2025
Geauga County
Natural Hazards Mitigation Plan

EMERGENCY MANAGEMENT
GEAUGA COUNTY

Executive Summary

Geauga County is subject to natural hazards that threaten life and health and have caused extensive property damage. To better understand these natural hazards and their impacts on people and property and to identify ways to reduce those impacts, Geauga County's Department of Emergency Services undertook this countywide Mitigation Plan. This Mitigation Plan was developed through the collaboration of the Planning Group, consisting of stakeholders from communities and organizations throughout Geauga County.

The Geauga County Hazard Mitigation Plan was created to protect the health, safety, and economic interests of Geauga County residents and businesses by reducing the impacts of natural hazards through mitigation planning, awareness, and implementation. The plan serves as the foundation for hazard mitigation activities and actions within Geauga County. Implementation of recommendations will reduce loss of life, destruction of property, and economic losses due to natural hazards. The plan provides a path towards continuous, proactive, and reduction of vulnerability to hazards which result in repetitive and oftentimes severe social, economic and physical damage. The ideal end goal is full integration of hazard mitigation concepts into day-to-day governmental and business functions and management practices.

This plan employs a broad perspective in examining multi-hazard mitigation activities and opportunities in Geauga County. Emphasis is placed on hazards which have resulted in threats to public health, safety and welfare, as well as the social, economic and physical infrastructure of the community. The plan addresses such hazards as winter and ice storms, severe storms, floods, tornadoes, wildfires, dam failure, droughts, earthquakes, etc. Each hazard is analyzed from a historical perspective, evaluated for potential risk, and considered for possible mitigate action. The plan also lays out the legal basis for planning and the tools to be used for its implementation.

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1.0 Introduction

1.1 Introduction

The Geauga County Hazard Mitigation Plan is a multi-jurisdiction plan that details natural hazards that threaten Geauga County and its incorporated municipalities and unincorporated jurisdictions. The plan fulfills the requirements set forth by the Mitigation Act of 2000 (DMA 2000). This Act requires counties to formulate a hazard mitigation plan to be eligible for mitigation funds made available by the Federal Emergency Management Agency (FEMA).

1.2 Purpose

The Geauga County Hazard Mitigation Plan was created to protect the health, safety, and economic interests of residents by reducing the impacts of natural hazards through hazard mitigation planning, awareness, and implementation. Hazard mitigation is any action taken to permanently eliminate or reduce long-term risk to human life and property from natural hazards. It is an essential element of emergency management along with preparedness, response and recovery. This plan serves as the foundation for hazard mitigation activities within the community. Implementation of the plan's recommendations will reduce injuries, loss of life, and destruction of property due to natural hazards. The plan provides a path toward continuous, proactive, and reduction of vulnerability to the most frequent hazards which result in repetitive and often severe social, economic and physical damage. The ideal end state is the total integration of hazard mitigation activities, programs, capabilities, and actions into normal day-to-day governmental functions and management practices.

1.3 Participating Communities and Planning Team

Geauga County has five incorporated communities within its borders. These incorporated communities are invited to participate in this planning process, and all must adopt the current plan. *Appendix A contains the list of participants from each community as well as letters sent to communities.*

The Geauga County Hazard Mitigation Plan Update process begins with establishing a planning team. Members of this team are stakeholders from within the county and are members of local businesses, civic organizations, local government, and/or other local, state, and federal agencies. To lead planning efforts effectively and collaboratively, several

representative stakeholders are sought after to participate. Representatives participated and contributed to plan update discussions by attending in-person meetings, e-mail correspondence, and teleconferences. The planning team included representatives from the following organizations.

- American Red Cross (ARC)
- Chardon Fire Department
- Chardon Police Department
- Chardon United Methodist Church
- City of Chardon
- Federal Emergency Management Agency (FEMA)
- Cuyahoga County Office of Emergency Management
- Geauga County Auditor's Office
- Geauga County Automatic Data Processing
- Geauga County Board of County Commissioners
- Geauga County Board of Mental Health & Recovery Services
- Geauga County Building Department
- Geauga County Community & Economic Development
- Geauga County Emergency Management Agency
- Geauga County Engineer's Office
- Geauga County GIS
- Geauga County Sheriff's Office
- Geauga Farm Bureau
- Geauga County Planning Commission
- Geauga Public Health
- Great Lakes Cheese Company
- National Weather Service & NOAA
- Ohio Department of Natural Resources (ODNR)
- Ohio Emergency Management Agency (OEMA)
- State Fire Marshal – Ohio (SFM)
- South Russell Police Department
- University Hospitals-Geauga Medical Center
- Village of Burton
- Village of Middlefield
- Village of South Russell

2.0 Community Information

2.1 County Profile

Geauga County is located in northeast Ohio approximately 35 miles east of the City of Cleveland–and adjacent Lake, Cuyahoga, Summit, Portage, Trumbull and Ashtabula counties. Of these counties, Geauga is the second least populated with 233 people per square mile with Ashtabula County having 139 people per square mile.

The City of Chardon the County Seat, which is the county's largest incorporated area, with 5,246 residents, according to the 2023 American Community Survey 5-year Estimates. Villages in the County, in order of descending population, include South Russell, Middlefield, Burton, and Hunting Valley. Hunting Valley Village is located in both Cuyahoga and Geauga counties, with most of the residents residing in Cuyahoga County. The political boundaries of the 16 townships within Geauga County are illustrated on *Map B-1, Political Boundaries, in Appendix B.* Townships, in order of descending population include Bainbridge, Chester, Munson, Auburn, Russell, Newbury, Hambden, Middlefield, Chardon, Parkman, Huntsburg, Claridon, Troy, Burton, Thompson, and Montville.

2.2 Geography and Climate

According to the Census Bureau the county has a total area of 408.29 square miles (1,057.5 km2), of which 400.16 square miles (1,036.4 km2) (or 98.01%) is land and 8.13 square miles (21.1 km2) (or 1.99%) is water.

Geauga County receives the most precipitation of any county in northern Ohio, with most of the county receiving over 42 inches annually in an average year, and some parts exceeding 44 inches. The northern part of the county generally experiences higher snowfall due to its higher elevation and lake-effect snow. According to the official website of the City of Chardon, the average annual snowfall is over 105 inches, the snowiest city in the state.

2.3 Transportation

U.S. Highways

- U.S. Route 6 Grand Army of the Republic Highway honoring American Civil War Veterans
- U.S. Route 322
- U.S. Route 422

State Highways

- State Route 44
- State Route 86
- State Route 87
- State Route 88
- State Route 166
- State Route 168
- State Route 306
- State Route 528
- State Route 608
- State Route 700

Public Transportation

The mostly rural nature of Geauga County limits the feasibility of a fixed-route transit system. Instead, Geauga Transit offers a demand-responsive door-to-door transit system within the county with some out-of-county service up to two miles from the county border. In 2023 Geauga Transit partnered with and is now operated by Laketran (in Lake County) through an agreement with the Geauga County Board of County Commissioners. Six new 12-passenger buses were added to replace vehicles and expand the fleet.

Airports

Geauga County is home to one public airport located at 15421 Old State Road, Middlefield, Ohio 44062. The airport is an approximate 100-acre general aviation facility that houses single and light twin engine aircraft. It currently has a 3,500

feet long x 65 feet wide runway, three (3) T-hangers, three (3) community hangers with a new T-hanger scheduled for construction.

University Hospitals AirMed, Cleveland Soaring Society, and Experimental Airccraft Association Chapter 5 are currently housed at the Geauga County Airport.

Paved Trails

The Maple Highlands Trail is the largest walking, biking, hiking trail in the county. While no statistics are available as to the number of residents who use the trail to travel to work, it's 21.1-mile length is available in the event of an emergency.

2.4 Education, Unemployment, and Labor Force

In terms of educational attainment, the 2023 American Community Survey Estimates Five-Year estimates found the following of the 66,426 persons aged 25 and over, 5,832 (8.8%) have no high school diploma, 17,592 (26.5%) had obtained a high school diploma, 12,079 (18.2%) had some college but no degree, 5,200 (7.8%) had an Associate's degree, 16,062 (24.2%) had a college degree and 9,661 (14.5%) had a Master's degree or higher.

As November 2024, unemployment in Geauga County is the 4th lowest in the state at 3.1% (not seasonally adjusted) according to Ohio Labor Market Information from the Ohio Department of Job and Family Services. Previous data is provided in Table 1.1, below Civilian Labor Force in Geauga County from 2019-2023 and Table 1.2, lists the Employment and Wages by Sector for 2022.

Table 1: Civilian Labor Force, 2019-2023

	2019	2020	2021	2022	2023
Total labor force	50,501	46,860	45,590	48,394	48,777
Employed	48,720	43,719	47,503	46,485	47,243
Unemployed	1,781	3,141	1,913	1,909	1,534
Unemployment Rate	3.5	6.7	4.0	4.4	3.1

Source: Ohio Department of Development, Geauga County Profile 2024 Edition

Table 2: Employment and Wages by Sector, 2022

Industrial Sector	Number of establishments	Average employment	Total Wages	Average Weekly Wages
Private Sector	3,005	31,725	$1,617,812,541	$981
Good producing	709	10,080	$609,655,542	$1,163
Natural Resources and Mining	40	343	$11,828,431	$663
Construction	456	2,545	$157,221,306	$1,188
Manufacturing	213	7,192	$440,605,805	$1,178
Service-Providing	2,297	21,646	$1,008,156,999	$896
Trade, Transportation and Utilities	604	7,999	$408,085,330	$981
Information	51	120	$11,930,667	$1,909
Financial Services	210	786	$57,201,997	$1,399
Professional and Business Services	678	3,606	$202,667,380	$1,081
Education and Health Services	301	4,952	$219,691,408	$853
Leisure and Hospitality	217	2,895	$59,141,132	$393
Other Services	233	1,284	$49,310,450	$739
Federal Government	Not provided	104	$7,496,148	$1,389
State Government	Not provided	199	$12,081,929	$1,169
Local Government	Not Provided	2,913	$156,237,702	$1,032

Source: Ohio Department of Development, Geauga County Profile 2024 Edition

2.5 Utilities

Electricity

Illuminating Company and Ohio Edison

Water

Burton Village, the City of Chardon, Middlefield Village, Geauga County Department of Water Resources. (These are the municipal or county water systems, however a majority of the county relies on privately owned water wells)

Sewer

Burton Village, the City of Chardon, Middlefield Village, Geauga County Department of Water Resources. (These are the municipal sewer systems; however, a majority of the county relies on privately owned septic systems)

Natural Gas

Brainard Gas Corporation, Dominion East Ohio Gas (now Enbridge), Columbia Gas of Ohio, Inc., Orwell Natural Gas, Knox Energy Cooperative Association, Inc., Ohio Rural Natural Gas Cooperative and there are 592 gas and oil wells that have been reported to Geauga County Department of Emergency Services

Telecommunications

Windstream Western Reserve, AT&T, Spectrum, and Charter Communications provide VoIP (Voice-over-Internet Protocol) telephone service throughout Geauga County. Private cellular providers include but are not limited to Verizon Wireless, AT&T, and T-Mobile.

Internet

Kinetic by Windstream, Western Reserve, AT&T, Spectrum, and Charter Communications provide internet services throughout Geauga County. Home internet provided by cellular providers include but are not limited to Verizon Wireless and T-Mobile. Satellite internet providers include but are not limited to Starlink, Hughesnet, Viasat, and Earthlink (service may not be available in all areas.)

2.6 Social and Economic Characteristics

According to 2023 American Community Survey 5-Year Estimates, Geauga County has a total population of 95,479. Of that, approximately 81,729 or 85.6% of the population live within the unincorporated areas of the county, while the remining 13,750, or 14.4%, live within the City of Chardon and the villages. The county's median age is 45.2, which is older than the state's median age of 39.6.

In 2023, the percentage of the population in Geauga County age 25 and older that completed high school or higher is 91.2%, which is slightly lower than the state average of 91.9% and is slightly higher than the national average of 89.8%. Table 3 below shows the basic demographic profile for the county.

Table 3: Geauga County Demographic Profile

	2023	2017
Total Population	95,479	93,895
Male	47,764	46,220
Female	47,715	47,675
Total Housing Units	37,617	36,921
Percent high school graduate or higher	91.2%	90.3%
Percent bachelor's degree or higher	38.7%	38.0%
Median Household Income	$99,305	$77,104
Per Capita Income	$50,431	$39,513
Families Below Poverty Level	3.9%	4.3%
Unemployment Rate	5.8%	3.5%

Source: U.S. Census Bureau – 2017 & 2023 American Community Survey

2.7 Geauga County Information

Table 4: Geauga County Information

Jurisdiction	Planning Commission	Comprehensive Plan	Floodplain Regulations	Building Codes (1)	Zoning Ordinances	Capital Budget (2)	Public Works Budget
Geauga County	Yes	Yes	Yes	Yes	Yes*	None	Limited in-kind wages only
City of Chardon	Yes	Yes	No	Yes	Yes	None	Limited in-kind wages only
Village of Burton	Yes	Yes	No	Yes	Yes	None	Limited in-kind wages only
Village of Hunting Valley	Yes	Yes	No	Yes	Yes	None	Limited in-kind wages only
Village of Middlefield	Yes	Yes	No	Yes	Yes	None	Limited in-kind wages only
Village of South Russell	Yes	Yes	No	Yes	Yes	None	Limited in-kind wages only

1. All jurisdictions with the State of Ohio now follow the State Building Code (Ohio Administrative Code 4101:1
2. Budget that would allow the jurisdiction to devote financial resources towards hazard mitigation activities
3. Through titles 3 and 7 of the Ohio Revised Code, the county and all municipal corporations have the authority to establish, maintain, or improve upon these capabilities vary based on their respective need, political will, and financial capacity. Compared to larger communities, smaller jurisdictions may have the same authority enabled to them by the Ohio Revised Code, but have less ability to establish, maintain, or improve these capabilities.

*Zoning is regulated by each individual township, not by the county. Middlefield Township has no zoning.

2.8 County Development

Much of the information measuring development was derived from Ohio County Profiles from the Ohio Department of Development. The current posture of Geauga County can be found using the 2024 county profile.

Table 5 Vital Statistics

Vital Statistics Geauga County, Ohio	2017		2021	
	Number	Rate	Number	Rate
Births / Rate per 1,000 women aged 15-44*	1,216	65	876	58.6
Teen births / Rate per 1,000 females 15-19	18	5	9	3.0
Deaths / rate per 100,000 population	881	936.6	993	1,040.1
Marriages / rate per 100,000 population	432	4.6	436	4.6
Divorces / rate per 100,000 population	227	2.4	154	1.6

Source: Ohio Department of Development Geauga County Profile 2024; and the Ohio Department of Health

Table 6 Geographic Mobility

The percentage of people moving out of the county remained the same between 2017 and 2024 at 4.6%. Geauga County is stable in that residents tend to stay in the same home per the data below that shows the number of people living in the same home as the previous year increased by 0.5%.

Population aged 1 year and older	**2017 Number (93,024)**	2017 **Percent (100%)**	**2024 Number (94,500)**	2024 **Percent (100%)**
Same house as previous year	85,666	92.1%	87,545	92.6%
Different house, same county	3,121	3.4%	2,615	2.8%
Different county, same state	3,126	3.4%	2,871	3.0%
Different state	819	0.9%	1,181	1.2%
Abroad	292	0.3%	288	0.3%

Source: Ohio Department of Development Geauga County Profile 2017 and 2024 Edition

Table 7 Housing Units

The total number of housing units increased by 1,120 units between 2012 and 2023. During that same time, renter occupied housing decreased by 32 units and vacant housing increased by 157 units.

	2012 ACS 5-year Estimate		2017 ACS 5-year Estimate		2020 Decennial Census		2023 ACS 5-year Estimate	
Total Housing Units	Number (36,497)	Percent (100%)	Number (36,921)	Percent (100%)	Number (37,419)	Percent (100%)	Number (37,617)	Percent (100%)
Occupied housing units	34,624	94.9%	35,121	95.1%	35,460	94.8%	35,587	94.6%
Owner Occupied	29,960	86.5%	30,129	85.8%	30,712	86.6%	30,958	87.0%
Renter Occupied	4,664	13.5%	4,992	14.2%	4,748	13.4%	4,629	13.0%
Vacant Housing Units	1,873	5.1%	1,800	4.9%	1,959	5.2%	2,030	5.4%

Source: American Community Survey (ACS) 2012, 2017, 2023 5-year estimates, Decennial Census 2020.

Prepared by: Geauga County Planning Commission

Table 8 Land Use and Cover

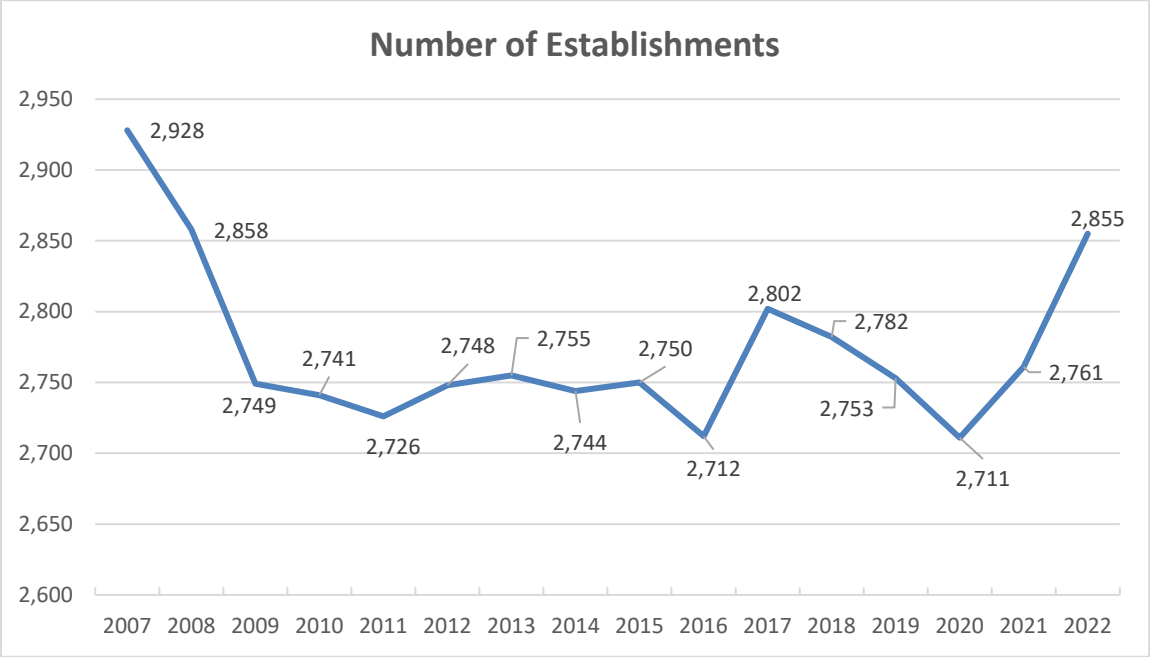
Land Use/Land Cover	Percent (2021)	Percent (2024)
Developed, Lower Intensity	15.07	16.89
Developed, Higher Intensity	1.03	1.76
Barren (strip mines, gravel pits, etc.)	0.24	0.25
Forest	49.98	49.04
Shrub/Scrub and Grasslands	1.64	1.10
Pasture/Hay	21.41	19.78
Cultivated Crops	3.45	3.44
Wetlands	5.75	6.32
Open Water	1.44	1.43

Source: Ohio Department of Development, Geauga County Profile 2024 Edition

Establishments

There was a sharp decline in the number of private sector business establishments in Geauga County between 2007 and 2011 in part related to what was referred to as the "Great Recession". Activity was relatively stagnant until a dip in 2016 followed by a general increase except for the economic downturn experienced in 2020 due to the Covid-19 Pandemic. Establishments have been on the rise since then and are near levels from 2008

Table 9 Establishments

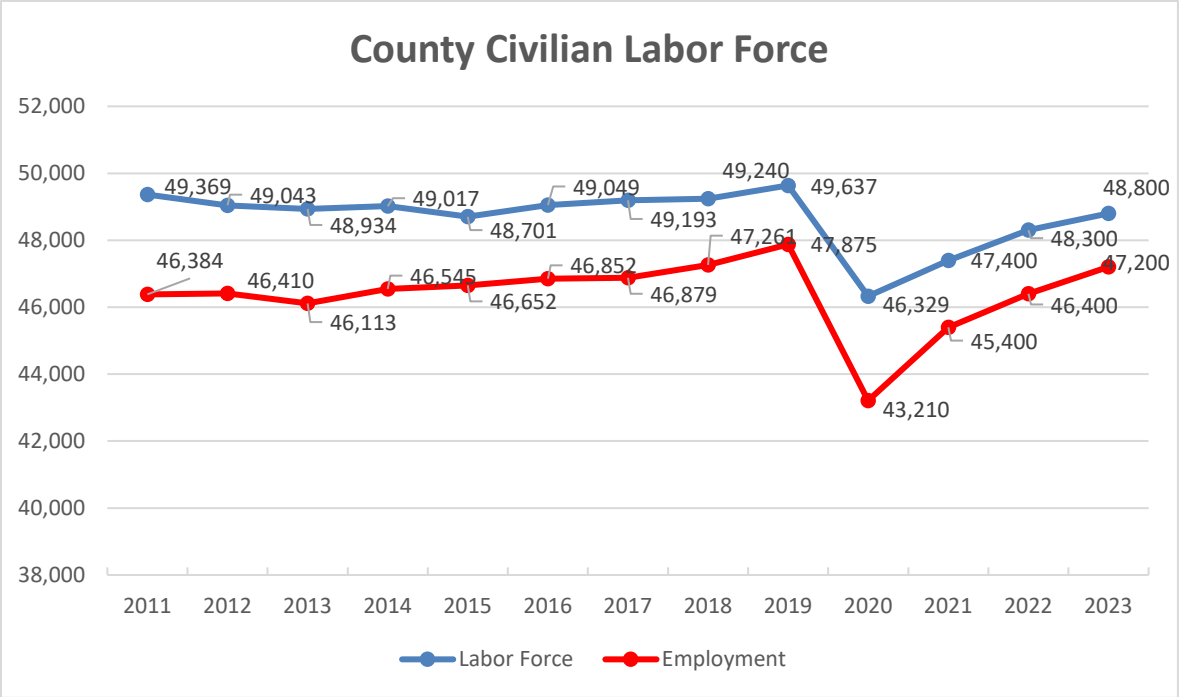


Source: Geography Area Series: County Business Patterns 2007-2022 by Employment Size Class

Labor Force and Unemployment

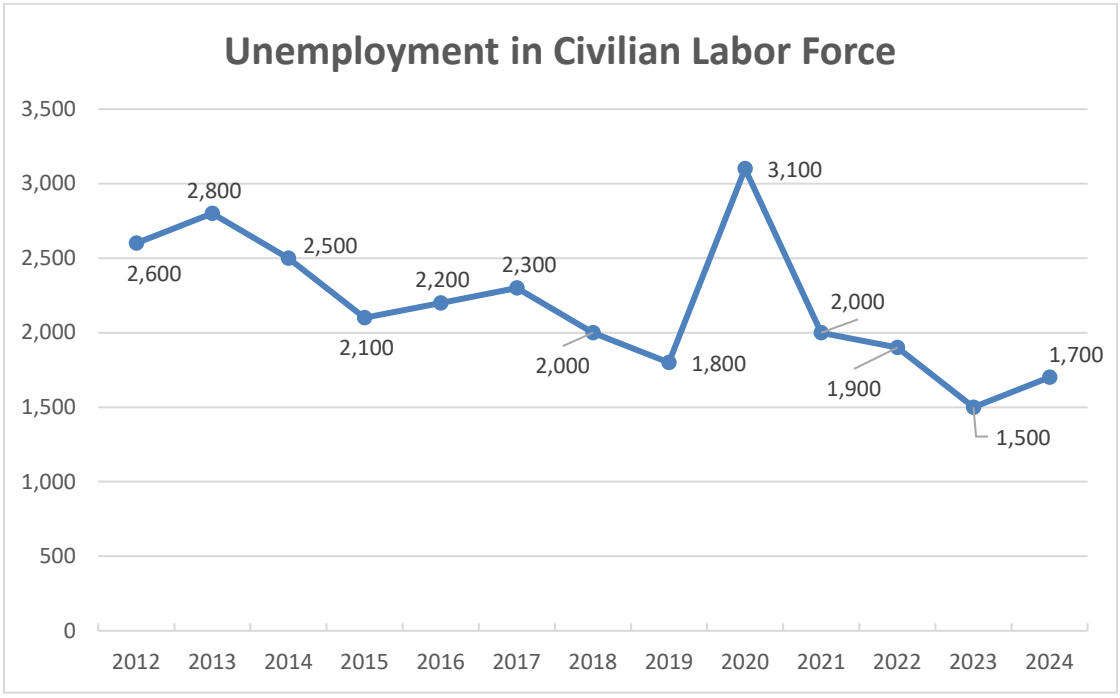
Between 2008 and 2010, economic collapse caused incredible job losses throughout the nation as well as locally in Geauga County. The Covid-19 pandemic beginning in 2020 worsened the economy as many businesses who temporarily shut down did not re-open., as of February 2025, Geauga County's unemployment rate of 4.6% is slightly higher than the state average, which is 4.1% (https://ohiolmi.com/)

Table 10 County Civilian Labor Force Estimates:



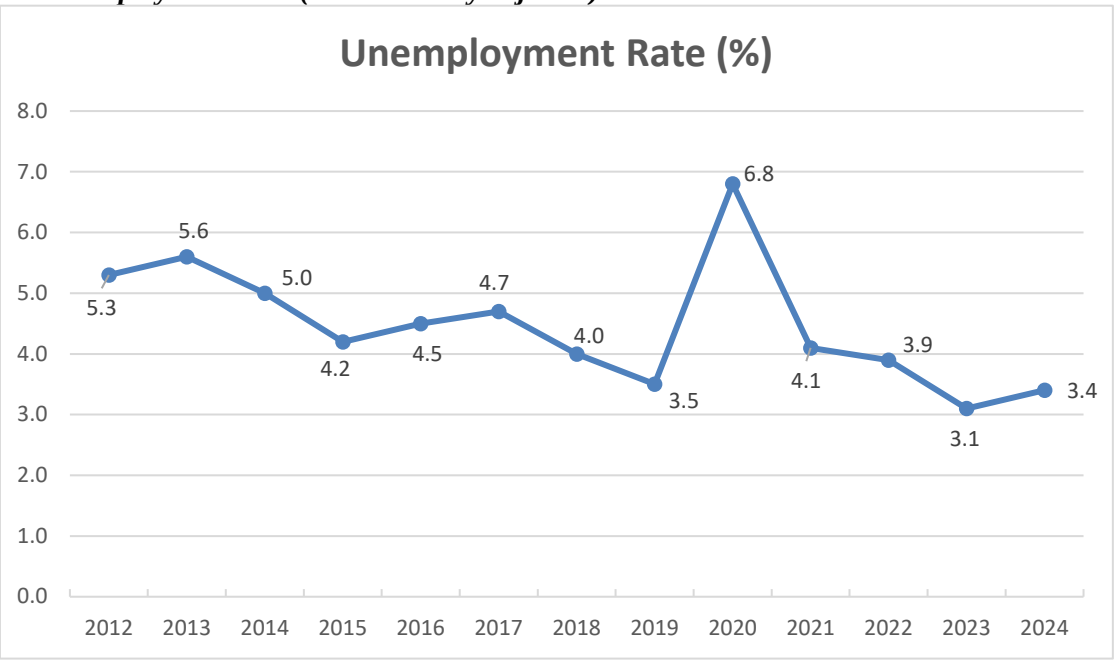
Source: Ohio Labor Market Information, Civilian Labor Force Estimates Annual Averages 2012-2023 not seasonally adjusted, *https://ohiolmi.com/Home/CountyProfiles/Civilian_Labor_Force*

Table 11 Unemployment in Civilian Labor Force



Source: Ohio Labor Market Information, Civilian Labor Force Estimates Annual Averages 2012-2024 not seasonally adjusted, https://ohiolmi.com/Home/LAUS/LAUSHome

Table 12 Unemployment Rate (not seasonally adjusted)



Source: Ohio Labor Market Information, Civilian Labor Force Estimates Annual Averages 2012-2024 not seasonally adjusted, https://ohiolmi.com/Home/LAUS/LAUSHome

Current and Future Land Use

A well-designed economic and community development plan will help the county, and its communities establish widely accepted economic development priorities, reduce sprawl, avoid duplication of costly infrastructure, and foster retention of local identity. There is a need for an approach to development that will build on the strengths of the county and its communities maximize the use of existing infrastructure and coordinate with local and regional development strategies.

A county-wide effort should be directed towards job creation, retention and expansion. Planning for development requires flexibility to be effective as markets and technology change. While each community has unique challenges and opportunities, land-use strategies can guide an integrated approach by all sectors to promote economic vitality in partnership with their neighbors.

Sewer & Water Infrastructure Capacity

Existing sewer capacity is stressed by current growth in some areas. Lack of a regional water districts hamper efforts to bring central water service to various parts of the county.

The development of a regional master water and sewer plan showing specific tributary area relationships to the existing trunk lines and indicating the capacity for each one is strongly recommended.

Telecommunication Services

Geauga County is served by different incumbent local telephone exchange providers, and the difference in local service has created an uneven provision of telecommunication services. The county and its communities should work with the telecommunication providers to develop countywide full spectrum communication services. The availability of adequate internet streaming services has remained a challenge in the eastern, more rural townships, though services are improving. Strong telecommunication is important because information sharing during disasters is critical. Good communication enables situational awareness, coordination of relief efforts, public information dissemination, and restoration of essential services. The lack of reliable service can hinder the speed and efficiency of these services.

Urban Sprawl

Sprawl is not as obvious in Geauga County as it is in some neighboring counties. New retail, residential and industrial development in the 1990s created concerns within the county regarding sprawl. Though there are concerns about urbanization in the county, Geauga's growth is no more significant than growth in neighboring counties, which are all more densely populated, except for Ashtabula County to the east.

Future Growth

Community development (Residential, Commercial, Industrial) is important for communities and is encouraged in Geauga County. Recent residential development in the county has focused on areas such as Chardon, Middlefield, and Bainbridge, for example. Development efforts should be encouraged to be conscious of natural hazards and existing regulations, and to avoid unchecked future development in hazard-prone areas that could increase risk and vulnerability to people, property, and infrastructure.

Infrastructure

For purposes of comprehensive land use planning, infrastructure is defined as potable water treatment and distribution, sanitary and storm sewers, wastewater treatment, telecommunications, natural gas and electricity distribution, and transportation. To minimize public costs and efficiently use resources, new development should occur in areas where adequate capacity exists or can be reasonably extended. Attention needs to be given to areas of the county that are presently under-served by utilities. Infrastructure should be well maintained and updated in hazard prone areas, or rebuilt all together, to decrease risks to the population. Actions to improve infrastructure could be to update and maintain floodplains, updating buildings currently in hazardous areas, raising public awareness about hazards, restoring natural systems to improve water quality, and/or maintaining and updating emergency systems.

3.0 Planning Process

3.1 Plan Adoption

Following federal approval, Geauga County and its participating jurisdictions will formally adopt this plan by resolution or ordinance.

3.2 Participation

The planning team is the original planning unit for this project. All planning team members are involved in the entire planning process. They are decision makers and implementers. The purpose of the planning team is to provide information to the various entities of Geauga County that have a stake, either directly or indirectly, in the mitigation plan.

Additionally, adjacent counties were invited to participate in the planning process. Invitations were sent to: Lake County EMA, Ashtabula County EMA, Trumbull County EMA, Portage County EMA, Cuyahoga County EMA and Summit County EMA announcing the plan update and inviting representatives to attend and participate in the planning process. However, no representatives from any of these counties participated. Other interested parties invited to participate included Great Lake Cheese Company, Masco Corp/KraftMaid Cabinetry Inc., University Hospitals Health System, and the American Red Cross. Additional representatives from local businesses and organizations were also invited to participate in the planning process.
See Plan Section 1.0 and Appendix A for the complete list of participants.

3.3 Planning Process

Meeting 1: Plan Review "Kick-Off" Meeting (02/13/2025)

During the kick-off meeting, the planning team members were provided with an overview of the purpose of mitigation and the goals surrounding the overall mitigation plan. A review of the current Geauga County Hazard Mitigation Plan was provided including details regarding the seven current sections of the plan. A discussion was given on the expected changes to be made within the revision of the plan, including the potential combining of sections.

The planning process was discussed, and the group was brought up to speed on actions that had already taken place, such as outreach. The group discussed moving forward with additional meetings and established a timeline for the meetings.

See Appendix C for Meeting 1 minutes.

Meeting 2: Hazards Meeting (03/6/2025)

During the second mitigation meeting, all participants began by completing their own hazard analysis, and then the group compared and compiled them together into a new list, assessing the perceived hazards facing the county.

In addition, participants reviewed the hazards within the county that had previously been determined and considered new ones. Hazard Probability, Impact, and Community Preparedness were considered for each hazard.

The group reviewed the hazards and risks section of the revised plan. This section provides information regarding the definition of the hazard, location the hazard may affect the county, the extent of possible damage, previous occurrences of such hazard within the county, the probability of the hazard affecting the county and the overall vulnerability assessment of these hazards.

Further research was completed with the help of the Ohio Department of Natural Resources, State Fire Marshal's Office, National Weather Service, and other appropriate entities to assist with data collection to analyze hazards facing Geauga County.

See Appendix C for Meeting 2 minutes.

Meeting 3: Goals Meeting (04/22/2025)

Like all meetings, the third meeting began with a recap of the previous meeting and the plan process status.

Also, the group reviewed the goals listed in the previous plan to determine if they were still relevant. The group determined that the goals would remain, however there would be an additional goal added for wildfires.

A previously created hazard matrix was assessed and reviewed to reflect the current plan. The criteria used to create the matrix included: cost effectiveness; technical feasibility; environmentally sound; socially equitable; funding availability; innovative ideas; and reactionary or preventative alternatives.
See Appendix C for Meeting 3 minutes.

Meeting 4: Draft Review Meeting (05/21/2025)

The final meeting with the planning group was a brief draft overview meeting, followed by an email chain. The plan draft was sent to all participants, and replies were gathered and shared related to corrections and suggestions of changes. During the draft review, members of the planning team assessed the plan's format, accuracy, charts, graphs, and overall usefulness as a working document for the county. Upon the completion of the draft review meeting on 5/21, the Outreach Website was made public and promoted, allowing the planning team and public to review the draft from there, as well as assess the website.
See Appendix C for Meeting 4 minutes.

Meeting 5: Final Public Draft Review Meeting (06/30/2025)

Public input was necessary to gauge the opinion of the community and build support for the mitigation plan. A public meeting was held on June 30, 2025 to make the plan draft and the planning team available to the public. This meeting gave the public an opportunity to comment on the plan. This meeting was also used to address comments and questions concerning the draft version of the mitigation plan. Sufficient time for public comment was provided, which is documented and incorporated into the mitigation plan. Besides this specifically allotted and advertised time for public review and input, the public was invited to every meeting prior, as well as participated through the online hazards survey. Also, the Public Outreach Website that was launched upon the completion of the Draft Review meeting on 5/21 allowed further public input with the website, draft, interactive hazard maps, and public survey.
See Appendix C for Meeting 5 minutes.

3.4 Public Outreach and Other Stakeholder Involvement

Since public participation was crucial for implementation of the review of the mitigation plan, a public notice was created. The plan was made available at the Geauga County Department of Emergency Services located at 12518 Merritt Road, Chardon, Ohio, the Department of Emergency Services Website, and the new interactive Hazard Mitigation Public Outreach Website. In addition, the public notice was printed in the Geauga County Maple Leaf *(See Appendix D)* regarding the beginning of the review and the opportunity for the public to be a part of the process. All meeting dates, agendas, minutes and plan updates were posted on the Geauga County Department of Emergency Services Website and new Hazard Mitigation Public Outreach Website *(See Appendix D).* In addition, presentations were given to local groups such as the local safety council for added community outreach.

The formal public notification process, as defined in the Federal Code, occurred prior to approval and/or adoption of the plan. A press release informing residents of the status of the planning process, where to view the plan, and the public meeting date was published in local media print and online. The public was notified of their opportunity to review and comment on the draft plan before and during each review period and invited to attend every meeting *(See Appendix D).* Comments were to be forwarded to the Geauga County Department of Emergency Services for inclusion in the final plan. The draft mitigation plan was submitted to the Ohio Emergency Management Agency (OEMA) and the Federal Emergency Management Agency (FEMA) for review and final approval.

3.5 Integration with Existing Plans

Existing plans that were consulted upon drafting of the Geauga County Hazard Mitigation Plan include:

-Geauga County Hazard Mitigation Plan (2020)

This plan was consulted to assist with the problem identification, goals and action plan component of the plan update.

-Geauga County Emergency Operations Plan (2021)

This plan was consulted to assist with the hazard identification component of the plan update.

-State of Ohio Hazard Mitigation Plan (2024)

This plan was consulted to assist with background information, data, hazard identification, and reference information.

-Geauga County and Local Floodplain Regulations (2009)

3.6 Finalization Process

Upon incorporation of all comments into the draft mitigation plan, the final mitigation plan will be prepared and submitted to the Geauga County Board of County Commissioners in hard copy and digital form. Each incorporated jurisdiction, as well as any township choosing to adopt this mitigation plan, will also receive a digital copy of the plan.

Each community that participates in this planning effort will be responsible for administering the various aspects of the mitigation plan within their respective community. It is the intention of the county and the participating jurisdictions to formally adopt this plan by passing a resolution or ordinance.

Implementation of the mitigation plan is crucial. The planning team must strategize effectively to put the mitigation plan into action. Geauga County must follow up to translate the goals and objectives developed during the planning process into action. It is recommended that a monitoring program be included in the mitigation plan.

3.7 NFIP Compliance Activities

Beginning in fiscal Year 2006, Geauga County underwent the floodplain map modernization process. Preliminary maps were released on September 13, 2007, and an Open House was conducted on January 28, 2008, for jurisdictions, government representatives and the public to review the updated maps. The period for which appeals or comments could be submitted was from February 19 – March 20, 2008. The letter of final determination was issued on December 16, 2008. The updated maps are scheduled to become effective on June 16, 2009, with Geauga County formally adopting these maps by way of resolution.

