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FULTON COUNTY
ALL HAZARDS MITIGATION PLAN
February 2020

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Fulton County

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1.1 Overview

With the 2015 Fulton County Multi-Jurisdictional Hazard Mitigation Plan set to expire in September of 2020, Fulton County and its constituents are aiming to adopt a new, updated hazard mitigation plan. As outlined in the Disaster Mitigation Act of 2000 (DMA2K), any local jurisdiction seeking funding from the Federal Emergency Management Agency (FEMA) must maintain an up-to-date disaster mitigation plan. This Plan meets the criteria as set forth by FEMA in the DMA2k and provides the County and its participating jurisdictions with a comprehensive guide for future mitigation efforts to combat the hazards that affect their communities.

Natural, geological, and manmade hazards pose a variety of risks to the lives, businesses, and properties within Fulton County. As such, a Core Planning Committee within Fulton County has been established with the goal of developing and implementing the 2020 Fulton County All Hazards Mitigation Plan. Through cooperative efforts between local, county, state, and federal government agencies, this Plan is designed to minimize the adverse effects of hazardous events on the lives and properties of residents of Fulton County.

The 2020 Fulton County All Hazards Mitigation Plan is a multi-jurisdictional plan which considers the impacts of hazards on incorporated areas (cities and villages) and unincorporated areas (townships). Fulton County's incorporated and unincorporated areas are listed below in **Tables 1.1-1.2**. These jurisdictions are also displayed in **Figure 1.1** on the following page. The Plan is designed for a five-year implementation period and describes the methods and procedures utilized in its development, provides the results of community involvement activities such as survey collection, identifies the mitigation activities determined to the be most important to the County, and establishes a timeline for the implementation of the actions.

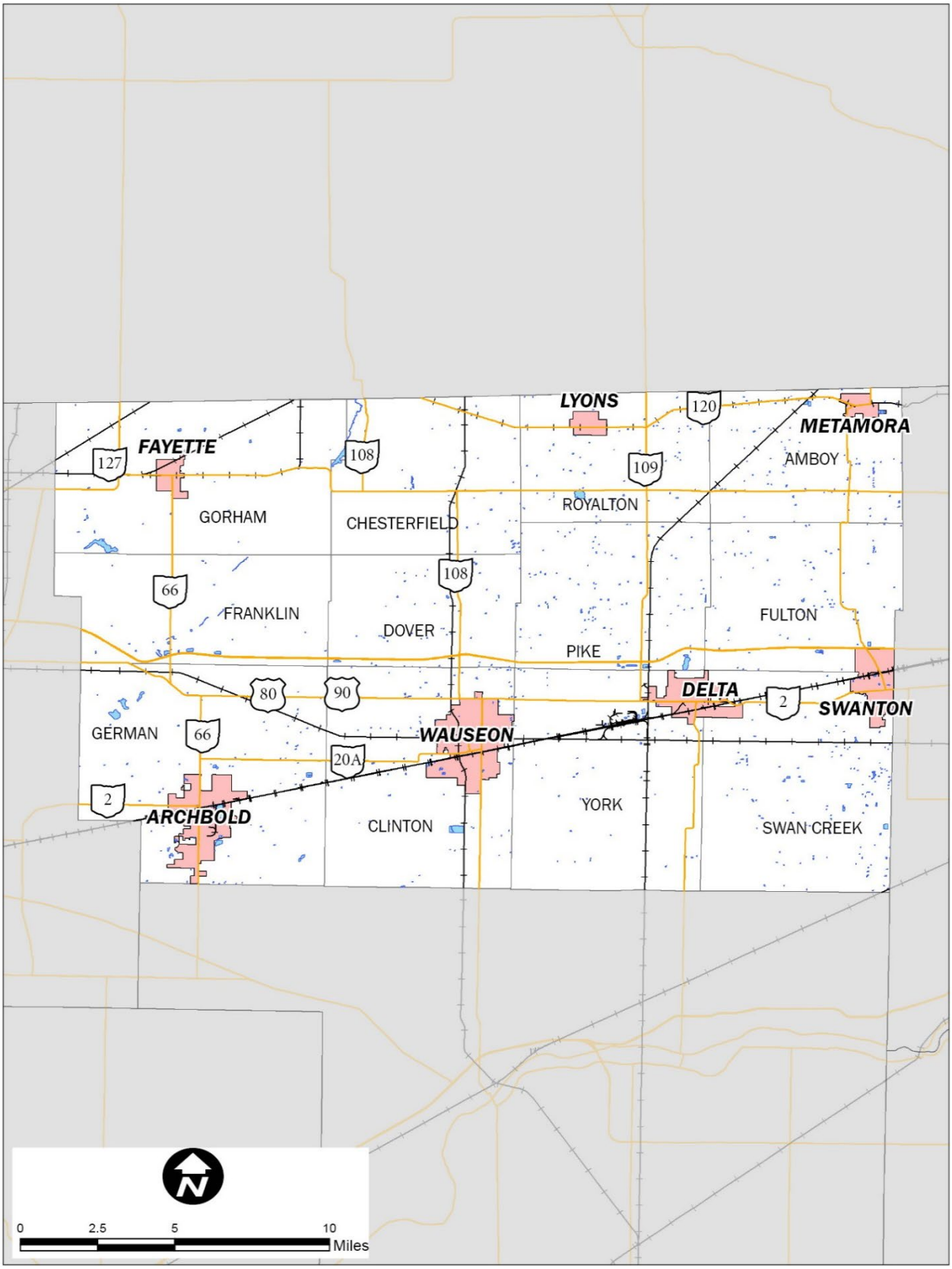
Table 1.1: Fulton County Jurisdictions

Jurisdictions
City of Wauseon
Village of Archbold
Village of Delta
Village of Fayette
Village of Lyons
Village of Metamora
Village of Swanton

Table 1.2: Fulton County Townships

Townships	
Amboy Township	German Township
Chesterfield Township	Gorham Township
Clinton Township	Pike Township
Dover Township	Royalton Township
Franklin Township	Swan Creek Township
Fulton Township	York Township

Figure 1.1 Fulton County Jurisdictions Map



1 | INTRODUCTION

This Plan is comprised of six sections, which detail the methods, analysis, and discussion surrounding the various hazards that threaten Fulton County and its jurisdictions. These sections are as follows:

1. This **Introduction** (Section 1) provides a discussion about the general purpose and goals that Fulton County wishes to achieve throughout the development and implementation of this Plan. This section also includes a summary of the Plan's contents.
2. Section 2, **History and Demographics**, includes a brief description of Fulton County and each of the jurisdictions participating in this Plan, including their history, population, and other general information.
3. The process for the development of this Plan is detailed in Section 3, **Planning Process**. This section includes details about the process used to develop this Plan, including a description of who participated, how the community was involved, which hazards were included in the Plan and why, as well as how the Plan was developed through public meetings, reviews, and evaluations. This section also details the review and incorporation of existing plans, studies, reports, and technical information.
4. Section 4 contains the **Hazard Identification and Risk Assessment (HIRA)**. This section provides detailed descriptions and a corresponding analysis for each hazard that could potentially affect Fulton County. The nature, location, extent, historical impact, vulnerability, and likelihood of occurrence for each hazard are provided for each hazard. These analyses include the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; an estimate of the potential dollar losses to vulnerable structures; and a general description of land uses and development trends within the community.
5. The goals, strategies, and actions for the County are then outlined in Section 5, **Hazard Mitigation**. The proposed actions are presented in tables, categorized by the associated hazard and community, and then ranked from highest to lowest priority based on feedback received from County officials and participating jurisdictions and stakeholders. Excluded hazards are also documented in this section, along with the rationale for exclusion from the Plan.
6. The final section of this Plan, **Schedule and Maintenance**, provides a summary of the proposed Plan adoption, integration, and maintenance schedule. This section describes how the County will review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five years in order to continue to be eligible for mitigation project grant funding.

The resulting Fulton County All Hazards Mitigation Plan will be submitted to the Ohio Emergency Management Agency (Ohio EMA) and subsequently FEMA for their review. Following the agency review, the jurisdictions will then review the Plan for adoption. This hazard mitigation plan serves as a helpful tool for citizens, policymakers, local businesses, and other local stakeholders who all share a public interest in keeping Fulton County as safe and resilient as possible. As such, this Plan aims to:

- Minimize property damage, economic loss, injury, and loss of human life – to achieve the Plan's main goal of reducing the impact of natural and manmade hazards on the County's economy and the well-being of its citizens.
- Enhance public awareness and education – to widen the public's understanding of natural and manmade hazards and how they might affect public health and safety, the environment, the local economy, and basic day-to-day operations.
- Coordinate inter-jurisdictional preparedness measures – to encourage and ensure multi-jurisdictional cooperation in County-wide mitigation actions and programs so that they may be implemented efficiently and effectively.

- Provide decision-making tools for interested stakeholders – to formulate a comprehensive, updated analysis of Fulton County's vulnerability to hazards so that decision-makers can better prepare for natural and manmade disasters.
- Achieve regulatory compliance – to ensure that the County and its political subdivisions meet state and federal mitigation planning requirements so that they may be eligible to participate in and receive funding from grant programs, policies, and regulations.

1.2 Setting

Fulton County is located in the northwest region of Ohio and borders the State of Michigan to the north. The County has a total area of approximately 407 square miles and contains one city, six villages and 16 townships (**Table 1.2**, above). The City of Wauseon serves as the County seat. Fulton County is bounded by five counties: Lenawee County (Michigan) to the north, Hillsdale County (Michigan) to the northwest, Lucas County to the east, Henry County to the south, Williams County to the west.

Land use patterns in Fulton County are consistent with similar rural counties in Ohio. There are seven land uses in Fulton County, including agriculture, industrial, commercial, residential, government owned and exempt, oil and gas, and other. (**Figure 1.2**). The most common land use in the County is agriculture. Land cover in Fulton County is shown in **Figure 1.3**. Land cover types include crops, bare/mines, urban, deciduous forest, evergreen forest, wetlands, open water, and pasture.

1.3 County Features

1.3.1 Transportation

Fulton County contains many major roadways, including Interstates (I), US Routes (US), and State Routes (SR). Notably, the County is bisected by the Ohio Turnpike, I-80. Additional major roadways in Fulton County include: US-20, US-127, SR-2, SR-64, SR-66, SR-108, SR-109, and SR-120.

Fulton County contains 56.5 miles of US routes, 83.9 miles of state routes, and 26.2 miles of the Ohio Turnpike (I-80/I-90). 59.5 miles of road within the County are part of the National Highway System. Additionally, the County contains 363.5 miles of county roads, 383.8 miles of township roads, and 111.8 miles of municipal roads, which amounts to nearly 859 miles of local roads.

The Federal Aviation Administration (FAA) has record of four aviation facilities in Fulton County, including three airports and one heliport. The Fulton County Airport is a publicly owned airport located four to five miles north of the City of Wauseon. Two additional privately-owned airports are located in the Villages of Archbold and Lyons. The one heliport in the County is located at the Fulton County Health Center.

The Ohio Department of Transportation (ODOT) has record of two active rail lines in Fulton County. The Norfolk Southern Railway traverses the County from east to west while the Indiana & Ohio Railway travels north to south. The two rail lines transect each other west of the Village of Delta.

Figure 1.2: Fulton County Land Use Map

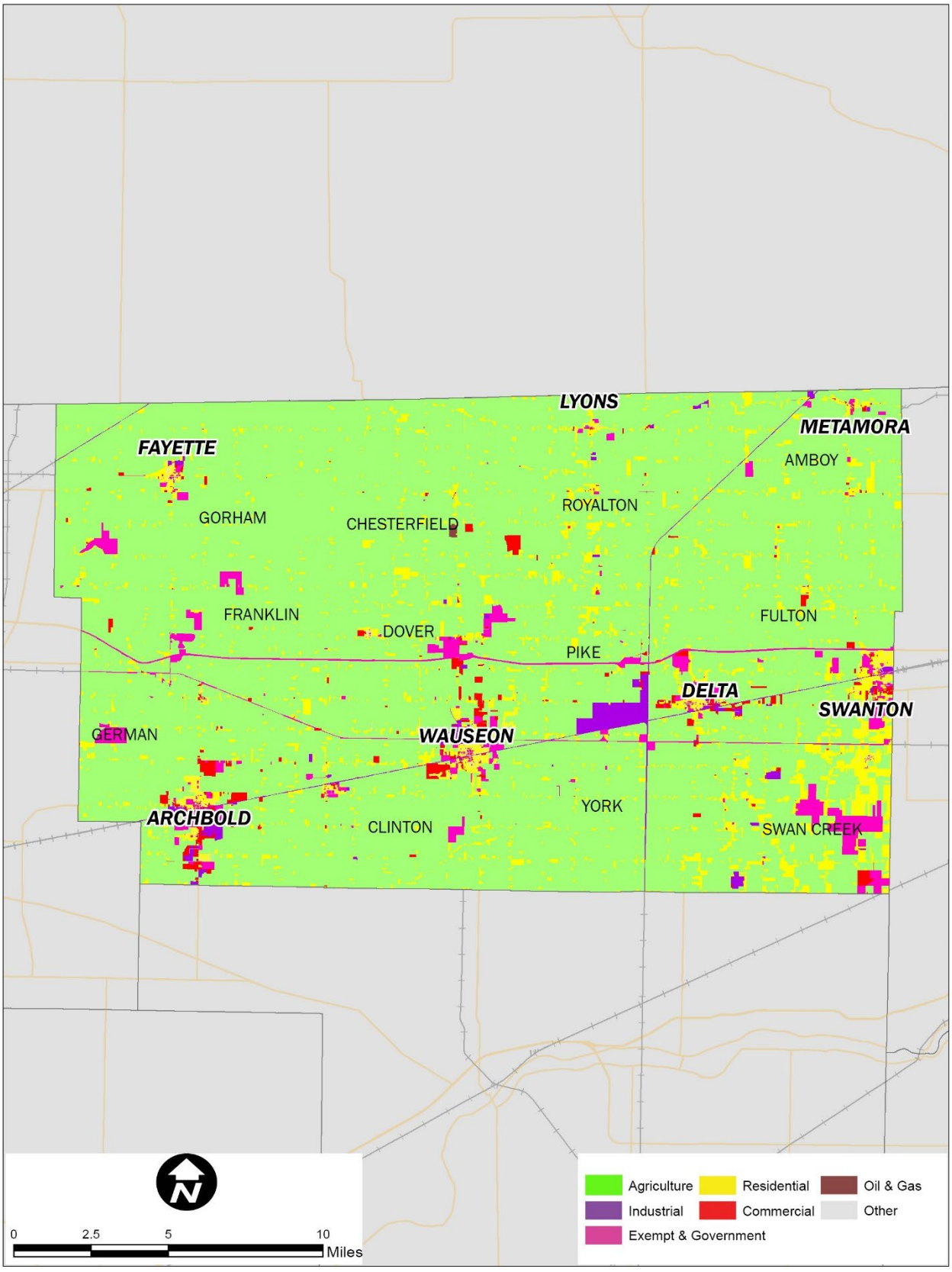
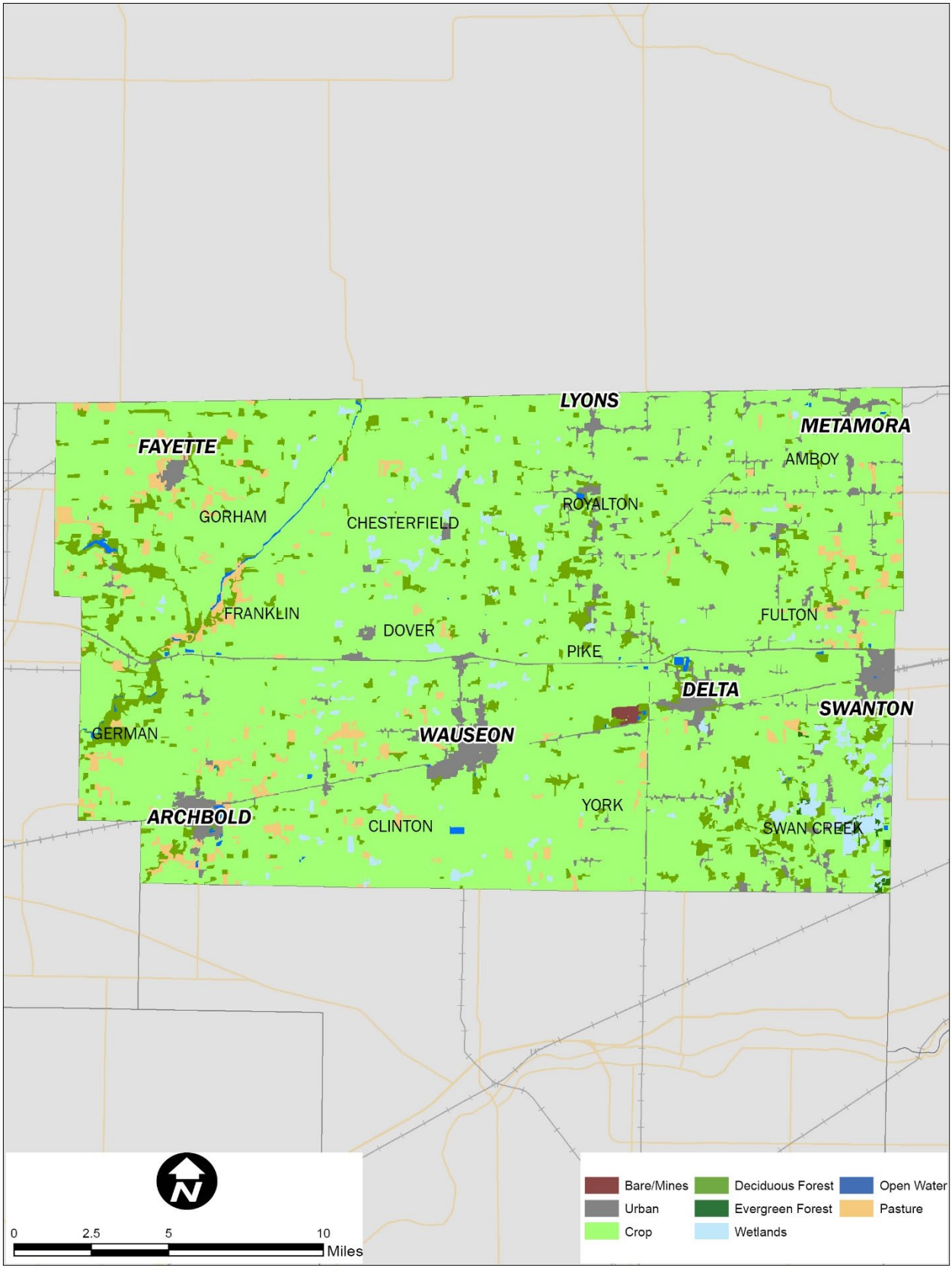


Figure 1.3: Fulton County Landcover Map



1.3.2 Natural Features

Fulton County's principal streams and rivers were identified in Fulton County's 2012 Water Supply and Demand Analysis Report. **Table 1.3**, below, lists the drainage areas and for principal streams in the County.

Table 1.3: Fulton County Principal Streams and Drainage Areas

Stream	Drainage Area (mi^2)	Notes
Tiffin River	410	Above Stryker, Ohio
*Bean Creek-North	206	Portion north of US-20
*Bean Creek - Combined	246	Above Mill Creek
*Old Bean Creek	33.3	Above Bean Creek
*Mill Creek	31.8	Above Tiffin River
*Bates Creek	12.3	Above Tiffin River
Brush Creek	65.7	Above Tiffin River
North Turkeyfoot Creek	75.3	Above Maumee River
Dry Creek	27.7	Above Maumee River
Bad Creek	64.7	Above Maumee River
Blue Creek	44.8	Above Swan Creek
Swan Creek	45.1	Above Blue Creek
Ai Creek	50.6	Above Swan Creek
Ten Mile Creek	39.9	Above Prairie Ditch
Bear Creek	26.5	Above Fulton County Line
Maumee River	5,545	USGS Gage near Defiance, Ohio

*Streams that are tributaries to Tiffin River, upstream of the USGS Gage at Stryker.

In addition to these principal streams, Fulton County is home to Goll Woods, which preserves 321 acres of old-growth woods about one to two miles north of the Village of Archbold. According to the ODNR, Goll Woods is the least disturbed woodland known to remain in extreme northwestern Ohio and features some of the largest trees remaining in the State of Ohio.

Finally, Maumee State Forest is located south of the Village of Swanton in Fulton, Henry, and Lucas counties. This 3,194-acre forest contains eight miles of bridle trails, seven miles of all-purpose vehicle (APV) trails, a windbreak arboretum, a tree improvement area, and a wet-sedge area.

2 | History and Demographics

2.1 History

Fulton County, Ohio was established in February 1850 after settlers started inhabiting townships within the County in the 1830s. The County was named in honor of Robert Fulton, who invented the first economically-viable, commercial steamboat. Originally, the County was part of the Northwest Territory and consisted mostly of the Great Black Swamp. Early settlers harvested timber and worked in the transportation industry. Once man-made ditches and drainage allowed for the swamp to be drained, the County's land became suitable for farming. As such, the area became populated with farmers.

The Maumee Valley Planning Organization's Comprehensive Economic Development Strategy identified two eras of major growth in Fulton County. The first era occurred in the second half of the 1800s, when canals and railroads were built allowing for the export of lumber and agricultural products. The second growth period occurred between the 1940s and 1980s, when the food and automotive sectors experienced significant industrial growth.

The City of Wauseon, the County's largest municipality and only city, was laid out in March 1854 and named for a Chief of the Ottawa Nation. Later that year, the first railroad cars passed through Wauseon. In 1869, the City of Wauseon became the County Seat.

The Fulton County Historical Society is a non-profit charitable organization dedicated to helping the County utilize its heritage to promote tourism while collecting, preserving, and interpreting its local cultural, historical, and natural resources. As such, the Historical Society manages several destinations in the County, including the Museum of Fulton County (**Figure 2.1**), the History Manor, the Wauseon Railroad Depot, Canfield Cabin, and the Reighard Blacksmith Shop.

Figure 2.1: Museum of Fulton County

2.2 Communication Outlets

Additional County communication outlets including websites, television, and social media are listed in **Table 2.1**, below:

Table 2.1: Communication Outlets and Social Media

Communication Type	Source
Website	https://www.fultoncountyoh.com/
Twitter	https://twitter.com/FultonCounty_OH
Facebook	https://www.facebook.com/fultoncountyohio/
Instagram	https://www.instagram.com/fultoncountyohio/
Newspaper	Fulton County Expositor (https://www.fcnews.org/) Archbold Buckeye (https://www.archboldbuckeye.com/)
Radio	90.3 WBCL-FM
	96.1 WMTR-FM

2.3 Demographics Overview

Table 2.2, below, provides a summary of the total population changes that have occurred in Fulton County between the 2010 US Census and the 2017 American Community Survey (ACS). According to the US Census, Fulton County's population declined by 402 people (0.94 percent) between 2010 and 2017. Additionally, all but four townships also experienced population decline. The four townships with population growth included Dover, Fulton, Gorham, and Royalton townships. Of the townships experiencing population decline, Franklin Township experienced the greatest population decline, with a decrease of 250 people (33.65 percent).

Table 2.2: County/Township population growth estimates between 2010 Census and 2017 ACS

County/Township	Total Population 2010 Census	Total Population 2017 ACS	2010-2017	
			Population Change	Percent Change
Fulton County	42,698	42,296	-402	-0.94%
Amboy Township	1,846	1,719	-127	-6.88%
Chesterfield Township	1,012	913	-99	-9.78%
Clinton Township	9,554	9,527	-27	-0.28%
Dover Township	1,578	1,699	121	7.67%
Franklin Township	743	493	-250	-33.65%
Fulton Township	3,182	3,195	13	0.41%
German Township	6,443	6,400	-43	-0.67%
Gorham Township	2,260	2,402	142	6.28%
Pike Township	1,854	1,822	-32	-1.73%
Royalton Township	1,515	1,570	55	3.63%
Swan Creek Township	8,566	8,487	-79	-0.92%
York Township	4,145	4,069	-76	-1.83%

2.4 Fulton County

Tables 2.3 to 2.5 summarize Fulton County's population, housing statistics, and income statistics. The tables show that the County's population declined by 402 people (0.9 percent) from 2010 to 2017. For housing units, the County had a combined owned and rental housing vacancy rate of 6.2 percent. Related to income, the largest percentage of households (20.2 percent) had an income between $50,000 and $74,999; approximately 8.1 percent of households had an annual income of less than $15,000.

Table 2.3: Fulton County Population Totals 2010-2017

Year & Source	Population Total
2010 Census	42,698
2011 ACS Estimate	42,702
2012 ACS Estimate	42,635
2013 ACS Estimate	42,601
2014 ACS Estimate	42,541
2015 ACS Estimate	42,485
2016 ACS Estimate	42,466
2017 ACS Estimate	42,296

Table 2.4: Fulton County Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	17,482
Occupied Housing Units (Owned & Rented)	16,404
Vacant Housing Units (Owned & Rented)	1,078
Vacancy Rate of Owned & Rented Housing	6.2%

Table 2.5: Fulton County Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	566
$10,000 to $14,999	766
$15,000 to $24,999	1,428
$25,000 to $34,999	1,865
$35,000 to $49,999	2,481
$50,000 to $74,999	3,314
$75,000 to $99,999	2,556
$100,000 to $149,999	2,259
$150,000 to $199,999	834
$200,000 or more	335
Median Household Income	$57,774
Mean Household Income	$71,844

2.5 City of Wauseon

Tables 2.6 to 2.8 summarize the City of Wauseon's population, housing statistics, and income statistics. The tables show that the City's population declined by 257 people (3.5 percent) from 2010 to 2017. For housing units, the City had a combined homeowner and rental vacancy rate of 6.4 percent, which is 0.2 percent greater than that of the County. Related to income, like the County, the largest percentage of households (19.0 percent) had an income between $50,000 and $74,999; 13.5 percent of households had an annual income of less than $15,000.

Table 2.6: City of Wauseon Population Totals 2010-2017

Year & Source	Population Total
2010 Census	7,332
2011 ACS Estimate	7,175
2012 ACS Estimate	7,229
2013 ACS Estimate	6,803
2014 ACS Estimate	6,953
2015 ACS Estimate	7,179
2016 ACS Estimate	7,059
2017 ACS Estimate	7,075

Table 2.7: City of Wauseon Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	3,007
Occupied Housing Units (Owned & Rented)	2,816
Vacant Housing Units (Owned & Rented)	191
Vacancy Rate of Owned & Rented Housing	6.4%

Table 2.8: City of Wauseon Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	190
$10,000 to $14,999	189
$15,000 to $24,999	221
$25,000 to $34,999	439
$35,000 to $49,999	402
$50,000 to $74,999	536
$75,000 to $99,999	395
$100,000 to $149,999	243
$150,000 to $199,999	190
$200,000 or more	11
Median Household Income	$47,885
Mean Household Income	$59,762

2.6 Village of Archbold

Tables 2.9 to 2.11 summarize Village of Archbold's population, housing statistics, and income statistics. The tables show that the Village's population remained relatively constant from 2010 to 2017, compared with other jurisdictions and the County as a whole. For housing units, the Village had a lower combined homeowner and rental vacancy rate than the County (5.2 percent). Related to income, the largest percentage of households (21.7 percent) had an income between $50,000 and $74,999; 11.0 percent of households had an annual income of less than $15,000.

Table 2.9: Village of Archbold Population Totals 2010-2017

Year & Source	Population Total
2010 Census	4,346
2011 ACS Estimate	4,217
2012 ACS Estimate	4,197
2013 ACS Estimate	4,358
2014 ACS Estimate	4,374
2015 ACS Estimate	4,304
2016 ACS Estimate	4,368
2017 ACS Estimate	4,343

Table 2.10: Village of Archbold Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	1,832
Occupied Housing Units (Owned & Rented)	1,736
Vacant Housing Units (Owned & Rented)	96
Vacancy Rate of Owned & Rented Housing	5.2%

Table 2.11: Village of Archbold Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	92
$10,000 to $14,999	99
$15,000 to $24,999	190
$25,000 to $34,999	197
$35,000 to $49,999	254
$50,000 to $74,999	377
$75,000 to $99,999	182
$100,000 to $149,999	217
$150,000 to $199,999	69
$200,000 or more	59
Median Household Income	$53,106
Mean Household Income	$66,964

2.7 Village of Delta

Tables 2.12 to 2.14 summarize Village of Delta's population, housing statistics, and income statistics. The tables show that the Village's population increased by 75 people (2.4 percent) from 2010 to 2017. For housing units, the Village had a similar combined homeowner and rental vacancy rates to the County (6.2 percent). Related to income, the largest percentage of households (20.6 percent) had an income between $75,000 and $99,999; 7.2 percent of households had an annual income of less than $15,000.

