

Coshocton County, OH

Countywide All-Natural Hazards Mitigation Plan

2021-2026

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Executive Summary

Overview

In 2000 FEMA developed the Robert T. Stafford Disaster Relief and Emergency Assistance Act that was later amended by the Disaster Mitigation Act of 2000 (DMA 2000). This document provides legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance. The revisions compiled in the DMA 2000 were designed to create more incentives for local governments to coordinate their mitigation actions and implement them

After suffering the effects of floods, tornadoes, winter storms, and other natural and man-made hazards, the citizens, business leaders, and officials of Coshocton County recognized the need to develop a long-term approach to reducing their vulnerability to hazards. In 2009, the Coshocton County hazard Mitigation Core Committee (HMCC), the local leadership for an initiative to promote communities' resistance to natural and human-caused hazards, began a hazard mitigation planning process to identify the hazards that can affect the county and create a strategy to reduce damage from these hazards. The Committee identified the hazards most threatening to the county and then determined a series of prioritized actions necessary to reduce potential damages from these hazards.

This document, the **Coshocton County Hazard Vulnerability Assessment and Mitigation Plan**, represents the work of citizens, elected and appointed government officials, business leaders, and volunteers of non-profit organizations, to develop a plan that will serve as a blueprint for protecting community assets, preserving the economic viability of the community, and saving lives. Endorsed by the Federal Emergency Management Agency (FEMA) and the Ohio Emergency Management Agency (OEMA), the hazard mitigation planning process and the plan will help the county implement its mitigation projects.

The hazard mitigation planning process consisted of:

- Public involvement through a series of meetings;
- Identification of hazards that could affect the county;
- Assessment of the county's vulnerability to these hazards in terms of the number of structures, critical facilities, and people affected;
- Identification of mitigation actions that can reduce the risk from these hazards; and
- Development of an implementation of mitigation actions identifying roles and responsibilities.

No plan can succeed without the support of the community. Because of the diversity of interests in the county and municipalities, the Committee encouraged public input throughout the planning process, allowing citizens a voice in the decisions that will affect their future.

1.0 Introduction

Purpose

Across the United States, natural disasters have led to increasing levels of deaths, injuries, property damage, and interruption of business and government services. The time, money, and efforts to recover from these disasters exhaust resources, diverting attention from important public programs and private agendas. With several statewide and federal disaster declarations since 1976, the emergency management community, citizens, elected officials, and other stakeholders in Coshocton County, Ohio recognized the impact of disasters on their community and concluded that proactive efforts needed to be taken to reduce the impact of natural hazards.

Hazard mitigation is a phrase that describes actions taken to prevent or reduce the long-term risks to life and property from hazards. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, mitigation actions can be long-term, cost-effective means of reducing the risk of loss.

Accordingly, the Coshocton County Hazard Mitigation Core Committee (HMCC), composed of governmental leaders from Coshocton County and federal and State representatives, in cooperation with the elected officials of the county and its municipalities, has sponsored and prepared this Hazard Vulnerability Assessment and Mitigation Plan. The plan is the result of over several year's work by the citizens of the county to develop a pre-disaster multi-hazard mitigation plan that will not only guide the county towards greater disaster resistance, but will also respect the character and needs of the community.

In order to qualify for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with the Disaster Mitigation Act of 2000 (DMA) and its implementing regulations (44 CFR §§201.6, published February 26, 2002). The Coshocton County Hazard Vulnerability Assessment and Mitigation Plan has been prepared to meet FEMA and OEMA requirements in order for the county to be eligible for funding and technical assistance from state and federal hazard mitigation programs.

This planning effort was specifically designed to update the Coshocton County Hazard Mitigation (HMP) plan for the five (5) year period of 2021 to 2026.

As part of the Disaster Mitigation Act of 2000 (DMA2K, 42 USC 5165), communities that desire to remain eligible for Federal and State mitigation funds must have an approved mitigation plan in place.

According to the DMA2K, incorporated jurisdictions within a county must participate as well as representatives from the unincorporated areas. Townships are not required to participate because the county commissioners can represent them on mitigation projects. However, if a township would like to take an active part by submitting a hazard mitigation project, then their participation in the

planning effort is crucial. Local participation is “key” to the successful implementation of these mitigation plans.

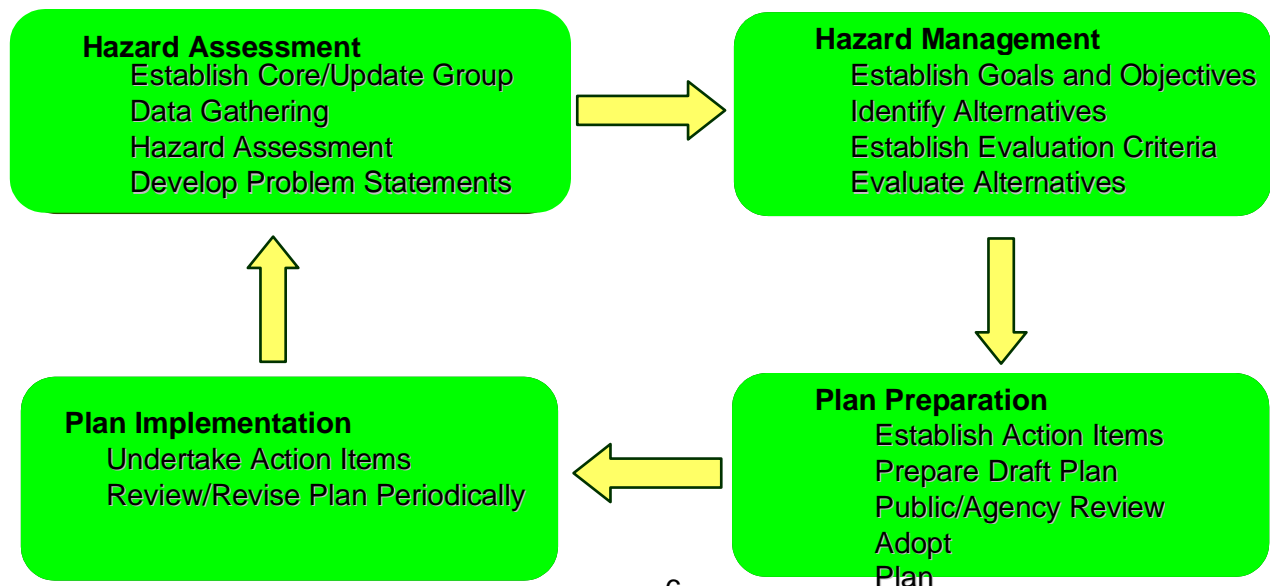
If a community chooses not to participate in the mitigation planning effort, the community becomes ineligible for any future federal or state mitigation money. This mitigation money usually comes in the form of a grant such as the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) or the PDM Grant Program, which is to be used to implement mitigation strategies and activities. Examples of eligible activities that could be supported by mitigation dollars include: relocation, acquisitions, elevation, dry-flood proofing, wet-flood proofing, lightning prediction systems, interoperable siren systems, stream restorations or any other activity potentially funded with mitigation dollars.

To proceed with the revision of a locally initiated Natural Hazard Mitigation Plan, the County selected as a planning model the **Ohio Natural Hazard Mitigation Planning Guidebook**, which was developed cooperatively by the Ohio Emergency Management Agency (OEMA) and the Ohio Department of Natural Resources (ODNR). The planning model for this effort incorporates the following components:

1. Introduction
2. County Profile
3. Mitigation Plan Process
4. Hazard Profile
5. Vulnerability Assessment
6. Goals and Actions
7. Mitigation Plan Maintenance and Schedule
8. Resolution to Adapt

Below is the typical Natural Hazard Mitigation Planning Process that was followed:

NATURAL HAZARD MITIGATION PLANNING PROCESS



In addition to the aforementioned process, the Core Group and the designated leaders of the group made sure that every community that participated in this planning effort was aware of their responsibilities as well as how they could represent their community the best. Some suggestions that were incorporated into the initial invitation to participate in the natural hazard mitigation planning effort included:

- Participate in the Core/Update Group planning meetings representing your community's interests
- Supply any historic information (background) on natural disasters for your community to the Core Group
- Review and comment on the Draft Mitigation Plan
- Review and select mitigation activities developed by the Core Group for your community to implement
- Be an advocate for Final Adoption of the Mitigation Plan by your community

1.1 Planning Approach

In an effort to continue to meet the mission of protecting lives, property, economic viability and quality of life for the people of Coshocton County, the County Commissioners desired to create the Coshocton County Mitigation Plan for their community and its residents. Coshocton County authorized the engineering firm EMH&T, Inc. to help them fulfill this task in the development of the initial Plan. The first five-year plan update was prepared in house by the Coshocton County Office of Emergency Management. With regard to this new five-year Plan update, the County Commissioners contracted with a mitigation planning consultant, RFG Associates Inc., to assist in developing the 2021-2026 Mitigation Plan Update.

The approach undertaken in the creation of the Mitigation Plan for Coshocton County can be described as both comprehensive and collaborative. The comprehensive approach includes following the interim final rule guidelines enacted under the DMA2K and FEMA suggested guidelines for the creation of a mitigation plan. Any additional items that Coshocton County and the Core and Update Groups chose to address as part of the comprehensive analysis of their community were addressed as well.

The collaborative portion of creating the plan included working with the different agencies within Coshocton County and coordinating with all participating jurisdictions. The County could not have a comprehensive plan without the coordination of several other agencies. Information was collected from agencies such as the Coshocton County Emergency Management Agency (EMA), Coshocton County Floodplain Administration, the Coshocton County Planning Office and any other agencies that were involved in planning efforts for the County.

1.2 Participating Communities

Coshocton County has six (6) incorporated areas within its borders. These include the City of Coshocton and Villages of Conesville, Nellie, Plainfield, Warsaw and West Lafayette. The City of

Coshocton and the Villages of Warsaw and West Lafayette. (Incorporated communities) chose to participate in this planning effort. The Villages of Conesville, Nellie and Plainfield did not participate in the planning process.

1.2.1 Outreach Efforts for Community Participation

The Coshocton County EMA, in coordination with the planning consultant, developed a comprehensive survey for each of these communities to complete and return with mitigation planning information specific to their community. The EMA Director and the planning consultant made numerous efforts, including mailing documents, emails and phone calls, over nine (9) months to collect community specific information and to involvement each community in the selection of problem statements and mitigation alternatives. Participation in this planning process was satisfied by participation in the planning meetings, completing and returning the survey, or discussing their community with either the EMA Director or planning consultant. See Appendix A for meeting notices, Appendix C for a list of meeting attendees and Appendix D for completed community surveys. While the three (3) Villages did not participate, the final Action Plan does include some activities for these communities based on information provided by other members of the Core Committee. These three (3) villages, as non participates in the formal plan process or approval, are not eligible for HMA funding.

The process to create the Mitigation Plan started with the creation of a “Mitigation Core Committee” of decision makers and implementers. In order to lead the planning efforts effectively and on a countywide basis, other representatives were added. The Core Committee included:

The following chart identifies all participants on the Core Committee:

Name	Affiliation
Steve Lonsinger	County Health
Jesse Christmas	County Health
Fred Wachtel	County Engineer
Rick Raach	Coshocton JVSD
Mike Layton	Coshocton Fire
Rob McMasters	Coshocton Co. EMA
Troy Cole	Coshocton Co. EMA
Jeff Corder	City of Coshocton

2.0 Community Information

As required by DMA2K, a community profile must be developed for the County and any jurisdictions participating in this effort. Because of the multiple jurisdictions involved in this plan, this section presents a demographical as well as historical description, if available, of each jurisdiction that will be adopting this plan. This brief profile of each jurisdiction gives some insight as to what types of communities exist in the county and provides a better understanding of the effect natural hazards, to be discussed in later sections, may have on this population. In numerous cases, the communities themselves provided the information that follows.

2.1 County Profile

Coshocton is conveniently located midway between Pittsburgh, PA and Columbus, OH. Coshocton is also home to the active Ohio Central Railroad company which operates as a short line with access to CSX and Norfolk-Southern lines. Richard Downing Airport is located approximately 2 miles northeast of the City of Coshocton and is centrally located in the county. It operates as a general aviation service airport and currently has one 5000-foot runway which is equipped with lights for night time use.

Coshocton is home to AK Steel, American Electric Power, Annin-Flagmakers, Buckeye Brine LLC, Buckeye Fabric Finishing Co., Coshocton Grain Co., Excello Fabric Finishing Co., Jones Metal Products LLC, Kraft-Heinz Company, McWane Ductile, McWane Poles, MFM Building Products, Novelty Advertising Co., Organic Technologies, Prime Materials LLC, SanCasT Inc., Three Rivers Energy and Yankee Wire Cloth Products.



Coshocton County consists of The City of Coshocton, Villages of Warsaw, West Lafayette, Plainfield, Nellie, and Conesville. Townships include Adams, Bethlehem, Crawford, Linton, Newcastle, Perry, Pike, Tiverton, Tuscarawas, Virginia, Washington, Monroe, Franklin, Jackson, Bedford, Oxford, White Eyes, Keene, Lafayette, Jefferson, Millcreek, and Clark.

2.2 County History

Coshocton County History

Coshocton County consists of 564.1 square miles and 22 townships and is located in the east-central portion of the state. Coshocton County is bordered by Holmes, Tuscarawas, Guernsey, Muskingum, Licking, and Knox counties in Ohio. The County Seat is Coshocton. Coshocton County is a rich historical area. The word Coshocton is a derivative of an Indian word meaning “union of waters”. Coshocton County has continued to grow into a rural area of more than thirty-six thousand people. The County/City flag of Coshocton, designed by former local student Karen Uher, contains twenty-two stars which represent our twenty-two townships. The horizontal “Y” represents the Tuscarawas and Walhonding Rivers converging at Coshocton to form the Muskingum River.

2.3 Jurisdictions

City of Coshocton

The City of Coshocton, located in Coshocton County has a total land area of 8.08 mi². According to the 2016 census estimate, there are 11,190 people, with 4,754 households and 10,164 families residing in the city. The population density is 1,386 people/mi². There are 5,369 housing units at an average density of 665 units/mi². The median income for an individual in the city of Coshocton is \$40,668 and the median income for a household is \$38,310.

Village of Warsaw

The town of Warsaw, located in Coshocton County has a total land area of .44 mi². According to the 2016 census estimate, there are 683 people, with 308 households and 218 families residing in the town. The population density is 1,560 people/mi². There are 290 housing units at an average density of 663 units/mi². The median income for an individual in the town of Warsaw is \$33,348 and the median income for a household is \$41,250.

Village of West Lafayette

The town of West Lafayette, located in Coshocton County has a total land area of .88 mi². According to the 2016 census estimate, there are 2,272 people, with 948 households and 642 families residing in the town. The population density is 2,568 people/mi². There are 1,029 housing units at an average density of 1,163 units/mi². The median income for an individual in the town of West Lafayette is \$38,333 and the median income for a household is \$39,348.

Village of Plainfield

The Village of Plainfield, located in Coshocton County has a total land area of .41 mi². According to the 2016 census estimate, there are 147 people, with 69 households and 46 families residing in the village. The population density is 359 people/mi². There are 73 housing units at an average density of 178 units/mi². The median income for an individual in the Village of Plainfield is \$37,813 and the median income for a household is \$50,417.

Village of Nellie

The Village of Nellie, located in Coshocton County has a total land area of .71 mi². According to the 2016 census estimate, there are 96 people, with 44 households and 34 families residing in the village. The population density is 134 people/mi². There are 39 housing units with an average density of 55 units/mi². The median income for an individual in the Village of Nellie is \$27,500 and the median income for a household is \$39,028.

Village of Conesville

Conesville, located in Coshocton County has a total land area of .2 mi². According to the 2016 census estimate, there are 349 people, with 134 households and 98 families residing in the town. The population density is 2,182 people/mi². There are 162 housing units with an average density of 1,013 units/mi². The median income for an individual in the town of Conesville is \$32,250 and the median income for a household is \$40,833.

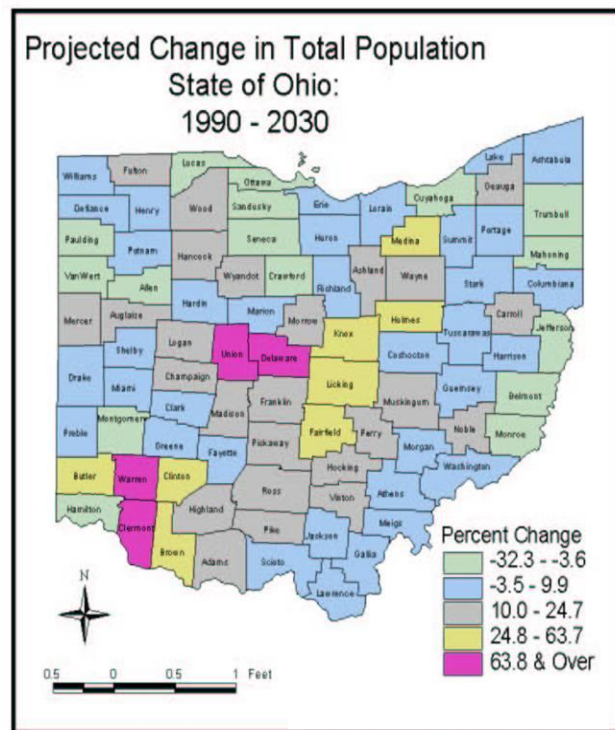
2.4 Census Information

2.4.1 State Population

The State of Ohio's population in 2010 was 11,536,504 and it is projected to climb to 12,317,613 by 2030, an increase of 8.5%. However, it appears that the rate at which Ohio's population is growing is diminishing.

Several factors may be contributing to this decline. The birth to death ratio is much smaller than in faster growing states, with Ohio expected to have 4.4 million births and 3.6 million deaths. Net migration is a factor as well. Ohio may gain approximately 247,000 people through in-migration but may lose about 758,000 people through out-migration.