Under the Geauga County Floodplain Management Regulations, the county and its incorporated jurisdictions have appointed Floodplain Administrators. The duties of the Floodplain Administrator is to maintain and enforce these regulations. Also, as part of their regular tasks, Floodplain Administrators monitor the floodplains on a routine basis as well as provide community assistance to structure owners. This may include items such as encouraging that flood insurance is kept up to date. Below is a list of the Floodplain Administrators in Geauga County.

City of Chardon: Ben Young, City Manager
County of Geauga: Dan Spada, Chief Building Official (CBO)
Village of Middlefield: Leslie Gambosi-McCoy, Zoning Inspector
Village of South Russell: Laura Heilman, Building Commissioner

Communities that are participating in the National Flood Insurance Program (NFIP) are required to adopt and enforce regulations and codes that apply to new development in Special Flood Hazard Areas (SFHAs). These local floodplain management regulations must contain, at a minimum, NFIP requirements and standards that apply not only to new structures, but also to existing structures which are Substantially Improved (SI), or Substantially Damaged (SD) from any cause, whether natural or human-induced hazards.

According to 44 CFR 59.1, Substantial improvement means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. Likewise, substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. SI/SD requirements are also triggered when any combination of costs to repair and improvements to a structure in an SFHA equals or exceeds 50 percent of the structure's market value (excluding land value).

$$\frac{(Cost\ to\ Repair) + (Cost\ of\ Improvements)}{Market\ Value\ of\ Structure} \geq 50\ Percent$$

Enforcing the SI/SD requirements is a very important part of a community's floodplain management responsibilities. The purpose of the SI/SD requirements is to protect the property owner's investment and safety, and, over time, to reduce the total number of buildings that are exposed to flood damage, thus reducing the burden on taxpayers through the payment of disaster assistance. SD/SI requirements are enforced by the local floodplain administrator and monitored by the Ohio Department of Natural Resources (ODNR) Floodplain Management Program during Community Assistance Visits.

If a local floodplain administrator is overwhelmed by the number of SD/SI inspections after a large event, ODNR has developed a network of building code officials that are trained in conducting SD/SI field determinations. Help with SD/SI inspections can be requested through the county emergency management agency director. For more information regarding Substantial Improvement and Substantial Damage, please refer to FEMA's Substantial Improvement/ Substantial Damage Desk Reference, P-758 or contact the ODNR Floodplain Management Program.

4.0 Identification of Hazards and Risks

4.1 Hazard Analysis

The hazard analysis will identify those natural hazards that have affected and will continue to potentially affect Geauga County and its municipalities. There are five components of the hazard analysis: hazard identification, profile of a hazard event (extent and location), history and vulnerability analysis.

4.2 Hazard Identification

The research compiled during the initial hazard assessment was provided to the planning team for their review and assessment. The team evaluated all the hazards being considered and ranked them based on the number of historic events and cumulative damage that has occurred. The planning team reviewed the hazard vulnerability analysis during a planning meeting and chose the top hazards for further study. A copy of the hazard vulnerability assessment tool that was used during team discussion is available in Appendix F. The following list shows the planning team's ranking of hazards with number one being the hazard of the most concern:

1. Severe Storms (Hail, Wind, Lightning, Heavy Rain)
2. Winter Storms (Snow, Sleet, Ice)
3. Power Outages
4. Tornadoes
5. Floods (Flash, 100yr)
6. Extreme Temperatures (Heat, Cold)
7. Infectious Disease or Outbreak
8. Dam Failure
9. Earthquakes
10. Wildfires (Forest, Brush, Grass, Agricultural)
11. Droughts

4.3 Severe Storms (Hail, Wind, Lightning, Heavy Rain)

A severe storm is a form of turbulent weather characterized by the presence of lightning and its acoustic effect on the Earth's atmosphere known as thunder. Storms are usually accompanied by strong winds, heavy rain and sometimes snow, sleet, hail, or no precipitation at all. Those that cause hail to fall are called hailstorms.

Strong or severe thunderstorms may rotate and can generally form and develop in any particular geographic location, perhaps most frequently within areas located at mid-latitude when warm moist air collides with cooler air. Thunderstorms are responsible for the development and formation of many severe weather phenomena. Thunderstorms, and the phenomena that occur along with them, pose great hazards to populations and landscapes. Damage that results from thunderstorms is mainly inflicted by downburst winds, large hailstones, and flash flooding caused by heavy precipitation. Stronger thunderstorm cells are capable of producing tornadoes and waterspouts.

4.3.1 Location

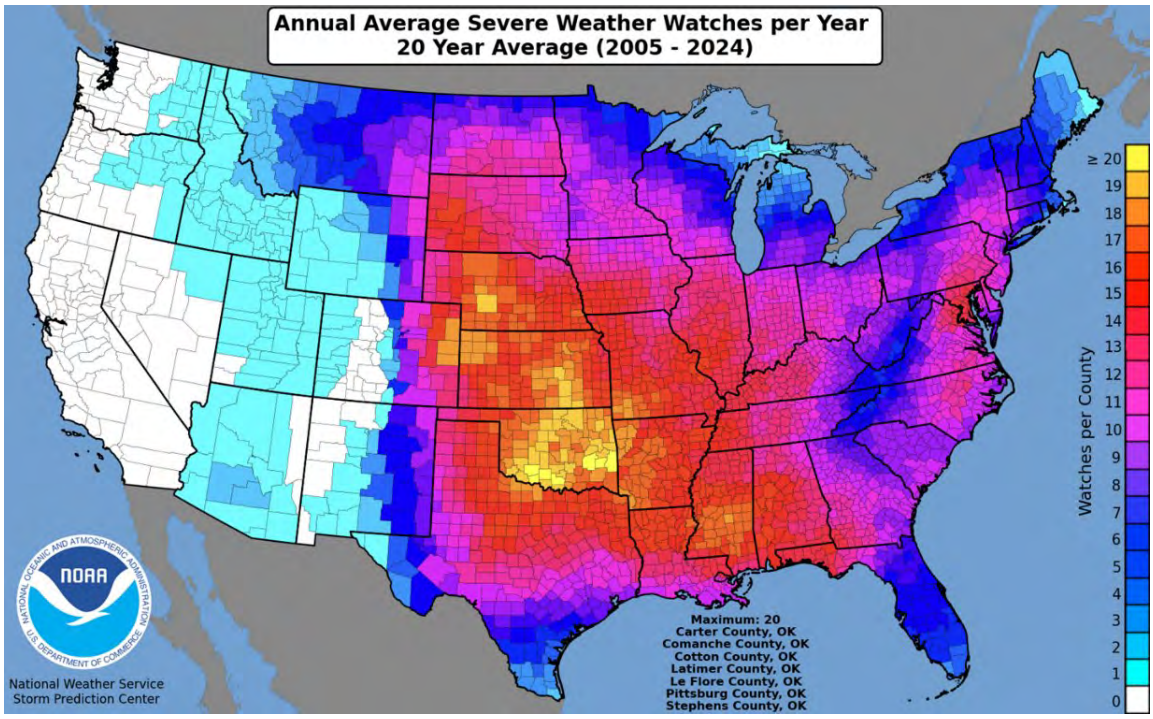
Severe Storms are countywide hazards and can affect all areas and jurisdictions.

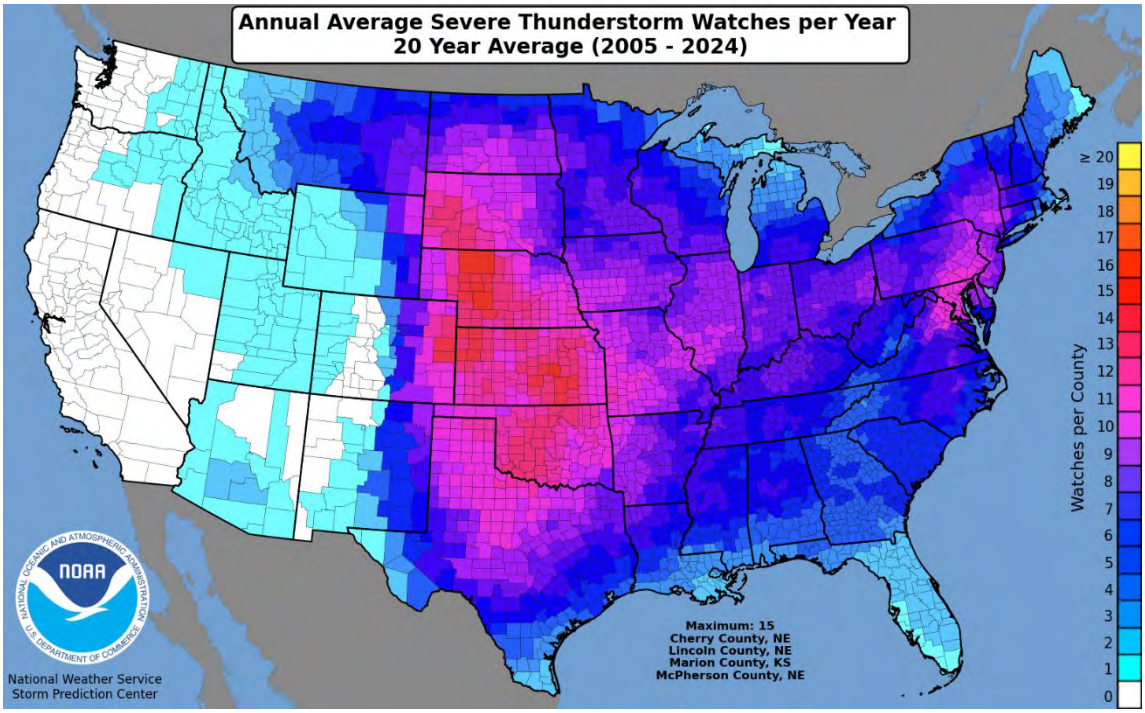
4.3.2 Extent

Severe storms are generally measured in terms of wind speeds, rainfall amounts or hail stone size and often occur simultaneously or in quick succession. According to the National Weather Service (NWS), a Thunderstorm is a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder. (Important to note that multiple hazards are present with thunderstorms, including lightning, thunder, hail, strong winds, heavy rainfall, and even tornadoes).

Further, according to the NWS, a Severe Thunderstorm is a thunderstorm that produces a tornado, winds of at least 58 mph (50knots), and/or hail at least 1" in diameter. Structural wind damage may imply the occurrence of a severe thunderstorm. A thunderstorm wind equal to or greater than 40 mph (35 knots) and/or hail of at least 1" is defined as approaching severe. (Important to note that all thunderstorms have lightning which may also impact the public, although it is not a factor in being considered severe). Rainfall rates of 2+ inches per hour are possible in some of the most well-developed storms.

Sometimes, the NWS may issue a “Severe Thunderstorm Warning”. The criteria for this official warning is Winds 50+ knots and/or hail 1” +. (See Figures 1 and 2 below)





4.3.3 Previous Occurrences

According to the National Centers for Environmental Information (NCEI) database, from 1950-2024 there were a total of 447 events of strong winds, heavy rains, hail, and lightning recorded for Geauga County. The bulk of the events either had impacts from hail or strong thunderstorm winds, while heavy rain and lightning related impacts were a bit lower. These have totaled an estimated $9.5 million dollars in property damages and $64,000 in crop damage across the county.

Looking at recent events (2010-present), there have been a total of 161 of these severe storm events recorded. This subset of events has totaled approximately $2.1 million in property damage and no recorded crop damage.

Table 1: 1950-2024 Severe Weather Event Breakdown for Geauga County, NWS	
Hail	100
Wind	259
Lightning	6
Heavy Rain	82

August 6, 2024 Severe Weather

A low-pressure system moves from the Midwest across the area, resulting in ideal conditions for severe weather development including all hazards. During this event, there were multiple tornadoes reported, macrobursts, and strong bowing lines of storms that resulted in widespread damage. A macroburst (a convective downdraft with an affected outflow area of at least 2.5 miles wide and peak winds lasting between 5 and 20 minutes) impacted portions of Geauga, Lake, and Cuyahoga Counties. The macroburst primarily caused damage to trees, wires, and power lines with isolated instances of structural damage due to trees falling. Based on observed damage, wind speed estimates were generally 70-90 mph with small pockets up to 100 mph. Specific areas impacted by this event in Geauga County included the Mulberry Corners and Fullerton (Russell) areas,

Chesterland, Chardon, and Claridon. In total, the estimated property damage in Geauga County was $75,000.

August 24-25, 2023 Damaging Severe Weather

Strong thunderstorms developed along a cold front across the Great Lakes region during the late evening hours of August 24, 2023. Strong storms developed over Michigan and became a fast-moving cluster of storms across the area, resulting in extensive wind damage and tornadoes. A number of measured and estimated straight line wind gusts over 75 mph occurred in the Cleveland area, resulting in an estimated 250,000 customers being left without power. There were two tornadoes that occurred in Geauga County with this event (one in Chardon and one in Middlefield), but that was not the only damage from strong winds observed. There were also numerous trees down in the area of Fowlers Mill and north of the Chardon tornado track, Newbury, and Burton. Multiple homes reported having damage from falling trees, ultimately resulting in an estimated $48,000 worth of property damage.

May 21, 2022 Severe Weather

A fast-moving convective complex passed across the southern Ontario Province of Canada during the morning hours, sending an outflow boundary south across Lake Erie, which became the focus for thunderstorm development across northern Ohio that afternoon. Simultaneously, a trough resulted in storm initiation over north central Ohio. These two areas of storms ultimately merged into a broken line of strong to severe thunderstorms that swept east through the evening and produced large hail, localized wind damage, and heavy rain. Hail as large as eggs (2” diameter) fell in central Geauga County with other reports of golf ball sized hail (1.75” diameter) throughout the county. There was no reported monetary property damage, injuries, or fatalities with this event in Geauga County.

November 15, 2020 Severe Weather

A warm front extending from a low over the western Great Lakes moved north across the area early that morning before the associated cold front moved east later that evening. The area was prime in the warm sector of the low, with all

atmospheric parameters present that are needed for severe weather development. Storms initially developed upstream over Indiana, quickly congealing into a fully developed line of thunderstorms as it moved east towards Ohio. This line tracked east, impacting all of northern Ohio with damaging wind gusts of 60+ mph. These winds caused widespread damage to trees, power poles, roofs, and more. There were also widespread power outages, some of which lasted 2+ days. Many of the damage reports in Geauga County that the NWS received came from South Russell, Chardon, Claridon, and Middlefield.

November 17, 2013 Severe Weather

A strong cold front moved across northern Ohio during the evening hours of November 17th. A line of strong to severe thunderstorms developed in advance of this front causing significant damage in some areas. At least three tornadoes touched down in Wood County. The strongest of the three, an EF2, crossed into Lucas County. A fourth tornado occurred in Ottawa County. All of the tornadoes downed trees and damaged homes and buildings. Strong non thunderstorm winds also occurred behind the cold front through the evening hours. Thunderstorm winds downed several trees in Chardon Township. State Route 87 was blocked by some of the fallen trees.

August 20, 2009 Severe Weather

A strong area of low pressure tracked eastward across the northern Great Lakes during the afternoon and evening of the 20th. Scattered showers and thunderstorms developed ahead of the cold front and tracked eastward across the area. Many of the thunderstorms became severe in the very warm and humid air mass in place across the region. The thunderstorms diminished during the evening hours. Trees and utility lines were reported down throughout the county.

October 28, 2006 Severe Weather

An area of low pressure developed along the Gulf Coast of the United States and tracked northeast through the Tennessee and Ohio Valleys through the 27th. This area of low pressure quickly intensified through the day on the 28th as it continued tracking into western New York State. Several severe thunderstorms developed during the afternoon and evening hours of the 28th, and the strong

intensification of the low brought about high winds across northeast Ohio and northwest Pennsylvania. The winds diminished during the overnight hours into the 29th as the area of low pressure moved into Quebec and away from the region. Numerous trees and utility poles were reported down across the southern portion of the county.

4.3.4 Probability

NOAA has recorded 447 historical occurrences of severe storm conditions. This shows a historical trend of 6.04 severe storm events each year that average $128,378 in property damages, and $864 in crop damages per event. Since 2010, the trend has been 10.73 severe storm events per year that average $140,000 in property damages per event, and no crop damages. Even though the increase in event frequency per event in recent years is much higher than the historical records, this is in part due to better record keeping by NOAA. There is also an increase in the average cost of damages per event, which may be expected due to inflation.

Based on this historical information, it can be reasonably concluded that there is a 100% probability that Geauga County will experience several severe storms each year. For further details on the NWS recordkeeping process, history, and definitions refer to the *National Weather Service Instruction 10-1605 March 23, 2016 Operations and Services Performance, NWSPD 10-16 Storm data Preparation.*

4.3.5 Vulnerability Assessment

Since severe storms are random in nature, the impact on the county's infrastructure is not limited to a certain area as might be expected with a geographically fixed hazard such as river flooding. Homes and businesses throughout the county are susceptible to severe storms. Winds, for example, can cause severe damage to mobile home parks and campgrounds if units are not properly secured to permanent structures.

The entire county population is susceptible and should be prepared for a severe storm. The populations located in mobile home parks and campgrounds should

take particular care to seek adequate shelter with approaching severe weather. Because the number of severe storms affecting Geauga County is high, the potential for death and injury is higher. As the population of the county continues to grow, there is more potential for loss of life and/or injury.

See the tables below showing the exposure and expected annual loss estimates (EAL) in Geauga County for Hail, Lightning, and Strong Winds. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries.

Table 2 (Below) on page 8 and Tables 3 & 4 (Below)on page 9

Geauga County NRI Hail
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$111,669**	**$22,624**	**$4,124**	**$138,417**
311800	$1,990,010,128	7,285	$721,121	$10,563	$1,807	$72	$12,442
311900	$1,699,778,282	6,574	$3,088,165	$9,022	$1,630	$309	$10,962
310800	$1,782,989,887	7,087	$928,609	$8,907	$1,647	$89	$10,643
312300	$1,389,973,954	4,644	$2,086,968	$8,166	$1,275	$231	$9,672
311700	$1,466,860,378	5,608	$153,236	$7,786	$1,391	$15	$9,192
310600	$1,394,673,049	6,017	$149,976	$7,398	$1,492	$15	$8,905
311500	$1,348,741,319	5,540	$415,106	$7,159	$1,374	$42	$8,575
311400	$1,282,044,504	5,244	$1,512,888	$6,805	$1,301	$151	$8,257
311300	$918,214,264	4,379	$3,310,464	$5,287	$1,175	$360	$6,822
311600	$1,002,898,717	3,972	$72,757	$5,323	$985	$7	$6,316
310700	$1,001,818,456	3,940	$333,363	$5,244	$958	$32	$6,234
312201	$1,451,798,072	5,504	$25,612	$5,283	$936	$2	$6,221
312100	$593,705,464	4,446	$5,746,582	$3,488	$1,220	$636	$5,344
312000	$609,343,180	2,778	$5,212,924	$3,500	$753	$574	$4,826
310900	$638,456,287	3,103	$3,653,977	$3,279	$730	$353	$4,361
312203	$866,854,167	4,676	$1,396,952	$3,283	$830	$100	$4,213
312202	$861,569,693	4,232	$743,378	$3,135	$720	$51	$3,906
311000	$449,502,098	3,657	$3,666,935	$2,271	$876	$357	$3,504
312400	$420,347,874	2,629	$2,384,015	$2,469	$722	$264	$3,455
310100	$400,274,461	2,144	$3,737,425	$1,689	$423	$297	$2,409
310200	$381,494,427	1,938	$2,076,156	$1,610	$382	$165	$2,157

Geauga County NRI Lightning
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$16,699**	**$104,458**	**$121,156**
311800	$1,990,010,128	7,285	$1,503	$7,917	$9,421
310800	$1,782,989,887	7,087	$1,375	$7,914	$9,289
310600	$1,394,673,049	6,017	$1,210	$7,545	$8,755
311500	$1,348,741,319	5,540	$1,194	$7,091	$8,285
311900	$1,699,778,282	6,574	$1,249	$6,972	$8,222
311700	$1,466,860,378	5,608	$1,193	$6,575	$7,768
311400	$1,282,044,504	5,244	$995	$5,874	$6,869
312201	$1,451,798,072	5,504	$1,026	$5,672	$6,698
312300	$1,389,973,954	4,644	$1,024	$4,937	$5,961
310700	$1,001,818,456	3,940	$835	$4,723	$5,558
312203	$866,854,167	4,676	$631	$4,906	$5,537
311600	$1,002,898,717	3,972	$776	$4,450	$5,226
312202	$861,569,693	4,232	$640	$4,542	$5,182
311300	$918,214,264	4,379	$635	$4,416	$5,051
312100	$593,705,464	4,446	$414	$4,564	$4,978
311000	$449,502,098	3,657	$322	$3,790	$4,112
310900	$638,456,287	3,103	$442	$3,120	$3,562
312400	$420,347,874	2,629	$311	$2,824	$3,135
312000	$609,343,180	2,778	$392	$2,613	$3,006
310100	$400,274,461	2,144	$259	$2,013	$2,272
310200	$381,494,427	1,938	$272	$1,998	$2,270

Geauga County NRI Strong Winds
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$203,479**	**$157,517**	**$1,279**	**$362,275**
311800	$1,990,010,128	7285	$721,121	$19,168	$12,540	$23	$31,731
310800	$1,782,989,887	7087	$928,609	$16,372	$11,587	$28	$27,988
311900	$1,699,778,282	6574	$3,088,165	$16,372	$11,316	$97	$27,786
311700	$1,466,860,378	5608	$153,236	$14,129	$9,653	$5	$23,787
310600	$1,394,673,049	6017	$149,976	$13,427	$10,354	$5	$23,785
312300	$1,389,973,954	4644	$2,086,968	$14,478	$8,645	$71	$23,194
311500	$1,348,741,319	5540	$415,106	$12,991	$9,536	$13	$22,541
311400	$1,282,044,504	5244	$1,512,888	$12,349	$9,027	$48	$21,423
312201	$1,451,798,072	5504	$25,612	$10,495	$7,111	$1	$17,607
311300	$918,214,264	4379	$3,310,464	$9,416	$8,006	$111	$17,534
311600	$1,002,898,717	3972	$72,757	$9,660	$6,837	$2	$16,500
310700	$1,001,818,456	3940	$333,363	$9,544	$6,675	$10	$16,229
312100	$593,705,464	4446	$5,746,582	$6,184	$8,276	$196	$14,656
312203	$866,854,167	4676	$1,396,952	$6,309	$6,085	$33	$12,427
312202	$861,569,693	4232	$743,378	$6,228	$5,467	$18	$11,713
312000	$609,343,180	2778	$5,212,924	$6,236	$5,118	$177	$11,531
310900	$638,456,287	3103	$3,653,977	$5,927	$5,050	$110	$11,088
311000	$449,502,098	3657	$3,666,935	$4,013	$5,924	$109	$10,046
312400	$420,347,874	2629	$2,384,015	$4,378	$4,894	$81	$9,354
310100	$400,274,461	2144	$3,737,425	$2,970	$2,843	$91	$5,904
310200	$381,494,427	1938	$2,076,156	$2,831	$2,570	$50	$5,451

4.4 Winter Storms (Snow, Sleet, Ice)

A winter storm is an event in which the varieties of precipitation are formed that only occur at low temperatures, such as snow or sleet, or a rainstorm where ground temperatures are low enough to allow ice to form (i.e. freezing rain).

4.4.1 Location

Winter and Ice Storms are countywide hazards and can affect all areas and jurisdictions.

4.4.2 Extent

Winter Storms are typically measured by amounts of precipitation (i.e. snowfall, freezing rain and ice) and associated with winds and extreme cold temperatures. Snowfall in excess of 6-inches is typically considered disruptive. Massive snowstorms with heavy winds and other conditions are known as blizzards. Heavy showers of freezing rain and ice are one of the most dangerous types of winter storms, as little as 0.04 inches of freezing rain can paralyze a region making driving extremely hazardous, downing trees and damaging utility lines.

According to the National Weather Service (NWS), a Winter Storm is a weather phenomenon that produces heavy snow, significant ice accumulations, or a combination of mixed precipitation. Sometimes, the NWS may issue official warnings related to winter storm events. The following are a list of the types of winter storm warnings and their criteria:

-Winter Storm Watch: Issued when a winter weather event has a 50% chance or more of exceeding warning criteria.

-Winter Storm Warning/Lake Effect Snow Warning: Issued for winter weather events that will have one or more predominant hazards, such as a mix of snow and blowing snow, snow and ice, snow and sleet, sleet, ice, or snow). For snow specifically, they are issued when accumulations are expected to be 6 inches or more. For ice specifically, they are issued when accumulations are expected to be ¼ inch or more.

-Ice Storm Warning: Issued when ice accumulation of ¼ inch or more is expected in less than a 12-hour period.
Snow Squall Warning: Issued when enhanced snow bands are producing visibilities ¼ mile or less and there is sub-freezing ambient road temperatures (or plunging temperatures behind an arctic front).
These are not issued if there is already a Winter Storm or other winter weather headline in effect.

-Blizzard Warning: Sustained wind or frequent gusts greater than or equal to 35 mph which is accompanied by falling and/or blowing snow that frequently reduces visibility to ¼ mile or less for more than 3 hours.
Winter Weather Advisory: Issued for winter weather that has an average snowfall of more than 4 inches, but less than 6 inches and/or sleet/ice accumulations less than ¼ of an inch and/or blowing snow with intermittent visibility reductions less than ¼ mile. Also issued for lake effect snow accumulations between 4-6 inches. Also issued for freezing rain less than ¼"

4.4.3 Previous Occurrences

Geauga County is located within the "snow belt" region of northeast Ohio. The county is located near the northern edge of the Appalachian Plateau in close proximity to Lake Erie. Moisture laden winds crossing the lake are forced to rise as they reach the Geauga County uplands and as a result, significant snow falls during the winter, typically over 100 inches annually.

According to the National Centers for Environmental Information (NCEI) Events Database, from 1950-2024 there were a total of 168 winter weather events recorded in Geauga County. These events include those labeled as blizzard (0), heavy snow (62), lake-effect snow (42), winter storm (62), and winter weather events (2). All of these events have totaled an estimated $24.4 million in property damage. There was no reported crop damage given the fact that most of these events occurred during the non-growing season.

Looking at recent events (2010 to present), there have been a total of 63 winter related events with 1 heavy snow event, 28 lake effect snow events, 33 winter

storm events, and 1 winter weather event. This subset of events had a total estimated cost of property damage of $9.7 million with no crop damage.

Table 5: 1950-2024 Winter Weather Event Breakdown for Geauga County, NWS	
Heavy Snow	62
Lake Effect Snow	42
Winter Storm	62
Winter Weather Events	2

Late November to early December 2024 Historic Lake Effect Storm

A prolonged, historic lake effect snow event took place during late November into early December of 2024. This early season storm ramped up from November 28th into the 29th with widespread snowfall rates of up to 2 inches per hour occurring. A westerly wind across Lake Erie resulted in the bulk of impacts being confined to the primary snowbelt, including across northern Geauga County. There was a notable break in snowfall on November 30th before heavy snow returned on December 1st. Through the event, poor road conditions and low visibility made travel difficult to impossible in the heaviest bands. This event also impacted Thanksgiving travel. There was a tight gradient of snowfall across the county with highest totals across northern Geauga County then quickly decreasing south. For the entire event, the highest event total snowfall in the area was observed in Madison (Lake County) where 33” of snow fell. Other recorded totals included 22.6” in southern Thompson, 14.7” in Montville, and 9.5” in Chardon.

January 16-17, 2022 Snowstorm

A strong low-pressure system tracked from the Gulf Coast of the United States north along the spine of the Appalachian Mountains, placing northeast Ohio on

the northwest (cold) side of the storm. The unique set up of this storm allowed for ample moisture across the area and resulted in very heavy snow. To add to the overall set up, general flow across an open Lake Erie allowed lake effect processes to enhance bands pushing south. Snowfall rates at times were 1 to 2 inches per hour which lasted for several hours. These prolonged conditions resulted in nearly impassable roadways for the morning commute on January 17, 2022. There were many reports of accidents and stranded vehicles across the area. Impacts were quite extensive, but some impacts were mitigated by the fact that it was a holiday, and many schools and businesses were closed. With this event, areas outside of the snowbelt generally saw 4 to 6 inches of snow, however with lake effect enhancing rates, snowfall totals across the snowbelt ranged from 11 to 28 inches. The highest snowfall total occurred in Thompson Township where 28" fell. Other totals across Geauga County included 23.9" in Hambden Township, 21" in Chardon, 20.5" in Montville, 19.3" in Munson Township, 19.2" in Auburn Township, and 17.2" in Burton.

Christmas Snowstorm 2020

The Christmas Snowstorm of 2020 was a two-part winter storm that impacted the area. Initially, a low-pressure system moved northeast up the spine of the Appalachian Mountains, resulting in moderate to heavy snowfall on Christmas Eve. At times, snowfall rates with this storm were 1 to 1.5 inches per hour, resulting in significant impacts to holiday travel across the area. The general snowfall totals with this first round of snow was between 6 to 12 inches. This low quickly shifted northeast on Christmas Day, allowing for a surface trough to become established with a predominant west to northwest flow. At this point in December, Lake Erie remained wide open allowing for the development of lake effect snow showers. A dominant band developed, impacting the primary and secondary snowbelts in Ohio with snowfall rates of 2 to 3 inches per hour over the span of several hours. The snowfall totals from this event for Geauga County included 20.4" in Chardon, 19.7" in Hambden Township, 18.8" in Thompson, 15.6" in Burton, and 13.3" in Montville. The estimated cost of property damage from this event was approximately $30,000.

Nov 30 to Dec 2, 2020 Major Winter Storm

The early season winter storm in 2020 started as rain as a low-pressure system tracked out of the southern plains toward the Ohio Valley. As this low-pressure center shifted east of the area, cold air pushing east across the region allowed for a transition to snow from west to east during the evening of November 30th. By the morning of December 1st, widespread wet, heavy snow was falling with snowfall rates of up to one inch per hour and reduced visibility to ¼ mile or less. This significantly impacted travel as this heavy snow quickly accumulated on roads, which lacked pre-treatment due to the prior rainfall. This heavy snow quickly became problematic on area trees, resulting in some trees falling and impacting area roads, power lines, and structures. Across Geauga County, tree damage was extreme with nearly 25,000 customers left without power by the morning of December 1, 2020 which was not restored for several days. Many schools and businesses were closed during this event due to the hazardous weather conditions and lack of power. In Geauga County, snowfall totals ranged from 15 to 26 inches. The peak snowfall total was observed in Hambden Township with 26.3" falling. Additional reports included 24.8" in Chardon, 24.4" in Thompson Township, 22.2" in Burton, 20.5" in Montville, and 17" in Middlefield. The estimated cost of property damage from this event was approximately $500,000.

December 8-10, 2016 Lake Effect Snow

Cold air pushing south across Lake Erie allowed for lake effect snow showers to begin to develop on December 8, 2016. Initial snowfall was confined to near the lakeshore, however that evening the winds became more westerly to northwesterly, allowing the heaviest bands to push further inland. The heaviest snowfall across Geauga County occurred during the daytime hours on December 9th when some locations saw over a foot of new snowfall. Snowfall persisted to some extent through December 10 with periods of moderate to heavy snow that caused quick accumulations. In addition to snowfall totals, gusty winds resulted in reduced visibilities to less than ¼ mile at times and ample blowing and drifting snow. Numerous accidents were reported across the area which caused significant traffic problems at times. There was a notable spread in snowfall totals for this three-day event, but some observed totals in Geauga County included 23.9" in Thompson, 28.5" in South Madison, 27" in Chardon, 23.5" in

Montville, 22.1” in Hambden Township and 22” in Claridon Township. The estimated cost of property damage from this event was approximately $500,000.

January 17-19, 2016 Heavy Snow Event

An arctic cold front pushed through the region on January 17th, ushering in the coldest air of the 2015-16 season. As a result, heavy lake effect snow developed behind the departing cold front with a prolonged period of west to northwest flow across Lake Erie. At that point, Lake Erie still remained primarily open, allowing for abundant moisture to continue to feed the snow showers. The heaviest snowfall fell on the morning of January 18th and again on the morning of January 19th when snowfall rates exceeded 1 inch per hour. Heavy snowfall rates reduced visibilities to near 0 miles at times, causing considerable impacts to travel with numerous accidents reported. In addition, gusty winds caused blowing and drifting snow and also dropped wind chill values to -10°F or colder, making the clean up more difficult. Many schools in northeast Ohio were closed due to this multi-hazard event. In Geauga County, three-day snowfall totals were notable with 29” in Chardon, 20” in South Madison, and 18” in Chesterland. The estimated cost of property damage from this event was approximately $400,000.

First Quarter Snowstorms, January-March 2014

January

An area of strong low pressure moved east across the Great Lakes on January 25th. A cold front trailing this low-pressure system swept east across northern Ohio during the morning hours. Snow developed ahead of this front during the early morning and then intensified around daybreak as the front moved through. Southwest winds gusted to as much as 35 mph ahead of the front. Northwest winds developed behind the frontal passage and by midday, the snow had transitioned to lake effect snow showers. The snow showers intensified just before the evening commute causing near blizzard conditions at times. Visibilities were less than a quarter mile for most of the late afternoon and early evening hours. Snowfall rates of 1 to 2 inches per hour crippled the Cleveland Metropolitan area and made for a rough evening commute. The snow lessened around 7 pm and tapered to flurries shortly after that. In Geauga County, a peak total of 12.5 inches was reported in Thompson along with 11.1 inches in Chagrin

Falls and 8.0 inches in Burton. In addition, the gusty winds caused considerable blowing and drifting. Dozens of accidents were reported across the area and commute times were two to three times normal.

February

A low-pressure system developed near the Gulf Coast of the United States on February 4th and tracked northeast through the Tennessee and Ohio Valleys toward Pittsburgh, Pa., by the morning of February 5th. As this system tracked northeast, it brought heavy snow to northern Ohio. The heaviest snow occurred on an arc extending from Findlay to Toledo and then eastward along the Lake Erie shoreline with accumulations of 6 to 11 inches. Accumulations in Geauga County ranged from 6 to 9 inches. Temperatures were in the mid-20s during the snowstorm and northeast winds shifted to the northwest by the afternoon of the 5th with speeds increasing to 15 to 20 mph with gusts up to 25 mph. The snow tapered off from west to east during the afternoon of February 5th.

A fast-moving area of low pressure raced east across the lower Great Lakes during the evening hours of February 17th and the morning hours of the 18th. Snow associated with this low began over Northeast Ohio during the evening of the 17th. The snow quickly intensified and then continued through the early morning hours of the 18th. Snow was heavy at times with visibilities less than a quarter mile and accumulations of an inch or more per hour. The snow quickly tapered off from west to east beginning around daybreak on the 18th and by mid-morning had ended across the entire area. Southwest winds gusted to as much as 35 mph during the first half of the event. Winds became westerly and slowly diminished as the surface low passed just to the north. Considerable blowing and drifting was reported causing difficult road conditions. The morning commute was very slow and most of the schools in Northeast Ohio closed on the 18th. Snowfall totals from Lorain County eastward across the Cleveland and Akron Metropolitan areas to Trumbull County ranged from 6 to 8 inches. The peak total reported in the county was 8.6 inches at South Russell.

March

Mixed precipitation spread across the area early on March 12th and then transitioned to snow from west to east. Much of the area also saw a period of freezing rain. The snow increased in intensity during the late morning hours with visibilities less than one half mile. North to northeast winds increased as the low passed to the south of the area. Winds gusted to more than 40 mph during the early afternoon hours. Winds continued to gust to more than 30 mph through the evening hours. Strong winds combined with snow created significant blowing and drifting and treacherous driving conditions. Snowfall totals of 6 to 8 inches were reported along with a glaze of ice in many areas. Schools across most of northern Ohio were closed on the 12th and the evening commute was very difficult. Dozens of accidents and some power outages were reported.

December 31, 2013 to January 3, 2014 Winter Storm

A clipper system moving east across the Tennessee Valley impacted the area to start off the 2014 year, bringing a widespread 1 to 3 inches of snowfall initially. A lingering surface trough moved into western Pennsylvania allowing for a northerly flow to develop across Lake Erie and marked a transition to predominantly lake effect snow by the morning of January 2, 2014. Snowfall intensities increased with these bands of lake effect, quickly reducing visibilities to ¼ miles or less for several hours. Snowfall rates at the peak approached nearly 2 inches per hour resulting in numerous accidents. On top of that, gusty winds resulted in blowing and drifting snow, further enhancing the impacts. Much of the area received 6 to 8 inches of snowfall from Lorain County east to Ashtabula, including portions of Geauga County. Some totals in Geauga County included 9.3 inches in Thompson and 8.5 inches in Montville during the peak snowfall. Event totals across Geauga County ranged from 10 to 17 inches. The estimated cost of property damage from this event was approximately $250,000.

Record Snowstorm, March 4-9, 2008 (EM-3286)

During the early morning hours of March 4th, low pressure was located over the lower Mississippi Valley. Precipitation began spreading into the area during the early morning hours of the 4th. Most locations across the area had surface temperatures at or just below freezing. In contrast, air aloft over the region was

above freezing causing precipitation to be mainly in the form of freezing rain. Temperatures throughout the day did not rise significantly. The freezing rain tapered off in some locations in northern Ohio during the early afternoon. Across far northeast Ohio surface temperatures rose a little above freezing allowing for a period of just rain during the afternoon hours. As the late afternoon hours approached, freezing rain picked up again and areas seeing just rain saw a changeover back to freezing rain. Around sunset the freezing rain began to quickly freeze on roadways and in a short period of time, numerous accidents were reported. Also, during the evening, the freezing rain was actually moderate to heavy at times as trained spotters reported thunder throughout northern Ohio. As the evening progressed, colder air aloft built over the area allowing for freezing rain to turn to sleet and back over to snow late on the 4th and into the overnight hours into the 5th.

