lake Erie phenomenon: seiche causes 7-foot water rise at Buffalo. Retrieved from https://www.mlive.com/news/grand-rapids/index.ssf/2015/11/lake_erie_phenomenon_seiche_ca.html

University of Michigan. (n.d.). Surges and seiches. Retrieved November 15, 2018, from http://www.miseagrant.umich.edu/lessons/lessons/by-broad-concept/earth-science/surges-and-seiches-2/

Landslide

American Geosciences Institute. (2017, May 23). How much do landslides cost the U.S. in terms of monetary losses? Retrieved from https://www.americangeosciences.org/critical-issues/faq/how-much-do-landslides-cost-terms-monetary-losses

Ohio Coastal Management Program. (2011). *Ohio coastal design manual*. Retrieved from Ohio Division of Natural Resources website: http://coastal.ohiodnr.gov/design/fundamentals

Rimel, A. (2017, January 5). Landslide closes Highway 20 west of Toledo. Retrieved from https://www.gazettetimes.com/albany/news/local/landslide-closes-highway-west-of-toledo/article_3614fba2-2f3c-5403-a942-50a35da7aa0c.html

WHO. (n.d.). Landslides, technical hazard sheet. Retrieved from http://www.who.int/hac/techguidance/ems/landslides/en/

Pandemic

Molinari, et al., N. A. (2007, April 20). The annual impact of seasonal influenza in the US: measuring disease burden and costs. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/17544181\

Toledo Lucas County Health Department. (2016). Annual community and environmental health report. Retrieved from http://www.lucascountyhealth.com/reports-data/

Severe Thunderstorms

National Weather Service (NWS). (n.d.). Severe weather definitions. Retrieved October 10,

2018, from https://www.weather.gov/bgm/severedefinitions

University of Texas. (1998, June 29). Thunderstorm types. Retrieved from http://www.tsgc.utexas.edu/stars/tstypes.html

Voss Law Firm. (n.d.). Understanding the TORRO hailstorm intensity scale. Retrieved April 11, 2018, from https://www.vosslawfirm.com/blog/understanding-the-torro-hailstorm-intensity-scale.cfm

Severe Winter Storms

AccuWeather. (2012, October 3). Weather Channel decision to name winter storms will increase confusion in critical safety information to public. Retrieved from https://www.accuweather.com/en/press/84520

National Severe Storms Laboratory (NSSL). (n.d.). Severe weather 101 - winter weather. Retrieved October 10, 2018, from https://www.nssl.noaa.gov/education/svrwx101/winter/

National Weather Service (NWS). (n.d.). Winter storm safety tips and resources. Retrieved October 10, 2018, from http://www.nws.noaa.gov/om/winter/index.shtml

Panovich, B. (2012, November 8). What's the big deal with naming winter storms? Retrieved from http://wxbrad.com/whats-the-big-deal-with-naming-winter-storms/

Rice, D. (2015, January 20). What are Alberta Clippers? Retrieved from https://www.usatoday.com/story/weather/2015/01/20/alberta-clippers/22049039/

Sousounis, P. (2018, March 29). Can "global warming" cause more wintry conditions? Retrieved from https://www.air-worldwide.com/Blog/Can-%E2%80%9CGlobal-Warming%E2%80%9D-Cause-More-Wintry-Conditions-/

Temperature Extremes

Center for Disease Control. (n.d.). Climate change and extreme heat events. Retrieved from https://www.cdc.gov/climateandhealth/pubs/ClimateChangeandExtremeHeatEvents.pdf

Environmental Protection Agency. (2018, August 28). Heat islands. Retrieved August 3, 2018, from https://www.epa.gov/heat-islands

National Weather Service (NWS), & Federal Emergency Management Agency (FEMA). (2001). *Anticipating hazardous weather and community risk* (IS-271). Boulder, CO: University Corporation for Atmospheric Research. Cooperative Program for Operational Meteorology, Education and Training (COMET).