The projected percentage of population change by county in Ohio from 1990 to 2030 is reflected on the map in this section. Counties surrounding a major metropolitan area – Cincinnati, Columbus, and Cleveland – generally will experience higher growth rates. Counties in the north central and eastern region of the state are projected to experience a decline.



2.4.2 County Population Projection

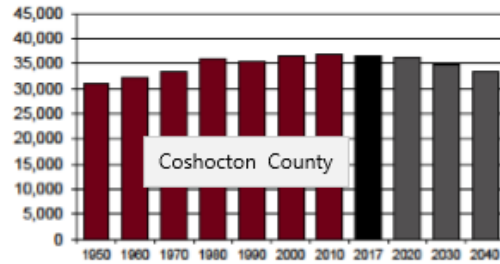
According to U.S. Census figures, the 2000 total population of Coshocton County was 36,665. In 2017 it decreased to 36,544. Coshocton County is rural in nature which is shown by comparing their inhabitants per square mile to the State's inhabitants per square mile.

The population of Coshocton County has increased and decreased over the last 100 years. From 1820 to 1880, there was a gradual increase in the population. From 1890 to 1970 there has been a fluctuation in population. Coshocton County is expected to decrease in population to 33,390 by 2040. Please refer to Table 2-1 for more demographic information.

Table 2-1 POPULATION TABLE

Total Population

Census			Estimated		
1800		1910	30,121	2012	36,820
1810		1920	29,595	2013	36,718
1820	7,086	1930	28,976	2014	36,526
1830	11,161	1940	30,594	2015	36,579
1840	21,590	1950	31,141	2016	36,644
1850	25,674	1960	32,224	2017	36,544
1860	25,032	1970	33,486	Projected	
1870	23,600	1980	36,024	2020	36,190
1880	26,642	1990	35,427	2030	34,790
1890	26,703	2000	36,655	2040	33,390
1900	29,337	2010	36,901		



A Coshocton County demographic profile is also available on the ODO's website and provides more specific information for Coshocton County and its political jurisdictions.

(<https://www.development.ohio.gov/files/research/C1017.pdf>)

2.5 County Land Use and Future Land Use

2.5.1 Topography

Coshocton County, OH can be described as rolling hills with development along primary and secondary waterways. The highest elevation is 1,378 feet and the lowest elevation is 709 feet. Coshocton County ranks in the lowest 1/3 of Ohio's county elevations.

2.5.2 County Land Use

**Table 2-2
Existing Land Use**

Land Use/Land Cover	Acres	Percent of County
High Intensity Residential	177	0.05%
Low Intensity Residential	3,374	0.095%
Urban/Recreational	146	0.04%
Commercial/Industrial/Transportation	399	0.11%
Row Crops	138,149	38.70%
Pasture/Hay	132,906	37.23%
Deciduous/Evergreen/Mixed Forest	77,781	21.79%
Herbaceous/Woody Wetlands	360	0.10%
Quarries/Strip Mines/Gravel Pits	274	0.08%
Transitional	10	0.003%
Open Water	3,402	0.95%

2.5.3 Future Land Use

The 2006 Coshocton County, Ohio Comprehensive Plan, devotes an entire section of the plan to future land use. This section discusses three types of growth management concepts: Conservation Subdivision, Promotion of Infill/Redevelopment and Economic Development Agreements. Conservation subdivisions are developments where a certain percentage of the total land has been set aside as permanent, protected open space. Financial and other incentives can be used to promote redeveloping declining commercial/industrial areas. Economic development agreements include joint economic development districts and cooperative economic development agreements which help to facilitate economic development.

Some of the policies *The 2006 Coshocton County, Ohio Comprehensive Plan* discusses as it relates to future land use include policies for land use, housing, green space protection economic development and infrastructure. The plan can be found at <https://coshocton.osu.edu>

2.6 County Utilities

2.6.1 Electric: AEP and Frontier Power

Telephone: Spectrum, Frontier Communications, and AT&T

Gas: Columbia Gas of Ohio (CGO), Dominion East Ohio (DEO), Northeast Ohio Natural Gas Corp (NON), Ohio Cumberland Gas Company (OCG), Piedmont Gas Co (PGC), Consumers Gas Cooperative (CGC), Knox Energy Coop Association (KEC), National Gas and Oil Coop (NGO), as per National Gas Distribution Companies.pdf (Ohio.gov)

2.6.2 Water and Wastewater

Water: City of Coshocton, Village of Warsaw, and Village of West Lafayette

Wastewater: City of Coshocton, Village of Warsaw, and Village of West Lafayette

Rural Sewage: Residential septic systems

3.0 COUNTYWIDE ALL-NATURAL HAZARDS MITIGATION PLANNING PROCESS

3.1 Mission Statement

At the beginning of the planning process, a mission statement was drafted to establish a clear goal for the Core Group. The Core Group reviewed and approved the following as its Mission Statement:

“The mission of the Pre-Disaster Hazard Mitigation Core Committee for Coshocton County, Ohio is to develop a working document that fulfills the mandates of the Federal Disaster Mitigation Act of 2000, and satisfies the requirements of FEMA and the Ohio EMA, as well as meets the needs of all of Coshocton County. Further, by researching and planning for future natural hazards and implementing appropriate mitigation techniques, all of Coshocton County can save lives and protect property, reduce the cost of disasters and provide for a rapid and efficient recovery by coordinating response efforts, and increasing the educational awareness of natural hazard events and their effects on the people, property, and resources of all Coshocton County.”

3.2 Notification Process

The incorporated jurisdictions of the County, as well as other agencies that work within the County, were notified of the mitigation planning process. The Coshocton County EMA Office created a master list of jurisdictions they felt necessary to participate in this planning effort. The comprehensive list was reviewed to ensure that all the appropriate agencies as well as jurisdictions would be invited to participate in this effort. Individuals representing a wide array of political subdivisions, as well as agency and private businesses, were notified of the mitigation planning update process. This comprehensive list of invited participants is listed in section 1.2.

Prior to commencing this planning process, in addition to contacting the Planning Group, Coshocton County notified the general public regarding this mitigation planning process. Coshocton County also posted all Hazard Mitigation Planning Meetings on their website (www.Coshoctoncountyema.com) and issued a press release. The Coshocton County EMA Director was the contact source and his contact information was provided. See Appendix A for copies of these correspondences.

3.3 Groups

The Core Group is the original planning unit for this project. All Core Group members are involved for the entire planning process. They are the decision makers and implementers. The purpose of the Core Group is to provide information to the various entities of Coshocton County that have a stake, either directly or indirectly, in the Mitigation Plan. They provide feedback, input and review as the process of the Mitigation Plan development is completed, leading to a better quality and more inclusive scope of the Mitigation Plan that everyone can acknowledge and adopt, truly implementing a countywide plan.

Obtaining support from the whole community required a comprehensive approach to preparing the Mitigation Plan. Identifying those persons, community leaders and government agencies with the knowledge and authority to help the community organize a plan was key to the planning effort. Establishing a group of leaders was necessary to give this task validity. The Core Group

included individuals from multiple agencies, County departments and incorporated jurisdictions as previously listed in Section 1.2.

3.4 Core Group Meetings/Planning Meetings

There were three (3) Core Group meetings and one (1) community meeting for public comment on the Draft Mitigation Plan. These meeting details are below.

3.4.1 Determination of Hazards - Meeting 1-Kick-Off Meeting Update Meeting 11/13/18 (Planning Group)

The kick-off meeting presented the Planning Group with the process to be followed in the update of the Mitigation Plan. Overall goals of the plan for Coshocton County were discussed and the Planning Group began a process to determine which hazards to focus on. This included a Hazard Identification and Risk Assessment (HIRA) based on historic disaster events data from the National Center for Environmental Information (NCEI) (formally the National Climatic Data Center (NCDC)), a summary of NCEI data prepared by the Consultant, and planning committee member insights about local hazard events. The initial list of critical hazards was established looking at the National Center for Environmental Information (NCEI) tables that illustrated which hazards in Coshocton County have produced the largest amount of damage based on human or monetary losses. The Planning Group also used the collective knowledge they had coupled with the vast amount of local experience and history to determine which hazards to address in their Mitigation Plan. This resulted in a listing of hazards including Wind Events, Severe Winter Storms, Severe Summer Storms, Flooding, Tornadoes, Earthquakes, Dam Failure, Drought, Wild Fires and Excessive Heat.

The 2010 Coshocton Co Hazard Mitigation Plan had included the following Hazards:

1. Flood
2. Tornado
3. Wind
4. Drought
5. Severe Weather (Summer)
6. Class I Dams
7. Earthquakes

The 2019 Coshocton Co Hazard Mitigation Plan includes the following Hazards:

1. Wind Storms
2. Flooding
3. Severe Winter Weather
4. Class I Dam Failure
5. Tornadoes
6. Earthquakes

The committee voted to eliminate drought from the plan update, due to no historic event history and minimal concern about any future event impact.

The committee then used HIRA weight factors of Probability, Impact, Geographic Location, Warning Time, and Duration to weigh the hazards for priority ranking. The Consultant collected the scores and would tabulate the results for Meeting #2.

Appendix H includes the historic National Center for Environmental Information (NCEI), (formally, National Climatic Data Center (NCEI)) event data and event data summary. Appendix B includes the HIRA methodology, and Weighted HIRA Scoring and Hazard Priorities summary for Coshocton County.

Additionally, by the end of the first meeting, Planning Group members had exchanged contact information, identified some additional data which needed to be collected for the plan, established a priority list of hazards and discussed the general process and timeline of the project.

Please see Appendix C for Meeting 1 Sign in sheet, Agenda, and other materials as presented.

3.4.2 Determination of Problem Statements and Overall Goals – Meeting 2 12/18/18 Update Meeting (Planning Core)

The second meeting of the Planning Group focused on reviewing and approving the weighted HIRA Hazard Priority Scoring and reviewing prior plan progress and accomplishments.

Based on the review of member scores on the weighted HIRA factors (see Summary in Appendix B), the Planning Committee approved the following prioritization for Coshocton Co Natural Hazards for the 2019-2023 Plan:

1. Wind Storms
2. Flooding
3. Severe Winter Weather
4. Class I Dam Failure
5. Tornadoes
6. Earthquakes

Please see Appendix C for Meeting 2 Sign in sheet, Agenda, and other materials as presented. Appendix D provides written input (survey format) from each participating jurisdiction.

3.4.3 Determination of Alternatives and Evaluation Criteria – Meeting 3 2/6/2019

The final meeting with the Planning Group focused on the goals and action items and establishing priorities.

Each individual community was also encouraged to identify an alternative or alternatives that they wanted to support and implement within their community.

The remaining steps in the mitigation planning process were reviewed, which included setting a date for a public meeting, which is being planned for early May 2019.

Please see Appendix C for Meeting 3 Sign in sheet, Agenda, and other materials as presented.

3.5 Review of Current/Expiring Plan

During meetings 2 and 3, Planning Group reviewed each Action Item in the current/expiring plan. The EMA staff had color coded each Action as green-completed, yellow-underway, or red-not accomplished.

Coshocton Co Hazard Mitigation Plan Progress from 2010-2018 Plan

Status Key: Completed (Green), Deferred (Yellow), Ongoing (White), or Deleted (Red)

Flood Hazards (Prior plan priority 1)

Goal Provide public outreach/education regarding strategies (e.g., flood proofing) for property owners in 100-year floodplain.

- Flash Flooding
- Driving through water TADD (Turn Around Don't Drown)
- Stream Maintenance
- NFIP, educate on new ordinances
- Early warning detection

Actions Work with township/village officials to increase awareness of model floodplain ordinance and with property owners, including informational mailings to property owners in the 100-year floodplain, and sponsoring a series of workshops about costs and benefits of:

- Acquiring flood insurance coverage, and
- Property acquisitions, relocation, elevation, dry flood proofing, and wet flood proofing.
- Maintaining compliance with NFIP

Flood Hazards (Prior plan priority 2)

Goal Assess protection of existing critical structures with the highest relative vulnerability to the effects of flooding.

Actions Obtain more detailed information on each structure, including first-floor elevations, market and/or replacement value, construction type, etc.

- Determine which structures have the highest relative vulnerability.
- Conduct cost-benefit analysis to determine the best property protection methods to promote with the individual property owners.

All Hazards (Priority 3 in prior plan)

Goal and Action

Coordinate with Wills Creek, Buckhorn and Mohawk Dam personnel to correlate plans for an early warning system for Coshocton County.

Hazards Droughts (Priority 4 in prior plan)

Goal and Action

Encourage and facilitate the development of an action plan for a drought in Coshocton County. Include scenarios, water rationing actions, development of aquifers and education to the public.

Floods/Hazmat Hazards (Priority 5 in prior plan)

Goal Identify and evaluate protection for hazardous material storage in floodplain.

Actions Identify all storage of hazardous materials in floodplains by using NFIP maps (including non-addressable structures, such as propane tanks).

- Evaluate alternative methods to minimize risk from existing storage areas.
- Assess means to prevent future storage in floodplain areas.

3.6 Public Update Meeting 11/ 29 /21 (Planning Group and Public Meeting)

A public meeting with the Coshocton Co Commissioners was held on 11/29/21 in their office to review the planning process with the general public. Hazard Mitigation Plan was listed on their advanced meeting item agenda. This meeting was also used to address comments and questions concerning the Draft Mitigation Plan. The local media was invited to attend and cover this public County Commissioner session. Two (2) media outlets were in attendance.

Public participation is extremely important and valuable during any phase of mitigation planning, including during the Plan update phase. To assure the opportunity for citizens to review and comment on the draft Plan Update, the Planning Group will include the draft Plan Update on the Coshocton County EMA website. A copy of the draft Plan will also be made available in the CCEMA office. A time frame of 14 days was provided for public comments and questions. Any comments or questions received during this period would be addressed and acted upon by the Planning Group prior to forwarding the final draft Plan Update version to the Ohio and Emergency Management agency for their review.

No comments or questions were received from the public during this public comment period.

3.7 Finalization

Upon incorporation of all comments into the Hazard Mitigation Plan, the plan will be prepared and submitted to the State of Ohio Emergency Management Agency (OEMA) for initial review and comment. The plan will then be further revised and submitted to the State of Ohio Emergency Management Agency and Federal Emergency Management Agency for formal review and approval. Each incorporated jurisdiction, as well as any township choosing to adopt this Hazard Mitigation Plan as a separate entity from the County, will also receive a digital copy of the plan.

Table 3-1: Coshocton County and Jurisdictional Authorities, Policies, Programs and Resources

Community	Planning Commission	Comp. Plans	Floodplain Regulations	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget	Public Works Budget
Coshocton County	Yes	Yes	No	Yes	No	No	None	\$5,218,691 (Co Eng.)
City of Coshocton	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes
Village of Conesville	No	No	No	No	No	NR	NR	NR
Village of Nellie	No	No	No	No	No	NR	NR	NR
Village of Plainfield	No	No	No	No	NR	NR	NR	NR
Village of Warsaw	No	No	No	Yes	No	Yes	None	None
Village of West Lafayette	Yes	No	No	No	Yes	Yes	Yes Storm Sewer Planning	Yes Storm Sewer Planning
Adams Township	Yes	No	Yes	Yes	No	Yes	None	None
Bedford Township	Yes	No	Yes	No	No	Yes	None	\$500,000
Bethlehem Township	No	No	No	No	No	No	None	None
Clark Township	No	No	No	No	No	No	None	None
Crawford Township	Yes	Yes	Yes	No	No	No	None	None
Franklin Township	No	No	Yes	Yes	No	No	None	None
Jackson Township	Yes	No	No	No	No	No	None	None
Jefferson Township	No	No	No	No	No	No	None	None
Keene Township	No	No	Yes	No	No	No	None	None
Lafayette Township	Yes	No	No	No	No	Yes	None	None

Table 3-1: Williams County and Jurisdictional Authorities, Policies, Programs and Resources

Community	Planning Commission	Comp. Plans	Floodplain Regulations	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget	Public Works Budget
Linton Township	No	No	No	No	No	No	None	None
Mill Creek Township	No	No	No	No	No	No	None	None
Monroe Township	Yes	No	No	No	No	No	None	None
New Castle Township	No	No	No	No	No	No	None	None
Oxford Township	Yes	No	Yes	Yes	Yes	Yes	None	None
Perry Township	No	No	No	No	No	No	None	None
Pike Township	Yes	No	Yes	No	Yes	Yes	None	None
Tiverton Township	No	No	No	No	No	No	None	None
Tuscarawas Township	NR	NR	NR	NR	NR	NR	NR	NR
Virginia Township	NR	NR	NR	NR	NR	NR	NR	NR
Washington Township	No	No	No	No	No	No	No	No
White Eyes Township	NR	NR	NR	NR	NR	NR	NR	NR

NR = No response

The Villages of Conesville, Nellie, and Plainfield have currently chosen not to participate in the NFIP program. Goal 3, Action Step 3.1.1 in the Section 6: Goals and Action Items, the County Flood Administrator, EMA and County Planning will be actively encouraging their participation and providing any necessary technical support.

4.0 HAZARD PROFILE

Coshocton County has experienced many natural disasters in the past 100 years. These disasters have ranged from tornadoes and blizzards, to flooding and droughts. The purpose of this document is to identify the number and frequency of disasters in Coshocton County to better prepare and deal with them when they do occur. The following sections describe the process of determining upon which hazards to focus, general background information on each hazard as well as hazard events that have occurred in Coshocton County.

4.1 Initial Hazard Assessment

In order to properly evaluate the natural hazards to which Coshocton County may be susceptible, a three-step process was utilized. This three-step process was completed in order to “narrow-down” the hazards for which Coshocton County should prepare, and potentially mitigate, in the future. The three steps are described in the following paragraphs.

Step 1 - FEMA’s database was researched to determine which hazards FEMA had documented as possible natural hazards, including future threats, for the State of Ohio. Several hazards that are listed on FEMA’s website include flooding, severe storms, tornadoes and winter storms.

Step 2 - The NCEI was contacted and historic hazard information was reviewed all the way down to the County level. The NCEI website presented each type of hazard and the historic information associated with it for each county, offering several hazard search parameters. These parameters included: droughts, dust storm, flooding, flash flooding, fog, hail, lightning, tornadoes, wild/forest fires, heavy rain, winter storms, blizzards, snow and ice storms, temperature extremes (hot and cold), thunderstorms and strong and high winds.

