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NOBLE COUNTY HAZARD MITIGATION PLAN

January 2020

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1 | Introduction

1.1 Overview

With the Noble County, Ohio Multi-Jurisdictional Hazard Mitigation Plan 2014-2019 set to expire in November of 2019, Noble 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 man-made hazards pose a variety of risks to the lives, businesses, and properties within Noble County. As such, a Core Planning Committee within Noble County has been established with the goal of developing and implementing the 2020 Noble County Hazard 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 Noble County.

The 2020 Noble County Hazard Mitigation Plan is a multi-jurisdictional plan which considers the impacts of hazards on incorporated areas (cities and villages) and unincorporated areas (townships). Noble County's incorporated and unincorporated areas are listed below in **Tables 1.1 and 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.

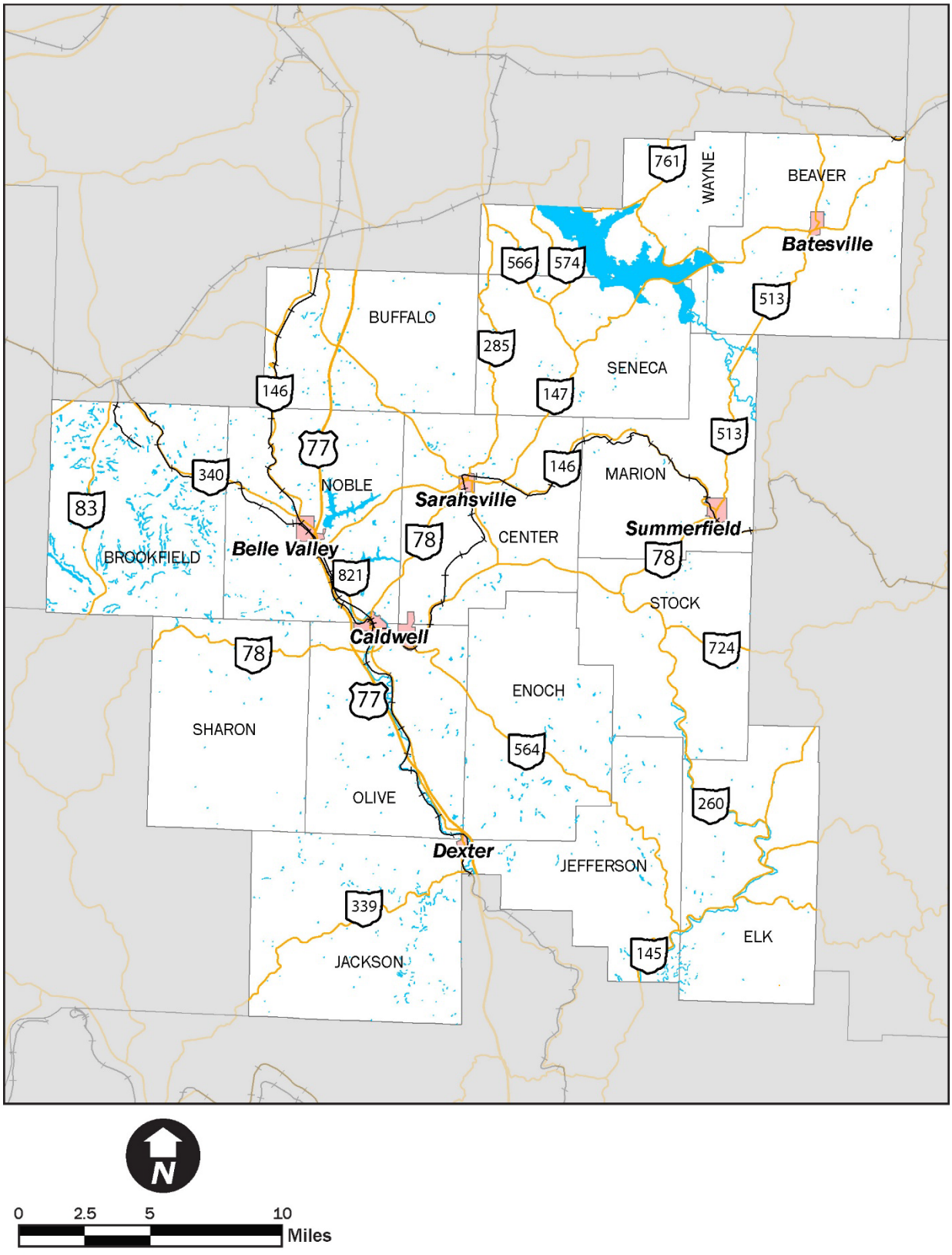
Table 1.1: Noble County Jurisdictions

Jurisdictions
Village of Batesville
Village of Belle Valley
Village of Caldwell
Village of Dexter City
Village of Sarahsville
Village of Summerfield

Table 1.2: Noble County Townships

Townships	
Beaver Township	Marion Township
Brookfield Township	Noble Township
Buffalo Township	Olive Township
Center Township	Seneca Township
Elk Township	Sharon Township
Enoch Township	Stock Township
Jackson Township	Wayne Township
Jefferson Township	

Figure 1.1 Noble 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 Noble County and its jurisdictions. These sections are as follows:

1. This **Introduction** (Section 1) provides a discussion about the general purpose and goals that Noble 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 Noble 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 Noble 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 Noble County Hazard 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 Noble 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 man-made 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 man-made 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 Noble County's vulnerability to hazards so that decision-makers can better prepare for natural and man-made 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

Noble County is located in the southeast region of Ohio, with a total area of approximately 399 square miles. Noble County contains six villages and 15 townships (**Tables 1.1-1.2**, above). The Village of Caldwell serves as the County seat. Noble County is bounded by six counties: Muskingum to the northwest, Guernsey to the north, Belmont to the northeast, Monroe to the east, Washington to the south, and Morgan to the west.

