Butler County, Ohio

Emergency Management Agency

Natural Hazard Mitigation Plan

2017-2022

Plan facilitation by:

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Butler County Natural Hazard Mitigation Plan

2017-2022 Revision

1. Introduction

Overview

Butler County OH has determined that there is a critical need to develop and maintain a Natural Disaster Mitigation Plan for the protection of property, and the preservation of life throughout the County. Such a plan is vital to assure the safety of residents given the historic record of natural hazards in the community.

The need for such a plan is further defined by the Federal Emergency Management Agency (FEMA), who has mandated locally developed and maintained natural hazard mitigation plans as a prerequisite to qualify for future mitigation assistance. This requirement is outlined in the Disaster Mitigation Act of 2000 (DMA2K, 42 USC 5165).

Butler County developed their initial Natural Hazard Mitigation Plan in 2000, covering 2000-2005. Subsequent revisions have included:

- 2005-2011
- 2011-2017

This Butler County Hazard Mitigation Plan revision covers 2017-2022.

Funding for this plan revision was provided by the Ohio Department of Public Safety, Emergency Management Agency (OEMA) and the Federal Emergency Management Agency (FEMA).

Planning Model

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

Planning Team

The *Mitigation Overhead and Development Committee* was established to create, implement, and liaison with the Mitigation Core Group Committee. This same structure was successfully used in the previous Five (5) Year Natural Hazard Mitigation Plan revision.

Members of the Mitigation Overhead and Development Committee include:

Butler County Emergency Management Agency
Butler County Geographical Information Services (GIS)
Butler County Engineer's Office

These members also participate on the Mitigation Core Group Committee.

This group was designated to assure that every community and a broad list of stakeholders, participated in the planning process.

The approach undertaken in this plan development was both comprehensive and collaborative.

Mitigation Core Group Committee members included at least one (1) invited representative from all 25 Butler County jurisdictions, state and regional parties, local fire/ems providers, community based organizations, and other local government officials.

Butler Co Hazard Mitigation Plan Committee Participants 2017 Name	Agency	Email
Charlie Young	BC Commissioners	
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John Jones	City Of Oxford	jjones@cityofoxford.org
Michael W. Sword	Village of Jacksonburg	None
Tim Miller	Reily Township	None listed
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Appendix A Mitigation Core Group Committee

2. County Information

County Profile

Butler County is located in the SW portion of Ohio. It lies north of Hamilton County, south of Preble County, WSW of Montgomery County, west of Warren County, and just east of the Indiana state line.
The county covers 467 square miles with an estimated population of 374,158 (2014 US Census Bureau).
The county has six (6) cities, 13 townships, and six (6) villages. The majority of the population resides in the cities. The highest populated area is the county seat, Hamilton, followed by Middletown, Fairfield, Oxford, Monroe, and Trenton. Additional, over 2,500 residents within the City of Sharonville reside in Butler County, the majority of Sharonville is located in Hamilton County. Butler County's highest populated village is the Village of New Miami, while its most populated township is West Chester Township.

County History

Butler County was established by the State of Ohio on March 24, 1803. The county was named in honor of Richard Butler, who was killed in St. Clair's defeat in 1791. The county was originally part of Hamilton County at its inception. Butler County has enjoyed a wide array of industry and business since its beginning. The cities of Hamilton and Middletown attracted industries which manufactured hundreds of products including paper, steel, machine tools, safes, and bicycles. By 1910 due to large growth of industry, the City of Hamilton's population was a robust 40,000 strong while the county as a whole was just over 70,000. The county population continued to grow steadily until 1960 when the population jumped from just over 150,000 to nearly 200,000 and has continued to rise to its current population. The latest data (2014) records the county population at 374,158 with expected growth to 419,900 (+12 %) by 2020 and to 430,360 (+ 15 %) by 2025.

County Jurisdictions

Assessment of Local Planning and Sustainability Measures
Jurisdictions within Butler Co. Ohio

During the course of the Hazard Mitigation Planning process, each jurisdiction in Butler Co either participated in one of the group planning sessions or was individually contacted by Butler Co EMA staff. Their input is reflected throughout the plan and their local planning/mitigation and sustainability tools are noted below.

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regs	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget of Mitigation	Public Works Budget for Mitigation	Other/or New Planning/ Mitigation/ Sustainability efforts underway
Butler Co (Unicorp. areas)	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
City of Hamilton	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
City of Fairfield	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants, general fund	Yes
City of Middletown	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
City of Monroe	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
City of Trenton	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regs	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget of Mitigation	Public Works Budget for Mitigation	Other
City of Oxford	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
Fairfield Township	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
Hanover Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Lemon Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Liberty Township	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Madison Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
Milford Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regs	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget of Mitigation	Public Works Budget for Mitigation	Other
Morgan Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Oxford Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
Reily Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Ross Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
St Clair Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Wayne Township	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes
West Chester Township	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regs	NFIP Compliant	Building Codes	Zoning Ord.	Capital Budget of Mitigation	Public Works Budget for Mitigation	Other
Village of College Corners	Yes	Yes	No	No	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Village of Jacksonburg	No	No	No	No	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Village of Millville	No	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Village of New Miami	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	No
Village of Seven Mile	Yes	Yes	Yes	Yes	Ohio Building Codes	Yes	In-kind, general fund, grants	In-kind wages, grants	Yes

Butler County Historic Population Data

Population history and projected population figures for Butler Co are presented below. Historic data is from the US Census Bureau. Projections are from the Ohio Development Services Agency.

Butler Co Historic and Projected Population	
2025 projected	430,360
2020 projected	419,900
2014	374,158
2010	368,130
2000	332,807
1990	291,479
1980	258,787
1970	226,207
1960	199,076
1950	147,203
1940	120,249
1930	114,084
1920	87,025
1910	70,271
1900	56,870

County Topography

According to the Butler County Soil and Water Conservation District, there are 14 different watersheds that influence drainage within the county. Of those 14 watersheds the Great Miami River, Indian Creek, and Four Mile Creek have the largest areas within the county.

Land Use

The Butler County Department of Development Land Use Plan was reviewed and used to provide technical information during the update process of this Mitigation Plan. After analyzing data provided by the Butler County Department of Development, it is apparent that the majority

of the land in the county is primarily used for agricultural purposes. Residential use is the next leading category with 30% of the county's land utilized in this fashion. The following table shows the breakdown of the county's current and projected land use.

Land Use 2010 Acres %	**Land Use 2020 Future Acres %**
Agriculture 167,688 56.1	Agriculture 155,950 52.2
Residential 92,022 30.8	Residential 99,336 33.2
Industrial 6,166 2.1	Industrial 7,566 2.5
Commercial 9,029 3	Commercial 11,743 3.9
Public 22,983 7.7	Public 23,293 7.8
Railroad 992 .3	Railroad 992 .3
TOTALS 298,880 100	**TOTALS 298,880 100**

According to the current Butler County Land Use Plan, five (5) goals are in place to guide land development in the county.
They are as follows:

1. To promote the orderly and efficient layout and appropriate use of land in Butler County to promote the health, safety, and welfare of all residents and to leave future generations a desirable place to work, study, and reside.
2. To provide the Board of County Commissioners, county planning commission, zoning commission and township trustees with policy guidelines in order to assist them in their weekly, monthly, and annual decision making concerning land use, zoning, public facilities and services, and development review matters.
3. To create a framework to provide current and future residents in Butler County the opportunity to create a shared vision for their community.
4. To establish the framework for implementing the recommendations of this plan in a timely and meaningful manner.
5. To assist the continuing efforts of coordinating various planning agencies operating in the county and achieve the overall goals and objectives of this plan without being unduly disrupted by any single element of this plan of other planning efforts undertaken in Butler County.

These goals are envisioned to eventually lead to the development of more of the county's agricultural land into residential, industrial, commercial, and public purposes.

Public Utilities

Water and Wastewater

The six (6) cities within Butler County all have their own water and wastewater facilities. The Butler County Water and Sewer Department (BCWS) serves a growing population of more than 100,000 in West Chester, Lemon, Liberty, Fairfield, Hanover and Ross townships, as well as, the city of Monroe and the village of New Miami. The BCWS provides both drinking water and wastewater services. The remaining townships and villages not served by cities or the BCWS depend on wells and septic systems for water and wastewater issues. Butler County receives its water from the City of Hamilton's ground water supply and the Greater Cincinnati Water Works' (GCWW) ground and surface water. The BCWS also maintains several other connections with the GCWW, Warren County, Cities of Hamilton, Mason, and Monroe to ensure the delivery of water in case of an emergency.

Other Utilities

The county is served by Duke Energy, Butler County Rural Elective Cooperative, and Dayton Power and Light for its gas and electricity needs. The City of Hamilton also has its own gas and electric department serving its residents. Telephone services are provided to the county by Cincinnati Bell and Time Warner Cable and other private telephone companies.

Butler County Critical Infrastructure

Critical Facilities

All the facilities deemed critical by this Mitigation Plan are listed below:

Critical Facility Type	# of Critical Facilities
Government	7
Nursing Homes	41
Fire Stations	49
Police Stations	14
Hospitals	6
Airports	3
Red Cross Shelters	14
Oil and Gas Wells	26
Water Pump Stations	74
Totals	**234**

3. Mitigation Planning Process

Mission Statement

"The mission of the Mitigation Core Group Committee for Butler 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 Butler County. By further researching and planning for future natural hazards as well as implementing appropriate mitigation techniques, Butler County lives and property can be saved, costs from disasters can be reduced, and a rapid and efficient recovery can occur."

Notification of Jurisdictions and General Public

All jurisdictions of the County, as well as other agencies that work within the County, were notified of the mitigation planning process. The Butler County EMA Office created a master list of jurisdictions they felt necessary to participate in this planning effort. Individuals that will make up the Mitigation Planning Core Group Committee were notified of the mitigation planning process. Prior to commencing this planning process, in addition to contacting the Mitigation Planning Core Group Committee, Butler County EMA notified the general public regarding this mitigation planning process. An initial press release was sent on April 25, 2016. Please see *Appendix B* for copies of this press release and all other communications with the Committee and the public.

Mitigation Planning Meetings

The Mitigation Overhead and Development Committee met three (3) times between January 2016 and May 2017. During these meetings, they determined partners and stakeholders to invite, mapped out the planning process, secured a planning consultant via an RFP process, and provided overall guidance to the planning effort.

Mitigation Planning Core Group Committee members were involved for the entire planning process. The purpose of the committee is to provide information to the various entities of Butler County that have a stake, either directly or indirectly, in Mitigation Planning such as neighboring communities/counties, local businesses & industry, non-profit organizations, and any colleges or universities.

They identified and reviewed other Butler County Planning documents and information, which were integrated into this revised Hazard Mitigation Plan. These include the Butler Co Land Use Plan, EMA Standard Operating Procedures (related to disaster events), local zoning ordinances, the Butler Co Building Code, and FEMA Repetitive Loss data.

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 Mitigation Core Group Committee met as follows:

Meeting 1: May 26, 2016 Initiated and completed Hazard Information Risk Assessment (HIRA) hazard scoring process and formally set hazard priorities

Meeting 2: February 8, 2017 Reviewed and confirmed HIRA results, and began evaluating progress on each Action items from last plan by reviewing each Action individually. Goals and Action Items "All Hazards" to "Winter Storms were covered in this session. The Butler Co EMS staff provided a starting point for this review by color coding each Action as green-completed, yellow-underway, or red-not accomplished. Began problem solving for revised goals and action items. Status of Current Plan document is included in *Appendix C*.

Meeting 3: March 23, 2017 Reviewed and verified prior meeting progress, and completed reviewing and revising goals and Action items from "Tornados" to "Earthquakes".

Meeting 4: May 18, 2017 Revised final draft of action items and evaluation of current plan vs the Ohio Mitigation Plan Review Tool, determined what information was needed to complete the plan.