Because NCEI information did not address earthquakes or dams and dam safety, other sources were contacted for this data. The information pertaining to earthquake susceptibility was attained from United States Geological Survey (USGS) data and the Ohio Earthquake Program Manager at OEMA. Dam and dam safety information was gathered from the ODNR Division of Dam Safety.

Step 3 - The *Ohio Hazard Analysis and Risk Assessment*, which is a document created in 1998 by OEMA for local and state emergency preparedness officials was reviewed. The *Ohio Hazard Analysis and Risk Assessment* documented both natural and non-natural (technological) hazard event information.

4.2 Risk Assessment Ranking

The research compiled during the initial hazard assessment was provided to the Core Group for their review and assessment. The Core Group evaluated all the hazards being considered and ranked them based on the number of historic events and cumulative damage that has occurred.

The following list shows the Core Group's ranking of hazards with number one being the hazard of the most concern:

1. Wind Storms
2. Flooding
3. Severe Winter Weather
4. Class I Dam Failure
5. Tornadoes
6. Earthquakes

Coshocton County has had 11 National Disaster Declarations including DR-90, DR-167, DR-266, DR-738, DR-831, DR-1127, DR-1444, DR-1580, DR-1805, DR-4077 and DR-4360.

4.3 Wind Storms

4.3.1 Extent

Hazards that fit into the severe wind storm category include thunderstorms and high winds. One of the biggest problems associated with severe weather is the lack of public education and awareness. Severe storms can do damage, but are often the precursor for much more severe weather to follow. One example is the direct association of tornadoes with thunderstorms.

4.3.2 Thunderstorms

A severe thunderstorm watch is issued by the NWS when the weather conditions are such that damaging winds of 58 mph or more, or hail 3/4 of an inch in diameter or greater, are likely to develop. Citizens should locate a safe place in the home and tell family members to watch the sky and listen to the radio or television for more information. A severe thunderstorm warning is issued when a severe thunderstorm has been sighted or indicated by weather radar. At this point, danger is imminent, and citizens should move to a safe place, turn on a battery-operated radio or television, and wait for the "all clear" by the authorities.

Severe wind storms are also associated with other hazards such as tornadoes and severe flooding. Since tornadoes and flash flooding are spawned by thunderstorms, people should review what action to take under a tornado warning or a flash flood warning when a "severe thunderstorm warning" is issued. When thunderstorms are forecasted to bring heavy rains (which can cause flash flooding), strong winds, hail, lightning and tornadoes, people should get inside a sturdy building and stay tuned to a battery-operated radio for weather information. People should also be aware that lightning and high winds are also major threats during thunderstorms.

According to the NCEI, a total of 173 thunderstorms were recorded in Coshocton County between 1950 and 2018. The monetary damage totaled \$1.545 Million in property damage and \$500 Thousand in crop damage, with NO deaths and NO injuries recorded. The data is included in *Appendix H*.

4.3.3 High Winds

Straight-line winds are often responsible for most of the wind damage associated with a thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds. However, the strong and gusty winds associated with straight-line winds blow roughly in a straight line unlike the rotating winds of a tornado.

Property damage and loss of life from windstorms are increasing due to a variety of factors. According to the Ohio Manufactured Housing Association (OMHA), the use of manufactured housing is on an upward trend, and this type of structure provides less resistance to wind than conventional construction. Uniform building codes for wind resistant construction are not adopted by all states, and population trends show rapid growth in the highly exposed areas.

A total of 11 high wind events were recorded in Coshocton County between 1950 and 2018, according to the NCEI. The monetary damage totaled \$821 thousand in property damage and NO crop damage, a single event that occurred on 09/14/2008 resulting in \$500 thousand in property damage. The data is included in *Appendix H*.

4.3.4 Frequency/Probability of Future Occurrence

Severe wind storms for Coshocton County quantitatively have the highest likelihood of occurring on a yearly basis. According to the NCEI, 184 high wind storm events including thunderstorms and high winds were documented for Coshocton County since 1950. High wind storm events in Coshocton County have caused cumulative property and crop damage with estimated total losses of \$2.866 million between 1950 and 2018. Based on historical information, Coshocton County can expect to endure approximately 3 severe storms in any given year (184 events / 68 years).

4.4 Flooding

4.4.1 Extent

Floods are a naturally recurring event for a river or stream and are caused by weather phenomena and events that deliver more precipitation to a drainage basin that can be readily absorbed or stored within the basin. Flooding is a localized hazard that is a result of heavy or continuous rainfall exceeding the absorptive capacity of soil and the flow capacity of rivers and streams. Floods can be generally considered in two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and riverine floods, caused by precipitation over a longer time period and over a given river basin.

Riverine flooding refers to periodic flooding of lands adjacent to non-tidal rivers and streams. It is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal watercourse, some of the above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

4.4.2 Special zone flood (100-year Floodplain)

Flood Insurance Rate Maps (FIRM) show areas delineated to be special flood hazards. The Base Flood Elevation (BFE) refers to the elevation associated with a special flood zone, or a flood with a 1% chance of occurring in any given year. Areas within a special flood zone area, also known as the 100-year floodplain, have an elevation lower than the BFE and are categorized into zones. Zone "A" is the flood insurance rate zone that corresponds to a special flood zone area that is determined in the Federal Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone. Zone "AE" is the flood insurance rate zone that corresponds to a special flood zone area that is determined in the Federal Flood Insurance Study by detailed methods. In most instances,

BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Coshocton County has special zone floodplains identified within the County. The best way to combat a disaster happening within these special zone flood hazard areas is through public awareness. The following list gives the incorporated jurisdictions that are in compliance with state floodplain management standards and participate in the NFIP, and the date in which they entered the program.

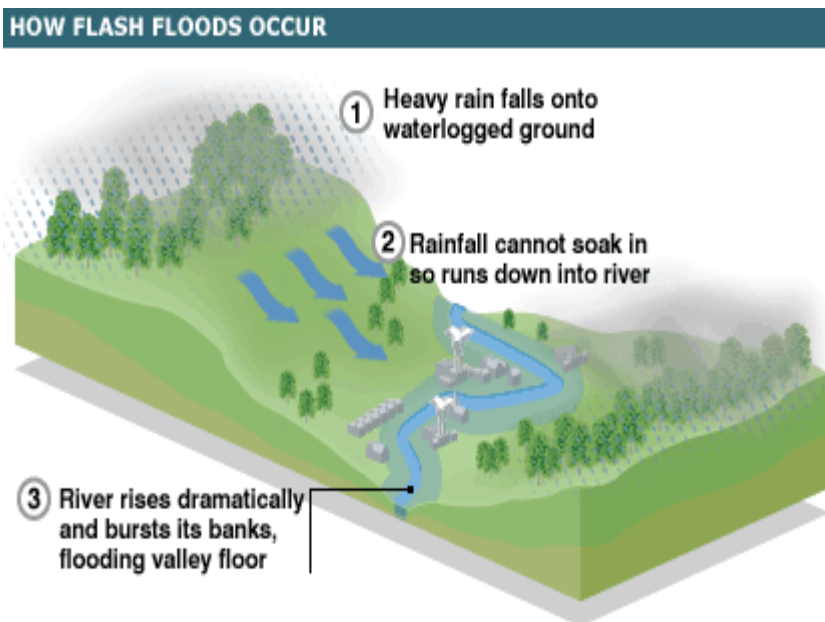
Community Code	Community with NFIP	Date Established
390765	Coshocton County	1/20/75
390089	City of Coshocton	1/23/74
390733	Village of Warsaw	4/18/75
390814	Village of W. Lafayette	3/02/10

4.4.3 Flash or Localized Flooding

Flash floods occur within a few minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Flash floods can destroy buildings and bridges, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas where much of the ground is covered by impervious surfaces. Roads and buildings generate greater amounts of runoff than typical forested land. Fixed drainage channels in urban areas may be unable to contain the runoff that is generated by relatively small, but intense, rainfall events.

Flash flooding can be intensified by:

*Diagram illustrating how flash floods occur.
Photo courtesy of British Broadcasting Corporation (BBC)
News.*



- Changing land use such as the development in catchments (increasing the rate and volume of run-off; sediment movement that has changed river cross-sections and affected flood levels).
- Lacking proper maintenance of flood defense systems, watercourses, culverts (including the flood relief areas around them) and road gullies, particularly where this leads to channel blockage.
- Increasing the rate of flow and decreasing the time taken for water to travel within a catchment by means of canalization, modification and diversion of rivers and watercourses.
- Building of structures (such embankments) which restrict flows over historical flood plains and thereby create additional flood risks both upstream and downstream.

4.4.4 Repetitive Loss

In most counties there are areas that periodically suffer damages from floods. They are known as “Repetitive Loss” properties. Repetitive loss properties are defined as properties with structures that have had two or more insurance claims within a 10-year period. Repetitive Loss properties in the county include:

Community Name	County Name	Occupancy	Rated Flood	Cumulative Building Payment	Cumulative Contents Payment	Total Losses	Total Paid
County Unincorporated	Coshocton	Single fmly	A	\$ 8,571.31	0	2	\$ 8,571.31
County Unincorporated	Coshocton	Single fmly	AE	\$20,288.77	\$2,068.31	2	\$22,357.08
County Unincorporated	Coshocton	Single fmly	A	\$ 7,140.08	0	2	\$ 7,140.08
County Unincorporated	Coshocton	Single fmly	A	\$17,773.08	0	3	\$17,773.08

4.4.5 Frequency/Probability of Future Occurrence/Flash Floods

Past floods are indications of what can happen in the future, but mitigation plans are based on the risk of future flooding. Flood studies interpret historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their recurrence interval.

According to the NCEI, Coshocton County has experienced 50 flash flood events over a 22- year period (1996-2018) with damage estimates totaling approximately \$15.347 million. Based on the information we have; the future probability of a flash flood is 2 events in a given year (50 events / 22 years). The data is included in *Appendix H*

4.4.6 Frequency/Probability of Future Occurrence/Flooding

Past floods are indications of what can happen in the future, but mitigation plans are based on the risk of future flooding. Flood studies interpret historical records to determine the statistical potential that storms and floods of certain magnitude will recur. Such events are measured by their recurrence interval.

Recurrence interval, or frequency of occurrence, is defined as the average number of years between storms of a given intensity. Recurrence intervals commonly used in technical studies and design are 2, 10, 25, 50 and 100 years. Recurrence interval addresses how often a flood of a specific depth will be expected to occur. Structures located within areas considered at higher risk should be prioritized higher as it relates to mitigation.

According to the NCEI, Coshocton County has experienced 36 floods over a 22-year (1996-2018) with damage estimates totaling approximately \$431,000. Based on the data we have; the future probability of a flood is 2 events in a given year (36 events / 22 years). The data is included in *Appendix H*.

4.5 Severe Winter Weather

A winter storm encompasses several types of storm systems that develop during the late fall to early spring. It deposits any of the following types of precipitation: snow, freezing rain, or ice. Blizzards and ice storms are subcategories of winter storms. A winter storm watch indicates that severe winter weather may affect an area. A winter storm warning indicates that severe winter weather conditions are definitely on the way.

4.5.1 Heavy Snow/Blizzards

A blizzard warning signifies there is a large amount of falling or blowing snow, and sustained winds of at least 35 miles per hour (mph), are expected for several hours. In order to be classified as a blizzard, as opposed to merely a winter storm, the weather must meet several conditions. The storm must decrease visibility to a quarter of a mile for three consecutive hours, include snow or ice as precipitation, and have wind speeds of at least 35 mph. A blizzard is also characterized by low temperatures.

According to the NCEI, there have been 5 heavy snow events in Coshocton County since 1999. Of these events, there has been NO property or crop damages. The data is included in *Appendix H*.

4.5.2 Ice Storms

An ice storm is defined as a weather event containing liquid rain that falls upon cold objects creating 1/4-inch-thick or more accumulation of ice buildup. This ice accumulation creates serious damage such as downed trees and power lines, leaving people without power and communication. It also makes for extremely treacherous road conditions.

Occasionally, snow will fall after an ice storm has occurred. With the ice covered, it is nearly impossible to determine which travel areas to avoid. When traveling by car, this snow-covered ice causes accidents and when walking it causes people to fall, possibly sustaining injuries.

According to the NCEI, there have been 5 recorded ice storm events since 2004 in Coshocton County with \$2,000 worth of property damage. A single event in January 2005 resulted in \$2,000 worth of damage. NO deaths or injuries were recorded for this event. The data is included in *Appendix H*

4.5.3 Extreme Cold

Extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with

extreme cold with a wind chill. The impacts include frostbite and hypothermia.

The wind chill temperature is how cold people and animals feel when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. On November 1, 2001, the National Weather Service (NWS) implemented a replacement Wind Chill Temperature (WCT) index for the 2001/2002 winter season. The reason for the change was to improve upon the current WCT Index which was based on the 1945 Siple and Passel Index.

Therefore, the wind makes it feel much colder. If the temperature is 0 degrees Fahrenheit and the wind is blowing at 15 mph, the wind chill is -19 degrees Fahrenheit. At this wind chill temperature, exposed skin can freeze in 30 minutes. The following chart lists wind chill values associated with degrees in Fahrenheit and wind in mph.



Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in fingers, toes, or nose and ear lobes are symptoms of frostbite.

Hypothermia is a condition brought on when the body temperature drops to less than 90 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

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

Frostbite Times

30 minutes

10 minutes

5 minutes

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

According to the NCEI, there have been 3 extreme cold events recorded from 1999 – 2018 in Coshocton County. These events resulted in NO property or crop damages and NO deaths or injuries. The data is included in *Appendix H*.

4.5.4 Frequency/Probability of Future Occurrence

According to the NCEI, 26 winter storm events, including snow, ice and extreme cold, were documented for Coshocton County since 1959. These winter storms have caused estimated total losses of \$2,000 over this 59-year period (1959-2018). Based on historical information, Coshocton County can expect to endure at least 1 winter storms in any given year. (26 events / 59 years).

4.6 Class I Dam Failure

Dam failures are often referred to as disasters. By definition, a disaster is any event that causes great harm or damage, serious or sudden misfortune. Because of the rapid and unexpected manner in which dam failures can occur, they are classified in the same general magnitude as earthquakes and tornadoes.

Because of the many dams existing in Coshocton County, the Core Group chose to discuss dam safety in this Mitigation Plan. The Core Group is especially concerned with the development occurring downstream of these dams.

4.6.1 Extent

Dams in Ohio

A dam is an artificial barrier usually constructed across a stream channel to impound water. Timber, rock, concrete, earth, steel or a combination of these materials may be used to build the dam. In Ohio, most dams are constructed of earth. Dams must have spillway systems to safely convey normal stream and flood flows over, around, or through the dam. Spillways are commonly constructed of non-erosive materials such as concrete. Dams also have a drain or other water-withdrawal facility to control the pool or lake level and to lower or drain the lake for normal maintenance and emergency purposes.

Most dams in Ohio are small and are constructed by farmers and other private individuals for water supply, recreation, swimming and fishing. Numerous other, usually larger, dams are built by cities and industry to form reservoirs for water supply or liquefied waste storage. Ownership of dams is diverse and maintained by both public and private interests. The federal government owns and operates over 30 dams for flood control, recreation and water supply. The state of Ohio has more than 100 dams, primarily located in state park and wildlife areas for recreational purposes. Flood control and some water supplies are provided by dams owned by watershed conservancy districts.

The oldest dams in Ohio were constructed over 150 years ago to create water supply reservoirs for a network of navigational canals. Buckeye Lake Dam, built in about 1825 as part of the canal system and located in Licking and Fairfield counties, is the oldest dam in the state. The highest dam in Ohio is located in Jefferson County and is 240 feet high.

Classification of Dams in Ohio

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

Class I: A dam shall be placed in Class I when failure of the dam would result in probable loss of human life. Dams having a storage volume greater than 5,000 acre-feet or a height of greater than 60 feet shall be placed in Class I.

Class II: Dams having a storage volume greater than 500 acre-feet or a height of greater than 40 feet shall be placed in Class II. A dam shall be placed in Class II when failure of the dam would result in at least one of the following conditions, but loss of human life is not envisioned:

(a) Possible health hazard, including but not limited to, loss of a public water supply or wastewater treatment facility.

(b) Probable loss of high-value property, including but not limited to, flooding of residential, commercial, industrial, publicly owned, and/or valuable agricultural structures, structural damage to downstream Class I, II, or III dams, dikes or levees, or other dams, dikes or levees of high value.

(c) Damage to major roads, including but not limited to, interstate and state highways and roads which provide the only access to residential or other critical areas such as hospitals, nursing homes or correctional facilities as determined by the Chief of ODNR's Division of Water.

(d) Damage to railroads, or public utilities.

Class III: Dams having a height of greater than 25 feet, or a storage volume of greater than 50 acre-feet, shall be placed in Class III. A dam shall be placed in Class III when failure of the dam would result in at least one of the following conditions, but loss of human life or hazard to health is not envisioned.

(a) Property losses, including but not limited to, rural buildings not otherwise listed as high-value property in paragraph (A) of this Rule and Class IV dams, dikes and levees not otherwise listed as high-value property in paragraph (A) of this Rule. At the request of the dam owner, the Chief of ODNR's Division of Water may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property.

(b) Local roads including but not limited to roads not otherwise listed as major roads in paragraph (A) of this rule.