Tornado

Cathey, B. (2018, March 29). Palm Sunday tornadoes: a look back. Retrieved from https://www.13abc.com/content/news/Palm-Sunday-Tornadoes-A-look-back-478358783.html

National Weather Service (NWS). (n.d.). NWS JetStream - Thunderstorm Hazards: Tornadoes. Retrieved October 10, 2018, from https://www.weather.gov/jetstream/tornado

Wildfire

Auburn University. (2018). Environmental effects. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/fire/effects.htm

Auburn University. (2018). Weather elements that affect fire behavior. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/fire/weather_elements.htm

Division of Forestry. (2018). Annual work plan for Maumee State Forest 2018/2019. Retrieved from ODNR website: http://forestry.ohiodnr.gov/Portals/forestry/PDFs/plans/maumee_annual.pdf

National Geographic. (2018, January 18). Wildfires information and facts. Retrieved from https://www.nationalgeographic.com/environment/natural-disasters/wildfires/

National Interagency Fire Center. Retrieved from https://www.nifc.gov/fireInfo/fireInfo_statistics.html

USDHS. (n.d.). Wildfires. Retrieved from https://www.ready.gov/wildfires

Wind

Weather Street. (2013). Weather questions and answers. Retrieved from http://www.weatherquestions.com/What_causes_wind.htm

Why does wind blow?. (2019, January 2). NOAA SciJinks. Retrieved from https://scijinks.gov/wind/

Section 3.0 Mitigation Strategy

Coastal Hazards Research Center, & Center for Sustainable Community Design. (n.d.). Types of mitigation actions. Retrieved from http://mitigationguide.org/task-6/mitigation-actions/

APPENDIX 6
PLAN ADOPTION

This appendix will contain the adoption letters or resolutions from the county and individual cities, villages, and townships who participated in the update of the plan.

Until this plan is approved and adopted, this appendix contains a sample resolution for a city.

RESOLUTION – CITY OF NAME

WHEREAS natural, technological, and man-made hazards can affect City of Name; and

WHEREAS significant structural, historical, and economic losses could result from an occurrence of a natural, technological, or man-made hazard events; and

WHEREAS undertaking mitigation projects during pre-disaster periods could decrease the total losses Name incurs as a result of said hazard occurrences.

AND WHEREAS the Name City Council has a strong interest in reducing losses from future hazard occurrences; and

WHEREAS the hazard mitigation plan is a federal and state requirement to maintain eligibility for hazard mitigation funding, and, by that requirement, must be updated a minimum of every five years; and

WHEREAS a cooperative, joint effort is a proven, efficient way to plan for and reduce hazard susceptibility in all government jurisdictions in Lucas County, Ohio.

THEREFORE, the Name City Council partnered with the Lucas County Emergency Management Agency and the other jurisdictions in the county to update the existing *Lucas County 2019 Hazard Mitigation Plan* in an effort to further identify, define, and characterize the hazards affecting the city as well as to continue identifying and prioritizing projects that could lessen hazard vulnerability.

NOW BE IT RESOLVED THAT the Name City Council does hereby adopt the updated *Lucas County 2019 Hazard Mitigation Plan* this _____ day of _____, 20__.

SIGNED: _____ _____

Mayor Witness

APPENDIX 7
ANNUAL MONITORING

This appendix will contain the documentation generated as a result of annual meetings the committee holds to monitor, evaluate, and update the plan.

2020 ANNUAL MEETING

Meeting Date and Time:	
Meeting Location:	
In Attendance:	
Topics Discussed:	
Next Steps:	
Comments:	
Tentative Next Meeting:	

2021 ANNUAL MEETING

Meeting Date and Time:	
Meeting Location:	
In Attendance:	
Topics Discussed:	
Next Steps:	
Comments:	
Tentative Next Meeting:	

2022 ANNUAL MEETING

Meeting Date and Time:	
Meeting Location:	
In Attendance:	
Topics Discussed:	
Next Steps:	
Comments:	
Tentative Next Meeting:	

2023 ANNUAL MEETING

Meeting Date and Time:	
Meeting Location:	
In Attendance:	
Topics Discussed:	
Next Steps:	
Comments:	
Tentative Next Meeting:	

2024 ANNUAL MEETING

Meeting Date and Time:	
Meeting Location:	
In Attendance:	
Topics Discussed:	
Next Steps:	
Comments:	
Tentative Next Meeting:	