Table 2.12: Village of Delta Population Totals 2010-2017

Year & Source	Population Total
2010 Census	3,103
2011 ACS Estimate	3,020
2012 ACS Estimate	3,039
2013 ACS Estimate	3,121
2014 ACS Estimate	3,464
2015 ACS Estimate	3,350
2016 ACS Estimate	3,271
2017 ACS Estimate	3,178

Table 2.13: Village of Delta Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	1,385
Occupied Housing Units (Owned & Rented)	1,299
Vacant Housing Units (Owned & Rented)	86
Vacancy Rate of Owned & Rented Housing	6.2%

Table 2.14: Village of Delta Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	11
$10,000 to $14,999	82
$15,000 to $24,999	152
$25,000 to $34,999	90
$35,000 to $49,999	220
$50,000 to $74,999	217
$75,000 to $99,999	268
$100,000 to $149,999	221
$150,000 to $199,999	19
$200,000 or more	19
Median Household Income	$60,927
Mean Household Income	$67,510

2.8 Village of Fayette

Tables 2.15 to 2.17 summarize Village of Fayette's population, housing statistics, and income statistics. The tables show that the Village's population increased by 233 people (18.2 percent) from 2010 to 2017, making it the municipality with the greatest growth during that time. For housing units, the Village had a higher combined homeowner and rental vacancy rate than the County (7.2 percent). Related to income, the largest percentage of households (24.5 percent) had an income between $50,000 and $74,999; 10.0 percent of households had an annual income of less than $15,000.

Table 2.15: Village of Fayette Population Totals 2010-2017

Year & Source	Population Total
2010 Census	1,283
2011 ACS Estimate	1,305
2012 ACS Estimate	1,291
2013 ACS Estimate	1,285
2014 ACS Estimate	1,372
2015 ACS Estimate	1,384
2016 ACS Estimate	1,461
2017 ACS Estimate	1,516

Table 2.16: Village of Fayette Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	665
Occupied Housing Units (Owned & Rented)	617
Vacant Housing Units (Owned & Rented)	48
Vacancy Rate of Owned & Rented Housing	7.2%

Table 2.17: Village of Fayette Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	39
$10,000 to $14,999	23
$15,000 to $24,999	103
$25,000 to $34,999	82
$35,000 to $49,999	104
$50,000 to $74,999	151
$75,000 to $99,999	85
$100,000 to $149,999	23
$150,000 to $199,999	7
$200,000 or more	0
Median Household Income	$44,120
Mean Household Income	$47,937

2.9 Village of Lyons

Tables 2.18 to 2.20 summarize Village of Lyons's population, housing statistics, and income statistics. The tables show that the Village's population declined by 155 people (27.6 percent) from 2010 to 2017, making it the municipality with the greatest decrease in population during that time. For housing units, the Village had an approximate combined vacancy rate of 6.0 percent, which is slightly lower than that of the County. Related to income, the largest percentage of households (21.8 percent) had an income between $50,000 and $74,999; 7.4 percent of households had an annual income of less than $15,000.

Table 2.18: Village of Lyons Population Totals 2010-2017

Year & Source	Population Total
2010 Census	562
2011 ACS Estimate	436
2012 ACS Estimate	481
2013 ACS Estimate	496
2014 ACS Estimate	467
2015 ACS Estimate	492
2016 ACS Estimate	465
2017 ACS Estimate	407

Table 2.19: Village of Lyons Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	215
Occupied Housing Units (Owned & Rented)	202
Vacant Housing Units (Owned & Rented)	13
Vacancy Rate of Owned & Rented Housing	6.0%

Table 2.20: Village of Lyons Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	6
$10,000 to $14,999	9
$15,000 to $24,999	36
$25,000 to $34,999	23
$35,000 to $49,999	30
$50,000 to $74,999	44
$75,000 to $99,999	42
$100,000 to $149,999	8
$150,000 to $199,999	4
$200,000 or more	0
Median Household Income	$49,250
Mean Household Income	$52,128

2.10 Village of Metamora

Tables 2.21 to 2.23 summarize Village of Metamora's population, housing statistics, and income statistics. The tables show that the Village's population decreased by 35 people (-5.6 percent) from 2010 to 2017. For housing units, the Village had a combined homeowner and rental vacancy rate of 7.6 percent, which is higher than the combined vacancy rate of the County. Related to income, the largest percentage of households (19.8 percent) had an income between $35,000 and $49,999; 7.8 percent of households had an annual income of less than $15,000.

Table 2.21: Village of Metamora Population Totals 2010-2017

Year & Source	Population Total
2010 Census	627
2011 ACS Estimate	732
2012 ACS Estimate	687
2013 ACS Estimate	675
2014 ACS Estimate	574
2015 ACS Estimate	673
2016 ACS Estimate	592
2017 ACS Estimate	592

Table 2.22: Village of Metamora Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	262
Occupied Housing Units (Owned & Rented)	242
Vacant Housing Units (Owned & Rented)	20
Vacancy Rate of Owned & Rented Housing	7.6%

Table 2.23: Village of Metamora Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	4
$10,000 to $14,999	15
$15,000 to $24,999	24
$25,000 to $34,999	41
$35,000 to $49,999	48
$50,000 to $74,999	36
$75,000 to $99,999	41
$100,000 to $149,999	26
$150,000 to $199,999	7
$200,000 or more	0
Median Household Income	$45,000
Mean Household Income	$59,718

2.11 Village of Swanton

Tables 2.24 to 2.26 summarize Village of Swanton's population, housing statistics, and income statistics. The tables show that the Village's population decreased by 23 people (-0.6 percent) from 2010 to 2017. For housing units, the Village had a combined homeowner and rental vacancy rate of 3.6 percent, which is less than that of the County. Related to income, the largest percentage of households (19.0 percent) had an income between $75,000 and $99,999; 6.9 percent of households had an annual income of less than $15,000.

Table 2.24: Village of Swanton Population Totals 2010-2017

Year & Source	Population Total
2010 Census	3,690
2011 ACS Estimate	3,581
2012 ACS Estimate	3,437
2013 ACS Estimate	3,477
2014 ACS Estimate	3,899
2015 ACS Estimate	4,040
2016 ACS Estimate	3,755
2017 ACS Estimate	3,667

Table 2.25: Village of Swanton Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	1,419
Occupied Housing Units (Owned & Rented)	1,367
Vacant Housing Units (Owned & Rented)	52
Vacancy Rate of Owned & Rented Housing	3.6%

Table 2.26: Village of Swanton Income Statistics 2017 Estimate

Household Income Statistics	Number of Households
Less than $10,000	85
$10,000 to $14,999	9
$15,000 to $24,999	166
$25,000 to $34,999	159
$35,000 to $49,999	209
$50,000 to $74,999	235
$75,000 to $99,999	260
$100,000 to $149,999	237
$150,000 to $199,999	0
$200,000 or more	7
Median Household Income	$57,446
Mean Household Income	$62,424

3 | Planning Process

3.1 Methodology

The Planning Process chapter describes the steps involved in the development of the Fulton County Hazard Mitigation Plan, including details about who participated, how community involvement was organized and promoted throughout the community, what hazards were included in the Plan and why, as well as how stakeholder involvement played a critical role in the planning process. This chapter also explains how the Core Planning Committee was formed and how member feedback contributed to the updating of the County's Hazard Mitigation Plan.

3.2 Existing Plans and Regulations

Fulton County and the State of Ohio maintains several plans and tools that were pertinent to reference in the development of the 2020 Hazard Mitigation Plan, including:

- 2015 Fulton County Multi-Jurisdictional Natural Hazard Mitigation Plan
- 2019 State of Ohio Hazard Mitigation Plan (SOHMP)
- Fulton County Comprehensive Development Plan
- Fulton County Flood Damage Prevention Regulations
- Fulton County Health Department Emergency Plans
- Fulton County Water Supply and Demand Analysis Report

3.3 Fulton County Authority to Adopt Plan

Table 3.1 lists the existing authorities and regulations in plan in Fulton County and its municipalities. While each jurisdiction maintains commercial building codes, the City of Wauseon is the only entity with residential building codes.

Table 3.1: Existing Authorities and Regulations in Fulton County's Municipalities

Community	Planning Commission	Comprehensive Plan	Floodplain Regulation	Building Codes	Zoning Ordinances	Capital Budget	Public Works Budget
Fulton County	Yes	Yes	Yes	Yes	Yes	General Fund	General Fund
City of Wauseon	Yes	County Shared	Yes	Yes	Yes	General Fund	General Fund
Village of Archbold	Yes	County Shared	Yes	Yes	Yes	General Fund	General Fund
Village of Delta	Yes	County Shared	Yes	Yes	Yes	General Fund	General Fund
Village of Fayette	Yes	County Shared	Yes	Yes	Yes	General Fund	General Fund
Village of Lyons	No	County Shared	No	No	Yes	General Fund	General Fund
Village of Metamora	Yes	County Shared	No	No	Yes	General Fund	General Fund
Village of Swanton	Yes	County Shared	Yes	Yes	Yes	General Fund	General Fund

3.4 Notification Process

Core Planning Committee members were invited to participate at the beginning of the planning process through a Kickoff Meeting announcement. Prior to each additional meeting, members of the Core Planning Committee were invited to participate via an email notification. Additionally, press releases were issued via *The Fulton County Expositor* and *The Archbold Buckeye*. Representatives from the following entities were invited to participate in the planning process. Additionally, **Table 3.2** lists the participating jurisdictions and representatives and how they participated.

Fulton County

- Fulton County Commissioners
- Fulton County EMA
- Fulton County Emergency Medical Services
- Fulton County Engineer
- Fulton County GIS
- Fulton County Health Department
- Fulton County Regional Planning Commission
- Fulton County Sheriff's Office
- Fulton County Soil & Water Conservation District
- Fulton County Visitor's Bureau

City and Village Members

- City of Wauseon
- Village of Archbold
- Village of Delta
- Village of Fayette
- Village of Lyons
- Village of Metamora
- Village of Swanton

Township Members

- Amboy Township
- Chesterfield Township
- Clinton Township
- Dover Township
- Franklin Township
- Fulton Township
- German Township
- Gorham Township
- Pike Township
- Royalton Township
- Swan Creek Township
- York Township

Local Schools and Universities

- Evergreen Local Schools
- Swanton Schools
- Wauseon Schools
- OSU Extension

Private/Nonprofit Organizations

- Fairlawn Haven
- First Energy
- Fulton County Economic Development Corporation
- Museum of Fulton County
- Norfolk Southern Railroad
- North Clinton Church
- Red Cross
- Sauder Woodworking
- Swanton Healthcare
- United Way of Fulton County
- Worthington Industries

Other County and State Agencies

- Defiance County EMA
- Ohio Department of Transportation
- Wood County Building Officer

Table 3.2: Participating Jurisdictions

Community/Organization	Representative(s)	Meetings Attended
County		
Fulton County EMA	Rebecca Goble, Director Peggy Volkman, Assistant	1, 2
Fulton County Commissioners	Bill Rufenacht, Commissioner Jon Rupp, Commissioner Lauren Lester, Director of Marketing and Communication	1, 2
Fulton County GIS	Scott Yoder, GIS	1, 2
Fulton County Emergency Management Services	Clayton O'Brien, EMS Coordinator	1
Fulton County Engineers	B.S. Abbott, Highway Superintendent	1
Fulton County Health Center	Sharon Morr, Director Britney Ward, Director of CCHP Carrie Sigg, Emergency Preparedness	1, 2
Fulton County Health Department	Kim Cupp, Health Commissioner Patricia Wiemken, EH Director Scott Strahl, Planner Rachel Kinsman, Health Educator	1, 2
Fulton County Regional Planning	Dennis Milton, Director	1
Fulton County Soil & Water Conservation District	Kim Bowles, District Administrator	1, 2
Fulton County Sheriff's Office	Roy Miller, Sheriff Richard Kilgour, 911 Coordinator	1, 2
Fulton County Public Utilities	Ziad Musallam, Director	2
Fulton County Visitors Bureau	Julie Brink, Coordinator	1, 2
Cities & Villages		
City of Wauseon	Bill Drummer, Director of Chamber of Commerce Kevin Chittenden, Police Chief Brittany Roof, Fire Dept. Administrator Keith Torbet, Public Service Director Troy Armstrong, Wauseon Schools	1, 2
Village of Archbold	Lee Wixom, Police Donna Dettling, Administrator David Davis, Fire Chief Dexter Krueger, Asst. Village Engineer	1, 2
Village of Delta	Scott Smith, Fire Chief	1, 2
Village of Fayette	Jason Simon, Police Genna Biddix, Administrator Angie Belcher, Fayette Schools	1, 2
Village of Lyons	Mark Bryson, Village Council Member	1, 2
Village of Metamora	Brooke Smith, Village Council Member John Pupos, Village Council Member	*

Community/Organization	Representative(s)	Meetings Attended
Village of Swanton	Ann Roth, Mayor Anthony C. Schaffer, Deputy Fire Chief Paul Dyzak, President of Village Council Chris Lake, Swanton Schools	1, 2

These representatives were unable to attend the Core Planning Committee meetings in person, so they participated via the online surveys, as documented in **Appendix F.*

Core Planning Committee members were invited to participate at the beginning of the planning process through a Kickoff Meeting announcement which was sent out via email. Prior to each additional meeting, members of the Core Planning Committee were invited to participate via an email notification. Members of the public were encouraged to attend public meetings through press releases and social media announcements.

In addition to these members of the Core Planning Committee, Mike Rudey, Wood County Building Inspector, participated in the planning process by attending the second Core Planning Committee meeting.

3.5 Meetings

The following section details the meetings that took place during the planning process. Documentation of each meeting, including newspaper postings, email announcements and attachments, meeting materials, and completed surveys can be found in **Appendix F**.

3.5.1 Core Planning Committee Kick-off

A Kickoff Announcement was emailed to stakeholders on August 27, 2019, inviting them to participate in the 2020 Fulton County All Hazards Mitigation Plan update process as part of the Core Planning Committee. The Announcement outlined the following details regarding the planning process:

- Goals of the Hazard Mitigation Plan.
- A summary of who is involved in the planning process.
- Federal requirements of the hazard mitigation planning process.
- An overview of the hazard mitigation planning process.
- The proposed schedule for the Fulton County Plan update.
- The role of the Core Planning Committee in the update process.
- Contact information for both Fulton County EMA and Burton Planning Services.
- Dates and times of the Core Planning Meetings.

3.5.2 Core Planning Committee Meeting 1

The first Core Planning Committee meeting took place on Tuesday, October 15, 2019 at 2:30 PM at the Fulton County Emergency Management Office (8848 State Highway 108, Wauseon, OH 43567). A total of 44 people attended, including two representatives from the Fulton County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Anna van der Zwaag, Associate Planner at Burton Planning Services. Ms. van der Zwaag then guided the attendees through a presentation which detailed the hazard mitigation planning process, including requirements of the planning process,

potential hazards that could be addressed, benefits of hazard mitigation planning, and potential types of projects that could be federally funded as a result of the hazard mitigation plan.

Ms. van der Zwaag also described the role that the Core Planning Committee would serve in the development of the 2020 Fulton County All Hazards Mitigation Plan.

Following the completion of the presentation, Ms. van der Zwaag guided the attendees through the following surveys:

Goals Survey:
The purpose of this survey was to reflect on the goals included in the 2015 Multi-Jurisdictional Natural Hazard Mitigation Plan to determine if they were still relevant to the 2020 Plan. Each attendee reviewed the previous goals and determined if they were still applicable, provided comments or edits to the goals that needed changed, and generated new goals to potentially be included in the Plan.

Hazard Priority Survey:
The purpose of this survey was to review all hazards that could be included in the 2020 All Hazards Mitigation Plan and prioritize them. As such, attendees were asked to rate each hazard on a scale of zero to five, with five meaning the hazard poses the greatest possible threat to the County or their community and zero meaning the hazard should not be included in the 2020 Plan. Attendees rated hazards that were included in the 2015 Multi-Jurisdictional Natural Hazard Mitigation Plan, as well as all potential hazards that could be included in the 2020 Plan.

Following the completion of this survey, Ms. van der Zwaag guided a discussion on which hazards were deemed most important and which hazards attendees did not think needed to be included. Several attendees indicated it would be important to discuss train derailment, and other representatives mentioned their desire for including Epidemic as a hazard.

Previous Mitigation Actions Status Survey
The purpose of the Previous Mitigation Actions Survey was to have attendees review the mitigation actions that were included in the 2015 Multi-Jurisdictional Natural Hazard Mitigation Plan, reflect on the status of each action, and determine if that action should be included in the 2020 All Hazards Mitigation Plan.

3.5.3 Public Meeting 1

The first Public Meeting took place on Tuesday, October 15, 2019 at 4:30 at the Fulton County Emergency Management Office (8848 State Highway 108, Wauseon, OH 43567). A total of 13 people attended, including two representatives from the Fulton County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Anna van der Zwaag, Associate Planner at Burton Planning Services. Ms. van der Zwaag then guided the attendees through a presentation which detailed the hazard mitigation planning process, including requirements of the planning process, potential hazards that could be addressed, benefits of hazard mitigation planning, and potential types of projects that could be federally funded as a result of the hazard mitigation plan.

Following the completion of the presentation, Ms. van der Zwaag guided the attendees through the Goals Survey, the Hazard Priority Survey, and the Previous Mitigation Action Status and Scoring Matrix, which are described above.

Several attendees at the Public Meeting were members of the Core Planning Committee who were unable to attend the 2:30 PM meeting on the same day. These members included representatives of jurisdictions within Fulton County.

3.5.4 Core Planning Committee Meeting 2

The second Core Planning Committee meeting took place on Tuesday, November 19, 2019 at 2:30 PM at the Fulton County Emergency Management Office (8848 State Highway 108, Wauseon, OH 43567). A total of 38 people attended, including two representatives from the Fulton County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Anna van der Zwaag, Associate Planner at Burton Planning Services. Ms. van der Zwaag then guided the attendees through a presentation which provided an update on the hazard mitigation planning process, including requirements of the planning process, and results from the Hazard Priority survey distributed at the previous meeting.

Following the completion of the presentation, Ms. van der Zwaag guided the attendees through the Mitigation Actions Scoring Matrix, which determines the mitigation actions attendees would like to see in their community to mitigate the impacts of hazards. Attendees were provided a list of proposed mitigation actions and were asked if the action was relevant to their community. If attendees indicated that the mitigation action was relevant, attendees were asked to score the mitigation action in five areas: cost effective, technically feasible, environmentally sound, immediate need, and total risk reduction. These scores will be used to determine the priority of all mitigation actions included in the 2020 All Hazards Mitigation Plan.

3.5.5 Public Meeting 2

The second Public Meeting took place on Tuesday, November 19, 2019 at 4:30 PM at the Fulton County Emergency Management Office (8848 State Highway 108, Wauseon, OH 43567). A total of five people attended, including two representatives from the Fulton County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Anna van der Zwaag, Associate Planner at Burton Planning Services. Ms. van der Zwaag then guided the attendees through a presentation which provided an update on the hazard mitigation planning process, including requirements of the planning process, and results from the Hazard Priority survey distributed at the previous meeting.

Following the completion of the presentation, Ms. van der Zwaag guided the attendees through a Mitigation Actions Scoring Matrix, which determines the mitigation actions attendees would like to see in their community to mitigate the impacts of hazards. Attendees were provided a list of proposed mitigation actions and were asked if the action was relevant to their community. If attendees indicated that the mitigation action was relevant, attendees were asked to score the mitigation action in five areas: cost effective, technically feasible, environmentally sound, immediate need, and total risk reduction. These scores will be used to determine the priority of all mitigation actions included in the 2020 All Hazards Mitigation Plan.

3.6 Public Comment Period

The 2020 Fulton County All Hazards Mitigation Plan will be made available to the public and Core Planning Committee for review for a 15-day public comment period beginning February 10, 2020. Hard copies of the Hazard Mitigation Plan will be made available for review in-person at the Fulton County EMA office, and a digital Draft Plan will be made available online. Both physical and digital surveys will be provided to the public and the Core Planning Committee for their comments on the Plan.

3.7 Planning Process

Stakeholder and public input were essential for determining the hazard prioritization, as well as which hazards were included or excluded from the Plan. Based on feedback from the Core Planning Committee, it was determined that hurricanes or tropical storms were not hazards of concern to Fulton County and its communities. As such, these hazards were not included in the plan outright. If remnants of a hurricane or tropical storm were witnessed in the County, those narratives are included in Severe Summer Storms. Other hazards, such as coastal erosion and coastal flooding are not applicable to Fulton County and have not been included in previous hazard mitigation plans, nor were they included in this plan. More details about how survey feedback assisted in the determination of which hazards to exclude can be found in **Chapter 5, Hazard Mitigation**.

Chapter 4, Hazard Identification and Risk Assessment, follows this chapter. Please note that **Chapter 4** is organized alphabetically and not in order of risk. The ranking of hazard priorities can be found in **Chapter 5, Hazard Mitigation**.

4 | Hazard Risk Assessment

4.1 Dam Failure

4.1.1 Description

FEMA defines a dam as "any artificial barrier of at least a minimum size, including appurtenant works, that impounds or diverts water or liquid-borne solids on a temporary or long-term basis." Dam failure occurs when impounded water is suddenly released in an uncontrollable manner. A dam/levee failure can result in the uncontrolled release of floodwaters downstream of a facility. Water released from the dam during failure will always flow downhill, and the resulting flood wave can cause significant damage to buildings and infrastructure downstream. The unexpected nature of the flood wave also increases the likelihood of loss of life in the impacted area due to reduced warning times.

Dams can fail for one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam
- Structural failure of materials used in dam construction
- Movement and/or failure of the foundation supporting the dam
- Settle and cracking of concrete or embankment dams
- Inadequate maintenance and upkeep
- Deliberate acts of sabotage

According to Ohio Administrative Code Rule 1501:21-13-01 (2010), dams are classified as Class I-IV dams based on the following criteria:

- Class I: Dams having a total storage volume greater than 5,000 acre-feet or a height of greater than 60 feet.
- Class II: Dams having a total storage volume greater than 500 acre-feet or a height of greater than 40 feet.
- Class III: Dams having a total storage volume greater than 50 acre-feet or a height of greater than 25 feet.
- Class IV: Dams having a total storage volume of 50 acre-feet or less and a height of 25 feet or less.

4.1.2 Location

Dam locations can be seen in **Figure 4.1.1**. Dam properties are also listed in **Table 4.1.1.**

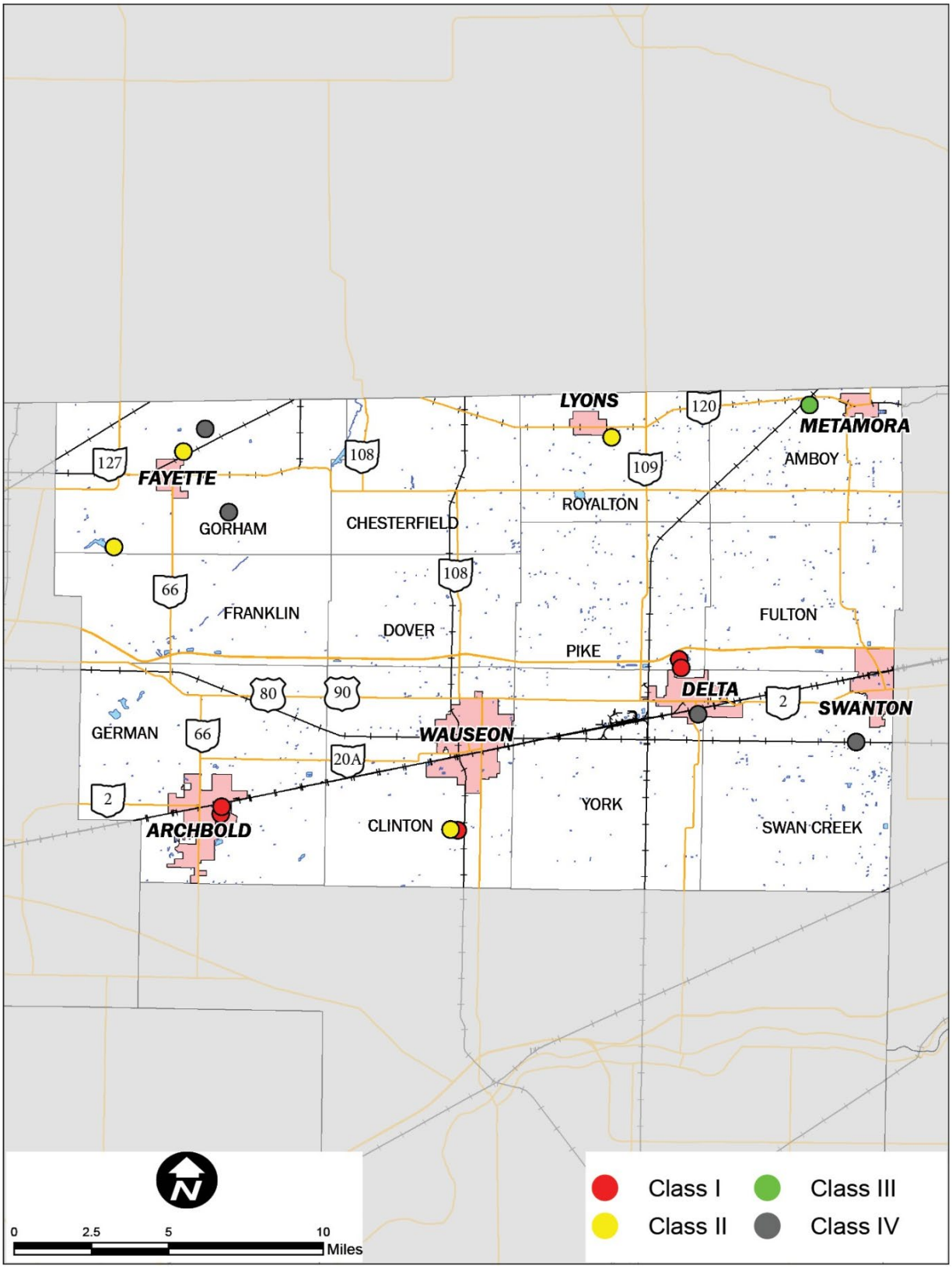
Table 4.1.1: Dam Locations in Fulton County, Ohio

Class	Name	Owner	Impoundment	Structure	Length	Height	Pool Acres	Storage	EAP
I	Archbold Upground Reservoir No. 1	Village of Archbold	Upground	Earthfill	3500	15	19.7	313	*
I	Archbold Upground Reservoir No. 2	Village of Archbold	Upground	Earthfill	5500	22.4	45.1	777	*

Class	Name	Owner	Impoundment	Structure	Length	Height	Pool Acres	Storage	EAP
I	Wauseon Upground Reservoir No. 2	City of Wauseon	Upground	Earthfill	5760	26	50.9	1064	*
I	Delta Reservoir No. 1	Village of Delta	Dam and Spillway	Earthfill	2000	22.2	40.6	546	*
I	Delta Reservoir No. 2	Village of Delta	Upground	Earthfill	5728	42	50	1510.5	*
II	Harrison Lake Dam	ODNR	Dam and Spillway	Earthfill	1800	34.7	100	1750	*
II	Fayette Sewage Lagoons	Village of Fayette	Upground	Earthfill	3400	15	11	137	*
II	Wauseon Upground Reservoir No. 1	City of Wauseon	Upground	Earthfill	3300	29	Null	275	*
II	Lyons WWT Lagoon	Village of Lyons	Upground	Earthfill, Homogenous	2724	7.75	7.89	60	*
III	Metamora Upground Reservoir	Village of Metamora	Upground	Earthfill	2412	11.4	7.3	79	*
Other	Wyse's Pond Dam	Lowell Wyse	Dam and Spillway	Null	Null	12	2	Null	*
Other	Fether Pond Dam	Loyal Fether	Dam and Spillway	Null	Null	10	3	Null	*
Other	Delta CSO Basin	Village of Delta	Null	Null	Null	7	Null	20.7	*
Other	Roth Lake Dam	Walter and Esther Roth	Dam and Spillway	Earthfill	Null	12	2.5	Null	*

**EAP status is currently being requested from ODNR – this column will be updated once dates/status of EAPs are determined.*

Figure 4.1.1: Dam Locations in Fulton County, Ohio



4.1.3 Extent

As previously mentioned, Class I dams have a total storage volume greater than 5,000 acre-feet or a height of greater than 60 feet. Sudden failures of Class I dams would increase the probability that one of the following conditions would result:

- Loss of human life
- Structural collapse of at least one residence or one commercial or industrial business

Sudden failures of Class II dams would result in at least one of the following conditions:

- Disruption of a public water supply or wastewater treatment facility, release of health hazardous industrial or commercial waste, or other health hazards.
- Flooding of residential, commercial, industrial, or publicly owned structures. At the request of the dam owner, the chief may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property.
- Flooding of high-value property. At the request of the dam owner, the chief may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property.
- Damage or disruption to major roads including but not limited to interstate and state highways, and the only access to residential or other critical areas such as hospitals, nursing homes, or correction facilities as determined by the chief.
- Damage or disruption to railroads or public utilities.
- Damage to downstream class I, II, or II dams or levees, or other dams or levees of high value. Damage to dams or levees can include, but is not limited to, overtopping of the structure. At the request of the dam owner, the chief may exempt dams from the criterion of this paragraph if the dam owner owns the potentials affected property.