Class IV: When failure of the dam would result in property losses restricted mainly to the dam and rural lands, and not loss of human life or hazard to health is envisioned, the dam may be placed in Class IV. Dams which are twenty-five feet or less in height and have a storage volume of fifty acre-feet or less, may be placed in Class IV. No proposed dam shall be placed in Class IV unless the applicant has submitted the preliminary design report required by Rule 1501:21-5-02 of the Administrative Code. Class IV dams are exempt from the permit requirements of Section 1521.06 of the Revised Code pursuant to paragraph (A) of Rule 1501:21-19-01 of the Administrative Code. (water.ohiodnr.gov/safety/dam-safety)

There are more than 50,000 dams identified in Ohio. A great majority of these dams are small and do not fall under the jurisdiction of Ohio's Dam Safety Laws. The number of dams, which fall under state law jurisdiction number as of April 2000 and their classifications are as follows:

- Class I Dams - 499
- Class II Dams - 539
- Class III Dams -704

Coshocton County Dams

According to the ODNR, Coshocton County has 18 Class I, II and III dams within its boundaries. Class I, II and III dams are listed below as follows:

Dam	ODNR Class	ODNR File No
Mohawk Dam	I	0220-004
Six Mile Dam	I	0217-007
Sunset Lake Dam	I	0217-002
Wills Creek Lake Dam	I	0116-001
Conesville Plant Ash Pond Complex	II	0116-002
Broken Aro Slurry Pond No. 1 Dam	II	0117-008
Peabody Coal Co Pond Dam	II	0117-012

Dam	ODNR Class	ODNR File No
Catfish II Dam	II	0117-013
Muskingum Valley Council Lake Dam	III	0116-005
Isleta Wolfe Adjacent 1, Pond No. 3 Dam	III	0115-015
Simco Sediment Pond E-55 Dam	III	0115-016
Moore Lake Dam	III	0120-003
Herbert Pond Dam	III	0215-003
Forest Hill Lake Pond	III	0216-001
Schlegel Lake Dam	III	0216-004
Olinger's Private Dam	III	0217-003
Broken Aro Sediment Pond No 47 Dam	III	0217-016
Broken Aro Sediment Pond No 46 Dam	III	0220-006

In addition, Coshocton County has two unclassified dams and 21 exempt dams, which have been determined by the ODNR's Chief of the Division of Water to not constitute a hazard to life, health or property in the event of a failure.

According to the Coshocton County Engineer's Office, one area of concern as it relates to dam safety are the areas downstream of the Mohawk Dam, as it would cause significant damage if it were to collapse.

4.6.2 Mohawk Dam

Mohawk Dam, located in Jefferson Township, Coshocton County, Ohio northwest of Nellie, is a dry dam constructed by the United States Army Corps of Engineers (USACE) in the mid-1930s for the purpose of flood control on the Walhonding River. It has a total capacity of 12.41 billion ft². Making it an extreme hazard to all down elevation properties. The dam is part of the larger 18-county Muskingum Watershed Conservancy District (MWCD). The dam has been in service for 70 years and was recently placed on the USACE's "Urgent" dam safety classification list and plans are currently being drafted that would allocate funds for dam stabilization.

A September 2010 US Army Corp of Engineers report indicates the full repair of this dam will cost \$187,349,000.

This full report is available from the US Army Corp of Engineers, Huntington District, lrh.usace.army.mil

The repair of this dam is of extremely high importance to Coshocton County and all downstream communities to the Ohio River.

4.6.3 Historic Occurrence

History of Dam Safety in Ohio

Construction of dams in Ohio dates back to the early 1800 when reservoirs such as Buckeye Lake and Grand Lake St. Mary's were built to supply water to the canal system, which provided a means of transportation for agricultural trade and commerce. Dam construction continued at a modest pace for about the next 100 years with relatively few dams built by private entities. In the early part of the nineteenth century, several large municipally-owned dams and reservoirs were built for public water supply. Severe floods also prompted the formation of conservancy districts which constructed dams for flood control.

Although the true forerunner of current dam safety laws in Ohio was enacted in 1963, legislation pertaining to the construction of dams was enacted as early as 1937. This early set of laws aimed to encourage construction of dams for the storage of water in response to recent drought periods in Ohio and the "dust bowl" days on the Great Plains. The regulatory agency responsible for the enforcement of these early laws was the Division of

Conservation and Natural Resources in the State Department of Agriculture.

Due to the availability of large earthmoving equipment after World War II, Ohio saw a significant increase in the number of dams built by individuals and private companies. Although the water storage and recreational capabilities provided by these dams were important benefits, concern about the adequacy of design and construction was prompted by the loss of life and property damage resulting from dam failures, which led to a greater interest in dam safety.

The ODNR's Division of Water has been involved in dam safety since 1963. During this year, the first Ohio law requiring construction permits for building new dams was enacted. In addition, following the failure of several dams in northeast Ohio during the severe flood of 1969, the General Assembly revised the law to include periodic inspections of existing structures. Inspections were required to help assure that the continued operation and use of a dam, dike or levee does not pose a hazard to life, health, or property. In 1972, the failure of Buffalo Creek Dam in West Virginia, which caused great loss of life and severe property damage, led to the enactment of the National Dam Safety Act. This law, administered by the Corp of Engineers, called for an inventory of dams in the United States and the inspection of those dams that could create the most hazards if they failed. The Corps contracted with the Division of Water to inventory roughly 4,500 non-federal dams in Ohio.

Coshocton County Dam History

Coshocton County does not have a significant history of dam failure. The State of Ohio Dam Safety Program is in place to monitor and provide dam owners in Coshocton County pertinent information to support their dam's maintenance requirements. The Dam Safety Program regulates the construction, operation and maintenance of Ohio's dams, dikes, and levees to protect life and property from damages due to failure. This regulation is accomplished through periodic inspection, new dam construction permits and regulation of improvements, maintenance and operation of existing dams. The data is included in *Appendix H*.

4.6.4 Frequency/Probability of Events

While historic event data suggests there is no risk of a dam failure, as the dams age without proper maintenance and repair, the risk increases. There is no clear data available to evaluate this probability risk.

Of specific concern, the unrealized US Army Corp of Engineers assessment of Mohawk Dam repair demands more serious attention, given the devastating impact it's failure would have on SE Ohio.

4.7 Tornadoes

4.7.1 Extent

Tornadoes are produced from the energy released during a thunderstorm, but account for only a tiny fraction of the overall energy generated. What makes them particularly dangerous is that the energy is concentrated in a small area, perhaps only 100 yards across. Not all tornadoes are the same and science does not yet completely understand how a portion of a thunderstorm's energy becomes focused into something as small as a tornado.

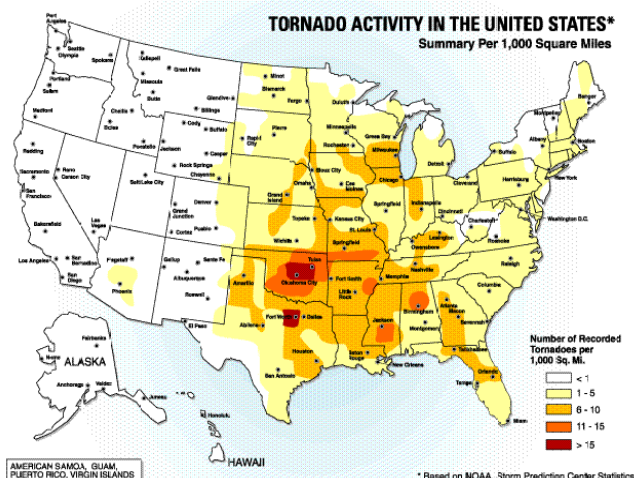


Figure 1.1 The number of tornadoes recorded per 1,000 square miles

Tornadoes occur mostly in the central plains of North America, east of the Rocky Mountains and west of the Appalachian Mountains. They occur primarily during the spring and summer – the tornado season comes early in the south and later in the north according to the seasonal changes in relation to latitude – usually during the late afternoon and early evening. They have been known to occur

in every state in the United States and every continent on the earth, any day of the year, and at any hour.

The damaging strong winds generated from tornadoes can reach 300 mph in the most violent tornadoes, causing automobiles to become airborne, ripping ordinary homes to shreds, and turning broken glass and other debris into lethal missiles. The biggest threat to living creatures, including humans, during tornadoes is flying debris and being tossed about in the wind. Contrary to previous belief, it is not true that the pressure in a tornado contributes to damage by making buildings "explode."

According to the NWS, the development of Doppler radar has made it possible, under certain circumstances, to detect tornado winds with radar. However, spotters remain an important part of the system to detect tornadoes, because not all tornadoes occur in situations where the radar can "see" them. Citizen volunteers comprise what is called the SKYWARN network of storm spotters, who work with their local communities to watch out for approaching tornadoes to ensure that appropriate action is taken during tornado events. Spotter information is relayed to the NWS, who operates the Doppler radars and issues warnings, usually relayed to the public by radio and TV, for communities ahead of the storms. The NWS utilizes all the information they can obtain from weather maps, modern weather radars, storm spotters, monitoring power line breaks, as well as additional sources for issuing tornado warnings.

Although the process by which tornadoes form is not completely understood, scientific research has revealed that tornadoes usually form under certain types of atmospheric conditions. Those conditions can be predicted, but it is not yet possible to predict in advance exactly when and where they will develop, how strong they will be, or precisely what path they will follow. According to the NWS, there are some "surprises" every year, when tornadoes form in situations that do not look like the right conditions in advance, but these are becoming less frequent. Once a tornado is formed and has been detected, warnings can be issued based on the path of the storm producing the tornado, but even these cannot be perfectly precise regarding who will, or will not, be struck.

Table 4-2 shows that although the State of Ohio may not have the most tornadoes, those that do hit Ohio are significant in damage and have other indication factors of a large-scale tornado.

Table 4-2
State Tornado Ranking

Rank	Total Number of Tornadoes	Deaths per 10,000 sq. miles	Number of Killer Tornadoes	Total Tornado Path Length per 10,000 sq. miles	Killer Tornadoes as a % of all Tornadoes	Annual Tornadoes per 10,000 sq. miles
1	Texas	Massachusetts	Texas	Mississippi	Tennessee	Florida
2	Oklahoma	Mississippi	Oklahoma	Alabama	Kentucky	Oklahoma
3	Florida	Indiana	Arkansas	Oklahoma	Arkansas	Indiana
4	Kansas	Alabama	Alabama	Iowa	Ohio	Iowa
5	Nebraska	Ohio	Mississippi	Illinois	Alabama	Kansas
6	Iowa	Michigan	Illinois	Louisiana	Mississippi	Delaware

7	Missouri	Arkansas	Missouri	Kansas	North Carolina	Louisiana
8	Illinois	Illinois	Indiana	Indiana	Michigan	Mississippi
9	S Dakota	Oklahoma	Louisiana	Nebraska	New York	Nebraska
10	Louisiana	Kentucky	Tennessee	Wisconsin	Massachusetts	Texas

Although the number of tornadoes in Ohio does not rank high compared to other states in the United States, the State does average around 14 tornadoes a year. Ohio's peak tornado season runs from April through July, with most tornadoes occurring between 2 p.m. and 10 p.m. Even though June has been the month with the most tornado occurrences, many of the State's major tornado outbreaks have taken place in April and May. However, history has shown that tornadoes can occur during any month of the year and at any time of the day or night.

Tornadoes are considered the most violent atmospheric phenomenon on the face of the earth with their strength being measured by the Fujita Scale as described in Table 4-3. This scale is the mechanism used to determine the potential type of tornado that may have affected a particular community. It is based on velocity of wind and the type of damage the tornado caused. Many F0 and F1 tornadoes have touched down in Ohio, but Ohio has also been struck by some of the most destructive (F5) tornadoes ever, including the April 3, 1974 tornado which devastated Xenia, killing over 30 people and destroying 2,000 buildings.

Table 4-3
Fujita Scale for Tornadoes

Scale	Wind Speed	Typical Damage
F-0 Weak	40-72 mph	Light Damage: Some chimneys damaged, twigs and branches broken off trees, shallow-rooted trees pushed over, signboards damages, some windows broken.
F-1 Weak	73-112 mph	Moderate Damage: Surface of roofs peeled off, mobile homes pushed off foundations or overturned, outbuildings demolished, moving autos pushed off the roads, trees snapped or broken; beginning of hurricane speed winds.
F-2 Strong	113-157 mph	Considerable Damage: Roofs torn off frame houses, mobile homes demolished, frame houses with weak foundations lifted and moved, large trees snapped or uprooted, light-object missiles generated.
F-3 Strong	158-206 mph	Severe Damage: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted, heavy cars lifted off the ground and thrown, weak pavement blown off the roads.
F-4 Violent	207-260 mph	Devastating Damage: Well-constructed houses leveled, structures with weak foundations blown off the distance, cars thrown and disintegrated, trees in forest uprooted and carried some distance away.
F-5 Violent	261-318 mph	Incredible Damage: Strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile-sized missiles fly through the air in excess of 300 feet, trees debarked, incredible phenomena will occur.

Five (5) tornadoes were recorded in Coshocton County from 1950 to 2018, according to the NCEI. These tornadoes caused \$27.53 million worth of property damage and no injuries or deaths. The data is included in *Appendix H*.

4.7.2 Historic Occurrence

With 5 reported tornadoes over the past 68 years (1950-2018) which occurred in 1961, 1970, 1077, and 2 in 1985. On average, tornadoes occur in the County every 13.6 years (5 tornadoes /68 years). The strongest tornado measured in the County's history was an F3 tornado that occurred in May 1985 which resulted in \$25 million in property damage.

4.7.3 Frequency/Probability of Future Occurrence

The probability of future occurrences is low and the likelihood of severe damage based on past events is low - moderate. One reason that the County would not expect to suffer severe damage is because the majority of the County is sparsely populated. The County is more affected by straight-line winds, which are not categorized as a tornadic event but can do just as much damage. Please see High Winds for more discussion on this topic. The likelihood of a future tornado is 7.3% (5 events /68 years) in any one year.

4.8 Earthquakes

4.8.1 Extent

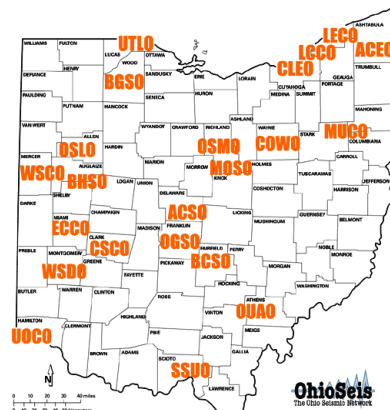
The Richter scale is the recognized method for measuring the impact of earthquakes. The following chart shows Richter scale ratings from 0 to 10.

4.8.2 Monitoring of Earthquakes

The ODNR Division of Geological Survey has established a 23-station cooperative network of seismograph stations throughout the State in order to continuously record earthquake activity. The network, which went on line in January 1999, ended a five-year gap during which there was only one operating station in Ohio. The State was dependent on seismographs in Kentucky and Michigan to record Ohio earthquakes.

The 23 stations of the new seismograph network, which is called OhioSeis, are distributed across the State, but are concentrated in the most seismically active areas or in areas that provide optimal conditions for detecting and locating very small earthquakes that are below the threshold of human notice. These small micro earthquakes are important because they occur more frequently and help to identify the location of faults that may periodically produce larger, potentially damaging earthquakes.

The OhioSeis seismograph stations are located at colleges, universities and other institutions, employing new technology that not only makes them very accurate, but also relatively inexpensive and easy to operate and maintain. In contrast to the old technology, in which a pen made a squiggly line on a paper drum, the new system is entirely digital and uses a desktop computer to continuously record

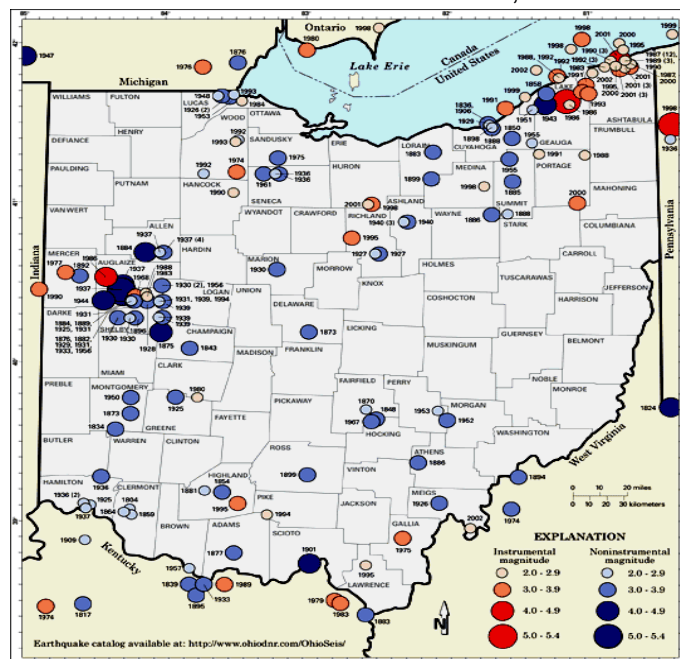


and display

data. Two other innovations have made the system unique. An inexpensive Global Positioning System (GPS) receiver is used to keep very precise time on the continuously recorded seismogram, and each station's computer is connected to the Internet for rapid data transfer.

Each OhioSeis station is a cooperative effort. Seismometers, the instrument that detects Earth motions, and other seismic components were purchased by the Division of Geological Survey with funds provided by FEMA through the OEMA, as part of the National Earthquake Hazards Reduction Program. The computers and Internet connection were purchased and provided by the cooperating institutions.

The Division of Geological Survey is coordinating the seismic network and has established the Ohio Earthquake Information Center at the Horace R. Collins Laboratory at Alum Creek State Park, north of Columbus. This facility functions as a repository and laboratory for rock core and well cuttings, but has a specially constructed room for earthquake recording. The seismograph system allows for very rapid location of the epicenter and calculation of the magnitude of any earthquake in the State. The earthquake records, or seismograms, from at least three seismograph stations are needed to determine earthquake locations (epicenters). These records can be downloaded from the internet at any station on the network, and location and magnitude can be determined. Small earthquakes were in many cases not even detected by distant, out-of-date seismograph stations.



Epicenters of past earthquakes in Ohio.

The OhioSeis network provides a whole new dimension of understanding about the pulse of the Earth beneath Ohio. Although the new seismograph network will not predict earthquakes or provide an alert prior to an event, it will provide insight into earthquake risk in the State so that intelligent decisions about building and facility design and construction, insurance coverage and other planning decisions can be made by individuals, business and industry, and governmental agencies.