Meeting 5: June 22, 2017 Public Hearing and presentation of draft Butler Co Hazard Mitigation Plan

All of the sign in sheets for these meetings, PowerPoint presentations, etc. are included in *Appendix D*.

As some jurisdictions were not able to attend the planning meetings, Butler Co EMA staff contacted them directly. These jurisdictions included City of Trenton, City of Sharonville, Village of College Corner, Village of Jacksonburg, Village of Millville and the Village of Somerville.

Butler County EMA officials met with City of Trenton Fire Chief Darrel Yater following a meeting of the Butler County Fire Chief's Association on November 17th, 2016. Chief Yater and Butler County EMA staff discussed mitigation actions and potential hazards for Butler County and the City of Trenton. Chief Yater was invited to participate in future mitigation meetings.

The City of Sharonville sits primarily within Hamilton County and has adopted the Hamilton County Hazard Mitigation Plan. The City of Sharonville was invited to participate in the development of the HIRA and the planning process. Several HIRA surveys were received from the City of Sharonville and the data is included in the analysis.

Butler County EMA officials met with Village of College Corner Fire Chief Dave McDill prior to a meeting of the Butler County Fire Chief's Association on March 16th, 2017. Chief McDill and Butler County EMA staff discussed mitigation actions and potential hazards for Butler County and the Village of College Corner. Chief McDill was invited to participate in any future mitigation meetings. Butler County EMA also offered to provide one-on-one meetings as needed.

Butler County EMA met with the Village Council from the Village of Jacksonburg on May 5th, 2017. Butler County EMA was provided an opportunity to discuss the Hazard Mitigation plan with the Village Council during their regularly scheduled council meeting. Butler County EMA discussed the hazards affecting the county as a whole and the Village of Jacksonburg in particular. On May 12th, 2017, Butler County EMA received a letter from the Village of Jacksonburg Mayor Michael W. Sword stating that the Village would like to include a mitigation action in the plan for an outdoor warning siren.

The Village of Millville is within Ross Township. Ross Township Fire Chief Steve Miller met with Butler County EMA officials regarding the development of the Hazard Mitigation Plan on May 8th, 2017.

On March 8, 2016, the residents of the Village of Somerville voted to dissolve the village. The vote to dissolve the village passed 25-23 and the village was dissolved and absorbed by Milford Township.

Review of Current/Expiring Plan

During meetings 2 and 3, noted above, the Core Group Committee reviewed each Action Item in the current/expiring plan. The status of Action Items in this plan are attached in Appendix C. The EMA staff had color coded each Action as green-completed, yellow-underway, or red-not accomplished. From there, the Committee reviewed each Action to confirm its status. Based on Appendix C, the current actions were evaluated and determined to be as follows:

COMPLETED *Action Completed (Green), no need to continue in the next Five (5) Year Plan:* 6.1.1.3, 6.2.1.1, 6.2.1.3, 6.2.1.4, 6.3.1.1, 6.4.2.1, 6.4.2.3, 6.6.1.2, 6.7.3.1

ONGOING *Action Completed* (Green), but needs to be ongoing and included in the next Five (5) Year Plan: 6.1.1.1, 6.1.1.2, 6.3.1.7, 6.3.2.1, 6.3.2.2, 6.5.1.1, 6.5.1.2, 6.5.1.4, 6.5.1.5, 6.7.2.1, 6.7.2.2 Each of these items represent an ongoing activity.

ONGOING *Action Not Totally Completed (Yellow), but needs to be continued in the next Five (5) Year Plan basically as is*: 6.2.1.2, 6.3.1.2, 6.3.1.3, 6.3.1.6, 6.5.1.3, 6.6.2.2, 6.7.1.1, 6.7.3.2 Each of these Actions were at least 25% completed over the past five (5) years, but were deemed important to continue in the plan. In each case, there was a discussion about why the Action was not achieved, and what could be done to better assure success over the next five (5) years. Some of the language was modified, typically with more specific outcomes, to better focus on success.

ONGOING *Action Not Totally Completed Ongoing (Yellow), but needs to be continued in the next Five (5) Year Plan with modifications*:
6.1.1.4: Grant funding to purchase new notification mechanisms revised to 1.1.1.2 IPAWs Web application implementation
6.1.2.1: Seek grants for mitigation activities revised to 1.1.1.4 funding for top priority mitigation projects
6.2.2.2: Identify Historic/arch significant buildings revised to 2.2.1.5 same goal with focus on 3 jurisdictions
6.3.1.5: County-wide plan for susceptible flood plain structures revised to 3.3.1.2 Identify and GIS structures, including repetitive loss and critical facilities
6.3.2.3: Public education for residents/business in Class 1 dam zones revised to 4.4.1.2 Develop and exercise emergency evacuation plans in these areas
6.4.1.2: Encourage shared snow removal equipment revised to 5.5.1.1 Encourage shared equipment investments in CIPs and budgets
6.6.2.1: Public education plan for wild fires revised to 7.7.1.2 Work with local fire departments to develop drought/wildfire education campaign

CANCELLED *Action Not Totally Completed (Yellow) and is deleted as not practical to accomplish or no longer necessary:*
6.4.2.2: Education plan for snow emergency levels. No longer needed, handled by Sheriff's Department
6.6.1.1: Comprehensive list of drought prone areas, businesses and people. Committee saw no value in this activity as drought is wide spread
6.6.1.3: Seek funding/subsidy for crop loss. Crop loss issues/insurance are handled by USDA, who have a regional office.

CANCELLED *Action Not Completed (Red) and is deleted as not practical to accomplish, or no longer necessary:*
6.4.1.1: Encourage utility companies to bury utility lines. This was deemed as an impractical activity, with no real chance of accomplishment over the next five (5) years.

DEFERRED *Action Not Completed (Red), but needs to be continued in the next Five (5) Year Plan as* is:

6.3.1.4: Develop public education program for flood prone areas re river setbacks, erosion and soil issues is revised to 3.3.1.5 (same language). While not even begun during the last five (5) years, the Committee considered this an important Activity to pursue, and believed it could be accomplished with existing resources.
6.2.2.1 and 6.4.1.3 Both address the need for stricter building codes and have been combined as 1.1.1.5 Stricter Building Codes. While the County uses the Ohio Basic Building Code (OBBC), the Committee believed stronger regulations are needed, but also understood the political reality of any such changes occurring.

DEFERRED *Action Not Completed (Red), but needs to be continued in the next Five (5) Year Plan with modifications*:
6.4.2.4 Work with the Red Cross to assure winter shelters has been modified to 5.5.2.3 Work with local jurisdictions to assure warming centers are operational

The revised Five (5) Year Plan reflects these decisions on each current/expiring plan Actions. Further, numerous additional Action Items were developed and included in the revised Five (5) Year Butler County Plan.

Plan 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 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.

4. HAZARD PROFILE

Butler County has experienced many natural disasters in the past one-hundred 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 Butler 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 Butler County.

Initial Hazard Assessment

In order to properly evaluate the natural hazards to which Butler County may be susceptible, a four-step process was utilized. This four-step process was completed in order to "narrow down" the hazards for which Butler County should prepare, and potentially mitigate, in the future. The four 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 summer storms, tornadoes and severe winter storms.

Step 2 – The National Climate Data Center (NCDC) was researched and historic hazard information was reviewed all the way down to the county level. The NCDC 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, fog, hail, hurricanes, lightning, tornadoes, wild/forest fires, precipitation, snow and ice, temperature extremes and thunderstorms and high winds.

Because NCDC information did not address earthquakes, dams and dam safety, other sources were contacted for this data. The information pertaining to earthquake susceptibility was attained from United States Geographical Survey (USGS) data. The information pertaining to landslides, dams and dam safety was obtained from ODNR.

Step 3 - The State of Ohio Hazard Mitigation Plan Update was referenced as well as its Hazard Analysis and Risk Assessment which documents both natural and non-natural (technological) hazard event information.

Step 4- The Mitigation Planning Core Group Committee was surveyed to rate the identified hazards on a five (5) point score base on Probability, Impact, Geographic Extent, Warning, and Duration. The full HIRA Report is attached in *Appendix F.*

Risk Assessment and Ranking

The research compiled during the initial Hazard Identification and Risk Assessment (HIRA) was provided to the Mitigation Overhead and Development Committee for their review and assessment. The committee evaluated all the hazards being considered and ranked them based on the number of historic events and cumulative damage that has occurred at their meeting on May 26, 2017. The Mitigation Planning Core Group Committee confirmed and verified this rating at their second meeting on February 17, 2017.

Butler County highest risk natural hazards were identified as follows:

Natural Hazard	**HIRA Score –Risk Factor RF Rating**	**Comments**
Tornadoes	3.44	
Severe Summer Storms	3.25	
Floods	3.00	
Heat Emergencies	2.91	New Hazard separated from Drought
Severe Winter Storms	2.87	
Earthquakes	2.68	
Drought	2.65	
Dam Failures	2.11	New Hazard separated from Floods

Land Subsidence and wild fires were also evaluated but did not achieve the minimum cut score of 2.1 or greater to be considered.

The prior plan Hazard priorities were:

1. Summer Storms
2. Floods (Flash/100-year)/Dams
3. Winter Storms/Ice Storms (Sub-Hazard – Energy Emergencies)
4. Tornadoes
5. Droughts (Excessive Heat/Excessive Cold) (Sub-Hazard – Energy Emergencies)
6. Earthquakes

Note that the priorities have changes based on updated data and Committee members expertize, and that Heat Emergencies and Dam Failure are now stand-a-lone hazards, not imbedded in other hazard titles.

A more detailed description of each hazard follows. Data to support event history has been secured from the National Oceanic and Atmospheric Administration (NOAA), National Center for Environmental Information (NCEI), Ohio Dept. of Natural Resources (ODNR) Div. of Geological Survey 2015 report on earthquakes, and from the National Integrated Drought Information System (Drought.gov). These data sets are included in *Appendix E.*

Tornadoes

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.

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 National Weather Service (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 (www.skywarn.org) 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
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.

Extent
Tornadoes are considered the most violent atmospheric phenomenon on the face of the earth, with their strength being measured by the Fujita Scale. 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.
The following table can be found at http://www.spc.noaa.gov/faq/tornado/f-scale.html.

Scale	Wind Estimate (MPH)	Typical Damage
F0	Less than 73	Light Damage: Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over
F1	73-112	Moderate Damage: Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113-157	Considerable damage: Roofs torn off frame homes; mobile homes demolished, boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158-206	Severe damage; Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
F4	207-260	Devastating damage: Well-constructed housed leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
F5	261-318	Incredible damage: Strong frame housed leveled off foundations and swept away; automobile-sized missiles fly though the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur

Historical Occurrences

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.

Butler County has experienced 16 tornadoes since 1950, according to NOAA-NCEI, which have caused over $61.013 million in damage as well as killing 1 person and injuring 31 more. On average, 4 tornadoes occur in the county every 10 years.

There have been (4) F2, (1) F3, and (1) F4 documented tornados within the county in the past 60 years including:

2/25/1956- An F2 tornado injured 5 and caused $250,000 in damage.

5/10/1969- An F3 tornado injured 9 and caused $2.5 million in damage.

4/8/1980- An F2 tornado injured 10 persons and caused $2.5 million in damage.

3/10/1986- An F2 tornado caused $2.5 million in damage.
5/4/1990- An F2 tornado kills 1, injures 5 and causes $250,000 in damage.
6/02/1990- An F4 tornado injured 2 persons and caused $25 million in damage.

Frequency/Probability of Future Occurrence

Butler County has a significant history of tornado occurrences. According to the NOAA-NCEI, there have been 16 tornadic events recorded in the county over the past 60 years. These figures suggest that the probability of future occurrences is quite high at a 26% (16 events/60 years) chance of happening in any given year, as well as the likelihood of severe damage based on significant population growth in the county.

