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 liaise 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

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. The full list of these participants is includes as Appendix A.

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

The jurisdictions represented in the Mitigation Core Group Committee include:

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 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 land use plan, 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

Healthcare Sector	Hospitals - 7
Gov't Facilities	Courts – 3
	Services Center – 1
	Admin Center – 1
Water/Wastewater	Pumping Stations – 21
	Wastewater Treatment - 2
Emergency Services	Fire – 49 stations
	Police – 14 stations
	EMS Only – 1 Station
	Engineers office – 1
	EMA - 1
	Red Cross Shelters - 11
Dams	Class 1 – 8
	Class 2 – 8
Communications	Dispatch Services – 1
	Technical Services – 1
Transportation	Airports - 3

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 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 HIRA process, formally set hazard priorities

Meeting 2: February 17, 2017 Reviewed HIRA results, reviewed progress on Action items from last plan, began problem solving for revised goals and action items

Meeting 3: March 23, 2017 Completed revising goals and establishing Action items

Meeting 4: May 18, 2017 Revised final draft of action items and evaluated 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

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 and Federal Emergency Management Agency for review.

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 storms, tornadoes and 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, ocean/lake surf, 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 is attached as Exhibit C.

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. 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 D.

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 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.

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. 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.

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. On average, 4 tornadoes occur in the county every 10 years. There have been 2 F4 tornadoes documented within the county and one 1 F3 in the past 60 years. The probability of future occurrences is quite high 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, 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 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.

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.

Frequency/Probability of Future Occurrence

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. 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. The following chart shows a breakdown of the events in this category based on NOAA-NCEI data from 1950 to 2017.

Event Type	No of Events	$ Damage	Injuries	Deaths	Crop Damage	$ Value of Crop

					Events	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**

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).

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
RL Losses (Total)	14	0	2	16
RL Losses (Insured)	7	0		9
RL Payments (Total)	$327,281.87	$.00	$4,779.72	$332,061.59
Building	$240,425.80	$.00	$4,779.72	$245,205.52
Contents	$86,856.07	$.00	$.00	$86,856.07
RL Payments (Insured)	$253,128.54	$.00	$4,779.72	$257,908.26
Building	$170,843.97	$.00	$4,779.72	$175,623.69
Contents	$82,284.57	$.00	$.00	$82,284.57

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

Additional repetitive loss data is included in Appendix E.

Frequency/Probability of Future 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.

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.

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.

Frequency/Probability of Future 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. Again, with concerns regarding the uncertain impact of global climate change, the Butler Co Core Planning Committee seeks to address preparation for heat emergencies though specific Actions proposed in this plan.

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.

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.

Frequency/Probability of Future 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.

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**

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.

4.8.1 Monitoring of Earthquakes

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 conditions for detecting and locating very small earthquakes that are below the threshold of human notice. These small micro earthquakes are important because they occur more frequently and help to identify the location of faults that may periodically produce larger, potentially damaging earthquakes.
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.

Frequency/Probability of Future Occurrence
Based on historical data the odds of an earthquake occurring in southwest Ohio and impacting Butler County are fairly high. 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. Actual earthquake events centered
around 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.

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. According to the NCDC, Butler County has not had any reported wild fires in the past 60 years. While chances of these occurring are minimal, the county still has nearly 130,000 acres of farmland that could be susceptible to 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.

Frequency/Probability of Future Occurrence

According to the NOAA-NCEI, Butler County has experienced 2 droughts of significance since 1999, with no recorded deaths or injuries. The odds of future occurrences based on this information are very minimal. Still, with the impact of Climate Change being so unpredictable, the Butler Co. Core Group Committee considered drought a real concern to 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 instate 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. Marys were built to supply water to the canal system, which provided a means of transportation for agricultural trade and commerce. Dam construction continued at a modest pace for about the next 100 years with relatively few dams built by private entities. In the early part of the nineteenth century, several large municipally-owned dams and reservoirs were built for public water supply. Severe floods also prompted the formation of conservancy districts which constructed dams for flood control.