4.8.3 Historic Occurrence

Earthquakes in Ohio

Earthquakes are a low probability, high consequence event. It is because of the potential high consequences that geologists, emergency planners and other government officials have taken a greater interest in understanding the potential for earthquakes in some of the areas of the eastern United States and educating the population as to the risk in their areas. Although there have been great strides in increased earthquake awareness in the eastern United States, the low probability of such events makes it difficult to convince most people that they should be prepared.

It is surprising to many Ohioans that the State has experienced more than 120 earthquakes since 1776, and that 14 of these events have caused minor to moderate damage. The largest historic earthquake in Ohio was centered in Shelby County in 1937. This event, estimated to have had a magnitude of 5.5 on the Richter scale, caused considerable damage in Anna and several other western Ohio communities, where at least 40 earthquakes have been felt since 1875. Northeastern Ohio, east of Cleveland,

is the second most active area of the state. At least 20 earthquakes have been recorded in the area since 1836, including a 5.0 magnitude event in 1986 that caused moderate damage. A broad area of southern Ohio has experienced more than 30 earthquakes.

Although the New Madrid Line is in close proximity to the State of Ohio, there has not been an earthquake of any significance since 1875 caused by this fault line. An earthquake on June 18, 1975 caused damage in western Ohio, and affected a total area estimated at over 40,000 square miles. Walls were cracked and chimneys thrown down in Sidney and Urbana. The shock was felt sharply at Jeffersonville, Indiana. The affected area included parts of Illinois, Indiana, Kentucky and Missouri.

Coshocton County Earthquake Events

Coshocton County experience NO recorded epicenters within its boundaries as shown on the epicenter map in this section since 1931.

According to OEMA's Earthquake Program Manager, the risk in Coshocton County's zone is low. Though Coshocton County has had earthquake tremors in the past, the natural geology in the area lends itself to stable conditions if an earthquake were to occur.

4.8.4 Frequency/Probability of Future Occurrence

Based on the lack of data and previous occurrences, the odds of an earthquake striking Coshocton County are unlikely, but possible. What information that is available is included in *Appendix H*.

5.0 VULNERABILITY ASSESSMENT

Coshocton County is susceptible to many different kinds of natural hazards as reviewed in the previous section of this plan. If a hazard event struck vacant land, there would not be much cause for concern. However, since Coshocton County has close to 37,000 residents and thousands of homes, businesses and critical facilities, the potential for damage and injury could be high, especially in higher populous areas such as the City of Coshocton.

This chapter reviews how vulnerable Coshocton County is to property damage and threats to public health and safety. This chapter also reviews how hazards may have an adverse impact on the economy. The potential for property damage is measured in dollars based on historical events of the past and damage incurred from those events.

A four-step process was followed to estimate the cost to Coshocton County of the hazards reviewed in the Hazard Profile section (Section 4.0) of this report. This process was documented on a per hazard basis. The steps that were used are as follows:

- Step 1: Inventory critical facilities and structures susceptible to property damage.
- Step 2: Determine potential dollars lost based on various levels of damage on different categories of structures.
- Step 3: Evaluate the impact on infrastructure and general population.

Step 4: Evaluate property damage, loss of life and economic losses.

5.1 Critical Facilities

Members of the Core Group from each of the communities were asked to compile a list of critical facilities pertaining to their community. All the critical facilities within Coshocton County (schools, hospitals, water treatment plants, airports, police and fire stations, nursing homes, entertainment facilities, and any other facility deemed a critical facility for their county) are summarized in the Coshocton County HAZUS-MH reports of 2/16/18. See the Table 5-1 for a summary of critical facilities by facility type.

Table 5-1
Critical Facilities in Planning Area

Property	Count
Agencies	50
Airports	2
Childcare	8
Churches	44
Dialysis Centers	2
Electric Suppliers	2
Fire EMS	6
Emergency Operations Centers	1
Highway	21
Hospitals	1
Nursing Homes	25
Police	3
Schools	21
Wastewater Plant	3
Water Plant	3
Total Critical Facilities	192

5.2 Potential Dollars Lost

The second step of the vulnerability assessment was to calculate the impact of the given hazards in terms of property damage and loss of property use. Averages and typical situations were used for various categories of facilities. This approach did not predict which facilities will be hit by which hazard, but it instead provided a general estimate of the level of damage that would be expected based upon available data.

First, the value of the property being damaged was determined based on average value of a facility within that category. Typical values of the structures were determined using data received from the County's Auditor's Office.

Content's value was calculated as a percentage of the structure's value. Table 5-2 shows the relative value of the typical contents to the typical structure type. These ratios were taken from FEMA guidance documents.

Table 5-2
Contents Value as a Percentage of Structure Value

Occupancy Class	Value (%)
Residential	50%
Commercial	100%
Industrial	150%
Medical Facilities	150%
Emergency Services	150%
General Government	100%
Schools/Libraries	100%
Colleges/Universities	150%
Religion/Non-profit	100%
Shelters	100%

Second, three levels of physical damage were evaluated for each category of structure. These levels have a percentage of damage associated with each. The dollars lost for each level, however, may be underestimated since there may be downtime associated with closing a business for an extended period of time.

- **Minor damage:** Many structures exposed to a storm or other hazard will suffer only minor to moderate damage. For example, a hurricane may just damage the roof and windows of some structures. For this calculation, 5% of the structure's value was used. Because the structure stays substantially intact, no contents losses were considered.
- **Moderate damage:** This category represents more serious damage, such as a collapsed wall or floodwater over the first floor of a building. Moderate damage is calculated as 40% of the structure's value plus 40% of the content's value.
- **Major damage:** This category is used when a building is demolished or heavily damaged. An example of the former is a house leveled by a tornado. An example of the latter is floodwater more than 1.5 feet over the lowest floor (i.e., over the electrical outlets). The average dollar figure for this category is 75% of the structure's value and 75% of the contents' value.

Table 5-3 shows the calculated dollar losses for each level of damage per facility type. The type of facility as listed was limited to that information available from the Coshocton County Auditor's Office. The Auditor's office distinguishes utilities from exempt property. Exempt property includes most of the other county critical facilities.

Table 5-3
Physical Potential Dollar Losses

5.3 Vulnerability Data Collection

Prior to beginning an assessment of a community's vulnerability to hazards, local sources of information were researched including comprehensive plans, land use plans, land development regulations and flood regulations, to determine if the county previously addressed its vulnerability to any particular hazard. In most cases, local plans and regulations did not yet exist or were very minimal in addressing natural hazard situations and building parameters.

Property	Number of Units	Average Improved Value	Minor Damage (5%)	Moderate Damage (40%)	Major Damage (75%)
Residential	12,253	\$ 64,016	\$ 3,201	\$ 25,606	\$ 48,012
Commercial	997	\$147,997	\$ 7,400	\$ 59,199	\$110,998
Agricultural	2,936	\$461,549	\$23,077	\$184,620	\$ 346,162
Industrial	116	\$721,198	\$36,060	\$288,479	\$540,900
Critical Facilities					
Utilities	224	\$262,633	-----	-----	-----
All others based on County Auditor Records	449	\$262,789	-----	-----	-----
Total Critical Facilities	673	\$262,711	\$13,136	\$105,084	\$197,033

Therefore, other state and national sources were researched for detailed information. One of these resources was the NCEI. The NCEI is the world's largest active archive of weather data. The NCEI produces numerous climate publications and responds to data requests from all over the world. The NCEI supports a three-tier national climate services support program that includes partners such as the NCEI, Regional Climate Centers, and State Climatologists. The NCEI has long served as a national resource for climate information. The NCEI's data is used to address issues that span the breadth of this nation's interests. As climate knows no boundaries, the NCEI works closely with scientists and researchers world-wide to develop both national and global data sets that have been used by both government and the private sector to maximize the resources provided by our climate and minimize the risks of climate variability and weather extremes. The NCEI has a statutory mission to describe the climate of the United States and acts as the nation's scorekeeper regarding the trends and anomalies of weather and climate. The NCEI's climate data have been used in a variety of applications including agriculture, air quality, construction, education, energy, engineering, forestry, health, insurance, landscape design, livestock management, manufacturing, recreation and tourism, retailing, transportation, and water resources management among other areas. The NCEI's data and products fulfill needs ranging from building codes to power plant and space shuttle design.

Another source of hazard information that was explored was the Ohio Seismic Network as described in previous sections of this report. The Division of Geological Survey of the ODNR coordinates a 23-station cooperative network of seismograph stations throughout the state in order to continuously record earthquake activity. OEMA's Ohio Earthquake Program Manager was also contacted to discuss the risks associated with each county to determine if the type of geology lends itself to increased damage.

Because the state and national agencies are not always privy to the local knowledge, some information extracted from their libraries may not be comprehensive or complete. Therefore, the Core Group used their experience and knowledge with verification from the local EMA directors to prioritize the hazards determined to affect the county the most and assess them according to local concerns.

Vulnerability Assessment by Hazard

5.4 Windstorms (Thunderstorms/High Winds)

Severe storms for Coshocton County quantitatively have the highest likelihood of occurring on a yearly basis. According to the NCEI, 184 storm events including thunderstorms (173) and high winds (11) were documented for Coshocton County since 1950. Severe storms in Coshocton County have caused cumulative property and crop damage with estimated total losses of \$2.866 million over a 68-year period. The county has rated Windstorms as its top priority.

5.4.1 Infrastructure Impact

Since severe summer storms are random in nature, the impact on Coshocton County's infrastructure is not limited to a certain area as with river flooding. Homes and businesses all throughout the County are susceptible to thunderstorms and high winds. Shingles are blown from rooftops and hail may dent siding or break windows. Trees may become uprooted and limbs detached and blown into structures. Winds also cause severe damage to mobile home parks and camp grounds if units are not properly tied down.

Utilities and municipal plants may also be damaged during wind storms. Debris, such as tree limbs, blown into utility lines may cause downed power lines. Wastewater plants may also be adversely affected with blown limbs and debris clogging the tanks and filters. A factor of .25 is used in this calculation as a wind event is not likely to impact more than 25% of the county.

Windstorms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Infrastructure Impact	673 (.25) = 168	8	67	126
		\$105,088	\$7,040,628	\$24,826,158

*Property and Contents

5.4.2 Population Impacts

Because windstorms are random in nature, the entire Coshocton County population is susceptible and should be prepared. The populations located in mobile home parks and campgrounds should take particular care to seek adequate shelter with approaching severe weather. Since 1950, there have been No deaths and one (1) injury resulting from Severe Summer Storms.

5.4.3 Property Damage

According to the NCEI, 184 storm events including thunderstorms (173) and high winds (11) were documented for Coshocton County from 1950 to 2018. Severe storms in Coshocton County have caused cumulative property and crop damage with estimated total losses of \$2.866 million over a 68-year period including the following major historical events:

- High winds in Coshocton on 12/01/2006 with \$30.00K worth of property damage.
- High winds in Coshocton on 01/09/2008 with \$50.00K worth of property damage.
- High winds in Coshocton on 1/30/2008 with \$50.00K worth of property damage.
- High winds in Coshocton on 9/14/2008 with \$500.00K worth of property damage.
- High winds in Coshocton on 02/12/2009 with \$100.00K worth of property damage.

- High winds in Coshocton on 04/28/2011 with \$75.00K worth of property damage.
- Thunderstorm in West Bedford on 07/07/2003 with \$50.00K worth of property damage.
- Thunderstorm in Coshocton on 05/11/2015 with \$500.00K worth of crop damage.

With the insured house value at \$100,000 damage costs from storms would accumulate quickly. Residents often cannot rely on federal assistance for the total damages incurred. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the cleanup process. A factor of .25 is used in this calculation as a wind event is not likely to impact more than 25% of the county.

Windstorms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	12,253 (.25) = 3,063	154 \$492,954	1225 \$31,367,350	2,297 \$110,283,564

*Property and Contents

5.4.4 Loss of Life

Since 1950, there have been one (1) recorded injuries and NO deaths due to severe summer storms. Due to the severity of the storms affecting Coshocton County, the potential for death and injury is low. One of the biggest problems associated with severe summer storms is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather. The injury reported included:

- Hail in Warsaw on 06/19/1994 which injured 1 person.

5.4.5 Economic Losses

The economic losses a community suffers during a severe summer storm event can be high. In communities with hazard trees, these trees have the potential to destroy homes and businesses if uprooted. Fallen branches may also cause severe damage. Residents and business owners then turn their efforts from work and running a business to clean up efforts. A factor of .25 is used in this calculation as a wind event is not likely to impact more than 25% of the county.

Windstorms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial Property Impact	997 (.25) = 249	12 \$88,800	100 \$5,919,900	187 \$20,756,626
Industrial Property Impact	116 (.25) = 29	1 \$36,060	12 \$3,461,748	22 \$11,899,800
Total Impact	278	\$124,860	\$9,381,648	\$32,656,426

*Property and Contents

Prioritization Rankings

Windstorms within Coshocton County received the following priority rankings during the HIRA assessment:

Probability of Occurrence: 1.5

Anticipated Impact: 1.2

Anticipated Geographic Extent: .8
Warning Time: .4
Duration: .2
Calculated Risk Factor: 4.1

5.5 Flooding - 100 Year and localized Flooding

Flooding is a site-specific hazard. Therefore, floodplains are an important planning consideration. A floodplain is any land area susceptible to inundation by floodwaters from any surface water source. Floodplains are measured in terms of the amount of storm water that it takes to cover a given area of land. These storm events are measured in frequency of occurrence, such as 5-year, 100-year and 500-year, with the standard measurement being the 100-year storm or floodplain. The 100-year floodplain is the land area having a 1 in 100 chance of flooding in any given year, but the statistics can be misleading. In reality, the 100-year storm or flood could occur two, three, or several years in a row (unlikely but possible), because the 100-year flood is a statistical probability and not a predictable recurrence. Statistically, the 100-year flood has a 25% chance of occurring during the typical 30-year lifespan of a home mortgage.

Any development within floodplains can impact the direction, flow and level of the watercourse during periods of high water or flooding. In other words, if fill material is placed or a house constructed in a floodplain, it will alter the boundaries of the floodplain downstream of that area. This alteration happens because structures or fill utilize valuable space that would otherwise act as a natural retaining area for floodwaters to spread and slow. Not only does development in the floodplain increase dangers downstream, developments within the floodplain are at higher risk of damage due to flooding. This damage includes fill material and debris from destroyed structures upstream colliding with structures in the floodplain downstream of an affected area. Many bridges are washed out in floods because river borne debris clog their free-flow area.

5.5.1 Based on the 25-year Coshocton Co HAZUS-MH Flood Risk Report (see *Appendix E*) conducted on 02/16/18, Essential Facilities Exposure to damage is shown on the following table.

Classification	Total	At Least/Moderate	At Least/Substantial	Loss of Use
Emergency Op Centers	1	0	0	0
Fire Stations	1	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	21	3	0	3

HAZUS-MH Expected Damage to Essential Facilities, Coshocton Co Ohio Table 5

5.5.2 Population Impact

Based on the NCEI data published from 1950 through June 2017 time period, Coshocton County's citizens have had to endure 86 flooding situations, including flash floods (50) and river floods (36). Flash floods affect a specific area over a short period of time and a smaller population than river floods. There were

NO deaths or injuries reported for flood events for Coshocton County.

For Flash Flooding, the quick change from calm to raging river is what catches people unaware, making flash floods very dangerous. On occasion, a life may be lost because of water rising very quickly in this short time.

Unlike flash flooding, the 100-year river flood has a less likelihood of occurring but will impact a larger population. The streams and rivers within the floodplain will flood their 100-year floodplains on an average of once every 100 years. The populations occupying at-risk structures located in the floodplain shown on the Multi-hazard Map will be affected by this flood.

The HAZUS-HM assessment concluded that up to 167 people will seek temporary shelter in public shelters, and that 837 households (2,512 people) will be displaced by flooding.

5.5.3 Property Damage

According to the NCEI, Coshocton County has experienced 50 flash floods since 1950 with damage estimates totaling approximately \$5,375,000 including the following major historical events:

- Flash flood in Warsaw on 01/18/1996 with \$50.00K worth of property damage.
- Flash flood what was county wide on 06/27/1998 with \$5.0M worth of property damage and \$10.00M worth of crop damage.
- Flash flood in Mound on 05/30/2002 with \$100.00K worth of property damage.
- Flash flood in Warsaw on 08/27/2003 with \$50.00K worth of property damage.
- Flash flood in Randle on 06/29/2008 with \$25.00K worth of property damage.
- Flash Flood in Coshocton on 06/05/2010 with \$50.00K worth of property damage.
- Flash Flood in Coshocton on 07/10/2003 with \$50.00K worth of property damage.

Based on the Coshocton Co HAZUS-MH Flood Risk Report (see *Appendix E*), there are approximately 268 total structures considered to be at-risk, representing 60% of the total number of buildings in the HAZUS scenario. It was also estimated that 56 buildings will be completely destroyed by flooding.

The HAZUS-MH assessment concludes that \$3,805,583 of buildings are exposed by Coshocton Co flooding as shown on the following chart.

Occupancy	Exposure (\$1,000) Study Region	Percent of Total
Residential	\$2,815,079	74%
Commercial	\$ 533,641	14%
Industrial	\$ 233,362	6.1%
Agricultural	\$ 35,030	0.9%
Religion	\$ 90,172	2.4%
Government	\$ 37,565	1.0%
Education	\$ 60,734	1.6%
Total	\$3,805,583	100%

HAZUS-MH Building Loss Exposure, Coshocton Co Ohio Table 1 and 2

Based on past damages of events, a flood is likely to cause **minor to moderate property damage** in Coshocton County.

5.5.4 Loss of Life

The NCEI has NO death or injuries occurring due to flooding within the county. During flash floods, water rises very quickly and may catch citizens by surprise. Homeowner's may not be prepared for the rising waters and the need to seek safety quickly. Motorists often think that they can drive through ponded water and risk getting stuck in the flooded area. Due to the frequency of flash flooding in Coshocton County, the risk to human life is high but can be reduced by educating the County's residents.