Severe Summer Storms – High/Strong/Thunderstorm Winds, Lightning, Hail

Hazards that fit into the severe weather category include thunderstorms, high winds, strong winds, lightning and hail. 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.

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 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. 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.
Lightning kills between 75 and 100 people a year. It is the second largest killer of natural hazard events, exceeded only by floods. Lightning strikes can happen anywhere and affect anyone. Only 10% of lightning strikes result in death, leaving the rest with various degrees of disability, most being central nervous system issues.

Hail is a type of precipitation composed of balls or irregular lumps of ice. It occurs when super cooled water droplets (remaining in a liquid state despite being below the freezing point, 0 °C/32 °F) in a storm cloud collide with some solid object, such as a dust particle or an already forming

hailstone. Hail often forms in strong thunderstorms, often along a cold front, where the layer of air on top is much colder than that on the bottom. The smaller hailstones can bounce up and down between the warm and cold layers due to updrafts and gravity. The longer the stones bounce around, the larger they grow. These strong, severe, or even supercell thunderstorms can also produce hail in the summer months, even without a cold front. Hailstones, while most commonly only a few millimeters in diameter, can sometimes grow to several inches or occasionally even bigger. Such large hailstones can do serious damage, notably to automobiles, skylights, and glass-roofed structures. Pea or golf ball-size hailstones are not uncommon in severe storms. Rarely, massive hailstones have been known to cause concussions or to kill people by causing head trauma.

Extent

Severe storms in Butler County quantitatively have the highest likelihood of occurring on a yearly basis. According to the NOAA-NCEI, 261 storm events including thunder storms, lightning, strong winds, high winds, and hail were documented for Butler County since 1950.

A severe thunderstorm watch is issued by the National Weather Service (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.

According to NOAA, High Winds are defined as 1-minute average surface winds of 35 kt. (40 mph) or greater lasting for 1 hour or longer, or wind gusts to 50kt (58 mph) or greater regardless of duration. Strong Winds are defined on the Beaufort Scale as reaching speeds of 47-54 mph and are capable of causing minor structural damage to buildings.

Historical Occurrences

The following chart shows a breakdown of the events in this category based on NOAA-NCEI data from 1950 to 2017.
NOAA printouts supporting the following chart are included in *Appendix E.*

Event Type	No of Events	$ Damage	Injuries	Deaths	Crop Damage Events	$ Value of Crop Damage
High Winds	10	$41.846m	7	0	0	0
Strong Winds	2	$250,000	0	0	0	0
Thunderstorms	175	$2.677m	5	0	1	$1,000
Lightning	6	$800,000	2	2	0	0
Hail	68	$71,000	0	0	1	$20,000
Totals	**261**	**$45.644m**	**14**	**2**	**2**	**$21,000**

Severe storms in Butler County have caused the most cumulative property damage with estimated total losses of over $45.644 million over a 60 year period

Frequency/ Probability of Occurrence

Severe summer storms as defined herein, are by far the most frequent type of natural hazard in Butler Co. Based on 261 events over the past 60 years, the probability of future occurrences is 4.35 (261/60), or the likelihood of over 4 events in any given year. The most damaging of the severe summer storm components, high winds, has a probability to occur at a 17% (10/60) chance of happening in any given year.

Floods

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.

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.

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.

Flooding is an important issue for the residents and business owners of Butler County. Whether it was riverine flooding or flash flooding events that have occurred in the past, lives have been disrupted or lost and damage has been extensive.

Areas of special flood hazards are defined as land in a flood plain that is subjected to a 1% or greater chance of flooding in any given year. Areas of special flood hazard are designated by the Federal Emergency Management Agency (FEMA). Flood Insurance Rate Maps (FIRM) determine the Base Flood Elevation (BFE) for the areas. BFE is defined by the Butler County Flood Plain regulations as “the water surface of the base flood in relation to a specified datum, usually the National Geodetic 14 Vertical Datum of 1929 or the North American Vertical Datum of 1988 and usually expressed in Feet Mean Sea Level (MSL).”

Butler County has special flood hazard areas identified within the county. All unincorporated and incorporated areas in Butler County are in compliance with state floodplain management standards and participate in the National Flood Insurance Program (NFIP). The Villages of Jacksonburg and College Corner are not located within the floodplain.

Map modernization within the county took place in 2005. The floodplain regulations related to the NFIP were reviewed and updated by the Butler County Department of Development between 2008 and 2010, with an effective date of December 17, 2010. The Butler County

Department of Development, per adopted regulations, monitors and enforces floodplain regulations for all areas of the county. This monitoring and enforcement is to ensure development does not occur in the floodplain in a way that will be a detriment to any citizen of Butler County.

Repetitive Loss Properties

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. The following is the repetitive loss property information for Butler County as provided by the State of Ohio EMA.

Butler Co. (unincorporated)

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	5	0	1	6
RL Buildings (Insured)	3	0	1	4

Community Repetitive Loss

COMMUNITY : HAMILTON, CITY OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	1	0	2	3
RL Buildings (Insured)	1	0	0	1
RL Losses (Total)	3	0	4	7
RL Losses (Insured)	3	0		3
RL Payments (Total)	$70,178.60	$.00	$40,873.56	$111,052.16
Building	$70,178.60	$.00	$40,859.17	$111,037.77
Contents	$.00	$.00	$14.39	$14.39
RL Payments (Insured)	$70,178.60	$.00	$.00	$70,178.60
Building	$70,178.60	$.00	$.00	$70,178.60
Contents	$.00	$.00	$.00	$.00

Post - FIRM SFHA RL Buildings:	0
Insured Buildings with 4 or More Losses:	0
Insured Buildings with 2-3 Losses > Building Value:	0
Total Target RL Buildings:	0

Community Repetitive Loss

COMMUNITY : FAIRFIELD, CITY OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	6	0	9	19
RL Buildings (Insured)	4	0	6	11
RL Losses (Total)	15	0	24	47
RL Losses (Insured)	11	0		31
RL Payments (Total)	$229,336.75	$.00	$183,688.24	$440,339.52
Building	$161,093.88	$.00	$128,382.21	$305,531.93
Contents	$68,242.87	$.00	$55,306.03	$134,807.59
RL Payments (Insured)	$205,567.73	$.00	$164,825.96	$379,115.89
Building	$142,636.02	$.00	$114,390.83	$260,351.97
Contents	$62,931.71	$.00	$50,435.13	$118,763.92

Post - FIRM SFHA RL Buildings: 0

Insured Buildings with 4 or More Losses: 3
Insured Buildings with 2-3 Losses > Building Value: 0
Total Target RL Buildings: 3

Community Repetitive Loss

COMMUNITY : MIDDLETOWN, CITY OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	1	0	0	1
RL Buildings (Insured)	1	0	0	1
RL Losses (Total)	3	0	0	3
RL Losses (Insured)	3	0		3
RL Payments (Total)	$25,998.87	$.00	$.00	$25,998.87
Building	$25,998.87	$.00	$.00	$25,998.87
Contents	$.00	$.00	$.00	$.00
RL Payments (Insured)	$25,998.87	$.00	$.00	$25,998.87
Building	$25,998.87	$.00	$.00	$25,998.87
Contents	$.00	$.00	$.00	$.00

Post - FIRM SFHA RL Buildings: 0

Insured Buildings with 4 or More Losses: 0
Insured Buildings with 2-3 Losses > Building Value: 0
Total Target RL Buildings: 0

Community Repetitive Loss

COMMUNITY : MILLVILLE, VILLAGE OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	1	0	0	1
RL Buildings (Insured)	1	0	0	1
RL Losses (Total)	2	0	0	2
RL Losses (Insured)	2	0		2
RL Payments (Total)	$17,496.74	$.00	$.00	$17,496.74
Building	$17,496.74	$.00	$.00	$17,496.74
Contents	$.00	$.00	$.00	$.00
RL Payments (Insured)	$17,496.74	$.00	$.00	$17,496.74
Building	$17,496.74	$.00	$.00	$17,496.74
Contents	$.00	$.00	$.00	$.00

Post - FIRM SFHA RL Buildings: 0

Insured Buildings with 4 or More Losses: 0
Insured Buildings with 2-3 Losses > Building Value: 0
Total Target RL Buildings: 0

COLLEGE CORNER, VILLAGE OF: Zero RL claims

JACKSONBURG, VILLAGE OF: Zero RL claims

MONROE, CITY OF: Zero RL claims

NEW MIAMI, VILLAGE OF: Zero RL claims

Extent

Unlike flash flooding, the 100-year river flood has 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. Newer data suggests more frequent flooding than the once per 100 year or once per 500 year events.

Historical Occurrence

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 100 years and 500 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 NOAA-NCEI, Butler County has experienced 62 flood and flash flood events since 1996. These floods have caused over $3.377million in damage and 1 death. Most of this $3.273 million, was caused by flash flooding, with the most serious events occurring from May to August. This data is include in *Appendix E.*

The most significant recent flooding events include:

6/2/2016 Flash flood $30,000 damage, no deaths or injuries
6/26/2009 Flash flood $95,000 damage, no deaths or injuries
6/15/2003 Flash flood $1 million property damage, no deaths or injuries
5/7/2002 Flood $25,000 property damage, no deaths or injuries
7/17/2001 Flash flood $1.470 million property damage, no deaths or injuries
8/17/1997 Flash flood $100,000 property damage, no deaths or injuries
6/1/1997 Flash flood $450,000 property damage, no deaths or injuries

The only recorded flood related death occurred on 4/29/1996.

HAZUS-MH Flood Risk Report of Butler Co

The HAZUS-MH Flood Global Risk Report was conducted on August 1, 2017 and is included in this report as Appendix G. The finding of this report are included in Section 5 Vulnerability: Flooding.

Frequency/Probability of Future Occurrence

Based on 62 flood and flash flood events over the past 21 years (1996-2017), the probability of future occurrences is 2.95 (62/21), or the likelihood of about three (3) flood events in any given year.

Heat Emergencies

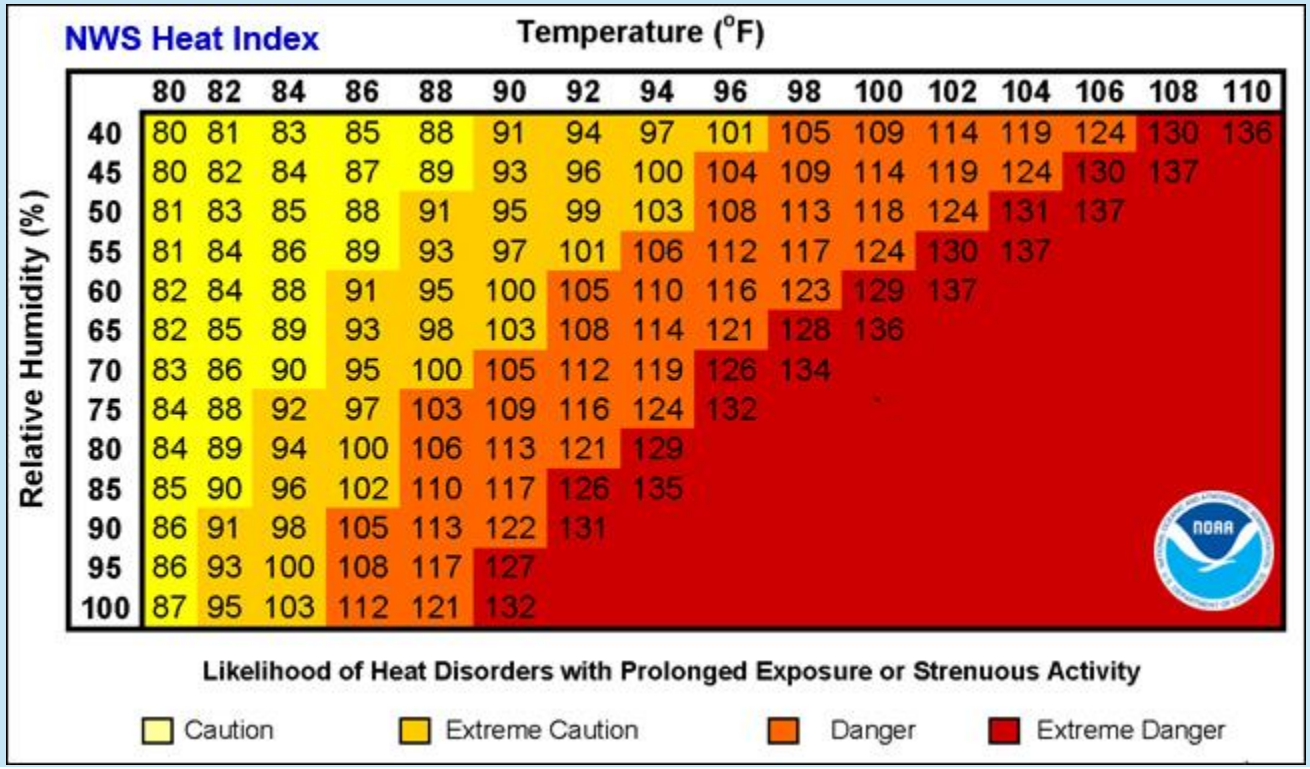
Heat-related deaths and illness are preventable yet annually many people succumb to extreme heat. Extreme heat caused 7,415 heat-related deaths in the United States from 1999 to 2010. Extreme heat kills more people than hurricanes, floods, tornadoes and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