Land use patterns in Noble County are consistent with similar rural counties in Ohio. There are six land uses in Noble County, including agriculture, industrial, commercial, residential, government owned, and other (**Figure 1.2**). The most common land use in the County is active agriculture. Land cover in Noble County is shown in **Figure 1.3**. Land cover types include deciduous forest, evergreen forest, pasture, crop, open water, urban, and barren/mines.

1.3 County Features

1.3.1 Transportation

The six villages in the County are all located along highway corridors. Major roadways – Interstates (I) and State Routes (SR) – in Noble County include: I-77, SR-78, SR-83, SR-145, SR-146, SR-147, SR-215, SR-260, SR-265, SR-285, SR-313, SR-339, SR-340, SR-513, SR-564, SR-565, SR-566, SR-574, SR-672, SR-724, SR-761, and SR-821.

Noble County contains 75.68 lane miles of priority roadways and 394 lane miles of general roadways. There are no urban lane miles or active rail lines in Noble County.

The Federal Aviation Administration (FAA) has record of one aviation facility in Noble County. The Noble County Airport is a publicly owned airport located approximately five miles northeast of the Village of Belle Valley and eight miles north of the Village of Caldwell, by vehicle. Major facilities at the airport include a 3,811-foot primary runway and a turn-around taxiway. In total, three hangers on the airfield support the storage of up to 11 planes. The most frequent general aviation operations at the Noble County Airport include flight training operations, military operations, and recreational flights. Additionally, this airport supports law enforcement flights, utility line tree trimming, and military practice approaches.

1.3.2 Natural Features

Noble County is home to a variety of natural features. Wolf Run State Park is located near the Village of Caldwell and covers over 1,000 acres. Additionally, Seneca Lake Park is located in the north of Noble County and west of the Village of Batesville. It is accessible by both I-70 and I-77. Seneca Lake Park includes 3,550 acres of water along with 4,060 acres of surrounding land. Additionally, a small portion of Wayne National Forest is located in the southeastern corner of Noble County; however, the vast majority of the 240,101 acres that make up Wayne National Forest are located in Washington and Monroe counties.