5.5.5 Economic Loss

The economic losses a community suffers during a flood event can be high. Productivity decreases as residents miss work to tend to the damage incurred at their homes. Some inventory within a business itself may be lost if the owner was not prepared and the facility not flood proofed prior to a flood event. Small businesses may suffer so much damage that they are unable to reopen. Contractors and clean up companies may reap the benefits of the damage but not enough to offset the overall losses to the economy.

Based on the Coshocton Co HAZUS-MH Flood Risk Report (see *Appendix E*), the following table shows the potential Build and Business interruption losses associated with the calculated scenario (millions of dollars).

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	46.11	17.66	12.34	2.87	78.98
	Contents	21.86	49.27	34.39	14.21	119.74
	Inventory	0.00	1.52	4.32	0.27	6.11
	Subtotal	67.97	68.46	51.05	17.36	204.83
Category	Area	Residential	Commercial	Industrial	Others	Total
Business Interruption						
	Income	.043	31.51	1.47	5.79	39.21
	Relocation	12.49	9.11	1.31	2.93	25.84
	Rental Income	5.85	6.83	.031	0.20	13.20
	Wage	1.02	29.90	1.70	41.82	74.44
	Subtotal	19.79	77.35	4.79	50.75	152.68
	Total	87.76	145.81	55.84	68.10	37.51

HAZUS-MH Building/Business Interruption Loss Exposure, Coshocton Co Ohio Table 6

Based on past damages of events, a flood is likely to cause **moderate economic losses** in Coshocton County.

5.5.6 Prioritization Rankings

Flooding within Coshocton County received the following priority rankings during the HIRA assessment:

Probability of Occurrence: 1.2

Anticipated Impact: 1.2

Anticipated Geographic Extent: 1.0

Warning Time: .3

Duration: .3

Calculated Risk Factor: 4.0

5.6 Severe Winter Weather – Snow/Ice/Extreme Cold

Coshocton County is located in the north central portion of the State, just south of in the “snow belt” making it moderately susceptible to winter storms, which encompass Blizzards, Ice Storms and extremely cold temperatures. See *Appendix H* for the tables extracted from the NCEI that show the number of reported events since 1995 (5 Heavy Snow, 1 Cold/wind Chill, 3 Extreme Cold, 8 Winter Storms, and 5 Ice Storms =total 22 events).

5.6.1 Infrastructure Impact

Because the area receives a moderate amount of snowfall, all of the structures erected in Coshocton County are susceptible to damage if not designed to the proper snow loading parameters.

Severe Winter Storms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Infrastructure Impact	673	34	269	505
		\$446,624	\$28,267,596	\$99,501,665

*Property and Contents

5.6.2 Population Impact

Because winter storms occur countywide, the entire County population is susceptible and should be prepared. The sensitive populations will be the most susceptible to the deep snows and extreme temperatures and should prepare for such events prior to the winter months.

Motorists should be aware of declared snow emergencies and seek safety before becoming stranded. Residents may become trapped in their homes, without utilities or other services.

5.6.3 Property Damage

According to the NCEI, there have been 22 winter storm events, including extreme cold and blizzards in Coshocton County reported since 1995, with total property losses of \$7.00K. The most damaging events include:

- Ice Storm in Coshocton on 01/22/2005 with \$2.00K worth of property damage.
- Winter storm in Coshocton on 01/13/1999 with \$5.00K worth of property damage.

Severe Winter Storms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	12,234	\$1,959,012	\$125,315,764	\$440,534,106

*Property and Contents

5.6.4 Loss of Life

Since 1995, there have been NO recorded deaths and NO recorded injuries due to severe winter storms and extremely cold temperatures. Due to the number of winter events affecting Coshocton County and being located along the “snow belt”, the potential for death and injury is moderate. Since the population of the County is forecasted to slightly increase, the potential for injury and/or loss of life will also slightly increase. One of the biggest problems associated with winter storms and extreme cold is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather, such as driving on ice and snow and medical conditions relative to frost bite and hypothermia.

5.6.5 Economic Losses

The economic losses a community suffers during a Severe Winter Storm is high. Residents and business owners turn their efforts from work and running a business to digging themselves out of the snow. If power lines become burdened with snow and snap, prolonged power outages may cause some businesses to close for an extended period of time leading to loss of revenue. In communities with hazard trees, these trees have the potential to damage homes and businesses if branches loaded with snow crack off and fall.

Severe Summer Storms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial Property Impact	997	50 \$370,000	399 \$23,620,401	748 \$83,026,504
Industrial Property Impact	116	6 \$216,360	46 \$13,270,034	87 \$47,058,300
Total Impact	278	\$586,360	\$36,890,435	\$130,084,804

*Property and Contents

Prioritization Rankings

Severe Winter Storms within Coshocton County received the following priority rankings during the HIRA assessment:

Probability of Occurrence: 1.2

Anticipated Impact: .9

Anticipated Geographic Extent: 1.0

Warning Time: .2

Duration: .2

Calculated Risk Factor: 3.5

5.7 Dam Failure

Coshocton County has NO history of Dam failure related deaths, injury, or property damage.

5.7.1 Infrastructure Impact

Inundation areas below the dams are most at risk for infrastructure damage. This plan identifies the need to address possible repairs inundation area and public areas around the Class I Mohawk Dam.

5.7.2 Population Impact

As above, the inundation area around Mohawk Dam presents the highest risk for loss of life. Public awareness regarding the inundation zone (from Warsaw to the Ohio River along the Muskingum River) will minimize any population impact.

5.7.3 Property Damage

Property damage could be significant in the limited inundation zones in the event of a dam failure. A US Army Corp Engineer study shows significant inundation flooding resulting from a Mohawk Dam failure, impacting most communities in Coshocton County and almost every community along the Muskingum River basin from Coshocton to Marietta.

Given the defined geographic nature of dam failure caused property damage, such an event is likely to cause **major property damage** in Coshocton County, Muskingum County, Morgan County, and Washington County.

5.7.4 Loss of Life

Given the anticipated lead time proceeding any potential dam failure, residents should be able to safely evacuate. Potential Loss of life is considered minimal given these conditions.

5.7.5 Economic Losses

The failure of Mohawk Dam will cause serious flooding and resulting economic loss to virtually every city and village between Warsaw, Coshocton County and Marietta in Washington County.

Given the defined geographic nature of a Mohawk dam failure, such an event would likely cause **major economic losses** in Coshocton County, and every other community all the way to the Ohio River.

5.7.6 Prioritization Rankings

Dam Failure within Coshocton County received the following priority rankings during the HIRA assessment. This is our lowest scoring hazard in the plan:

Probability of Occurrence: .3

Anticipated Impact: 1.2

Anticipated Geographic Extent: 1.0

Warning Time: .4

Duration: .4

Calculated Risk Factor: 3.3

5.8 Tornadoes

16 tornadoes were recorded in Coshocton County from 1950 to 2018, according to the NCEI. These tornadoes caused \$27.530 million worth of property damage, NO deaths or injuries occurred. The biggest historical events include:

- Coshocton on 06/30/1977 with an F1 tornado causing \$25.00K worth of property damage.
- Coshocton on 05/31/1985 with an F3 tornado causing \$25.00M worth of property damage.
- Coshocton on 05/31/1985 with an F1 tornado causing \$2.500M worth of property damage.

5.8.1 Infrastructure Impact

Because tornadoes are random in nature, no one area of a county is more susceptible to infrastructure damage than another. In Coshocton County, the occurrence of tornadoes is moderate to high with 16 F-0 to F-3 events occurring since 1950. Since the occurrence of tornadoes is moderate, the effect on the infrastructure will also be moderate with many houses or businesses needing some type of repair. On occasion, a structure may be destroyed completely but a high frequency of this extent of damage will not be expected.

Since tornadoes will not affect all of the county, the following chart assumes up to 20% of the county could be impacted by a single tornado event.

Tornadoes	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Infrastructure Impact	673 (.20) = 135	7	54	505
		\$91,952	\$5,675,536	\$99,501,665

*Property and Contents

5.8.2 Population Impact

Tornado occurrences are random in nature. Therefore, the entire Coshocton County population is susceptible and should be prepared. The populations located in mobile home parks and camp grounds should take particular care to seek adequate permanent shelter with approaching severe weather.

Since tornadoes typically present localized hazards, several homes may need repair, but typically homeowners will have insurance to cover these expenses will not suffer long term financial hardship.

5.8.3 Property Damage

Since tornadoes will not affect all of the county, the following chart assumes up to 20% of the county could be impacted by a single tornado event.

Tornadoes	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	12,253 (.20) = 2,451	123 \$393,723	980 \$25,093,880	1,838 \$88,246,056

*Property and Contents

5.8.4 Loss of Life

Since 1950, there have been NO injuries and NO recorded deaths due to tornadoes. One of the biggest problems associated with tornadoes is the lack of public education and awareness, especially since tornadoes do not happen that frequently. Citizens are not aware of the warnings and dangers associated with severe weather and tornadoes and thus may not be prepared.

5.8.5 Economic Losses

Due to the frequency of tornado events in Coshocton County, the overall impact on the economy is moderate. If a tornado were to touch down, the majority of the economic losses would be localized versus countywide. It is very unlikely that a Presidential Disaster Declaration would occur, therefore the all-clean-up costs would be funded locally. If a Presidential Disaster Declaration is granted to the County, federal money may not cover the entire amount of damage. Therefore, the County and local governments must find the additional money needed to complete the clean-up process.

Since tornadoes will not affect all of the county, the following chart assumes up to 20% of the county could be impacted by a single tornado event.

Tornadoes	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial Property Impact	997 (.25) = 249	12 \$88,800	100 \$5,919,900	187 \$20,756,626
Industrial Property Impact	116 (.25) = 29	1 \$36,060	12 \$3,461,748	22 \$11,899,800
Total Impact	278	\$124,860	\$9,381,648	\$32,656,426

*Property and Contents

5.8.6 Prioritization Rankings

Tornadoes within Coshocton County received the following priority rankings during the HIRA assessment:

Probability of Occurrence: .6

Anticipated Impact: .9

Anticipated Geographic Extent: .8

Warning Time: .4

Duration: .2

Calculated Risk Factor: 2.

5.9 Earthquakes

Coshocton County experience NO recorded earthquake events since 1931, with NO deaths, NO injuries, and NO property damage.

As seen in the hazard profile and as determined by the Core Group, Coshocton County has a very low risk of incurring damage from earthquakes. However, if there is an earthquake the damage could be measured in \$100's millions.

5.9.1 Infrastructure Impact

Due to the infrequency of earthquakes occurring in Coshocton County, the impact on the County's infrastructure is quite low.

Based on the Coshocton Co HAZUS-MH Earthquake Risk Report (see *Appendix E*) conducted on 02/16/18, Essential Facilities Exposure to damage is shown on the following table. The HAZUS-MH earthquake scenario assumes a 5.0 magnitude earthquake.

Classification	Total	At Least/Moderate >50%	Complete Damage < 50%	With Functionality >50% on day 1
Fire Stations	6	1	0	2
Hospitals	1	1	0	0
Police Stations	3	1	0	1
Emergency Op Centers	1	1	0	0
Schools	21	9	0	2

HAZUS-MH Expected Damage to Essential Facilities, Coshocton Co Ohio Table 5

The potential total damage of an earthquake event on infrastructure is \$10.84 million.

The following tables 6, 7, 8 and 9 are taken directly from the HAZUS-HM Earthquake Risk Report and identify specific infrastructure related damages given the scenarios magnitude 5.0 earthquake.

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Table 6: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations			
			With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	21	0	0	21	21
	Bridges	101	1	0	100	101
	Tunnels	0	0	0	0	0
Railways	Segments	10	0	0	10	10
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	1	1	0	1	1
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	2	1	0	2	2
	Runways	2	0	0	2	2

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7: Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	4	3	0	0	4
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	2	2	0	0	2
Communication	3	3	0	1	3

Table 8: Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	2,437	349	87
Waste Water	1,462	175	44
Natural Gas	975	60	15
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	14,658	224	0	0	0	0
Electric Power		7,349	4,613	1,783	298	9

5.9.2 Population Impact

The HAZUS-HM assessment concluded that up to 164 people will seek temporary shelter in public shelters, and that 255 households will be displaced by earthquakes (of over 36,000 population). The HAZUS-HM further indicates that up to ¼ of the buildings in the county would be damaged by an earthquake, with 272 damaged beyond repair.

Resulting, the threat of an earthquake is moderate, but with minimal impact to the population and the overall impact on the County's population will be very low. Still, all citizens within the County need to be aware of the threat of potential earthquakes and aftermath fire risks.

5.9.3 Property Damage

The level of damage expected from an earthquake in Coshocton County is moderate. It would be expected to be on the order of a magnitude of 5.0 quake, or lower, as registered on the Richter scale.

Based on the Coshocton Co HAZUS-MH Earthquake Risk Report (see *Appendix E*), there are approximately 4,016 total structures considered to be at-risk, representing 24% of the total number of buildings in the study area. It was also estimated that 272 buildings will be damaged beyond repair by an earthquake.

The HAZUS-MH assessment concludes that \$460.58 million of buildings are exposed by Coshocton Co earthquakes as shown on the following chart, showing building counts of slight to complete damage.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	71.99	.82	29.56	0.75	34.96	1.29	18.08	1.76	4.40	1.62
Commercial	264.94	3.02	178.54	4.51	224.04	8.25	115.98	11.28	35.49	13.02
Education	10.91	0.12	6.73	0.17	8.33	0.31	3.83	0.37	1.20	0.44
Government	10.21	0.12	7.11	0.18	9.74	0.36	4.47	0.43	1.48	0.54
Industrial	83.31	0.95	50.27	1.27	70.70	2.60	41.49	4.04	12.24	4.49
Other Residential	1,001.65	11.42	615.90	1,556	819.30	30.16	410.33	39.91	90.83	33.32
Religion	45.92	0.52	23.42	0.59	22.78	0.84	12.08	1.18	3.80	1.39
Single Family	7,281.79	83.02	3,046.91	76.97	1,526.32	56.19	421.83	41.03	123.14	45.18
Total	8,771		3,958		2,716		1,028		273	

HAZUS-MH Earthquake Risk Report Building Loss Exposure, Coshocton Co Ohio Table 3

Based on past damages of events, an earthquake is likely to cause **moderate property damage** in Coshocton County.

5.9.4 Loss of Life

The level of an expected earthquake is not considered to be life threatening. Some minor injuries may result from falling objects. Because the likelihood of an earthquake occurring is very low, the potential for death or injury is minimal.

5.9.5 Economic Losses

Based on the Coshocton Co HAZUS-MH Earthquake Risk Report (see *Appendix E*), the economic loss estimate for an earthquake would be \$595.30 million, which includes building and lifeline related losses. The following table shows the potential Build and Business interruption losses associated with the calculated scenario (millions of dollars).

Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0	1.5970	14.7074	0.9153	2.3067	19.5264
	Capital-Related	0	0.6809	12.9591	0.6745	0.2982	14.6127
	Rental	4.5406	2.8910	6.5887	0.4168	0.4991	14.9362
	Relocation	15.8356	3.9775	10.3196	2.0959	5.1225	37.3511
	Subtotal	20.3762	9.1464	44.5748	4.1025	8.2265	86.4264
Capital Stock Losses							
	Structural	24.0667	6.6824	16.2433	7.2424	6.2590	60.4938
	Non Structural	95.4386	29.8485	45.6302	23.1548	16.4572	210.5293
	Content	39.1565	8.5404	25.2542	16.8062	10.0196	99.7769
	Inventory	0	0	0.6639	2.5352	0.1568	3.3560
	Subtotal	159.6618	45.0713	87.7916	49.7387	32.8926	374.1560
Total		179.04	54.22	132.37	53.84	41.12	460.58

HAZUS-MH Building/Business Interruption Loss Exposure, Coshocton Co Ohio Table 11.

Based on past damages of events, an earthquake is likely to cause **high economic losses** in Coshocton County.

5.9.6 Prioritization Rankings

Earthquake within Coshocton County received the following priority rankings during the HIRA assessment:

Probability of Occurrence: .3

Anticipated Impact: .9

Anticipated Geographic Extent: .8

Warning Time: .5

Duration: 2.2

Calculated Risk Factor: 2.7

6. GOALS AND ACTION ITEMS

Coshocton County, OH Mitigation Action Plan Matrix

The following chart shows the seven (7) Goals and 15 Action Items which are intended to address and mitigate the loss of property and life as a result of Natural Hazards in Coshocton County over the next five (5) years (2021-2026). Priority Projects were determined and ranked by the Planning Committee.

“ALL” under Target Jurisdiction and Comments includes ALL of the following local jurisdictions:

City of Coshocton, Villages of Warsaw, West Lafayette, Plainfield, Nellie, and Conesville.