Sudden failures of Class III dams would result in at least one of the following conditions:

- Property losses including but not limited to rural buildings not otherwise described the Ohio Administrative Cod Rule 1501:21-12-01 (2010), and class IV dams and levees not otherwise listed as high-value properties in this rule. At the request of the dam owner, the chief may exempt dams from the criterion of this paragraph if the dam owner owns the potentially affected property.
- Damage or disruption to local roads including but not limited to roads not otherwise listed as major roads.

Sudden failures of class IV dams would result in property losses restricted mainly to the dam and rural lands, and the loss of human life is not probable.

4.1.4 History

There have been no reported dam failures in Fulton County.

4.1.5 Probability

There have been no reported dam failures in Fulton County. As such, there are no reported property or crop damages on record for dam failure. Future dam failures are unlikely, but not impossible.

4.1.6 Vulnerability Assessment

Infrastructure Impact

Failures of Class I and Class II dams could flood roadways, including major routes and local roads. Utility infrastructure (wastewater, drinking water, and commercial and industrial waste lines) may be disrupted or destroyed.

Population Impact

The local population could be impacted by loss of utilities, including the local water supply. Health hazards may also be released into the flood waters during a dam failure which may cause indirect harm to the local population.

Property Damage

At least one residential or commercial property is likely to face structural collapse during a Class I dam failure. Class II dam failure has the potential to damage high value properties. Residential, commercial, and industrial properties may be damaged, as well as publicly owned properties. Properties that are owned by the dam owner may be exempt from the property damage calculation.

Loss of Life

Loss of life is likely during a Class I dam failure. Loss of life during a Class II or Class III dam failure is unlikely. Class I dams exist within or nearby the Villages of Archbold and Delta (see **Figure 4.1.1**).

Economic Losses

Economic losses can include damages from flooding crops, damaged goods, and the flooding of vital roadways.

EAP's have been completed for some of the Class I and Class II dams; however, the data is subjected to agreements where it cannot be published publicly. The Ohio Department of Natural Resources holds record of these EAP's. The status of EAPs for the dams in Fulton County are indicated in **Table 4.1.1**.

4.1.7 Land Use and Development Trends

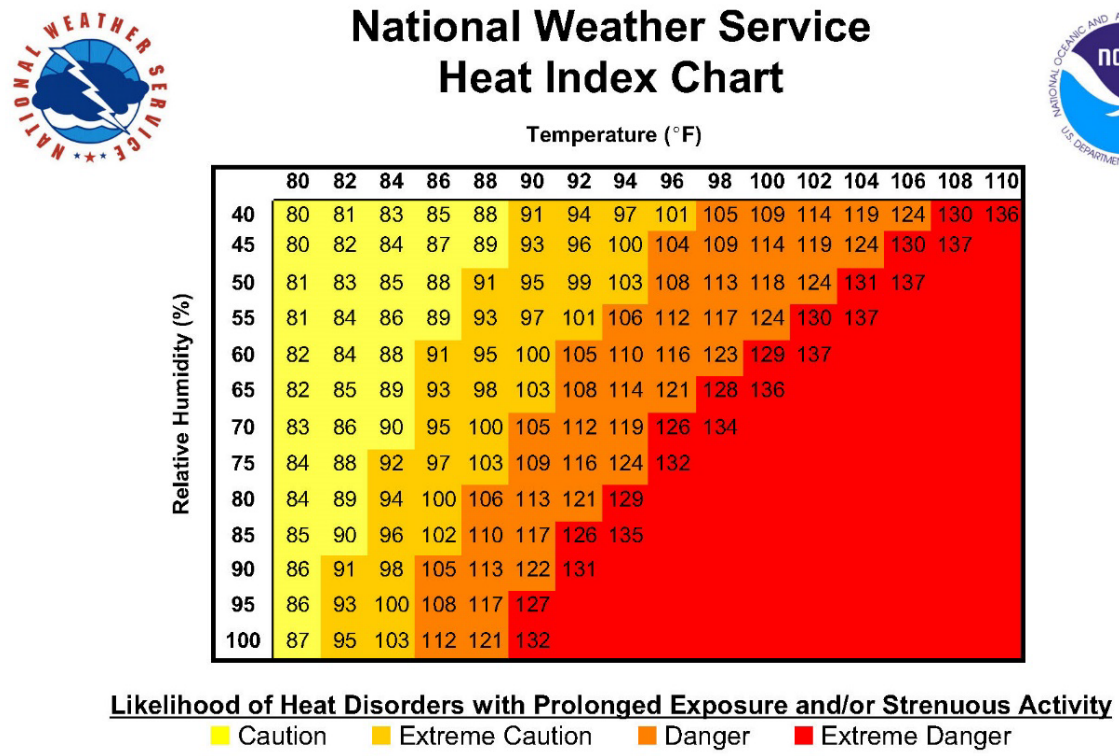
Development that has occurred in areas that will flood after a dam failure should be prepared for rapid flooding. Land use plans can limit development in these areas.

4.2 Drought and Extreme Heat

4.2.1 Description

According to the states of New York, Washington, and California, temperatures that hover over ten degrees or more above the average high temperature for the region and last for several days are considered extreme heat. Humid conditions, which add to the discomfort of high temperatures, occur when a high-pressure weather system traps hazy, moist air near the ground. Extreme heat may also contribute to the formation of a drought if moisture and precipitation are lacking. The National Weather Service's Heat Index Chart is provided in **Figure 4.2.1**.

Figure 4.2.1: Heat Index Chart (Source: National Weather Service)



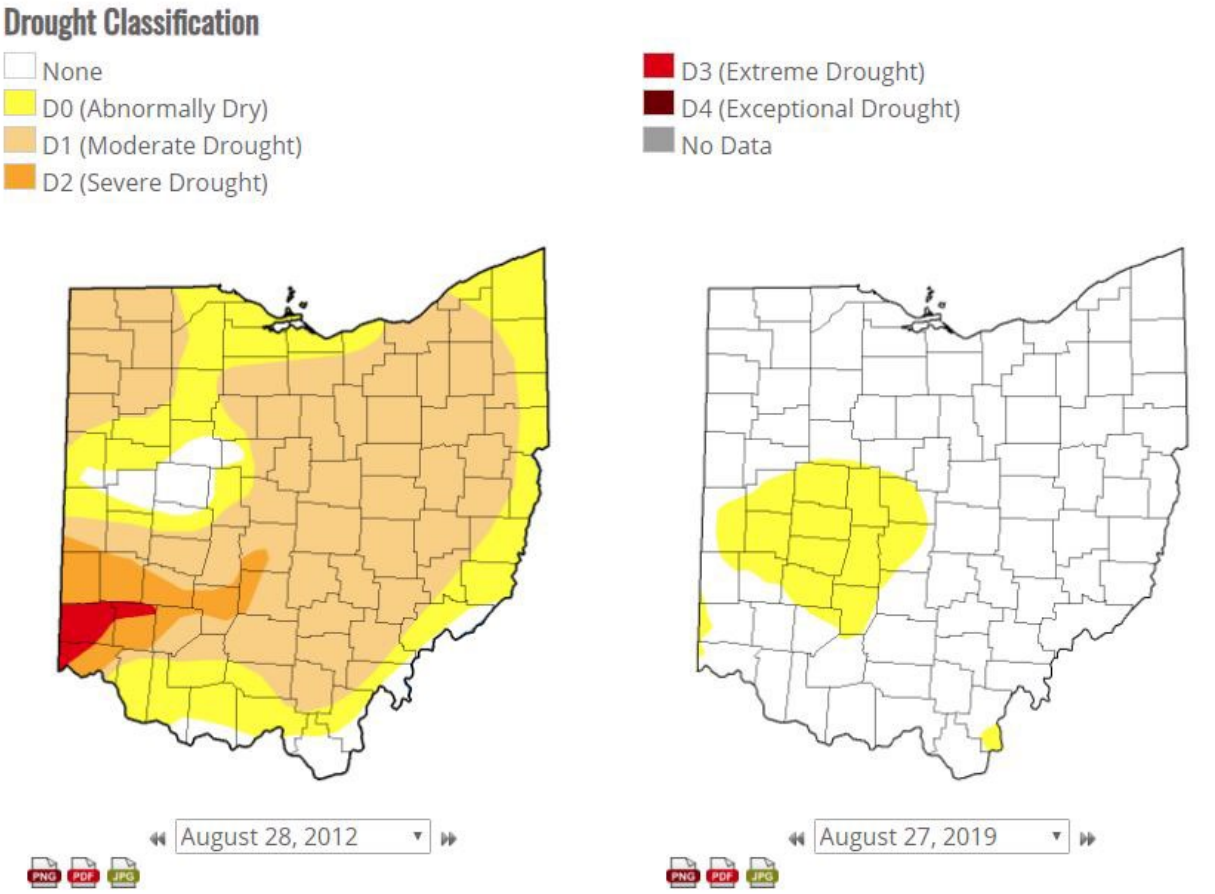
A drought is a shortage in atmospheric moisture or precipitation over an extended period of time. Droughts are common throughout all climatic zones and can range in length from a couple weeks to multiple years or decades in some areas. According to the National Oceanic and Atmospheric Administration (NOAA), there are three common types of drought: Meteorological, Agricultural, and Hydrological.

Meteorological drought severity is calculated by the amount of the rainfall deficit (compared to annual averages) and the length of the dry period. Agricultural drought is based on the effects to agriculture by factors such as rainfall and soil water deficits or diminished groundwater/reservoir levels needed for irrigation. Hydrological drought is based on the effects of rainfall shortages on the water supply, such as stream flow, reservoir and lake levels, and groundwater table decline.

4.2.2 Location

Drought and extreme heat is a countywide hazard that can affect all locations and jurisdictions in Fulton County. More specifically, this hazard typically occurs at a regional scale. Droughts most commonly occur in Ohio from spring through autumn; however, they may occur at any time throughout the year. **Figure 4.2.2** depicts the Drought Monitor for the State of Ohio for August 28, 2012 compared with the Drought Monitor for August 27, 2019, as well as the associated statistics comparison for the percent area of the State of Ohio that were experience the associated drought conditions. The drought in the summer of 2012 was one of the worst on record for the State of Ohio and is described in more detail below.

Figure 4.2.2: Drought Monitor for the State of Ohio, 2012 and 2019



Statistics Comparison

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2012-08-28	6.61	93.39	65.23	7.57	1.64	0.00	168
2019-08-27	86.74	13.26	0.00	0.00	0.00	0.00	13
Change	80.13	-80.13	-65.23	-7.57	-1.64	0.00	-155

**The Statistics Comparison above is calculated as a percent area in those drought conditions.*

4.2.3 Extent

Due to the widespread nature of extreme heat events, all structures, croplands, and infrastructure may experience impacts. More specifically, severe lack of moisture can cause soil – especially expansive soil - to recede from foundations of buildings, leading to structural instability. All residents of the County may also be impacted, especially at-risk populations that are more susceptible. The elderly and infants are the most vulnerable populations for extreme heat.

The most common symptoms caused by extreme heat, according to the Centers for Disease Control (CDC), include:

- Heat Cramps are muscle spasms, often in the abdomen, arms, or calves, caused by a large loss of salt and water in the body. Heat cramps can occur from prolonged exposure to extreme heat combined with dehydration, and they commonly happen while participating in strenuous outdoor activities such as physical labor or sports.
- Heat Exhaustion is a severe illness requiring emergency medical treatment. It can occur from exposure to extreme heat over an extended period of time (usually several days), especially when combined with dehydration.
- Heat Stroke is the most serious medical condition caused by extreme heat, requiring emergency treatment. Heat stroke (or hyperthermia) occurs when the body can no longer regulate its temperature and its temperature rises rapidly—up to 106°F or higher. It usually occurs as a progression from other heat-related illnesses, such as heat cramps or heat exhaustion; however, it can also strike suddenly without prior symptoms, and it can result in death without immediate medical attention.

Extreme heat is especially dangerous because people might not recognize their symptoms as signs of a more serious condition. For example, symptoms like sweating or fatigue may just appear to be normal reactions to a hot day. People may be in more danger if they experience symptoms that alter their decision-making, limit their ability to care for themselves, or make them more prone to accidents. If untreated, heat-related illnesses can worsen and eventually lead to death. Heat can also contribute to premature death from health impacts other than those listed above. This is because extreme heat can worsen chronic conditions such as cardiovascular disease, respiratory disease, and diabetes.

Due to the regional nature of droughts, effects may be noticed throughout the County in the urbanized and rural areas. All jurisdictions with the County may be affected in a single drought event. In Fulton County, droughts are often linked to prolonged periods of above average temperatures and little to no precipitation.

Initial effects of drought can be noticed within a short period, as soils may dry out and plants may wither and die. When drought conditions persist over several weeks, months, or years, effects may be more pronounced with reductions in water levels of wells, lakes, reservoirs, streams, and rivers. Water supply issues for agriculture, commercial/industrial activities, and private consumption may arise if drought conditions persist over a long term.

The extent of the drought is determined by the Palmer Drought Severity Index (PDSI). In this way, the Index can be utilized as a tool to help define disaster areas and indicate the availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and potential for forest fires. The PDSI depicts prolonged (in months or years) abnormal dryness or wetness and is slow to respond, changing little from week to week. It also reflects long-term moisture runoff, recharge, and deep percolation, as well as evapotranspiration.

The PDSI is a standardized index with values typically falling between -4.00 and +4.00, although extreme conditions can be greater in value (**Table 4.2.1**). Negative values indicate drought conditions while positive values represent wet conditions. Values around zero represent near normal conditions.

Table 4.2.1: Palmer Drought Severity Index Classifications

Palmer Classifications	
4.0 or greater	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 to -2.99	Moderate Drought
-3.0 to -3.99	Severe Drought
-4.0 or less	Extreme Drought

4.2.4 History

According to the U.S. Drought Monitor, since 2000, the longest duration of drought in Ohio lasted 44 weeks beginning on July 23, 2002 and ending on May 20, 2003. Additionally, the most intense period of drought occurred the week of September 4, 2007.

In Fulton County, the National Climatic Data Center (NCDC) has record of one ongoing drought event from June 1999 to August 1999, which did not result in any reported crop or property damages through the NCDC. The NCDC also has record of a second drought event in August of 1996. One additional drought event was recorded by the National Weather Service and the United States Department of Agriculture (USDA). While not all drought events resulted in disaster declarations made for drought events in the County, all drought events on record are described below due to the potential economic losses due to reduction in crop yield.

Drought, Summer 2012

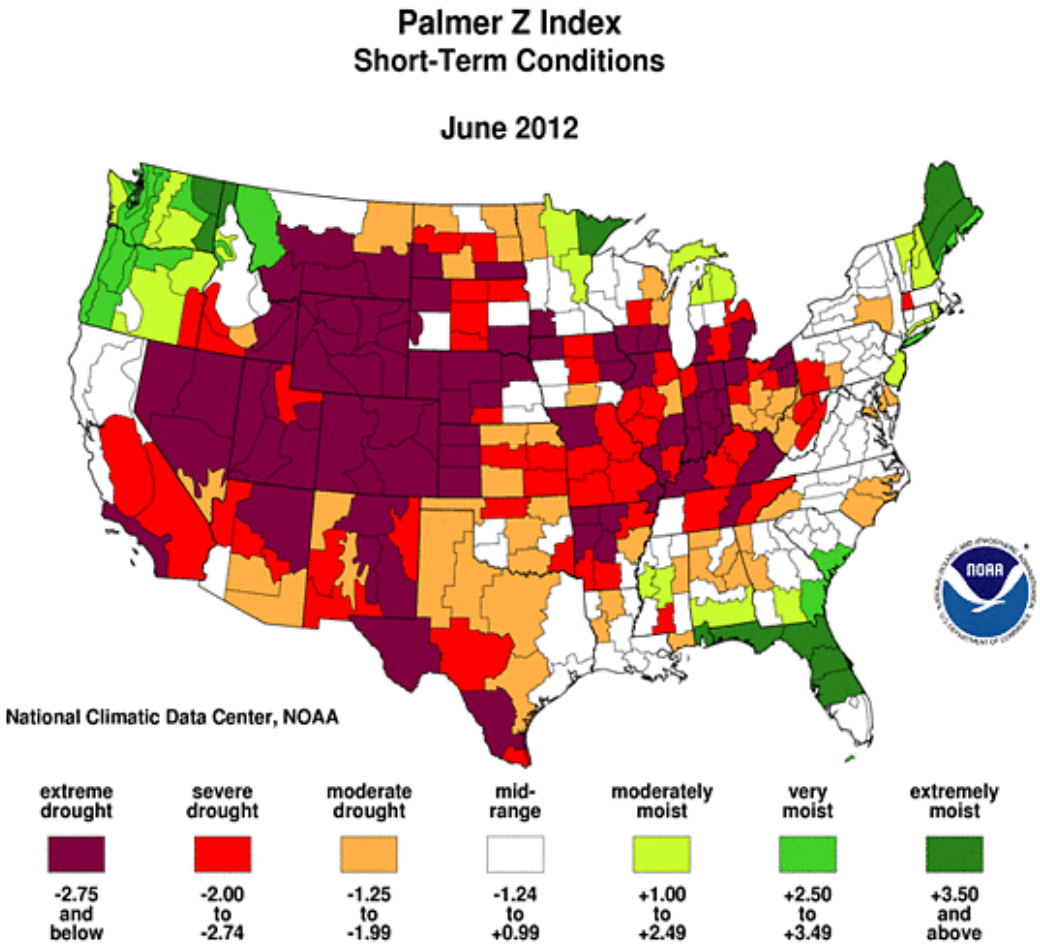
The National Weather Service recorded the drought of Summer 2012 with the following description:

"The warm and dry spring of 2012 became the hot and dry summer of 2012. Temperatures in June and July were well above normal, with monthly temperatures in July averaging 4 to 5 degrees above normal. High temperatures reached 90 or above on dozens of days. The mercury topped 90 degrees 28 times at Cleveland and 32 times at Toledo. At Toledo, the temperature soared above 100 degrees 4 times! Other locations in northern Ohio and northwest Pennsylvania got close to 100 or exceeded 100 at least once or twice. There was little relief at night, with many nights seeing low temperatures barely dropping into the 70s, especially in July. The lack of rain compounded the summer stress. Rainfall was below normal in most areas from April through July. The combination of heat and drought left many farmers with parched soil. Rainfall in September and October was much above normal but was too little too late for many of the farmers."

Furthermore, by mid-June, Fulton County was designated with moderate drought conditions. On July 30, 2012, the Governor of Ohio sent a memorandum to the USDA Ohio State Executive Director requesting primary county natural disaster designations for eligible counties due to agricultural losses caused by drought and additional disasters during the 2012 crop year. The USDA reviewed the Loss Assessment Reports and determined that there were sufficient production losses in 85 counties, including Fulton County, to warrant a Secretarial disaster declaration. This declaration was issued on September 5, 2012.

Figure 4.2.3 displays the PDSI of June 2012 for the continental United States. This image shows that the region containing Fulton County experienced extreme drought, with a Palmer Index of -2.75 or below, during the 2012 Drought. Further estimates of crop losses associated with this drought are located in **Table 4.2.2**.

Figure 4.2.3: Palmer Drought Severity Index for the United States in June of 2012



Drought, June - August 1999

June: Little rain occurred from late May through much of June. In the region, 1.19 inches of rainfall fell at Akron-Canton Airport during the month making it the fifth driest June on record. Similarly, 1.66 inches of rain fell at Mansfield Airport also making it the fifth driest June on record. Scattered rains late in June brought hope for farmers but it was likely that crop yields were reduced even with adequate rain the remainder of the season. Losses due to the drought were unknown. Several communities instituted water use restrictions.

July: Drought conditions across northern Ohio eased as thunderstorm rains became more widespread. Nonetheless, very dry soil conditions persisted in a few areas that missed the brunt of the thunderstorm activity. Some communities instituted water use restrictions and crop yields were likely reduced because of the lack of adequate rainfall. Losses due to the drought were unknown.

August: Drought conditions persisted across northern Ohio as rainfall totals for the month were below normal at most locations. 1.40 inches of rain fell in Toledo during August with only 1.80 inches measured in Cleveland. Both of these totals are roughly half the monthly normal. Mansfield finished the month 1.98 inches below normal making it the sixth driest August on record. Water use restrictions were instituted in many areas. The drought also greatly impacted agricultural interests. Crop yields in northern Ohio were reduced by an average of 30 percent this growing season. Associated financial losses as a result were not available through the NCDC.

Drought, August 1996
Dry weather persisted throughout the month across northern Ohio. Rainfall averaged from a few tenths of an inch in north central and northwest Ohio to one to two inches in extreme northeast Ohio. August rainfall normally averages between three and four inches. Rainfall totals were 0.76 inches at Toledo Airport and 0.71 inches at Cleveland Airport, which rank among the five driest Augusts on record. Crops that normally mature during August were affected by the dry weather and crop losses were predicted at 10-30 percent. The actual dollar amount of crop loss was unknown.

4.2.5 Probability
Fulton County has experienced droughts and excessive heat in the past, and the potential exists for the County to experience droughts in the future. Seasons of drought and extreme heat have the potential to occur during any particular year when necessary conditions are met, and they are most likely to occur from spring through autumn. More specifically, the County has record of three drought events from August 1996 to September 2012, which amounts to an 18.75 percent chance of a drought occurring any given year. While no crop or property losses were recorded through the NCDC, a more detailed commodity loss analysis is provided in the Vulnerability Assessment, below.

Based on current climate reports:

- Drought projections suggest that some regions of the U.S. will become drier and that most will have more extreme variations in precipitation.
- Even if current drought patterns remained unchanged, warmer temperatures will amplify drought effects.
- Drought and warmer temperatures may increase risks of large-scale insect outbreaks and wildfires.
- Drought and warmer temperature may accelerate tree and shrub death, changing habitats and ecosystems in favor of drought-tolerant species.
- Forest-based products and values, such as timber, water, habitat and recreation opportunities, may be negatively impacted.
- Forest and rangeland managers can mitigate some of these impacts and build resiliency in forests through appropriate management actions.

4.2.6 Vulnerability Assessment
Drought does have the potential for significant impacts to structures, businesses, and people, as well as critical infrastructure. Additionally, the greatest impacts of drought tend to be on agricultural interests, as crops may fail, and livestock may not have sufficient water resources. Economic losses

are the greatest threat from droughts to Fulton County. According to the 2012 Census of Agriculture developed by the USDA, top crop items based on acreage for Fulton County include soybeans for beans, corn for grain, wheat for grain, and winter wheat. Commodity Loss Statistics for these crops are included in **Table 4.2.2** and compare a non-drought year (2011) with the production and harvest of crops in a drought year (2012).

Based on data from the United States Department of Agriculture, Fulton County's soybean yields decreased by 12.1 percent between 2011 and 2012; however, the yield of soybeans increased by five bushels per acre harvested. Additionally, the County's corn production decreased by 36 bushels per acre harvested between 2011 and 2012. The County's winter wheat yield increased by three bushels per acre harvested; however, the raw yield of acres harvested decreased by 2.40 percent.

Table 4.2.2: Commodity Loss Statistics between 2011 and 2012 (Source: USDA)

Commodity	Units	Non-Drought Year 2011	Drought Year 2012	Change	Change Amount
Soybeans, Planted	Acres	78,200	87,500	Up	9,300
Soybeans, Harvested	Acres	78,100	76,832	Down	-1,268
Yield	%	99.87%	87.81%	Down	-12.1%
Soybeans, production	Bushels	3,791,000	4,148,000	Up	357,000
Yield	Bushels/Acre Harvested	49	54	Up	5
Corn for grain, planted	Acres	84,900	85,900	Up	1,000
Corn for grain, harvested	Acres	79,200	80,000	Up	800
Yield	%	93.29%	93.13%	Down	-0.15%
Corn, production	Bushels	12,200,000	9,473,000	Down	-2,727,000
Yield	Bushels/Acre Harvested	154	118	Down	-36
Winter Wheat, planted	Acres	21,100	12,600	Down	-8,500
Winter Wheat, harvested	Acres	20,100	11,700	Down	-8,400
Yield	%	95.26%	92.86%	Down	-2.40%
Winter Wheat, production	Bushels	1,422,000	858,000	Down	-564,000
Yield	Bushels/Acre Harvested	71	73	Up	3

4.2.7 Land Use and Development Trends

Drought is most likely to impact agriculture land uses. Extreme heat is most likely to impact land uses that house or serve vulnerable populations, such as schools, daycares, hospitals, and nursing homes.

4.3 Earthquake

4.3.1 Description

Earthquakes are a result of a sudden movement of the Earth's crust and are caused by the abrupt rupture and rebound of accumulated stress along geologic faults. These movements vary in length and may last from a few seconds to several minutes.

The seismicity, or seismic activity, of an area refers to the frequency, type, and size of earthquakes experienced over a period of time. Earthquakes are measured using observations from seismometers. The Moment Magnitude Scale (MMS), which was developed in the 1970s, is the most common scale on which earthquakes larger than approximately 5.0 in magnitude are reported for the entire world. Earthquakes smaller than magnitude 5.0, which are more numerous, are reported by national seismological observatories and measured most commonly on the local magnitude scale – also referred to as the Richter Scale. These two scales are numerically similar over their range of validity. Earthquakes of magnitude 3.0 or lower are often almost imperceptible or weak, while earthquakes of magnitude 7.0 or greater can potentially cause serious damage over larger areas.

Damage from an earthquake also depends on the earthquake's depth in the Earth's crust. The shallower an earthquake's epicenter, the more damage to structures it will cause. Alternatively, an earthquake can also be measured by its intensity. The Modified Mercalli Intensity Scale (MMI) ranges in value I to XII, in roman numerals (**Table 4.3.1**).

Major earthquakes are low probability, high consequence events. Most major earthquakes in the U.S. have occurred in California and other western states. There have been recorded earthquakes throughout the U.S., and the Ohio River Valley has experienced earthquakes exceeding the 3.0 magnitude within the last 25 years.

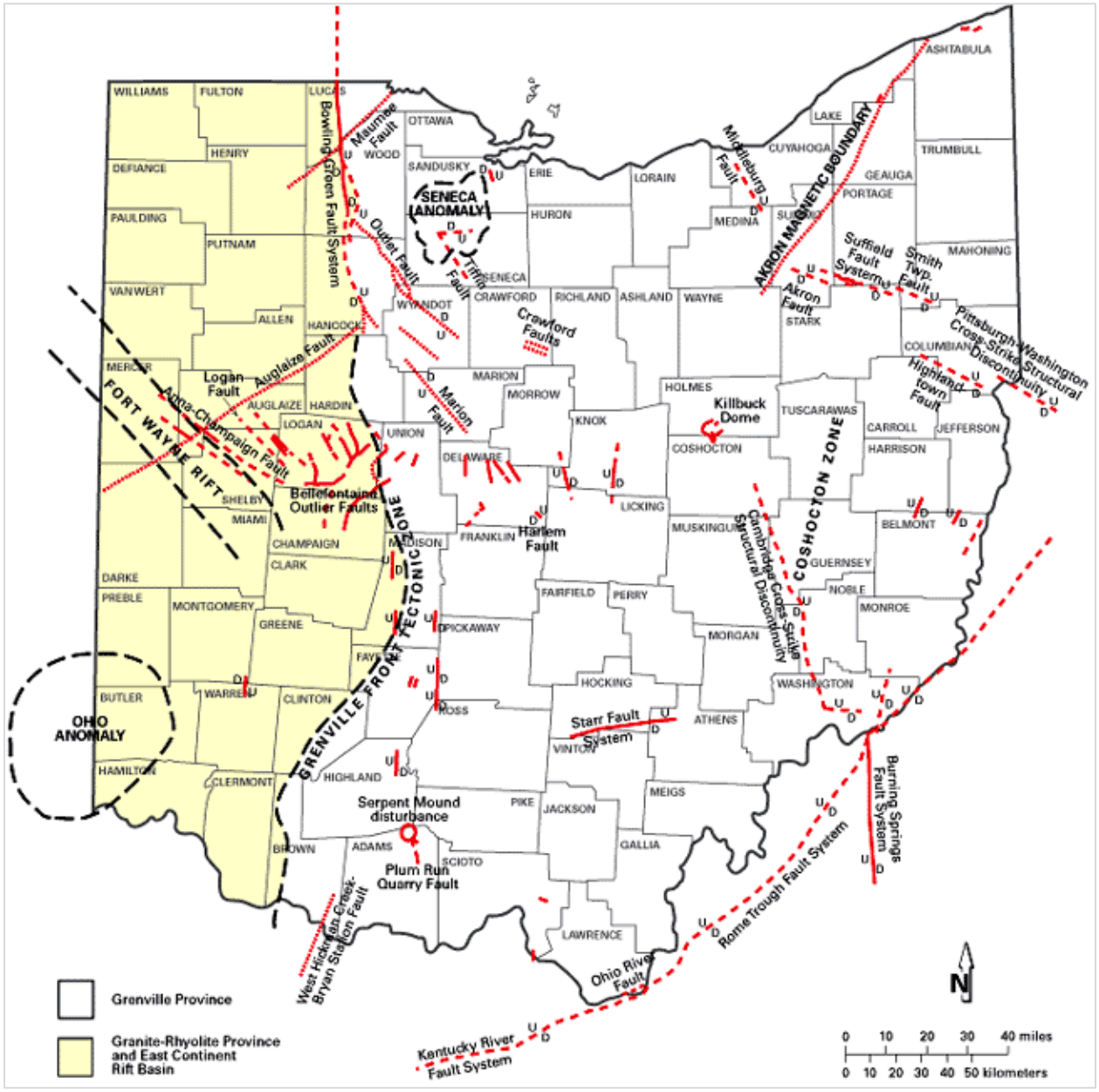
4.3.2 Location

Earthquakes are countywide hazards and can affect all areas and jurisdictions within Fulton County. According to the Ohio Department of Natural Resources, Ohio is located on the periphery of the New Madrid Seismic Zone, an area in and around Missouri that was the site of the largest earthquake sequence to occur in the Country. Additionally, west central Ohio is the area of Ohio with the highest risk for earthquakes in the State.