People suffer heat-related illness when their bodies are unable to compensate and properly cool themselves. The body normally cools itself by sweating. But under some conditions, sweating just isn't enough. In such cases, a person's body temperature rises rapidly. Very high body temperatures may damage the brain or other vital organs.

A number of factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to risk include age, obesity, fever, dehydration, heart disease, mental illness, poor circulation, sunburn, and prescription drug and alcohol use.

Extent

Because heat-related deaths are preventable, people need to be aware of who is at greatest risk and what actions can be taken to prevent a heat-related illness or death. The elderly, the very young, and people with mental illness and chronic diseases are at highest risk. However, even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Air-conditioning is the number one protective factor against heat-related illness and death. If a home is not air-conditioned, people can reduce their risk for heat-related illness by spending time in public facilities that are air-conditioned. The following National Weather Service (NWS) Heat Index chart shows the scale of magnitude and extent of heat and humidity including “Caution”, “Extreme Caution”, “Danger” and “Extreme Danger.”



The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature. To find the Heat Index temperature, look at the Heat Index Chart above or check our Heat Index Calculator. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index--how hot it feels--is 121°F. The red area without numbers indicates extreme danger. The National Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F (depending on local climate) for at least 2 consecutive days.

NWS also offers a Heat Index chart for area with high heat but low relative humidity. Since heat index values were devised for shady, light wind conditions, **exposure to full sunshine can increase heat index values by up to 15°F.** Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Historical Occurrence

There were two (2) excessive heat emergencies in Butler Co, both reported in August 2007. No damage, injuries or deaths were reported in NOAA-NCEI. The data is included in *Appendix F.*

Frequency/Probability of Future Occurrence

Based on two (2) documented heat emergency events in the NOAA data base, over the past 21 years (1996-2017), the probability of future occurrences is .095 (2/21), or the likelihood of about 1 heat emergency every 10 years. Still, as noted above, climate change impact on weather patterns could alter these historic trends in short order. This plan identifies specific actions to prepare our community for future heat emergencies.

Severe Winter Storms

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.

Extent

Blizzards: A blizzard warning signifies that large amounts of falling or blowing snow, and sustained winds of at least 35 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.

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.

Historical Occurrence

According to the NOAA-NCEI, Butler County has had 94 winter storm occurrences since 1996. These storms have caused over $560,000 in damage and 1 death. According to the Butler County Engineer, the annual amount of snow the county receives during the winter season is 24 inches. That number is far less than Northeast Ohio just 250 miles north that receives 80-100 inches per year. Data which supports the following chart is include in *Appendix E.*

The following chart shows a breakdown of the events in this category based on NOAA-NCEI data from 1996 to 2017.

Event Type	No of Events	$ Damage	Injuries	Deaths	Crop Damage Events	$ Value of Crop Damage
Blizzards	1	$0	0	0	0	0
Winter Weather	38	$0	0	0	0	0
Winter Storm	33	$525,000	0	0	0	0
Heavy Snow	15	$ 5,000	5	0	0	0
Ice Storm	5	$0	0	0	0	0
Extreme Cold/Wind Chill	1	$0	0	1	0	0
Cold/Wind Chill	1	$ 30,000	0	0	0	0
Totals	**94**	**$560,000**	**5**	**1**	**0**	**$0**

Frequency/Probability of Future Occurrence

Based on the above 94 documented Severe Winter Storm events in the NOAA data base, over the past 21 years (1996-2017), the probability of future occurrences is 4.48 (94/21), or the likelihood of about 4 ½ Severe Winter Storm events in any given year. The historic data also suggests that these events, while frequent, do not typically result in any significant property damage, injury, or loss of life. There is, however, considerable expense on the part of local, township, and county government to manage snow removal and road icing.

Earthquakes

Major 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.

Monitoring of Earthquakes/Extent

The ODNR Division of Geological Survey has established a 25 station cooperative network of seismograph stations throughout the State, mostly at universities and colleges, 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 25 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 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.

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 in Delaware County. 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.

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.

While Butler County has never had an epicenter directly within the county, earthquakes have been in very close proximity located in northern Hamilton County and southern Montgomery County which have had direct effects on Butler.

Extent
Earthquakes are measured on the Richter scale. It is a base-10 logarithmic scale in which a Magnitude 3= 2 gigajoules of energy released, a Magnitude 4=63 gigajoules, Magnitude 5 = 2 Tera joules, Magnitude 6=63 Tera joules, and Magnitude 7 = 2 Peta joules. For comparison, this scaling means that a Magnitude 5 releases 31.6 times more energy than a Magnitude 4 event.

Historical Occurrence
Actual earthquake events centered Butler Co include 3.0-4.0 events in 1834 on the NE boarder of the county and in 1936 on the Butler/Hamilton Co boarder. Since 1931, there have been 83 earthquake events in Ohio. There have been no events in Butler Co since 1931.

Frequency/Probability of Future Occurrence
Based on historical data the odds of an earthquake occurring in southwest Ohio and impacting Butler County are fairly low. Still, the New Madrid fault line, which runs in close proximity to the State of Ohio, has a high probably of activity within the next 50 years according to geologists. Butler County's close proximity to this fault line puts the county at risk for any major earthquakes. The USGS rates Butler/Hamilton as a "very low risk" for earthquake damage, with a chance of 0.578% chance of an event in any given year.

Drought

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (i.e., crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration and the size of the affected area. The worst drought in 50 years affected 35 states during the long, hot summer of 1988, when some areas had been suffering from lack of rainfall since 1984. Rainfall totals in 1988 throughout the mid-west, Northern Plains and the Rockies were 50% to 85% below normal. Crops and livestock died, and some areas became desert. Forest fires began over the Northwest that left 4,100,000 acres destroyed by autumn.

Droughts as a Precursor to Other Disaster

Rural counties are susceptible to wild land fires especially during drought conditions. When most people think of wild fires, the first thing that comes to mind is the devastating and disastrous western fires that are quite prevalent during the summer months.
With more people than ever living, working, traveling and recreating in the urban/urban interface, the odds of wild land fires are increasing.

Causes of wild land fires include the careless burning of debris, household trash and cigarettes, lightning, equipment and vehicles, railroad accidents, electrical fires, and arson.

Fire fighters talk of the fire triangle in terms of the heat of combustion, fuel and oxygen all being necessary for fire to occur. Wild land fire fighters are concerned with the wild land fire triangle of fuel (grass, brush, forests, crops, etc.), terrain (open flat lands, steep slopes and everything conducive to wild land fire spread) and weather (hot, dry, windy conditions are typical wild land fire weather).
During an average year in Ohio, an estimated 15,000 wildfires and natural fuel fires occur. Typically, a reported 1,000 wild land fires burn an average between 4,000 to 6,000 acres in Ohio each year.
Butler County has nearly 160,000 acres of farmland that could be susceptible to drought induced fires.

Urban/Rural Fire Interface

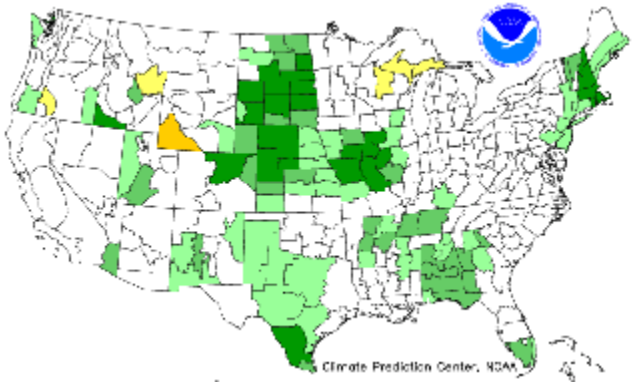
The wildland-urban interface can be defined as the zone where structures and other human developments meet or intermingle with undeveloped lands. Topography plays a major role in how fast a wildfire spreads. Steep slopes are the greatest topographical influence on fire behavior. As the steepness of a slope increases, fires spread more quickly. A fire will spread twice as fast on a 30% slope than it will on level ground. This fast speed is due to the fact that a fire starting at the bottom of a slope has a longer upslope run with more available fuel in its path.
Unlike most hazards, the threat of a drought tends to be dismissed because of the relatively long time a drought takes to have damaging effects.

Extent

NOAA considers drought one of the most costly weather related events. Their website, www.drought.gov , indicates that the 25 years from 1980 to 2005, the US had nine (9) major drought events, each reaching or exceeding $1 billion in damages (mostly crop related). Injury and death are not prevalent in these events.

To measure the scale of magnitude for drought, the Palmer Drought Severity Index (PDSI) is a good tool. It provides a 10 point classification scale based on an algorithm using the factors of temperature, precipitation, and soil moisture content (Available Water Content-AWC).

The Palmer Drought Severity Index (PDSI)



The Palmer Drought Severity Index (PDSI) has been used the longest for monitoring drought.

The PDSI allows for a categorization of various levels of wetness and dryness that are prominent over an area. Palmer values may lag emerging droughts by several months; are less well suited for mountainous land or areas of frequent climatic extremes; and are complex.

4.0 or more	extremely wet
3.0 to 3.99	very wet
2.0 to 2.99	moderately wet
1.0 to 1.99	slightly wet
0.5 to 0.99	incipient wet spell
0.49 to -0.49	near normal
-0.5 to -0.99	incipient dry spell
-1.0 to -1.99	mild drought
-2.0 to -2.99	moderate drought
-3.0 to -3.99	severe drought
-4.0 or less	extreme drought

PDSI Classifications

Historical Occurrence

According to the NOAA-NCEI (*Appendix E)* Butler County has experienced 2 droughts of significance since 1999 (past 18 years), with no recorded deaths or injuries. These drought events include:

7/1/1999 drought which caused no reported property or crop damage, loss of life or injury
6/1/1999 drought which caused no reported property or crop damage, loss of life or injury

Frequency/Probability of Future Occurrence

The odds of future occurrences based on this information are very minimal with a probability of .11 (2/18 years) of a drought occurring in any given year. . Still, with the impact of Climate Change being so unpredictable, the Butler Co. Core Group Committee considered drought a real concern to include in this plan, and be better prepared for in the future.

Dam Failures

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 supply 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.

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.