Noble County also contains many streams and rivers. Tributaries of Wills Creek, including Buffalo Creek, Seneca Fork, Beaver Creek, South Fork, and Glady Run, drain the northeaster third of Noble County. These tributaries join Wills Creek and then flow north toward Guernsey County. The central portion of Noble County is primarily drained by West Fork Duck Creek, Middle Fork Duck Creek, and East Fork Duck Creek, which join in northwestern Washington County before flowing south and draining into the Ohio River. The western third of Noble County is drained by several tributaries of the Ohio River, including Olive Green Creek, Sharon Fork, Keith Fork, Big Run, and Cat Creek. The Muskingum River then flows south to join the Ohio River.

Figure 1.2: Noble County Land Use Map

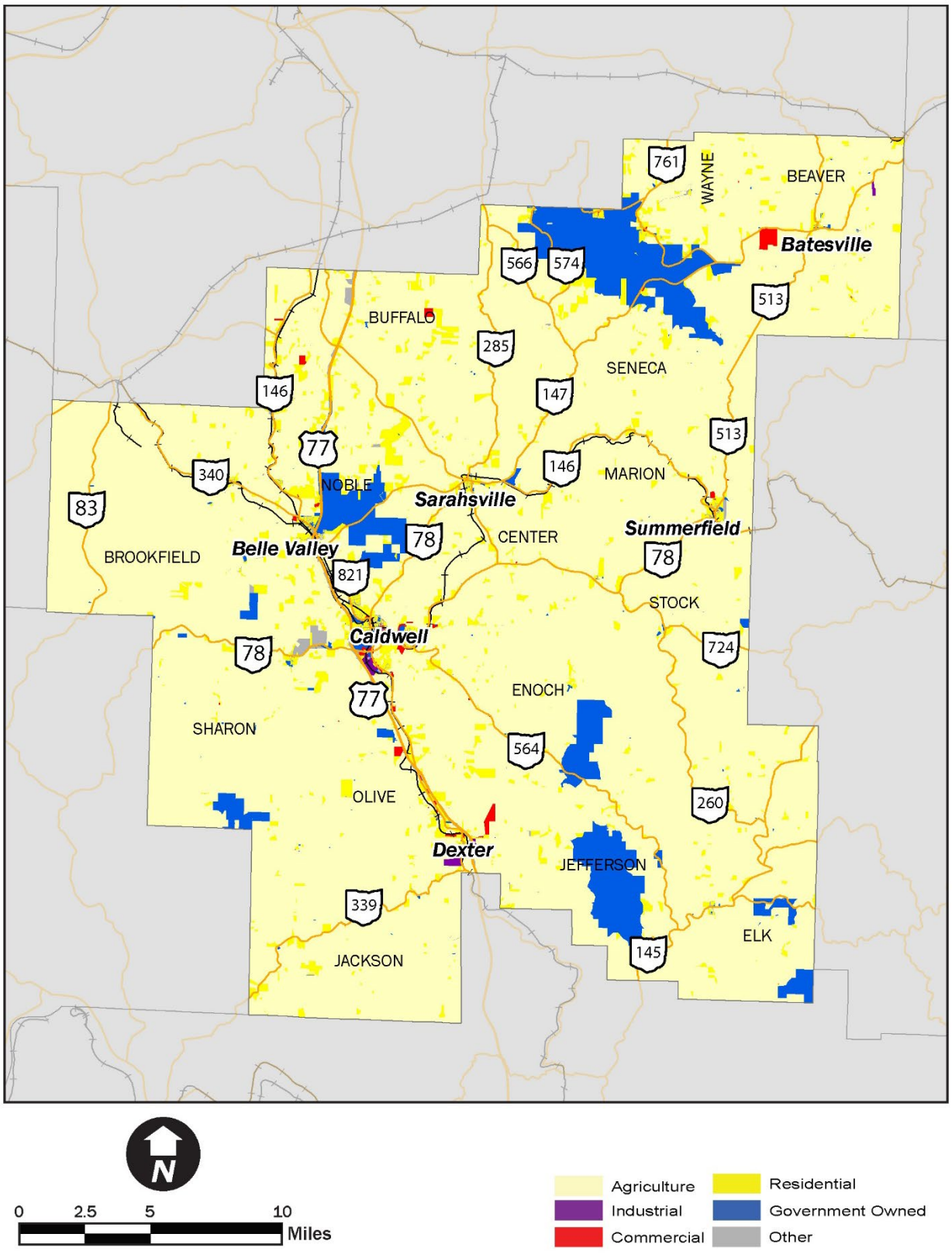
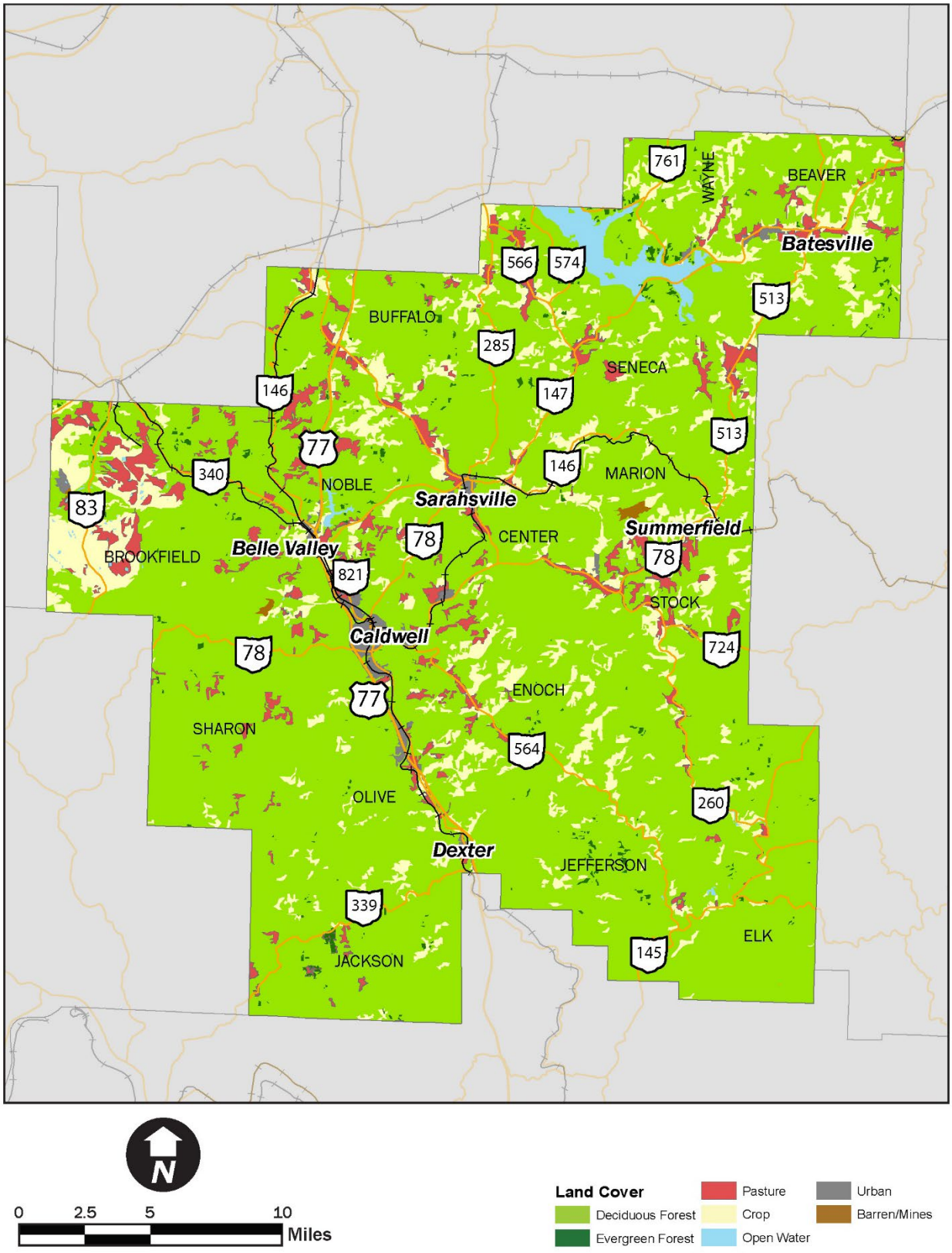