Table 4.3.1: Modified Mercalli Intensity Scale (Source: Ohio Department of Natural Resources)

Modified Mercalli Intensity Scale		Magnitude
I	Detected only by sensitive instruments.	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing.	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibrations like passing truck.	2.5
IV	Felt indoors by many, outdoors by few, at night some awaken; dishes, windows, doors disturbed; standing autos rock noticeably.	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects.	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small.	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos.	4.5
VIII	Panel walls thrown out of frames; walls, monuments, chimneys fall; sand and mud ejected; drivers of autos disturbed.	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken.	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides.	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent.	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up into air.	7 7.5 8

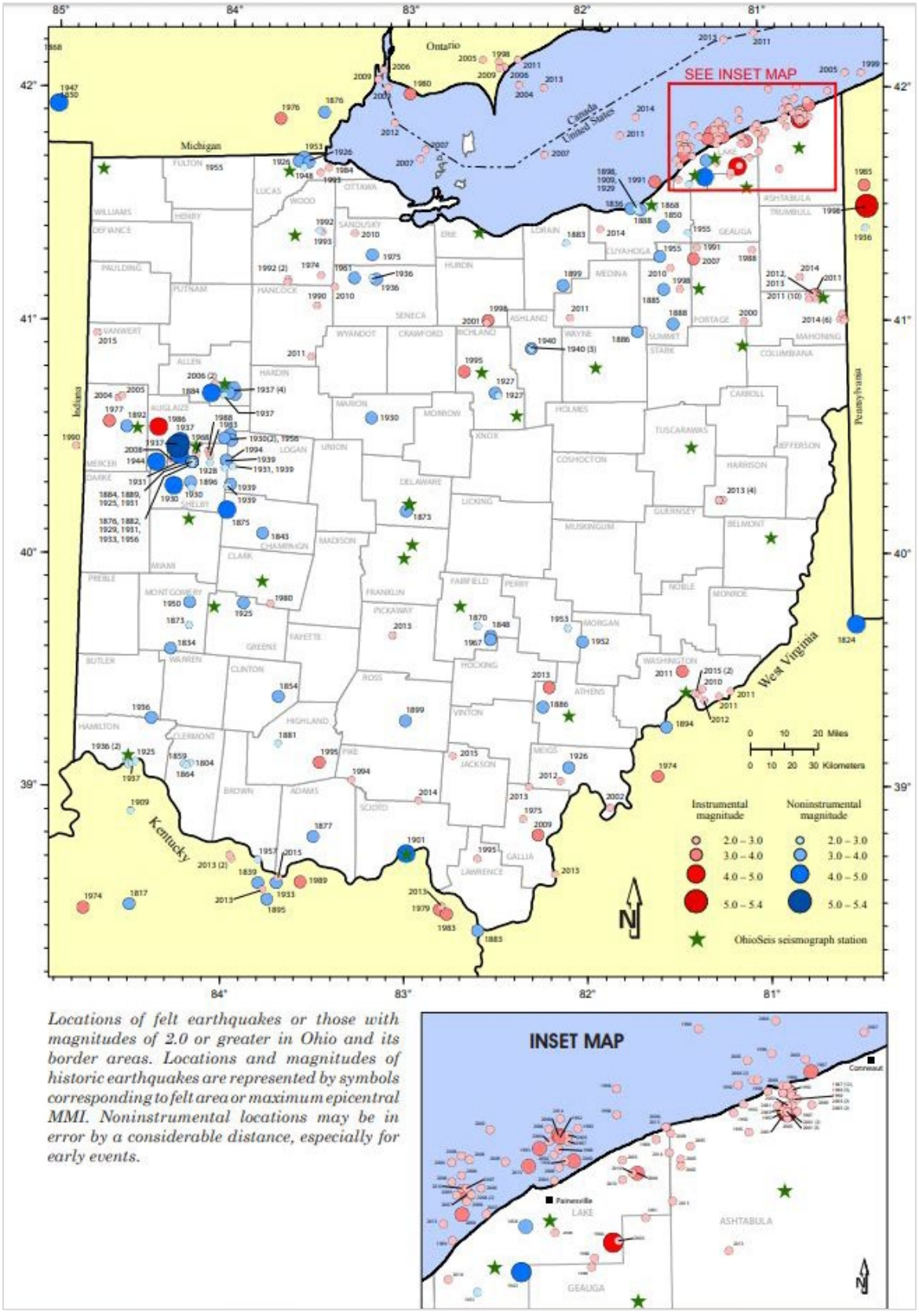
Figure 4.3.1 Map of Deep Structures in Ohio (Source: ODNR)



4.3.3 Extent

Earthquakes post a risk to life and property, depending on the severity. To monitor earthquakes, the State of Ohio has deployed several seismometers to record ground-shaking activity (**Figure 4.3.2**). The Station BCOH (Blue Creek Park Ohio) seismometer is located in the closest proximity to Fulton County and is situated in near Toledo in Lucas County. This seismometer is located three miles from the Bowling Green Fault System, in a location particularly useful for determining rapid and accurate earthquake locations in northwest Ohio.

Figure 4.3.2: Earthquake Epicenters and Seismometers in Ohio (Source: ODNR)



Locations of felt earthquakes or those with magnitudes of 2.0 or greater in Ohio and its border areas. Locations and magnitudes of historic earthquakes are represented by symbols corresponding to felt area or maximum epicentral MMI. Noninstrumental locations may be in error by a considerable distance, especially for early events.

Earthquakes can yield a variety of different outcomes. With the ground shaking associated with earthquake events, buildings have the potential to be impacted. If soil liquefaction, or the mixing of sand and soil with groundwater, occurs, buildings can sink into the ground. Earthquakes also have the potential to rupture dams or levees along a river, resulting in flooding (see Dam Failure section). Earthquakes can cause landslides in high risk areas and can cause mines to subside. Furthermore, earthquakes that break gas and power lines can result in fires.

4.3.4 History

The State of Ohio has experienced more than 120 earthquakes between 1776 and 2019. Fourteen of these earthquakes have caused minor to moderate damage. The largest historic earthquake in Ohio was centered in Shelby County in 1937. This event was estimated to have had a magnitude of 5.4 on the Richter scale. **Figure 4.3.2**, above, displays epicenters of all historical earthquakes with a magnitude greater than 2.0, as well as the location of seismometers in the State of Ohio.

The ODNR maintains a record of all earthquake events in the State of Ohio; however, no events have been recorded within Fulton County.

4.3.5 Probability

The USGS has both long-term and short-term probabilistic seismic hazard forecasts. In the 2018 one-year probabilistic seismic hazard forecast, the United States Geological Survey estimates that there is a less than one percent chance of potentially minor-damage ground shaking in 2018 for Fulton County (**Figure 4.3.3**).

The USGS also determined the long-term hazard of earthquakes for the United States (**Figure 4.3.4**). The measurement used in this estimation is based on the chance of ground shaking – peak ground acceleration – as a percentage of the natural force of gravity over time. This map identifies that most of Fulton County and surrounding areas in Ohio have the second to lowest hazard ranking for the nation.

Furthermore, the ODNR indicates that the brief historic record of Ohio earthquakes suggests a risk of moderately damaging earthquakes in the western, northeastern, and southeastern parts of the State.

Figure 4.3.3: Chance of Potentially Minor-Damage Ground Shaking in 2018 (Source: USGS)

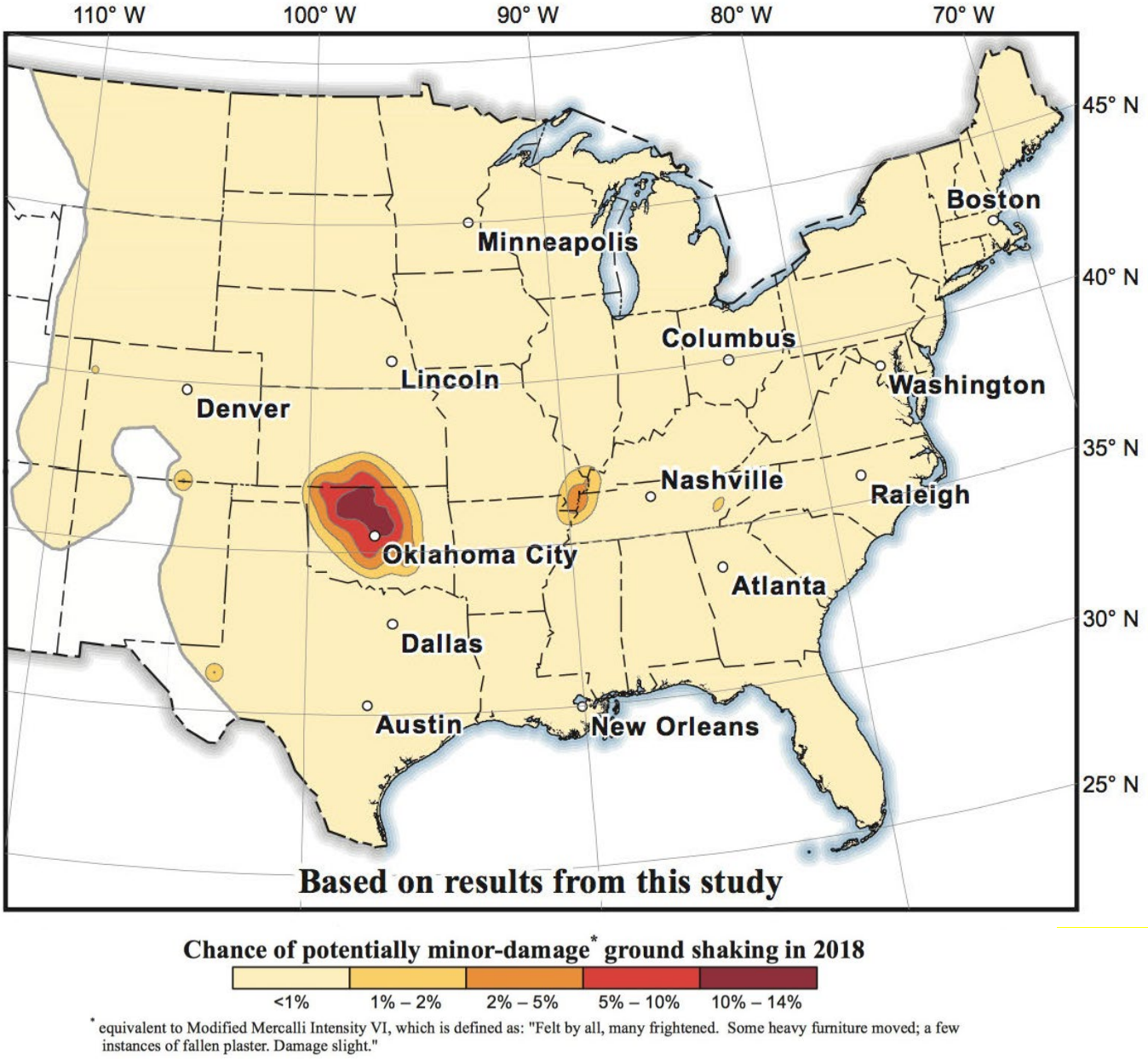
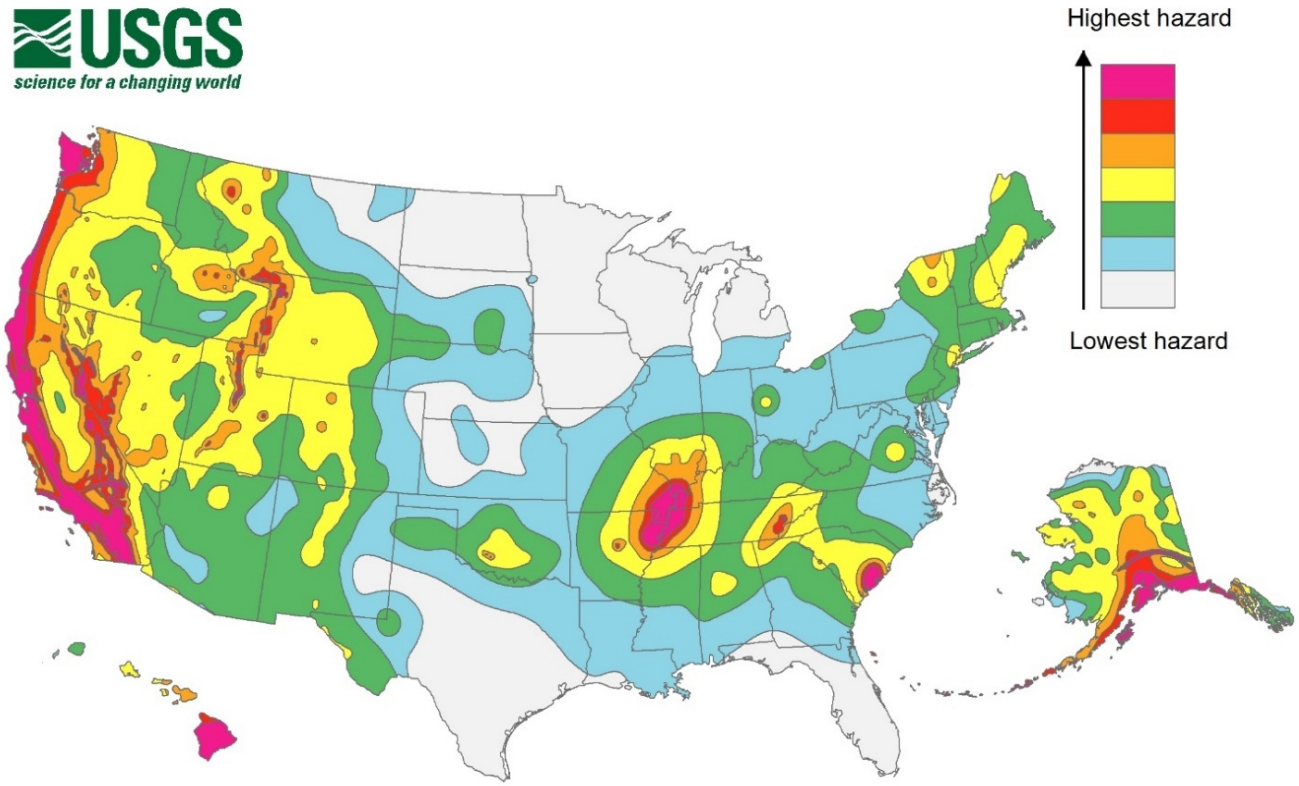


Figure 4.3.4: Probability of Earthquakes in the United States (Source: USGS)



4.3.6 Vulnerability Assessment

Infrastructure Impact

Since there are no historical earthquakes in the County's history, exact damages to infrastructure are unknown. Buildings, roadways, and gas and power lines have the potential to be affected. Since the probability of an earthquake occurring in Fulton County is less than one percent, there is a low risk of impact to infrastructure as a result.

Population Impact

There is a low risk of earthquakes occurring in Fulton County. Accordingly, there is low risk of impact to the population. If an earthquake would occur within the County, the population could be impacted by loss of homes, as well as potential loss of utilities.

Property Damage

With any earthquake event, there is potential for property damage to occur, as ground shaking can lead to damaged buildings. Due to the non-site-specific nature of this hazard, **Table 4.3.2** lists all structures within Fulton County as having potential impacts from earthquakes. It also provides values for two worst-case scenarios valued at one percent damage and five percent damage.

Loss of Life

Fulton County has no recorded earthquake events that have resulted in loss of life; however, in the event that an earthquake occurs, there is potential for loss of life. Loss of life can be mitigated by educating the public on proper protection in the event of an earthquake. For example, the Ready

Campaign (Ready.gov) is a national public service campaign designed to educate and empower the American people to prepare for, respond to, and mitigate disasters. The Ready Campaign provides materials for how to educate the public on earthquake preparedness.

Economic Losses

Earthquakes have the potential to damage infrastructure, resulting in economic burden of clean up and repairs. Potential economic losses and damages associated with Fulton County structures and potential worst-case scenarios are recorded in **Table 4.3.2**, below. Compared with other hazards, earthquakes are relatively unlikely to occur, meaning there is low risk of economic loss as a result of an earthquake.

Table 4.3.2: Structure Vulnerability from Earthquakes

Structure Type	Number of Properties Exposed	Total Value of Structures	Damage for 1% Scenario	Damage for 5% Scenario
Residential	15,276	$590,493,680	$5,904,936.80	$29,524,684
Non-Residential	7,988	$762,601,360	$7626013.60	$38,130,068
Critical Facilities	*650*	*$127,096,410*	*$1,270,964.10*	*$6,354,820.50*
Total	**23,264**	**$1,353,095,040**	**$13,530,950.40**	**$67,654,752.00**

**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.3.7 Land Use and Development Trends

As there are no current at-risk communities for earthquakes, there are no likely impacts on development and land use.

4.4 Epidemic

4.4.1 Description

The Centers for Disease Control and Prevention (CDC) defines an epidemic as "an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area."

Epidemics occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts. More specifically, an epidemic may result from any of the following:

- A recent increase in amount or virulence of the agent,
- The recent introduction of the agent into a setting where it has not been before,
- An enhanced mode of transmission so that more susceptible persons are exposed,
- A change in the susceptibility of the host response to the agent, and/or
- Factors that increase host exposure or involve introduction through new portals of entry.

While epidemics usually refer to infectious agents, the Centers for Disease Control and Prevention notes that non-infectious diseases such as diabetes and obesity exist in epidemic proportion in the United States. For the purposes of this report, only epidemics referring to infectious agents will be discussed. These types of infectious agents can include bacteria, viruses, fungi, and parasites.

Epidemic was identified as a hazard of concern by representatives from several local communities as part of the stakeholder involvement process.

4.4.2 Location

Epidemics can develop with little or no warning and quickly erode the capacity of local medical care providers. A fast-developing epidemic can last several days and extend into weeks or even months, in extreme cases. Epidemics can occur at any time of the year, but the warm summer months, when bacteria and microorganism growth are at their highest, present the greatest risk for epidemics to occur. An epidemic has the potential to affect the entire County but is more probable to occur in densely populated areas, especially at facilities with large numbers of occupants.

4.4.3 Extent

According to the World Health Organization (WHO), 70 percent of emerging human pathogens come from animals. As such, some of the most likely epidemics that could affect Fulton County include animal-sourced pathogens such as influenza and West Nile Virus. Such an event has the potential to cause serious injury or death to large numbers of people but would cause no damage to private property or structural damage to public facilities. The impact on individuals could also be economic at the individual level due to the inability of an infected person to go to work. In a worst-case scenario, cascading effects could lead to civil unrest, food and fuel shortages, or utility failure due to large numbers of people unable to provide services.

4.4.4 History

There were no known documented epidemics in Fulton County. As such, there are no historic property or crop damages associated with epidemics in the County.

4.4.5 Probability

As there are no known documented epidemics in Fulton County, there is a less than one percent chance in any given year of an epidemic occurring in the County. Furthermore, the WHO indicates that most epidemic-prone diseases are rare and outbreaks are generally contained quickly. Early detection of infected individuals can prevent a widespread epidemic.

As global weather patterns shift and permafrost in areas of the world melts, there will be more opportunity for diseases that have been frozen within layers of permafrost will be released, exposing humans to new diseases. As such, there will be more potential for epidemics to arise from these diseases.

4.4.6 Vulnerability Assessment

Given the lack of historic epidemic events in the County, it is difficult to estimate potential damages; however, the following assessment was developed to provide a general vulnerability assessment for epidemics in Fulton County.

Infrastructure Impact

There is likely to be little to no impact to infrastructure in the event of an epidemic.

Population Impact

The population of Fulton County is likely to be significantly impacted, should an epidemic occur; however, there is less than a one percent chance that an epidemic will occur in the County. This means there is a relatively low threat to the population from an epidemic hazard event.

Property Damage

Property damage is not likely to occur as a direct result of an epidemic event.

Loss of Life

Loss of life is a potential outcome from any epidemic event; however, there is a less than one percent chance of an epidemic event occurring in any given year, meaning there is low risk for loss of life due to an epidemic.

Economic Losses

Economic losses would likely be observed through the inability for individuals to work. Large-scale epidemics then can disrupt the flow of the economy. Because the threat of epidemics is low, there is little risk that economic losses will occur in the County due to an epidemic.

4.4.7 Land Use and Development Trends

Land use and development are not likely to be impacted by epidemics. Adequate health care facilities should be maintained in the event of an epidemic.

4.5 Flooding

4.5.1 Description

FEMA describes a flood as "a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters [and] the unusual and rapid accumulation or runoff of surface waters from any source." Floods are typically riverine, coastal, or shallow. Flash floods are floods that occur quickly, even occurring without visible signs of precipitation.

Urban flooding is a type of flood that can occur in areas of development that have a high level of impervious surfaces, such as concrete. The level of development and the level of stormwater management practices impact the severity of urban flooding.

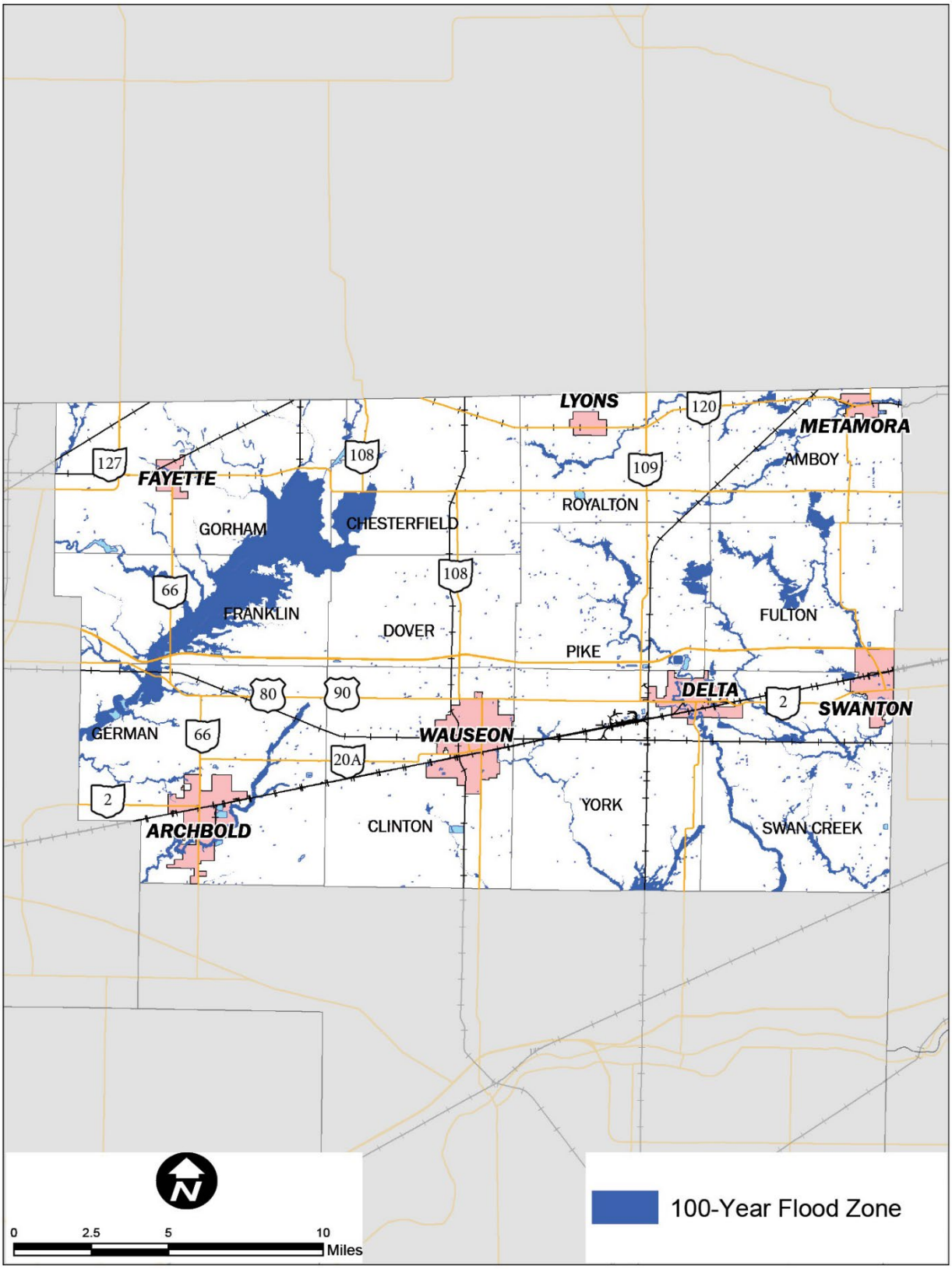
Common flood-related terms include:

- **100-Year Flood:** A flood that has a one percent chance to occur each year. The 100-year floodplain can be seen in **Figure 4.x.1: Flood Hazard Map**. The elevation of the water from the 100-year flood is called the Base Flood. Mitigation strategies should be based on the base flood elevation.
- **Floodplain:** An area that has the potential to flood from any source.
- **Floodway:** Sometimes referred to as a regulatory floodway. FEMA defines a floodway as "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the Base Flood without cumulatively increasing the water surface elevation more than a designated height."
- **Flash flood:** Flash floods are typically caused by heavy rainfall over a short period of time. These floods are particularly dangerous because they can occur in minutes and can sometimes occur even without rainfall, such as when an ice jam breaks or dissolves. Areas impacted by wildfires are particularly susceptible to flash floods.

4.5.2 Location

Flooding can occur throughout Fulton County. Flash flooding is more likely to occur in developed areas. **Figure 4.5.1** shows the location of the 100-year floodplain.

Figure 4.5.1: 100-Year Flood Zone in Fulton County, Ohio



4.5.3 Extent

Fulton County currently has seven flood insurance maps (see **Appendix F**). These were most recently updated in April 2011. Fulton County has adopted the Special Purpose Flood Damage Reduction Resolution. This resolution has five methods for reducing flood loss.

1. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water hazards, or which result in damaging increases in flood heights or velocities.
2. Requiring that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction.
3. Controlling the alteration of natural floodplains, steam channels, and natural protective barriers, which help accommodate or channel flood waters.
4. Controlling filling, grading, dredging, excavating, and other development which may increase flood damage.
5. Preventing or regulating the construction of flood barriers, which will unnaturally divert flood waters or which may increase flood hazards in other areas.

This is an overview of the resolution. Please see **Appendix D: Sources** for a link to the full resolution.

Fulton County and six communities within the County participate in the NFIP. These communities include the Village of Archbold, the Village of Delta, the Village of Fayette, the Village of Metamora, the Village of Swanton, and the City of Wauseon. The Village of Lyons does not participate as it does not fall within an insurable area (see **Figure 4.5.1**).

Table 4.5.1 shows the repetitive loss properties in Fulton County, Ohio. FEMA defines a repetitive loss property as an insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. FEMA defines a severe repetitive loss property as a single family property that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Table 4.5.1: Repetitive Loss Properties

Community Name	Zone	Firm	Building Payment	Contents Payment	Losses	Total Paid
Fulton County	A	N	$15,878	$8,520	3	$24,398

**Zone Types:*

- *100-Year Floods: A = special flood hazard area (SFHA), no base flood elevation provided*
  - *AE = SFHA, base flood elevation provided (newer designation)*
- *500-Year Floods: C = area of minimal flood hazard, X = area of minimal flood hazard (newer designation)*
- *Firm column: Y = located on a flood insurance map, N = not located on a flood insurance map*

4.5.4 History

There has been one flood and 11 flash floods in Fulton County between June 1966 and December 2019. These events have caused $190,000 in property damages and $1,020,000 in crop losses. There are no reported injuries or deaths associated with these events. Described below are the three most damaging events over the past decade. Disaster declarations are summarized in **Table 4.5.2**. All events are listed individually in **Appendix A**.

There have been two major disaster declarations in Fulton County according to the State of Ohio Enhanced Hazard Mitigation Plan.

Table 4.5.2: Flooding-Related Disaster Declarations in Fulton County, Ohio

Disaster Declaration	Date	Total Funds Provided
DR-653	March 26, 1982	$425,777
DR-951	August, 1992	$13,463,534

Flash Flooding in the Village of Archbold on August 24, 1998
Two people had to be rescued from their vehicles as they attempted to cross flooded roads. The Sauder Village Museum sustained damage as Flat Run Creek inundated the ground floor. Several homes in the Village of Archbold had water backup through the sewer into their basements. This event caused $150,000 in property damage and $100,000 in crop damage.