A mixture of sleet and snow began in Geauga County before daybreak on March 5th. This mixture changed to freezing rain by midday and then continued into the early morning hours of March 6th. Conditions quickly deteriorated after sunset as surface temperatures dropped off a few degrees. Over a quarter inch of ice accumulation was reported on roads and sidewalks by early evening. By the time the freezing rain changed to light snow during the early morning hours of the 5th, between one half and three quarters of an inch of ice had accumulated on parts of the county. Thunder and lightning were reported between 7 and 9 pm. The snow tapered to flurries during the morning hours of the 6th after an inch or two of accumulation. Scattered power outages occurred across the county as a result of the freezing rain. Some electric customers in the county were without power for as much as three days. Extensive tree damage was reported in the county as well. Many accidents were reported during this event. Property damage was estimated at $2,000,000.

Later, snow began to fall during the morning hours of the 7th and continued for the next day and a half. Snow tapered off a bit during the evening hours of the 7th but picked up again overnight and continued moderate to heavy at times through much of the day on the 8th. Gusty winds around 30 mph at times caused considerable blowing and drifting of snow which made some roads across the area nearly impassable. Numerous accidents and stranded vehicles were reported

across the area. Storm totals reported from trained spotters throughout the county included 23.0 inches in Thompson, 18.0 inches in Chardon, 17.0 inches in Burton, and 15.3 inches in Middlefield. Property damage was estimated at $1,000,000. As a result of this entire event, Geauga County received $196,506.79 in public assistance funds.

State of Emergency Declared April 3, 2005

As temperatures changed, snow began heavier on the morning of April 3, 2005 and winds were running from 20 to upwards of 50 miles per hour causing extreme blowing and drifting. This was most evident in the mid to eastern portion of the county where Hambden, Thompson, Montville, Huntsburg and Claridon townships were hardest hit. Because of the higher temperatures snow was quite heavy causing the snapping of trees and the bringing down many power lines. At the height of the storm, there were over 150,000 people in the entire affected area without power.

There were many issues with people trying to travel. There were approximately twenty separate accidents. Another issue was there were no county phones operational in the dispatch center. A care center was established by the American Red Cross at the Montville Recreation Center.

Due to higher temperatures and the threat of flooding within the county the State of Emergency remained until April 7, 2005.

4.4.4 Probability

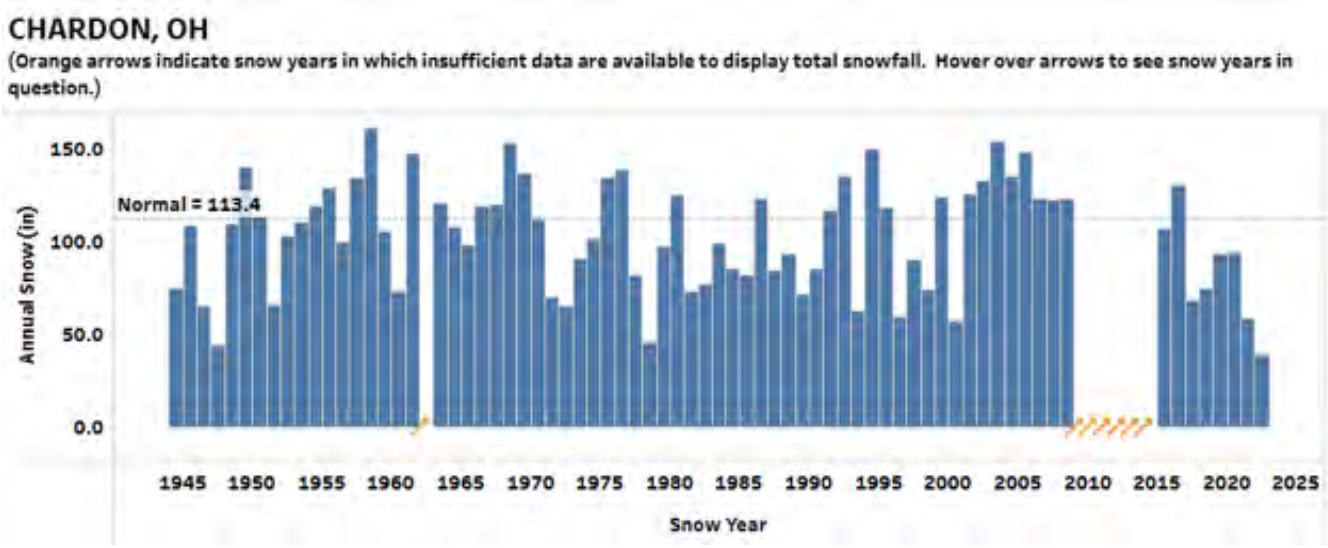
NOAA has recorded 168 historical occurrences of winter weather storm conditions, specifically 63 events since 2010. This shows a historical trend of 2.27 serious winter events each year that average $329,729 in property damages per event. Since 2010, the trend has been 4.2 serious winter events per year that average $646,666 in property damages per event. Even though the increase in both event frequency and damages per event in recent years is much higher than the historical records, this is in large part due to better record keeping by NOAA and inflation. Based on this historical information, it can be reasonably concluded that there is a 100% probability that Geauga County will experience winter weather storms each year. For further details on the NWS recordkeeping

process, history, and definitions please refer to the *National Weather Service Instruction 10-1605 March 23, 2016 Operations and Services Performance, NWSPD 10-16 Storm data Preparation.*

4.4.5 Vulnerability Assessment

Since Geauga County is located within the "snow belt" and is highly susceptible to winter storms, which encompass snow, ice and extremely cold temperatures. Because the area receives a significant amount of snowfall, all of the structures erected in the county are susceptible to damage if not designed to the proper snow loading parameters. Snow and ice mostly affect humans and animals. It also affects the freedom of movement throughout the county and the northeast Ohio region. Therefore, winter storms are countywide, and the entire county population is susceptible and should be prepared.

Snow, ice and extreme cold temperatures will always be a natural hazard that has potential to cause significant property and crop damage within Geauga County. Because the number of winter events affecting Geauga County is large, the potential for death and injury is high. As the population of the county continues to grow, as forecasted by the 2010 Census, there is more potential for loss of life and/or injury. In addition, the economic losses a community suffers during a winter storm event, which can leave behind three to five feet of snow, can be high.



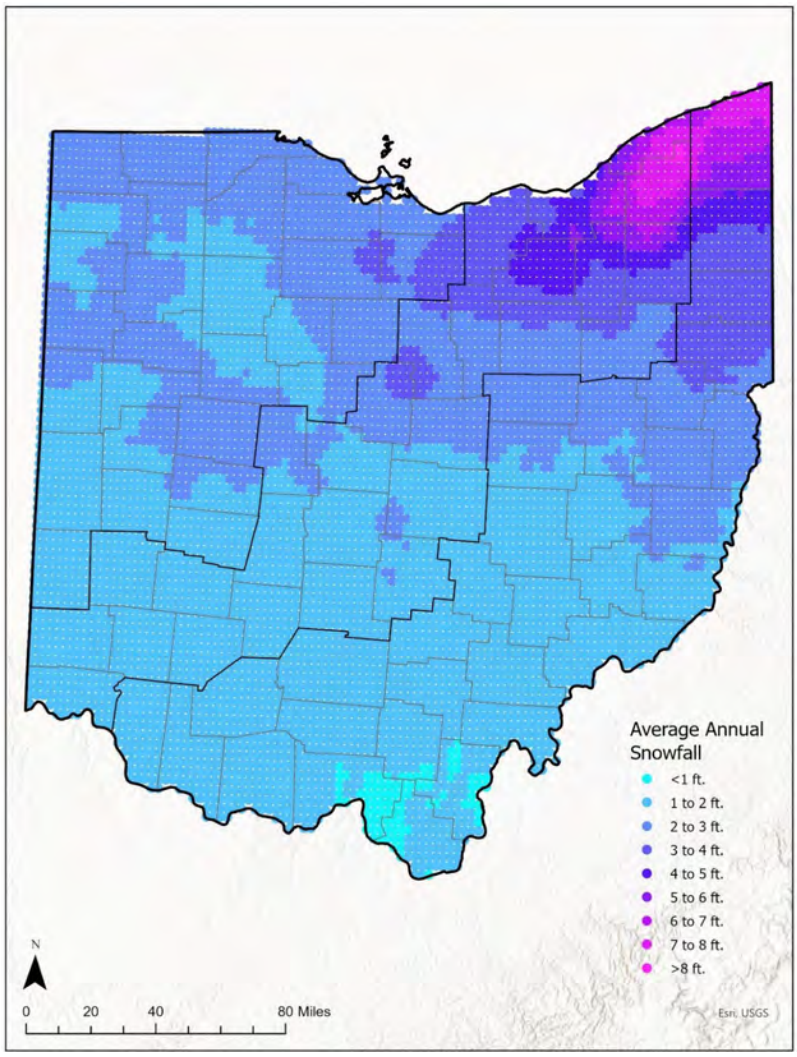


Figure 3 (Above) *Midwest Regional Climate Center Annual Snowfall for Chardon, Ohio (accessed 4/2025)*

Figure 4 (Left) *2024 State of Ohio Hazard Mitigation Plan*

See the tables below showing the exposure and expected annual loss estimates (EAL) in Geauga County for ice storms and winter weather. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries.

Table 6 & 7 (Below) Page 22

Geauga County NRI Ice Storm
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Total)
ALL	**$21,949,362,511**	**95,389**	**$46,521**	**$605**	**$47,126**
311800	$1,990,010,128	7,285	$4,122	$45	$4,167
310800	$1,782,989,887	7,087	$3,693	$44	$3,737
311900	$1,699,778,282	6,574	$3,521	$40	$3,561
311700	$1,464,874,228	5,600	$3,034	$34	$3,069
312201	$1,451,798,072	5,504	$3,007	$34	$3,041
312300	$1,389,973,954	4,644	$2,926	$29	$2,955
310600	$1,394,673,049	6,017	$2,889	$37	$2,926
311500	$1,348,741,319	5,540	$2,794	$34	$2,828
311400	$1,282,044,504	5,244	$2,656	$32	$2,688
311600	$1,002,898,717	3,972	$2,077	$24	$2,102
310700	$1,001,818,456	3,940	$2,075	$24	$2,099
312203	$866,854,167	4,676	$1,950	$31	$1,981
311300	$918,214,264	4,379	$1,926	$27	$1,954
312202	$861,569,693	4,232	$1,785	$26	$1,811
310900	$638,456,287	3,103	$1,391	$20	$1,412
312000	$609,343,180	2,778	$1,278	$17	$1,295
312100	$593,705,464	4,446	$1,250	$28	$1,277
310100	$400,274,461	2,144	$1,110	$18	$1,128
311000	$449,502,098	3,657	$1,095	$26	$1,122
310200	$381,494,427	1,938	$1,058	$16	$1,074
312400	$420,347,874	2,629	$885	$16	$901

Geauga County NRI Winter Weather
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$203,479**	**$157,517**	**$1,279**	**$362,275**
311800	$1,990,010,128	7,285	$721,121	$19,168	$12,540	$23	$31,731
310800	$1,782,989,887	7,087	$928,609	$16,372	$11,587	$28	$27,988
311900	$1,699,778,282	6,574	$3,088,165	$16,372	$11,316	$97	$27,786
311700	$1,466,860,378	5,608	$153,236	$14,129	$9,653	$5	$23,787
310600	$1,394,673,049	6,017	$149,976	$13,427	$10,354	$5	$23,785
312300	$1,389,973,954	4,644	$2,086,968	$14,478	$8,645	$71	$23,194
311500	$1,348,741,319	5,540	$415,106	$12,991	$9,536	$13	$22,541
311400	$1,282,044,504	5,244	$1,512,888	$12,349	$9,027	$48	$21,423
312201	$1,451,798,072	5,504	$25,612	$10,495	$7,111	$1	$17,607
311300	$918,214,264	4,379	$3,310,464	$9,416	$8,006	$111	$17,534
311600	$1,002,898,717	3,972	$72,757	$9,660	$6,837	$2	$16,500
310700	$1,001,818,456	3,940	$333,363	$9,544	$6,675	$10	$16,229
312100	$593,705,464	4,446	$5,746,582	$6,184	$8,276	$196	$14,656
312203	$866,854,167	4,676	$1,396,952	$6,309	$6,085	$33	$12,427
312202	$861,569,693	4,232	$743,378	$6,228	$5,467	$18	$11,713
312000	$609,343,180	2,778	$5,212,924	$6,236	$5,118	$177	$11,531
310900	$638,456,287	3,103	$3,653,977	$5,927	$5,050	$110	$11,088
311000	$449,502,098	3,657	$3,666,935	$4,013	$5,924	$109	$10,046
312400	$420,347,874	2,629	$2,384,015	$4,378	$4,894	$81	$9,354
310100	$400,274,461	2,144	$3,737,425	$2,970	$2,843	$91	$5,904
310200	$381,494,427	1,938	$2,076,156	$2,831	$2,570	$50	$5,451

4.5 Power Outages

Power Outage is usually an unanticipated interruption in the supply of electrical service to a specific area. Power Outages can be caused by a variety of factors, including weather events, equipment failure, accidents, and even human error. The most common causes include storms, high winds, heavy snow and ice, and lightning strikes, which cause damage to power lines and equipment.

Natural Causes

Severe Weather:
Storms, hurricanes, blizzards, and other extreme weather conditions can damage power lines, substations, and equipment, leading to outages.

Trees and Vegetation:
Trees falling on power lines or tree limbs coming in contact with wires can cause outages.

Earthquakes:
Earthquakes can damage electrical infrastructure and power lines, causing widespread outages.

Lightning:
Lightning strikes can directly damage power equipment or cause damage through tree strikes, leading to outages.

Human/Other Factors

Animals:
Squirrels, other small animals, and even birds can cause short circuits by getting into contact with power lines.
Vandalism:
Intentional damage to power lines, equipment, or substations can cause outages.

Excavation:
Unintentional damage to underground power cables during excavation work can lead to power outages.

Planned Maintenance:
Power outages are sometimes planned for maintenance and upgrades but are generally communicated in advance.

The duration of a Power Outage could be short-term or long-term, depending on many complicating factors such as weather conditions, extent of damage, and available service/repair crews. Outages are particularly hazardous during times when there is little or no sunlight, and during times of extreme temperatures or weather conditions. In addition, outages can be life threating to citizens in Geauga County who use electricity-dependent medical devices to sustain life. Such devices may include ventilators, BiPAP machines, IV infusion pumps, suction pumps, at-home dialysis equipment, electric wheelchairs, electric bed equipment, oxygen concentrators, etc.

4.5.1 Location

Power Outages can be isolated to a localized area that affect only a certain municipality/community or across wider regions throughout the county that can affect multiple communities and jurisdictions.

4.5.2 Extent

First Energy Corp. is the primary electrical service provider for Geauga County, which provides service to approximately 39,520 customers. (The Illuminating Company & Ohio Edison). Power Outages may be considered hazardous to the Geauga County population as whole based on complicating criteria. Some factors that are considered are the location of the outages, the number of customers affected, the time of day of the outage, the weather conditions, and the expected duration of the outage. Outage duration is considered when determining the need for possible warming/cooling centers for daytime use, or even overnight sheltering.

4.5.3 Previous Occurrences

August 6, 2024 Tornado near Mulberry Corners

On August 6th, a cold front drifted southward from northern OH to southern OH, separating two warm and humid air masses, with the one south of the boundary more pronounced. An initial line of storms developed over the Mahoning Valley, which merged with a separate line of convections moving east in the late afternoon hours. This formed a more extensive line of convection, with a few supercells out ahead of this line of storms. As a result of these storms, an EF1 tornado with estimated wind speeds of 110 mph entered Geauga County just west-southwest of the intersection of Hidden Valley Drive and Tibbets Road on the northwest side of Chesterland. Numerous trees were uprooted and snapped, some of which caused minor damage to several homes. The tornado dissipated after crossing Wilson Mills Road on the northeast side of Chesterland. The estimated cost of damage from this tornado was $20,000. This resulted in about 68% of First Energy customers in the county losing power. Thousands of utility workers came into the region to help with storm damage and restoration. In about 72 hours, the number of those without power in the county dropped to 32%. It took another week for those 32% of remaining customers to get their power restored. There was extensive tree damage, but fortunately no extensive damage to dwellings. Also, it was fortunate that this time of extended power outage was not during a time of extreme heat, cold, or another exasperating hazards.

Power Outage from February 24th-26th, 2019

Geauga County again sustained another winter storm, bringing a line of showers and winds exceeding 65mph, causing roughly 4,800 homes and businesses to lose power. Notably, nursing homes and mobile home parks also lost power. A community warming center was opened in the county and then transitioned into an overnight shelter.

Power Outage from March 1st-4th, 2018

On the evening of March 1st Geauga County sustained a winter storm causing approximately 4,400 homes or businesses to lose electrical service. There was

severe rain, which quickly transitioned into snow later in the evening. The accumulation of several inches of snow and icy conditions caused the power restoration process to be delayed for several days. Two community warming centers were opened.

4.5.4 Probability

There is always a possibility of a power outage. Since there are outages and interruptions in electrical service every year, and multiple times a year, the probability would be 100%. However, the severity of the outage is the issue, not the occurrence or quantity of outages themselves. While a few customers may have an outage on any given day, due to any number of factors, it is less frequent that hundreds or thousands of customers lose power in a single instance, though there does appear to be multiple occurrences of that severity each year. Statistically, the most hazardous months for power outages would be that of June, July, and August across the United States. This seems to coincide with severe storms and wind events, but events could happen at any time. One final consideration related to the frequency of outages is that the grid is becoming increasingly old and worn. Nationwide, from 2000-2014, the number of outages due to grid failures doubled every five years. Without significant improvements to the current electrical grid, it should be expected that longer sustained outages will continue to increase in future years.

4.5.5 Vulnerability Assessment

Power Outages are random and sporadic and vary greatly in extent and duration. Homes and businesses all throughout Geauga County are vulnerable to power outages. The entire population of the county is susceptible and should be prepared for an outage. Though power outages are becoming more frequent, they do not necessarily cause life threatening harm on their own. Typically, outages that last for less than two hours are not emergency situations. Widespread and long-lasting outages, combined with hazardous weather conditions, are the combination that could lead to potential injury or death in vulnerable populations. All citizens should be aware of the dangers of a power outage and should be aware of their unique needs that are created when an outage happens, and where to seek help to temporarily fill those needs. Residences and businesses in the

southern communities of the Geauga County (Auburn, Bainbridge, Parkman and Troy) have experienced the most significant outages in recent storms.

Table 8: Geauga County Electricity Dependent Medical Device Population	
Zip Code	**Electricity Dependent Medicare Beneficiaries**
Geauga County, Ohio	763
44021	52
44023	126
44024	234
44026	94
44046	23
44062	95
44064	16
44065	43
44072	37
44080	11
44086	32

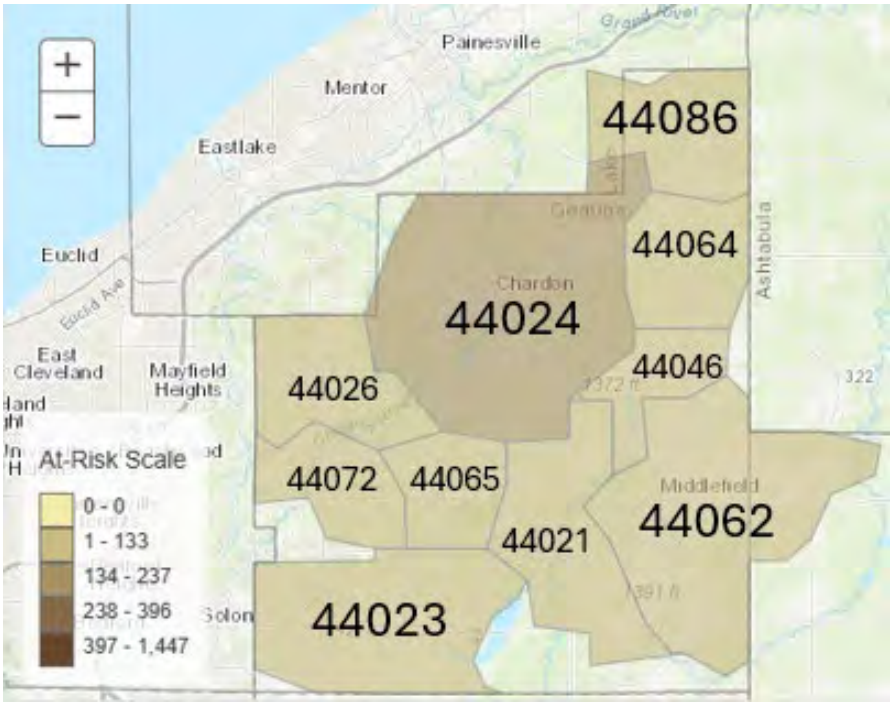
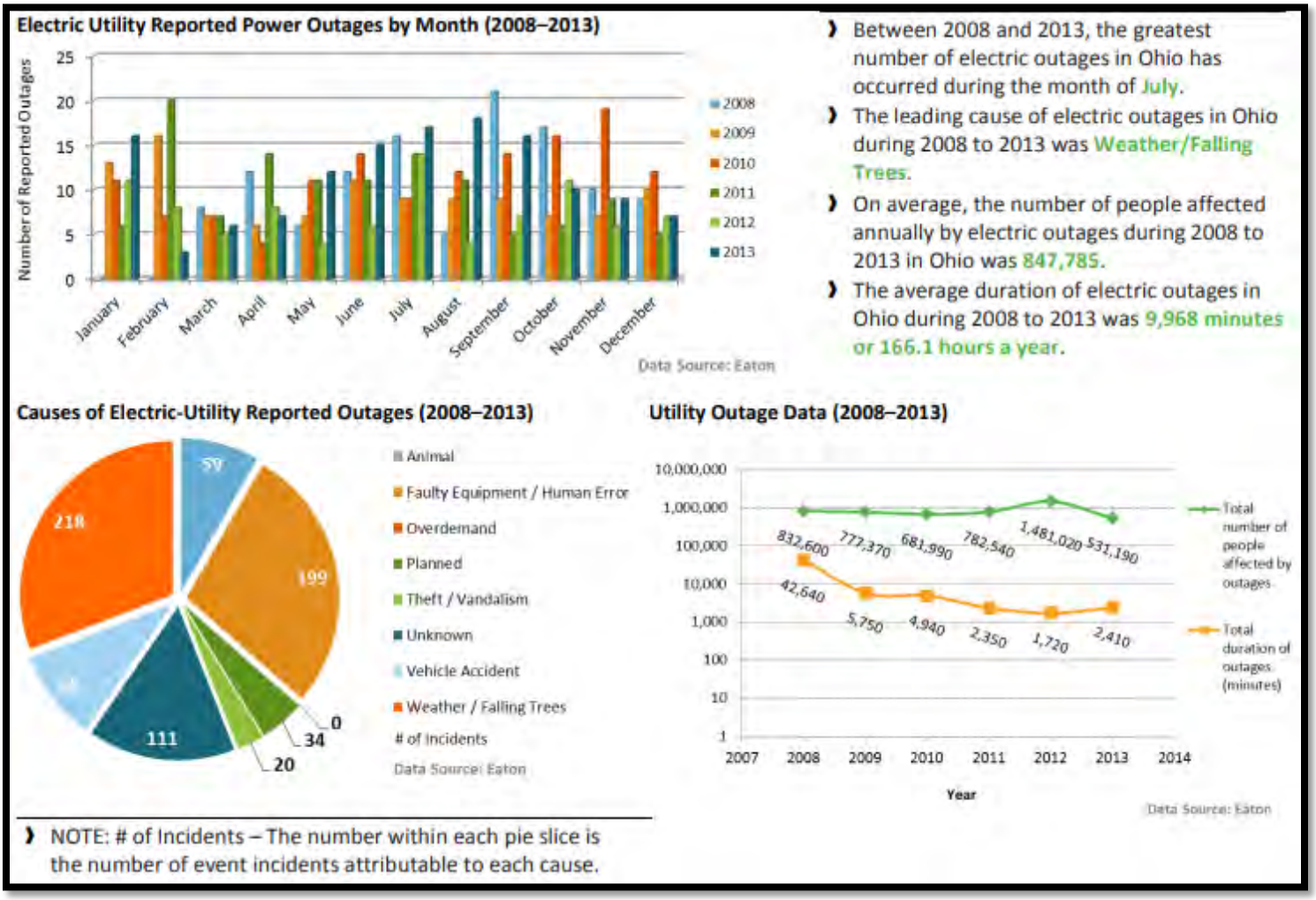


Table 8 (Page 27) Geauga County Electricity Dependent Medical Device Population from *Health and Human Services emPOWER Program (accessed 05/2025 https://empowerprogram.hhs.gov/empowermap)*

Figure 5 (Page 27) Geauga County Electricity Dependent Medical Device Population from *Health and Human Services emPOWER Program (accessed 05/2025 https://empowerprogram.hhs.gov/empowermap)*

Figure 6 (Below) Power Outage Data for Ohio, *Department of Energy (DOE), Office of Electricity Delivery & Energy Reliability (OE)*



4.6 Tornadoes

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long. While tornadoes are relatively short lived in duration, they are intensely focused, making them one of the most destructive natural hazards. Tornadoes are measured based on the Fujita Damage Scale, which was developed by Theodore Fujita to relate the speed of winds associated with tornadoes to the damage they cause. The currently used Enhanced Fujita Scale can be found below (Figure 7).

Fujita Scale 3-Second Gust (mph)		Damage Levels	Enhanced Fujita Scale 3-Second Gust (mph)	
F-0	45-78	Light - tree branches down	EF-0	65-85
F-1	79-117	Moderate - roof damage	EF-1	86-110
F-2	118-161	Considerable - houses damaged	EF-2	111-135
F-3	162-209	Severe - buildings damaged	EF-3	136-165
F-4	210-261	Devastating - structures leveled	EF-4	166-200
F-5	262-317	Incredible - whole towns destroyed	EF-5	Over 200

Table 2.3.a - Source: http://www.spc.noaa.gov/faq/tornado/ef-scale.html

4.6.1 Location

Tornadoes are a county-wide hazard that can affect all areas and jurisdictions.

4.6.2 Extent

Ohio is located in Zone IV, according to the FEMA Wind Zones Map, which is the highest category for wind zones in the United States. Wind speed can reach up to 250 mph during extreme conditions in this zone. High wind events are one of the most common types of hazards in Geauga County and affect all areas of the county. To be classified as a “high wind event”, winds must be in excess of 52 mph. Windstorms in Geauga County have been known to cause moderate property damage, but no loss of life has occurred as a result of severe winds. Ohio is located on the eastern side of what is commonly known as “Tornado Alley”. Geauga County is located in a Zone IV wind zone and as such, tornadoes have been identified as a hazard in Geauga County. This wind zone places Geauga County in a category where we could experience devastating tornadoes

with wind speeds up to 250 mph, which indicates that significant damage will be sustained to structures with solid foundations.

According to the National Weather Service (NWS), a tornado is a violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena.

The NWS may issue a Tornado Watch or Warning. A Tornado Watch simply means that the conditions are right for a tornado to form. The Tornado Warning means that there has been indicated by or there has been a reliable report of a tornado. (See Figure 8 below for Wind Zones, and Figure 9 on page 31 for Tornado Watches)

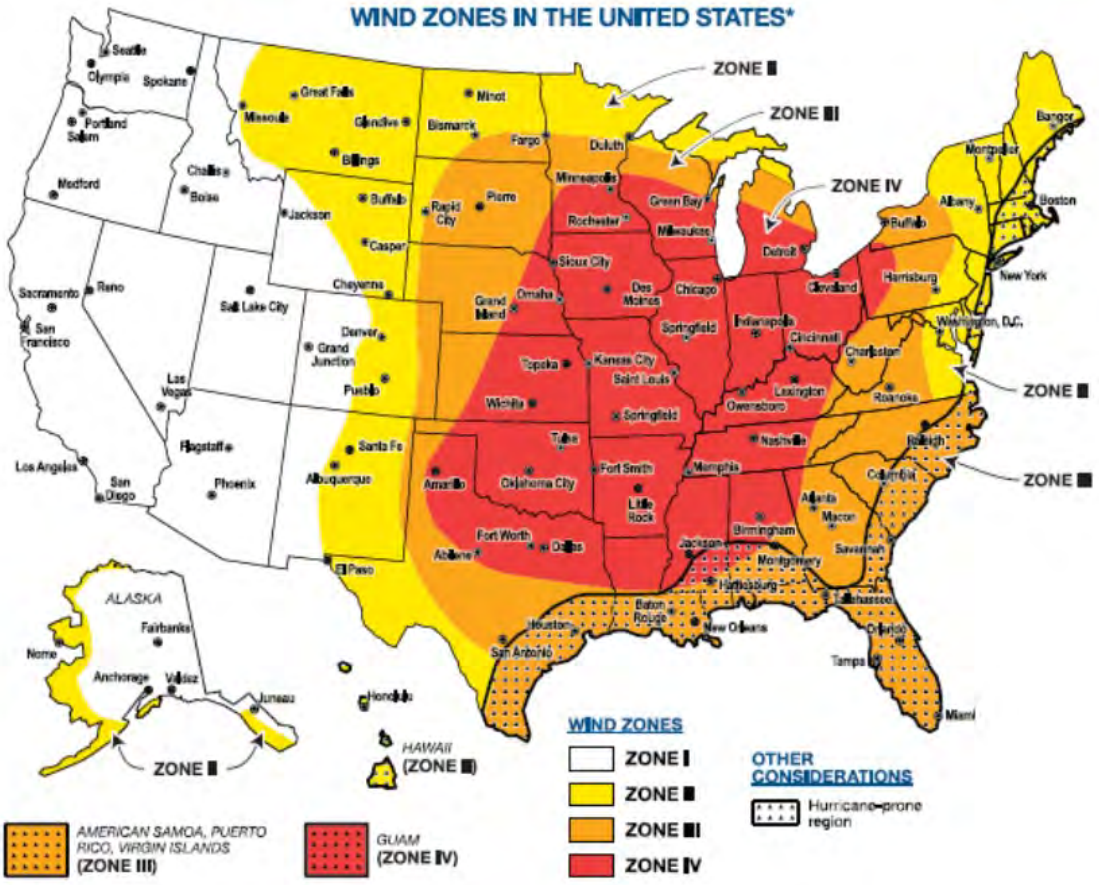
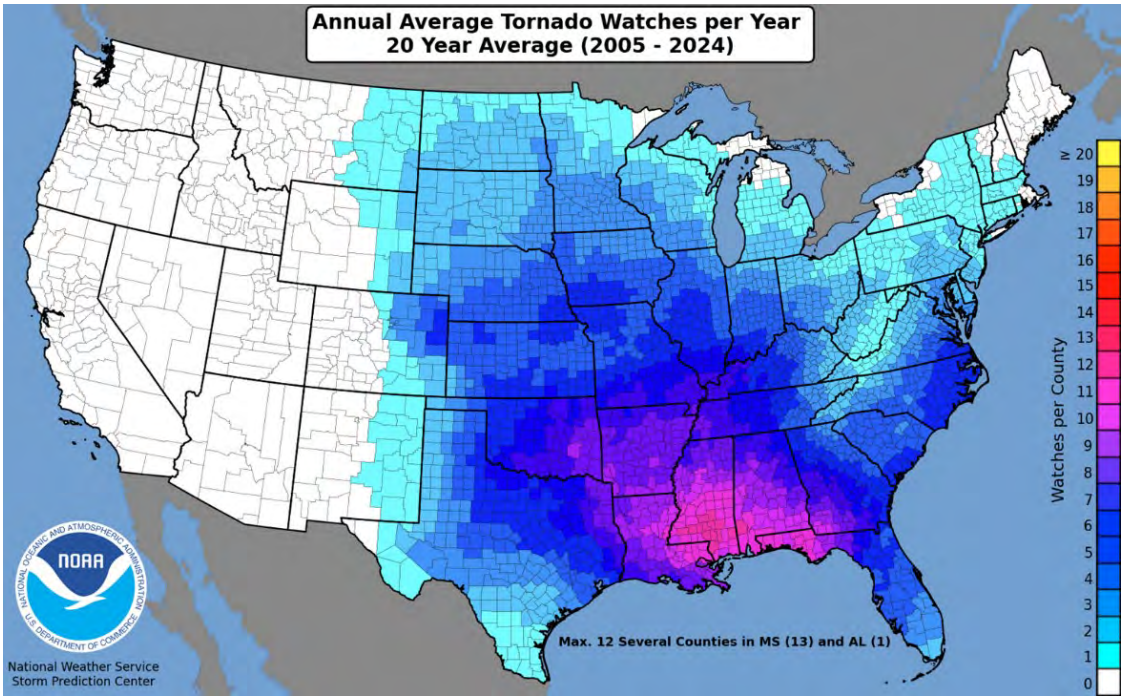


Figure 2-7: Wind Zones in the United States*



4.6.3 Previous Occurrences

Historically, from 1/1/1950 to 12/31/2024, there have been 17 tornado events recorded in Geauga County. These events have totaled approximately $2.6 million in property damages, but no damage has been recorded to crops. In addition, only 1 tornado event resulted in 4 injuries, which occurred in May 1995. The other 16 events had no injuries or fatalities reported. Since 2010, there have been 8 of these tornadic events resulting in approximately $723,000 in property damage.

Table 9: Tornado Events by Magnitude for Geauga County, NWS	
E/EF-0	3
E/EF-1	9
E/EF-2	4
E/EF-3	0
E/EF-4	0
E/EF-5	0

***There is one unknown rating from the tornado that occurred on August 22, 1964*

August 6, 2024 Tornado near Mulberry Corners

On August 6th, a cold front drifted southward from northern Ohio separating two warm and humid air masses, with the one south of the boundary more pronounced. An initial line of storms developed over the Mahoning Valley, which merged with a separate line of convections moving east in the late afternoon hours. This formed a more extensive line of convection, with a few supercells out ahead of this line of storms. As a result of these storms, an EF1 tornado with estimated wind speeds of 110 mph entered Geauga County just west-southwest of the intersection of Hidden Valley Drive and Tibbets Road on the northwest side of Chesterland. Numerous trees were uprooted and snapped, some of which caused minor damage to several homes. The tornado dissipated after crossing Wilson Mills Road on the northeast side of Chesterland. The estimated cost of damage from this tornado was $20,000.

August 24, 2023 Tornadoes

On August 24th, strong thunderstorms developed along a cold front across the Central and Lower Great Lakes region during the late evening and overnight hours of August 24th into the 25th. These thunderstorms moved into a very moist and warm airmass across the area, triggering a cluster of thunderstorms known as a Mesoscale Convective System (MCS) within a primed atmosphere. This MCS was limited to impacting Lake Erie and northern Ohio, spawning 12 mesovortex-related tornadoes and quite a bit of straight-line wind damage. In Geauga County, there were a total of 3 tornadoes, two EF-1 and one EF-2. The total estimated cost of damage between these 3 tornadoes was $200,000.

Tornado #1: Chardon EF-1

Just after midnight, an EF-1 with estimated winds of 110 mph tracked just southeast of Chardon, lasting for approximately 1.19 miles. The tornado began near the intersection of Aquilla Road and Tewksbury Lane where there was significant damage to trees and powerlines. It then tracked southeast through the Meadow Wood Drive cul-de-sac, where it caused extensive damage to trees, including numerous snapped and uprooted trees. The tornado then generally tracked eastward, impacting on a residential property along the west side of Taylor Well Road, where a swatch of trees was snapped and uprooted. The

tornado lasted a bit longer before lifting just east of Taylor Wells Road. The estimated damage cost from this tornado was $50,000.

Tornado #2: Middlefield EF-2

Around 12:22 AM on August 25th, a brief (0.70-mile track) tornado touched down near the intersection of Burton-Windsor Road and State Route 608 where it caused minor damage to trees. It then tracked southeast, quickly intensified before it completely destroyed a barn and caused extensive damage to the property. The entire barn was lofted and thrown approximately 150 yards to the southeast. The entire outer structure composed of cinder blocks also collapsed. Adjacent barns also received extensive damage to the sides and roof. The tornado then traveled south-southeast before lifting near the intersection of State Route 608 and Nauvoo Road where additional tree damage was noted on a property. The estimated damage cost from this tornado was $65,000.

Tornado #3: Bainbridge EF-1

Shortly after midnight, an EF-1 tornado with estimated winds of 90 mph briefly touched down in southwest Geauga County. The tornado began over the west part of Laurel Springs subdivision where it caused extensive tree damage with two uprooted trees on homes and approximately 100 trees blown down, twisted, and snapped in different directions. The tornado tracked east-southeast blowing down several power poles and trees. One tree landed on a home along Taylor May Road before it dissipated. The estimated damage cost from this tornado was $85,000.

September 20, 2018

On September 20, 2018, a warm front lifted north across the area, allowing for unseasonably warm and humid conditions. This allowed the atmosphere to become conducive to severe weather development. There were quite a few scattered thunderstorms that developed along the front in the afternoon, with a couple of them becoming severe. One storm became severe and produced two tornadoes in northeast Ohio. The total estimated cost of damage between these 3 tornadoes was $190,000.

Tornado #1: Middlefield EF-1

A tornado touched down approximately 3 miles northeast of Middlefield Township near the intersection of Hayes and Nauvoo Roads. This tornado tracked southeast for nearly 2.5 miles towards neighboring Trumbull County. Before crossing the county border, two mobile homes along State Route 87 just west of Bundysburg Road were damaged. One of the homes was overturned and the second lost roofing and walls. No injuries were reported. The total damage path seemed to be intermittent with numerous trees and limbs snapped. The estimated damage cost from this tornado was $125,000.

Tornado #2: Huntsburg EF-1

Another weak tornado touched down approximately 3 miles north of Middlefield near the intersection of Burton Windsor and Durkee Roads in Huntsburg Township. Trees and large limbs were snapped in the area before it continued south-southeast. A building under construction along State Route 528 was heavily damaged. The tornado dissipated as it approached State Route 87 about ½ mile east of State Route 528. The total damage path seemed to be intermittent with numerous trees and limbs snapped. The estimated damage cost from this tornado was $75,000.