Figure 1.3: Noble County Land Cover Map



2 | History and Demographics

2.1 History

Noble County's creation was authorized by the State of Ohio on March 11, 1851. The County, which was the last county formed in Ohio, is named after James Noble, an early settler in the area. The County's population grew tremendously in the late nineteenth century after the discovery of oil in the area. The Village of Caldwell, which is home to the first oil well in the United States, saw great economic growth during this period.

There are several historical properties in Noble County, Ohio that are included on the National Register of Historic Places. These places include:

- Samuel Caldwell House (Village of Caldwell)
- Samuel Danford Farm, Church, and Cemetery (Marion Township)
- Noble County Jail and Sheriff's Office (Village of Caldwell)
- St. Henry Roman Catholic Church and Rectory (Elk Township)
- St. Mary's Church of the Immaculate Conception (Enoch Township)
- Shenandoah Crash Sites (Buffalo, Noble, and Sharon Townships)
- Abner Williams Log House (Wayne Township) – **Figure 2.1**

Figure 2.1: Abner Williams Log House

Source: BWSmith

Over the last two decades, residential development has maintained a steady pace of growth. Most of this growth is a result of people moving from surrounding urban areas outside of the County into smaller communities within the County. The northern segments of the County appear to be experiencing the most residential development with several new subdivisions over the last decade, primarily near the I-77 corridor and the Seneca Lake Region.

2.2 Communication Outlets

Additional County communication outlets, including the Noble County EMA Facebook and the local newspaper, are listed in **Table 2.1**, below:

Table 2.1: Communication Outlets

Communication Type	Source
Facebook	https://www.facebook.com/Noble-County-Ohio-Emergency-Management-Agency-181786021928130/
Newspaper	The Journal and the Noble County Leader (https://www.journal-leader.com/)

2.3 Demographics Overview

The 2017 American Community Survey (ACS), provided by the U.S. Census, offers population estimates for all townships within Noble County. **Table 2.2**, below, displays the population estimates for the 2010 Census compared to the estimates provided by the 2017 ACS, as well as the expected percent change in population. These estimates show the population of Noble County shrinking by one percent between 2010 and 2017. Ten townships experienced population decline between 2010 and 2017, while five townships experienced population growth. Jefferson Township saw the greatest population growth during this time (64.77 percent) and Sharon Township underwent the greatest decline in population (-32.75 percent).

A more detailed description of population, housing, and income demographics for Noble County and each jurisdiction is discussed on the following pages.

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
Noble County	14,645	14,498	-147	-1.00%
Beaver Township	767	753	-14	-1.83%
Brookfield Township	99	86	-13	-13.13%
Buffalo Township	815	698	-117	-14.36%
Center Township	1,110	1,114	4	0.36%
Elk Township	333	297	-36	-10.81%
Enoch Township	440	585	145	32.95%
Jackson Township	528	381	-147	-27.84%
Jefferson Township	281	463	182	64.77%
Marion Township	671	496	-175	-26.08%
Noble Township	2,118	2,065	-53	-2.50%
Olive Township	5,852	5,815	-37	-0.63%
Seneca Township	479	762	283	59.08%
Sharon Township	342	230	-112	-32.75%
Stock Township	325	334	9	2.77%
Wayne Township	485	419	-66	-13.61%

2.4 Noble County

Tables 2.3 to 2.5 summarize Noble County's population, housing statistics, and income statistics. The tables show that the County's population declined by 147 people (1.0 percent) from 2010 to 2017. For housing units, the County had owned and rental housing vacancy rates of 0.2 percent and 6.5 percent, respectively. Related to income, the largest percentage of families (20.2 percent) had an income between $50,000 and $74,999; 11.7 percent of families had an annual income of less than $15,000.