Flash Flooding in the Village of Swanton on June 30, 1997
Heavy thunderstorm rain caused flooding of fields, roads, and low-lying areas. This event caused $10,000 in property damage and $5,000 in crop damage.

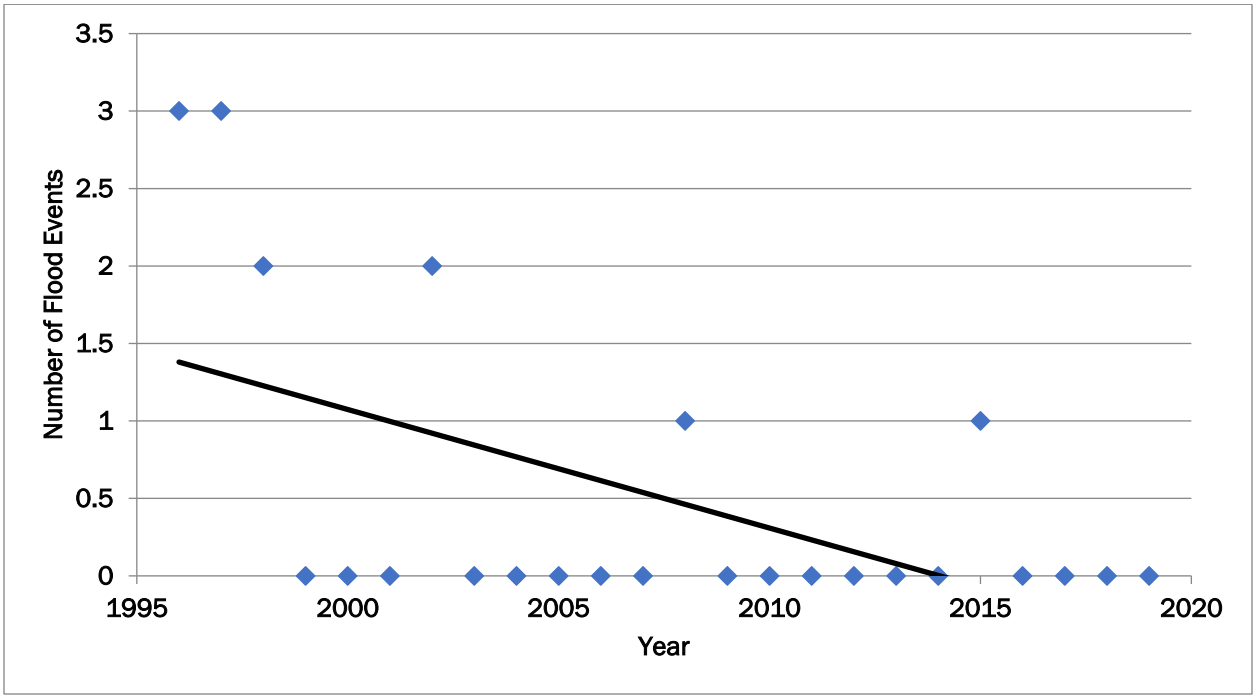
Countywide Flash Flooding on June 1, 1997
Heavy thunderstorm rain caused flooding of fields, roads, and low-lying areas. This event caused $25,000 in property damage and $15,000 in crop damage.

4.5.5 Probability

Figure 4.5.2 shows the trend of flood events over time since January 1996, as this is the earliest year with complete data from the NCDC. The trend line is sloping downwards over time, which indicates that floods have become less frequent – and therefore less likely – since January 1996.

Additionally, Fulton County has seen annualized property and crop damages amounting to $3,584.90 and $19,245.28, respectively. In total, the County averaged approximately $22,830.19 annually in damages from flooding events.

Figure 4.5.2 Flood Probability



4.5.6 Vulnerability Assessment

Infrastructure Impact

Floods can impact roadways, including interstates and state routes by blocking them due to high water or by filling them with debris. The transportation system in Fulton County, including highways, railways, and airports could suffer over $1,360,000 in damages during a 100-Year flood. Utility systems, including potable water, wastewater, and electric power systems, could suffer over $1,000,000 in damages.

Population Impact

Floods and flash floods have caused damages to occupied homes in the past. During flood events, shelter may need to be provided to those impacted by flooding.

Property Damage

Property damage is likely during floods, to both residential and non-residential properties. **Table 4.5.3** lists the value of all the properties that are exposed to 100-Year floods.

Loss of Life

There are no reported deaths or injuries related to floods or flash floods in Fulton County. Loss of life is possible in future floods or flashfloods.

Economic Losses

Floods can halt economic activity, block roadways, destroy building contents, and destroy agricultural crops.

Table 4.5.3: Structure Vulnerability from Flooding

Structure Type	Value (Exposed)	Percent of Total
Residential	$3,587,946,000	68.7%
Commercial	$95,037,000	13.9%
Industrial	$58,029,000	8.5%
Agriculture	$13,359,000	2.0%
Religious	$7,152,000	1.0%
Government	$4,373,000	0.6%
Education	$36,640,000	5.4%

4.5.7 Land Use and Development Trends

Any development that occurs in flood zones will be at risk. Development in these areas should be limited. Flash flooding is more likely to occur in areas with a high percentage of impervious surfaces. Future land use practices should limit the percentage of impervious surfaces. **Chapter 5** contains mitigation actions that address these issues.

4.6 Hazardous Materials

4.6.1 Description

According to the Ohio Environmental Protection Agency, hazardous materials can be defined in different ways depending on the law or regulation administered by the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC).

- The Institute for Hazardous Materials Management defines hazardous materials as "any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors."
- OSHA's definition includes any substance or chemical which is a health hazard or a physical hazard, including carcinogens, toxic agents, irritants, corrosives, and sensitizers, as well as agents that interact to be harmful to the human body, explosive, or flammable.
- The Environmental Protection Agency's definition includes the Occupational Safety and Health Administration definition. It also adds any item or chemical which can cause harm to people, plants, or animals when released into the environment.
- The Department of Transportation defines hazardous materials as any item or chemical which, when being transported or moved in commerce, is a risk to public safety or the environment.

The Ohio Environmental Protection Agency indicates that there are five categories in which materials can be hazardous, including acute, chronic, fire, reactive, or sudden release of pressure.

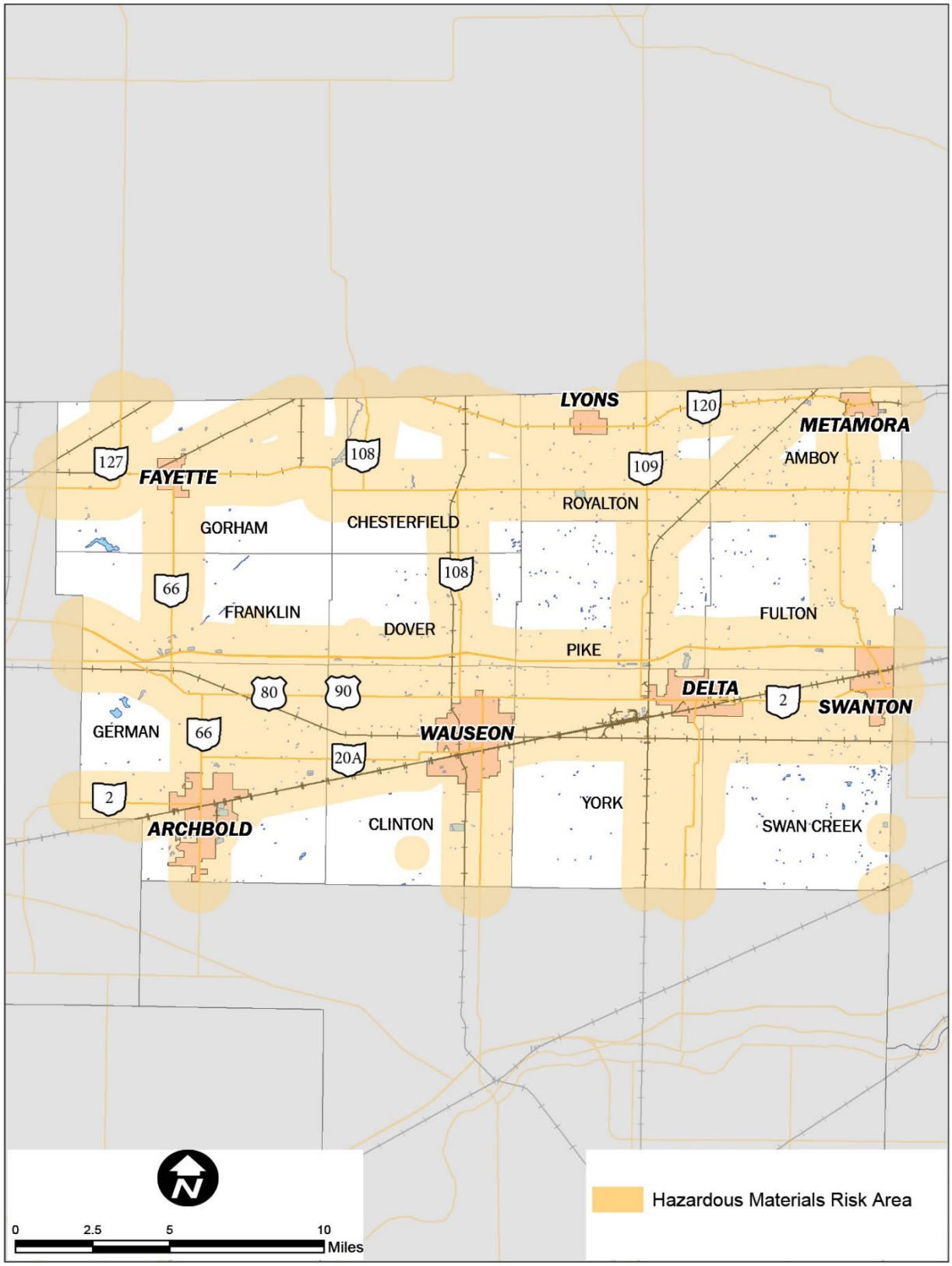
The U.S. Nuclear Regulatory Committee regulates materials that produce ionizing radiation, which includes by-product material and radioactive substances.

The Emergency Planning and Right to Know Act, or EPCRA, was passed as Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires a facility that processes, uses, or stores extremely hazardous substances or hazardous substances as classified by the Occupational Safety and Health Administration hazard communication standard. This is also codified in the Ohio Revised Code (ORC) Chapter 3750 and the Ohio Administrative Code Chapter 3750.

4.6.2 Location

Hazardous material spills can occur wherever hazardous materials are stored and during shipment to these facilities. **Figure 4.6.1** shows the areas which are at the highest risk of being impacted by hazardous materials spills. These areas were calculated by identifying normal shipping routes and placing a one-mile buffer around these routes.

Figure 4.6.1: Hazardous Materials Risk Area



4.6.3 Extent

The Environmental Protection Agency keeps records for Extremely Hazardous Substance facilities because these facilities have a higher probability of spills due to the higher amounts of hazardous materials at their sites. Each potential hazardous material has varying levels of toxicity. The concentration of these materials should be measured in parts-per-million to determine whether they present a threat. Many chemicals are safe at low amounts and low concentrations but can become dangerous and even toxic at high amounts and concentrations. Additionally, some chemicals can be flammable and can become more volatile when exposed to oxygen. In ground spills, untreated chemical and waste spills can contaminate the soil and drinking water, creating toxic environmental conditions. Corrosive, flammable, or explosive chemicals can create infrastructure damage depending on the location, amount spilled, and the circumstances of the incident. In worst case scenarios, large spills can trigger evacuations of residents and close transportation routes used for hazardous materials transportation, which can also affect local residents.

4.6.4 History

There have been 43 recorded hazardous material spills and releases in Fulton County from May 2017 through December 2019. Estimated property and crop damages have not been recorded.

Table 4.6.1 lists the hazardous materials spills and releases in Fulton County on record with the Ohio EPA from May 2017 through December 2019 (Source: Ohio Environmental Protection Agency).

Table 4.6.1: Hazardous Materials Spills

Location	Product	Amount	Spill Size
Dover Township	Oil Transformer non-PCB	15 Gallons	Small: 500 Gal/4000 lbs
Dover Township	Diesel Fuel	Unknown	Small: 500 Gal/4000 lbs
Franklin Township	Brown Material	Unknown	Unknown Amount
Village of Swanton	Water	Unknown	Unknown Amount
Royalton Township	Anhydrous Ammonia	2500 lbs	Small: 500 Gal/4000 lbs
Swan Creek Township	Solid Waste	Unknown	Unknown Amount
Dover Township	Diesel Fuel	50 Gallons	Small: 500 Gal/4000 lbs
Swan Creek Township	Diesel Fuel	Unknown	Unknown Amount
Swan Creek Township	Oil Motor	Unknown	Unknown Amount
City of Wauseon	Human Sewage	Unknown	Small: 500 Gal/4000 lbs
Pike Township	Gasoline	Unknown	Unknown Amount
Village of Fayette	Diesel Fuel	40 Gallons	Small: 500 Gal/4000 lbs
Fulton Township	Diesel Fuel	Unknown	Unknown Amount
German Township	Oil Transformer non-PCB	Unknown	Unknown Amount
Dover Township	Oil Transformer non-PCB	20 Gallons	Small: 500 Gal/4000 lbs
German Township	Diesel Fuel	40 Gallons	Small: 500 Gal/4000 lbs

Location	Product	Amount	Spill Size
Dover Township	Diesel Fuel	33 Gallons	Small: 500 Gal/4000 lbs
Village of Archbold	Anhydrous Ammonia	Unknown	Unknown Amount
Pike Township	Diesel Fuel	25 Gallons	Small: 500 Gal/4000 lbs
Pike Township	Diesel Fuel	50 Gallons	Small: 500 Gal/4000 lbs
Village of Archbold	Other	Unknown	Unknown Amount
Clinton Township	Gasoline	Unknown	Small: 500 Gal/4000 lbs
Fulton Township	Diesel Fuel	45 Gallons	Small: 500 Gal/4000 lbs
Village of Swanton	Propane	Unknown	Unknown Amount
Village of Archbold	Waste Water	Unknown	Unknown Amount
German Township	Fish Kill	Unknown	Small: 500 Gal/4000 lbs
Chesterfield Township	Diesel Fuel	200 Gallons	Small: 500 Gal/4000 lbs
Amboy Township	Oil Motor	Unknown	Unknown Amount
Pike Township	Fats / Oils / Grese	Unknown	Unknown Amount
Dover Township	Diesel Fuel	Unknown	Small: 500 Gal/4000 lbs
Dover Township	Oil Motor	Unknown	Unknown Amount
German Township	Air Odor Gasoline	25 Gallons	Small: 500 Gal/4000 lbs
Village of Archbold	Oil Transformer non-PCB	50 Gallons	Small: 500 Gal/4000 lbs
Swan Creek Township	Unknown	Unknown	Unknown Amount
Royalton Township	Other	Unknown	Unknown Amount
Dover Township	Diesel Fuel	100 Gallons	Small: 500 Gal/4000 lbs
Swan Creek Township	Other	Unknown	Unknown Amount
Swan Creek Township	Contaminated Water	Unknown	Unknown Amount
Village of Archbold	Oil Transformer non-PCB	150 Gallons	Small: 500 Gal/4000 lbs
Swan Creek Township	Brown Material	Unknown	Unknown Amount
Franklin Township	Paint / Laquer	Unknown	Unknown Amount
Franklin Township	Diesel Fuel	Unknown	Unknown Amount
Amboy Township	Diesel Fuel	30 Gallons	Small: 500 Gal/4000 lbs

4.6.5 Probability

Due to their unpredictable nature and the influence of human error, the probably of hazardous materials spills are difficult to quantify. Since hazardous material spills can occur at any time and they should be considered likely events.

4.6.6 Vulnerability Assessment

Infrastructure Impact

Roadways, waterways, and groundwater may be impact by hazardous materials spills. Road closures may occur as a direct or indirect result of hazardous materials spills.

Population Impact

The local population may be directly exposed to hazardous materials. If a large spill occurs, some residents may need to be evacuated and given shelter elsewhere.

Property Damage

Depending on the chemical, property damage is likely. Properties near Extremely Hazardous Substance facilities are likely to be damaged during a spill.

Loss of Life

While some hazardous materials can be toxic, loss of life from hazardous materials spills is unlikely. It is possible, however, and extreme precaution should be taken in the event of a spill.

Economic Losses

Economic losses can occur from the loss of hazardous materials that may be needed in manufacturing or for other processes. Road closures may lead to slowed commerce, and businesses impacted by hazardous materials spills may suffer property damage, damage to goods, or be required to close.

Table 4.6.2: Vulnerability of Land and Structures within Hazardous Materials Risk Area

Structure Type	Number of Properties Exposed	Value of Vulnerable Structures		
		Land	Building	Total
Residential	12,702	$91,679,860.00	$388,468,740.00	$480,148,600.00
Non-Residential	6446	$358,177,720.00	$270,130,690.00	$628,308,410.00
Critical Facilities	555	$21,158,160.00	$100,884,810.00	$122,042,970.00
Total	**19,148**	**$449,857,580.00**	**$658,599,430.00**	**$1,108,457,010.00**

**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.6.7 Land Use and Development Trends

Development that has occurred since the previous plan and any future development near hazardous materials storage facilities may be impacted by hazardous materials spills. All land uses are equally impacted by potential hazardous materials spills.

4.7 Invasive Species

4.7.1 Description

Harmful Species are species that have potential negative impacts on the environment and economy of Fulton County. Harmful species are both native and invasive. The National Oceanic and Atmospheric Administration (NOAA) defines an invasive species as "an organism that causes ecological or economic harm in a new environment and is not native." Harmful species are species that are native to a region, but that also cause significant ecological, public health, or economic harm. Their growth is often encouraged through human activity.

4.7.2 Location

Invasive species have the potential to impact any location within the County.

4.7.3 Extent

According to the Ohio Administrative Code 901:5-30-01 *Invasive plant species*, there are 38 invasive plant species in Ohio (**Table 4.7.1**). These plants cannot be sold, distributed, or imported.

Table 4.7.1: Invasive Plant Species in Ohio

Scientific Name	Common Name
Ailanthus altissima	Tree-of-heaven
Alliaria petiolate	Garlic mustard
Berberis vulgaris	Common barberry
Butomus umbellatus	Flowering rush
Celastrus orbiculatus	Oriental bittersweet
Centaurea stoebe ssp. Micranthos	Spotted knapweed
Dipsacus fullonum	Common teasel
Dipsacus laciniatus	Cutleaf teasel
Egeria densa Brazillian	Elodea
Elaegnus angustifolia	Russian olive
Elaegnus umbellate	Autumn olive
Epilobium hirsutum	Hairy willow herb
Frangula alnus	Glossy buckthorn
Heracleum mantegazzianum	Giant hogweed
Hesperis matronlis	Dame's rocket
Hydrilla verticillata	Hydrilla

Scientific Name	Common Name
Hydrocharis morsus-ranae	European frog-bit
Lonicera japonica	Japanese honeysuckle
Lonicera maackii	Amur honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Lythrum salicaria	Purple loosestrife
Lythrum virgatum	European wand loosestrife
Microstegium vimineum	Japanese stiltgrass
Myriophyllum aquaticum	Parrotfeather
Myriophyllum spicatum	Eurasian water-milfoil
Nymphoides peltata	Yellow floating heart
Phragmites australis	Common reed
Potamogeton crispus	Curley-leaved pondweed
Pueraria montana var. lobate	Kudzu
Pyrus calleryana	Callery pear
Ranunculus ficaria	Fig buttercup / Lesser celandine
Rhamnus cathartica	European buckthorn
Rosa multiflora	Multiflora rose
Trapa natans	Water chestnut
Typha angustifolia	Narrow-leaved cattail
Typha x glauca	Hybrid cattail
Vincetoxicum nigrum	Black dog-strangling vine / Black swallowwort

There are currently three invasive insect species that have the potential to impact Fulton County:

The **Emerald Ash Borer (EAB)** targets ash trees. This insect was first found in Ohio in 2003 and has been found in every county. Since the EAB has been found in every county, there are no quarantines in effect with Ohio's borders. Ohio is still listed in the Federal quarantine boundary.

The **Gypsy Moth** has been migrating into Ohio from Pennsylvania and Michigan. In the caterpillar stage the Gypsy Moth targets over 300 different trees and shrubs. A healthy tree will typically die within two years of a Gypsy Moth infestation. Gypsy Moth eggs are laid during July and overwinter

until late April to mid-May. An egg mass can contain up to 600 eggs. Before feeding, the larvae are dispersed by the wind to other trees or areas. The Gypsy Moth can lead to heavy defoliation and can make trees more susceptible to other invasive or harmful species. Preferred host plants include alder, aspen, gray birch, white birch, hawthorn, larch, linden, mountain ash, oaks, Lombardy poplar, willows, and witch-hazel. Trees that are susceptible to older larvae only include beech, red cedar, chestnut, hemlock, plum, pine, and Colorado blue spruce.

The **Walnut Twig Beetle** transmits the thousand cankers disease, a fungus that attacks black walnut trees. Butler County is currently under quarantine to limit the spread of the Walnut Twig Beetle throughout Ohio.

4.7.4 History

There are no known impacts of invasive species particular to Fulton County; however, it is possible that any of the species listed above have at one point affected the County and its residents.

4.7.5 Probability

Since there are many invasive species throughout Ohio, it is probable that Fulton County will experience some of the invasive species listed above.

4.7.6 Vulnerability Assessment

Infrastructure Impact

There are no likely impacts to public roadways or utilities. Public trees may be destroyed or impacted by various invasive species.

Population Impact

There are no likely impacts on the local population.

Property Damage

Property damage, in the form of reduced values from impacts on landscaping, is likely.

Loss of Life

Loss of life due to the effects of invasive species is unlikely.

Economic Losses

Economic impacts can vary greatly depending on the target and of the invasive species and their impacts on those targets. If a large number of trees are severely damaged or killed by various invasive species, there may be indirect economic losses. Examples include increased heating and cooling costs, reduced property value, and reduction in viable lumber for construction.

4.7.7 Land Use and Development Trends

There are no likely impacts on development and land use due to invasive species.

4.8 Landslide and Erosion

4.8.1 Description

The Ohio Department of Natural Resources (ODNR) defines a landslide as "a variety of downslope movements of earth materials. Some slides are rapid, occurring in seconds, whereas others may take hours, weeks, or even longer to develop." Landslides are commonly triggered by human-induced vibrations, over-steepened slopes, increased weight on a slope, and removal of vegetation on areas with landslide-prone slopes.

Erosion is the geological process in which earthen materials are worn away and transported by natural forces, such as wind or water. The movement of earthen materials by wind or water will be considered a landslide for the purposes of this Plan.

According to the Ohio Administrative Code 3901-1-48, mine subsidence is loss caused by the collapse or lateral or vertical movement of structures resulting from the caving in of underground mines, including coal mines, clay mines, limestone mines, and salt mines. Mine subsidence does not include loss caused by earthquakes, landslide, volcanic eruption, or collapse of strip mines, storm and sewer drains or rapid transit tunnels.

4.8.2 Location

Figure 4.8.1 shows the location of areas under risk for slope failure (landslides). Fulton County is categorized as either low incidence of landslides or moderate susceptibility with low incidence of slope failure. There are no known active or abandoned underground mines in Fulton County, mine subsidence will not be assessed further.

4.8.3 Extent

Landslides

There are three major types of landslides:

- **Rotational slump**, caused by the movement of a mass of weak rock or sediment as a block unit along a slope. These are the largest types of landslides found in Ohio.
- **Earthflow**, caused by a mass of rock or sediment flowing downslope. These are the most common landslides in Ohio.
- **Rockfall**, a rapid downslope movement of large blocks of bedrock. Most rockfalls in Ohio involve sandstone or limestone that has been weakened by surface water.

4.8.4 History

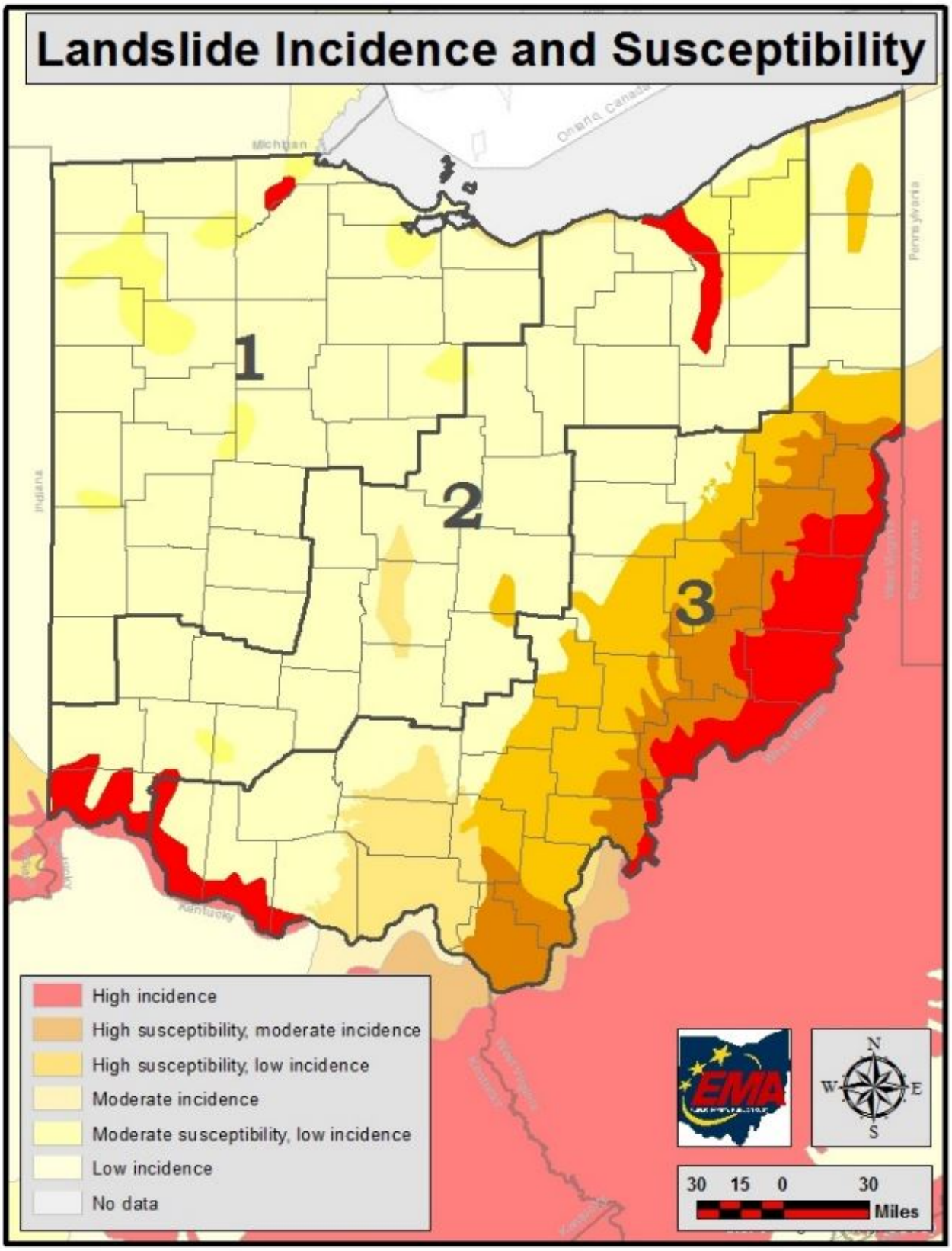
Figures 4.8.2 and 4.8.3 show that Fulton County has relatively low occurrences of landslides and rock falls as compared to other counties within Ohio, with 37 total landslides and no rockfall sites as of June 18, 2019.

4.8.5 Probability

Landslides

According to the ODNR, Fulton County falls within an area of low risk for slope failure. Landslides should be considered an unlikely event.

Figure 4.8.1: Landslide Incidence and Susceptibility Map (Source: Ohio EMA)



4.8.6 Vulnerability Assessment

Infrastructure Impact

Landslides can block or damage roadways and damage existing utility infrastructure. Mine subsidence can occur under existing roadways or utility infrastructure, causing anything from minor damage to complete destruction.

Population Impact

Landslides can cause injury or death if a person is struck by or trapped under falling earthen material. Mine subsidence can cause sinkholes under occupied structures which could lead to injuries.

Property Damage

Properties caught in the path of a landslide can be completely destroyed or severely damaged. Properties, including structures, can be completely destroyed by mine subsidence.

Loss of Life

Loss of life is possible during mine subsidence or landslides. There are no known fatalities in Fulton County due to mine subsidence or landslides.

Economic Losses

Both landslides and mine subsidence can block or destroy sections of roadways vital to shipping. Stores, storage facilities, and other structures that are important to economic activity can also be severely damaged or destroyed.

4.8.7 Land Use and Development Trends

Uses that serve vulnerable populations, such as schools and hospitals, should not be placed in areas that are in high risk zones for landslides. Development should be limited to areas with minimal slope to reduce potential losses during landslides.