Townships include: Adams, Bethlehem, Crawford, Linton, Newcastle, Perry, Pike, Tiverton, Tuscarawas, Virginia, Washington, Monroe, Franklin, Jackson, Bedford, Oxford, White Eyes, Keene, Lafayette, Jefferson, Millcreek, and Clark

Goal	Priority	Action Item	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
1. ALL Hazards: 1.1 Reduce health and safety risks during future natural disasters	5	1.1.1 Develop a comprehensive annual public outreach/education plan which seasonally covers Wind Storms, Flooding, Severe Winter Weather, Dam Failure, Tornadoes, and Earthquakes	6/1/21-12/31/26	CCEMA Local media Co Public Info Officer	Existing budget PSAs Utility mailings Social Media	ALL	
	2	1.1.2 Solve CCEMA power/communications issue so that EMA Command Center has power and full communications capacity during electric outages	6/1/21-3/15/22	CCEMA Co Commissioners	Existing budget	ALL	
	8	1.1.3 Actively promote Co Emergency Notification System (IPOD) to increase signups to over 50%	6/1/21-ongoing	CCEMA	Existing budget PSAs Social media	ALL Currently 15k of 52k phone numbers are registered (29%)	

Goal	Priority	Action Item	Start/ End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Statu s
2. Wind Storms 2.1 Reduce health and safety risks during future Wind Storms	7	2.1.1 Develop a tree maintenance program for proactively trimming and pruning trees to reduce power outages	6/1/21-ongoing	CCEMA County Engineer Utility Companies Coshocton Tree Commission	Existing budget	City of Coshocton	
3. Flooding 3.1 Reduce health and safety risks during future Flooding events	12	3.1.1 Work with Township and Village officials to increase awareness of model floodplain ordinance, acquiring flood insurance coverage, NFIP compliance, and proper flood mitigation activities (relocation, elevation, dry and wet flood proofing etc.)	6/1/21-12/31/23	Co Flood Admin Co Planning CCEMA	\$12,000	Warsaw, Conesville, Nellie and Plainfield	
	14	3.1.2 Encourage additional Villages to join NFIP	9/1/21-12/31/22	Co Flood Admin Co Planning CCEMA	Existing budget	Conesville, Nellie, Plainfield	
	4	3.1.3 Evaluate the severity of risk of critical facilities in flood prone areas, and implement mitigation actions accordingly	6/1/21-12/31/22	CCEMA Co Engineer	Existing budget for plan, Funding may be needed for mitigation actions TBD	Coshocton WTP Coshocton WWTP Warsaw WWTP W Lafayette WWTP Newcomerstown WWTP Han's Sunoco	
	13	3.1.4 Acquire, demolish or retrofit flood prone properties	1/1/24-12/30/26	Co Flood Admin Co Planning CCEMA	FEMA PDM	ALL	

Goal	Priority	Action Item	Start/ End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Statu s
4. Severe Winter Storms 4.1 Reduce health and safety risks during future Severe Winter Storm events	3	4.1.2 Evaluate location for a shelter in the Western part of Coshocton Co.	9/1/21-12/31/24	CCEMA Red Cross Cosh. Co Health Dept.	Existing budget	Echoing Hills- Warsaw Newcastle Township	
5 Class 1 Dam Failure 5.1 Reduce health and safety risks during a Class 1 Dam Failure	1	5.1.1 Lobby state and federal officials to budget funding to make repairs to Mohawk Dam, as per Army Corp of Engineers (ACE) plans	6/1/21-12/31/26	CCEMA All local govt. officials Army Corp of Eng.	Over \$100M is needed for repairs as per ACE report	Coshocton, Warsaw, Nellie, Conesville, W. Lafayette, Newcomerstown, and all communities south along the Muskingum River in Muskingum, Morgan and Washington Cos	
	9	5.1.2 Acquire inundation data for all (3) Class 1 dams	3/1/22-12/30/23	CCEMA	Existing budget	Class 1 dam locations and inundation areas	
	10	5.1.3 Mitigation action to rehabilitate all identified high hazard potential dams	1/1/24-12/30/26	CCEMA All local govt. officials Army Corp of Eng. Dam owners	FEMA US Army Corps OEMA	ALL	

Goal	Priority	Action Item	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
6 Tornadoes 6.1 Reduce health and safety risks during future Tornadoes	6	6.1.1 Evaluate need for tornado shelter(s) in mobile home parks and other concentrations of vulnerable residents	6/1/21-12/31/23	CCEMA Co GIS	OEMA, FEMA	Coshocton Warsaw West Lafayette Tiverton Township	
	11	6.1.2 Evaluate tornado/safety shelter for the Coshocton Co Fairgrounds	6/1/21-12/31/23	CCEMA	OEMA, FEMA	Coshocton	
7 Earthquakes 7.1 Reduce health and safety risks during future Earthquakes	15	7.1.1 Encourage and participate in Urban Search and Rescue (USR) Region 8, Team Training	6/1/22-12/31/24	CCEMA Local fire depts. Region 8	Existing Budget Ohio Fire Marshall	ALL	

7.0 HAZARD MITIGATION PRACTICES

As required by the DMA2K, this Mitigation Plan summarizes policies, plans, regulations, programs and projects that Coshocton County has implemented or is planning to implement in the future that affect growth and how the county can achieve and maintain sustainability and disaster resiliency. These administrative controls and activities are separated into six categories as determined by FEMA which are referred to as hazard mitigation activities. The following sections describe these general categories, as well as plans and activities that the communities are implementing now or plan to implement in the future.

There are six general approaches to reducing hazard risks:

- Preventive measures,
- Property protection,
- Emergency services measures,
- Structural projects,
- Natural resource protection, and
- Public information.

7.1.1 Preventive Measures

Preventive measures keep problems from getting started or getting worse. The use of known hazard areas, like floodplains for example, can be limited through planning, land acquisition, or regulation. These activities are usually administered by building, zoning, planning, and/or code enforcement officials:

- Planning and zoning,
- Open space preservation,
- Building codes and enforcement,
- Storm water management, and
- Drainage system maintenance.

7.1.2 Property Protection

Property protection measures are those actions that go directly to permanently getting people, property, and businesses out of unsafe areas where, in terms of wise disaster planning, they shouldn't have been in the first place.

The first of these measures is property acquisition: public procurement and management of lands that are vulnerable to damage from hazards. For example, flood-damaged homes have been purchased by municipalities (using state, federal, and local funds) and removed from flood-prone areas (by demolition or relocation). The acquired land then becomes public property, which can only be used as "open space" in the future. Open space use means that future development of the site is restricted to low-impact uses like parks, playing fields, gravel parking lots or agriculture--no permanent or enclosed structures. Relocation of at-risk structures also achieves the same result as acquisition. The home or business is moved to a safer location, remaining the property of the individual owner, while the original site is purchased and maintained by the local municipality.

Elevation of structures can be effective in-place mitigation for some flood threatened homes. By raising the height of the structure's living area above flood levels, damage and threat to life can be reduced. Retrofitting of homes is another in-place damage reduction method. Utilities, services, systems and appliances in some homes can be raised above flood levels.

Construction techniques to improve structural resistance to high wind or heavy snow accumulation can be incorporated into new homes or retrofitted into existing structures.

Private home and business insurance policies and participation in the National Flood Insurance Program can also reduce uninsured losses to properties.

7.1.3 Emergency Services Measures

Emergency services measures are taken during a disaster to minimize its impact. These measures are the responsibility of city or county emergency management staff, operators of major and critical facilities, and other local emergency service organizations. They include:

- Alert warning systems,
- Monitoring systems,
- Emergency response planning,
- Evacuation,
- Critical facilities protection, and
- Preservation of health and safety.

7.1.4 Structural Projects

Structural projects are usually designed by engineers and managed and maintained by public works staffs. They are designed to reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas. Examples include:

- Reservoirs, dams
- Levees, floodwalls
- Diversions
- Channel modifications
- Storm sewers

7.1.5 Natural Resource Protection

Natural resource protection preserves or restores natural areas or their natural functions. Such measures are usually implemented by park and recreation organizations, conservation agencies or wildlife groups. They include: Wetland protection,

- Best management practices,
- Erosion and sediment control, and

- River bank protection.

7.1.6 Public Information Programs

Public information programs advise property owners, potential property owners, and others, of hazards and ways to protect people and property from them. Public information activities can include:

- Flood maps and data
- Library resources
- Outreach projects
- Technical assistance
- Real estate disclosure information
- Environmental education programs

7.2 Maintenance, Monitoring, and Evaluation of the Plan

Monitoring, evaluation and updating of the Plan is critical to maintaining the relevance of the Plan. Ensuring ongoing public input and effective implementation of mitigation activities pave the way for continued momentum in the planning process and gives direction for the future. This section explains how the plan was updated, reviewed and analyzed and who will be responsible for monitoring, evaluation and updating and what those responsibilities entail. This section also lays out the method and schedule of these activities and describes how the public will be involved on a continued basis.

Coshocton County Emergency Management Agency is the permanent entity to be in charge and responsible for the plan maintenance processes of monitoring, evaluation and updating. This Plan recommends creating a permanent planning group, the Coshocton County Hazard Mitigation Planning Committee, with representation from all participating municipalities. The permanent Committee is an outgrowth of the HMCC, and represents citizen, municipal, business, educational, volunteer and county interests through a balanced membership. The committee is to serve in an advisory capacity to the Coshocton County Board of Commissioners and to the Coshocton County Planning Commission.

The Committee is to oversee the progress made on the implementation of the identified action items and update the plan, as needed, to reflect changing conditions. The Committee will revise the plan by analyzing past mitigation actions, risk assessment, infrastructures and development in the county. The Committee is to serve as the focal point for coordinating the countywide mitigation efforts. The proposed Hazard Mitigation Committee will meet at least twice yearly (early Spring and Fall) to address all of its responsibilities. Minutes of these meetings will be provided to the Coshocton Co. Commissioners and to the Coshocton Co. Planning Commission.

To encourage public input, these meetings will be open to the public and the EMA Director will assure there is public notification for these meetings using the local newspaper, Commissioners' office, the Coshocton Co EMA web site, and social media.

The master copy of the latest Coshocton Co Hazard Mitigation Plan will be kept at the Coshocton County EMA office and posted on their website.

Evaluation of the Plan will not only include checking whether mitigation actions are implemented or not, but also assessing their degree of effectiveness. This will be done by reviewing the qualitative and quantitative benefits (or avoided losses) of the mitigation activities. These are then to be compared to the goals and objectives the Plan set out to achieve. The Committee is to also evaluate mitigation actions if they need to be discontinued, or modified in any way in light of new developments in the community. The progress is documented by the Committee minutes and submitted to the Board of Commissioners on an annual basis by November of each year (after the annual fall Coshocton County Hazard Mitigation Planning Committee meeting).

The Plan will be submitted to FEMA every five years, as required by the Disaster Mitigation Act, 2000, or significant change to the community, including after a disaster. The updated Plan is to include any new developments (new structures, as well as other changes) in the community or special circumstances (e.g., post disaster). Issues that come up during monitoring and evaluation that require changes in mitigation strategies and actions will be incorporated in the Plan at this stage.

7.3 Planning and Zoning

7.3.1 Comprehensive Planning

Comprehensive plans and land use plans specify how a community should be developed (and where development should not occur). Through these plans, uses of land can be tailored to match the land's hazards. Comprehensive planning reflects what a community wants to see happen to their land in the future. A comprehensive plan can look 5, 10, or even 20 years into the future to help a community plan and shape how they envision their community. However, planning is only one part of the puzzle and usually has limited authority. Tied with zoning comprehensive planning can be more effective.

The 2006 Coshocton County Comprehensive Plan serves as a guide for the Planning Commission and Coshocton County officials as they evaluate the location, character and extent of public and private development proposals within the County. It provides guidance on a variety of factors: land use, environmental issues, transportation, community investments, community character, open space and land preservation with special emphasis upon agricultural areas.

A Steering Committee was implemented for the planning process and contained individuals appointed by the Coshocton County Board of Commissioners and the Coshocton County Planning Commission. The community process included a visioning process, an assessment of existing conditions and historic trends and an examination of development issues facing the County. In developing the plan's goals and policies, a variety of strategies were developed including the preservation of the County's rich agricultural and environmental heritage, discouraging development patterns that are difficult or costly to provide public services and acknowledging private property rights.

Public participation was encouraged and made a fundamental goal of the planning process. Citizens' views were solicited and closely examined by the Steering Committee when deliberating policy and plan options. The Steering Committee make-up yielded a broad cross section of Coshocton County's citizens and elected officials. The Committee's views were supplemented through issue-oriented task forces reflecting individuals knowledgeable about specific issues and elected/appointed officials responsible for development decisions within the County.

The Plan is organized under the following categories: land use, farmland and rural character preservation and infrastructure. Included are policies and strategies that are to be used in guiding development decisions.

Many policies and recommendations important to the Plan's successful implementation are identified.

The following is a summary of the five highest priority actions that the County plans on undertaking in the near future.

- Create a development protocol including an application process requiring appropriate County departments and officials to sign and approve all development proposals. Such an instrument could contribute to broader understanding of the Plan's intent and assure compliance with the Plan's policies and recommendations.
- Modify Coshocton County's subdivision regulations to support managed growth. Modifications should include the broad array of recommendations contained within the various chapters of the Plan.
- Continue ongoing efforts to develop an access management plan and permitting process aimed at discouraging random driveway cuts and intersections along major thoroughfares.
- Pursue the development of a program supporting the agricultural economy through the implementation of policies aimed at preserving the County's valuable farmland.
- Prioritize the development of County zoning, reflecting the unique needs of Coshocton County. Also, include a public relations effort that provides citizens with information on how zoning can contribute to improved quality of life and the future health of the County.

7.3.2 Zoning Ordinance and Building Codes

A zoning ordinance regulates development by dividing the community into zones or districts and establishing the type of development allowed within each district. The floodplain can be designated as one or more separate zoning districts in which development is prohibited or allowed only if it is not susceptible to flood damage. Some districts that are appropriate for floodplains are those designated for public use, conservation or agriculture. Zoning works best in conjunction with a comprehensive plan or "road map" for future development and building codes.

Building codes provide some of the best methods of addressing all the hazards in this plan. They are the prime measure to protect new property from damage by high winds, tornadoes, earthquakes, hail, and winter storms. When properly designed and constructed according to

code, the average building can withstand the impact of most of these forces.

Currently, three (3) jurisdictions have zoning regulations in place including the City of Coshocton, and the Villages of Warsaw and West Lafayette. The remaining unincorporated areas of Coshocton County do not have zoning regulations or building codes in place. The unincorporated areas typically comply with the State of Ohio's codes. Discussion for the need of zoning regulations on a countywide level has started and plans for implementation have begun.

7.3.3 Subdivision Regulations

Subdivision Regulations govern how land will be broken up into individual lots. These regulations set construction and location standards for the infrastructure built by the developer, including roads, sidewalks, utility lines, storm sewers, storm water retention or detention basins, and drainage ways.

The Ohio Revised Code, Chapter 711, enables the Coshocton County Board of Commissioners and the planning commission of Coshocton County to adopt regulations governing plats and subdivisions of land within the incorporated area of the County.

7.3.4 Manufactured Homes

Previously, the location and installation of manufactured and mobile homes were regulated at the local level of government, with the construction and fabrication standards being set by the United States Department of Housing and Urban Development (HUD). All mobile type homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements.

The installation of manufactured homes in Coshocton County is currently regulated by Senate Bill 102, which became effective on August 6, 2004, and revised recently as 1/21/18 (ORC 4781). This bill created the Ohio Manufactured Homes Commission to regulate the installation of manufactured housing, which includes mobile and manufactured homes, and vests it with the exclusive authority to regulate manufactured housing installers, the installation of manufactured housing and manufactured housing foundations and support systems. The bill set forth those municipal corporations and other political subdivisions are preempted from regulating and licensing installers and regulating and inspecting the installation of manufactured housing and manufactured housing foundations and support systems. The Commission has exclusive power to adopt rules of uniform application throughout the state to govern the installation of manufactured housing, the inspection of manufactured housing, the inspection of manufactured housing foundations and support systems, the training and licensing of manufactured housing installers, and the investigation of complaints concerning manufactured housing installers. No political subdivision of the state or any other department or agency of the state may establish any other standards. The Law was promulgated as ORC 4781, and revised provisions have been added as recently as 1/21/2018.

The Commission must establish standards by rule that govern the installation of manufactured housing, with the minimum standards being the model standards the Secretary of the United States Department of HUD adopts. The standards established by the Commission must be consistent with, and not less stringent, than the standards adopted by the Department of HUD. The Commission has the exclusive authority to make rules regarding "blocking" and "tiedowns"

of mobile and manufactured homes. The Commission must also approve permanent foundations to which a mobile or manufactured home may be affixed.

7.3.5 Floodplain Regulations

Communities that adopt and enforce a floodplain management ordinance, to regulate new development within the floodplains, can significantly reduce the effects of flood damage. Communities typically adopt minimum standards that are recommended by FEMA. The objective of these regulations is to ensure that development will not aggravate existing flooding conditions and that new buildings will be protected from flood damage. Zoning and open space preservation work to keep damage-prone development out of hazardous or sensitive areas while floodplain development regulations impose construction standards on what is allowed to be built in the floodplain.

Currently, within Coshocton County there are flood damage prevention regulations in place for the following jurisdictions as per their NFIP ordinance:

- Coshocton County
- City of Coshocton
- Village of Warsaw
- Village of West Lafayette

7.3.6 Drainage Regulations

In order to protect a county's natural resources a community can implement regulations such as County Water Management and Sediment Control Regulations. The purposes of these regulations are to protect the county's water resources by ensuring that the proper storm water and erosion and sediment control measures are in place. Erosion and sediment control measures are called Best Management Practices (BMPs), and when installed and maintained correctly, they help prevent soil from leaving the site. Storm water control measures ensure that the volume of storm water runoff remains the same as before development occurs.

Some examples of what can go into a County Water Management and Sediment Control Ordinance are as follows:

- Submit a Water Management and Sediment Control (WMSC) Plan for proposed commercial, industrial, or residential development sites on parcels greater than one acre.
- Submit an abbreviated plan for sites on parcels less than five acres and part of a larger plan of development.
- Submit a plan for residential dwellings only if a village, township, or city zoning requires them to do so. They must check with the appropriate community for this information.
- Comply with the regulations whether or not a plan is required. All County residents are responsible for being familiar and complying with the regulations.

A designated agency should inspect sites to ensure that the regulations are being followed correctly. The designated agency should also work diligently to review plans and perform site

inspections to ensure that these erosion and sediment control measures are in place.

Coshocton County currently does not have any drainage regulations in place.

7.4 Natural Resource Protection

7.4.1 Riparian Buffer/Wetland Protection

Riparian area refers to the vegetated area next to a watercourse often thought of as the floodplain and its connected uplands. Riparian buffers can protect water resources from non-point source pollution and provide bank stabilization, flood storage and aquatic wildlife habitat. They can be a natural resource management tool used to limit disturbance within a certain distance of a water course to maintain streamside vegetation. Some communities in the State of Ohio have proceeded to adopt riparian buffer overlays and zoning ordinances to reap the benefits of such protection.

Currently, Coshocton County, nor its villages and townships have codes for the development and protection of wetlands. The Coshocton Soil and Water Conservation District (SWCD) uses the State and Federal programs as they become available for issues associated with wetlands protection.