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

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

The ODNR’s Division of Water has been involved in dam safety since 1963. During this year, the first Ohio law requiring construction permits for building new dams was enacted. In addition, following the failure of several dams in northeast Ohio during the severe flood of 1969, the General Assembly revised the law to include periodic inspections of existing structures. Inspections were required to help assure

that the continued operation and use of a dam, dike or levee does not pose a hazard to life, health, or property. In 1972, the failure of Buffalo Creek Dam in West Virginia, which caused great loss of life and severe property damage, led to the enactment of the National Dam Safety Act. This law, administered by the Corp of Engineers, called for an inventory of dams in the United States and the inspection of those dams that could create the most hazards if they failed. The Corps contracted with the Division of Water to inventory roughly 4,500 non-federal dams in Ohio.

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.

Frequency/Probability of Future 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. 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.

6. GOALS AND ACTION ITEMS

Butler County Mitigation Action Plan Matrix

The following chart shows the __ Goals, and __ strategies 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).

Goal	Action Item	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 Include education re emergency utility shutoffs (gas, water, electricity)	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	Jan 2018/ Dec 2020	EMERGENCY MANAGEMENT County IT	Homeland Security grant	ALL	
	1.1.3 Update list of Emergency shelters	June 2017/ annually	EMERGENCY MANAGEMENT American Red Cross SW Ohio Region ESF6	Existing Budget	ALL	

Goal	Action Item	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	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	Jan 2019/ 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	Jan 2019/ June 2022	County Building Dept. County Health Department	Existing Resources	ALL	

Goal	Action Item	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
	1.1.7 Build Disaster Recovery Support Network	June 2018/ June 2022	EMERGENCY MANAGEMENT Team Rubicon Public/Private partnerships (3Ps)	Existing Resources	ALL	
	1.1.8 Coordinate Fuel for Hazard Mobilization Efforts	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	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	Jan 2019	EMERGENCY MANAGEMENT NWS	Existing Budget	Encourage local jurisdictions to partner as "Weather Ready Ambassadors"	

Goal	Action Item	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	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	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	Jan 2018/ June 2022	EMERGENCY MANAGEMENT Public Works Local Utilities County Engineer IBEW	FEMA, OEMA, CDBG, OPWC grant funding	ALL	
	2.1.4 Enhance public awareness and preparation for severe weather: Update written info into media/ social media platforms and include straight-line winds and l	June 2017/ June 2018	EMERGENCY MANAGEMENT County IT Local PIOs National Weather Service	Existing Budget	ALL	

Goal	Action Item	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 serve weather events	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**	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	Sept 2017/ Sept 2018	EMERGENCY MANAGEMENT FEMA Local and Co Flood Plain Managers BC Auditors Office	Existing Budget	ALL	
	3.1.3 Develop Mitigation Projects to	Sept 2017/ June 2022	EMERGENCY MANAGEMENT	FEMA Pre-Mitigation and	ALL with focus on: City of	

	mitigate FEMA identified repetitive loss susceptible structures		Butler Co. Building and Zoning	Mitigation Grants	Fairfield, St. Clair Township, Village of New Miami	
Goal	**Action Item**	**Start/End Dates**	**Responsible Party (key)**	**Resources**	**Target Jurisdiction and Comments**	**Status**
	3.1.4 Develop Mitigation Projects to mitigate structures and critical facilities in designated floodplain areas	Sept 2017/ June 2022	EMERGENCY MANAGEMENT	FEMA Pre-Mitigation and Mitigation Grants	Designated flood zones	
	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	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	
	3.1.7 Link flood/hydraulic modeling monitoring to real-time maps and promote their availability	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	