August 24, 2011

The first confirmed tornado in Geauga County since 1996 occurred on 8/24/2011 west of Chesterland. An EF1 tornado touched down west of Chesterland just to the north of the intersection of U.S. Route 322 and Caves Road. The tornado then traveled east southeast through Chesterland and finally lifted north of the intersection of Sperry and Cedar Roads. The damage path was nearly three miles in length and up to 50 yards in width. Dozens of trees were down along the damaged path. Some homes and businesses in Chesterland sustained roof and siding damage. Many windows were also blown out. This tornado caused approximately $300,000 in damage; there were nine additional tornadoes prior to 2011.

May 28, 1995

May 1995 Tornado Outbreak Sequence was a series of tornado events that occurred from May 6 through May 27, 1995. Thirteen deaths occurred due to the outbreak. Nearly 300 tornadoes (six ranked up to F4) occurred during this period from the Central U.S. through the Southeast and into the Mid-Atlantic. Within Geauga County an F2 tornado touched down on May 28, 1995 in Middlefield. The F2 tornado caused $500,000 to $5M dollars in damage though there were no fatalities.

July 12, 1992

The 28 tornadoes that occurred in Ohio on Sunday, July 12, 1992, went into the record books as the most recorded in a single day. Fortunately, summer tornadoes tend to be weaker than spring storms and none of the 44 tornadoes during July 1992 were violent. This contributed to the absence of fatalities and only 36 injuries from the record number of tornadoes. The Tornado History Project website indicates that an EF1 tornado hit Geauga County causing an estimated $5-$50,000 damage.

4.6.4 Probability

NOAA has recorded 17 historical occurrences of tornadoes, specifically 8 events since 2010. This shows a historical trend of 0.23 tornados each year that average $152,941 in property damage per event. Since 2010, the trend has been 0.53 serious tornado events per year that average $90,375 in property damage per event. Even though the increase in event frequency in recent years is much higher than the historical records, this is in part due to better record keeping by NOAA. The estimated damage per event has decreased compared to the historical average, which could reflect better building standards in the locations affected by these tornadoes.

Based on this historical information, it can be reasonably concluded that there is at least a 23% chance that Geauga County will experience a tornado event each year. For further details on the NWS recordkeeping process, history, and definitions please refer to the *National Weather Service Instruction 10-1605*

March 23, 2016, Operations and Services Performance, NWSPD 10-16 Storm data Preparation.

4.6.5 Vulnerability Assessment

Since tornadoes are random in nature, no one area of the county is more susceptible to infrastructure damage than another area. As would be the nature of a tornado, the location of the tornado will largely impact the location of the damage. Since the occurrence of tornadoes is low, the effect on the infrastructure will also be low with only a few houses or businesses needing repairs. The overall population impact within the county is relatively low. Several homes may need repair, but typically homeowners will have insurance to cover these expenses and will not suffer any long-term financial hardship. The populations located in mobile home parks and campgrounds should take particular care to seek adequate permanent shelter with approaching severe weather.

Recent tornadoes have caused a moderate amount of debris, but fortunately, there has been very little uninsured damage to primary dwellings, which is the requirement for disaster relief. Though severe storms that produce tornadoes have caused more debris damage in Geauga County than other single events, no recent incident has met the uninsured damages threshold.

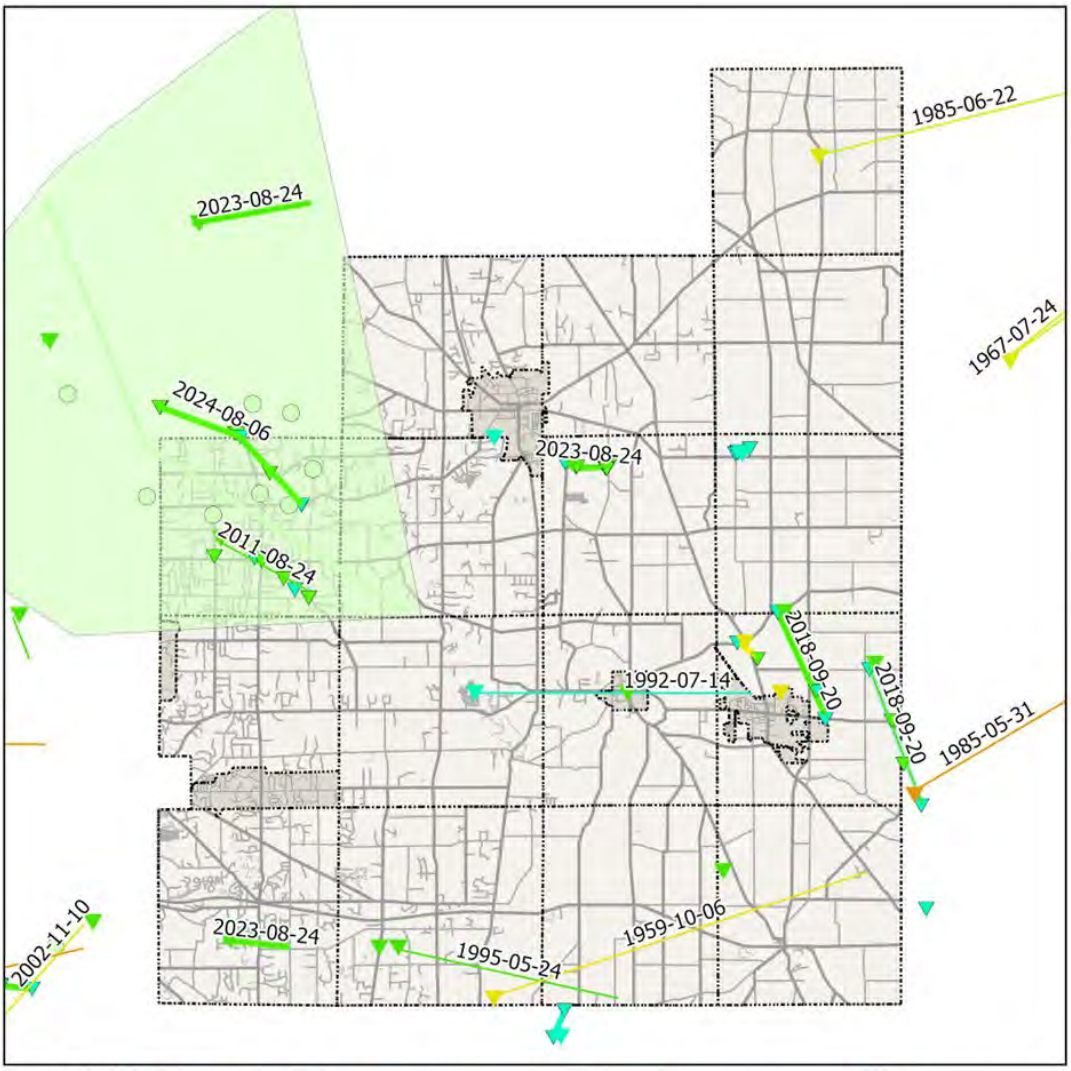
Apart from the 1995 tornado that stuck the Village of Middlefield, the county has not suffered significant property damage due to tornadoes. Therefore, there is a low impact relative to property damage. Due to the infrequency of major tornado events in Geauga County, the overall impact on the economy is very low. As the population of the county continues to grow, there is more potential for loss of life and/or injury. However, the frequency and severity of tornadoes in the county is such that even with a growing population, the potential for death or injury will still be relatively low.

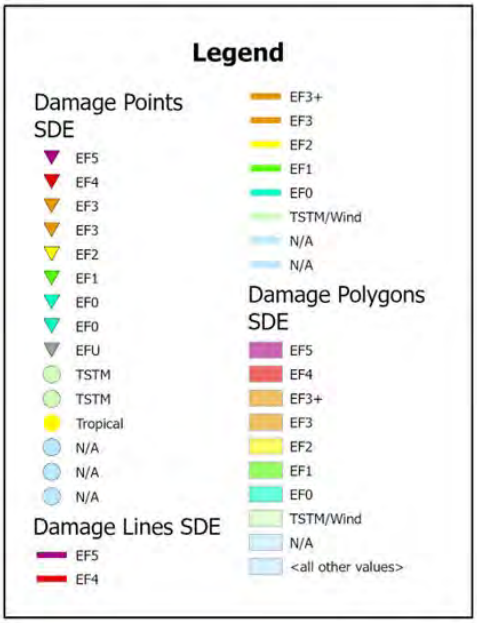
See the table below showing the exposure and expected annual loss estimates (EAL) in Geauga County for tornadoes. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries. Also below, see further information on historical tornadoes in Geauga County.

Table 10 (Below)

Geauga County NRI Tornado
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$889,894**	**$541,944**	**$194**	**$1,432,032**
311800	$1,990,010,128	7285	$721,121	$78,842	$38,658	$3	$117,503
310800	$1,782,989,887	7087	$928,609	$68,677	$36,990	$5	$105,672
311900	$1,699,778,282	6574	$3,088,165	$67,343	$34,884	$14	$102,241
312300	$1,389,973,954	4644	$2,086,968	$66,880	$32,031	$9	$98,920
311700	$1,466,860,378	5608	$153,236	$58,103	$29,751	$1	$87,854
310600	$1,394,673,049	6017	$149,976	$55,229	$31,918	$1	$87,148
311500	$1,348,741,319	5540	$415,106	$53,430	$29,394	$2	$82,826
311400	$1,282,044,504	5244	$1,512,888	$50,811	$27,834	$8	$78,654
312201	$1,451,798,072	5504	$25,612	$48,979	$26,826	$0	$75,805
311300	$918,214,264	4379	$3,310,464	$42,578	$28,557	$18	$71,154
311600	$1,002,898,717	3972	$72,757	$39,723	$21,071	$0	$60,794
310700	$1,001,818,456	3940	$333,363	$39,428	$20,797	$2	$60,227
312100	$593,705,464	4446	$5,746,582	$28,566	$30,665	$27	$59,259
312203	$866,854,167	4676	$1,396,952	$31,595	$25,021	$6	$56,622
312202	$861,569,693	4232	$743,378	$29,067	$20,627	$3	$49,697
312000	$609,343,180	2778	$5,212,924	$28,117	$18,558	$26	$46,700
311000	$449,502,098	3657	$3,666,935	$20,800	$24,758	$15	$45,573
310900	$638,456,287	3103	$3,653,977	$26,767	$18,456	$18	$45,241
312400	$420,347,874	2629	$2,384,015	$20,227	$18,135	$10	$38,372
310100	$400,274,461	2144	$3,737,425	$17,776	$14,184	$15	$31,975
310200	$381,494,427	1938	$2,076,156	$16,957	$12,827	$11	$29,795





Source: NOAA: https://services.dat.noaa.gov/arcgis/rest/services/nws_damageassessmenttoolkit/

Figure 10 (Left)
Historic Geauga County Tornado Events (NOAA)

4.7 Floods (Flash, 100yr)

A flood is an overflow of water that submerges land which is normally dry. Flooding may occur as an overflow of water from water bodies, such as a river or lake, in which the water overtops or breaks levees, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an aerial flood. While the size of a lake or other body of water will vary with seasonal changes in precipitation and snow melt, these changes in size are unlikely to be considered significant unless they flood property or drown domestic animals.

Floods can also occur in rivers when the flow rate exceeds the capacity of the river channel, particularly at bends or meanders in the waterway. Floods often cause damage to homes and businesses if they are in the natural flood plains of rivers. While river flood damage can be eliminated by moving away from rivers and other bodies of water, people have traditionally lived and worked by rivers because the land is usually flat and fertile and because rivers provide easy travel and access to commerce and industry.

Some floods develop slowly, while others such as flash floods can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins.

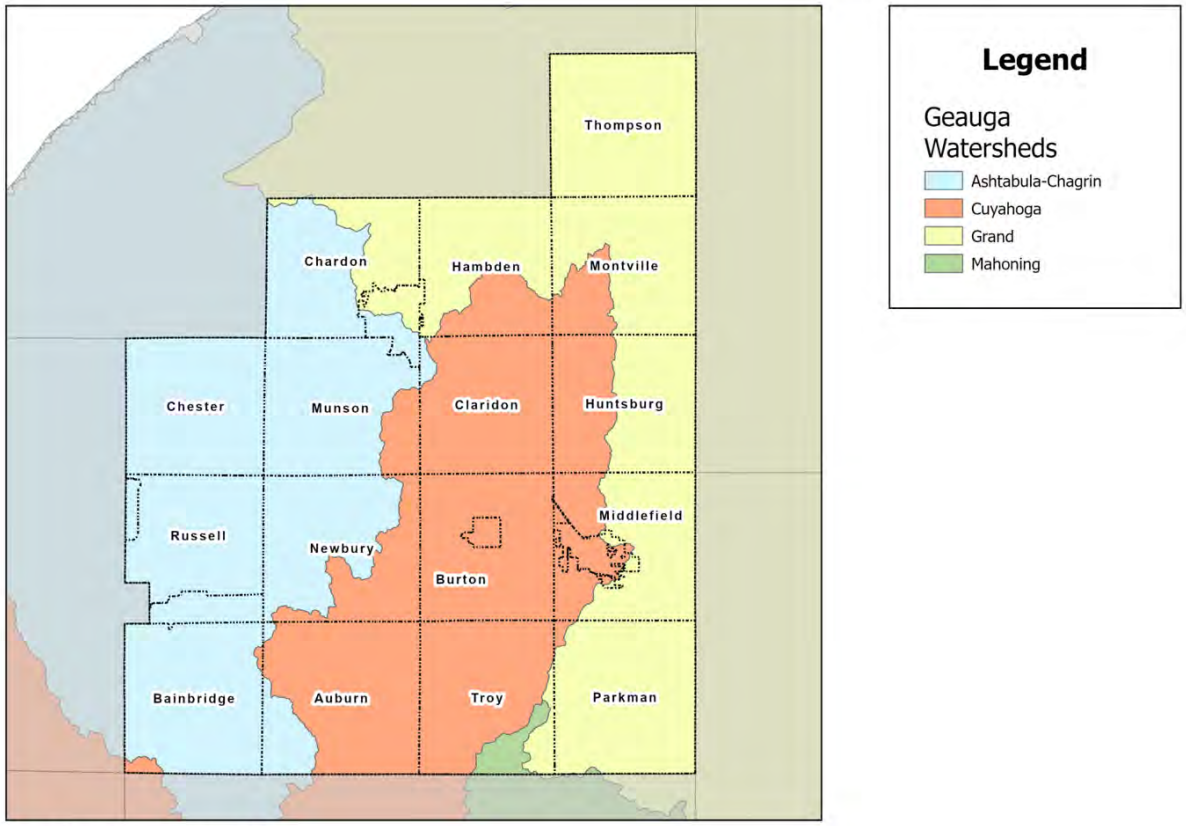
4.7.1 Location

Within Geauga County there are four major watersheds; the Chagrin River Basin, the Cuyahoga River Basin, the Grand River Basin, and the Mahoning River Basin. These river basins are all part of the Lake Erie Watershed. Geauga County itself, is located mostly within the boundaries of the Lake Erie Watershed. This means that all of the water that flows in our streams and rivers will eventually flow into Lake Erie. The only exception to this is the Mahoning River Basin. The Mahoning River flows south, into the Ohio River. (See Figure 11 on page 37).

4.7.2 Extent

According to the NWS, a flood is any high flow, overflow, or inundation by water which causes or threatens damage. A Flash Flood is a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual

time threshold may vary in different parts of the country. Ongoing flooding can intensify flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. River flooding is the rise of a river to an elevation such that the river overflows its natural banks causing or threatening damage.



Source: United States Geological Survey

When looking at terms such as 100-year flood, it should be known that a one-hundred-year flood is a flood event that has a 1% probability of occurring in any given year. The 100-year flood is typically a benchmark used for flood hazard areas and flood insurance.

NWS may issue different types of Flood Advisories and warnings. Below are the criteria for various types that may be issued:

-Flood Advisory: Used when flooding is nuisance related and does not require action to protect life and property.

-Flood Warning: Flooding develops less rapidly than a flash flood but is still severe enough to need action to protect life and property. Typically, rainfall rates with these events are less than 2 inches per hour.

-Flash Flood Warning: Heavy rainfall is expected to cause a rapid onset of damaging flood conditions. Most likely to occur when rainfall rates exceed 2 inches per hour. Flash flooding typically develops less than 3 hours from the onset of heavy rainfall.

-Flash Flood Emergency: Issued in rare cases when a flood event poses an extreme threat to life and property. Some examples of when this is issued include when numerous fatalities are possible, when infrastructure is being destroyed, when trees are uprooted, when vehicles are lifted and carried away, or when people are disabled by the force of water and debris.

4.7.3 Previous Occurrences

According to the National Centers for Environmental Information (NCEI) Events Database from 1950-2024, there were a total of 32 flood events recorded in Geauga County. These events include those labeled as Flash Flood (27), Flood (3), and Heavy Rain (2). All these events combined resulted in approximately $11.4 million dollars in damage to property and an additional $69,000 in crop damage.

Looking at recent events (2010 to present), there have been a total of 8 flood related events with every event being a Flash Flood. This subset of events resulted in approximately $4.9 million dollars in property damage, but no additional financial loss due to crop damage.

Table 11: 1950-2024 Flood Event Breakdown for Geauga County, NWS	
Flash Flood	27
Flood	3
Heavy Rain	2

August 8, 2024 Flash Flooding

Ample moisture associated with remnants from Tropical Storm Debby pushed over the area as a surface trough remained stationary. This setup led to torrential rainfall and flash flooding across portions of Wayne, Summit, Portage, and Geauga Counties. Rainfall totals were generally between 3 to 5 inches, although there were isolated pockets as high as 5 to 7 inches. The bulk of this rainfall occurred within an approximately 3-hour period. In Geauga County specifically, there were numerous flooded roads, including Bainbridge Road and Chillicothe Road at US-422 in Bainbridge. In addition, there was flooding to yards and additional minor road flooding near McFarland Creek along Chagrin Road near Westhill Drive. Precipitation frequency estimates for this event equated this amount of rain in a three-year period at an average recurrence interval of 1000 years, or about a 0.1% chance of occurrence in any given year.

August 23-24, 2023 Significant Flash Flooding

An anomalously warm and moist air mass over the Midwest led to a very unstable atmosphere with the Lower Great Lakes region on the eastern edge of the lingering “heat dome”. Strong northwest flow allowed for organized convection to develop across northern Ohio, where a constant feed of moisture allowed these storms to maintain intensity into the overnight hours. Rainfall totals across the area were generally 2 to 4 inches with locally higher amounts of 5+ inches, all of which fell within only a few hours. This heavy rainfall caused flash flooding of the East Branch of the Chagrin River in Chardon Township. The river came out of its banks flooding Mitchells Mills Road near Wisner Road.

Labor Day Floods of 2020

On Labor Day in 2020, a cold front slowly dropped south across Lake Erie and northern Ohio where a very moist environment coupled with back building and training storms resulted in widespread rainfall totals of 2 to 5 inches. There was widespread flooding reported in Geauga County with many roads impassable due to flowing water over them.

Flash Flooding on May 28, 2017 in Montville

On May 28, 2017, a warm front lifted north across the area where convection developed along and behind this boundary. The most intense storms and concentration were along the lake breeze from Cleveland eastward, which allowed for training storms and a consequent increased risk of flooding. It is important to note that leading up to this event, conditions across the area were already very saturated given a near record breaking wet spring. These antecedent conditions set the stage for excessive runoff. This event produced a widespread 2 to 4 inches of rain, with one rain gauge in Chardon recording 1.4 inches of rainfall in only 45 minutes. This heavy rainfall moved near the Montville community just after 4PM, where flash flooding rapidly developed. The most impacted area was in the hilly area between SR 86 and SR 528. Quick water rises necessitated a water rescue in a home for two individuals, though the water never entered the property. Numerous roads between Montville and Thompson were closed due to flooding, with a few minor washouts. The total estimated cost of property damage with this event was nearly $10,000.

Flash Flooding on July 14, 2015 in Bainbridge

Widespread thunderstorms developed ahead of a cold front slowly moving across the region. The airmass ahead of the boundary was very moist, allowing for these thunderstorms to produce not only a combination of damaging winds and large hail, but also resulted in very heavy, efficient rainfall. The result of this heavy rainfall was flash flooding from Bainbridge Township north to Novelty. Silver Creek came out of its banks in Novelty and flooded the Copaw Cabana Kennel where 3 people and 12 dogs had to be rescued around 4 PM. Rushing water entered the Chagrin Valley Roller Rink with rushing water of 3 to 4 feet deep on nearby Cedar and South Streets. Numerous roads were closed in Bainbridge including Route 306, Haskins Road, Snyder Road under 422, Bainbridge Road and East Washington. Tanglewood Lake overflowed into the secondary spillway, resulting in flooding damage to the adjacent golf course. Lake Lucerne Dam had water approach levels that put the dam at risk of being breached. An observation in South Russell indicated 2.91 inches of rain fell within a 3-hour period. In addition, the Aurora Branch of the Chagrin River was overwhelmed and flooded

nearby roads in northern Aurora. Much of this flooding damaged the pavement, which would ultimately need to be repaired or replaced. The total estimated cost of property damage with this event was nearly $225,000.

Flash Flooding May 2011 (record May)

A low-pressure system tracked north into the Ohio River Valley on May 14, 2011. Adequate moisture streaming from the Gulf resulted in rainfall rates associated with thunderstorms of over 1 inch per hour. The intense rainfall triggered responses in many of the small creeks and streams with many of them overflowing their banks. In Geauga County, there was nearly 1 inch of rain that fell within 75 minutes that resulted in rapid runoff and subsequent flooding. Flash flooding was primarily isolated to the northern portions of the county where rainfall was the heaviest, with numerous roads closed due to flooding.

Presidential Declaration (DR-1656) Declared July 28, 2006

Meteorologists determined that the flooding that took place in Lake, Geauga and Ashtabula was a result of a 100-year storm. Among the buildings affected was Ledgemont High School, which sustained $52,000 worth of damages. Due to flooding there was no real way in or out of Thompson Township. Moseley Road Bridge between Clay Street and Leroy Township had buckled like an accordion, a portion of Dewey Road was underwater and a culvert on Clay Street had been badly damaged. All other roads were impassable due to flood waters. Several residents placed calls for assistance due to rising waters on their property. In all $1.2 million dollars of damage was recorded for Thompson Township within Geauga County. As a result of this event, Geauga County received $440,666.82 in public assistance funds.

Countywide Flooding August 30, 2005

The remnants of Hurricane Katrina dumped locally heavy rains on portions of Northeast Ohio. The rain began during the morning hours of the 30th and tapered off after daybreak on the 31st. Rainfall totals during this period were generally 2 to 4 inches with locally heavier amounts. Much of this rain fell during the evening hours of the 30th. In Geauga County, Russell experienced high rain totals of 3.53 inches. Widespread lowland and urban flooding was reported

throughout Northeast Ohio. Numerous streams and rivers left their banks forcing the closure of several roads. Geauga County estimated property damage at $75,000.

Countywide Flooding January 1, 2005

Heavy rain and runoff from snowmelt caused widespread flooding throughout Northeast Ohio during the first half of January. January 2005 was among the wettest January's ever. At Cleveland, 5.92 inches of precipitation was recorded making it the 3rd wettest January ever. Geauga County reported 7.47 inches at Chardon. In addition to this rain, an extensive snowpack existed over Northeast Ohio at the beginning of the month. Temperatures in the upper 40s and 50s the first three days of the month caused a rapid snowmelt and brought area streams and creeks to bank full just in time for a significant winter storm on the 5th and 6th. Then, just as things began to return to normal, heavy rains fell on the area on the 11th, 12th and 13th causing conditions to once again worsen. Geauga County estimated property damage at $250,000.

4.7.4 Probability

NOAA has recorded 33 historical occurrences of flooding, those being Flood, Flash Flood, and Heavy Rain. There have been 8 events since 2008. This shows a historical trend of 0.44 flood events each year that average $345,454 in property damages, and $2,090 in crop damages per event. Since 2008, the trend has been 0.50 flooding events per year. Even though the increase in both frequency and damages per event in recent years is higher than the historical record, this could be in part due to better record keeping by NOAA. For further details on the NWS recordkeeping process, history, and definitions please refer to the *National Weather Service Instruction 10-1605 March 23, 2016 Operations and Services Performance, NWSPD 10-16 Storm data Preparation.* Based on this historical information, it can be reasonably concluded that there is a 40-45% probability that Geauga County will experience a flood event each year.

4.7.5 Vulnerability Assessment

Methodology: Hazard US – Multi Hazard (HAZUS-MH) flood vulnerability assessment with a level 2 analysis done by the U.S. Army Corps of Engineers

and the Ohio Emergency Management Agency, in 2023. This assessment analyzes both a 100-year and 25-year level flood in Geauga County, identifying the percentage of damaged buildings and the estimated building interruption. Table 8 below reflects the results of the vulnerability assessment. See the table below showing the exposure and expected annual loss estimates (EAL) in Geauga County for riverine flooding. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries.

NFIP Compliance and Floodplain Regulation

Mapping: The County underwent the floodplain map modernization process with FEMA and the Ohio Department of Natural Resources. This process began with a scoping meeting on September 6, 2006 with preliminary maps released on September 17, 2007 and an Open House conducted on January 28, 2008. The appeals and comment period was open on February 19, 2008 and closed on March 20, 2008. The Letter of Final Determination was issued on December 16, 2008. New floodplain maps were adopted by the county and became effective on June 16, 2009.

Floodplain Regulation: The Geauga County Building Department keeps the county's Special Purpose Flood Damage Reduction Regulations. This regulation appoints a county Floodplain Administrator and specifies this position's duties and responsibilities. Some of the duties include, but are limited to routine monitoring of the floodplain, enforcing regulations and providing community assistance such as encouragement for owners to maintain flood insurance.

Repetitive Loss Properties: According to Federal databases, there are a total of 5 residential properties with 33 losses totaling $837,200.18 and 0 non-residential properties. One residential property in unincorporated Geauga County is a Severe Repetitive Loss (SRL) property.

USACE-OEMA HAZUS-MH Level 2 Scenario Analysis											
			Percent Damage						Estimated Building Interuption		
County	2020 Population	Building Exposure Value ($1,000)	1-10% Damage Count	11-20% Damage Count	21-30% Damage Count	31-40% Damage Count	41-50% Damage Count	>50% Damage Count	Building Loss	Content Loss	Inventory Loss
Geauga (25-year Flood Event)	95,397	$ 2,328,381	20	23	15	4	0	2	$ 2,886,568	$ 1,782,382	$ 170,157
Geauga (100-year Flood Event)		$ 2,394,681	23	26	15	7	1	3	$ 3,779,520	$ 2,387,798	$ 387,155

Geauga County Rep Loss and Severe Rep Loss Structures (Unmitigated)					
JURISDICTION Occupancy	Total RL/SRL Structures	RL Structures	SRL Structures	Total Losses	Total Paid
MIDDLEFIELD, VILLAGE OF					
Other Residential	2	2	0	4	$352,220
GEAUGA COUNTY (UNINCORPORATED)					
Single Family Residential	4	3	1	11	$199,691
SOUTH RUSSELL, VILLAGE OF					
Single Family Residential	2	2	0	5	$114,625
Countywide Total	**8**	**7**	**1**	**20**	**$666,536**

Table 12 (Above) *Geauga County Flood Vulnerability Analysis, USACE-OEMA*

Table 13 (Above) *Repetitive Loss Properties*

Table 14 (Below) Participation in the National Flood Program

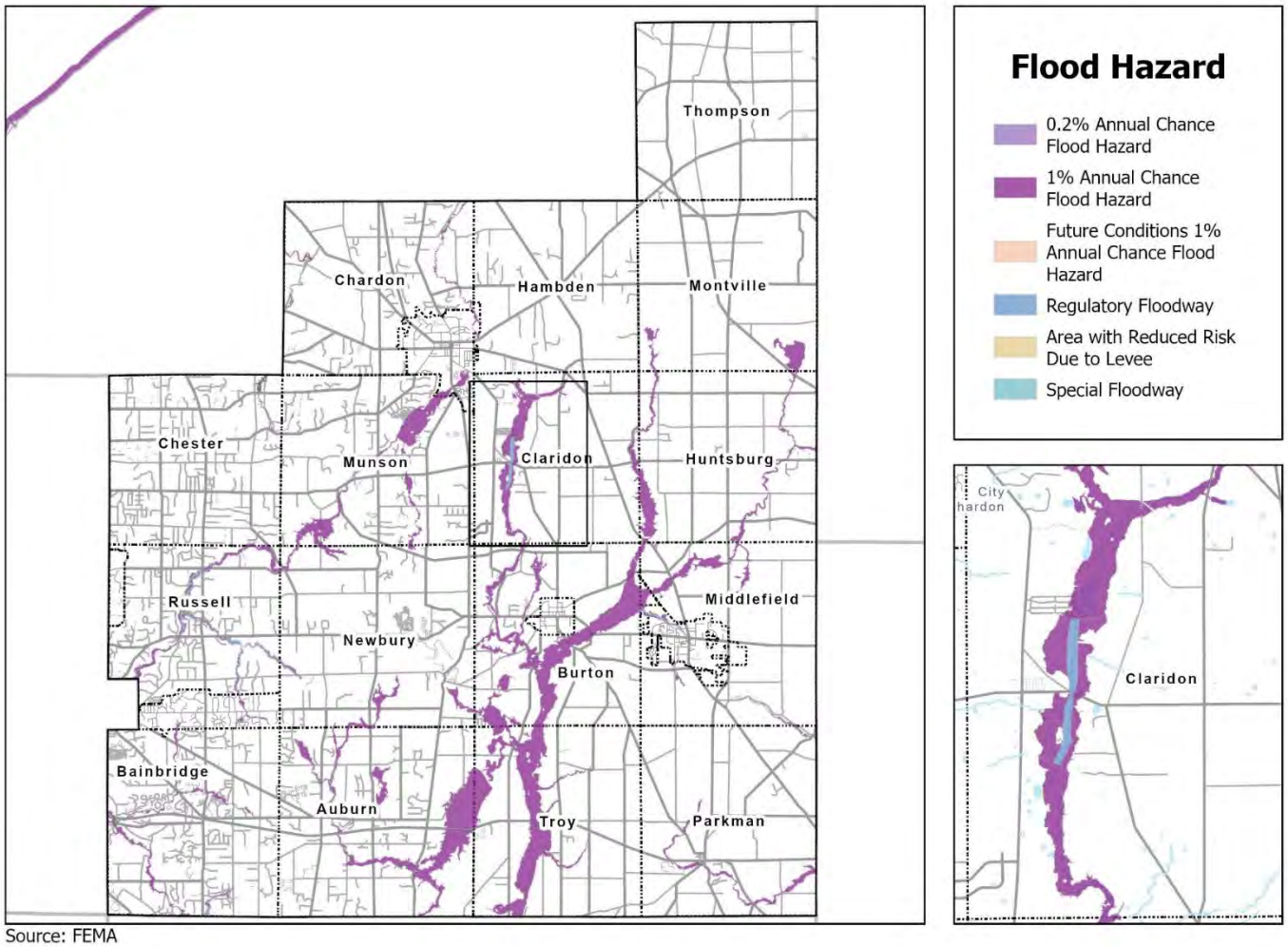
Table 14: Participation in the National Flood Program

CID	Name	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg Emer Date
390190	Geauga County	12/9/1977	11/14/1988	6/16/2009	11/4/1988
390191	City of Chardon	1/9/1974	1/4/1985	6/16/09 (M)	1/4/1985
390739	Village of Aquilla	4/18/1974	12/7/1984	6/16/09(M)	12/7/1984
390192	Village of Middlefield	3/22/1974	9/30/1988	6/16/2009	9/30/1988
390740	Village of South Russell	7/11/1975	6/16/2009	6/16/2009	6/16/2009
Note: (M) – No elevation Determined. All zones A, C, and X					

Table 15: Sanctioned Community in NFIP					
CID	**Name**	**Init FHBM**	**Init FIRM**	**Curr map Date**	**Sanction date**
390594	Village of Hunting Valley	11/30/74	1/05/78	12/03/10	02/23/78 suspended
390693	Village of Burton		6/16/2009	6/16/2009	6/16/2010

Table 15 (Left) *Sanctioned Community in NFIP*

Figure 12 (Below*) Geauga County Floodplains*



Source: FEMA

Table 16 (Below)

Geauga County NRI Riverine Flooding
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Sq. Mi)	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**0.62**	**$67,473,007**	**346**	**$226,994**	**$214,308**	**$39,749**	**$992**	**$255,049**
311500	0.03	$12,070,712	53	$1,074	$38,339	$6,133	$5	$44,476
310800	0.03	$9,442,543	47	$7,721	$29,991	$5,372	$34	$35,397
311300	0.07	$8,730,658	46	$35,351	$27,730	$5,322	$155	$33,207
312201	0.01	$5,876,032	29	$0	$18,663	$3,344	$0	$22,007
311800	0.01	$5,506,265	26	$2,261	$17,489	$3,011	$10	$20,510
311700	0.01	$5,480,826	26	$844	$17,408	$3,035	$4	$20,447
312300	0.13	$3,767,671	15	$47,935	$11,967	$1,678	$210	$13,854
312000	0.05	$3,212,666	23	$25,259	$10,204	$2,676	$110	$12,990
310900	0.06	$2,070,345	13	$30,351	$6,576	$1,548	$133	$8,257
312400	0.01	$1,739,897	15	$3,059	$5,526	$1,698	$13	$7,238
311000	0.09	$1,480,893	13	$34,051	$4,704	$1,533	$149	$6,386
312202	0.01	$1,641,660	10	$984	$5,214	$1,103	$4	$6,322
311900	0.06	$1,675,280	5	$24,040	$5,321	$592	$105	$6,018
311400	0.01	$1,314,611	6	$3,095	$4,175	$743	$14	$4,932
312100	0.01	$951,804	7	$3,208	$3,023	$830	$14	$3,867
310700	0.01	$952,926	5	$1,824	$3,027	$618	$8	$3,653
310200	0.02	$751,041	2	$4,685	$2,385	$174	$20	$2,580
311600	0.00	$546,886	2	$255	$1,737	$267	$1	$2,005
312203	0.00	$260,112	1	$997	$826	$73	$4	$903
310100	0.00	$180	0	$0	$1	$0	$0	$1
310600	0.00	$0	0	$0	$0	$0	$0	$0

4.8 Extreme Temperatures (Heat, Cold)

According to the NWS, Extreme Heat is a period of abnormally hot and dangerous temperatures, with or without high humidities, that can result in negative impacts to people, animals, and infrastructure. In contrast, Extreme Cold is a period of abnormally cold and dangerous temperatures or wind chills that can result in negative impacts to people, animals, and infrastructure. Typically, Extreme Temperatures are a hazard when they occur over a prolonged period of time.

4.81. Location

Extreme Heat and Cold conditions can affect all areas and jurisdictions of the County.

4.8.2. Extent

Extreme Temperatures are measured by high or low temperatures above or below averages. The NWS may issue a Watch or Warning for Extreme Temperatures when forecasted to meet or exceed certain thresholds. Below are the types of advisory notices that may be declared:

-Extreme Heat Warning: Heat Index values forecast to meet or exceed 105°F

-Extreme Heat Watch: Heat Index values forecast to reach 100-104°F

-Extreme Cold Warning: Temperatures or wind chill/ambient temperatures reaching or exceeding values of -25°F or colder.

-Cold Weather Advisory: Temperatures or wind chill/ambient temperatures reaching -15 to -24°F

4.8.3. Previous Occurrences

There were no historical heat occurrences for Geauga County specifically in the database of historic weather events, per the NWS. However, there are regional occurrences.

December 23-24, 2022 Extreme Cold Event

This was a long-duration, multi-faceted winter storm that hit northern Ohio just before Christmas, including extreme cold, strong winds, and accumulating and blowing snow. The transition to extremely cold temperatures occurred after an arctic cold front swept east in the late evening hours of December 22, 2022.

Temperatures behind this front rapidly decreased, resulting in flash freezes and icy conditions across area roadways. Roads remained hazardous as high winds continued to blow snow onto them. Ultimately there was a prolonged period of widespread blowing and drifting snow on December 23rd. These hazards led to widespread impacts across northern Ohio, including a 50-car pile-up on the Ohio Turnpike near the Sandusky and Erie County line. Unfortunately, over 70 people were injured and there were 4 fatalities. Several hundred additional accidents occurred, with approximately 200 accident-related injuries resulting. In addition to the cold impacts on area roads, wind chill values dropped to -25 to -40°F across all of northern Ohio, but no known injuries or fatalities were reported in Geauga County. Other infrastructure had damage with numerous pipes freezing and bursting.

January 30-31, 2019 Extreme Cold Event

A strong low-pressure system moves through the region, moving an arctic cold front across the area. This resulted in extremely cold temperatures, some of which were the coldest recorded in the 5 years prior. In addition to the cold pattern, strong winds of 30 to 35 mph allowed for wind chill values to drop below 0°F on January 29 and not break the 0°F mark until late on January 31. The coldest temperatures were on the morning of January 30 with much northern Ohio seeing temperatures in the -5 to -11°F range. During these hours, wind chill values plummeted to -25 to -35°F, with the coldest wind chill closer to -40°F. Four fatalities were reported in the state of Ohio as a result of the extreme cold, although none were reported in Geauga County. All area schools were closed on January 30 & 31, 2019 due to the cold.

2012 North American Heatwave

2012 as a whole was one of the top 10 warmest years on record worldwide. There were two periods of heat waves that occurred throughout the year. The first heat wave was in March across the Eastern United States. Well above normal temperatures resulted in early blooming of vegetation across the region, which led to subsequent damage when later frosts occurred. The average high temperature for the month of March was warmer in Cleveland than for April of 2012. Across the country, there were 7,755 daily record maximum temperatures

tied or broken. The second heat wave occurred from mid-June into the first half of July when daily highs in Cleveland were consistently in the 90s with little overnight relief with temperatures dropping into the 60s to 70s. This resulted in multiple days of heat index values exceeding 100°F, putting excessive strain on infrastructure and increasing the threat to life, especially for vulnerable populations. In total, this heatwave accounted for 82 heat-related deaths across the United States and Canada. Some of these impacts were enhanced due to a derecho that tracked from near Chicago southeast through West Virginia, leaving many without power and adequate ways to cool for days. This heat wave also acted to exacerbate the drought conditions across much of the country, leading to extensive damage to crops in the Great Lakes region.