Figure 4.8.2: State of Ohio Total Geohazards Landslide Inventory (Source: Ohio EMA)

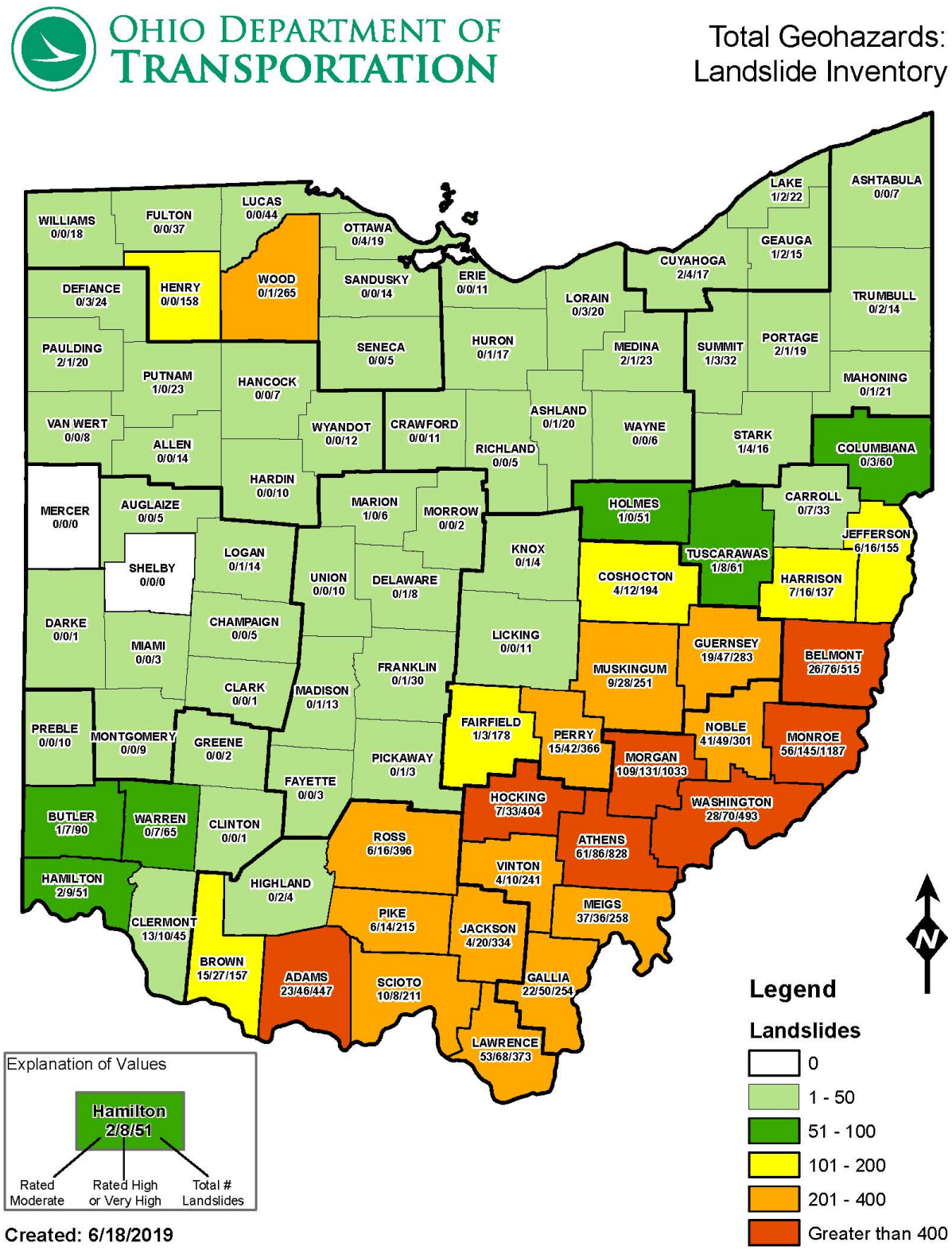
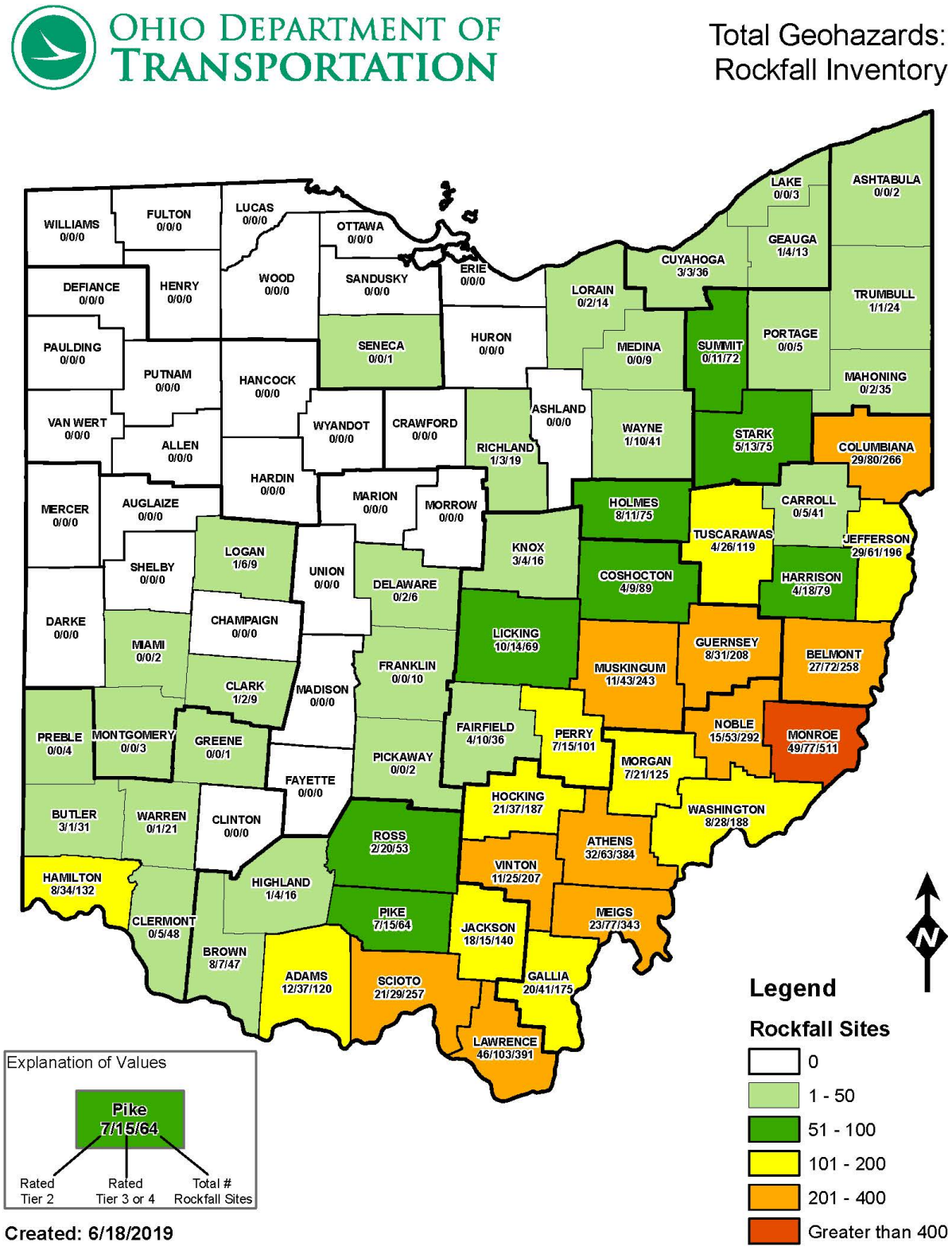


Figure 4.8.3: State of Ohio Total Geohazards Rockfall Inventory (Source: Ohio EMA)



4.9 Terrorism

4.9.1 Description

The Terrorism hazard is assessed as a way to monitor different types of terrorism and acts of violence inflicted on a civilian population. Terrorism is defined as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR, Section 0.85). Tools used to conduct acts of terrorism include Weapons of Mass Destruction (WMD), biological, chemical, nuclear, and radiological weapons, arson, incendiary, explosives, armed attacks, industrial sabotage, intentional hazardous materials release, and cyberterrorism.

The Federal Bureau of Investigations (FBI) produces an annual terrorism report, which contains profiles and chronologies of terrorism incidents in the United States. Terrorism can be both International and Domestic, where International Terrorism is defined as acts "perpetrated by individuals and/or groups inspired by or associated with designated foreign terrorist organizations or nations (state-sponsored)" (Source: FBI). The second is Domestic Terrorism, defined as acts "perpetrated by individuals and/or groups inspired by or associated with primarily U.S.-based movements that espouse extremist ideologies of a political, religious, social, racial, or environmental nature" (Source: FBI).

Types of terrorism include cyberterrorism, agroterrorism, terrorism (biological), and terrorism (chemical). Stakeholders have also requested discussion on active aggressors as part of this hazard assessment. These types of terrorism and other complex/coordinated events are defined below:

- **Cyberterrorism:** Cyberterrorism is an electronic attack using one computer system against another, and attacks can be directed towards computers, networks, or entire systems. A cyber-attack may last minutes to days. Homeland Security, the FBI, and the Federal Communications Commission Department of Justice are often involved in developing countermeasures that focus on reducing the threat, vulnerability, and likelihood of attack.
- **Agroterrorism:** Agroterrorism is a direct, generally covert contamination of food supplies or the introduction of pests and/or disease agents to crops and livestock. An agricultural-based terror attack can last days to months.
- **Biological Terrorism**: Biological terrorism includes use of bacteria, viruses, or toxins to incite terror. This mode of terrorism can last minutes to months.
- **Chemical Terrorism**: Chemical terrorism includes use of nerve agents, choking agents, blood agents, or blister agents, to attack normal bodily functions of the nervous, respiratory, circulatory, and skin, respectively. Usually, an act of chemical-based terror lasts only minutes.
- **Active Aggressor:** An active aggressor is an armed individual or group of individuals that is intending to cause harm or inflict terror on a civilian population. An active aggressor (or group) may be armed with guns, knives, bombs, or any other weapon/implement that may be used to inflict harm.

4.9.2 Location

Terrorism events have generally been localized within a single jurisdiction. Coordinated events have occurred historically, greatly expanding the number of affected jurisdictions. Based on the nature of the event, several jurisdictions may respond to an incident.

4.9.3 Extent

The extent of each of these terrorism events includes:

- **Cyberterrorism**: Typically, the built environment is unaffected by a cyber-attack. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.
- **Agroterrorism**: The extent of the effects varies by type of incident. Inadequate security can facilitate the adulteration of food and introduction of pests and disease agents to crops and livestock.
- **Biological Terrorism**: A biological attack could cause illness and even kill hundreds of thousands of people, overwhelm public health capabilities, and create significant economic, societal and political consequences. Public health infrastructure must be prepared to prevent illness and injury that would result from biological terrorism.
- **Chemical Terrorism**: Most chemical agents are capable of causing serious injuries or death, and their often-rapid course of action, means there is very little time to act when an act of chemical terrorism occurs. Public health infrastructure must be prepared to prevent illness and injury that would result from chemical terrorism.
- **Active Aggressor**: Active aggressor incidents often occur in areas where a number of people gather regularly. This may be a place of employment, a neighborhood gathering area (church, recreational center, school, etc.), or other location.

Terrorist threats may also occur among school districts within the County. Threats can last several hours or even days and cause multiple problems such as disturbing a school's order, causing traffic jams, and inducing civil panic. Individuals, groups, and institutions should be aware of, and understand how to react to, such potential threats immediately and appropriately.

4.9.4 History

There have been no reported terrorism events in Fulton County. Terrorist plots have been thwarted in Columbus, Dayton, Cincinnati, and Cleveland, among other locations. Mass shootings, such as a school shooting, are an example of an Active Aggressor situation. While there are no recorded school shootings or terrorism incidents in Fulton County, local officials have determined that the risk of such an incident occurring in Fulton County exists.

4.9.5 Probability

Terrorism-related events are not predictable. As these events are man-made, they should be considered unlikely but not impossible. Cyberattacks are becoming more likely, with 21,239 public sector attacks occurring nationwide in 2016 according to the U.S. Council of Economic Affairs. Utility systems experienced 32 attacks nationwide in 2016.

4.9.6 Vulnerability Assessment

Infrastructure Impact

Above ground structures such as government buildings, churches, libraries, and schools, as well as below-ground infrastructure such as natural gas pipelines, are at risk for terrorism damage. Acts of cyberterrorism have the potential to target systems that may influence or control infrastructure.

Population Impact
The population of Fulton County is likely to be impacted should an act of terror occur. It is important that public health organizations are prepared to prevent illness and injury that may result from acts of terror.

Property Damage
Since coordinated incidents can occur anywhere within the County, property damage is a possible outcome of such an event. Agroterrorism may result in damage to crops, and an active aggressor situation may result in minimal property damage.

Loss of Life
Acts of terror are likely to result in loss of life. It is important that public health and healthcare organizations are prepared to act quickly should an act of terror occur.

Economic Losses
Since the probability of a coordinated attack happening in Fulton County is very low, and there is less than a one percent chance of this type of hazard occurring in any given year, local terrorism-related economic losses are estimated at zero. However, terror attacks occurring in other locations have the potential to have economic impacts in Fulton County.

Transportation networks, such as air transportation, can be shut down as a result of terrorism, impeding profits and resulting in economic losses to organizations within the County. Any nationwide complex/coordinated attack or act of terror that results in a temporary freeze of goods or services has the potential to limit or suspend economic activity in Fulton County as well.

4.9.7 Land Use and Development Trends
Terrorism-related events can occur anywhere. Non-residential land uses are more likely to be targeted for terror events or active shooters. Schools and government buildings should have active shooter plans in place.

4.10 Thunderstorms

4.10.1 Description

Thunderstorm events may include severe Thunderstorms, hail, and lightning. Tornadoes and flooding may also be related to Thunderstorms as severe storm events, and due to the potential threat of these events, they are each discussed in separate risk assessments. While tropical storms and hurricanes are also forms of severe storms, Fulton County does not have any record of such events affecting the County; therefore, the County has not deemed tropical storms and hurricanes to be a threat and these specific types of weather will not be addressed further.

According to the National Weather Service (NWS), a severe thunderstorm is a thunderstorm that produces a tornado, winds of at least 58 MPH, and/or hail at least one inch in diameter. A Severe Thunderstorm Watch is issued by the NWS if conditions are favorable for the development of severe Thunderstorms. A watch is usually in place for four to eight hours, during which time people should be prepared to move to safe place if threatening weather approaches.

A Severe Thunderstorm Warning is issued if either the WSR-88D radar indicates a severe thunderstorm or if a spotter reports a storm producing hail or winds meeting the criteria outlined in the description of a severe thunderstorm. The WSR-88D radar is an advanced Weather Surveillance Doppler Radar utilized by the NWS to generate a radar image. The NWS recommends that people in the affected area seek safe shelter immediately, as severe Thunderstorms have the potential to produce tornadoes with little to no advance warning. Lightning frequency is not a criterion for issuing a severe thunderstorm warning. The warnings are usually issued for one hour and can be issued without a Severe Thunderstorm Watch already in effect. The National Weather Service Forecast Office in Northern Indiana is responsible for issuing Severe Thunderstorm Watches and Warnings for Fulton County.

Lightning is caused by a rapid discharge of electrical energy that has built up in the atmosphere between clouds, the air, or the ground. Lightning strikes can be either direct or indirect. A direct strike is when lightning strikes a building or a specific zone, which can result in fusion points melting holes of varying sizes at the point of impact of materials with high resistivity. An indirect lightning strike is when lightning causes power surges that disrupt electrical equipment.

Severe storms can also create strong winds – often called “straight-line” winds to differentiate thunderstorm winds from tornadic winds. These winds, which have the potential to cause damage, are caused by an outflow generated by a thunderstorm downdraft. Windstorms are discussed in more detail in **Section 4.15.**

Hail is a type of frozen precipitation that occurs when thunderstorm updrafts carry raindrops upward into extremely cold atmospheric zones where they freeze before falling to the ground. The resulting hailstones can fall at speeds greater than 100 MPH and range in size from smaller than 0.50 inches (the size of a pea) to 4.5 inches (the size of a softball) (Source: National Weather Service).

4.10.2 Location

Severe storms are a countywide hazard and all of Fulton County is susceptible to severe weather.

4.10.3 Extent

Severe storm events have the potential to create large-scale damage in Fulton County. Specifically, lightning is responsible for approximately 50 deaths annually across the United States, as well as

hundreds of injuries (Source: NOAA). Winds have the potential to cause damage by bringing down tree limbs and generating widespread power outages. Both strong winds and hail can result in property damage. People living in mobile homes are especially at risk for injury and death due to strong winds. Even anchored mobile homes can be seriously damaged if winds gust over 80 MPH.

4.10.4 History

According to the National Climatic Data Center (NCDC), there have been 93 thunderstorm wind events, 36 hail events, and one lightning event recorded in Fulton County from August 1962 to December 2019. These events resulted in $1.25 million in property damage and $2.0 million in crop damage. These events were not responsible for any deaths or injuries. These events are summarized in **Table 4.10.1**, below. A complete list of severe storm events can be found in **Appendix A**.

Table 4.10.1: Thunderstorm-Related Events in Fulton County since 1962

Severe Storm Event Type	Number of Events	Injuries	Deaths	Property Damages	Crop Damages
Thunderstorm Wind	93	0	0	$554,002	$0
Hail	36	0	0	$650,000	$2,000,000
Lightning	1	0	0	$50,000	$0
Total	**130**	**0**	**0**	**$1,254,002**	**$2,000,000**

The most damaging thunderstorm, hail, and lightning events, based on property and crop damages, are associated with a line of storms that approached the County on August 24, 1998, having produced high winds and tornadic activity throughout northern Indiana. These events are described below based on narratives provided by the NCDC. Fulton County has not been associated with any thunderstorm-related disaster declarations since the previous hazard mitigation plan.

August 25, 1998

This line of severe weather and Thunderstorms was responsible for $200,000 in property damage and affected the City of Wauseon and the Village of Archbold. No crop damage was reported.

August 24, 1998

Several homes near Archbold sustained moderate to severe structural damage from the high winds associated with this storm event, with hail causing significant damage. One homeowner had his chimney collapse which fell through the roof. They also lost several windows on the west side of the home from flying debris. Another homeowner had his barn blown off its foundation and had every tree on their property uprooted. Several crop fields in the area were heavily damaged by the high winds and hail.

This event was responsible for $650,000 in property damage and $2.0 million in crop damages.

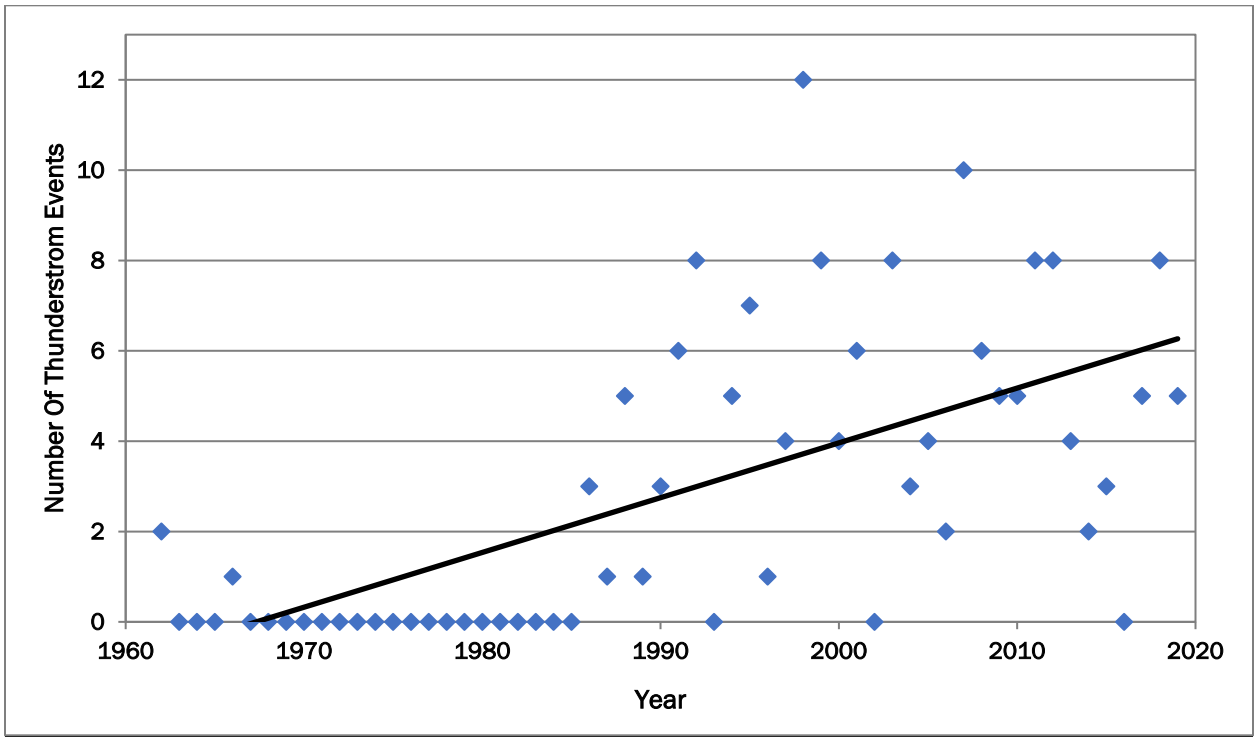
4.10.5 Probability

According to the NCDC, there have been 130 thunderstorm events reported in Fulton County from August 1962 to December 2019, with total losses reaching more than $1.25 million in property damage and $2.0 million in crop damage. This amounts to between two and three severe storm events annually with average annual damages of $57,387. It is significant to note that while there

has been a total of $2.0 million in crop damages as a result of hail, these damages are associated with only one event. Thunderstorm events do not regularly result in damages to crops; however, it is a possibility.

Furthermore, **Figure 4.10.1** below shows the trend in number of thunderstorm events per year over time. The trend line has a positive slope, which indicates thunderstorm events are becoming more common each year.

Figure 4.10.1: Thunderstorm Probability



4.10.6 Vulnerability Assessment

Infrastructure Impact

Above-ground infrastructure is at risk for storm damage by wind and falling debris. For infrastructure, high winds and hail are the most damaging part of a severe storm. High winds can strip bark from trees and detach limbs. If large branches fall, they can damage buildings and supporting above-ground infrastructure. In the most severe storms with high winds, large trees can be uprooted and have the potential to fall on buildings, including houses, which can cause harm or death.

Utilities are at risk for damage by severe storms, as well. Electrical lines are spread throughout the County connecting homes, businesses, and other facilities. Severe storms are likely to down tree limbs and generate other debris that can affect above-ground electrical lines, causing power outages. Downed power lines that are still live are extremely hazardous and can cause death by electrocution.

Population Impact

According to the American Community Survey's 2018 population estimates, the population of Fulton County is approximately 42,276. Summer storms are random in nature and affect the entire area of the County. Everyone within the County should be prepared during a storm event. Populations residing in mobile home parks are particularly vulnerable and should seek out shelters.

Property Damage
As described above, these events have caused an average of $57,387 in property and crop damages annually. Due to the non-site-specific nature of this hazard, **Table 4.10.2** lists all structures within Fulton County as having potential impacts from severe storms.

Loss of Life
Although no injuries or loss of life was reported due to the 130 thunderstorm events on record with the NCDC, there is always potential for injuries and fatalities during severe weather.

Economic Losses
Severe storms usually cause minor damage to structures, such as blowing shingles off roofs and downed branches breaking windows or falling onto buildings and above-ground infrastructure. More severe damage may also result. Of the 130 severe summer storm events since 1962, 17 events resulted in property damage of $10,000 or more. The costliest storm in the County's history was a thunderstorm wind event on August 25, 1998 which caused $200,000 in property damage between the Village of Archbold and the City of Wauseon.

Table 4.10.2: Structure Vulnerability from Severe Storms

Structure Type	Number of Properties Exposed	Value of Vulnerable Structures		
		Land	Building	Total
Residential	15,276	$113,485,850.00	$477,007,830.00	$590,493,680.00
Non-Residential	7,988	$466,326,940.00	$296,274,420.00	$762,601,360.00
Critical Facilities	650	$24,645,280.00	$102,451,130.00	$127,096,410.00
Total	**23,264**	**$579,812,790.00**	**$773,282,250.00**	**$1,353,095,040.00**

**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.10.7 Land Use and Development Trends
Severe storms can occur anywhere. Any development that has occurred since the previous plan and any future development has the potential to be impacted by severe storms.

4.11 Tornadoes

4.11.1 Description

FEMA defines a tornado as 'a violently rotating column of air extending from a thunderstorm to the ground.' Tornadoes can generate wind speeds of greater than 250 MPH. Tornado paths can be as large as one mile wide and 50 miles long. Nationally, there is an average of 800 tornadoes reported annually across all 50 states.

In general, the midsection of the United States experiences a higher rate of tornadoes than other parts of the country because of the recurrent collision of moist, warm air moving north from the Gulf of Mexico with colder fronts moving east from the Rocky Mountains. Supercells, which form from rotating Thunderstorms, are the most destructive variety of tornado.

Tornado Warnings are issued by the Northern Indiana NWS Forecast Office when a tornado is indicated by the WSR-88D radar or sighted in person by spotters. The WSR-88D radar is an advanced Weather Surveillance Doppler Radar utilized by the NWS to generate a radar image. Once a warning has been issued, people in the warning area should seek shelter immediately. Warnings will include the location of the tornado, as well as what communities will be in its path. A tornado warning can be issued without a tornado watch, and they are typically issued for 30 minutes at a time. If the thunderstorm responsible for the formation of the tornado is also producing large volumes of rain, the tornado warning may be combined with a Flash Flood Warning. The NWS Office will follow up any Tornado Warnings with Severe Weather Statements to provide up to date information on the tornado and inform the public when the warning is no longer in effect. (Source: NWS).

4.11.2 Location

Tornadoes can occur anywhere in Fulton County. All areas and jurisdictions should be considered at risk for a tornado.

4.11.3 Extent

Tornadoes are measured by damage scale for their winds, with greater damage equating greater wind speed. The original Fujita Tornado Damage Scale (F-scale) was developed in 1971, without much consideration to a structure's integrity or condition as it relates to the wind speed required to damage it. The Enhanced Fujita-scale (EF-Scale) took effect on February 1, 2007. This scale starts with the original F-scale's F0-F5 ratings and also classifies tornado damage across 28 different types of damage indicators. These indicators mostly involve building/structure type and are assessed at eight damage levels from 1-8. Therefore, construction types and their relative strengths and weaknesses are incorporated into the EF classification given to a particular tornado. The most intense damage within the tornado path will generally determine the EF scale given the tornado. **Table 4.11.1** lists the classifications under the EF- and F-scale. It should be noted that the wind speeds listed in this table are estimates based on damage rather than measurements.

There are no plans by National Oceanic Atmospheric Administration (NOAA) or the National Weather Service to re-evaluate the historical tornado data using the enhanced scale. Therefore, this Plan and subsequent plans will reference both scales until a complete switchover is deemed necessary.

Figure 4.11.1, below, simulates an extremely destructive, worst case scenario EF5 tornado and its impacts on Fulton County assets and infrastructure. The worst-case scenario is simulated by running the EF5 tornado on a straight path through the most populated areas of the County. This theoretical scenario is performed to determine maximum potential damage within the County.