Extent

The Corps contracted with the Division of Water to inventory roughly 4,500 non-federal 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.
(www.dnr.ohio.gov/water/dsafety/whatdam.htm)
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.
Butler County has 51 total dams within its boundaries. The breakdown of classifications is below:
Class I: 8
Class II: 8
Class III: 14
Class IV: 21
Total: 51

In addition, Butler County has 3 abandoned dams, 7 unclassified dams, and 58 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.

Historic Occurrence

Butler 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 Butler 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.

Frequency/Probability of Future Occurrence

The probability of future dam failure occurrences is quite low, however the likelihood of severe damage if a Class I or potentially a Class II Dam were to fail is determined on a case by case basis and could be devastating to areas such as the City of Oxford, City of Hamilton, City of Fairfield, City of Middletown, and West Chester Township due to Class I or II dams located near or directly in the area.

With the events of the "close call" dam failure in California this past year (heavy rains following years of drought conditions), dam failure was "top-of-mind" for the Butler Co. Core Group Committee, and they have developed clear Actions to be more proactive with this potential hazard.

5. VULNERABILITY ASSSESSMENT

Butler 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 Butler County has nearly 375,000 residents and thousands of homes, businesses and critical facilities, the potential for damage and injury is very high, especially in higher populous areas such as the major cities and the continuously growing townships.

This chapter reviews how vulnerable Butler 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 five-step process was followed to estimate the probability and cost to Butler 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.
Step 5: Determine and prioritize the probability, geographic extent and magnitude of the hazards

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.

Therefore, other state and national sources were researched for detailed information. One of these resources was the NOAA National Center for Environmental Information (NCEI) –formerly called the National Climate Data Center (NCDC). NOAA-NCEI is the world's largest active library of weather data. NOAA-NCEI creates many climate publications and responds to data requests from all over the world. The NOAA-NCEI supports a three-tier national climate services support program that includes partners such as the NCEI, Regional Climate Centers, and State Climatologists. The NOAA-NCEI has long served as a national resource for climate information. The NOAA-NCEI's data is used to address issues that span the breadth of this nation's interests. As climate knows no boundaries, NOAA-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. NOAA-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- 26 station cooperative network of seismograph stations throughout the state in order to continuously record earthquake activity.

Additionally, HAZUS-MD, a regional multi-hazard loss estimation model developed by FEMA, was used for Flooding.

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 Mitigation Core Group Committee used their experience and knowledge with verification from the local communities to prioritize the hazards determined to affect the county the most and assess them according to local concerns.

Critical Facilities

All the facilities deemed critical by this Mitigation Plan are listed below:

Critical Facility Type	# of Critical Facilities
Government	7
Nursing Homes	41
Fire Stations	49
Police Stations	14
Hospitals	6
Airports	3
Red Cross Shelters	14
Oil and Gas Wells	26
Water Pump Stations	74
Totals	**234**

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 in July 2017.
Contents value was calculated as a percentage of the structure's value.

The following information shows the relative value of the typical contents to the typical structure type. These ratios were taken from FEMA guidance documents.

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/Nonprofit 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 strong windstorm 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.

For these calculations, 100% contents value equals the building value.

Dollar Losses due to Natural Hazards based on Land Use and event Severity

Land Use	Property Average Value	# Units in County	Total County Valuation	Structure Minor Damage 5% Contents 0% Total	Moderate Damage Damage 40% Contents 40% Total	Major Damage Damage 75% Contents 75% Total
Residential	$97,765	115,243	$11,266,731,895	$4,888 $0 $4,888	$39,106 $39,106 $78,212	$ 73,324 $ 73,324 $146,648
Commercial/Industrial	$684,033	10,105	$6,912,153,465	$34,202 $0 $34,202	$273,613 $273,613 $547,226	$ 513,025 $ 513,025 $1,026,050
Agricultural	$103,607	1,990	$206,177,930	$5,180 $0 $5,180	$41,443 $41,443 $82,886	$ 77,705 $ 77,705 $155,410
Public Utilities/Infrastructure/ Critical Facilities	$257,173	1809	$465,225,957	$12,859 $0 $12,859	$102,869 $102,869 $205,738	$192,880 $192,880 $385,760

All data provided by the Butler County Auditor's Office in July 2017.

Prioritization Rankings

The information contained in each hazard profile was used to prioritize each hazard. A total priority score was assigned to each hazard type based on a combination of five (5) factors of the natural hazard:

- Probability of future occurrence
- Impact
- Geographical Extent
- Warning Time
- Duration

Using the nationally recognized Hazard Identification and Risk Assessment (HIRA) methodology, the Planning Team assigned these scores at their May 2016 meeting, and reviewed/reconfirmed the findings at their February 2017 meetings.

Scoring of each hazard component, based on a five (5) point scale, was as follows:

Probability of Occurrence
5: The historical records indicate the natural hazard has occurred ten or more times over a one-year period.
4: The historical records indicate the natural hazard has occurred at least ten times over a ten year period.
3: The historical records indicate the natural hazard has occurred more than one but less than ten times over a ten-year period
2: The historical records indicate the natural hazard has occurred on average one time over a ten-year period
1: The historical records indicate the natural hazard has occurred less than one time over a ten-year period

Impact
5: The occurrence of the natural hazard has in the past resulted in deaths and/or injuries and extensive property damage in the millions of dollars and at least one record from the past that resulted in the declaration of a Federal Disaster. The affected community would need outside assistance to recover from this event. There is a large potential for critical facilities to be affected that could exaggerate the impacts of the event through the community.
4: The occurrence of the natural hazard has not in the past, but could in the future result in the deaths and/or injuries and has in the past resulted in extensive property damage in the millions of dollars. The affected community would need outside assistance to recover from this event. There is large potential for critical facilities to be affected that could exaggerate the impacts of the event throughout the community.
3: The future occurrence of the natural hazard could result in deaths and/or injuries, but extensive property damage to only specific areas within the community would be expected.
There is a small potential for critical facilities to be affected. The occurrence likely would require local multi-agency and multi-jurisdictional assistance for recovery.
2: The future occurrence of the natural hazard would not result in deaths and/or injuries, and property damage would be localized and limited. There is a small potential for critical facilities to be affected. The occurrence would be treated as a local emergency and likely would not require multi-agency and multi-jurisdictional assistance for recovery.
1: The occurrence of the natural hazard in the future would not result in deaths and/or injuries, and property damage would be minimal or unlikely. There is no potential for critical facilities to be affected. The occurrence would be treated as a local emergency and would not require multi-agency and multi-jurisdictional assistance for recovery.

Anticipated Geographic Extent
5: The future occurrence of the natural hazard may affect multiple sites in six or more townships, or approximately one-half the entire county.

4: The future occurrence of the natural hazard may affect multiple sites in at least one but less than six townships
3: The future occurrence of the natural hazard may affect individual sites in at least one but less than six townships
2: The future occurrence of the natural hazard may affect multiple sites in one township; however additional townships would not be affected
1: The future occurrence of the natural hazard may affect an individual site in only One Township

Warning Time
5: No warning
4: Limited warning, which allows some personal safety precautions
3: Limited warning which permits some property and personal safety precautions
2: Adequate warning, which allows time to move, secure, or protect property and people.
1: Clear and predicable warning time for everyone, including vulnerable populations to prepared

Duration
5: Duration to result in Impact #5.
4: Duration to result in Impact #4.
3: Duration to result in Impact #3.
2: Duration to result in Impact #2.
1: Duration to result in Impact #1.

Vulnerability Assessment by Hazard

Tornadoes

As seen in the hazard profile and as determined by the Mitigation Development and Overhead Committee, Butler County has a high risk for tornadoes.

Infrastructure Impact

Because tornadoes are random in nature, no one area of the County is more susceptible to infrastructure damage than another area. Since the occurrence of tornadoes is fairly high within Butler County, the effect on the infrastructure can be great due to the density within the area. Trees may become uprooted, limbs detached and blown into structures and structures may be completely destroyed.

Tornado	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Infrastructure Impact	1809	90 units	724 units	1,357 units
		$1,157,310	$148,954,3112	$523,476,320

*Property and Contents

Population Impact

While Butler County is rapidly growing and will be nearing 400,000 residents within the next two decades, some of the western parts of the county have a limited population and low density. Therefore, if a tornado impacts the western part of Butler County the devastation may be relatively low, however if a tornado impacts the central or eastern part of the county where population and density are very high there could be widespread destruction and devastation of infrastructure. Tornadoes destruction may typically be covered by some homeowner's insurance which will cover the expenses of rehabilitation; however some homes and businesses may need extensive public assistance if it's made available.

Property Damage

According to the NCDC, there have been 16 reported tornadoes in Butler County since 1950 with magnitudes ranging from F0 to F4. These tornadoes have caused property losses of $61.013 million. Two (2) 1990 tornadoes recorded in Butler
County were an F2 and F4, causing over $25 million in damage. The variety of tornado sizes Butler County has endured over the past 60 years, along with the amount of past property damage created by these tornadoes, plus the additional and continued growth of the county over the foreseeable decades, makes tornadoes impacts high within the area.

Tornado	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

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

Loss of Life

There has been 1 recorded death and 31 injuries related to tornadic events in Butler County since 1950. The death occurred during a F2 tornado in 1990, while the injuries have been during tornadic events spread out through the decades. While 15 tornadoes in the past 60 years gives a low probability of a tornadic event in the county, the continued growth of the county's population and increased density of infrastructure will increase the potential for loss of life and/or injury.

One of the biggest problems associated with tornadoes is the lack of public education and awareness, especially since tornadoes do not happen frequently. Citizens are not aware of the warnings and dangers associated with severe weather and tornadoes and thus may not be prepared.

Economic Loss

If a tornado of F4 or F3 proportions, which have been recorded in the area before, impacted Butler County the devastation to the local economy could be great. Infrastructure could possibly be destroyed along with businesses, both small and large. There have been two federal disaster declarations in Butler County due to tornadoes, one in 1974 and one in 2001. Unless, there is a major tornado within the county that causes widespread devastation, a federal disaster declaration is unlikely.

Tornado	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Commercial/Industrial Property Impact	10,105	90 units	4,042 units	7,579 units
		$909,450	$2,211,887,492	$7,776,432,950

*Property and Contents

Based on past damages of events, a tornado is likely to cause between **minor economic losses** in Butler County.

Prioritization Rankings

Tornadoes within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 3.2
Anticipated Impact: 4.2
Anticipated Geographic Extent: 3.4
Warning Time: 3.2
Duration: 2.2
Calculated Risk Factor: 3. 44

Severe Summer Storms

Butler County is highly susceptible to severe summer storms, which encompasses thunderstorms, high winds, strong winds, lightning and hail.

Infrastructure Impacts

Since severe storms are random in nature, the impact on the County's infrastructure is not limited to a certain area as with river flooding. Homes and businesses all throughout the County are susceptible to high winds, lightning and hail. Shingles are blown from rooftops and hail may dent siding or break windows. Lightning strikes may be more damaging to structures that are not grounded with lightning rods. Trees may become uprooted and limbs detached and blown into structures. Winds also cause severe damage to mobile home parks and campgrounds if units are not properly secured to permanent structures and municipal plants may also be damaged during severe 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.

Population Impacts

Because severe storms are random in nature, the entire 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 shelter with approaching severe weather.

Property Damage

According to the NCDC, there have been 261 severe storm events in Butler County since 1950. The total property lost within the county due to severe storms accumulates to $45.644 million. The majority of this damage came during the 2008 Hurricane Ike windstorm that which caused $41.7 million in damage, easily the most significant event in Butler County in the past 60 years.

Severe Summer Storms	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Based on past damages of events, a severe summer storm is likely to cause **minor property damage** in Butler County.