April 29, 2012 Extreme Cold Event

As overnight lows dropped into the 20s and remained below freezing for several hours. Although not necessarily an 'extreme' temperature, these sub-freezing temperatures on the tail end of an abnormally warm March and start to April, resulted in significant crop damage across the area as everything began to bloom early. As much as 80% of all grape crops were destroyed, resulting in approximately $1 million worth of damage.

Winter of 1993-94

During the winter of 1993-94, multiple shots of arctic air caused much of the CONUS east of the Rockies to see above normal snowfall and below normal temperatures. Cold temperatures peaked by mid-January, when numerous all-time record low temperatures were observed in many cities across northeast Ohio. The average temperature for the Cleveland area in January of 1994 was 19.2°F, which was nearly 10°F below average. This January also saw the Cleveland area's all time coldest day on January 19, 1994 with the morning low temperatures bottoming out at -20°F without the wind chill. Numerous local impacts were recorded as a result of this very cold weather in mid-January, including many schools being closed due to wind chill values below -60°F! In addition, some businesses, public transportation, and government offices were also closed as frozen and burst pipes were common in both residential and commercial buildings. Many roads were closed due to quick black ice

development causing multiple accidents. Local electrical providers also set records for power consumption with a demand of over 3.2 million Kilowatts on January 19 according to WJW-TV 8. This led to scattered power outages across the region. In total, the economic impacts across the country resulted in approximately $2.2 billion of damages (this cause is CPI adjusted estimated cost). Aside from infrastructure impacts, local area hospitals reported treating numerous people for frostbite and other cold related illnesses. In total, there were approximately 70 deaths directly related to this cold snap. Unfortunately, the NCEI storm database does not go that far back for extreme cold locally, so this was collected at the larger scale.

1936 North American Heatwave

The heatwave of 1936 was the deadliest heatwave on record, impacting everywhere from the Plains to the Midwest to the Great Plains in July. This event resulted in over 5,000 fatalities, with many locations breaking records at that time (many were again broken during the 2012 heatwave). The heat wave exacerbated ongoing drought conditions across the country, leading to extensive losses in livestock and crops. The economic toll from the 1936 heatwave was very significant with notable losses to farmers and other agricultural sectors and a diminished food supply in some areas. This same time frame coincided with the Dust Bowl and with higher temperatures and limited precipitation, this enhanced the overall impacts already felt.

4.8.4. Probability

There have been 0 Extreme Heat or Cold events reported specifically to Geauga County since 1950, according to the NWS. There are several regional examples, however, of Extreme Temperatures. There is thus a low chance of a Geauga specific extended Extreme Heat or Cold event, though a larger regional one may occur every few years. For further details on the NWS recordkeeping process, history, and definitions please refer to the *National Weather Service Instruction 10-1605 March 23, 2016 Operations and Services Performance, NWSPD 10-16 Storm data Preparation.*

4.8.5. Vulnerability Assessment

Extreme Temperatures add to the general discomfort and add additional challenge to daily activities during a hazardous time. Typically, extreme temperatures coincide with another hazard, such as drought or winter storms, which increase the challenge of the circumstances. Not only do these abnormal temperatures add to general discomfort, but Extreme Heat and Cold Temperatures can be dangerous, for people and animals, especially vulnerable populations. As the population of the County continues to grow, there is more potential for loss of life and/or injury. However, the frequency of extended Extreme Temperature conditions in the County is such that even with a growing population, the potential for death or injury will still be relatively low, as well as very low potential economic impact. (See Figure 13 below for Relative Humidity, Figure 14 on page 55 for Heat Index, Figure 15 on page 55 for Statewide Average Temps, and Figure 16 on page 55 for the NWS Windchill Chart). See tables 17 & 18 on page 56 showing the exposure and expected annual loss estimates (EAL) in Geauga County for cold wave and heatwave. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries. Also below, see further information on historical tornadoes in Geauga County.

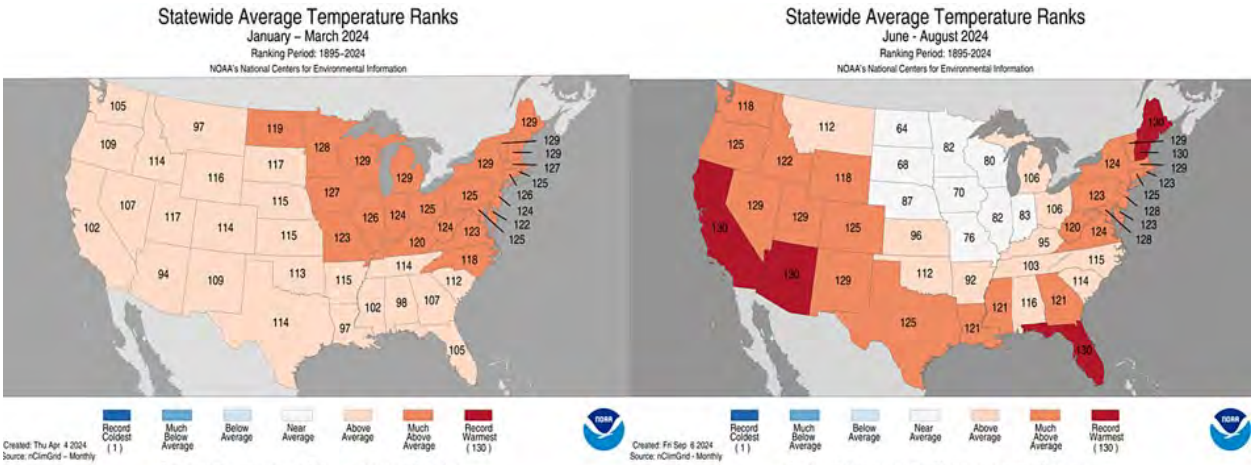
Temperature (°F)

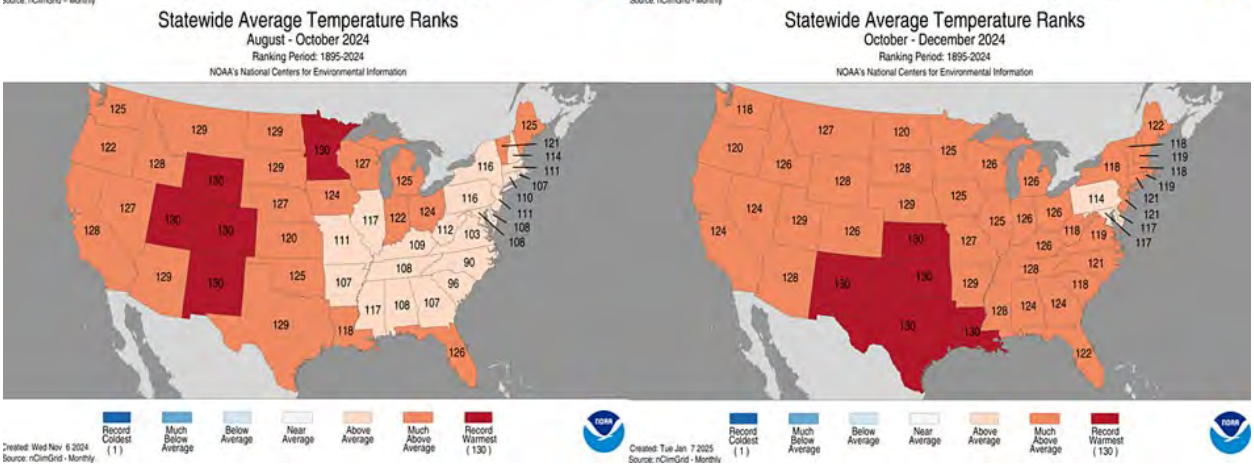
Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

	Heat Index/Apparent Temp	Effect on the body
Caution	80°F - 89°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F -104°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	105°F-129°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	130°F or higher	Heat stroke highly likely





NWS Windchill Chart

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

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

Geauga County NRI Coldwave
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$5,973**	**$34,315**	**$148**	**$40,436**
311800	$1,990,010,128	7,285	$721,121	$541	$2,620	$3	$3,164
310800	$1,782,989,887	7,087	$928,609	$485	$2,549	$3	$3,038
311900	$1,699,778,282	6,574	$3,088,165	$462	$2,365	$11	$2,838
310600	$1,394,673,049	6,017	$149,976	$379	$2,164	$1	$2,544
311700	$1,466,860,378	5,608	$153,236	$399	$2,017	$1	$2,417
312201	$1,451,798,072	5,504	$25,612	$395	$1,980	$0	$2,375
311500	$1,348,741,319	5,540	$415,106	$367	$1,993	$1	$2,361
311400	$1,282,044,504	5,244	$1,512,888	$349	$1,886	$5	$2,240
312300	$1,389,973,954	4,644	$2,086,968	$378	$1,670	$7	$2,056
312203	$866,854,167	4,676	$1,396,952	$236	$1,682	$5	$1,923
311300	$918,214,264	4,379	$3,310,464	$250	$1,575	$12	$1,837
312100	$593,705,464	4,446	$5,746,582	$162	$1,599	$21	$1,781
312202	$861,569,693	4,232	$743,378	$234	$1,522	$3	$1,759
311600	$1,002,898,717	3,972	$72,757	$273	$1,429	$0	$1,702
310700	$1,001,818,456	3,940	$333,363	$273	$1,417	$1	$1,691
311000	$449,502,098	3,657	$3,666,935	$122	$1,317	$13	$1,452
310900	$638,456,287	3,103	$3,653,977	$174	$1,116	$13	$1,303
312000	$609,343,180	2,778	$5,212,924	$166	$999	$19	$1,184
312400	$420,347,874	2,629	$2,384,015	$114	$946	$9	$1,069
310100	$400,274,461	2,144	$3,737,425	$109	$771	$13	$894
310200	$381,494,427	1,938	$2,076,156	$104	$697	$7	$809

Geauga County NRI Heatwave
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**$21,951,348,661**	**95,397**	**$41,416,609**	**$1,103**	**$72,652**	**$850**	**$74,604**
311800	$1,990,010,128	7,285	$721,121	$100	$5,548	$15	$5,663
310800	$1,782,989,887	7,087	$928,609	$90	$5,397	$19	$5,506
311900	$1,699,778,282	6,574	$3,088,165	$85	$5,006	$63	$5,155
310600	$1,394,673,049	6,017	$149,976	$70	$4,582	$3	$4,655
311700	$1,466,860,378	5,608	$153,236	$74	$4,271	$3	$4,348
311500	$1,348,741,319	5,540	$415,106	$68	$4,219	$9	$4,295
312201	$1,451,798,072	5,504	$25,612	$73	$4,192	$1	$4,265
311400	$1,282,044,504	5,244	$1,512,888	$64	$3,994	$31	$4,089
312300	$1,389,973,954	4,644	$2,086,968	$70	$3,537	$43	$3,649
312203	$866,854,167	4,676	$1,396,952	$44	$3,561	$29	$3,633
312100	$593,705,464	4,446	$5,746,582	$30	$3,386	$118	$3,534
311300	$918,214,264	4,379	$3,310,464	$46	$3,335	$68	$3,449
312202	$861,569,693	4,232	$743,378	$43	$3,223	$15	$3,281
311600	$1,002,898,717	3,972	$72,757	$50	$3,025	$1	$3,077
310700	$1,001,818,456	3,940	$333,363	$50	$3,001	$7	$3,058
311000	$449,502,098	3,657	$3,666,935	$23	$2,787	$75	$2,884
310900	$638,456,287	3,103	$3,653,977	$32	$2,363	$75	$2,470
312000	$609,343,180	2,778	$5,212,924	$31	$2,116	$107	$2,253
312400	$420,347,874	2,629	$2,384,015	$21	$2,002	$49	$2,072
310100	$400,274,461	2,144	$3,737,425	$20	$1,633	$77	$1,730
310200	$381,494,427	1,938	$2,076,156	$19	$1,476	$43	$1,538

4.9 Infectious Disease or Outbreak

A disease epidemic is defined as an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. The following epidemiological terms help frame the scope of disease transmission:

-Epidemic: “An increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area.” (CDC)

-Endemic: “The constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area.” (CDC)

-Pandemic: “An epidemic that has spread over several countries or continents, usually affecting a large number of people.” (CDC)

Diseases can spread through a variety of transmission routes. Understanding these routes helps inform mitigation and preparedness strategies. According to the CDC, the main types of transmission include:

- Direct contact: Person-to-person transmission through physical contact (e.g., touching, coughing, sneezing).
- Indirect contact: Contact with contaminated surfaces or objects (fomites).
- Droplet and airborne: Respiratory droplets or aerosols that carry pathogens through the air and are inhaled.
- Vector-borne: Transmission via insects such as mosquitoes or ticks.
- Common source: Spread through contaminated food, water, or medical products.

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, began in late 2019 and quickly escalated into a global public health crisis. Declared a pandemic by the World Health Organization in March 2020, it significantly affected Geauga County and serves as the most recent and relevant example of an epidemic event transitioning to a pandemic.

4.9.1 Location

As demonstrated during the COVID-19 pandemic, a disease epidemic is a county-wide hazard that can affect all areas and jurisdictions. Rural counties like Geauga, despite lower population density, were not spared due to interconnected travel, commerce, and regional movement.

4.9.2 Extent

While some diseases remain endemic to specific regions, the COVID-19 pandemic revealed how rapidly a novel pathogen can spread globally. Geauga County experienced multiple waves of transmission, fluctuating case numbers, and community-wide impacts on health, education, businesses, and government operations. The extent of an epidemic now includes not only morbidity and mortality but also economic disruption, mental health stressors, and social vulnerabilities.

4.9.3 Previous Occurrences

-H1N1 “Swine Flu” (2009): Monitored regionally

-Ebola monitoring (2014–2016): No confirmed cases in the county, but preparedness plans were activated.

-COVID-19 (2020–2023): The most significant disease event in recent history. Geauga County reported thousands of cases, outbreaks, numerous hospitalizations, and COVID-19 related deaths. The local public health system responded through mass vaccination clinics, contact tracing, public communication, and policy advisories

-Pertussis Outbreak (2023): A large outbreak of pertussis occurred with over 80 cases.

-emergence of Measles: Despite prior elimination status in the U.S., recent years have seen imported and local cases elsewhere in Ohio, underscoring the risk of under vaccination.

4.9.4 Probability

Assessing the probability of a disease epidemic involves considering various dynamic factors, including population density, connectivity to urban areas, and public health infrastructure. While specific annual probabilities are challenging to quantify without detailed modeling, the county remains at risk for disease outbreaks, as evidenced by the COVID-19 pandemic. Continuous monitoring and adaptive public health strategies are essential to mitigate this risk.

4.9.5 Vulnerability Assessment

Vulnerability factors influencing disease spread and outcomes include:

-Exposure risks: High in shared living environments, congregate settings, schools, and workplaces without sick leave or remote work options.

-Susceptibility: Chronic illness, age, immunocompromised status.

-Access to care: Barriers include lack of insurance, limited provider access, under vaccination, misinformation, and health literacy gaps.

Population Density and Mobility

Geauga County's population density of 238 persons per square mile (U.S. Census, 2020) is lower than surrounding counties, but this did not prevent sustained community transmission during COVID-19. Proximity to Cuyahoga and Lake Counties—both with densities over 1,000 per square mile—created regional transmission pathways.

Connectivity

Though lacking international airports or interstates, the county's characteristics still enable inter-county movement and disease spread:

-Major routes (e.g., US-422)

-Proximity to the Cleveland metropolitan area

-Regular commuter travel

Rural isolation does not equate to immunity.

4.9.6 Communicable Disease Surveillance

Table 19: Top 20 Reportable Conditions in Geauga County (2020-2024)							
Rank	Disease/Condition	2020	2021	2022	2023	2024	Total Cases
1	COVID-19	4,279	9,723	5,969	2,078	1,447	23,496
2	Chlamydia infection	161	151	126	86	91	615
3	Influenza-associated hospitalization	61	1	34	34	64	194
4	Hepatitis C - chronic	44	35	36	18	13	146
5	Gonococcal infection	31	24	22	19	26	122
6	Campylobacteriosis	13	22	25	21	25	106
7	Pertussis	2	1	2	85	4	94
8	Influenza - ODH Lab Results	2	4	29	14	7	56
9	Salmonellosis	7	11	7	11	20	56
10	Streptococcal - Group A -invasive	1	5	11	16	11	44
11	Lyme Disease	2	6	5	7	13	33
12	Carbapenemase Producing Organism (CPO)	2	6	3	7	9	27
13	Legionellosis	8	4	2	4	6	24
14	Giardiasis	2	4	7	5	5	23
15	Hepatitis B (including delta) - chronic	2	4	3	5	5	19
16	E. coli, Shiga Toxin-Producing	3	6	2	0	7	18
17	Cryptosporidiosis	1	2	3	1	9	16
18	Streptococcus pneumoniae - invasive	1	1	4	2	7	15
19	Syphilis - unknown duration or late	2	2	3	0	3	10
20	Haemophilus influenzae - invasive disease	3	2	0	2	2	9

4.10 Dam Failure

Dams are man-made structures designed to obstruct or restrain waters that may cause flooding downstream. These structures are generally made with concrete or earthen material. The failure of these dams, although a man-made structure, would result in a natural event of flooding. A dam failure occurs when the barrier constructed across a waterway fails or otherwise does not obstruct or retain the flow of water, which can rapidly result in a large area of completely inundated land. The NWS considers Dam Failure to be, in hydrologic terms, a catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water.

Dams are classified by two conditions, height and storage. Dams are classified as Class 1 thru 4 based on the combination of height and storage. Class 1 dams provide the highest potential for significant loss of life and structural damage to high value properties, including, residential, industrial and public utilities in the event of failure. According to the Ohio Department of Natural Resources (ODNR), Class 1 dams are identified as "*dams having a total storage volume greater than five thousand acre-feet or a height of greater than sixty feet shall be placed in class 1. A dam shall be placed in class 1 when sudden failure of the dam would result in one of the following conditions: (a) Probable loss of human life and (b) Structural collapse of at least one residence or one commercial or industrial business.*"

4.10.1 Location

According to ODNR, Geauga County has 129 dams within its boundaries. (See Figure 17 on page 60). The number of dams and their classifications are as follows:

-Class I - 9

-Class II - 10

-Class III - 11

-Class IV – 26

-Exempt – 58

-Abandon – 8

-Mining – 5

-Unclassified, Private - 2

4.10.2 Extent

According to Ohio Administrative Code Rule 1501:21-13-01, dams are classified as follows:

Class I: Dams having a total storage volume greater than five thousand acre-feet or a height of greater than sixty feet shall be placed in class I. A dam shall be placed in class I when sudden failure of the dam would result in one of the following conditions.

(a) Probable loss of human life.

(b) Structural collapse of at least one residence or one commercial or industrial business.

Class II: Dams having a total storage volume greater than five hundred acre-feet or a height of greater than forty feet shall be placed in class II. A dam shall be placed in class II when sudden failure of the dam would result in at least one of the following conditions, but loss of human life is not probable.

(a) Disruption of a public water supply or wastewater treatment facility, release of health hazardous industrial or commercial waste, or other health hazards.

(b) Flooding of residential, commercial, industrial, or publicly owned structures.

(c) Flooding of high-value property.

(d) 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.

(e) Damage or disruption to railroads or public utilities.

(f) 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: Dams having a total storage volume greater than fifty acre-feet or a height of greater than twenty-five feet shall be placed in class III. A dam shall be placed in class III when sudden failure of the dam would result in at least one of the following conditions, but loss of human life is not probable.

(a) Property losses including but not limited to rural buildings not otherwise described in paragraph (A) of this rule, and class IV dams and levees not otherwise listed as high-value property in paragraph (A) of this rule. 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.
(b) Damage or disruption to local roads including but not limited to roads not otherwise listed as major roads in paragraph (A) of this rule.

Class IV: Dams which are twenty-five feet or less in height and have a total storage volume of fifty acre-feet or less may be placed in class IV. When sudden failure of the dam would result in property losses restricted mainly to the dam and rural lands, and loss of human life is not probable, the dam may be placed in class IV. Class IV dams are exempt from the permit requirements of section 1521.06 of the Revised Code pursuant to paragraph (C) of rule 1501:21-19-01 of the Administrative Code (See Table 14 on page 59 for a list of Class I and II dams).

4.10.3 Previous Occurrences

There are no documented dam failures in Geauga County. However, according to the Stanford University National Performance of Dams Program, there have been three incidents (See Table 15 on page 59).

4.10.4 Probability

Based on historical information and the current assessment of each dam structure, there is a less than 1 percent chance in any given year of a dam failure occurring in the County.

4.10.5 Vulnerability Assessment

Geauga County has 9 dams that if there was a failure there would probably be a loss of life. There are 10 dams within the boundaries of Geauga County that if a failure occurred there would be potential health hazard, flooding and water damage to homes, businesses, and state and interstate highways. In addition, Geauga County has 11 dams that if failure occurred there would be low damage

to non-residential structures and local roads. Geauga County also has 26 dams that if there was a failure there would be almost no damage with only losses restricted to the dam itself. Due to limitation of data and resources, HHPD Vulnerability Assessment requirements are deferred for all class 1 dams. An amendment will be made to this in the Geauga County 2025 Natural Hazards Mitigation Plan if a dam owner or community wishes to pursue HHPD funding in the future.

Table 20: Class I and II Dams within Geauga County		
Location	**Name**	**Approved EAP**
Class I Dam		
Huntsburg	East Branch Reservoir Dam	Approved
Chardon	Loecy Pond Dam	Not Approved
Auburn	Bridge Creek Dam	Approved
Bainbridge	Lake-in-the-Woods Dam	Not Approved
Bainbridge	Lake Lucerne Dam	Not Approved
Bainbridge	Tanglewood Lake Dam	Not Approved
Chester	Shadow Hill Lake Dam	Not Approved
Montville	Mont-Mere Lake Dam	Approved
Parkman	Schloss Pond Dam	Not Approved
Class II Dam		
Russell	Lake Louise Dam	Not Approved
Parkman	Shangi-La Ski Club Lake Dam	Not Approved
Burton	Giel Lake Dam	Not Approved
Parkman	Brown Lake Dam	Approved
Burton	Harvey Lake Dam	Not Approved
Munson	Fowlers Mill Golf Course Upground	Not Approved
Russell	Hidden Lakes Dam	Not Approved
Russell	Bellwood Lake Dam	Not Approved
Hambden	Kittredge Arboretum Lake Dam	Not Approved
Montville	Bella Luna Lake Dam No. 1	Not Approved

Table 20 (Above) *Class I and II Dams within Geauga County*

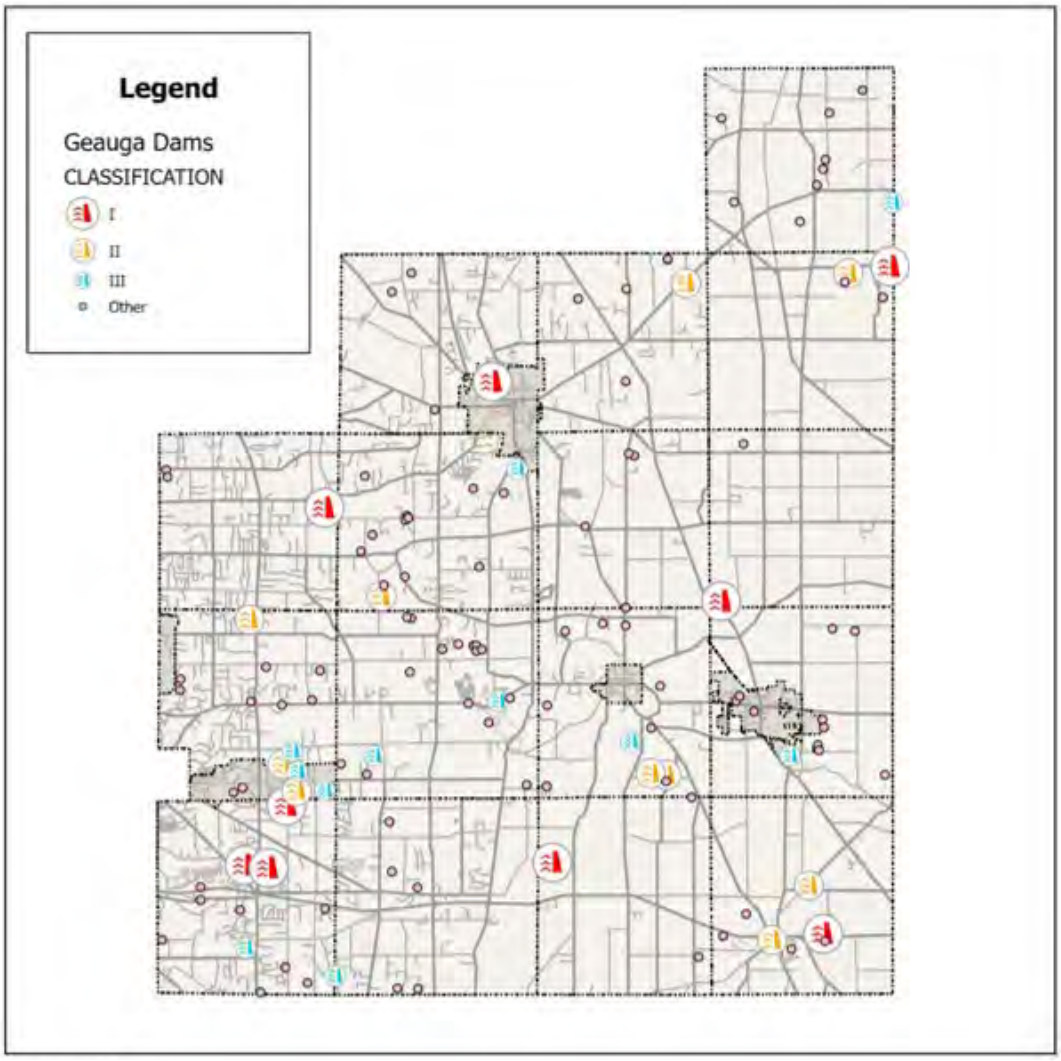
Table 21: Stanford University National Performance of Dams for Geauga County			
Date	**Structure**	**NID Number**	**Incident**
8/22/1995	Schloss Pond Dam	OH01005	Inadequate spillway capacity
8/12/1999	Cardinal Lake Dam	OH01000	Inadequate spillway capacity
8/22/2000	Silver Lake Dam	OH01628	Deterioration

Table 22: Estimated Vulnerability Assessment (2025 USD)		
Structure Type	**Structures at Risk**	**Damage in Dollars**
Residential	876	$37,709,126
Non-Residential	553	$66,288,197
Critical Facilities	133	$22,761,164
Total	1562	$126,758,487

Table 21 (Left) *Stanford University national Performance of Dams for Geauga County*

Table 22 (Left) *Estimated Vulnerability Assessment*

Figure 17 (Below) *Dams in Geauga County* by ODNR



Source: ODNR

4.11 Earthquakes

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The severity of these effects 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 casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures and ground failure.

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 a moderate earthquake risk. Although most people do not think of Ohio as an earthquake-prone state, at least 1099 earthquakes epicenters have been recorded in Ohio since 1776, according to ODNR. At least 160 of those earthquakes have been felt, according to USGS, and 15 have caused property damage and injury.

4.11.1 Location

Earthquakes are a county-wide hazard that can affect all areas and jurisdictions. However, the northern part of the county is closer to Lake Erie and Lake County, which experiences more earthquakes in this region.

4.11.2 Extent

Earthquake intensity is typically measured based on the Modified Mercalli Intensity (MMI) Scale, (see Figure 19 on page 67). According to the USGS, Geauga County is classified as an MMI IV, which means that in the event of an earthquake, it will be felt indoors by many; outdoors by a few; at night, some individuals might awaken; dishes, windows and doors may be distributed; and standing autos will rock. Areas rated as MMI IV are not likely to experience structural damage or loss of life during an earthquake event.

A lack of noticeable earthquake activity in Geauga County can be partly attributed to the Peak Ground Acceleration (PGA). PGA is defined as how much the ground shakes during a seismic event. PGA is partly determined by what

soils and bedrock are present in the area. In Geauga County, the PGA is relatively low, being on the border area of 2 to 3. According to the Ohio Department of Natural Resources Ohio Seismic Network, this is interpreted as having the possibility of 2 to 3 percent of gravity's acceleration listed as 2g. These numbers are denoted as 0.02 and 0.03 respectively. As noted by the Ohio Seismic Network, when the peak acceleration nears 0.2g, you would feel the earthquake noticeably indoors, especially on upper floors of buildings, but not always recognized as earthquake; standing autos may rock slightly; vibrations like a passing truck. While acceleration nearing 0.3g, during the day, felt indoors by many, outdoors by few; at night, some awakened; dishes, windows, doors disturbed; walls make creaking sound; sensation like heavy truck hitting building; standing autos rock noticeably.

4.11.3 Previous Occurrences

Historically, earthquake activity has been isolated and virtually non-existent in Geauga County. Between 1986-2023, there have been 8 reported earthquake epicenters in Geauga County, from various sources, ranging from 1-3.6 in magnitude. ODNR recognizes 7 epicenters in Geauga. There have been several earthquake epicenters near the county as well that have been felt in the county, mostly in Lake County to the north.

Earthquake event December 18, 2023

At 3:01 am on December 18, 2023, there was a 1.3 magnitude earthquake. There was no reported damage or issues associated with this event.

Earthquake event September 4, 2018

An earthquake occurred on September 4, 2018, at 9:43 am. It was a 2.0 magnitude earthquake. There was no reported damage or issues associated with this event.

Earthquake event June 30, 2003

At 3.21 p.m., a seismic event occurred near Painesville, Ohio. The event measured 3.4 on the Richter scale. The Department of Natural Resources Geologic Survey, Seismic Monitoring Center reports that a seismic event of 3.4

is considered minor, and that there were felt reports in Ashtabula and Lake Counties. An Unusual Event was reported at the Perry Nuclear Power Plant.

Earthquake event on September 25, 1998

An earthquake was reported 10 miles north of Sharon PA at approximately 1545 to 1600 hrs. on September 25, 1998. The earthquake measured 5.2 on the Richter scale. No reported emergency system problems and no damage were reported in Geauga County.

Earthquake event October 16, 1993

In the early morning on a Saturday, at 2:30 am, a 3.6 magnitude earthquake hit Geauga County. Though considered moderate in magnitude, it was not reportedly felt or caused any reported damage.

Earthquake event on January 31, 1986 - 4:46 p.m. - Magnitude: 5.0

This historic earthquake caused minor property damage in several towns in northeast Ohio and northwest Pennsylvania; 17 people were injured in the epicentral area.

Most of the damage to houses and commercial buildings occurred in Ashtabula, Geauga, Lake, Trumbull, and Wood Counties in Ohio and Crawford and Erie Counties in Pennsylvania. It mainly included fallen ceilings and plaster; cracked chimneys, foundations, and brick walls; and broken windows and underground pipes. Changes in the flow of water were observed in more than a dozen wells in Lake and Geauga Counties, east of Cleveland. The changes included variations (starting, stopping) in the flow of water and sediment deposits in water. In Leroy Township, a small pond was formed from the flow of a new artesian well. Another artesian well suddenly began feeding water to an old water trough.

Over the next 2 months, 13 aftershocks of magnitude 0.5 to 2.4 were recorded on the area, and 13 more aftershocks of about magnitude 1.0 were detected through April 15, 1987. The main earthquake was felt over a large area of the Eastern United States, covering all or parts of eight States (Illinois, Indiana, Kentucky, Michigan, New York, Ohio, Pennsylvania, West Virginia) and Ontario, Canada.

It also was reported by people on the top floors of multistory buildings in Delaware, Maryland, New Jersey, Virginia, and Wisconsin, as well as Washington, D.C.

4.11.4 Probability

There have been 8 earthquake epicenters reported in Geauga County from 1986-2023. In total, Geauga County and its neighboring counties (Ashtabula, Cuyahoga, Lake, Portage, Trumbull) have combined for more than 300 epicenters according to ODNR, and 33 of which were 3.0 or greater in magnitude. Based on this historical information, it can be reasonably concluded that there is a 100% probability that Geauga County will experience an earthquake each year. Despite this, there is little chance that the earthquake will be felt or cause damage, which may be closer to 7% chance.

4.11.5 Vulnerability Assessment

Loss estimates were calculated by HAZUS MH (2018) based on a 5-magnitude earthquake, with the City of Chardon as the epicenter.

Building Damages

HAZUS MH estimates that about 5,405 buildings will be at least moderately damaged. There are an estimated 308 buildings that will be damaged beyond repair. Figure 18 below summarizes the expected building damage by occupancy.

Fire and Debris Generation

Fires often occur after an earthquake. HAZUS MH estimates that there will be 0 ignitions that would burn about 0 sq. miles or 0% of the total land area for the County. The model estimates that fires would displace approximately 0 people. HAZUS also estimates the number of debris that would be generated by an earthquake. The model estimates that a total of 216 million tons of debris will be generated, requiring approximately 8,640 truckloads (at 25 tons/truck) for removal.

Shelter Requirements and Causalities

HAZUS estimates that the number of households expected to be displaced in the event of an earthquake and the number of displaced people that will require accommodation in temporary public shelters. The model estimates a total of 292 households, of which 156 will seek temporary accommodations in public shelters.

HAZUS estimates the number of people that will be injured or killed by an earthquake. Causalities are broken down into 4 severity categories, as follows:

*Severity Level 1 –injuries that will require medical attention, but hospitalization is not required.

*Severity Level 2 – injuries will require hospitalization but are not considered life-threatening

*Severity Level 3 – injuries will require hospitalization and can become life-threatening if not treated promptly

*Severity Level 4 – victims are killed by earthquake.

Casualty estimates are given 3 times of day: 2 AM, 2 PM and 5PM. These times represent periods of day that different sectors of the community are at their peak occupancy loads. The 2 AM estimate considers the residential occupancy of the community, the 2 PM estimate considers the educational, commercial and industrial sectors and the 5 PM represents the peak commute time. Table 17 below summarizes the estimated total causalities for an earthquake event in Geauga County, which represents the worst-case scenario.

Economic and Building Related Losses

HAZUS MH estimates that the total economic loss for the county due to an earthquake is $1,208,852,821 dollars, using 2025 dollars. This would be about This includes building and lifetime related losses based on regional inventory. HAZUS MH also estimates building losses based on direct building loss and business interruption. Table 18 below summarizes these losses. (Millions of dollars)

See table 23 below showing the exposure and expected annual loss estimates (EAL) in Geauga County for earthquakes. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries.