7.4.2 Urban Forestry

Eighty percent of Ohioans live and/or work within urban areas. The quality of life for them and their families is dependent upon the urban environment. Healthy trees enhance this environment by promoting clean air and water, increasing property values, reducing erosion and storm water runoff, providing wildlife habitat, moderating temperature, lessening energy demands, and offering year-round enjoyment.

Ohio's Urban Forestry Program was created in 1979 within the ODNR to promote trees and other vegetation as tools to enhance the quality of life within cities and villages. The purpose of the Urban Forestry Program is to provide community officials and allied agencies with the organizational and technical ability to effectively manage the trees along streets, within parks, and on public grounds. Through a statewide network of regional urban foresters, the program helps communities manage their urban forest resources to meet their local needs.

Trees are particularly subject to damage by tornadoes, wind, ice and snow storms. Downed trees and branches break utility lines and damage buildings, parked vehicles, and anything else beneath them. An urban forestry program can reduce the damage potential of trees. A properly written and enforced urban forestry plan can reduce liability, alleviate the extent of fallen trees and limbs caused by wind and ice build-up, and provide guidance on repairs and pruning after a storm. Such a plan helps a community qualify to be a Tree City USA.

Ohio has been the Tree City USA national leader for the past 23 years. There are 233 Tree Cities USA in Ohio. Counties are not eligible for the program but can implement the credited activities.

The City of Coshocton has been a Tree City USA since 2015.

Currently, the unincorporated areas of Coshocton County do not have codes for issues concerning urban forestry. The Coshocton SWCD uses the State and Federal programs as they become available for issues associated with reforestation.

7.4.3 Flood Compensation Banking

A flood compensation bank is a detention basin that is used for floodplain encroachment compensation or for flood storage in which the basin's volume may be purchased to mitigate the effects of new development. A development may purchase storage volume from a bank to compensate for floodplain encroachment or to satisfy storm water detention requirements provided the basin is within the appropriate zone of influence.

Coshocton County currently has nothing enacted within the County dealing with flood compensation banking.

7.4.4 Watershed Planning Efforts

Cities and counties carry out many of the decisions that result from watershed planning efforts. Participation and cooperation with state agencies is also an important component to quality watershed planning.

Coshocton County is part of the Muskingum Watershed Conservancy District (MWCD).

The most recent watershed management plan of record, Amendment to the Official Plan, June 2005, includes Dam Safety/Flood Control language supported by elements in this Coshocton Co Hazard Mitigation Plan. The MWCD amendment is included in Appendix D, Community Surveys.

7.4.5 Habitat Restoration

In urbanized watersheds, some stream and/or rivers suffer the effects of increased erosion and water quality problems because of the amount of development that is occurring in a given area. Bioengineering techniques can help prevent further degradation and also provide water quality and habitat benefits.

Biotechnical practices use vegetative or other natural materials to achieve stream management objectives, usually erosion control. One of the chief advantages of biotechnical practices is that they help restore natural stream features, like in-stream habitat and streambank vegetation. The materials used for biotechnical practices are generally less expensive than for more traditional approaches, but installation is more labor intensive and they may require more frequent maintenance.

The ODNR has published a *Stream Management Guide #10*. This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. It maps and briefly describes some of the many projects that have been constructed in Ohio using biotechnical practices, including the installation date.

The Coshocton County SWCD currently promotes and provides technical support for several

habitat restoration programs and projects.

Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program (EQIP) was reauthorized in the Agricultural Improvement Act of 2018 (Farm Bill), reduced by \$800 million over the 2014 authorization, and is intended to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

7.5 Emergency Services

Emergency services protect people before, during, and after a disaster. A good emergency management program addresses all hazards, natural and man-made. It involves the active participation and involvement of all County's departments and municipalities. Emergency services include:

- Threat Recognition
- Warning
- Response
- Evacuation and Sheltering
- Post-Disaster Recovery and Mitigation

7.5.1 Threat Recognition

The first step in responding to a hurricane, flood, tornado or other natural hazard is knowing when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

7.5.2 Warning

After there is a potential hazard recognized following steps must be taken to notify the public of its possible onset. Early and specific warnings allow more people the ability to set protection procedures in motion.

The NWS issues notices to the public using two levels of notification:

Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.

Warning: a flood, tornado, etc. has started or has been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations

- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- National Oceanic and Atmospheric Association (NOAA) Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- E-mail notifications

Coshocton County has eight (8) outdoor warning sirens located throughout the County. They are located at the Coshocton Fire Station, West Lafayette Fire Station, Walhonding Valley Fire Station, Bakersville Fire Station, Conesville Fire Station, Three Rivers Fire District South Station, Canal Lewisville Baseball Field, and at the Coshocton City Schools campus.

As per the County ESA Plan, Coshocton County has four (4) Emergency Alert System (EAS) radio stations located in the County. They include WTNS 1560 AM, WHVY 89.5, WOSE 91.1 and WTNS 99.3 FM. They broadcast NWS watches, warnings, forecasts and other hazard information 24 hours a day.

7.5.3 Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries.

Typical actions and responding parties include the following:

- Activate the emergency operations center (emergency preparedness)
- Close streets or bridges (sheriff or public works)
- Shut off power to threatened areas (utility company)
- Pass out sand and sandbags (public works)
- Hold children at school/releasing children from school (school superintendent)
- Open evacuation shelters (Red Cross)
- Monitor water levels (engineering)
- Establish security and other protection measures (police/sheriff)

An emergency operation plan (EOP) ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

In Ohio, an EOP is a requirement of the Ohio Revised Code, Section 5502.271. The purpose of an EOP is to predetermine, to the extent possible, actions to be taken by the governmental jurisdictions of Coshocton County to prevent avoidable disasters and respond quickly and adequately to emergencies in order to protect the lives and property of the residents of Coshocton County. It usually consists of a Basic Plan which defines and identifies areas of potential risk, lists people and organizations involved in response situations, and discusses plan development and maintenance. In addition to the Basic Plan are annexes that

describe the details of various aspects of emergency response. Some examples of these annexes include Direction and Control, Notification and Warning, Law Enforcement, Medical, Anti-Terrorism and Resource Management. Lastly, the plan contains guidelines with respect to roles and responsibilities.

The goal of the Coshocton County EOP is to save lives, property and the environment by developing programs and emergency operational capabilities that address mitigation (preventative measures), preparedness (planning, training, and education), response (active post-event coordination of on-scene activities) and recovery (restoring affected areas to pre-disaster status) for natural, technological, hazardous materials, civil or attack-related emergencies.

Coshocton County updated their EOP in regard to certain Hazards in 2020. Attached in Appendix D, Community Survey, are Coshocton Co EOP Annex L Appendix A- Flooding and Dams, B Tornadoes and Severe Storms, and C Winter Storms.

The Coshocton County Commissioners, in coordination with personnel in the activated EOC, and Chief Executive Officers (CEOs) in other affected jurisdictions of the County, assume direction and control of emergency activities from the primary EOC, located at 724 S 7th St. Coshocton OH, Ohio.

7.5.4 Evacuation and Sheltering

There are five key components to a successful evacuation:

1. Adequate warning
2. Adequate routes
3. Traffic control
4. Knowledgeable travelers
5. Care for special populations (i.e. handicapped, prisoners, school children)

According to the Coshocton County EOP, the Coshocton County Sheriff's Office, Municipal and Village Police Departments are responsible for evacuation procedures and traffic control in the event of an emergency. The Municipal, Village and Township Fire Departments are also responsible for conducting evacuations if necessary.

In addition, they are responsible for assisting special populations during an evacuation.

Shelter is required for those who cannot get out of harm's way. Typically, the Red Cross will staff a shelter and ensure that there is adequate food, bedding and washing facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring their pets and the potential for an overcrowded facility.

According to the Coshocton County EOP, the Red Cross is responsible for performing shelter operations, establishing reception and care centers and administering first aid at shelters and at scene if requested by Emergency Medical Services (EMS).

7.5.5 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrol evacuated areas to prevent looting
- Provide safe drinking water
- Monitor for diseases
- Vaccinate residents for tetanus
- Clear streets
- Clean up debris and garbage

Throughout the recovery phase, everyone wants to return to their daily routines. The problem is when recovery efforts are being instituted, people may be performing a quick fix that returns them to their daily routines faster. However, it is imperative that during this recovery phase every effort should be made to think about how to prevent repeated damage from happening if another disaster were to strike. Some efforts include:

- Advise residents through public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work
- Evaluate damaged public facilities to identify mitigation measures that can be included during repairs
- Acquire substantially or repeatedly damaged properties from willing sellers,
- Plan for long term mitigation activities, and
- Apply for post-disaster mitigation funds.

According to the Coshocton County EOP, damage assessment is conducted by the Ohio EMA. Private utility companies such as Ohio Gas Company, Ohio Cumberland Gas Company, Piedmont Gas Company, North East Ohio Natural Gas Corporation, Columbia Gas, Dominion East Ohio, Knox Energy Cooperative, National Gas and Oil Cooperative, and Customer's Gas Cooperative, American Electric Power, Frontier, Homes Wayne Electric and Licking Rural Electrification, GTE, AT&T and Century Link are responsible for restoring power to failed utilities after a natural hazard event.

7.6 Flood Control

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as “structural” projects that keep flood waters away from an area as opposed to “non-structural” projects, like retrofitting, that do not rely on structures to control flows.

7.6.1 Flood Control Measures

The most common type of measures that keep flood waters away from an area are reservoirs and dams, diversion channels and levees and floodwalls.

7.6.2 Reservoirs and Dams

Reservoirs and dams impound water to reduce the amount of water that reaches an area at one time. A reservoir holds high flows behind a dam or in a storage basin. Water is released at a controlled rate. Reservoirs and dams are generally perpendicular to a stream or river.

According to the ODNR, Coshocton County has 18 Class I, II and III dams within its boundaries. Class I, II and III dams are listed below as follows:

Dam	ODNR Class	ODNR File No
Mohawk Dam	I	0220-004
Six Mile Dam	I	0217-007
Sunset Lake Dam	I	0217-002
Wills Creek Lake Dam	I	0116-001
Conesville Plant Ash Pond Complex	II	0116-002
Broken Aro Slurry Pond No. 1 Dam	II	0117-008
Peabody Coal Co Pond Dam	II	0117-012
Dam	ODNR Class	ODNR File No
Catfish II Dam	II	0117-013
Muskingum Valley Council Lake Dam	III	0116-005
Isleta Wolfe Adjacent 1, Pond No. 3 Dam	III	0115-015
Simco Sediment Pond E-55 Dam	III	0115-016
Moore Lake Dam	III	0120-003
Herbert Pond Dam	III	0215-003
Forest Hill Lake Pond	III	0216-001
Schlegel Lake Dam	III	0216-004
Olinger's Private Dam	III	0217-003
Broken Aro Sediment Pond No 47 Dam	III	0217-016
Broken Aro Sediment Pond No 46 Dam	III	0220-006

In addition, Coshocton County has two unclassified dams and 21 exempt dams, which have been determined by the ODNR's Chief of the Division of Water to not constitute a hazard to life, health or property in the event of a failure.

According to the Coshocton County Engineer's Office, one area of concern as it relates to dam safety are the areas downstream of the Mohawk Dam, as it would cause significant damage if it were to collapse.

7.6.3 Diversion Channels

A diversion is a new channel or overflow weir that sends floodwater to a different location, thereby reducing flooding along a watercourse. During normal flows, the water stays in the old channel. During flood flows, the stream spills over to the diversion channel.

Currently, there are no diversion channels constructed in Coshocton County.

7.6.4 Levees and Floodwalls

Levees and floodwalls restrain the flow of the stream or river. During a flood, the stream or river flow is not reduced; only confined. Levees and floodwalls are generally parallel to the flow of the stream.

Currently, there are no levees or floodwalls constructed in Coshocton County as per the US Army Corp of Engineers data base.

7.6.5 Drainage Maintenance

Man-made ditches and storm sewers help drain areas where the surface drainage system is inadequate, or where underground drainageways may be safer or more practical. Particularly appropriate for depressions and low spots that will not drain naturally, drainage and storm sewer improvements are designed to carry the runoff from smaller, more frequent storms.

There are three (3) types of drainage improvements that are usually pursued to reduce storm water flooding: putting drainageways in underground pipes, channelization, and removing obstructions caused by stream crossings, such as culverts and bridges with small openings. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving stream or river has sufficient capacity to handle the additional volume and flow of water. To reduce the cumulative downstream flood impacts of numerous small drainage projects, additional detention or run-off reduction practices should be provided in conjunction with the drainage system improvements.

8.0 Resolution of Adoption

The Coshocton County Commissioners as well as the incorporated areas of Cities of Coshocton and the Villages of Warsaw, and West Lafayette will be passing a Resolution or Ordinance of Support for the Coshocton County countywide Mitigation Plan after contingent approval from the State of Ohio EMA as well as FEMA.

Examples of the Resolution of Adoption that will be presented to the Commissioners, as well as the Ordinance that the participating incorporated jurisdictions will pass, is provided in Appendix I.

END

RESOLUTION NO. _____

ADOPTION OF THE updated 2021-2026 COSHOCTON COUNTY COUNTYWIDE ALL-NATURAL HAZARDS MITIGATION PLAN

WHEREAS, on _____, the Coshocton County Commissioners passed Resolution No. _____ adopting the COSHOCTON COUNTY COUNTYWIDE ALL-NATURAL HAZARDS MITIGATION PLAN (the Mitigation Plan) pursuant to the Disaster Mitigation Act of 2000, which established goals to minimize and reduce storm water damages to existing structures and land use in order to maximize the protection of public health, safety, and welfare, and identify and develop revenue sources to complete the goals and objectives; and

WHEREAS, the mission of the Coshocton County Countywide All-Natural Hazards Mitigation Plan Core Group is: "To develop a working document that fulfills the mandates of the Federal Disaster Mitigation Act of 2000, and satisfies the requirements of FEMA and the Ohio EMA, as well as meets the needs of all of Coshocton County. Further, by researching and planning for future natural hazards and implementing appropriate mitigation techniques, all of Coshocton County can save lives and protect property, reduce the cost of disasters and provide for a rapid and efficient recovery by coordinating response efforts, and increasing the educational awareness of natural hazard events and their effects on the people, property, and resources of all Coshocton County."; and

WHEREAS, EVERY FIVE (5) YEARS, the Coshocton County Emergency Management Agency Director shall lead in the update of a Mitigation Plan on behalf of the Coshocton County Board of County Commissioners; and

WHEREAS, a Mitigation Plan for Coshocton County will be required beginning in 2021 to receive any state or federal mitigation funding such as flood prone property improvement or buyout funds; and

WHEREAS, the County of Coshocton County is subject to flooding, tornadoes, winter storms, and other natural hazards that can damage property, close businesses, disrupt traffic, and present a public health and safety hazard; and

WHEREAS, Coshocton County contracted with RFG Associates, Inc. to facilitate and draft an updated Coshocton County Hazard Mitigation Plan; and

WHEREAS the Mitigation Planning Core Group, comprised of representatives from the County, municipalities and stakeholder organizations, has prepared a recommended updated Mitigation Plan that reviews the options to protect people and reduce damage from these natural hazards; and

WHEREAS, the recommended Mitigation Plan has been widely circulated for review by the County's residents and federal, state and regional agencies and has been supported by those reviewers.

NOW, THEREFORE BE IT RESOLVED by the Coshocton County Commissioners that:

1. 2021-2026 COSHOCTON COUNTY COUNTYWIDE ALL-NATURAL HAZARDS MITIGATION PLAN is hereby adopted as an official plan of Coshocton County.

2. The Mitigation Planning Core Group will continue as a permanent advisory body. It shall be composed of representatives from the existing Mitigation Planning Core Group, as recommended by the Coshocton County Emergency Management and Homeland Security Office. This includes those municipalities that pass a resolution to adopt for the Mitigation Plan.

3. The Core Group shall meet as often as necessary to prepare or review mitigation activities and progress toward implementing the Mitigation Plan. It shall meet at least once each year to review the status of ongoing projects.

4. The schedule of Core Group meetings shall be posted in appropriate places. All meetings of the Core Group shall be open to the public.

5. By November 30 each year, the Core Group shall prepare an annual evaluation report on the Mitigation Plan for the County Board of Commissioners and the municipalities.

The report will cover the following points:

a. A review of the updated plan.

b. A review of any natural disasters that occurred during the previous calendar year.

c. A review of the action items in the original plan, including how much was accomplished during the previous year.

d. A discussion of why any action items were not completed or why implementation is behind schedule.

e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the County Board of Commissioners and the affected municipality's governing boards as amendments to the adopted plan.

6. The director of each County office identified as "responsible agency" for the Mitigation Plan's action items shall ensure that the action item is implemented by the listed deadline subject to fiscal and staff time constraints.

Passed by the Coshocton County Board of Commissioners on

Vote:

Yes ____

No ____

ORDINANCE NO. _____

AN ORDINANCE APPROVING AND ADOPTING THE 2021-2026 COUNTYWIDE ALL-NATURAL HAZARDS MITIGATION PLAN PREPARED BY RFG ASSOCIATES INC.

WHEREAS, the Coshocton County Commissioners have approved the aforementioned plan by resolution, and

WHEREAS, the Plan will fulfill the mandates of the Federal Disaster Mitigation Act of 2000, satisfies the requirements of FEMA and Ohio EMA, and meets the needs of Coshocton County,

NOW, THEREFORE, Be it ordained by the Council of the City/Village of _____,
State of Ohio:

SECTION 1: That the Countywide All-Natural Hazards Mitigation Plan as prepared by RFG Associates Inc., and approved by the Coshocton County Commissioners, is hereby approved and adopted.

SECTION 2: That this Ordinance shall take effect and be enforced from and after the earliest period allowed by law.

ADOPTED: _____, 202_.

ATTEST: _____

Clerk of Council

President of Council

Date filed with Mayor: _____, 202__.

Date approved by Mayor: _____, 202_.

Mayor

Approved as to form: _____
Director of Law