Loss of Life

Since 1950, there have been 2 recorded deaths and 14 recorded injuries due to severe summer storms, wind, lightning and hail. Because the number of severe storms affecting Butler County is large, the potential for death and injury is high. As the population of the County continues to grow, as forecasted by the latest UC Census data, there is more potential for loss of life and/or injury. One of the biggest problems associated

with severe storms is the lack of public education and awareness. Citizens are not aware of the warnings and dangers associated with severe weather.

Economic Loss

The economic losses a community suffers during a severe 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.

Federal assistance to Butler County residents in the aftermath of a severe storm has only occurred once in the past 10 years, on August 27, 2001. However, even if a disaster declaration is issued 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 and restoration process.

Severe Summer Storms	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Commercial/Industrial Property Impact	10,105	90 units	4,042units	7,579 units
		$909,450	$2,211,887,492	$7,776,432,950

*Property and Contents

Based on past damages of events, a severe summer storm is likely to cause between **minor economic losses** in Butler County.

Prioritization Ranking

Severe Storms within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 3.7
Anticipated Impact: 3.1
Anticipated Geographic Extent: 3.5
Warning Time: 2.7
Duration: 2.4
Calculated Risk Factor: 3.25

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 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.

Infrastructure Impact

Based on the Butler Co HAZUS-MH Flood Risk Report (see Appendix G), Essential Facilities Exposure to damage is shown on the following table.

Classification	Total	At Least/Moderate	At Least/Substantial	Loss of Use
Fire Stations	30	1	0	1
Hospitals	3	0	0	0
Police Stations	16	2	0	2
Schools	113	5	1	6

HAZUS-MH Essential Facilities Exposure, Butler Co Ohio Table 5

Population Impact

Based on the NCDC data published from 1996 through June 2017 time period, Butler County's citizens have had to endure 62 flooding situations, including flash floods and river floods. Flash floods affect a specific area over a short period of time and a smaller population than river floods. 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 and 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 13,973 people will seek temporary shelter in public shelters, and that 5,600 households will be displaced by flooding

Property Damage

Based on information retrieved from the NCDC, river flooding in Butler County has accounted for $3.377 million in damages from 1996 through 2017. The most significant events occurred in July 2001 where flooding accounted for $1.47 million in damages throughout the county and in June 2003, causing $1 million in property damages. On average, according to the data gathered from the NCDC, in the past 20 years the county suffered $168,850 in damage per year from flooding.

Based on the Butler Co HAZUS-MH Flood Risk Report (see Appendix G), there are approximately 2,151 total structures considered to be at-risk, representing 67% of the total number of buildings in the HAZUS scenario. An estimated 206 buildings will be completely destroyed by flooding. The HAZUS-MH assessment concludes that $43,670,341 of buildings are exposed by Butler Co flooding as shown on the following chart. The calculated scenario would cause $5,520,442 in building damage.

Occupancy	**Exposure ($1,000) Study Region**	**Exposure ($1,000) Scenario**
Residential	33,713,888	3,984,158
Commercial	6,423,474	929,577
Industrial	2,151,545	281,570
Agricultural	116,897	24,948
Religion	694,133	145,996
Government	162,016	94,825
Education	408,188	59,368
Total	**43,670,341**	**5,520,442**

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

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

Loss of Life

The NCDC has only 1 record of death occurring due to flooding within the county. This event took place in 1996, when an 18th month old child drowned in a flooded stream. While this is the only death recorded since 1993, the potential for death and injury is ever present, especially in flash flood events. 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 Butler County, the risk to human life is high but can be reduced by educating the County's residents.

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.

The County's infrastructure will also suffer damage to be repaired. Some roads and bridges may wash out. In some areas of the County, especially near Canyon Lake, residential developments sustain substantial erosion.

Based on the Butler Co HAZUS-MH Flood Risk Report (see Appendix G), 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	222.63	73.24	18.32	16.72	330.91
	Contents	109.96	189.62	40.80	77.10	417.47
	Inventory	0	3.90	6.45	0.60	10.95
	Subtotal	**332.59**	**266.76**	**65.57**	**94.41**	**759.33**
Business Interruption						
	Income	0.01	1.09	0	0.24	1.35
	Relocation	0.45	0.23	0	0.16	0.83
	Rental Income	0.09	0.13	0	0.02	0.24
	Wage	0.02	1.10	0	2.77	3.90
	Subtotal	**0.57**	**2.55**	**0.01**	**3.19**	**6.31**
	Total	**333.16**	**269.31**	**65.58**	**97.60**	**765.65**

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

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

Prioritization Rankings
Flooding within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 3.2
Anticipated Impact: 3.1
Anticipated Geographic Extent: 2.6
Warning Time: 2.5
Duration: 3.4
Calculated Risk Factor: 3. 0

Heat Emergencies

Heat-related deaths and illness are preventable yet annually many people succumb to extreme heat. Extreme heat caused 7,415 heat-related deaths in the United States from 1999 to 2010. Extreme heat kills more people than hurricanes, floods, tornadoes and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

Infrastructure Impact
While excessive heat may cause some softening of asphalt roadways, the real infrastructure threat is overheating of critical facilities, including motors at water and sewer plants, and electrical generation/distribution facilities. Such system failures will cause broad impact across the population effected. Potential loss of water and electricity (AC) could result.

Population Impact
Heat emergencies will most dramatically impact vulnerable populations, including the elderly**.** Because heat-related deaths are preventable, people need to be aware of who is at greatest risk and what actions can be taken to prevent a heat-related illness or death. The elderly, the very young, and people with mental illness and chronic diseases are at highest risk. However, even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Air-conditioning is the number one protective factor against heat-related illness and death. If a home is not air-conditioned, people can reduce their risk for heat-related illness by spending time in public facilities that are air-conditioned. The loss of electricity and limited potable water create the greatest threats to the population during a heat emergency.

Property Impact
The most likely impact on property will be on crop production. Extreme heat can ruin crops, or deprive them of the water they need. There could also be spoilage of food and goods that require refrigeration, if electrical service is interrupted. Residential, commercial and industrial property will see NO/Minimal impact from heat emergencies.

Heat Emergencies	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Based on past damages of events, a heat emergency is likely to cause less than **minor property damage** in Butler County.

Loss of Life

Again, vulnerable populations, particularly the elderly, could be dramatically impacted by a heat emergency including death. This Hazard Mitigation plan addresses preparation planning to reduce the likelihood of such an outcome.

Economic Loss

Heat emergencies can cause work slowdowns, crop damage and spoilage of refrigerated goods. As such an event would likely be county wide, the following chart attempts to quantify these potential losses.

Heat Emergencies	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Agricultural Property Impact	1990 units (farms)	96 units	796 units	1,493 units
		$497,280	$32,988,628	$116,013,565

*Contents only

Based on past damages of events, a heat emergency is likely to cause **minor economic losses** in Butler County.

Prioritization Rankings

Heat Emergencies within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 3.1
Anticipated Impact: 2.3
Anticipated Geographic Extent: 3.6
Warning Time: 1.6
Duration: 4.1
Calculated Risk Factor: 2.91

Severe Winter Storms

While Butler County does not necessarily receive a high amount of snow during the winter months, it is still susceptible to strong winter storms, ice storms, and extremely cold temperatures.

Infrastructure Impact

Because the area is not known for the extreme winter storms that are mostly associated to the northern
Ohio region, structures in the county may not be built to withstand an intense snow fall/ice storm if they do occur.

Population Impact

Because winter storms are countywide, the entire County population is susceptible and should be prepared. Motorists should be aware of declared snow emergencies and seek safety before becoming stranded. Motorists should also be educated on the presence of black ice on roadways and bridges. 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.

Property Damage

According to the NCDC, there have been 94 winter storm events in Butler County since 1996. These storms have caused $560,000 in property damage in the past 20 years. There has not been any crop damage in the county due to winter storms according to NCDC.

Severe Winter Storms	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Based on past damages of events, a severe winter storm is likely to cause **minor property damage** in Butler County.

Loss of Life

Since 1996, there have been 1 death and 5 reported injuries in Butler County due to winter storms.
Because the number and severity of winter storms is not great in the county, deaths and injuries are not potentially high. However, due to continued population growth as well as the county's lack of experience dealing with major winter storms the impact of an extreme winter storm, one of which the county has never dealt with previously, could be significant.

Economic Loss

The economic losses the county will endure during a normal winter storm are low. While some residents and businesses may be unable to partake in normal daily activities, the majority of the county should be able to function without any significant problems. However, if an unusually strong winter storm occurs within the area, the county may see significant school and business closings until the storm becomes manageable.

Severe Winter Storms	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial/Industrial Property Impact	10,105	90 units	4,042units	7,579 units
		$909,450	$2,211,887,492	$7,776,432,950

Based on past damages of events, a severe winter storm is likely to cause **minor economic losses** in Butler County.

Federal assistance to Butler County residents in the aftermath of a winter storm is not likely. In the past 60 years Butler County has only received 1 federal disaster declaration from FEMA, which occurred on January 11th, 2005 after a strong winter storm impacted the region.

Prioritization Ranking

Severe Winter Storms within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 3.2
Anticipated Impact: 2.7
Anticipated Geographic Extent: 4.1
Warning Time: 1.7
Duration: 3.8
Calculated Risk Factor: 2.87

Earthquakes

As seen in the hazard profile and as determined by the Mitigation Development and Overhead Committee, Butler County does have a reasonable chance of being impacted by an earthquake in the future due to its close proximity to the New Madrid fault line. However, there have not been any previous epicenter locations within Butler County from the early 1800s through today. Therefore, the county is more susceptible to earthquake's impacting which have epicenters located outside of Butler County limits.

Infrastructure Impacts
While earthquake events in the county are very limited, if one of significance does occur the impacts on the county's infrastructure could be great due to the increasing population growth and therefore density of the area. Facilities deemed 'critical' previously in this plan could potentially be damaged or completely destroyed.

Population Impact
The increasing population growth and density within the county could potentially be significantly impacted by an earthquake. While the western portion of Butler County is mostly agricultural areas creating low population density, the central and eastern portion of the county has significant density making this area's population more susceptible to earthquakes.

Property Damage
The level of damage expected from an earthquake in Butler County is low to moderate. According to previous historical data, it would be expected to be on the order of a 3.0 to 5.0 magnitude as registered on the Richter scale. A quake of this magnitude would be felt by all people. It would cause breakage of dishes, windows, plasters and possibly chimneys. Damage to buildings will vary depending on the quality of construction.

Earthquakes	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Based on past damages of events in areas effected by earthquakes, an earthquake is likely to cause **moderate property damage** in Butler County.

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.

Economic Losses
Based on the slight property damage expected from a 3.0 to 5.0 magnitude earthquake, the impact on the local economy and local government expenditures is considered to be low. Businesses may need to repair cracks in the walls but should not have to close due to severe infrastructure damage.

Earthquakes	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial/Industrial Property Impact	10,105	90 units	4,042units	7,579 units
		$909,450	$2,211,887,492	$7,776,432,950

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

Prioritization Rakings
Earthquakes within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 1.9
Anticipated Impact: 2.9
Anticipated Geographic Extent: 3.2
Warning Time: 3.4
Duration: 2.6
Calculated Risk Factor: 2.68

Drought

As seen in the hazard profile and as determined by the Mitigation Development and Overhead Committee, Butler County has a low risk of incurring damage from droughts. Due to the non-site specific nature of this hazard, the best way to deal with preparing for future events is to consider historical occurrences.

Infrastructure Impact
Because droughts are a non-site specific hazard, the effects of a drought should be evaluated countywide. There are no documented critical facilities that are considered at-risk as it relates to droughts.
By itself, a drought does not damage developed property. However, over a long period of time, certain soils can expand and contract resulting in some structural damage to buildings. A small percentage of buildings in areas with such soils suffer minor damage during their “useful lives.” Therefore, the overall impact on the County’s infrastructure will be very low.