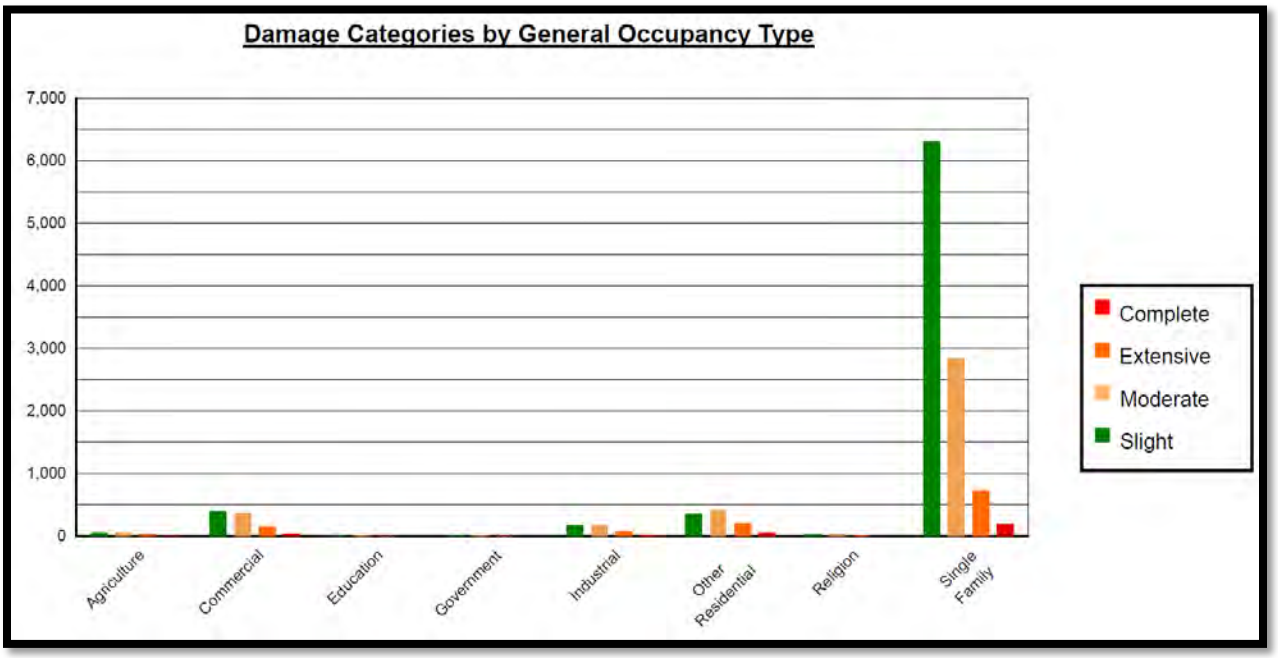


Table 24: HAZUS MH estimates				
	Level 1	**Level 2**	**Level 3**	**Level 4**
Total (2am)	153	32	4	8
Total (2pm)	236	53	7	13
Total (5pm)	163	37	6	9

Figure 18 (Above) *Estimated Building Damage by Occupancy*

Table 24 (Left) *Estimated Total Causalities*

Table 25 (Below) *Estimated Economic Loss*

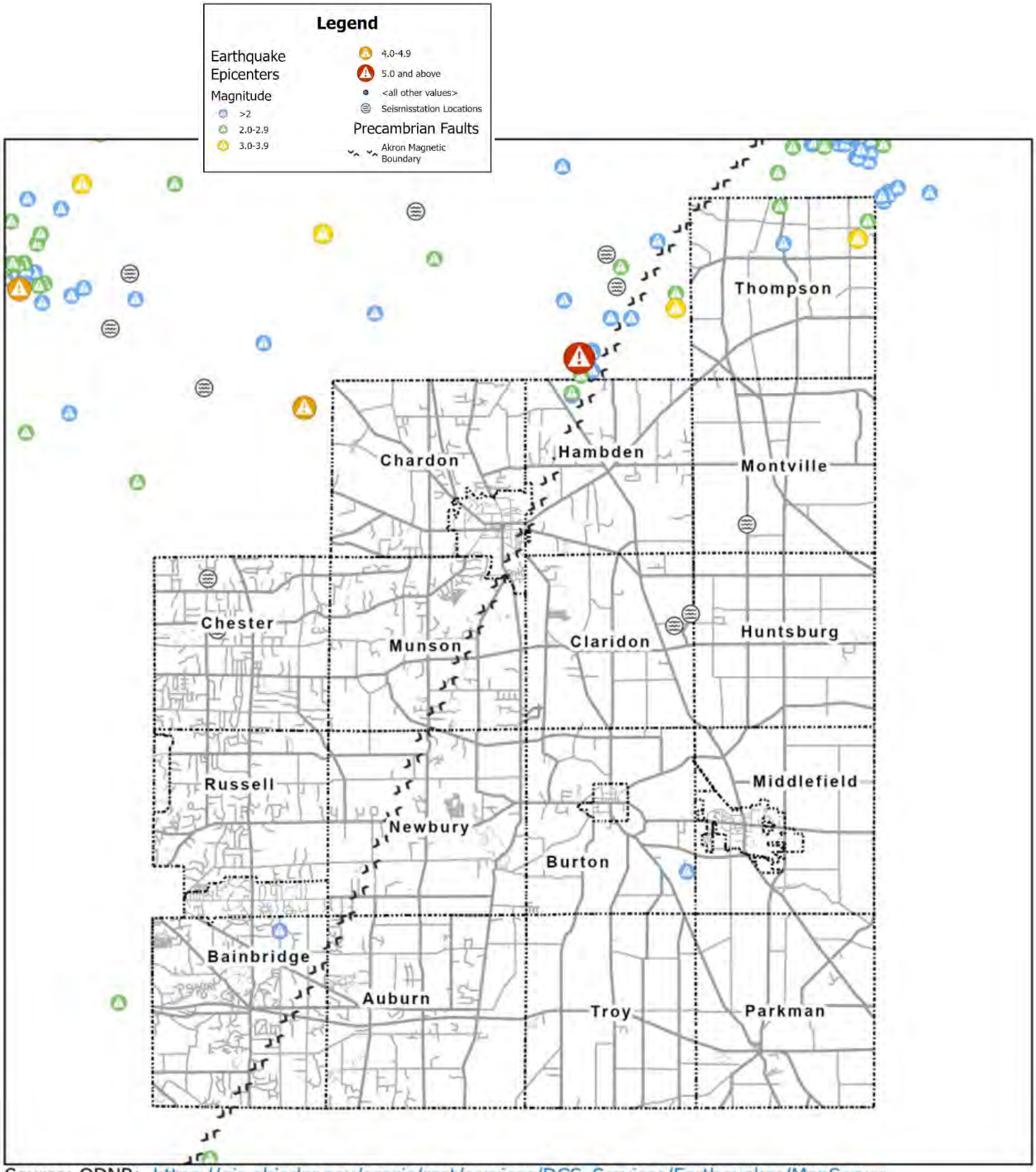
Table 25: HAZUS MH estimate (2025 USD update)			
	Income Losses	**Capital Stock Losses**	**Total**
Total (millions)	$170,572,153	$1,038,280,668	$1,208,852,821

Richter Magnitude Scale (M)	Modified Mercalli Intensity Scale (MMI)	Magnitude/Intensity felt near an earthquake epicenter
1.0- 1.9	I	An M=1 is roughly equivalent to a quarry blast and can be generated by non-earthquake related events (such as a rock fall). Earthquakes of this intensity are generally not felt.
2.0-2.9	II	Felt by only a few people at rest, especially on the upper floors of buildings.
3.0-3.9	III	Felt noticeably by people indoors or on upper floors of buildings, but may not be recognized as an earthquake (similar to shaking by a passing truck, typically very short in duration).
4.0-4.9	IV-V	Felt noticeably by people both indoors and outdoors. Will wake some sleeping people. Walls will make cracking noises, and dishes, doors, and windows will rattle or move. Motor vehicles will rock noticeably. MMI=5 will cause unstable objects to fall or overturn; pendulum clocks may stop.
5	VI-VII	An M=5 earthquake is roughly equivalent to the force of a 10 kiloton nuclear blast (like Hiroshima). Earthquakes of this magnitude are felt by practically everyone. Damage is negligible in well-constructed buildings. Plaster may crack and fall; some chimneys may be broken.
6	V11-IX	Damage negligible in well-designed buildings. Slight to great damage to buildings and infrastructure of poor design.
7	VIII and higher	Well designed buildings may experience some damage. Building and bridges may shift off their foundations or partially collapse.
8	X and higher	Wooden building may be destroyed. Few masonry structures remain standing. Bridges destroyed; rail lines are bent.
9	XII	Damage total. The ground is distorted. Objects are thrown into the air.

Figure 19 (Above*) Richter and Modified Mercalli Intensity Scales*

Figure 20 (page 73) *Geauga County Seismic Activity Map*

Table 26 (page 74) Earthquake EAL Estimate



Source: ODNR: https://gis.ohiodnr.gov/arcgis/rest/services/DGS_Services/Earthquakes/MapServer

Geauga County NRI Earthquake
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Buildings)	Exposure (Population)	EAL (Buildings)	EAL (Pop Equiv)	EAL (Total)
ALL	**$21,951,144,000**	**95,397**	**$98,583**	**$20,522**	**$119,105**
311800	$1,990,000,000	7,285	$9,834	$1,972	$11,806
312300	$1,389,959,000	4,644	$9,852	$1,691	$11,542
310800	$1,782,980,000	7,087	$7,268	$1,407	$8,675
311700	$1,466,849,000	5,608	$7,663	$1,000	$8,662
311900	$1,699,769,000	6,574	$6,975	$1,108	$8,083
311400	$1,282,033,000	5,244	$6,690	$1,370	$8,060
312201	$1,451,785,000	5,504	$6,347	$1,225	$7,572
311300	$918,203,000	4,379	$5,553	$1,715	$7,269
311500	$1,348,735,000	5,540	$4,906	$952	$5,858
312203	$866,846,000	4,676	$4,517	$1,094	$5,611
310600	$1,394,664,000	6,017	$4,251	$946	$5,197
310700	$1,001,804,000	3,940	$4,289	$883	$5,172
312000	$609,332,000	2,778	$3,703	$741	$4,444
311600	$1,002,890,000	3,972	$3,369	$647	$4,016
312100	$593,699,000	4,446	$2,677	$980	$3,657
310900	$638,446,000	3,103	$2,417	$588	$3,005
311000	$449,495,000	3,657	$1,728	$748	$2,476
312202	$861,562,000	4,232	$2,003	$418	$2,421
312400	$420,340,000	2,629	$1,535	$391	$1,926
310200	$381,488,000	1,938	$1,597	$304	$1,900
310100	$400,265,000	2,144	$1,408	$342	$1,750

4.12 Wildfire (Forest, Brush, Grass, Crop)

A wildfire is an uncontrolled fire in an area of combustible vegetation that occurs in the countryside or a wilderness area. Specifically, the NWS defines wildfire as any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. Other names such as brush fire, bushfire, forest fire, desert fire, grass fire, hill fire, peat fire, and vegetation fire may be used to describe the same phenomenon depending on the type of vegetation being burned. A wildfire differs from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to change direction unexpectedly, and its ability to jump gaps such as roads, rivers and fire breaks. Wildfires are characterized in terms of the cause of ignition, their physical properties such as speed of propagation, the combustible material present, and the effect of weather on the fire.

4.12.1. Location

Geauga County contains a great deal of forestland, with several recreational campsites and other attractions in designated areas such as Punderson State Park and Geauga County Park District. Wildfires can take place at any place throughout the county where fires could break out in an outdoor area.

4.12.2. Extent

The wild land-urban interface can be defined as the zone where structures and other human developments meet or intermingle with undeveloped lands. Topography plays a major role in how fast a wildfire spreads. Steep slopes are the greatest topographical influence on fire behavior. As the steepness of the slope increases, fires spread more quickly. A fire will spread twice as fast on a 30% slope than it will on level ground. This fast speed is because a fire starting at the bottom of a slope has a longer upslope run with more available fuel in its path.

Heavily wooded or forested areas cover approximately 13% of Geauga County's total land base. When the conditions are right, these areas can become vulnerable to wildfires. In the last few decades, the nature and scope of Geauga County's wildfire hazard has changed dramatically due to the increase in the development of homes and businesses in and around forested areas.

The NWS may make a Watch or Warning related to Fire. A Fire Weather Watch/Red Flag Warning means that 10-hour fuels must be at or below 8% AND the afternoon and evening RH levels are expected to fall to 25% or lower AND the surface winds must equal or exceed 15 mph. These conditions must be for at least 2 consecutive hours.

4.12.3. Previous Occurrences

The National Centers for Environmental Information (NCEI) database, from 1950-2024, has no recorded wildfires. These would have been stereotypical large wildfires.

ODNR recently added Geauga County to their Wildfire Protection Area in 2019, so they only have some reported incidents from 2019 to present. (See Figure 21 on page 71). For the period 2019-2024 they received reports of 21 fires for 35.7 acres in Geauga County.

The State Fire Marshal has the most specific and realistic wildfire information for the county. Using the fire classifications listed in the National Fire Incident Reporting System (NFIRS) Complete Reference Guide, between 3/18-2/25, there were 53 incidents. These incidents were categorized as natural Vegetation (Forest, Brush, Grass) and Cultivated Vegetation (Grain, Orchard, Crop). All wildland fires from this report can be found in the map below (Figure 22 on page 72).

Wildfire Incident on 4/9/2013:

A tall tree on fire that apparently was struck by lightning. No injuries or major damage occurred.

Wildfire Incident on 6/30/2012:

A mulch fire around a tree on Treelawn in front of St Anselm church. There were no injuries, and no major damage occurred.

4.12.4. Probability

Using the Ohio State Fire Marshall's recent fire statistics, there is a 100% chance of several wildland 'wildfire' events taking place in Geauga County every year, based on this historical information.

4.12.5. Vulnerability Assessment

Geauga County has diverse land use from residential, commercial, agricultural, and parks to privately owned wooded spaces. This diversity poses a wildfire threat to homes, barns, commercial structures, agriculture crop lands, parks and open space. Those residents living near the 13% of heavily wooded or forested areas within Geauga County are more susceptible to the impacts of wildfire. There has been no recorded information regarding loss of life within Geauga County for wildfire. The economic losses a community could suffer from a major wildfire could be high depending on where the fire takes place within the County. However, due to the infrequency and small size of these wildland fires within the county, the overall impact on the economy is low. See the table below showing the exposure and expected annual loss estimates (EAL) in Geauga County for wildfires. The estimates are organized by census tract. See Appendix B at the end of the plan for a map of Geauga County census tracts overlayed by jurisdictional boundaries.

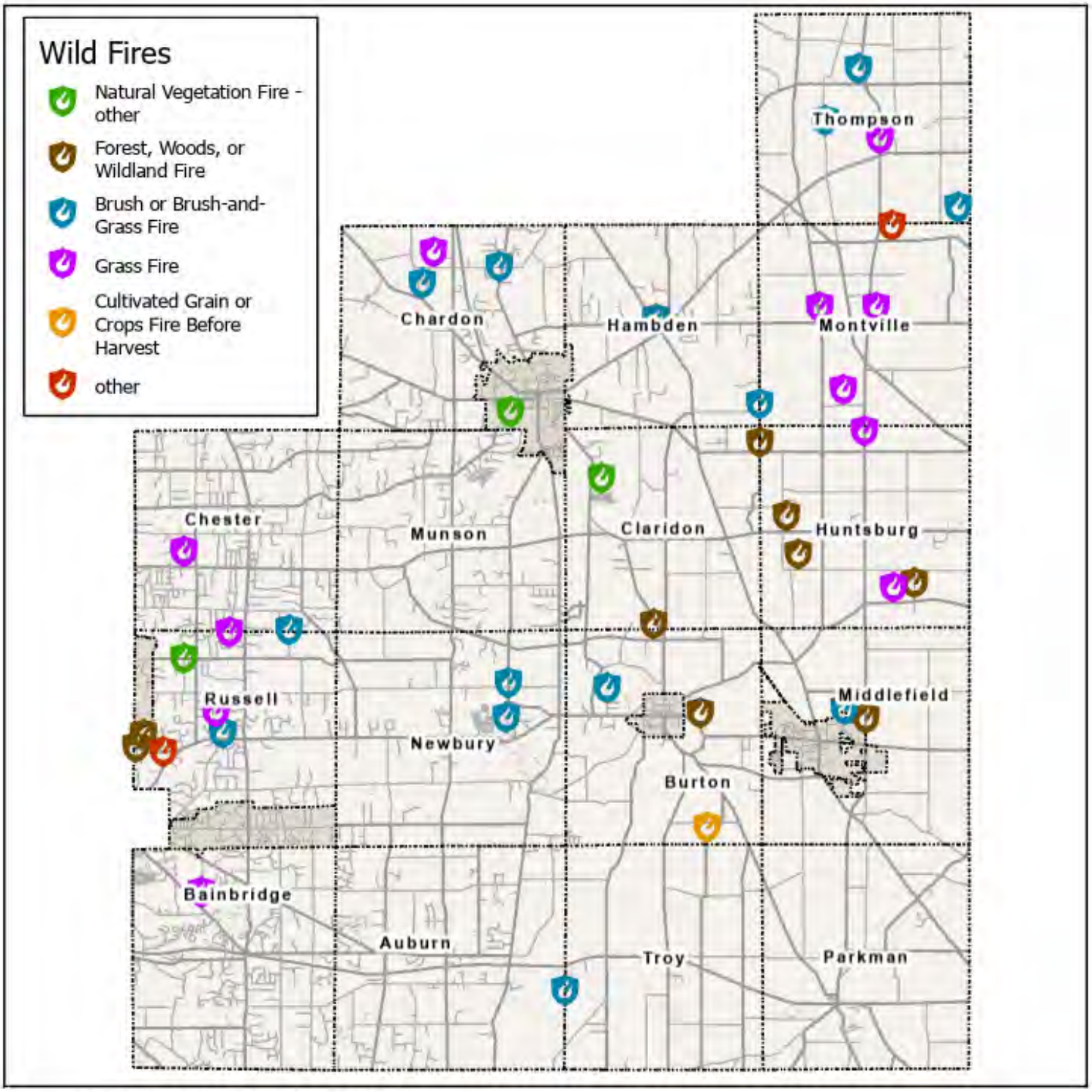
Table 27: Estimated Vulnerability Assessment (2025 USD)

Structure Type	Structures at Risk	Damage in Dollars
Residential	136	$5,074,957
Non-Residential	124	$14,822,008
Critical Facilities	13	$540,121
Total	274	$20,437,086

Table 27 (Above) *Estimated Vulnerability Assessment*

Figure 21 (Right) *Wildfire Protection Area, ODNR*

Figure 22 (Below) *Wildfire Breakdown in Geauga County Map*



Source: Ohio Fire Marshall's Office, 5/7/25.

Table 28 (Below) Wildfire EAL Estimate

Geauga County NRI Wildfire
Exposure and Expected Annual Loss (EAL) Estimate

Census Tract	Exposure (Sq. Mi)	Exposure (Buildings)	Exposure (Population)	Exposure (Agriculture)	EAL (Buildings)	EAL (Pop. Equiv)	EAL (Agriculture)	EAL (Total)
ALL	**53.70**	**$7,913,011,602**	**35,739**	**$15,336,619**	**$31,702**	**$2,513**	**$2**	**$34,216**
310800	2.99	$803,399,136	3215	$468,160	$3,214	$225	$0	$3,439
311900	4.51	$786,790,138	3163	$1,346,816	$3,147	$222	$0	$3,369
311800	2.02	$710,695,909	2762	$278,058	$2,843	$194	$0	$3,036
311500	2.17	$655,065,225	2680	$212,753	$2,620	$188	$0	$2,808
311400	3.67	$522,047,162	2122	$743,183	$2,088	$149	$0	$2,237
311700	0.80	$503,890,929	2375	$66,541	$2,016	$166	$0	$2,182
310600	1.01	$420,381,282	1884	$36,769	$1,682	$132	$0	$1,814
310700	1.33	$384,069,555	1558	$168,254	$1,536	$109	$0	$1,646
311600	0.60	$367,680,495	1506	$39,812	$1,471	$106	$0	$1,576
312203	3.346	$334,998,986	1805	$691,621	$1,340	$127	$0	$1,467
312202	1.558	$298,116,177	1435	$230,615	$1,192	$101	$0	$1,293
312300	2.239	$293,805,519	993	$752,195	$1,175	$70	$0	$1,245
311300	2.085	$280,562,639	1337	$820,740	$1,122	$94	$0	$1,216
312100	5.194	$236,741,353	1751	$2,041,210	$985	$129	$0	$1,114
312000	4.119	$240,600,467	1140	$2,019,989	$962	$80	$0	$1,043
312201	0.319	$207,286,997	1025	$6,309	$829	$72	$0	$901
311000	4.186	$184,281,796	1406	$1,362,053	$737	$99	$0	$836
310900	2.314	$189,950,476	911	$1,024,796	$760	$64	$0	$824
312400	3.484	$167,809,912	972	$1,063,702	$671	$68	$0	$740
310200	2.815	$168,345,616	880	$751,723	$673	$62	$0	$735
310100	2.947	$156,491,833	820	$1,211,318	$637	$59	$0	$696

4.13 Droughts

Drought occurs when there is below-average precipitation over an extended period of time, affecting hydrological and agricultural concerns. Meteorological drought is the departure of precipitation from normal causes two other drought types that negatively affect areas. Hydrological drought occurs when a below average amount of precipitation affects the water table, potentially affecting drinking water supply. Agricultural drought occurs when there is not enough soil moisture to support crop growth or good pasture conditions. Extended widespread are infrequent; however, brief local events are common and can be severe.

4.13.1 Location

Droughts conditions can affect all areas and jurisdictions of the County.

4.13.2 Extent

Geauga County's large agricultural sector is extremely susceptible to drought and could potentially suffer significant economic losses. According to the National Weather Service, a drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. There are numerous types of droughts including meteorological, hydrological, agricultural, ecological, and snow. The most impactful to Geauga County include:

-Meteorological drought which is the departure of precipitation from normal that negatively impacts conditions in a given area.

-Hydrologic drought which is when a below average amount of precipitation affects the water table, possibly impacting drinking water.

-Agricultural drought which is when there is a lack of sufficient soil moisture for good farming conditions.

Droughts are categorized in five classifications. Below are the drought category meanings:

-D0 (Abnormally Dry) - Going into drought, short-term dryness slowing planting, growth of crops and pastures; fire risk above average. Coming out of drought, some lingering water deficits, pastures or crops not fully recovered.

-D1 (Moderate Drought) - Some damage to crops, pastures, fire risk high; streams, reservoirs or well low, some water shortage developing or imminent, voluntary water use restrictions requested.

-D2 (Severe Drought) - Crop or pasture loss likely, fire risk very high, water shortages common, water restrictions imposed

-D3 (Extreme Drought) - Major crop/pasture losses, extreme fire danger, widespread water shortages or restrictions

-D4 (Exceptional Drought) - Exceptional and widespread crop and pasture losses, exceptional fire risk, shortages of water in reservoirs, streams and wells causing water emergencies.

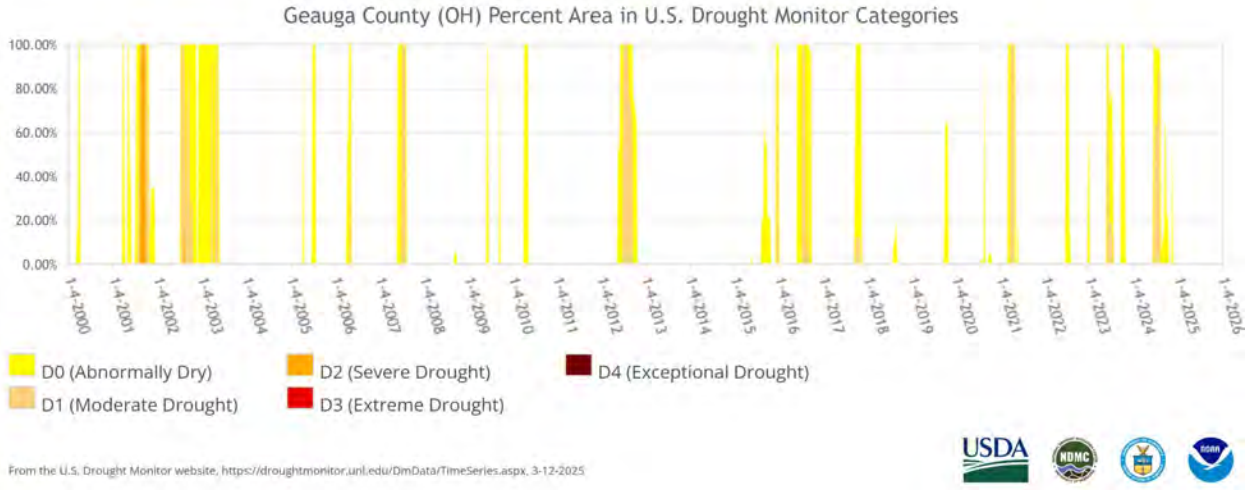


Figure 23 (above) *The above figure is a snapshot of drought conditions in Geauga County since 2000. The most notable drought for the county was in September of 2001, when widespread D2 conditions were observed. Graphic courtesy of the U.S. Drought Monitor.*

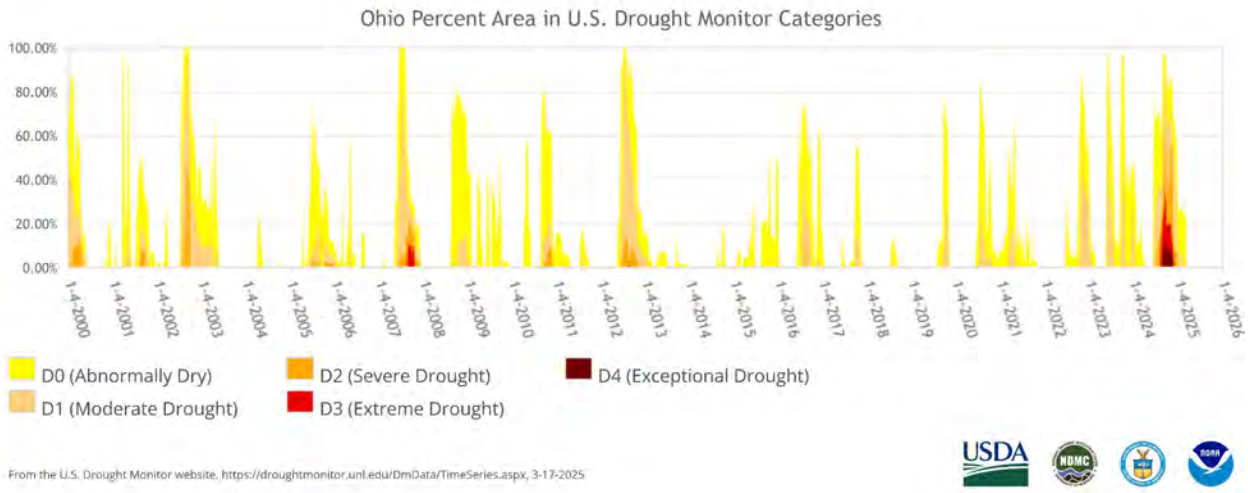


Figure 24 (above) *The above figure is a snapshot of drought conditions in the State of Ohio. There were numerous periods of drought throughout the last 25 years, with the most notable in 2007 and then again in 2024. In September 2024, D4 drought conditions were observed across approximately 8% of the state, with the bulk of this occurring in southeastern Ohio. Graphic courtesy of the U.S. Drought Monitor.*

4.13.3 Previous Occurrences

According to the National Centers for Environmental Information (NCEI) database, from 1950-2024 there were a total of 5 events specific to Geauga County. These have totaled an estimated $2,000,000 in crop damage. The crop damage all came from one large drought that took place in 1999. The most notable drought event for Geauga County occurred in September 1999. During that month, historic records show that less than 2 inches of rainfall occurred which resulted in significant negative impacts to crop conditions. There was late September heavy rainfall, however with how dry the antecedent conditions were, there was little relief for crops. Losses from reduced crop yields are estimated at nearly $200 million for northern Ohio alone. For further details on the NWS recordkeeping process, history, and definitions please refer to the *National Weather Service Instruction 10-1605 March 23, 2016, Operations and Services Performance, NWSPD 10-16 Storm data Preparation.*

2012 North American Drought

The 2012-2013 North American Drought is an expansion of the 2010-2012 United States droughts which began in the spring of 2012, when the lack of snow

in the United States caused very little melt water to absorb into the soil. The drought includes most of the US and including Ohio. Among many counties, Geauga County was designated with moderate drought conditions by mid-June. It has been equaled to similar effects as droughts in the 1930s and 1950s but it has not yet been in place as long. However, the drought has inflicted, and is expected the 1988-1989 North American Drought, which is the most recent comparable drought.

On July 30, 2012, the Governor of Ohio sent a memorandum to the USDA Ohio State Executive Director requesting primary county natural disaster designations for eligible counties due to agricultural losses caused by drought and additional disasters during the 2012 crop year. The USDA reviewed the Loss Assessment Reports and determined that there were sufficient production losses in 85 counties to warrant a Secretarial disaster designation. On September 5, 2012, Geauga County was one of those designated counties.

4.13.4 Probability

There have been 5 recorded drought occurrences in Geauga County according to since 1950. Since the year 2000, there have not been any events. This shows a trend of D0 drought conditions occurring once every 1.5 years in Geauga County and a D1 drought occurrence around every 3 years. For further details on the NWS recordkeeping process, history, and definitions please refer to the *National Weather Service Instruction 10-1605 March 23, 2016, Operations and Services Performance, NWSPD 10-16 Storm data Preparation.*

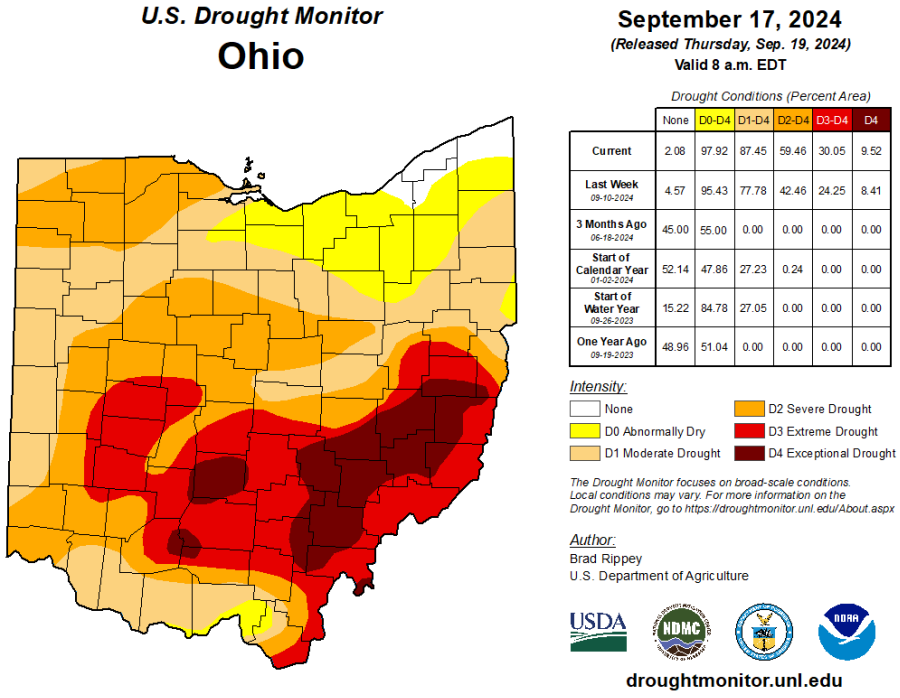
4.13.5 Vulnerability Assessment

Geauga County has a low risk of incurring damage from droughts. Due to the non-site-specific nature of this hazard, the best way to deal with preparing for future events is to consider historical occurrences. Because droughts are a non-site-specific hazard, the effects of drought should be evaluated countywide. There are no documented critical facilities that are considered at-risk as it relates to droughts. By itself, a drought does not damage developed property. However, over a long period of time, certain soils can expand and contract resulting in some structural damage to buildings. A small percentage of buildings in areas

with such soils suffer minor damage during their "useful lives." Therefore, the overall impact on the County's infrastructure will be very low.

Since droughts are non-site specific, the entire County population could be affected by the hot, dry conditions. The overall impact that droughts have on the Geauga County population is very low based on the number of events recorded by the National Climatic Data Center. Except for the 1999 drought, the County has not suffered significant property or crop damage due to extreme heat and drought conditions. Therefore, based on the number of occurrences, there is a low impact relative to property damage. Due to the infrequency of drought events in Geauga County, the overall impact on the economy is low. However, when droughts do occur, the economic losses would be countywide hitting the farming community the hardest.

Extended droughts may not be frequent, but there are often short periods of drought in the county that should be monitored. These exceptionally dryer times, coupled with extreme heat, can cause hardship and injury to people, animals, and the economy. (See Figure 25 below for a recent Drought Monitor look at Ohio). See Appendix G for the USDA Agricultural profile for Geauga County.



5.0 Local Hazard Mitigation Goals

5.1 Goals

Goals were needed for this planning effort to guide the review of the possible mitigation measures. The recommended actions of this plan are consistent with what is appropriate for Geauga County. Mitigation goals reflect community priorities and should be consistent with other plans for the county.

5.1.1 Severe Storms (Hail, Wind, Lightning, Heavy Rain)

Overall Goal: To educate the county's citizens to increase awareness of the dangers associated with heat and severe storms that occur in the warmer months, to provide adequate shelters where citizens can seek safety from severe weather, to improve the warning system and radio communications throughout the county and to expedite the clean-up process through coordination and equipment acquisition.

5.1.2 Winter Storms (Snow, Sleet, Ice)

Overall Goal: To educate the county's citizens to increase awareness of the dangers associated with winter storms, to reduce property damage caused by severe weather and to expedite the clean-up process through coordination and equipment acquisition.

5.1.3 Power Outages

Overall Goal: To educate the county's citizens to increase awareness of the frequency, cause, and dangers associated with power outages, to reduce damage to life or property caused by extended outages, and to guide citizens in finding reliable and accurate information during outages in order to make appropriate decisions.

5.1.4 Tornadoes

Overall Goal: To reduce the risk of injury and fatalities during an event by providing shelters and permanent structures where citizens can seek safety,

reduce potential damage through preplanning and increase citizen awareness of the hazards of tornadoes.

5.1.5 Floods (Flash, 100 yr)

Overall Goal: To save lives and property and reduce damage, to establish administrative controls for construction and to educate citizens on flood insurance and to increase citizens' awareness of the hazards associated with flooding

5.1.6 Extreme Temperatures (Heat, Cold)

Overall Goal: To reduce the risk of injury and to increase awareness of the hazards of Extreme Temperatures. Also, to provide emergency services and relief centers if needed.

5.1.7 Infectious Disease or Outbreak

Overall Goal: To increase awareness of the hazards of a disease epidemic event, to maintain operations of critical facilities and emergency services, and to establish administrative controls that address measures to preserve public health during a medical crisis.

5.1.8 Dams Failures

Overall Goal: To re-evaluate the number and classification of dams in the county, to evaluate administrative controls for regulating and maintaining new and existing dams and to develop better coordination and communication efforts between the state and Geauga County.

5.1.9 Earthquakes

Overall Goal: To increase awareness of the hazards of an earthquake event, to maintain operations of critical facilities and emergency services and to establish administrative controls that address earthquakes during construction

5.1.10 Wildfires (Forest, Brush, Grass, Agricultural)

Overall Goal: To educate the county's citizens and to increase awareness of wildfire causes in an effort to lessen the risks of wildfire to communities across Geauga County.

5.1.11 Droughts

Overall Goal: To install more equipment to aid in supplying water during a drought event, to establish administrative controls to limit potential property damage, to provide for potential alternate water supply through preplanning and to educate the general public of the hazards associated with drought and extreme temperatures.

5.2 Completed/Deleted Activities

The Planning Team revised the previous Mitigation Plan (2020). This included removing activities that actions have taken place to complete the items. In addition, the group felt some of the items needed to be deleted due to the Project not being feasible or beneficial to the County and its residents.

Completed/Deleted Activities			
Hazard	**Activity**	**Status**	**Comments**
Severe Storm	Provide an alternate power source, such as back-up generators, for those sensitive populations and critical facilities that must have continuous power to preserve and protect human health.	Complete	The EMA has developed a response generator trailer for the use in power outages
Severe Storm	Geauga County has a comprehensive Spillman System. Evaluate need (seek funding) for data information sharing (network infrastructure) to help with coordinated damage assessments and continued technological updates.	Complete	The county had made many upgrades to their network over the past 5 years
Tornadoes	Knowing that sirens are for outdoor notification only the Planning Team would like to seek funding for NOAA weather alert radios to reach out to residents that are within their homes. Also, there should be outreach and awareness conducted regarding low cost and free technology available that relays reliable weather and warning information, such as phone apps.	Deleted	With the advanced technology of today, most people have smartphones and internet access that have countless apps and warning systems available

Tornadoes	Look into and seek funding for residential storm shelters. Also, identify and develop a method for appropriate distribution and allocation of any potentially received funds.	Deleted	Due to the efforts in finding funding for community storm shelters, the planning team thought that this additional effort would be redundant
Floods	Insurance agents need education on the requirements of purchasing flood insurance. Insurance agents are misinforming residents about the requirements of flood insurance. Outreach to insurance agents	Deleted	Other priority action items go into detail regarding public outreach efforts and thus this would be redundant
Dam Failure	Dam Safety for the planning group is a significant issue, especially since there are so many unknowns. The planning group would like to evaluate the use of mitigation dollars to help dam owners in the county.	Complete	No funding sources were found that would allow mitigation dollars to help dam owners in the county during the investigation period

5.3 Action Plan for Hazards

In developing the list of mitigation activities, the planning team prioritized activities based on economic and technical feasibility. The group reviewed the activities from the previous plan and determined what items were completed, those that needed deletion and any items that may need to be added or revised. Once this was completed, the group reviewed the remaining activities and prioritized them. There were two informally established categories of mitigation initiatives that were reviewed by the committee, general activities and mitigation projects. Those activities considered to be general in nature were generated by the planning team itself and were approved through the consensus of the group. Cost effectiveness is required to be addressed as part of the planning process for all proposed mitigation projects. Consideration of the availability of not only local funds, but also on the potential availability of outside sources of funds (State, federal and other grants) must be included.

The following is a summary of the mitigation strategy for Geauga County. Though there are numerous actions that could be taken that may address each individual hazard or multiple hazards, the planning team has listed several priority actions under each individual hazard. The collective of all actions are not organized in order of total priority,

but within each hazard irrespective of other hazards. Also, each hazard gives a list of lead entities that are responsible for helping with the hazard/ action items for said hazard. Due to this being a multi-jurisdictional plan, local government is a large part of these action items. The participating jurisdictions of this plan are the City of Chardon, villages of Burton, Hunting Valley, Middlefield and South Russell, and the townships of Auburn, Bainbridge, Burton, Chardon, Chester, Claridon, Hambden, Huntsburg, Middlefield, Montville, Munson, Newbury, Parkman, Russell, Thompson, and Troy. All unincorporated jurisdictions are under the authority of Geauga County for the adoption of the plan. A listing of the prioritized actions can be found in Appendix E

Severe Storms (Hail, Wind, Lightning, Heavy Rain)

Lead: National Weather Service (NWS), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office, and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management (EMA), Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Continue to distribute outreach/pamphlets on preparedness activities as it relates to storms. Disseminate storm warnings and other weather awareness information to the public through social media and other outlets. Promote and maintain an interactive hazard outreach website. Responsible implementing agency and position Geauga County DES/EMA, Director.
Priority Activity 2: Geauga County has a substantial agricultural component. Coordinate with the agricultural community on disaster preparedness and response as it related to severe storms. Responsible implementing agency and position Geauga County DES/EMA, Director.

Winter Storms (Snow, Sleet, Ice)

Lead: National Weather Service (NWS), Geauga County Engineer's Office, and/or Municipal and Township Road/Service Departments, local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Emergency Management Agency (EMA), Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.

Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Every winter there is a problem with uninformed residents utilizing improper or old heating sources such as kerosene heaters. Conduct outreach to residents on the use of improper heating sources. Promote and maintain the interactive hazard outreach website which includes information about winter storms and heat sources. Responsible implementing agencies and positions Geauga County DES/EMA Director and local fire departments, Fire Chief.

Power Outages

Lead: First Energy Corp./Ohio Edison (Utility), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management Agency (EMA), Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Develop a list of Critical Infrastructure throughout the county. Identify their backup power needs and capabilities, as well as coordinating the list with the electric utility company for repair priority. Responsible implementing agency and position Geauga County DES/EMA, Director.

Priority Activity 2: Educate the public on the safe use of generators and the dangers of carbon monoxide. Promote and maintain the hazards outreach website to include power outage safety. Responsible implementing agencies and positions Geauga County DES/EMA, Director.

Priority Activity 3: Identify which gas stations, stores, and other fuel sources throughout the county have backup generators. Responsible implementing agencies and positions Geauga County DES/EMA, Director

Priority Activity 4: There have been several locations identified as critical locations to be used at the time of an emergency event. These locations may need to have backup generators and currently do not have the proper hook up for the

generator. Aim to seek funding to assist with getting the proper hook up for generators at these locations. Responsible implementing agency and position Geauga County DES/EMA, Director.