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

Goal	Action Item	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**	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	June 2018/ Dec 2018	EMERGENCY MANAGEMENT ESF2 Hospitals/Nursing homes ODOT Miami Conservancy Dist.	Existing Budget	As above	
	4.1.3 Develop public education program for property owner in inundation areas	June 2018/ June 2019	EMERGENCY MANAGEMENT Local and Co CIOs SWCD	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**	June 2017/ Ongoing annually	Local Public Works EMERGENCY MANAGEMENT Commissioners County Engineer	Existing Budget	ALL	
Goal	**Action Item**	**Start/End Dates**	**Responsible Party (key)**	**Resources**	**Target Jurisdiction and Comments**	**Status**
5.2 Reduce public vulnerability during future winter storms	**5.2.1 Ongoing briefings for public official officials regarding winter storm preparedness**	Sept 2017/ Each Sept annually	EMERGENCY MANAGEMENT Commissioners, County, City and Township officials	Existing Budget	ALL	
	5.2.3 Work with local jurisdiction warming centers to assure all can be operational during winter storm events (power outages, heating issues etc.)	Sept 2017/ ongoing annually	EMERGENCY MANAGEMENT	Existing Budget	ALL	

Goal	Action Item	Start/End Dates	Responsible Party (key)	Resources	Target Jurisdiction and Comments	Status
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**	On-going	EMERGENCY MANAGEMENT	Existing Budget Grants	ALL	
	6.1.2 Continue to update tornado warning siren public education program	Sept 2017/ Ongoing	EMERGENCY MANAGEMENT	Existing Budget	ALL	
	6.1.3 Increase availability of Weather Radios, targeting the elderly and other vulnerable populations	Jan 2018/ Ongoing	EMERGENCY MANAGEMENT	FEMA, OEMA and other grants		
	6.1.4 Provide training to the elderly regarding tornadoes safety and available supportive resources	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	Sept 2017/ Dec 2019	EMERGENCY MANAGEMENT Local School Districts	Existing Budgets Ohio School Facilities Authority	ALL	

	schools and critical facilities					
Goal	**Action Item**	**Start/End Dates**	**Responsible Party (key)**	**Resources**	**Target Jurisdiction and Comments**	**Status**
	6.1.6 Deliver National Weather Service weather spotter course	October 2017/ annually	EMERGENCY MANAGEMENT National Weather Service	Existing Budget	ALL	
	6.1.7 Continue to evaluate the need for tornado safe rooms and shelter rooms at Mobile Home communities		EMERGENCY MANAGEMENT	Existing Budget Mobile Home Park Developers/Owners	ALL	
	6.1.8 Investigate the development of shelters at parks, ball fields and other open public spaces		EMERGENCY MANAGEMENT	Existing Budget	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**	Sept 2017/ renewed annually	EMERGENCY MANAGEMENT Red Cross Salvation Army National Guard ESF6	Existing Budget	ALL	
	7.1.2 Develop a	March	EMERGENCY	Existing Budget	ALL	

	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	2018/ July 2018	MANAGEMENT Local Fire Departments			
Goal	**Action Item**	**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	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	June 2018/ June 2020	EMERGENCY MANAGEMENT Local Fire Departments	State Fire Marshal grants	ALL	
	7.1.5 Coordination of tanker transportation of public potable water	June 2018/ June 2019	EMERGENCY MANAGEMENT Local Fire Departments	Existing Budget	ALL	

	During droughts		Co Water utilities			
Goal	**Action Item**	**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 (HAZSUS) and disseminate it to the public and implement a public awareness campaign to educate the public on earthquake preparedness**	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**	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	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	**8.3.1** Based on identification of earthquake at-risk	Jan 2018/ June 2022	EMERGENCY MANAGEMENT	Existing Budget	ALL	

infrastructure	critical infrastructure**, identify funding to implement earthquake risk reduction practices**					
	8.3.2 Provide First Response and firefighter training for HazMat, rail, storage area and pipeline events	Spring 2018/ annual training	EMERGENCY MANAGEMENT Local Fire/EMS	Existing Budget State Fire Marshall Grants	ALL	
Goal	**Action Item**	**Start/End Dates**	**Responsible Party (key)**	**Resources**	**Target Jurisdiction and Comments**	**Status**
	8.3.3 Regularly assess risks using Commodity Flow Studies	Jan 2019/ June 2022	EMERGENCY MANAGEMENT	Existing Budget	ALL	
8. 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**	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	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	Sept 2017/ Dec 2017	EMERGENCY MANAGEMENT	Existing Budget	ALL	

End