Population Impact
Since droughts are non-site specific, the entire County population could be affected by the hot, dry conditions. The overall impact that droughts have on the Butler County population is very low based on the number of events recorded by the NOAA. However, the County's residents, especially the sensitive populations, should still be aware of the dangers of extreme heat, such as heat exhaustion and heat stroke.

Property Damage
According to NOAA, there have been only 2 droughts in Butler County since 1999. Neither of these events caused any property damage or crop damage to the county. Due to this lack of drought occurrences within the county, there is a low impact relative to property damage.

Drought	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Based on past damages of events, a drought is likely to cause **minor property damage** in Butler County.

Loss of Life
There were not any reported deaths or injuries during the 2 droughts in 1999. While drought occurrences are low within the county, it is important to educate the public about the problems with extreme heat and/or drought in case one does occur which could have potential significant health related issues for all residents.

Economic Losses
Due to the infrequency of drought events in Butler County, the overall impact on the economy is low.

Drought	**# Units**	**5% of Units Minor Damage***	**40% of Units Moderate Damage***	**75% of Units Major Damage***
Agricultural Property Impact	1990 units (farms)	96 units	796 units	1,493 units
		$497,280	$32,988,628	$116,013,565

However, when droughts do occur, the economic losses would be countywide hitting the farming community the hardest. It is very unlikely that a Presidential Disaster Declaration would occur, therefore the all mitigation costs would be funded locally.

Based on past damages of events, a drought is likely to cause **minor economic losses** in Butler County.

Prioritization Rankings
Drought within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 2.6
Anticipated Impact: 2.0
Anticipated Geographic Extent: 3.4
Warning Time: 1.7
Duration: 4.2
Calculated Risk Factor: 2.65

Dam Failures

Dam failure is a new hazard identified in the plan, which requires proactive measures to protect property and loss of life in Butler Co. The County has 51 total ODNR registered dams.

Infrastructure Impact
Inundation areas below the dams are most at risk for infrastructure damage. This plan identifies the need to study and quantify this risk.

Population Impact
As above, the inundation areas present the highest risk for loss of life. As some notice will be likely of a pending dam failure, the plan includes the development of evacuation plans and increased public awareness regarding inundation zones.

Property Damage
Property damage could be significant in the inundation zones in the event of a dam failure. The County will further study and quantify these risks over the next few years.

Dam Failure	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Residential Property Impact	115,243	6,262 units	46,097 units	86,432units
		$1,157,310	$3,605,338,564	$12,675,079,936

*Property and Contents

Given the defined geographic nature of dam failure caused property damage, such an event is likely to cause **minor property damage** in Butler County.

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.

Economic Losses
Until the inundation zones are studied and quantified, there is no rational way to quantify the potential property damage or economic impact of a specific dam failure. Over the next few years, this data should be available for such calculations and risk assessments.

Dam Failure	# Units	5% of Units Minor Damage*	40% of Units Moderate Damage*	75% of Units Major Damage*
Commercial/Industrial Property Impact	10,105	90 units	4,042units	7,579 units
		$909,450	$2,211,887,492	$7,776,432,950

Again, given the defined geographic nature of dam failures, such an event would likely cause **minor economic losses** in Butler County.

Prioritization Ranking
Dam Failures within Butler County received the following priority rankings during the HIRA assessment:
Probability of Occurrence: 1.5
Anticipated Impact: 2.1
Anticipated Geographic Extent: 2.0
Warning Time: 3.6
Duration: 2.7
Calculated Risk Factor: 2.11

Other natural hazards considered

In addition to the above hazards, the Committee also considered Land Subsidence and Wild fires in their HIRA assessment process. Both scored below the determined 2.1 Risk Factor score to be considered treats in this Natural Hazard Plan update.

6. GOALS AND ACTION ITEMS

Butler County Mitigation Action Plan Matrix

The following chart shows the nine (9) Goals, and 55 Action Items which are intended to address and mitigate the loss of property and life as a result of Natural Hazards in Butler County over the next five (5) years (2017-2022).

Action Plan Prioritization: Core Planning Committee established these Action Items by reviewing historic data, reviewing the prior Plan, and by adding their own expertise into the decision making. Priorities in this plan are identified by earlier Action start dates, with items of lower priority beginning later in the five (5) year plan horizon. In general, earlier start priority Actions were determined by the Planning Committee to have the greatest impact preventing the loss of life and property. While date ranges for each Action Item are unique, for the most part, **High Priorities** are from June 2017 to December 2018, **Medium Priorities** are from January 2019 to December 2020, and **Low Priorities** are from January 2021 to December 2022.

Key: Were "ALL" is noted under Targeted Jurisdictions and Comments, "ALL" represents the following jurisdictions in Butler County OH:

1. City of Hamilton	11. Madison Township	21. Village of Jacksonburg
2. City of Fairfield	12. Milford Township	22. Village of Millville
3. City of Middletown	13. Morgan Township	23. Village of New Miami
4. City of Monroe	14. Oxford Township	24. Village of Seven Mile
5. City of Trenton	15. Reily Township	25. Village of Somerville
6. City of Oxford	16. Ross Township	
7. Fairfield Township	17. St. Clair Township	
8. Hanover Township	18. Wayne Township	
9. Lemon Township	19. West Chester Township	
10. Liberty Township	20. Village of College Corner	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
1. ALL Hazards: **1.1 Reduce health and safety risk to the Butler Co community in the event of a significant disaster**	**1.1.1 Emergency Notification:** Investigate new notification options including media/social media and by connecting partners Education i.e. emergency utility shutoffs (gas, water, electricity)	H	June 2017/ Dec 2017	Emergency Management County IT Local and Co PIOs Local utility companies	Existing Budget	ALL	
	1.1.2 IPAWS Web app Implementation Apply for funding and implement this program	M	Jan 2019/ Dec 2020	EMERGENCY MANAGEMENT County IT	Homeland Security grant	ALL	
	1.1.3 Update list of Emergency shelters	H	June 2017/ annually	EMERGENCY MANAGEMENT American Red Cross SW Ohio Region ESF6	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	1.1.4 Mitigation activity funding: Apply for funding to implement top priority mitigation projects	H	Jan 2018/ Jan 2022	EMERGENCY MANAGEMENT	FEMA Pre Mitigation, Mitigation and other OEMA grants CDBG	ALL	
	1.1.5 Stricter Building Codes: Investigate and support the update of building codes to achieve sustainable buildings and structures to severe weather, flooding and other natural hazards. Priority focus on manufactured and mobile housing code enhancements	M	Jan 2020/ June 2022	EMERGENCY MANAGEMENT County Building Dept.	Existing Budget	ALL	
	1.1.6 Manufactured Housing Standards Integrate and support zoning and health department priority focus on upgraded standards for manufactured and mobile housing codes	L	Jan 2021/ June 2022	County Building Dept. County Health Department	Existing Resources	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	1.1.7 Build Disaster Recovery Support Network	M	June 2018/ June 2022	EMERGENCY MANAGEMENT Team Rubicon Public/Private partnerships (3Ps)	Existing Resources	ALL	
	1.1.8 Coordinate Fuel for Hazard Mobilization Efforts	H	Jan 2018/ June 2019	EMERGENCY MANAGEMENT Incident Management Team	Coordinate with County EOP		
	1.1.9 Public Awareness: Update all printed material into electronic format for use on media and social media. Priority focus on severe weather, tornadoes, and flooding	H	June 2017/ June 2018	EMERGENCY MANAGEMENT County IT Local and Co PIOs ESF6	Existing Budget	ALL	
	1.1.10 Maintain NWS "Severe Weather Ready" County status	M	Jan 2019	EMERGENCY MANAGEMENT National Weather Service	Existing Budget	Encourage local jurisdictions to partner as "Weather Ready Ambassadors"	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
2.Severe Summer Storms: **2.1 Ensure public safety and reliable utility service during severe storms**	**2.1.1 Tree Maintenance:** Continue to coordinate with utility companies	H	June 2017/ Ongoing annually	County Engineer Local Public Works ODOT Local Utilities	Existing Budget	ALL	
	2.1.2 Back-up Generators: Critical Facilities Plan Develop coordinated back-up generator plan for all critical facilities	M	Jan 2018/ June 2022	EMERGENCY MANAGEMENT County Engineer IBEW	Existing Budget	ALL	
	2.1.3 Back-up Generators: Funding Seek funding for back-up generators for all critical facilities in the county	M	Jan 2018/ June 2022	EMERGENCY MANAGEMENT Public Works Local Utilities County Engineer IBEW	FEMA, OEMA, CDBG, OPWC grant funding	ALL, with focus on: City of Trenton, Village of College Corner	
	2.1.4 Enhance public awareness and preparation for severe weather: Update written info into media and social media platforms and include straight-line winds and lightning	H	June 2017/ June 2018	EMERGENCY MANAGEMENT County IT Local PIOs National Weather Service	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	2.1.5 Significant Building and Critical Infrastructure Sustainability: Identify historic /architecturally significant buildings and critical infrastructure that may need structural upgrades to withstand severe weather events	H	Sept 2018/ June 2019	EMERGENCY MANAGEMENT County Engineer	Existing Budget BC Historical Society BC Citizens for Historic Preservation Society (CHAPS)	City of Hamilton City of Fairfield City of Middletown	
3. Floods: **3.1 Minimize losses caused by river and flash flooding to both public and private property**	**3.1.1 Complete FEMA Rate Map update**	H	June 2017/ June 2018	EMERGENCY MANAGEMENT FEMA Local and Co Flood Plain Managers	Existing Budget	ALL	
	3.1.2 Identify and GIS/ inventory structures subject to flood damage, including critical facilities and repetitive loss properties	H	Sept 2017/ Sept 2018	EMERGENCY MANAGEMENT FEMA Local and Co Flood Plain Managers BC Auditors Office	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	3.1.3 Develop Mitigation Projects to mitigate FEMA identified repetitive loss susceptible structures	M	Sept 2017/ June 2022	EMERGENCY MANAGEMENT Butler Co. Building and Zoning	FEMA Pre-Mitigation and Mitigation Grants	ALL with focus on: City of Fairfield, St. Clair Township, Village of New Miami, Village of Millville	
	3.1.4 Develop Mitigation Projects to mitigate structures and critical facilities in designated floodplain areas	M	Sept 2017/ June 2022	EMERGENCY MANAGEMENT	FEMA Pre-Mitigation and Mitigation Grants	Designated flood zones, with emphasis on: City of Monroe, Village of Seven Mile	
	3.1.5 Develop a public education program for residents and business owners located in flood prone areas regarding river setbacks, erosion, safe egress, and other soil/flood related issues	M	Sept 2018/ June 2019	Local and Co Flood Plain Managers EMERGENCY MANAGEMENT Local PIOs National Weather Service Soil and Water Conservation District (SWCD) Chamber of Commerce Silver Jackets	Existing partner resources	ALL	
	3.1.6 Link flood/hydraulic modeling monitoring to real-time maps and promote their availability	H	Jan 2018/ Review quarterly	EMERGENCY MANAGEMENT National Weather Service Silver Jackets Army Corp of Engineers Local and Co PIOs Miami Conservancy Dist. OEMA	FEMA and OEMA funding	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	3.1.7 Monitor and maintain list of Butler Co communities to assure full participation in NFIP	H	June 2017/ Updated annually	EMERGENCY MANAGEMENT Local and Co Flood Plain Managers ODNR FEMA	Existing Budget	ALL	
	3.1.8 Investigate new technologies for flood prevention and diversion	M	Jan 2018/ June 2022	EMERGENCY MANAGEMENT Flood Plain Administrators	Existing Resources	ALL	
	3.1.9 Place public awareness signage at repetitive loss locations	H	June 2018	EMERGENCY MANAGEMENT Flood Plain Administrators	Existing Resources	Repetitive Loss areas	
	3.1.10 Use alternative storm water retention strategies, like Rain Gardens where appropriate	M	Jan 2019/ June 2022	EMERGENCY MANAGEMT County Engineer	OEMA, FEMA, CDBG grants	ALL	
	3.1.11 Encourage residents to secure available FEMA Flood Insurance	M	Sept 2018/ June 2019	Local and Co Flood Plain Managers EMERGENCY MANAGEMENT Local PIOs Soil and Water Conservation District (SWCD) Chamber of Commerce	Existing Resources	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
4. Dams: **4.1 Minimize the danger to life and property associated with potential Class 1 Dam failure in the county**	**4.1.1 GIS Class I and II dams and their potential inundation zones**	H	Jan 2018/ June 2018	EMERGENCY MANAGEMENT County GIS ODNR Div. Dam Safety Arm Corp of Engineers Miami Conservancy Dist.	Existing Resources	ALL with focus on: City of Oxford Oxford Township Hanover Township Ross Township City of Fairfield City of Middletown Madison Township West Chester Township	
	4.1.2 Develop and exercise emergency action plans, including evacuation plans, in the event of a dam/levy failure	H	June 2018/ Dec 2018	EMERGENCY MANAGEMENT ESF2 Hospitals/Nursing homes ODOT Miami Conservancy Dist.	Existing Budget	As above	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	4.1.3 Develop public education program for property owner in inundation areas	H	June 2018/ June 2019	EMERGENCY MANAGEMENT Local and Co CIOs Soil and Water Conservation Dist.	Existing Budget	ALL	
5 Severe Winter Storms: **5.1 Reduce vulnerability of county infrastructure during future winter storm events**	**5.1.1 Encourage local entities to include snow Emergency Management removal vehicles and equipment, salt storage facilities etc., in their local Capital Improve Emergency Management Plans (CIPs) and to consider shared use facilities and consumable materials (salt etc.) where appropriate**	H	June 2017/ Ongoing annually	Local Public Works EMERGENCY MANAGEMENT Commissioners County Engineer	Existing Budget	ALL	
5.2 Reduce public vulnerability during future winter storms	**5.2.1 Ongoing briefings for public official officials regarding winter storm preparedness**	H	Sept 2017/ Each Sept annually	EMERGENCY MANAGEMENT Commissioners, County, City and Township officials	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	5.2.2 Work with local jurisdiction warming centers to assure all can be operational during winter storm events and extreme cold conditions (power outages, heating issues etc.)	H	Sept 2017/ ongoing annually	EMERGENCY MANAGEMENT	Existing Budget	ALL	
6. Tornadoes **6.1 Reduce health and safety risks to Butler County community in the event of a tornado**	**6.1.1 Continue to review and update existing warning sirens coverage county-wide and investigate needs for additional sirens**	M	On-going	EMERGENCY MANAGEMENT	Existing Budget Grants	ALL, with emphasis on Village of Jacksonburg	
	6.1.2 Continue to update tornado warning siren public education program	H	Sept 2017/ Ongoing	EMERGENCY MANAGEMENT	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	6.1.3 Increase availability of Weather Radios, targeting the elderly and other vulnerable populations	M	Jan 2019/ Ongoing	EMERGENCY MANAGEMENT	FEMA, OEMA and other grants		
	6.1.4 Provide training to the elderly regarding tornadoes safety and available supportive resources	H	Spring 2018 and annually each spring	EMERGENCY MANAGEMENT Senior Centers Council on Aging of SW Ohio Butler Co Elder Services Board Hospital Trauma Outreach Team	Existing Budget	ALL	
	6.1.5 Continue to evaluate the need for tornado safe rooms and shelter rooms at schools and critical facilities	M	Sept 2017/ Dec 2019	EMERGENCY MANAGEMENT Local School Districts	Existing Budgets Ohio School Facilities Authority	ALL	
	6.1.6 Deliver National Weather Service weather spotter course	H	October 2017/ annually	EMERGENCY MANAGEMENT National Weather Service	Existing Budget	ALL	
	6.1.7 Continue to evaluate and implement tornado safe rooms and shelter rooms at Mobile Home communities	M	Sept 2017/ Dec 2019	EMERGENCY MANAGEMENT	Existing Budget Mobile Home Park Developers/ Owners	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	6.1.8 Investigate and develop shelters at parks, ball fields and other open public spaces	H	Sept 2017/ Dec 2019	EMERGENCY MANAGEMENT	Existing Budget Local government resources and funding sources	ALL	
7. Droughts **7.1 Reduce the economic impact in Butler County caused by droughts**	**7.1.1 Establish MOUs with private contracts for the supply and distribution of water and ice in case of prolonged drought conditions and coordinate with Co EOP**	H	Sept 2017/ renewed annually	EMERGENCY MANAGEMENT Red Cross Salvation Army National Guard ESF6	Existing Budget	ALL	
	7.1.2 Develop a template for use by local fire and public service officials to help identify alternative water sources (ie. lakes, ponds etc.) that can supplement firefighting efforts during dry and drought conditions	L	March 2021/ July 2022	EMERGENCY MANAGEMENT Local Fire Departments	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	7.1.3 Develop and educational campaign for public and business awareness/ preparation for drought conditions, including the increased risk of wildfires	M	June 2018/ June 2019	EMERGENCY MANAGEMENT Local Fire Departments	Existing Budget	ALL	
	7.1.4 Investigate and secure funding for Dry force Fire hydrants in high risk areas in the Co	M	June 2018/ June 2020	EMERGENCY MANAGEMENT Local Fire Departments	FEMA and State Fire Marshal grants	ALL	
	7.1.5 Coordination of tanker transportation of public potable water During droughts	M	June 2018/ June 2019	EMERGENCY MANAGEMENT Local Fire Departments Co Water utilities	Existing Budget	ALL	
	7.1.6 Coordinate removal of dead trees and underbrush to reduce the risk of drought related fires	H	Jan 2018/ ongoing	EMERGENCY MANAGEMENT Local fire departments	Existing budget WIOA and TANF workforce grants	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
8.Earthquakes **8.1 Increase public awareness of earthquakes and the associates risks to health, safety, and private property**	**8.1.1 Update potential earthquake impact information (HAZUS) and disseminate it to the public and implement a public awareness campaign to educate the public on earthquake preparedness**	H	Jan 2018/ Dec 2018	EMERGENCY MANAGEMENT County GIS Local and Co PIOs	Existing Budget	ALL	
8.2 Improve first responder capabilities that will reduce fatalities in the event of an earthquake event	**8.2.1 Sustain capabilities of Butler Co Tech Rescue Team (BCTRT) for incidences dealing with building collapse**	M	Sept 2017/ June 2022	EMERGENCY MANAGEMENT Fire Chief Association	Existing Budget OEMA	ALL	
	8.2.2 Continue to provide all necessary support and equipment for BCTRT and invest in enhanced technologies	M	Sept 2017/ June 2022	EMERGENCY MANAGEMENT Fire Chief Association	County General Funds OEMA, FEMA and other grants	ALL	
8.3 Reduce damages to existing and future county critical infrastructure	**8.3.1 Based on identification of earthquake at-risk critical infrastructure, identify funding to implement earthquake risk reduction practices**	L	Jan 2019/ June 2022	EMERGENCY MANAGEMENT	Existing Budget	ALL	