Tornadoes

Lead: National Weather Service (NWS), Local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management Agency (EMA), Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: There is a need to better define and establish a shelter network throughout Geauga County. Aim to seek funding for the shelter network (public/private). Responsible implementing agency and position Geauga County DES/EMA, Director.
Priority Activity 2: Evaluate the need for storm shelters in existing schools and new schools. Potentially seek funding for storm shelters within critical facilities. Responsible implementing agencies and positions Geauga County DES/EMA, Director and the Geauga County School District Superintendents.
Priority Activity 3: Aim to seek funding for multi-use storm shelters within public parks and campgrounds (multi-use possibility). Responsible implementing agency and position Geauga County DES/EMA, Director.
Priority Activity 4: Aim to seek funding for the establishment of storm shelter networks within mobile home parks. Possible funding may be available through Community Development Block Grant Programs. Responsible implementing agency and position Geauga County DES/EMA, Director.

Floods (Flash, 100yr)

Lead: National Weather Service (NWS), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Emergency Management (EMA), Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments**,** Geauga County Building Department,

Geauga County Soil and Water Conservation District and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: The Chagrin River Watershed Partner boundaries are within Geauga County and there have been several communities within Geauga County that have adopted riparian buffer overlays. Hazardous areas should be identified, and communities should be made aware of these hazards and potential remedies. Responsible implementing agencies and positions Geauga County DES/EMA, Director and the Geauga County Soil and Water Conservation District, Board.
Priority Activity 2: Identify any repetitive loss properties within Geauga County. Responsible implementing agencies and positions Geauga County DES/EMA, Director, Geauga County Building Department, and the Geauga County Soil and Water Conservation District, Board.
Priority Activity 3: Investigate and consider the process and possibilities involved in the acquisition, demolition, and/or retrofit of flood-prone properties. Responsible implementing agencies and positions Geauga County DES/EMA, Director, Geauga County Building Department, and the Geauga County Soil and Water Conservation District, Board.

Extreme Temperatures (Heat, Cold)

Lead: National Weather Service (NWS), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Identify additional locations that can serve as warming and cooling centers. Responsible implementing agencies and position Geauga County DES/EMA, Director.
Priority Activity 2: Promote and maintain the hazard outreach website to include information on extreme temperature safety. Also, promote and disseminate information regarding any open warming or cooling centers during

an extreme temperature event. Responsible implementing agencies and position Geauga County DES/EMA, Director.

Infectious Disease or Outbreak

Lead: Geauga Public Health (GPH), Ohio Department of Health (ODH), UH Geauga Medical Center (Hospital), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Continue to educate and distribute outreach/pamphlets on preparedness activities as it relates to infectious disease. Promote and maintain the hazard outreach website and other materials that provide public awareness. Responsible implementing agencies and position Geauga County Public Health and DES/EMA, Director.

Priority Activity 2: Public Health and EMA will coordinate on identifying and securing Point of Dispensing (POD) locations and assisting in acquiring supplies such as personal protective equipment (PPE). Responsible implementing agencies and position Geauga County Public Health and DES/EMA Director.

Priority Activity 3: Encourage information sharing between Geauga Public Health and the EMA to include surveillance reports and help implement corrective actions from the COVID-19 Pandemic. Disseminate appropriate information for public awareness and emergency response. Responsible implementing agencies and position Geauga County Public Health and DES/EMA, Director.

Dam Failure

Lead: Ohio Department of Natural Resources (ODNR), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Seek to obtain/maintain EAP's and inundation data for all Class I and II dams in Geauga County. Responsible implementing agencies and positions Geauga County DES/EMA, Director and the State of Ohio: ODNR

Priority Activity 2: Seek to rehabilitate or mitigate all high hazard potential dams in Geauga County, if funding is available. Responsible implementing agencies and positions Geauga County DES/EMA, Director and the State of Ohio: ODNR

Earthquakes

Lead: Ohio Department of Natural Resources (ODNR), United States Geological Survey (USGS), Local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.

Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: There are many unknowns and misconceptions when it comes to earthquakes. For example, many residents in Geauga County are unaware that earthquakes are not typically covered by their homeowner's insurance. Promote and maintain the hazard outreach website, which should include earthquake safety information. Responsible implementing agencies and positions Geauga County DES/EMA, Director

Wildfires (Forest, Brush, Grass, Agricultural)

Lead: Ohio Department of Natural Resources (ODNR), State Fire Marshal (SFM), local Fire/EMS, local Law Enforcement, Geauga County Sheriff's Office, Geauga County Engineer's Office and/or Municipal and Township Road/Service Departments, Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.

Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: Promote and maintain the hazard outreach website to include information regarding wildfire prevention, burn bans, and fire safety. Responsible implementing agencies and positions Geauga County DES/EMA Director, Ohio Department of Natural Resources (ODNR), State Fire Marshal (SFM).

Droughts

Lead: Ohio Department of Natural Resources (ODNR), Ohio State University Extension, Ohio Farm Bureau (Geauga County), Geauga County Emergency Management Agency (EMA), and Mayor, Council, Administrator or other appropriate authorities of participating jurisdictions.
Timeframe: January 1, 2025 – December 31, 2030

Priority Activity 1: There are numerous businesses in Geauga County that are dependent on water, such as farms. Encourage information sharing between the Ohio State University Extension, Ohio Farm Bureau and the EMA to include information on water dependent businesses and agricultural concerns. Collaborate to deal with the potential problems with a long-term drought. Disseminate appropriate information for public awareness. Responsible implementing agency and position Ohio State University Extension, Ohio Farm Bureau, Geauga County DES/EMA, Director.

Over the course of the five-year implementation period of the mitigation plan, there may be other proposed mitigation activities that the planning team will need to consider. Proposals for additions or modifications to the action plan section may result from conditions noted during a particular task(s) performed in conjunction with a specific mitigation activity. Modifications or additions may also be prompted by public responses as a part of their ongoing opportunities to participate in the mitigation planning and implementation process. The planning team will evaluate proposed modifications to the Action Plan section and determine their viability for inclusion in the plan. Incorporation of any additions or changes to the plan is also discussed in the plan maintenance section.

6.0 Plan Maintenance Process

6.1 Plan Monitoring, Evaluation and Update Process

The planning period for Geauga County Mitigation Plan is every five years. This planning cycle is consistent with FEMA requirements. The Geauga County Department of Emergency Services is solely responsible for the maintenance of the Hazard Mitigation Plan. The Geauga County Department of Emergency Services will facilitate a planning evaluation meeting with members of the Planning Group as needed, especially during periods following a disaster event. The Director of Emergency Services will be responsible for contacting group members and organizing the evaluation meeting. Any meeting will be announced by invitation and advertised in advance by newspapers, the website, and other media. The group, at a minimum, will consist of representatives of the following:

- Geauga County Board of County Commissioners
- Geauga County Department of Emergency Services
- Geauga County Fire Chiefs' Association
- Geauga County Police Chiefs' Association
- Geauga County Sheriff's Office
- Geauga County Township Association
- Geauga Public Health
- Incorporated Municipality Governments

The group will utilize these meetings to evaluate the Hazard Mitigation Plan and how disasters affected their respective jurisdictions during the period. Prior to the meeting, the planning group shall review their mitigation sections for any changes needed. Local group member representatives shall keep a log of natural disasters in their jurisdiction, including financial loss information, if available, to discuss at the meeting. After the meeting, the jurisdictions will adopt any changes made to the plan.

The Geauga County Department of Emergency Services will regularly stay in contact with each jurisdiction to address preparation and education issues regarding hazard

events within the county and its municipalities. Each lead agency for mitigation activities will be responsible for compiling data and presenting this information at the review meeting. The planning team will then be responsible for determining the status of each mitigation activity and whether they are worth continuing throughout the county.

The planning team, led by the director, will also be responsible for updating the Hazard Mitigation Plan before the five-year planning cycle expires. The planning group will be responsible for developing a funding source, procurement of services, and preparation of the scope of work for future plans.

6.2 Plan Incorporation

The planning team, which has representatives from various jurisdictions, industries, and county offices, will incorporate appropriate elements of the Hazard Mitigation Plan as any local planning mechanisms are developed or updated, in accordance with the planning process (Reference Sections 2.7 and 3.5). Besides the adoption of the plan by participating jurisdictions, the 2019 Hazard Mitigation Plan was used as a reference in the development process for plans, procedures, and exercise design for participating jurisdictions, businesses, non-profits, and agencies in the county. The 2025 Hazard Mitigation Plan is encouraged to be used as a reference as well.

6.3 Continued Public Involvement

Since public participation is crucial in the completion and update of the mitigation plan, the current plan will be posted at the local Department of Emergency Services, located at 12518 Merritt Road, Chardon, Ohio and the Geauga County Department of Emergency Services Website. In addition, the new interactive Geauga County Hazard Mitigation Outreach Website will be available to the public for continued education, assessment, survey, and comment.

Any future planning group meetings will be advertised to the public by local media, the agency website, and the outreach website. The public is encouraged to attend and participate in any plan updates. In addition, all meeting dates, agendas, minutes and plan updates will be on the Geauga County Department of Emergency Services website and the Geauga County Hazard Mitigation Outreach Website. Additional community

outreach will be completed throughout the five-year cycle to involve residents in the planning process. This outreach may include presentations, seminars and/ or attendance at various events and promotion of mitigation activities.

Appendix A

List of Attendees and Invitation Letters

The Geauga County Natural Hazards Mitigation Plan was created with the help of various agencies, leaders, and stakeholders from within the community. This appendix provides details on letters that were sent out prior to the start of the review of the plan and sign in sheets of those that assisted in the planning process.

Sign-in-Sheet

Geauga County Hazard Mitigation Plan Meeting 1

02-13-2025

	PRINT NAME:	Agency:	Email Address:
1	Austin Rice	Geauga EMA	arice@co.geauga.oh.us
2	BRANDON REED	GEAUGA EMA	BMReed@geauga.oh.gov
3	TJ ROWAN	Sheriff's Office	TROWAN@GEAUGAOH.GOV
4	Mallorie Berry	Great Lakes Cheese	mallorie.berry@greatlakescheese.com
5	Sara Lippi	Cuyahoga County EMA	slippi@cuyahogacounty.gov
6	MICHAEL RIZZO	SOUTH RUSSELL P.D.	SRPDRIZZO@GMAIL.COM
7	Christin LaKomiak	G. M Entral Health & RS	CLakomiak@Geauga.org
8	Linda Burhenne	BOCC	lburhenne@geauga.oh.gov
9	Jim Powers	UH GEAUGA	james.powers@uhhospitals.org
10	SCOTT NIEHUS	CHARDON POLICE	SNIEHUS@CHARDON.COM
11	Randy Sharpe	City of Chardon	RSharpe@chardon.com
12	Justin Geiss	Chardon Fire	Jgeiss@chardonfire.com
13	Kevin Friis	Cuyahoga County EMA	KFriis@Cuyahogacounty.gov
14	TIM FOWLER	Village South Russell	STREET@southrussell.com
15	MIKE SANTILLI	GCSO	MSANTILLI@GEAUGA.OH.GOV
16	Loan Nguyen	OEMA	lknguyen@dps.ohio.gov
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Sign-in-Sheet

Geauga County Hazard Mitigation Plan Meeting 2

EMERGENCY MANAGEMENT GEAUGA COUNTY

03-06-2025

	PRINT NAME:	Agency:	Email Address:
1	BRANDON REED	GEAUGA DES/EMA	BMReed@geauga.oh.gov
2	STEPHEN KNITTEL	GEAUGA AUDITOR GIS	SKNITTEL@GEAUGA.OH.GOV
3	ED KOPCAK	AMERICAN RED CROSS	ED.KOPCAK@REDCROSS.ORG
4	Mike Williams	UMC Disaster Response Services	Mike.Kaufmisurance@gmail.com
5	Linda Crombie	Planning Commission	lcrombie@co.geauga.oh.us
6	Allyson Kobus	Planning Commission	akobus@co.geauga.oh.us.
7	DAN LARK	Geauga Public Health	DLARK@GeaugaCountyHealth.org
8	Katie Taylor	GCEO	ktaylor@geauga.oh.gov
9	TRACI SALKIEWICZ	GCEO	tsalkiewicz@geauga.oh.gov
10	Mandy Orahood	Farm Bureau	aorahood@ofbf.org
11	Bob Rogish	Farm Bureau	rogishfarmmgmt@gmail.com
12	TJ Rogers	GC50	trogers@geauga.oh.gov
13	SCOTT NIEHUS	CHARDON POLICE	SNIEHUS@CHARDON.GOV
14	Mallorie Berry	Great Lakes Cheese	mallorie.berry@greatlakescheese.com
15	Roger Peterson	DES	RPETERSON@GEAUGA.OH.GOV
16	Justin Geiss	Chardon Fire	jgeiss@chardonfire.com
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Sign-in-Sheet

Geauga County Hazard Mitigation Plan Meeting 2

EMERGENCY MANAGEMENT GEAUGA COUNTY

03-06-2025

	PRINT NAME:	Agency:	Email Address:
1	Austin Rice	Geauga EMA	arice@co.geauga.oh.us
2	Michael Rizzo	South Russell	MRizzo@southrussell.com
3	Lydia Castner	GPH	lcastner@geaugacountyhealth.org
4	Gina M. Hofstetter	CED	ghofstetter@geaugaced.com
5	Frank Antinucci	AOP	
6	Scott Hildebrand	GCSO	
7	Chrishil Laycock	MHMS	
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Sign-in-Sheet

Geauga County Hazard Mitigation Plan Update Meeting #3

04/02/2025

	PRINT NAME:	Signature:	Agency:
1	BRANDON REED		GEAUGA DES
2	Austin Rice		Geauga EMA
3	MICHAEL RIZZO		SOUTH RUSSELL
4	STEPHEN KNITTEL		GEAUGA GIS
5	Bob Roglish		Geauga Farm Bureau
6	TJ ROWAN		GCSO
7	SCOTT A. HILDEBRAND		GCSO
8	DAN LAIRK		GPH
9	Mike Williams		United Methodist Disaster Service
10	Frank Antenucci		ADP / Auditor GIS
11	Kandy Shaw		City of Chardon
12	MATT DELISA		CHARDON P.D.
13	Lydia Castner		GPH
14	Linda Cimbre		Planning Commission
15	Mallorie Berry		Great Lakes Cheese
16	Justin Geiss		Chardon Fire
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Sign-in-Sheet

Geauga County Hazard Mitigation Plan Update Meeting #4

05/21/2025

	PRINT NAME:	Signature:	Agency:
1	Austin Rice		Geauga EMA
2	Michael Rizzo		South Russell P.D.
3	Daniel Spada		Geauga Building Dept
4	Mallorie Berry	Mallorie Berry	Great Lakes Cheese
5	Bob Raglish		Geauga Farm Bureau
6	Stephen Knebel		Geauga Auditor GIS
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GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey, Esq. James W. Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 14, 2025

Dear Representative

The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. The current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

The hazard mitigation plan update will focus on reengaging the public and reviewing/revising the risk assessments, goals, and action plan. As local agencies involved in hazard mitigation activities, we hope that you will be an integral part in this update. A meeting has been scheduled for Thursday, February 13, 2025 at 10:00 a.m. at the Geauga County Department of Emergency Services located at 12518 Merritt Road, Chardon, Ohio 44024. Luan K. Nguyen, State Mitigation Planner, from the Ohio Emergency Management Agency will provide a presentation on mitigation planning at the meeting.

A current copy of the Geauga County Countywide All Natural Hazard Mitigation Plan is located on the Geauga County Department of Emergency Services website. If you wish to review the plan, please follow the link below https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services

Cc: Geauga County Sheriff's Office
Geauga County Police Chief's Association
Geauga County Township Association
Geauga Public Health
Geauga County Fire Chief's Association
Geauga County Board of Commissioners
Geauga County Board of Mental Health and Recovery Services

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 14, 2025

Dear Representative

The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. The current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

Please consider this correspondence our notification to adjacent counties that Geauga County is actively engaged in the update process. Each incorporated community within Geauga County represented in the plan must participate in its update. Community participation in the update process not only enhances the plan's development, but it also required by FEMA

A meeting has been scheduled for Thursday, February 13, 2025 at 10:00 a.m. at the Geauga County Department of Emergency Services located at 12518 Merritt Road, Chardon, Ohio 44024. Luan K. Nguyen, State Mitigation Planner, from the Ohio Emergency Management Agency will provide a presentation on mitigation planning at the meeting.

A current copy of the Geauga County Countywide All Natural Hazard Mitigation Plan is located on the Geauga County Department of Emergency Services website. If you wish to review the plan, please follow the link below https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services

Cc: Chardon Burton Middlefield
Hunting Valley South Russell

Roger Peterson • 440-279-2171 • Fax: 440-286-1023 • rpeterson@co.geauga.oh.us

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 14, 2025

Dear Representative

The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. The current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

Please consider this correspondence our notification to all communities that Geauga County is actively engaged in the update process. Should you want to review the current version of our County's Hazard Mitigation Plan, it is posted on our website: https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/. Upon review, feel free to contact me at the email below with any input or questions you may have.

The hazard mitigation plan update will focus on reengaging the public and reviewing/revising the risk assessments, goals, and action plan. A meeting has been scheduled for Thursday, February 13, 2025 at 10:00 a.m. at Geauga County Department of Emergency Services located at 12518 Merritt Road, Chardon, Ohio 44024. Representatives from the State of Ohio will be present to assist with guidance on how to update this Plan. The Department of Emergency Services will complete updates and the required documentation.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson
Geauga County
Department of Emergency Services

Cc: Great Lakes Cheese Company
Masco Corp/KraftMaid Cabinetry Inc
Tarkett/Johnsonite Inc
University Hospital Health System

Roger Peterson • 440-279-2171 • Fax: 440-286-1023 • rpeterson@co.geauga.oh.us

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 16, 2025

Dear Representative

The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. The current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

Please consider this correspondence our notification to adjacent counties that Geauga County is actively engaged in the update process.

A meeting has been scheduled for Thursday, February 13, 2025 at 10:00 a.m. at the Geauga County Department of Emergency Services located at 12518 Merritt Road, Chardon, Ohio 44024. Luan K. Nguyen, State Mitigation Planner, from the Ohio Emergency Management Agency will provide a presentation on mitigation planning at the meeting.

A current copy of the Geauga County Countywide All Natural Hazard Mitigation Plan is located on the Geauga County Department of Emergency Services website. If you wish to review the plan, please follow the link below https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services

Cc: Ashtabula County, Cuyahoga County, Lake County, Portage County, Summit County, Trumbull County

Roger Peterson • 440-279-2171 • Fax: 440-286-1023 • rpeterson@co.geauga.oh.us

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 14, 2025

To Whom It May Concern

Per Section 201.6 44CFR, The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. Accordingly, the current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

Please consider this correspondence our notification to the public that Geauga County is actively engaged in the update process. Each incorporated community within Geauga County represented in the plan must participate in its update. Community participation in the update process not only enhances the plan's development, but it is also required by FEMA. Should you want to review the current version of our County's Hazard Mitigation Plan, it is posted on our website: https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/. Upon review, feel free to contact me at the email below with any input or questions you may have. A public hazards survey will be sent out in the next few months to solicit additional public input. Once, the Plan's update is complete and it is approved by FEMA, each jurisdiction will need to formally re-adopt the updated document. Additional information will be provided regarding this adoption at a future time.

In addition, the hazard mitigation plan update will focus on reengaging the public and reviewing/revising the risk assessments, goals, and action plan. An initial meeting for the planning team has been scheduled for Thursday, February 6, 2025 at 10:00 a.m. at the Geauga County Department of Emergency Services. Representatives from the State of Ohio will be present to assist with guidance on how to update this Plan. The Department of Emergency Services will complete updates and the required documentation.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services

Roger Peterson • 440-279-2171 • Fax: 440-286-1023 • rpeterson@co.geauga.oh.us

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Monday May 19, 2025

Public Notice

Per Section 201.6 44CFR, The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. Accordingly, the current Geauga County Countywide All-Natural Hazard Mitigation Plan will need to be updated and ultimately approved by the Federal Emergency Management Agency (FEMA) by the end of 2025.

We ask each incorporated community within Geauga County to participate in its update. Community participation in the update process not only enhances the plan's development, but it is also required by FEMA. Should you want to review the current version of our County's Hazard Mitigation Plan, it is posted on our website: https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/. Upon review, feel free to contact me at the email below with any input or questions you may have. Additionally, a Public Outreach Website has been created for citizens and stakeholders to review. That website can be located at: https://hazard-mitigation-planning-geauga.hub.arcgis.com/. The draft is available on the Public Outreach Website also, as well as interactive maps, a public survey, and other information.

Once the plan update is complete and is ultimately approved by FEMA, each incorporated jurisdiction will need to formally adopt the updated plan document. Additional information will be provided regarding this adoption at a later date.

A ***Public Draft Review Meeting*** has been scheduled for ***Monday June 30, 2025, at 10:00 a.m.*** This meeting will be located at the Geauga County Department of Emergency Services, 12518 Merritt Rd. Chardon, Ohio 44024. Members of the public are invited to attend this meeting to participate in reviewing the draft of the plan prior to it being forwarded to the State of Ohio and FEMA for final approval.

Please contact me if you are interested in attending this meeting

Sincerely,

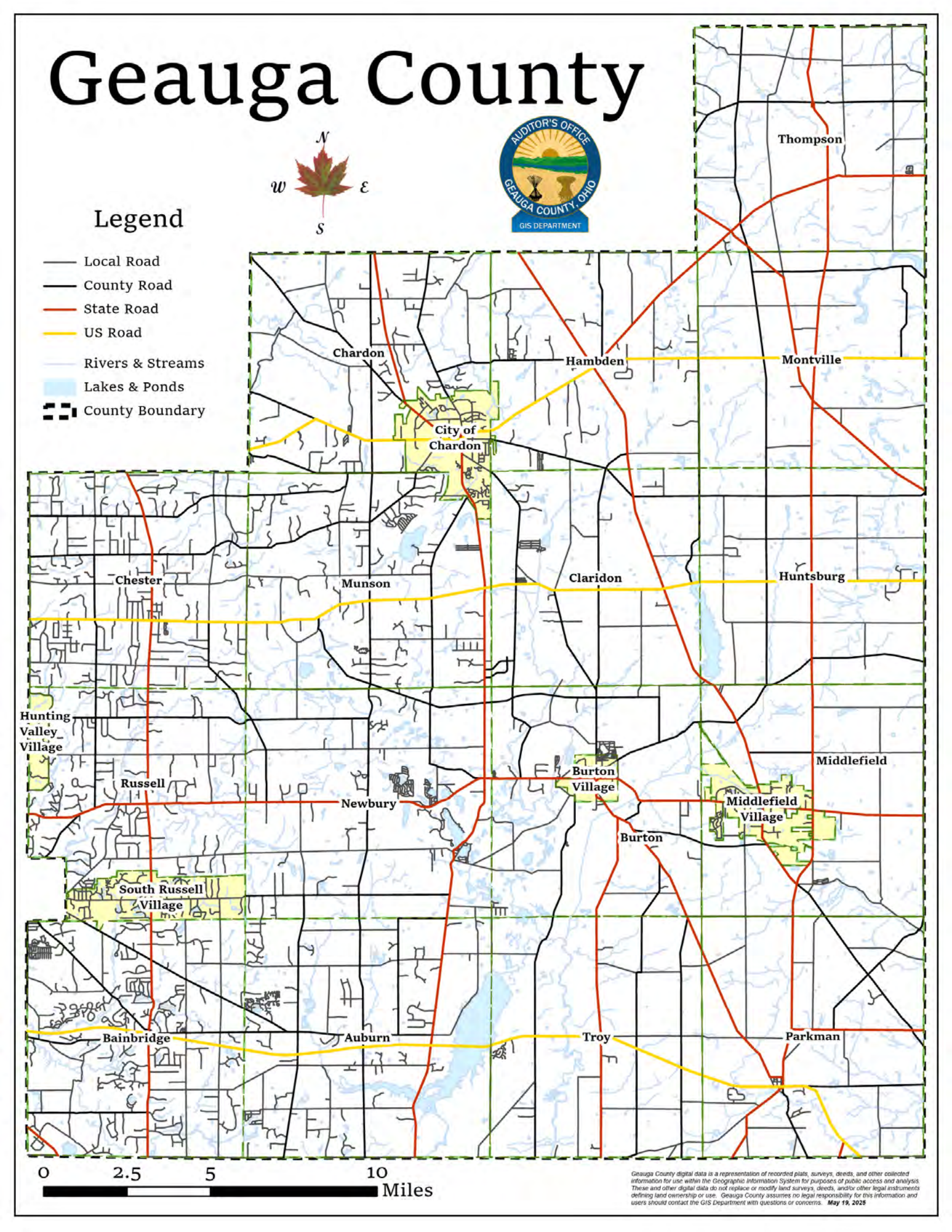
Roger M. Peterson, Director
Geauga County
Department of Emergency Services
RPeterson@co.geauga.oh.us
(440)279-2171

Appendix B

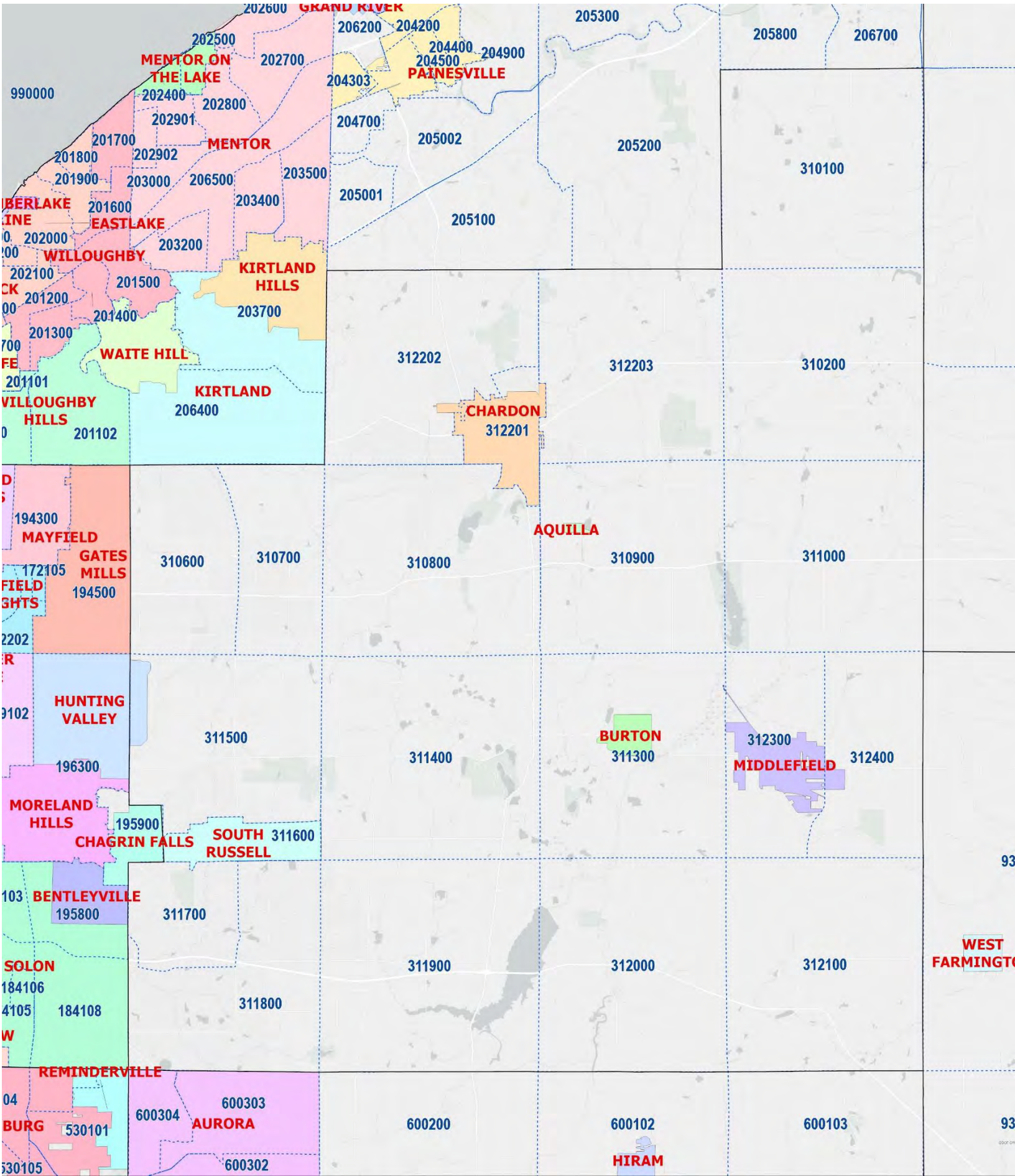
Geauga County Maps

Appendix B provides two maps of Geauga County. The first map outlines the cities, villages, and townships within the geographical and jurisdictional boundaries of Geauga County. The second map shows the Census Tracts of Geauga County, which is used to interpret the data from the hazard vulnerability assessments in the plan.

Geauga County



Geauga County Census Tracts



Appendix C

Meeting Minutes

Appendix C provides documented meeting minutes that contain detailed agendas for completion of the review of the Geauga County Natural Hazards Mitigation Plan.

Hazard Mitigation Planning Meeting 1
Meeting Minutes
2-13-2025

Introductions

- In attendance
  - Luan K. Nguyen, Ohio EMA
  - Brandon Reed, Department of Emergency Services
  - Austin Rice, Department of Emergency Services
  - Randy Sharpe, City of Chardon
  - Scott Niehus, Chardon PD
  - Tom Rowan, Geauga County Sheriff's Office
  - Mallorie Berry, Great Lakes Cheese
  - Sara Lippi, Cuyahoga County EMA
  - Michael Rizzo, South Russell PD
  - Linda Burhenne, Geauga County Board of County Commissioners
  - Jim Powers, UH Geauga Medical Center
  - Justin Geiss, Chardon FD
  - Kevin Friis, Cuyahoga County EMA
  - Mike Santilli, Geauga County Sheriff's Office
  - Tim Young, Village of South Russell
  - Christine Lakomiak, Geauga Mental Health and Recovery Services

What is Mitigation?

- "…Any action taken to reduce or eliminate long term risk to people and property from natural disasters. "
- "Hazard Mitigation planning is a process used by State, tribal, and local governments to identify risks and vulnerabilities associated with natural disasters and develop mitigation strategies to reduce or eliminate long term risks. "
  Planning Process
- Luan K. Nguyen -State Hazard Mitigation Planner (OEMA)

Geauga County's Current Mitigation Plan

- **1.0 Introduction**
  - Introduction, Purpose, Participating Communities
- **2.0 Community Information**
  - County Profile, Geography, Transportation, Economy, Utilities, Social and Economic Characteristics, Geauga County Information, County Development
- **3.0 Countywide All Natural Hazards Mitigation Planning Process**
  - Plan Adoption, Participation, Planning Process, Public Outreach and Other Stakeholder Involvement, Integration with Existing Plans, Finalization Process, NFIP Compliance Activities
- **4.0 Identification of Hazards and Risks**
  - Hazard Analysis, Hazard Identification, Winter Storms, Severe Storms, Power Outages, Tornadoes, Floods, Earthquakes, Dam Failure, Disease, Droughts and Extreme Heat, Wildfires
- **5.0 Goals**

    - Goals, Completed/Deleted Activities, Action Plan for Hazards
- **6.0 Plan Maintenance Process**
    - Plan Monitoring, Evaluation, and Update process, Plan Incorporation, Continued Public Involvement
- **Appendixes**
    - List of Participants and invitation Letters, Geauga County Map, Meeting Minutes, Outreach Information, Action Plan
    -

Important Elements of a Hazard Mitigation Plan

- *Community Involvement* – Community involvement is vital in the reviewing of the plan. All incorporated jurisdictions must adopt the plan.
- *Hazard Determination* – This section identifies what hazards can happen within the county and provides a review on those hazards.
- *Vulnerability Assessment* – This section reviews how vulnerable Geauga County is to property damage and threats to public health and safety.
- *Goal Determination* – The sections list the overall goal that the county would like to accomplish under each hazard identified.
- *Hazard Mitigation Projects* – This section lists out the agreed upon mitigation projects that the county would like to implement.
- *Identification of activities and action plan* – This section identifies an action plan for completion of the Hazard Mitigation Projects that were identified in the previous section.
- *Plan Maintenance and Schedule* – This section identifies a plan maintenance schedule to keep the plan reviewed, updated and current.

Completed Actions

- *Hazard Mitigation Plan Review* – Presentation by Luan with OEMA
- *Outreach* – Outreach on the plan has already begun. The plan has been posted on the website, and is available to be viewed at the Department of Emergency Services Office. Also, a public notice has been advertised in the Geauga County Maple Leaf. In addition to this public outreach, formal letters have been sent to local communities, businesses, agencies, and neighboring counties as a means of invitation to participate in the plan review process.
- *Plan Review* – Reviewed sections 1.0, 2.0, and 3.0 in the previous plan.

Next Meeting

- **Next meeting is set for Thursday, March 6, 2025 at 10:00am at the Department of Emergency Services**
- If there is anyone that you feel should be a part of the planning process, please provide us with their contact information, and they will be invited to the next meeting. Suggestions were made to include water and similar utilities.

Action Items

- Please review sections 1.0, 2.0, and 3.0 and let us know if there are any changes or updates needed. In addition, prepare for the next meeting by looking at section **4.0 Identification of Hazards and Risks.** We will be reviewing and updating these sections. If you or your agencies are able to provide any additional information that would be a benefit to the review for these sections, please contact us.

Hazard Mitigation Planning Meeting 2
Meeting Minutes
3-6-2025

Introductions

- In attendance
  - Roger Peterson, Department of Emergency Services
  - Austin Rice, Department of Emergency Services
  - Brandon Reed, Department of Emergency Services
  - Scott Niehus, Chardon PD
  - Tom Rowan, Geauga County Sheriff's Office
  - Mallorie Berry, Great Lakes Cheese
  - Michael Rizzo, South Russell PD
  - Justin Geiss, Chardon FD
  - Christine Lakomiak, Geauga Mental Health and Recovery Services
  - Stephen Knittel, Geauga County Auditor, GIS
  - Ed Kopcak, American Red Cross
  - Mike Williams, Chardon United Methodist Church
  - Linda Crombie, Geauga County Planning Commission
  - Allyson Kobus, Geauga County Planning Commission
  - Dan Lark, Geauga Public Health
  - Lydia Castner, Geauga Public Health
  - Katie Taylor, Geauga County Engineer's Office
  - Traci Salkiewicz, Geauga County Engineer's Office
  - Mandy Orahood, Geauga Farm Bureau
  - Bob Rogish, Geauga Farm Bureau
  - Gina Hofstetter, Geauga County Community and Economic Development
  - Frank Antenucci, Geauga County Automatic Data Processing
  - Scott Hildenbrand, Geauga County Sheriff's Office

2025 Identified Hazards

1. Severe Storms (Thunderstorms, Lightning, Wind, Hail)
2. Winter Storms (Snow, Sleet, Ice)
3. Power Outages
4. Tornadoes
5. Floods (25yr, 100yr, 500yr)
6. Extreme Temperatures (Heat, Cold)
7. Disease (Epidemic)
8. Dam Failure
9. Earthquakes
10. Wildfires
11. Droughts

Next Meeting

- **Next meeting is set for Thursday, April 2, 2025 at 10:00am at the Department of Emergency Services**

Action Items

- Please review sections **5.0 Local Hazard Mitigation Goals** and **6.0 Plan Maintenance Process** for the next meeting. We will be reviewing and updating these sections. If you or your agencies can provide any additional information that would be a benefit to the review for these sections, please contact us.

- Please continue to work on previous action items as well, if you are still working on a specific portion of the plan.

Hazard Mitigation Planning Meeting 3
Meeting Minutes
4-2-2025

Introductions

- In attendance
  - Austin Rice, Department of Emergency Services
  - Brandon Reed, Department of Emergency Services
  - Matt DeLisa, Chardon PD
  - Randy Sharpe, City of Chardon
  - Scott Hildenbrand, Geauga County Sheriff's Office
  - Tom Rowan, Geauga County Sheriff's Office
  - Mallorie Berry, Great Lakes Cheese
  - Michael Rizzo, South Russell PD
  - Justin Geiss, Chardon FD
  - Frank Antenucci, Geauga County Automatic Data Processing
  - Stephen Knittel, Geauga County Auditor, GIS
  - Mike Williams, Chardon United Methodist Church
  - Linda Crombie, Geauga County Planning Commission
  - Lydia Castner, Geauga Public Health
  - Dan Lark, Geauga Public Health
  - Bob Rogish, Geauga Farm Bureau

Plan Review

- 5.0 Local Hazard Mitigation Goals

- 6.0 Plan Maintenance Process

Outreach

- Hazard Mitigation Website and Community Survey Overview

Next Meeting

- **Next meeting is set for Thursday, May 21, 2025 at 10:00am at the Department of Emergency Services**

Action Items

- Please continue to work on and review the sections that you/ your agency is currently working on. If you have any suggestions, please provide them as we put the draft of the plan together. Also, please review the Hazard Mitigation Website and provide feedback on it.