Figure 4.11.1: Worst Case Tornado Scenario

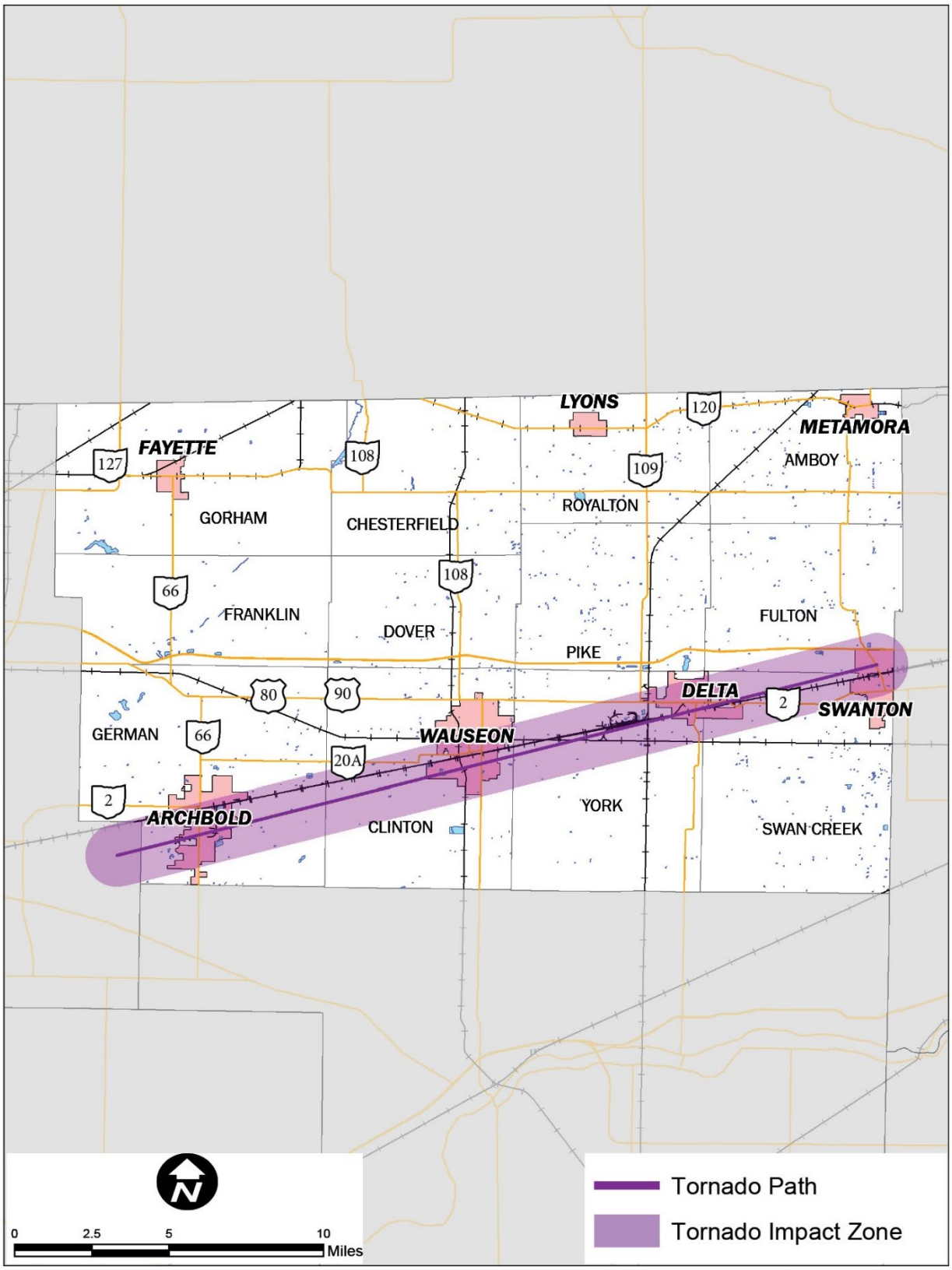


Table 4.11.1 Fujita and Enhanced Fujita Scale Classifications (Source: SOHMP)

Fujita Scale 3-Second Wind Gust (MPH)		Damage Levels	Enhanced Fujita Scale 3-Second Wind Gust (MPH)	
F0	45-78	**Light Damage**: Tree branches down.	EF-0	65-85
F1	79-117	**Moderate damage**: Roof damage.	EF-1	86-110
F2	118-161	**Considerable damage**: Houses damaged.	EF-2	111-135
F3	162-209	**Severe damage**: Buildings damaged.	EF-3	136-165
F4	210-261	**Devastating damage**: Structures leveled.	EF-4	166-200
F5	262-317	**Incredible damage**: Whole towns destroyed.	EF-5	Over 200

4.11.4 History

There have been 12 tornadoes in Fulton County between May 1954 and October 2019, resulting in a total of $5.85 million in property damage and no crop damage. These tornadoes were responsible for eight injuries and one death. Only one of these events occurred in the last ten years. Annualized property damages average to approximately $90,000. Events with recorded property damages, injuries, and fatalities are described below.

Tornado in South Delta, Fulton County on June 5, 2010

An EF-2 tornado touched down along Highway 109 just north of County Road A and moved northeast, impacting several homes, trees and power lines. Several homes were severely damaged or destroyed. Additionally, improper anchoring of some of the homes resulted in a failure on all walls, resulting in their destruction. Several trees were uprooted or damaged, including through the Maumee State Forest. The tornado ended near the Fulton/Lucas county line. The maximum width of the tornado was around 700 yards with maximum wind speeds estimated around 130 MPH. Damage is estimated at $500,000. No deaths or injuries were reported.

Tornado in Amboy Township, Fulton County on July 14, 1992

An F1 tornado caused $25,000 in property damage. There were no reported deaths or injuries. The tornado was 73 yards wide and tracked 0.1 miles.

Tornado in Pettisville, Fulton County on July 12, 1992
An F2 tornado caused $2.5 million in property damage in the Community of Pettisville, Ohio. There were eight reported injuries and no reported deaths. The tornado tracked two miles and measured 150 yards in width.

Tornado in Village of Fayette, Fulton County on May 25, 1989
An F1 tornado caused $25,000 in property damage, moving cars, imploding windows, destroying a shed, and shearing tops off trees. A factory in the Village of Fayette was also damaged. No injuries or fatalities were reported. The tornado was recorded to be 50 yards wide and tracked 2.5 miles.

Tornado in Fulton County on June 7, 1980
An F1 tornado caused $2.5 million in property damage on June 7, 1980. The tornado was recorded to be 50 yards wide and tracked one mile. No deaths or injuries were reported.

Tornado in Fulton County on June 20, 1972
A squall line moved into Fulton and Lucas counties on the evening of June 20, 1972. The F0 tornado touched down in one location destroying a house trailer and killing its lone occupant. The trailer was located 0.25 miles south of SR-2 on CR-20. Investigation of the area revealed that only the floor of the trailer, which was resting on a foundation, remained. Debris was scattered for approximately 200 yards to the southwest. Numerous trees and heavy branches were broken in the Community of Pettisville, which is just to the east of the trailer site. A total of $25,000 in property damage was reported, along with the one death. No additional injuries were recorded.

Tornado in Chesterfield Township, Fulton County on June 1, 1969
An F1 tornado measuring 33 yards wide touched ground in Chesterfield Township, tearing a mobile home into several pieces. Total property damage was estimated to be $2,500 and no deaths or injuries were reported.

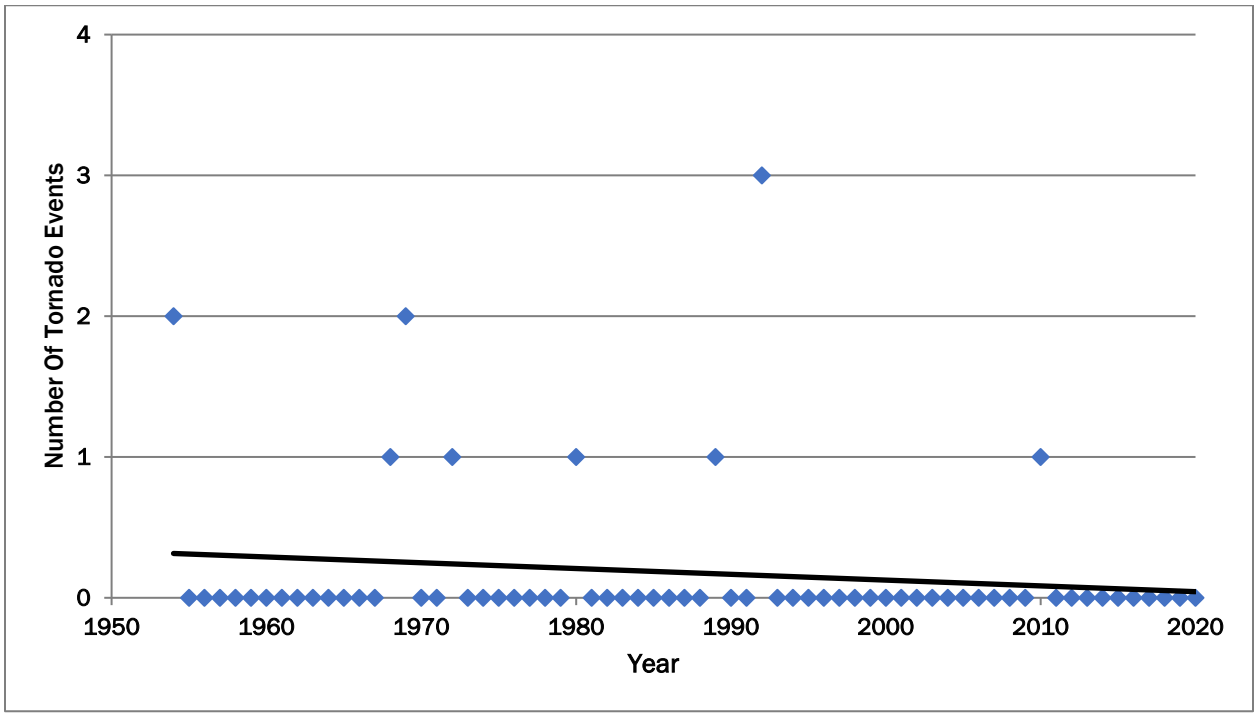
Tornado near the Village of Delta, Fulton County on July 4, 1969
An F1 skipped eastward through a rural area just south of the Village of Delta. Huge trees were uprooted, and two barns were torn apart – leaving only the foundations. At least three other buildings and two homes were damaged along the storm's path. $25,000 in property damages were recorded, and no deaths or injuries were reported.

Tornado in Gorham Township, Fulton County on April 23, 1968
An F1 tornado measuring 100 yards wide caused $25,000 in property damage. There we no reported deaths of injuries.

4.11.5 Probability
There have been 12 tornadoes in Fulton County since May 1954 and one within the past decade. As such, tornadoes are likely to occur within Fulton County and result in an average of $90,000 of property damages annually.

Figure 4.11.2 shows the trend line for the number of tornado events per year over time. The trend line has a slightly negative slope, which indicates that the number of events, on average, is decreasing slightly over time; however, it should be noted that tornadoes have the potential to occur multiple times each year if the conditions support such an event.

Figure 4.11.2: Tornado Probability



4.11.6 Vulnerability Assessment

Infrastructure Impact

Above ground infrastructure can be damaged by high tornado winds. Debris caught in the high winds can also cause damage to buildings and infrastructure, including road closure. Above ground utility infrastructure can be damaged or destroyed, which can cause service outages.

Population Impact

Tornadoes are random in nature and have the potential to occur anywhere in the County. Everyone within the County should be prepared for a tornado. Residents in mobile home parks are particularly vulnerable and should have a plan in place.

Property Damage

Tornadoes can cause significant damage to buildings and properties. There have been 12 tornadoes in Fulton County which have caused more than $5.85 million in property damage. Annually, this amounts to $90,000 in property damage. **Table 4.11.2** details the structure vulnerability from tornadoes for Fulton County.

Loss of Life

At least one life has been lost as a result of a tornado in Fulton County. There is potential for loss of life during any tornado event.

Economic Losses

Tornadoes can cause major damage to structures and roads. Higher severity tornadoes have the potential to completely destroy structures. Debris also has the potential to cause damage to structures by breaking windows, damaging walls, or falling directly onto buildings and above-ground infrastructure.

Damages to utilities and roadways may also cause economic damage due to business closures, destruction of goods that require electricity, and halting economic activity.

Table 4.11.2: Structure Vulnerability from Tornadoes

Structure Type	Number of Properties Exposed	Value of Vulnerable Structures		
		Land	Building	Total
Residential	6,525	$45,489,330.00	$188,874,730.00	$234,364,060.00
Non-Residential	2,197	$83,425,920.00	$168,778,350.00	$252,204,270.00
Critical Facilities	294	$12,802,450.00	$78,076,720.00	$90,879,170.00
Total	8,722	$128,915,250.00	$357,653,080.00	$486,568,330.00

**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.11.7 Land Use and Development Trends

Tornadoes can occur anywhere. Any development that has occurred since that previous plan and any future development has the potential to be impacted by tornadoes.

4.12 Utility Failure

4.12.1 Description

Utility failure refers to the loss of electric power (blackouts), water, sewage, natural gas or other utilities. These are primarily caused by system overload or lack of updated infrastructure. Power failures are generally caused by natural events, such as severe storms, ice storms, tornadoes, and high winds. These power failures are common and cannot easily be predicted due to the random nature of storms; however, updates to infrastructure can reduce the among and frequency of these power outages.

Fulton County residents receive electric services from American Electric Power, Toledo Edison, Ohio Edison, Duke Energy, and the Tricounty Rural Electric Cooperative, Inc. Natural gas is provided by Columbia Gas of Ohio, Dominion Energy, and Duke Energy. Residential internet providers include Spectrum, CenturyLink, Windstream, Viasat, and HughesNet. Water services are provided by the Wauseon Water Department, the Archbold Village Water Department, and the Delta Water Department.

4.12.2 Location

Depending on the cause, blackouts can be isolated or countywide. Utility failures can occur in any area where the utility is provided.

4.12.3 Extent

Utility failures due to damaged infrastructure have the potential to impact large areas of the County through the loss of utilities that provide necessary services for the population. Loss of electric or gas can affect household temperatures, which can lead to severe dehydration or possibility of loss of life if outdoor temperatures are extreme. Additionally, utility failure affecting the water service has the potential to lead to contamination of the water supply.

4.12.4 History

While numerous utility failures have occurred within Fulton County in the form of power outages due to severe storms, severe winter weather, or other natural hazards; widespread utility failure has not been recorded in the County. Events resulting in power outages can be referenced in the Risk Assessment sections of the appropriate hazard.

4.12.5 Probability

As there are no previous indications that a widespread utility failure has occurred in Fulton County, there is less than one percent chance of a widespread utility failure within the County. However, it is likely that utility failures in the form of power outages will occur throughout any given year due to severe storms, ice storms, and other natural hazards. Probability of these natural hazards can be found in their respective sections.

4.12.6 Vulnerability Assessment

Infrastructure Impact

In the event of a utility failure caused by downed power lines, roads may be closed. Utility infrastructure may also suffer long-term damage as a result of such an event.

Population Impact

Extensive utility failures can threaten the health and safety of the public. During extreme temperature events, the impacts on residents are heightened. Loss of utilities that provide air conditional or heat can create a safety hazard, especially for children and older populations. The County and/or communities should have a plan in place for how to notify and assist residents in case of utility failure.

Property Damage

Direct damage to property may result directly from downed power lines. Fires may also occur because of downed power lines.

Loss of Life

Loss of life from the loss of electricity can occur. Those who depend on electricity for necessary medical treatment are at risk. Critical facilities such as hospitals and nursing homes should be prepared in the event of a utility failure, as they manage sensitive populations that may be reliant on utilities. Downed power lines can also lead unsafe environments with live electric lines that have the potential to lead to loss of life.

Economic Losses

Blackouts are often caused by systems that are aging and deteriorating, and updates to these systems may require additional funds. Economic loss can occur because of reduced commercial activity. Goods that need electricity or other utilities for preservation may also be lost. If widespread blackouts occur, people may not be able to work, and wages or income may be lost as a result.

4.12.7 Land Use and Development Trends

Utility failure can impact any development. All development that has occurred since the previous plan and all development in the future can be impacted by utility failure.

4.13 Wildfire

4.13.1 Description

A wildfire is a fire in an area of combustible vegetation that occurs in the countryside or rural area. The Ohio Department of Natural Resources identifies Ohio's wildfire seasons as occurring primarily in the spring (March, April, and May) before vegetation has "greened-up" and in the fall (October and November) when leaf drop occurs. During these times and especially when weather conditions are warm, windy and with low humidity, cured vegetation is particularly susceptible to burning. Fuel (vegetation, woody debris), weather (wind, temperature, humidity) and topography (hills and valleys) can combine to present an extreme danger to unwary civilians and firefighters in the path of a wildfire. Each year an average of 1,000 wildfires burn 4,000 to 6,000 acres of forest and grassland within Ohio's forest fire protection district, which corresponds mostly to the state's unglaciated hill country.

4.13.2 Location

According to the *State of Ohio Hazard Mitigation Plan (SOHMP)*, Swan Creek Township has been identified as part of the Ohio Department of Natural Resources Division of Forestry's Wildfire Protection Area. Furthermore, the entirety of Fulton County has been included in the Division of Forestry's Expanded Forest Fire Protection Area. Counties within this region tend to have abundant forested lands and grasslands and, as such, represent the area of highest wildfire risk and hazard in the State of Ohio. The Ohio Wildfire Hazard Assessment is included in **Figure 4.13.1**. This assessment identifies wildfire risk level by township and classifies all townships in Fulton County as low risk for wildfire.

4.13.3 Extent

Several factors can contribute to the escalation of risk of wildfires, including the prevalence of forests and agricultural lands and their close proximity to homes, residences, and structures, as well as the distance between fire and emergency management services. In these cases, presence of fire near structures causes fire departments to shift focus away from fire suppression and towards structure protection.

According to the *SOHMP*, 99.9 percent of wildfires in Ohio are caused by human action or accident. As such, many wildfires in the State burn into close proximity of homes and structures. From 1997 to 2007, the main causes of wildfire in Ohio included debris burning, incendiary (arson), equipment, smoking, campfires, children (playing with matches), lightning, and railroad.

4.13.4 History

The *SOHMP* identifies 111 total fire events from January 1, 2007 to December 31, 2017, which averaged to ten events annually. These events burned a total of 763 acres, averaging 6.87 acres per event.

Estimating the monetary losses associated with wildfires is difficult due the fact that most of these events occur in open land or fields, with monetary losses often not being recorded. This lack of data may result in inconsistencies if an analysis was done based on reported monetary loss. As such, acres burned per fire event is a more consistent method of analysis for this hazard.

Of the 111 events, 90 fires (81.08 percent of events) burned less than ten acres, while 21 events (18.92 percent of events) burned between 10-99.9 acres. No events burned more than 100 acres.

4.13.5 Probability

According to the *State of Ohio Hazard Mitigation Plan*, there is a 100 percent probability that a wildfire will occur within any county in any given year. Since 111 total fire events occurred in Fulton County between 1/1/2007 to 12/31/2017, an average of ten fire events are estimated to occur annually in the County.

4.13.6 Vulnerability Assessment

Infrastructure Impact

There is low risk that wildfire in Fulton County will impact infrastructure. Wildfire will most likely impact the County through property and crop damage.

Population Impact

There is low risk of wildfire in Fulton County. Accordingly, there is low risk of impact to the population. If wildfire would occur within the County, the population could be impacted by loss of homes and crops.

Property Damage

As there were 111 recorded wildfire events in Fulton County's history, it is currently estimated that the County has experienced some property and crop damage as result of wildfires. Occasionally, in the event of wildfire event, fire engines belonging to local fire departments are damaged while suppressing wildfires. Wildfire suppression has resulted in a great amount of personal property being saved by fire departments.

Due to the non-site-specific nature of this hazard, **Table 4.13.1** lists all structures within Fulton County as having potential impacts from Wildfires. It also provides values for two worst-case scenarios valued at one percent damage and five percent damage.

Additionally, there are currently 50 State-owned and State-leased critical facilities located within Fulton County, as determined by the Ohio Department of Natural Resources. All 50 of these facilities are located within a low wildfire risk area and have a value of approximately $4,930,612.

Loss of Life

Fulton County has no recorded wildfire events resulting in loss of life. Because of this, it is unlikely that loss of life will result from wildfire; however, with any wildfire event, there is potential for loss of life. Advanced evacuation warnings can reduce the likelihood of death as a result of wildfire.

Economic Losses

Wildfire has the potential to damage agricultural crops and tree plantations, which can result in economic losses. Potential economic losses and damages associated with Fulton County structures and potential worst-case scenarios are recorded in **Table 4.13.1**, below.

Figure 4.13.1: ODNR Division of Forestry Wildfire Hazard Level

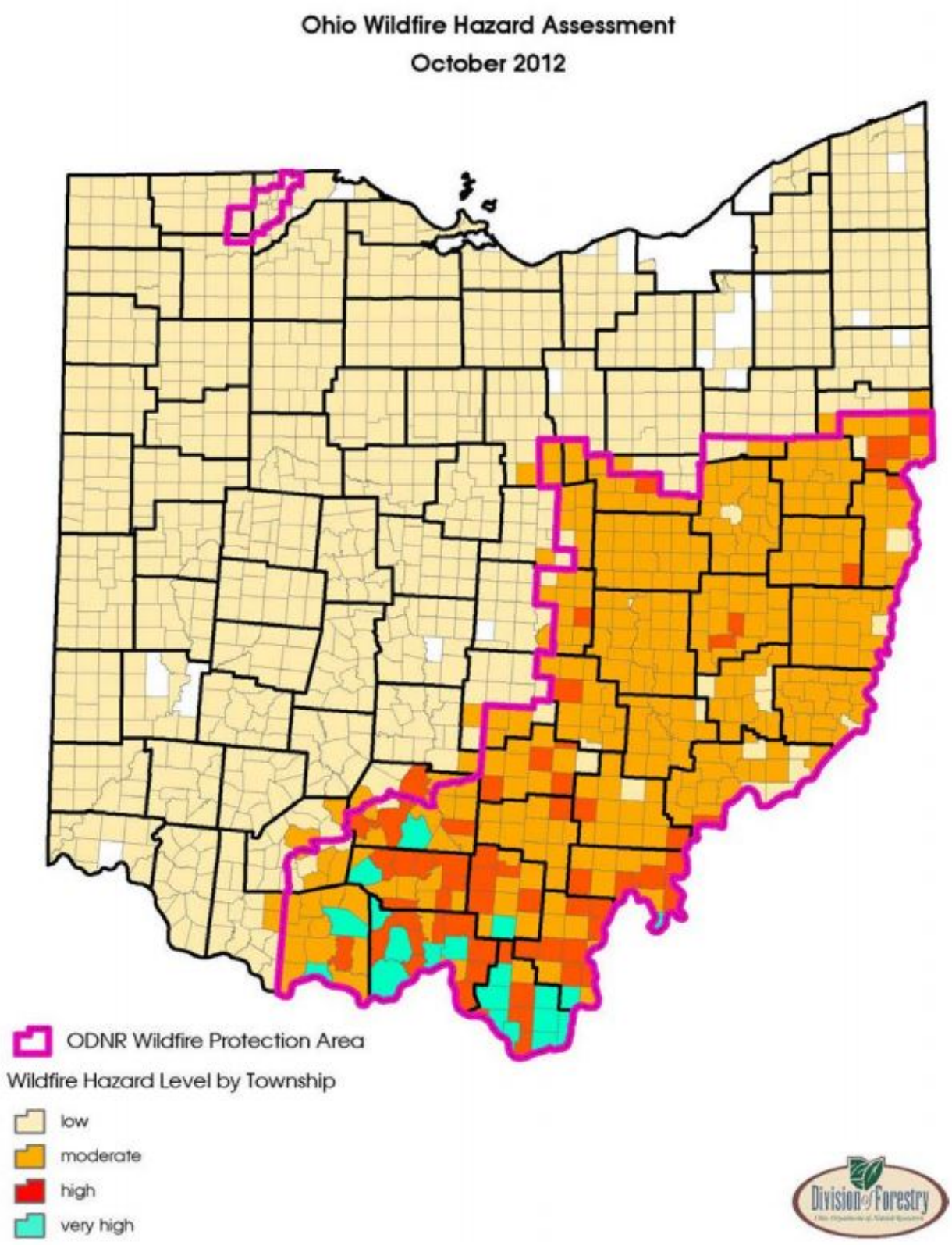


Table 4.13.1: Structure Vulnerability from Wildfires

Structure Type	Number of Properties Exposed	Total Value of Structures	Damage for 1% Scenario	Damage for 5% Scenario
Residential	15,276	$590,493,680.00	$5,904,936.80	$29,524,684.00
Non-Residential	7,988	$762,601,360.00	$7626013.60	$38,130,068.00
Critical Facilities	650	$127,096,410.00	$1,270,964.10	$6,354,820.50
Total	**23,264**	**$1,353,095,040.00**	**$13,530,950.40**	**$67,654,752.00**

**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.13.7 Land Use and Development Trends

Communities within the ODNR's Wildfire Protection Area in Swan Creek Township should be especially aware of their risk and monitor new development accordingly.

4.14 Windstorms

4.14.1 Description

Windstorms are wind events that can cause damage to trees and buildings. Damaging winds typically have speeds of at least 34 MPH, and can be either gusts of wind or long, sustained periods of strong winds. Gusts of winds can last for only a few minutes, while sustained windstorms can last for days.

Longer periods of windstorms can be caused by large, regional differences in atmospheric pressure or strong jet-stream winds. Intense winter storms can also long-lasting windstorms, since winter storms can have strong jet-stream winds.

While tornadoes, hurricanes, and tropical storms can cause wind damage, they are considered separate from windstorms and considered in separate hazard analyses.

4.14.2 Location

Windstorms are typically large events that will impact the entire County and have the potential to impact multiple counties.

4.14.3 Extent

Windstorms in Fulton County have reached 80 MPH. Windstorms can occur quickly and can impact any area within the County.

4.14.4 History

There have been at least 148 windstorm events in Fulton County from August 1962 to May 2019. These events have caused at least $7,450,000 in property damages and $3,150,000 in damages to crops. The three most damaging events, based on property damage, are described below. For all event descriptions, see **Appendix A**.

Windstorm in the Village of Lyons on June 15, 2008

County officials reported several trees down and twelve power poles being snapped. Damage is estimated at $75,000 for the power poles. No other damages were reported.

Windstorm in the Village of Archbold and the City of Wauseon on August 25, 1998

Windstorms in the Village of Archbold and the City of Wauseon were strong enough to blow air conditioners from the roofs of several structures. These windstorms caused at least $100,000 in property damage.

Countywide Windstorm on October 30, 1996

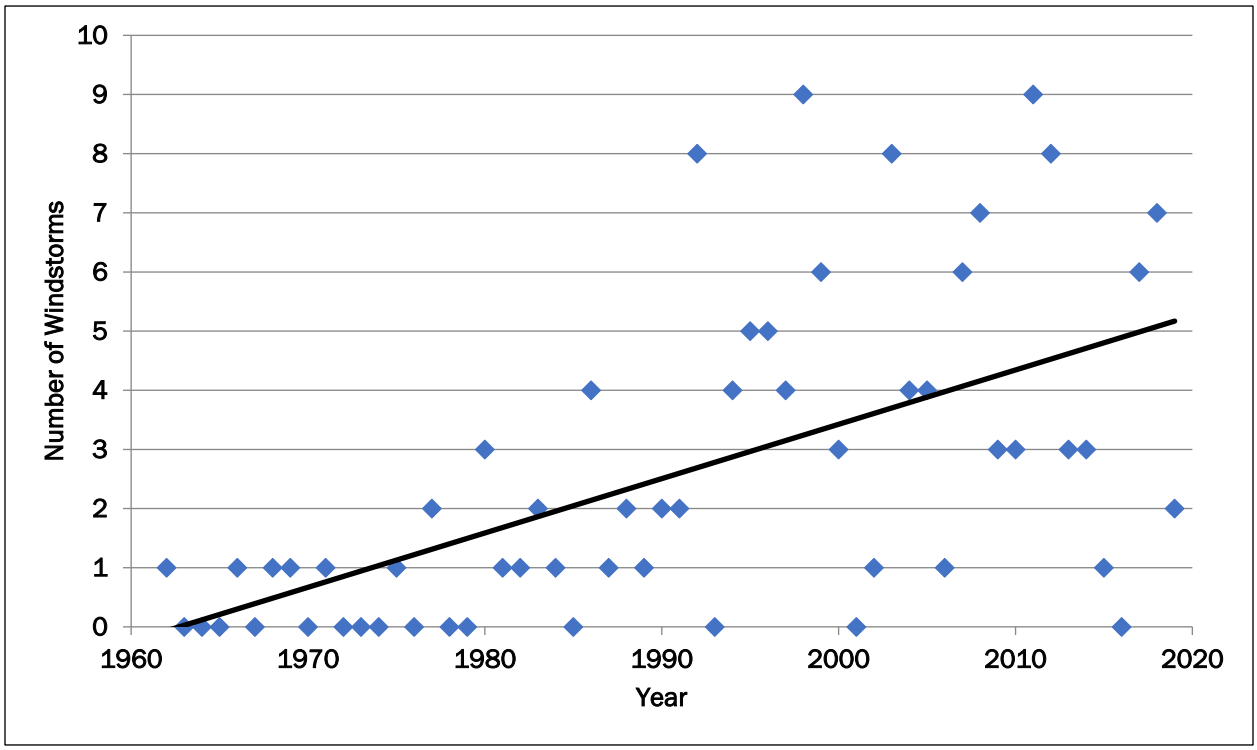
A deep low pressure moving east across Ontario, Canada brought winds of 60 to 70 MPH, with higher gusts, to Northern Ohio, including Fulton County. This windstorm caused $75,000 in property damage and $100,000 in damages to crops within Fulton County.

4.14.5 Probability

There have been at least 148 reported windstorm events from August 1962 to May 2019. **Figure 4.14.1** shows the trend line for the amount of windstorm events per year over time. The trend line has a positive slope, which indicates that windstorms are becoming more common each year. These

windstorm events are responsible for an average of $130,701.75 in property damages and $55,263.16 crop damages annually. Altogether, that amounts to $185,964.91 in damages annually.

Figure 4.14.1: Windstorm Probability



4.14.6 Vulnerability Assessment

Infrastructure Impact

Windstorms, by definition, cause at least minor damage to trees, buildings, and property. Utility poles and overhead wires are likely to be impacted by direct wind or falling branches and tree limbs. Debris may also block roadways or damage cars.