Butler Co HMP Goal	Action Item	Priority H=High M=Medium L=Low	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	8.3.2 Provide First Response and firefighter training for HazMat, rail, storage area and pipeline events	L	Spring 2020/ annual training	EMERGENCY MANAGEMENT Local Fire/EMS	Existing Budget State Fire Marshall Grants	ALL	
	8.3.3 Regularly assess risks using Commodity Flow Studies	M	Jan 2019/ June 2022	EMERGENCY MANAGEMENT	Existing Budget	ALL	
9. Heat Emergencies **9.1 Reduce health and safety risks to Butler Co community in the event of Heat Emergencies**	**9.1.1 Develop a public education program for residents and business owners regarding Heat Emergencies**	H	Jan 2018/ Annually	EMERGENCY MANAGEMENT Local PIOs National Weather Service Chamber of Commerce	Existing Budget	ALL	
	9.1.2 Plan for and support cooling stations to serve high at-risk populations	H	Jan 2018/ annually	EMERGENCY MANAGEMENT Red Cross Salvation Army ESF6 County Health Dept.	Existing Budget	ALL	
	9.1.3 Link Heat Emergencies with Emergency Operations Plan (EOP)	H	Sept 2017/ Dec 2017	EMERGENCY MANAGEMENT	Existing Budget	ALL	

Resources for Implementing the Approved Plan

Grant funding may be available to assist in the implementation of a number of the Plan Action Items. These grant programs include the following:

HMGP: The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Act, as amended. The key purpose of HMPG is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMPG is available, when authorized under the Presidential major disaster declaration, in areas of a State requested by the Governor.

PDM: The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 USC 5133. The PDM program is designed to assist States and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disaster declarations.

FMA: The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act (NFIA) of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

SHARPP: The State Hazard Analysis Resource and Planning portal (SHARPP) has additional resources listed in the Grants section under Other Mitigation Grants. Go to: http://ohiosharpp.ema.state.oh.us/OhioSHARPP/Grants.aspx#otherMitigationGrants for more information.

7. MITIGATION PLAN MAINTENANCE AND SCHEDULE

Once the Mitigation Plan is approved by the State of Ohio and FEMA by late 2017, the existing Mitigation Core Group Committee, initiated by the Butler County Emergency Management Agency, and made up of representatives of all county jurisdictions, will focus on implementing, monitoring, and evaluating the plan. Monitoring and evaluation of this plan involves the ongoing process of compiling information on the outcomes from the implementation of the mitigation action items.

At the initial meeting the committee will review the goals and action items to make sure that they are being successfully completed or are on track to be completed. The committee will assess if the county's vulnerability to hazards has decreased from the mitigation actions. Other issues that will be assessed by the committee are the redundancy of mitigation strategies, technical, legal or coordination problems associated with implementation, and any funding issues that may arise.

The committee will meet at least twice per year, or as needed. The success of the Mitigation Plan will depend upon the efforts of this committee to become involved with other planning efforts in the community such as the development of future land-use plans, capital improvement plans, zoning ordinances, floodplain regulations, building codes, and subdivision regulations, etc. created by county jurisdictions.
By becoming involved in these planning processes and plan's development, the goals and actions of this Mitigation Plan will be successfully embedded in everyday planning and development practice in Butler County and each hazard will be addressed and mitigated.
Communities will be able to use the plan for a variety of activities, including implementing specific mitigation projects, as well as, implementing changes in the daily operation of the local government.

To ensure the success of an ongoing program, it is critical that the plan remains relevant to the County's growth and development. Thus, it is important for the County to conduct periodic evaluations and make revisions as needed, as well as, incorporate changes into other planning documents in the County.

The public will be involved on a continuous basis. Public involvement will be accomplished by establishing a website link (http://www.butlercountyohio.org/ema/) whereby the mitigation action items that are slated for development that current year will be highlighted. The public will be encouraged to participate in the continued development of the mitigation plan. There will also be a formalized press release developed for their annual review process.

8. RESOLUTION OF ADOPTION

The Butler County Commissioners, and the jurisdictions listed in Section 2 will pass Resolutions of Support and/or Ordinance for the Butler County Mitigation Plan after contingent approval from the Ohio Emergency Management Agency as well as The Federal Emergency Management Agency. Copies of the adopted ordinances and/or resolutions that jurisdictions pass are provided in the *Appendix I*.

Appendix

- **A- Planning participants**
- **B- Communications with public**
- **C- Status of current plan Action Items (Green, Yellow, Red status)**
- **D- Public Participation Documentation: Sign In sheets, Agendas, Handouts for Meeting 1-5**
- **E- Historical Natural Hazard Event Data (NOAA, USGS, etc.)**
- **F- HIRA Report**
- **G- HAZUS-MH Flooding**
- **H- Maps**
- **I- Ordinances of Adaption**

End