Hazard Mitigation Planning Meeting 4
Meeting Minutes
5-21-2025

Introductions

- In attendance
  - Austin Rice, Department of Emergency Services
  - Mallorie Berry, Great Lakes Cheese
  - Michael Rizzo, South Russell PD
  - Stephen Knittel, Geauga County Auditor, GIS
  - Bob Rogish, Geauga Farm Bureau
  - Daniel Spada, Geauga County Building Department

Plan Review

- Draft Review

Outreach

- Hazard Mitigation Outreach Website Discussion

Next Meeting

- **Public Draft Review meeting is set for Monday, June 30, 2025 at 10:00am at the Department of Emergency Services**

Action Items

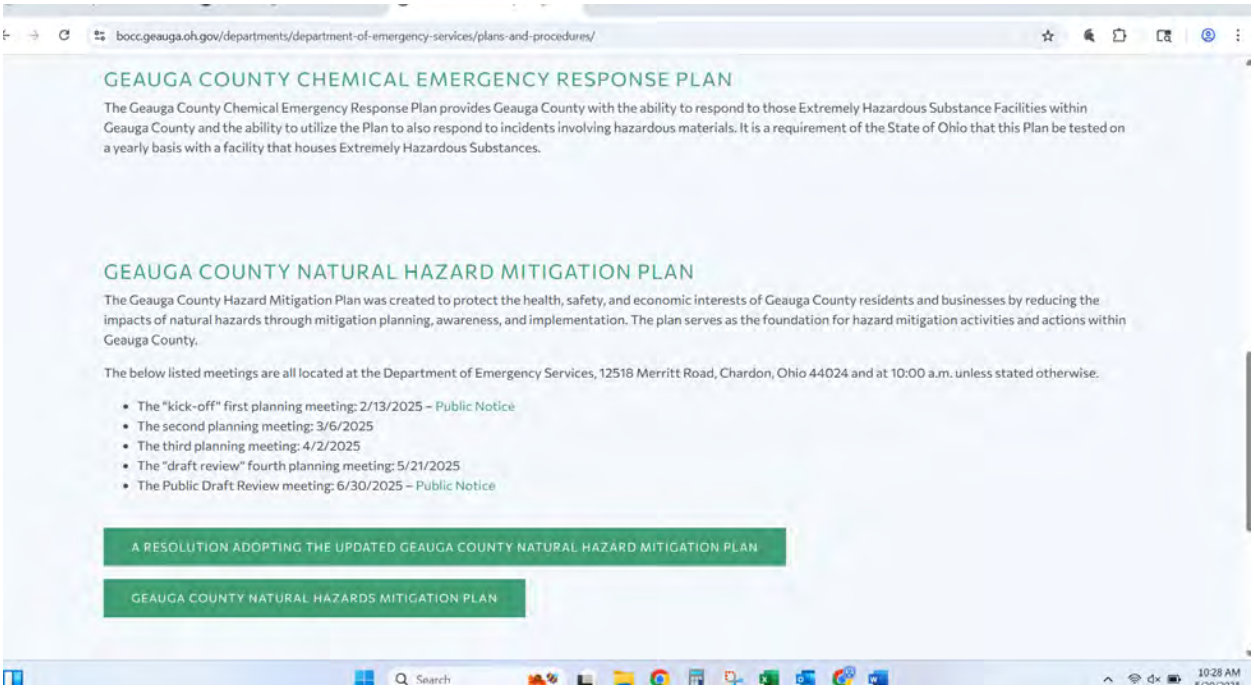
- Please review the draft. Please promote the outreach website which includes draft review, survey and comment. If you have any suggestions, please provide them to prepare the draft for submission. Thank you to everyone involved in the planning process.

Appendix D

Public Outreach Information

Participation from members of the public and various county stakeholders was instrumental in completing a comprehensive review of the Geauga County Natural Hazards Mitigation Plan. Appendix D provides documentation of efforts to seek public comment/feedback and provide outreach opportunities to members of the public and county stakeholders.

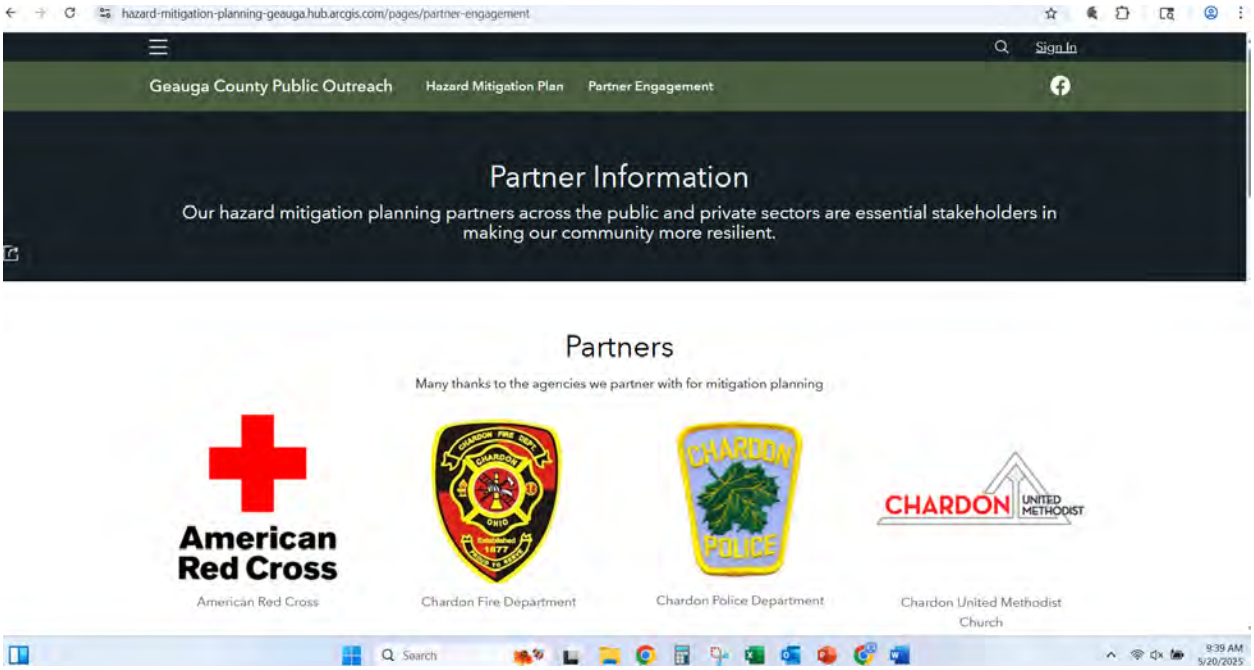
Meeting dates were posted on the official Geauga County Department of Emergency Services website, as shown in the screenshot below:



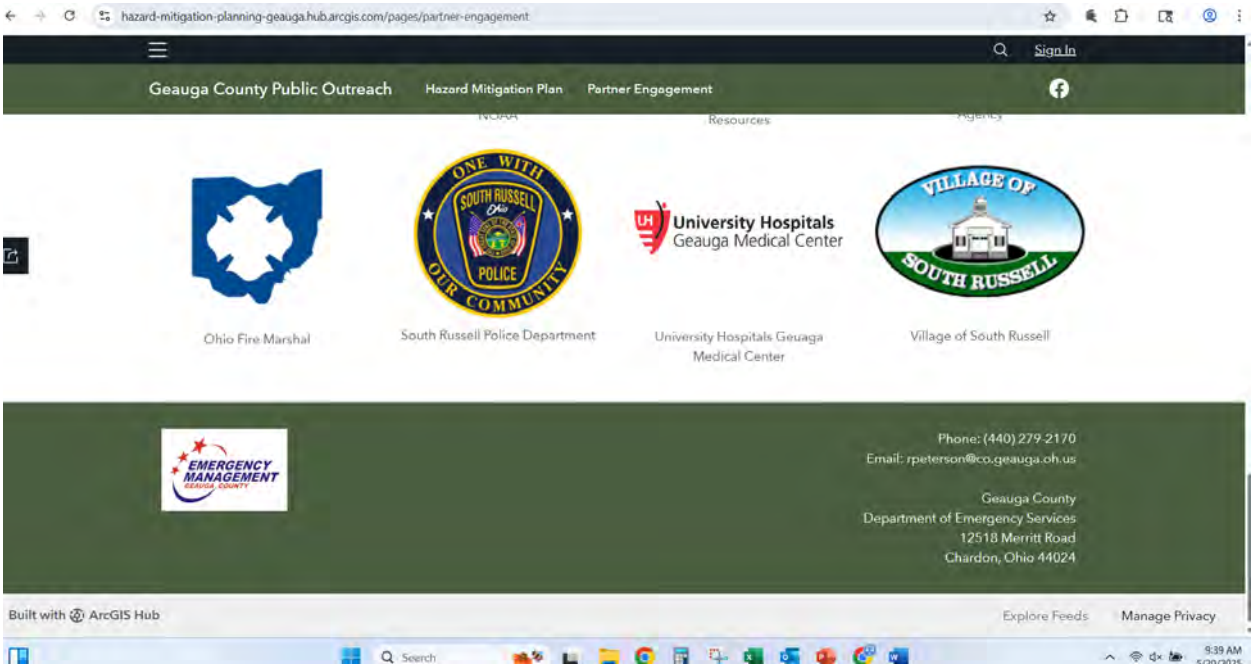
You can see the meeting dates, time and location listed here, as well as the initial public notice, and the final public notice. The same information is also available on the new Geauga County hazard Mitigation Outreach Website (information below).

Below are examples of screenshots from the Interactive Hazard Mitigation Outreach Website:

(Participating Partners in the Planning Process)

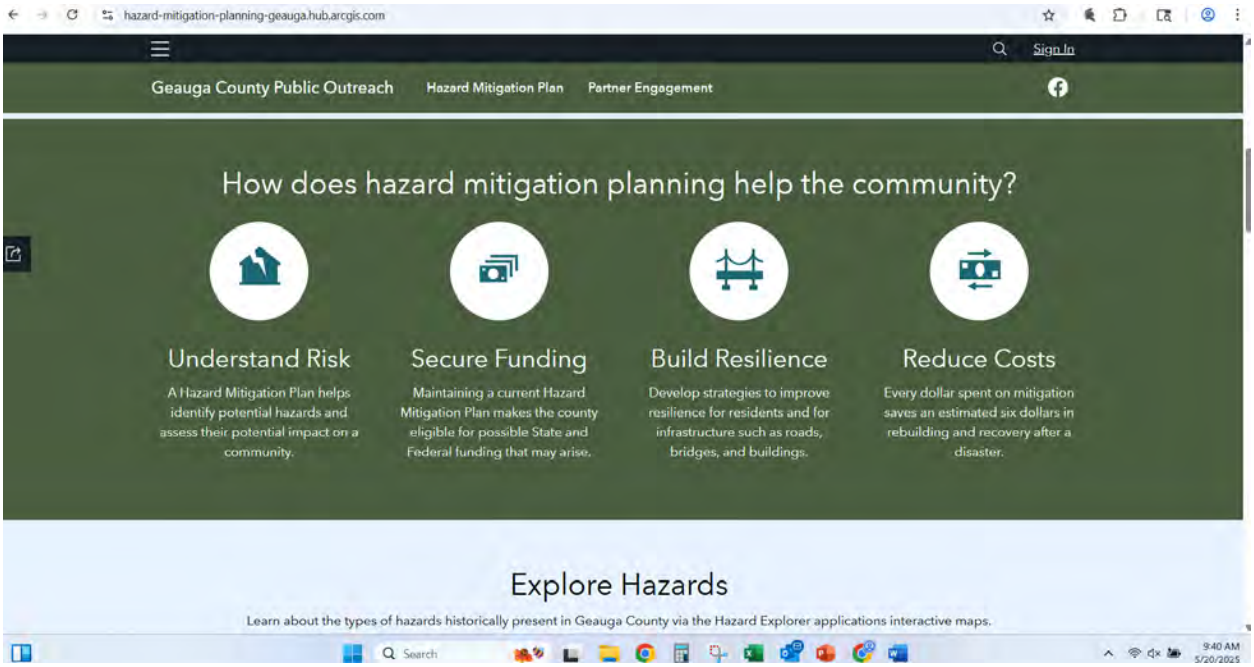


(Contact Information)

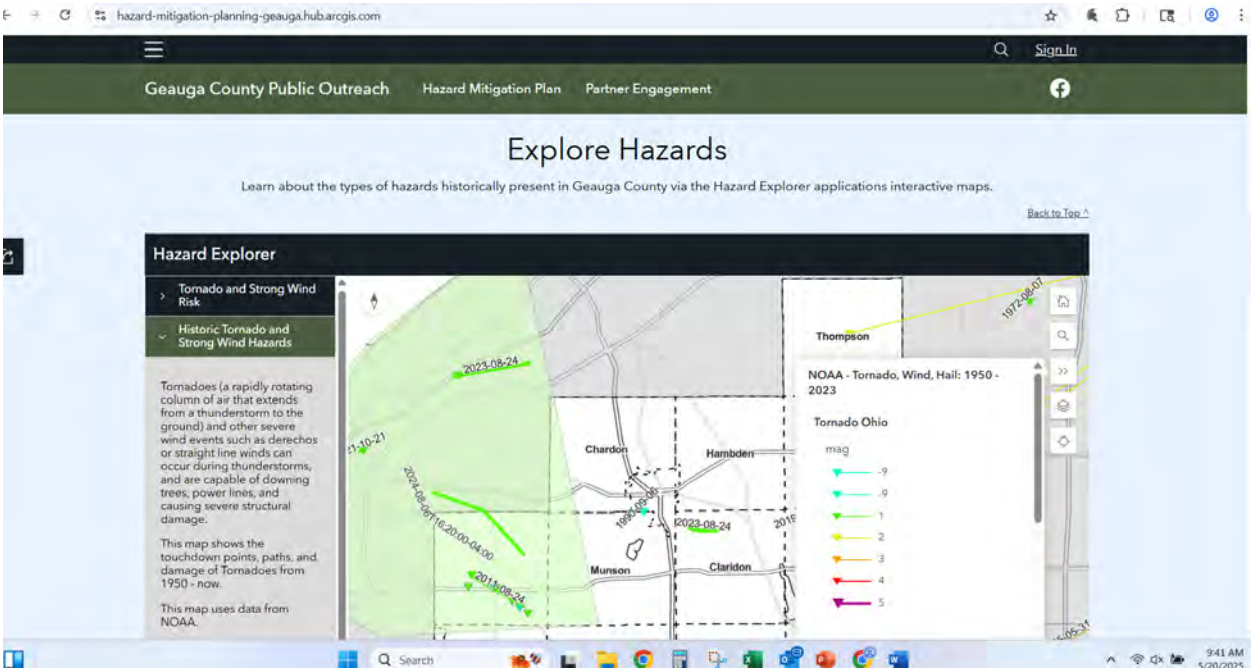


(Menu, Title, Overview)

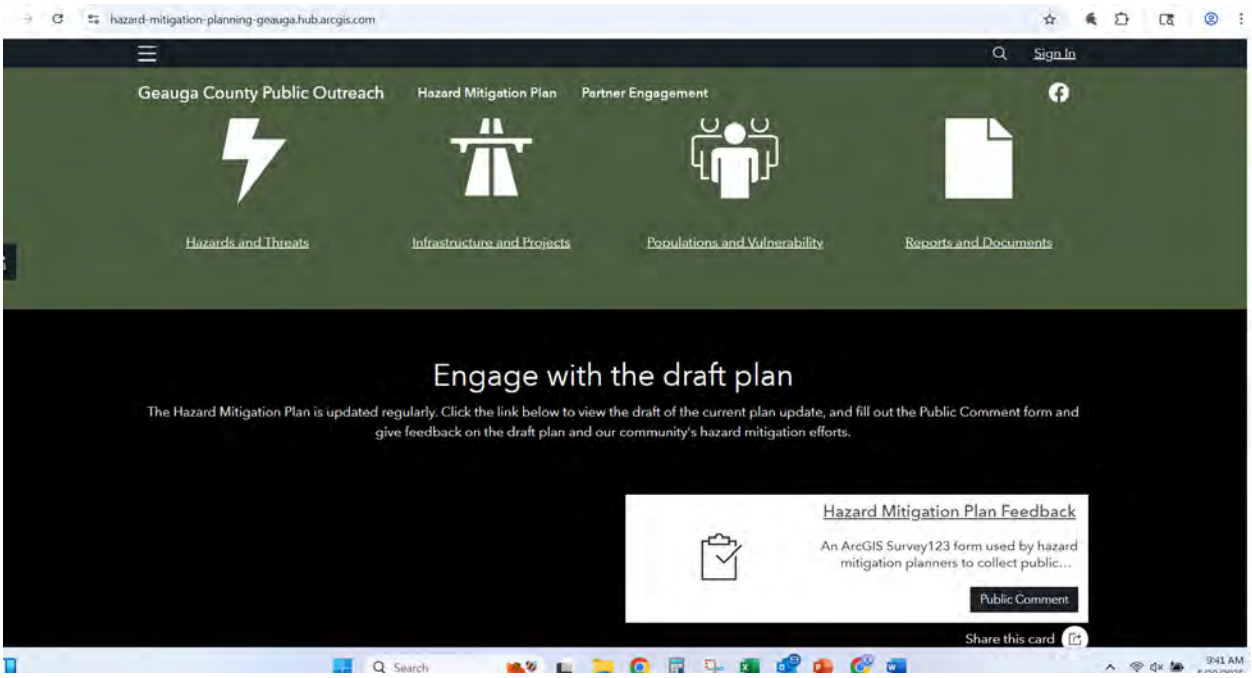
(Basic Overview Information)



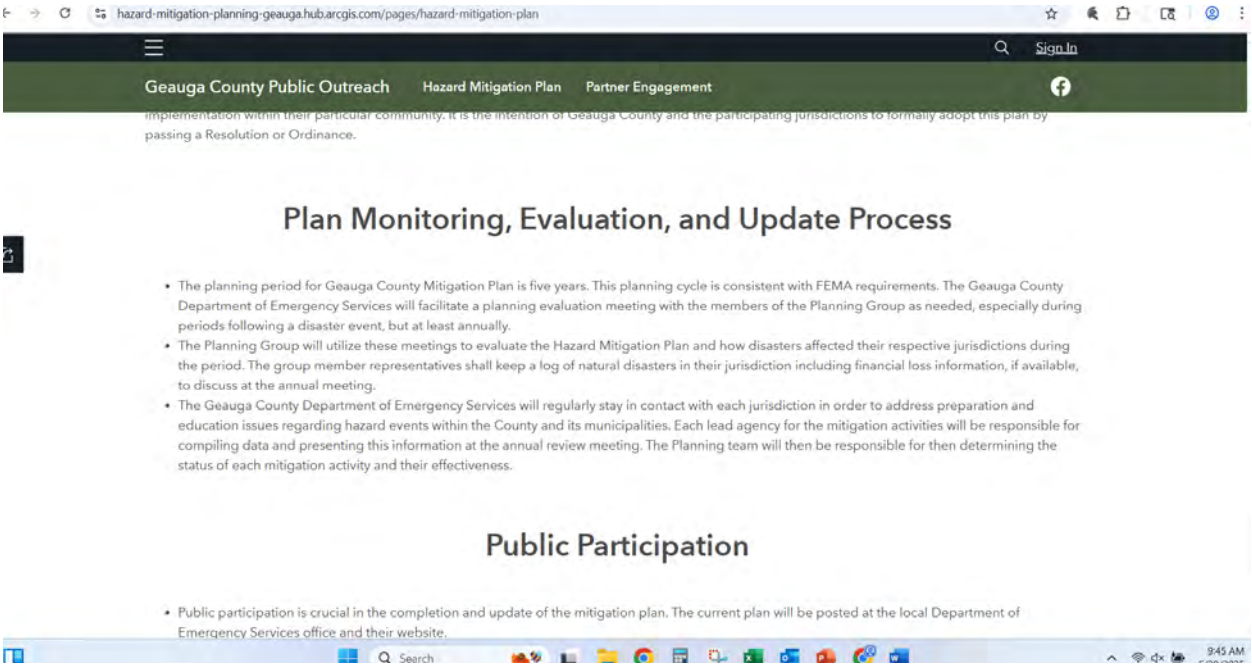
(Interactive County Hazard Maps)



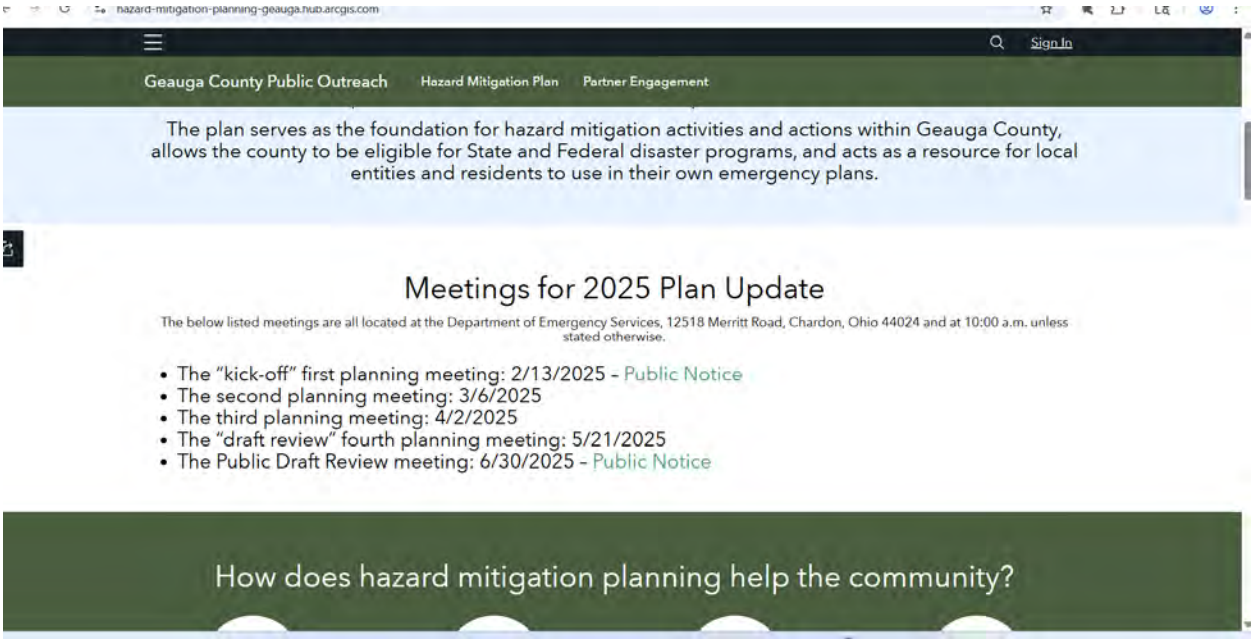
(Public Draft Review, Survey, Comment)



(More Example Information)



(Meeting Dates, Times, Locations and Public Notices)



GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Tuesday, January 14, 2025

To Whom It May Concern

Per Section 201.6 44CFR, The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. Accordingly, the current Geauga County Countywide All Natural Hazard Mitigation Plan will need to be updated and ultimately approved by FEMA by the end of 2025.

Please consider this correspondence our notification to the public that Geauga County is actively engaged in the update process. Each incorporated community within Geauga County represented in the plan must participate in its update. Community participation in the update process not only enhances the plan's development, but it is also required by FEMA. Should you want to review the current version of our County's Hazard Mitigation Plan, it is posted on our website: https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/. Upon review, feel free to contact me at the email below with any input or questions you may have. A public hazards survey will be sent out in the next few months to solicit additional public input. Once, the Plan's update is complete and it is approved by FEMA, each jurisdiction will need to formally re-adopt the updated document. Additional information will be provided regarding this adoption at a future time.

In addition, the hazard mitigation plan update will focus on reengaging the public and reviewing/revising the risk assessments, goals, and action plan. An initial meeting for the planning team has been scheduled for Thursday, February 6, 2025 at 10:00 a.m. at the Geauga County Department of Emergency Services. Representatives from the State of Ohio will be present to assist with guidance on how to update this Plan. The Department of Emergency Services will complete updates and the required documentation.

Please contact me, if you are interested in attending this meeting and/or would like to participate in our plan update.

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services

Roger Peterson • 440-279-2171 • Fax: 440-286-1023 • rpeterson@co.geauga.oh.us

GEAUGA COUNTY
BOARD OF COMMISSIONERS

Carolyn Brakey Esq. Jim Dvorak Ralph Spidalieri

DEPARTMENT OF EMERGENCY SERVICES
12518 Merritt Road, Chardon, Ohio 44024

Date: Monday May 19, 2025

Public Notice

Per Section 201.6 44CFR, The Disaster Mitigation Act of 2000 (DMA) requires all approved local hazard mitigation plans to be updated every five years. Accordingly, the current Geauga County Countywide All-Natural Hazard Mitigation Plan will need to be updated and ultimately approved by the Federal Emergency Management Agency (FEMA) by the end of 2025.

We ask each incorporated community within Geauga County to participate in its update. Community participation in the update process not only enhances the plan's development, but it is also required by FEMA. Should you want to review the current version of our County's Hazard Mitigation Plan, it is posted on our website: https://bocc.geauga.oh.gov/departments/department-of-emergency-services/plans-and-procedures/. Upon review, feel free to contact me at the email below with any input or questions you may have. Additionally, a Public Outreach Website has been created for citizens and stakeholders to review. That website can be located at: https://hazard-mitigation-planning-geauga.hub.arcgis.com/. The draft is available on the Public Outreach Website also, as well as interactive maps, a public survey, and other information.

Once the plan update is complete and is ultimately approved by FEMA, each incorporated jurisdiction will need to formally adopt the updated plan document. Additional information will be provided regarding this adoption at a later date.

A ***Public Draft Review Meeting*** has been scheduled for ***Monday June 30, 2025, at 10:00 a.m.*** This meeting will be located at the Geauga County Department of Emergency Services, 12518 Merritt Rd. Chardon, Ohio 44024. Members of the public are invited to attend this meeting to participate in reviewing the draft of the plan prior to it being forwarded to the State of Ohio and FEMA for final approval.

Please contact me if you are interested in attending this meeting

Sincerely,

Roger M. Peterson, Director
Geauga County
Department of Emergency Services
RPeterson@co.geauga.oh.us
(440)279-2171

Appendix E

Action Plan

Appendix E represents The Action Plan and lists, by hazard, the activities that were identified throughout the plan review process.

Appendix E
Mitigation Action items

Priority Activity Ranking	Description of Activity	Start Date	End Date	Funding	Responsibly agencies	Status
Severe Storms (Hail, Wind, Lightning, Heavy Rain)						
Priority #1	Continue to distribute outreach/pamphlets on preparedness activities as it relates to storms. Disseminate storm warnings and other weather awareness information to the public through social media and other outlets. Promote and maintain an interactive hazard outreach website.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Priority #2	Geauga County has a substantial agricultural component. Coordinate with the agricultural community on disaster preparedness and response as it related to severe storms.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Winter Storms (Snow, Sleet, Ice)						
Priority #1	Every winter there is a problem with uninformed residents utilizing improper or old heating sources such as kerosene heaters. Conduct outreach to residents on the use of improper heat sources. Promote and maintain the interactive hazard outreach website which includes information about winter storms and heat sources.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA Director and local fire departments, Fire Chief	Ongoing
Power Outages						
Priority #1	Develop a list of Critical Infrastructure throughout the county. Identify their backup power needs and capabilities, as well as coordinating the list with the electric utility company for repair priority.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director.	Ongoing
Priority #2	Educate the public on the safe use of generators and the dangers of carbon monoxide. Promote and maintain the hazards outreach website to include power outage safety.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Priority #3	Identify which Gas Stations, Stores, and other fuel sources throughout the county have backup generators.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Priority #4	There have been several locations identified as critical locations to be used at the time of an emergency event. These locations may need to have backup generators and currently do not have the proper hook up for the generator. Aim to seek funding to assist with getting the proper hook up for generators at these locations.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Tornadoes						

Priority #1	There is a need to better define and establish a shelter network throughout Geauga County. Aim to seek funding for the shelter network (public/private).	1/1/2025	12/31/2030	HMGP	Geauga County DES/EMA, Director	Ongoing
Priority #2	Evaluate the need for storm shelters in existing schools and new schools. Potentially seek funding for storm shelters within critical facilities.	1/1/2025	12/31/2030	HMGP	Geauga County DES/EMA, Director	Ongoing
Priority #3	Aim to seek funding for multi-use storm shelters within public parks and campgrounds (multi-use possibility).	1/1/2025	12/31/2030	HMGP	Geauga County DES/EMA, Director	Ongoing
Priority #4	Aim to seek funding for the establishment of storm shelter networks within mobile home parks. Possible funding available through Community Development Block Grant Program.	1/1/2025	12/31/2030	Community Development Block Grant Program.	Geauga County DES/EMA, Director	Ongoing
Flooding (Flash, 100 yr.)						
Priority #1	The Chagrin River Watershed Partners boundaries are within Geauga County and there have been several communities within Geauga County that have adopted riparian buffer overlays. Hazardous areas should be identified, and communities should be made aware of these hazards and potential remedies.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Priority #2	Identify any repetitive loss properties within Geauga County.	1/1/2025	12/31/2030	HMGP, PDM, FMA	Geauga County DES/EMA, Director and Geauga County Soil and Water Conservation District, Board	Ongoing
Priority #3	Investigate and consider the process and possibilities involved in the acquisition, demolition, and/or retrofit of flood-prone properties.	1/1/2025	12/31/2030	FMA	Geauga County DES/EMA, Director and Geauga County Soil and Water Conservation District, Board	Ongoing
Extreme Temperatures (Heat, Cold)						
Priority #1	Identify additional locations that can serve as warming and cooling centers.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director and Mitigation Focus Group, Chair	Ongoing
Priority #2	Promote and maintain the hazard outreach website to include information on extreme temperature safety. Also, promote and disseminate information regarding any open warming or cooling center during an extreme temperature event.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director and Mitigation Focus Group, Chair	Ongoing
Infectious Disease or Outbreak						
Priority #1	Continue to educate and distribute outreach/pamphlets on preparedness activities as it relates to infectious disease. Promote and maintain the hazard outreach website and other materials that provide public awareness.	1/1/2025	12/31/2030		Geauga County Public Health and DES/EMA, Director.	Ongoing

Priority #2	Public Health and EMA will coordinate on identifying and securing Point of Dispensing (POD) locations and assisting in acquiring supplies such as personal protective equipment (PPE).	1/1/2025	12/31/2030		Geauga County Public Health and DES/EMA, Director.	Ongoing
Priority #3	Encourage information sharing between Public Health and the EMA to include surveillance reports and help implement corrective actions from the COVID-19 Pandemic. Disseminate appropriate information for public awareness and emergency response.	1/1/2025	12/31/2030		Geauga County Public Health and DES/EMA, Director.	Ongoing
Dams Failure and Dam Safety						
Priority #1	Seek to obtain/maintain EAP's and inundation data for all Class I and II dams in Geauga County.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director and the State of Ohio: ODNR	Ongoing
Priority #2	Seek to rehabilitate or mitigate all high hazard potential dams in Geauga County, if funding is available.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director and State of Ohio: ODNR	Ongoing
Earthquake						
Priority #1	There are many unknowns and misconceptions when it comes to earthquakes. For example, many residents in Geauga County are unaware that earthquakes are not typically covered on their homeowners insurance. Promote and maintain the hazard outreach website, which should include earthquake safety information.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA, Director	Ongoing
Wildfires (Forest, Brush, Grass, Agricultural)						
Priority #1	Promote and maintain the hazard outreach website to include information regarding wildfire prevention, burn bans, and fire safety.	1/1/2025	12/31/2030	County EMA Annual Budget	Geauga County DES/EMA Director, Ohio Department of Natural Resources (ODNR), State Fire Marshal (SFM).	Ongoing
Droughts						
Priority #1	There are numerous businesses in Geauga County that are dependent on water, such as farms. Encourage information sharing between the Ohio State University Extension, Ohio Farm Bureau and the EMA to include information on water dependent businesses and agricultural concerns. Collaborate to deal with the potential problems with a long-term drought. Disseminate appropriate information for public awareness.	1/1/2025	12/31/2030	County EMA Annual Budget	Ohio State University Extension, Ohio Farm Bureau, Geauga County DES/EMA, Director.	Ongoing

Appendix F

Hazard Vulnerability Analysis

The Hazard Vulnerability Analysis (HVA) in Appendix F is an example of a tool that was used by the planning team during the hazard identification discussions.

Geauga County Natural Hazards Mitigation Plan
2025

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interuption of services*	*Preplanning*	*Time, effectivness, resouces*	*Community/ Mutual Aid staff and supplies*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Winter Storms/ Ice Storms	2.9	1.7	2.1	2.1	1.5	1.2	1.4	**54%**
Dams Failure	1.3	1.8	2.1	1.7	2.2	1.9	1.6	**27%**
Droughts	1.4	1	1.1	1.3	2.1	1.9	1.6	**23%**
Earthquake	1.2	1.4	1.7	1.6	2.6	2.4	1.9	**26%**
Epidemic	1.8	2	0.7	2	2	2	1.6	**34%**
Extreme Temperature	1.8	1.7	1.1	1.3	2.1	2.1	2	**34%**
Floods (Flash, 25Yr, 100Yr)	1.9	1.8	2.3	2	1.7	1.8	1.5	**39%**
Hurricane	0.4	0.9	1	1	1.6	1.4	1.1	**5%**
Landslide	0.5	0.8	1.2	0.8	1.6	1.4	1	**6%**
Power Outage	2.7	1.4	1.5	2.4	1.8	1.6	1.4	**51%**
Severe Storms (High Wind, Lightning, Hail)	3	1.9	2.5	2.3	1.5	1.4	1.4	**61%**
Tidal Wave	0.1	0.3	0.3	0.3	0.2	0.3	0.1	**0%**
Tornado	2.2	2.2	2.5	2.4	1.3	1.3	1.2	**44%**
Volcano	0.1	0.3	0.3	0.3	0.2	0.3	0.1	**0%**
Wildfires	1.4	1.2	2.1	1.4	1.7	1.5	1.5	**24%**
AVERAGE SCORE	**1.42**	**1.28**	**1.41**	**1.43**	**1.51**	**1.41**	**1.21**	**22%**

**Threat increases with percentage.*

RISK = PROBABILITY * SEVERITY		
0.22	**0.47**	**0.46**

Appendix G

USDA Agricultural Profile

Appendix G is the USDA agricultural profile for Geauga County. This farm overview is especially important when considering hazards such as drought.

2022 CENSUS OF AGRICULTURE *County Profile*

Geauga County
Ohio

Total and Per Farm Overview, 2022 and change since 2017

	2022	% change since 2017
Number of farms	1,133	+8
Land in farms (acres)	66,881	-4
Average size of farm (acres)	59	-11
Total	($)	
Market value of products sold	38,896,000	+8
Government payments	253,000	-32
Farm-related income	7,246,000	+16
Total farm production expenses	47,583,000	+6
Net cash farm income	-1,189,000	+40
Per farm average	($)	
Market value of products sold	34,330	-0
Government payments [a]	7,215	-12
Farm-related income [a]	19,220	+7
Total farm production expenses	41,997	-1
Net cash farm income	-1,049	+44

(Z) Percent of state agriculture sales

Share of Sales by Type (%)

Crops	55
Livestock, poultry, and products	45

Land in Farms by Use (acres)

Cropland	28,770
Pastureland	7,017
Woodland	24,972
Other	6,122

Acres irrigated: 615

1% of land in farms

Land Use Practices (% of farms)

No till	7
Reduced till	10
Intensive till	17
Cover crop	10

Farms by Value of Sales

	Number	Percent of Total [b]
Less than $2,500	401	35
$2,500 to $4,999	155	14
$5,000 to $9,999	154	14
$10,000 to $24,999	194	17
$25,000 to $49,999	89	8
$50,000 to $99,999	71	6
$100,000 or more	69	6

Farms by Size

	Number	Percent of Total [b]
1 to 9 acres	252	22
10 to 49 acres	527	47
50 to 179 acres	314	28
180 to 499 acres	28	2
500 to 999 acres	4	(Z)
1,000+ acres	8	1

2022 CENSUS OF AGRICULTURE *County Profile*

Market Value of Agricultural Products Sold

	Sales ($1,000)	Rank in State [c]	Counties Producing Item	Rank in U.S. [c]	Counties Producing Item
Total	**38,896**	**69**	**88**	**2,112**	**3,078**
Crops	**21,426**	**71**	**88**	**1,800**	**3,074**
Grains, oilseeds, dry beans, dry peas	5,331	73	88	1,750	2,917
Tobacco	-	-	5	-	267
Cotton and cottonseed	-	-	-	-	647
Vegetables, melons, potatoes, sweet potatoes	2,289	24	87	592	2,831
Fruits, tree nuts, berries	1,953	13	86	409	2,711
Nursery, greenhouse, floriculture, sod	5,989	20	87	433	2,660
Cultivated Christmas trees, short rotation woody crops	2,191	1	73	31	1,274
Other crops and hay	3,673	18	88	907	3,035
Livestock, poultry, and products	**17,470**	**55**	**88**	**1,839**	**3,076**
Poultry and eggs	569	44	88	869	3,027
Cattle and calves	1,866	65	88	2,181	3,047
Milk from cows	8,815	35	78	481	1,770
Hogs and pigs	159	65	88	799	2,814
Sheep, goats, wool, mohair, milk	188	57	88	1,001	2,967
Horses, ponies, mules, burros, donkeys	3,277	3	87	72	2,907
Aquaculture	-	-	44	-	1,190
Other animals and animal products	2,597	3	88	96	2,909

Producers [d]	**2,067**
Sex	
Male	1,341
Female	726
Age	
<35	316
35 – 64	1,108
65 and older	643
Race	
American Indian/Alaska Native	1
Asian	6
Black or African American	-
Native Hawaiian/Pacific Islander	-
White	2,047
More than one race	13
Other characteristics	
Hispanic, Latino, Spanish origin	25
With military service	132
New and beginning farmers	646

Percent of farms that:

Have internet access	**60**
Farm organically	**2**
Sell directly to consumers	**19**
Hire farm labor	**21**
Are family farms	**94**

Top Crops in Acres [e]

Forage (hay/haylage), all	13,065
Soybeans for beans	5,150
Corn for grain	2,855
Corn for silage/greenchop	1,411
Cultivated Christmas trees	463

Livestock Inventory (Dec 31, 2022)

Broilers and other meat-type chickens	5,197
Cattle and calves	6,722
Goats	341
Hogs and pigs	444
Horses and ponies	3,498
Layers	10,444
Pullets	1,914
Sheep and lambs	1,042
Turkeys	2,307

[a] Average per farm receiving. [b] May not add to 100% due to rounding. [c] Among counties whose rank can be displayed. [d] Data collected for a maximum of four producers per farm. [e] Crop commodity names may be shortened; see full names at www.nass.usda.gov/go/cropnames.pdf. [f] Position below the line does not indicate rank. (D) Withheld to avoid disclosing data for individual operations. (NA) Not available. (Z) Less than half of the unit shown. (-) Represents zero.