Population Impact

All residents of Fulton County have the potential to be impacted by windstorms.

Property Damage

Windstorms, by definition, cause at least minor damage to trees, buildings, and property. Building exteriors can be damaged by strong winds or roofs can be damaged or removed. Falling tree limbs can also cause damage to structures and properties.

Because Windstorms have the potential to impact the entire County, estimates of property damage to residential, non-residential, and critical facilities are provided for vulnerable structures within all of Fulton County (**Table 4.14.1**). Annual property damage cost is around $130,701.75.

Loss of Life

There are no reported deaths or injuries from the 148 recorded windstorms. Injury and loss of life are possible during windstorms.

Economic Losses

Economic losses can occur from halted economic activity, damage to electrical facilities, and road closures.

Table 4.14.1: Structure Vulnerability from Windstorms

Structure Type	Number of Properties Exposed	Value of Vulnerable Structures		
		Land	Building	Total
Residential	15,276	$113,485,850.00	$477,007,830.00	$590,493,680.00
Non-Residential	7,988	$466,326,940.00	$296,274,420.00	$762,601,360.00
Critical Facilities	650	$24,645,280.00	$102,451,130.00	$127,096,410.00
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**Note: Critical Facilities are non-residential structures and their value is incorporated into the non-residential totals, as well. Calculated totals are determined by summing the residential and non-residential values.*

4.14.7 Land Use and Development Trends

Windstorms can occur anywhere. Any development that has occurred since that previous plan and any future development has the potential to be impacted by strong winds.

4.15 Winter Storms

4.15.1 Description

Severe winter weather includes winter storms, heavy snow, and extreme cold. Winter storms are events that have snow, sleet, or freezing rain as their primary type of precipitation. While the precipitation itself is typically not dangerous, frozen roads and exposure to cold can cause death and injury.

A winter storm forms under the right combination of three causes.

- Below freezing temperatures in the clouds and near the ground, which are necessary to make snow and ice.
- Lift, which raises the moist air from the clouds and causes precipitation. Warm air colliding with cold air and being forced to rise over the cold is an example of lift.
- Moisture is needed to form clouds and precipitation. Air blowing across a body of water is a common source of moisture.

Winter storms are categorized by their type: blizzards, ice storms, lake effect storms, and snow squalls.

1. **Blizzards** are winter storms that are a combination of blowing snow and wind which lead to very low visibility. Heavy snowfalls and severe cold often accompany blizzards, but this is not required. Ground blizzards occur when strong winds pick up snow that has already fallen.
2. **Ice Storms** occur when at least a quarter inch of ice accumulates on exposed surfaces. Roads and sidewalks can become dangerously slick, and trees and powerlines can easily break under the weight of accumulated ice.
3. **Lake Effect Storms** are cold, dry air masses that move over the Great Lakes regions and drop the moisture as snow in areas near the Great Lakes.
4. **Snow Squalls** are brief, intense snow showers accompanied by strong winds. Accumulation may be significant.

4.15.2 Location

Winter storms are typically large events that will impact the entire County and have the potential to impact multiple counties.

4.15.3 Extent

The average annual snowfall in Fulton County is 28 inches. Snowfall typically occurs between November and April. January is the coldest month on average.

4.15.4 History

There have been at least 35 winter storm and winter weather events in Fulton County since December 2004. These events have not caused any property or crop damage, nor have they caused any injuries or deaths, according to the NCDC.

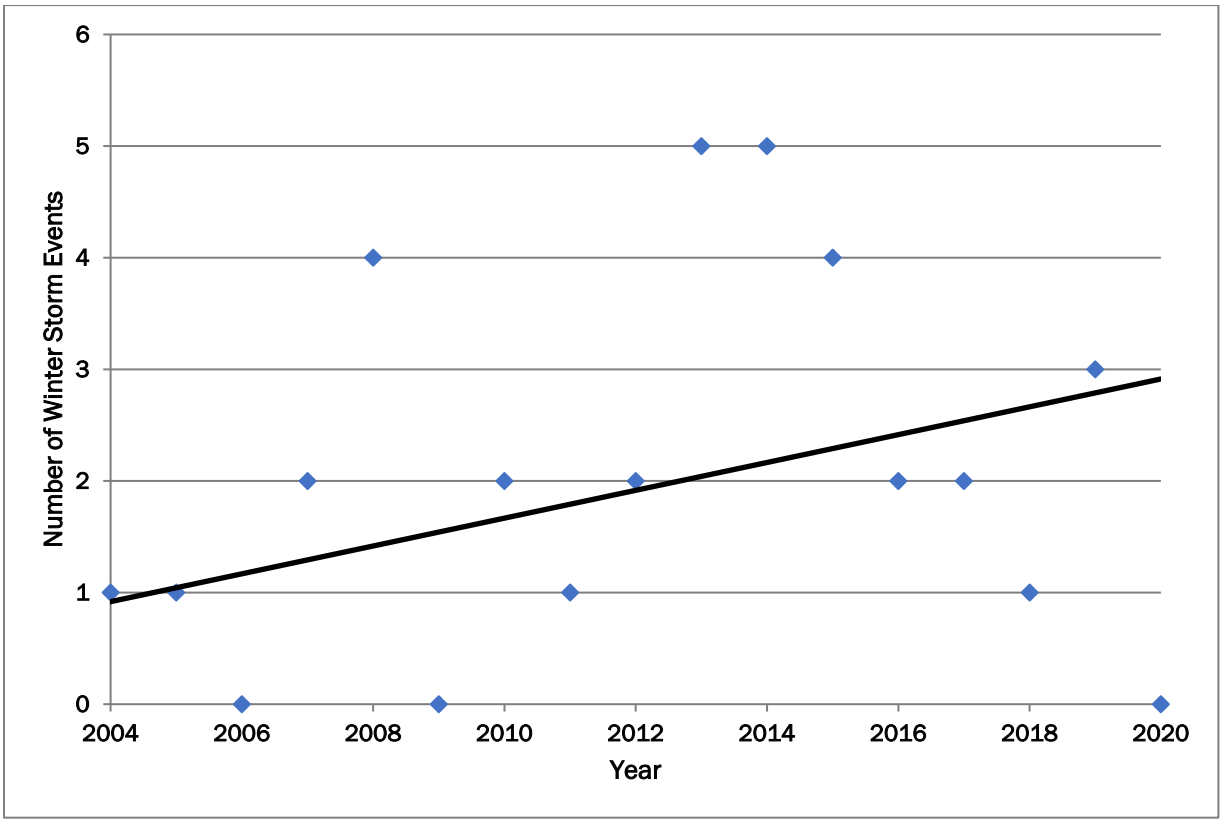
There has been one emergency declaration related to winter storms covering Fulton County. The public assistance amount for each emergency declaration was divided between all jurisdictions impacted by the event, including those outside of Fulton County,

Major Disaster Declaration on January 26, 1978 (DR-3055-OH)
A severe blizzard impacted Fulton County on January 26, 1978. $3,546,669 in public assistance was distributed throughout all impacted counties.

4.15.5 Probability

Figure 4.15.1 shows the trend of severe winter weather events over time between December 2004 and February 2019. The trend line increases over time, showing that winter storm events are becoming more common each year. On average, the County has experienced no annual property or crop damages as a result of winter storms.

Figure 4.15.1: Winter Storm Probability



4.15.6 Vulnerability Assessment

Infrastructure Impact
Winter storms can cause damage to overhead utilities. Wires in particular can collapse under the weight of accumulated snow and ice. Debris can block roadways or damage property as tree limbs can also collapse under the weight of accumulated snow and ice. Water pipes can be frozen under extreme low temperatures that may accompany severe winter storms.

Roads and sidewalks can be blocked by the accumulation of snow, as well as being iced over.

Population Impact
All residents of Fulton County are expected to be impacted by severe winter storms. The elderly and children may be more severely impacted by extreme cold.

Property Damage
Property can be damaged by accumulated snow and ice, debris, and falling wires. Extreme low temperatures can also freeze the water in pipes which could cause them to explode. All buildings are in the County are exposed and vulnerable to winter storms. Severe winter storms have caused no property damage in Fulton County; therefore, the annualized cost on property due to winter weather is $0.00. However, it is important to note that damage to infrastructure can be costly (see *Infrastructure Impact* above) and is not documented by the NCDC as property damage.

Loss of Life
There are no reported deaths from any severe weather event in Fulton County. However, there may be indirect deaths that occur from winter storms. Likely causes of death are from iced over and dangerous roads which lead to vehicular accidents, hypothermia from prolonged exposure to cold, and heart attacks from heavy snow shoveling.

Economic Losses
Economic losses can occur from businesses shutting down for potentially long periods of time. Economic activity can be completely halted during winter storms, including transportation of goods. Electricity outages may lead to spoiled goods. Since winter storms occur during the winter season, damages to crops are unlikely.

4.15.7 Land Use and Development Trends
Winter storms can occur anywhere. Any development that has occurred since that previous plan and any future development has the potential to be impacted by winter storms. All land uses are equally impacted by severe winter weather.

5 | Hazard Mitigation

5.1 Hazard Mitigation Strategy

Each potential hazard, including natural, geological, and man-made hazards, were rated by members of the Core Planning Committee, which included representatives from each jurisdiction in Fulton County. Each potential hazard was rated on a scale of zero to five, with zero indicating the hazard should not be studied and five indicating the most significant threat to the representative's community. **Table 5.1** displays the average of the representatives' ratings as a Priority Score for each hazard. The hazard that scored the highest (Hazardous Materials, 4.030), was given a Hazard Rank of one. The mitigation goals follow the ranking of hazards as established by the representatives of the participating jurisdictions.

Table 5.1: Hazard Priorities

Hazard	Priority Score	Hazard Rank
Hazardous Materials	4.030	1
Winter Storms	3.879	2
Tornadoes	3.836	3
Utility Failure	3.821	4
Thunderstorms	3.761	5
Windstorms	3.746	6
Floods	3.265	7
Terrorism	2.970	8
Drought and Extreme Heat	2.701	9
Invasive Species	2.403	10
Wildfire	1.806	11
Dam Failure	1.664	12
Landslides, Erosion, Mine Subsidence	1.239	13
Epidemic	1.075	14
Earthquakes	0.881	15

Coastal erosion and hurricanes/tropical storms are hazards that are not applicable to Fulton County and were not assessed; however, if remnants of hurricanes or tropical storms were experienced as thunderstorms, thunderstorm winds, or high/severe winds, those events were included in the thunderstorms and wind storms assessments. Seven new hazards were added to the Fulton County All Hazards Mitigation Plan since the previous Plan. These include hazardous materials, utility failure, terrorism, invasive species, wildfire, landslides, erosion and mine subsidence, and epidemic.

Mitigation projects will only be implemented if the benefits outweigh the associated cost of the proposed project. The Core Planning Committee, in coordination with the Fulton County Emergency Management Agency, performed a general assessment of each action that would require FEMA

funding as part of the planning process. A detailed cost-benefit analysis of each mitigation action will be required during the project planning phase in order to determine the economic feasibility of each action. Projects will also be evaluated for social and environmental impact-related feasibility, as well as technical feasibility and any other criteria that evaluate project effectiveness. This evaluation of each project will be performed during the pre-application phase of a grant request. Project implementation will be subject to the availability of FEMA grants and other funding sources, as well as local resources. Projects that are determined to be infeasible during this review process will be re-evaluated by members of the Core Planning Committee for re-scheduling or deletion.

5.2 Hazard Mitigation Goals and Mitigation Actions

Developing achievable goals forms the foundation for all mitigation actions and activities that will aid Fulton County in attaining the overall mission of the Core Planning Committee. As such, the Core Planning Committee assessed the goals of the 2015 Fulton County Multi-Jurisdictional Natural Hazard Mitigation Plan and had the opportunity to develop new goals for the 2020 update. Goals were reviewed and established based upon their relationship to the potential adverse impact upon the community.

The goals, as well as the hazards assessed for this Plan, informed the development of actions that the County and participating jurisdictions can take to mitigate the impacts of each of the hazards. The goals of the 2020 Fulton County All Hazards Mitigation Plan are as follows:

- **Goal 1:** Fulton County and each jurisdiction will develop, design, and implement property protection projects to reduce vulnerability to natural and man-made disaster incidents in Fulton County.
- **Goal 2:** Fulton County and each jurisdiction will take action to prevent vulnerability to natural and man-made disasters in Fulton County.
- **Goal 3:** Fulton County and each jurisdiction will protection natural resources as a way to prevent losses from natural and man-made disasters.
- **Goal 4:** Fulton County and each jurisdiction will utilize structurally engineered solutions to lessen the damages to property in the County due to disasters and extreme weather incidents.
- **Goal 5:** Fulton County and each jurisdiction will implement public information and outreach actions that inform residents of Fulton County about hazards, response and protective actions, and prevention measures.

5.3 Hazard Mitigation Action Priority

Members of the Core Planning Committee completed a Previous Mitigation Action Status survey, which indicated the status of mitigation actions included in the 2015 Multi-Jurisdictional Natural Hazard Mitigation Plan. This survey asked representatives to indicate whether the mitigation action from the previous plan was completed, deleted, deferred, unchanged, or ongoing. It also asked the representative if the action should be included in the updated Plan.

Once all mitigation actions from the previous plan were reviewed and their status indicated, all mitigation actions for the 2020 Fulton County All Hazards Mitigation Plan were reviewed and rated on a scale of one to five by members of the Core Planning Committee based on the several criteria, including whether the action was cost-effective, technically feasible, environmentally sound, needed immediately, and the action's total risk reduction.

All of the surveys collected were tabulated to develop a single raw score for each individual mitigation action. These scores are indicated on the Hazard Mitigation Action Priority Table on the following pages. Overall, the score was determined by two factors:

1. The rankings of the hazard, as determined by the Hazard Priority Survey (**Table 5.1**, above).
2. The ratings received from the Core Planning Committee and the public on each of the mitigation actions.

The raw scores were then ranked, and each mitigation action was assigned a number (1-62) to indicate the priority of that specific action, according to the survey responses.

Hazard Mitigation Action priorities are organized by hazard in **Table 5.2**. The information used to develop the priorities can be found in the Matrix Score Spreadsheet, which is located in **Appendix B**. Comments from the jurisdictions responsible for each action can be found in **Appendix F**, along with all completed surveys that were used to make **Table 5.2**.

Table 5.2: Mitigation Actions Priority Table, by Hazard

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Multiple Hazards								
1	Encourage property owners to protect their properties against loss from disasters through individual preventative actions.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	1	2	Fulton County EMA	Staff Time	03/01/20 - 03/01/25	Previous
2	Identify and search out methods to assist individual property owners to implement individual protective actions for sheltering-in-place.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	1	7	Fulton County EMA	Staff Time	03/01/20 - 03/01/25	Previous
3	Work to develop, implement and enforce building codes and construction standards as a guideline for economic development in Fulton County.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	1	9	Fulton County RPC	Staff Time	03/01/20 - 03/01/25	Previous
4	Develop and implement land use planning standards that prevent damages from occurring as a result of extreme natural hazards or disasters.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette	1	4	Fulton County RPC	Staff Time	03/01/20 - 03/01/25	Previous

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
5	Develop, adopt, implement, and enforce consistent zoning regulations in all areas of the county to protect natural resources and property from disaster damages.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	1	11	Fulton County RPC	Staff Time	03/01/20 - 03/01/25	Previous
6	Identify, evaluate, and determine how proactive mitigation efforts can be supported through grants, fees, and other methods of financial support.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta	1	6	Fulton County EMA	Staff Time	03/01/20 - 03/01/25	Previous
7	Consider advocating for and/or utilizing vegetative buffer zones and fire-resistant landscaping in new commercial construction.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta	1	12	Fulton County RPC	Staff Time	03/01/20 - 03/01/25	Previous
8	Engage in public information and outreach projects that help residents know what to do in an emergency.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons, Village of Swanton	1	1	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	Previous

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
9	Maintain and improve warning and notification systems as necessary and as funding exists by replacing and updating hardware and software as needed.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons, Village of Swanton	1	5	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Emergency Management Performance Grant (EMPG) Special Project Grants	03/01/20 - 03/01/25	Previous
10	Work to incorporate mitigation planning actions into other development and regulation planning and implementation in the County.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta	1	10	Fulton County RPC, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	Previous
11	Prepare public buildings to serve as shelters during potential hazards.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Swanton	1	8	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
12	Gather and maintain local GIS data, including tax parcels, building footprints, critical facility locations, and hazardous materials facilities in an easily shareable format.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	1	3	Fulton County GIS	Staff Time	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Dam Failure								
13	Repair and maintain, or advocate for such when not owned/controlled, any dams, dikes, and floodwalls in the County.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette	13	59	Fulton County Engineer	Capital Improvement Budgets	03/01/20 - 03/01/25	Previous
14	Complete inundation maps for Class I, II, and III dams.	Fulton County, City of Wauseon	13	60	Fulton County GIS	Staff Time	03/01/20 - 03/01/25	New
15	Encourage all dam owners to create an emergency action plan (EAP).	Fulton County, City of Wauseon, Village of Fayette	13	58	Fulton County EMA	Staff Time	03/01/20 - 03/01/25	New
Drought and Extreme Heat								
16	Increase tree plantings, especially near impervious surfaces such as parking lots.	Fulton County, City of Wauseon, Village of Archbold	10	55	Fulton County RPC, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
17	Identify local drought indicators, such as soil moisture, precipitation, temperature, and surface water levels, and record them at least once per month.	Fulton County, Village of Archbold, Village of Fayette	10	56	OSU Extension	Staff Time	03/01/20 - 03/01/25	New
18	Organize outreach to provide appropriate support (transportation to cooling centers, water delivery, etc.) to vulnerable populations, such as children or the elderly during drought and extreme heat events.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	10	54	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Epidemic								
19	Evaluate public health emergency preparedness capabilities.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette, Village of Lyons	15	62	Fulton County Health Department	Staff Time	03/01/20 - 03/01/25	New
Flooding								
20	Work to prevent flood damage to property in low-lying areas where runoff water collects.	Fulton County, Village of Fayette, Village of Lyons	8	36	Fulton County Engineer	General Operating Budget	03/01/20 - 03/01/25	Previous
21	Adopt, maintain, and enforce floodplain regulations and flood insurance mapping consistent with FEMA's floodplain management standards.	Fulton County, Village of Delta, Village of Fayette, Village of Lyons	8	32	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	Previous
22	Identify and utilize acquisition/relocation program to eliminate the damages from flooding to any repetitive or severe repetitive loss properties.	Fulton County	8	45	Fulton County EMA	General Operating Budget	03/01/20 - 03/01/25	Previous
23	Review, implement, and evaluate the storm water management plan for the purpose of flood and flash flood prevention.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta	8	35	Fulton County EMA, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Planning Assistance to States	03/01/20 - 03/01/25	Previous

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
24	Advocate for, establish, maintain, or restore natural habitat where natural habitat will serve to provide a buffer zone for riverine or flash flooding.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta	8	34	Fulton County EMA, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	Previous
25	Control development in floodplains by enforcing flood-proofing standards.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette	8	37	Fulton County RPC, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	Previous
26	Establish, maintain, and adopt maps for flood- prone areas and maintain NFIP and FIRM standards for flood zone mapping.	Fulton County, Village of Delta, Village of Fayette	8	31	Fulton County GIS, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Planning Assistance to States	03/01/20 - 03/01/25	Previous
27	Evaluate, maintain, repair, and improve storm sewers and flood water management structures in the County.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	8	33	Fulton County Engineer, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	Previous
28	Install retention ponds where floodwaters are likely or have a history of forming, and a retention pond would eliminate the vulnerability.	Fulton County, City of Wauseon, Village of Delta, Village of Fayette	8	43	Fulton County RPC, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	Previous
29	Work to elevate areas of roadways and other critical infrastructure so that heavy precipitation and/or runoff does not collect and prevent use.	City of Wauseon, Village of Archbold	8	50	Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	Previous

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
30	Develop and maintain access to a supply of sandbags to protect public property and critical infrastructure from sudden flooding or runoff.	City of Wauseon	8	48	Mayor/ Administrator of Wauseon	Capital Improvement Budgets	03/01/20 - 03/01/25	Previous
31	Advocate for, support, and facilitate construction of dams and reservoirs to contain storm water in private and public projects.	Village of Archbold	8	39	Mayor/ Administrator of Archbold	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	
32	Advocate for, support, and facilitate construction of floodwalls, dikes, and levees where such structures can provide flood control.	Village of Archbold	8	49	Mayor/ Administrator of Archbold	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	
33	Advocate for, support, and conduct as appropriate channelization modifications and maintenance, or channel diversion, to lessen the likelihood of flooding.	Village of Archbold	8	38	Mayor/ Administrator of Archbold	United States Army Corps of Engineers (USACE) Flood Control Program	03/01/20 - 03/01/25	
34	Acquire, retrofit, elevate, or relocate flood prone structures throughout Fulton County.	Fulton County, City of Wauseon, Village of Archbold, Village of Lyons	8	51	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
35	Adopt ASCE-24-05 Flood Resistant Design and Construction code, which establishes minimum requirements for building design and construction in flood hazard areas.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette	8	44	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
36	Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette	8	40	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
37	Assess the feasibility of an early flood warning/notification system.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette	8	42	Fulton County EMA	Staff Time	03/01/20 - 03/01/25	New
38	Continue to acquire structures in identified repetitive loss areas throughout Fulton County.	Fulton County, Village of Archbold,	8	47	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
39	Evaluate the feasibility of upstream surface flood storage for flood prone structures that cannot be mitigated by conventional techniques.	Fulton County, Village of Archbold	8	46	Fulton County Archbold EMA, Mayors/ Administrators of Jurisdictions	United States Army Corps of Engineers (USACE) Planning Assistance to States	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
40	Identify structure inventory for properties at-risk to flood (specifically properties located in the special flood hazard area/1% annual chance area).	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette	8	41	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
Hazardous Materials								
41	Update existing alarm systems to warn about hazardous materials spills.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons, Village of Swanton	2	14	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Emergency Management Performance Grant (EMPG) Special Project Grants	03/01/20 - 03/01/25	New
42	Complete a commodity flow study for Fulton County.	Fulton County	2	15	Fulton County EMA	Hazardous Materials Emergency Planning Grant (HMEP)	03/01/20 - 03/01/25	New
43	Maintain an inventory of hazardous waste generators and storage facilities in GIS.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette	2	13	Fulton County GIS, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
Invasive Species								
44	Develop a public awareness campaign to heighten awareness of locally occurring invasive species, including how to spot them and to prevent their distribution.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	11	57	Fulton County Health Department	Staff Time	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Landslides, Erosion, and Mine Subsidence								
45	Identify and map erosion hazard areas.	Fulton County, City of Wauseon, Village of Archbold	14	61	Fulton County GIS	Staff Time	03/01/20 - 03/01/25	New
Thunderstorms								
46	Require structures on temporary foundations to be anchored to permanent foundations.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette, Village of Lyons	6	30	Fulton County RPC, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
47	Install and maintain surge protection on critical electronic equipment.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	6	29	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Capital Improvement Budgets	03/01/20 - 03/01/25	New
48	Provide educational materials to school children about the safety procedures during severe summer storms.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	6	28	Fulton County EMA, School Districts	General Operating Budget	03/01/20 - 03/01/25	New
Terrorism								
49	Install bollards to block roadways during public events, such as festivals and parades.	Fulton County, Village of Archbold, Village of Fayette, Village of Swanton	9	53	Fulton County Sheriff, Local Police	General Operating Budget	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
50	Require active shooter training exercises in public schools and government facilities.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons, Village of Swanton	9	52	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
Tornadoes								
51	Construct community safe rooms.	Fulton County, City of Wauseon, Village of Archbold	4	21	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Capital Improvement Budgets	03/01/20 - 03/01/25	New
52	Encourage or require tornado safe room construction in mobile home parks, shopping centers, fairgrounds, and other vulnerable public structures.	Fulton County, City of Wauseon, Village of Archbold, Village of Lyons	4	20	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
53	Promote enhanced anchoring of manufactured homes.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette, Village of Lyons	4	19	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New
54	Encourage wind engineering measures and construction techniques, such as structural bracing, impact-resistant glass, and interlocking roof shingles.	Fulton County, City of Wauseon, Village of Archbold, Village of Lyons	4	22	Fulton County Engineer, Mayors/ Administrators of Jurisdictions	Staff Time	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
55	Distribute information about the locations of tornado shelters.	Fulton County, City of Wauseon, Village of Archbold, Village of Fayette, Village of Lyons	4	18	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
Utility Failure								
56	Develop, design, and implement mitigation actions to harden utility service and ensure that utilities will be dependable even during extreme weather conditions.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette	5	26	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	Previous
57	Advocate for, support, and facilitate the proper maintenance and improvement of utility lines within Fulton County.	Fulton County, City of Wauseon, Village of Delta, Village of Fayette, Village of Lyons	5	25	Fulton County EMA (coordinate with utility companies)	General Operating Budget	03/01/20 - 03/01/25	Previous
58	Install power generators in public buildings.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	5	27	Fulton County EMA, Mayors/ Administrators of Jurisdictions	Capital Improvement Budgets	03/01/20 - 03/01/25	New
59	Support tree-trimming to prevent limb breakage and safeguard nearby utility lines during severe storm events.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	5	24	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New

Hazard Mitigation Actions – Priorities Table by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
60	Develop a public outreach campaign to heighten awareness on being prepared for long-term power outages.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	5	23	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
Winter Storms								
61	Plan for and maintain adequate road and debris clearing capabilities.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Fayette, Village of Lyons	3	16	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New
62	Plant tree lines or other vegetation to limit blowing or drifting of snow onto critical roadways.	Fulton County, City of Wauseon, Village of Archbold, Village of Delta, Village of Swanton	3	17	Fulton County EMA, Mayors/ Administrators of Jurisdictions	General Operating Budget	03/01/20 - 03/01/25	New

6 | Schedule and Maintenance

6.1 Participation Overview

The 2020 Fulton County All Hazards Mitigation Plan will be adopted by all jurisdictions in Fulton County, including the County, all townships, and all villages. After the jurisdictions have adopted the plan, their signed resolutions or ordinances will be added to the plan as an Appendix.

6.2 Continued Public Involvement

The public will continue to be able to provide feedback on the Plan, as the Plan will be available through the Fulton County Emergency Management Agency and Ohio Emergency Management Agency websites. The Fulton County Emergency Management Agency will provide access to the plan to all County, municipality, and township offices, and will make the Plan available in hardcopy and electronic format to the public as appropriate. The Fulton County Emergency Management Agency Director will post notices of any meetings for updating and evaluating the Plan, using the usual methods for posting meeting announcements in the County to invite the public to participate. All meetings will be open to the general public. The Fulton County Emergency Management Agency will publicly announce the mitigation action items that are slated for development in the current year, as well as any updates to the Plan as part of the annual review process.

6.3 Plan Integration and Annual Review

6.3.1 Previous Integration Efforts

The Fulton County Emergency Management Agency and Local Emergency Planning Committee (LEPC) have worked to integrate the previous Hazard Mitigation Plan into planning processes in the County. The following courses and trainings were offered as a result of the previous plan:

- ICS-400 class was offered in Fulton County and hosted by the EMA (July 14-15, 2015)
- Tabletop exercise on May 30, 2018 Incident Assessment, Incident Command, Population protective actions, traffic and access control
- Exercise on December 12, 2018 Emergency Operations Center, Resource Management, Population Protective Actions, and Emergency Public Information
- LEPC received a certificate of recognition for the SERC in December 2018 for the Community Right to Know Program
- Weather Spotter Training offered to public March 19, 2019
- Active Shooter training offered to County employees March 28, 2019
- Electrical Safety Training offered to first responders April 3, 2019
- Several weather-related trainings for school kids

6.3.2 Future Integration Efforts

Local government plays a major role in the execution and implementation of mitigation strategies. This happens in large part during the daily operations that guide the development of various communities in the County. As such, each community will be responsible for understanding which items they are accountable for implementing. The Core Planning Committee will meet annually in order to monitor and evaluate the Fulton County All Hazards Mitigation Plan. During the annual meeting, a status update will be provided for each mitigation action by the responsible agency.

All participating jurisdictions will be encouraged to attend this yearly plan update meeting. The meeting will be held so that it coincides with the budget process so that future funding sources can be determined and set aside for actions slated for that particular year. This meeting will also be available to the public.

Additionally, each jurisdiction and the County will review the Hazard Mitigation Plan during other planning processes, such as development of comprehensive plans or capital improvement plans and incorporate appropriate goals and mitigation actions into such documents.

6.4 Updating the Plan

The Plan must be updated within five years and re-adopted by the County and all participating jurisdictions in order to maintain compliance with federal regulations and ensure eligibility for certain federal mitigation grant funds. The Fulton County Emergency Management Agency will identify any necessary modifications to the Plan, including changes in mitigation goals and actions that should be incorporated into the next update. The Fulton County Emergency Management Agency Director and the County Commissioners will initiate the process of updating the plan in accordance with federal guidelines in sufficient time to meet state and federal deadlines.