Table 2.3: Noble County Population Totals 2010-2017

Year & Source	Population Total
2010 Census	14,645
2011 ACS Estimate	14,658
2012 ACS Estimate	14,643
2013 ACS Estimate	14,639
2014 ACS Estimate	14,561
2015 ACS Estimate	14,508
2016 ACS Estimate	14,429
2017 ACS Estimate	14,498

Table 2.4: Noble County Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	6,126
Occupied Housing Units (Owned & Rented)	5,012
Vacant Housing Units (Owned & Rented)	1,114
Vacancy Rate of Owned & Rented Housing	18.2%

Table 2.5: Noble County Income Statistics 2017 Estimate

Family Income Statistics	Percent of Households
Less than $10,000	5.7%
$10,000 to $14,999	6.0%
$15,000 to $24,999	12.7%
$25,000 to $34,999	16.2%
$35,000 to $49,999	16.0%
$50,000 to $74,999	20.2%
$75,000 to $99,999	12.8%
$100,000 to $149,999	7.0%
$150,000 to $199,999	1.3%
$200,000 or more	2.0%
Median Family Income	$41,171
Mean Family Income	$59,439

2.5 Village of Batesville

Tables 2.6 to 2.8 summarize the Village of Batesville population, housing statistics, and income statistics. The tables show that the Village's population increased by 32 people (45.1 percent) from 2010 to 2017. For housing units, the Village had a combined homeowner and rental vacancy rate of 10.8 percent, which is less than that of the County. Related to income, like the County, the largest percentage of families (26.8 percent) had an income between $50,000 and $74,999; 24.4 percent of families had an annual income of less than $15,000.

Table 2.6: Village of Batesville Population Totals 2010-2017

Year & Source	Population Total
2010 Census	71
2011 ACS Estimate	97
2012 ACS Estimate	74
2013 ACS Estimate	69
2014 ACS Estimate	95
2015 ACS Estimate	87
2016 ACS Estimate	98
2017 ACS Estimate	103

Table 2.7: Village of Batesville Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	46
Occupied Housing Units (Owned & Rented)	41
Vacant Housing Units (Owned & Rented)	5
Vacancy Rate of Owned & Rented Housing	10.8%

Table 2.8: Village of Batesville Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	4.9%
$10,000 to $14,999	19.5%
$15,000 to $24,999	12.2%
$25,000 to $34,999	2.4%
$35,000 to $49,999	7.3%
$50,000 to $74,999	26.8%
$75,000 to $99,999	4.9%
$100,000 to $149,999	19.5%
$150,000 to $199,999	2.4%
$200,000 or more	0.0%
Median Family Income	Unavailable through Census.gov
Mean Family Income	$56,780

2.6 Village of Belle Valley

Tables 2.9 to 2.11 summarize Village of Belle Valley's population, housing statistics, and income statistics. The tables show that the Village's population declined by 79 people (35.4 percent) from 2010 to 2017. For housing units, the Village had a lower combined homeowner and rental vacancy rate than the County (11.0 percent). Related to income, the largest percentage of families (26.1 percent) had an income between $50,000 and $74,999; 19.6 percent of families had an annual income of less than $15,000.

Table 2.9: Village of Belle Valley Population Totals 2010-2017

Year & Source	Population Total
2010 Census	223
2011 ACS Estimate	258
2012 ACS Estimate	269
2013 ACS Estimate	308
2014 ACS Estimate	271
2015 ACS Estimate	220
2016 ACS Estimate	267
2017 ACS Estimate	302

Table 2.10: Village of Belle Valley Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	172
Occupied Housing Units (Owned & Rented)	153
Vacant Housing Units (Owned & Rented)	19
Vacancy Rate of Owned & Rented Housing	11.0%

Table 2.11: Village of Belle Valley Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	8.5%
$10,000 to $14,999	11.1%
$15,000 to $24,999	20.3%
$25,000 to $34,999	5.2%
$35,000 to $49,999	11.1%
$50,000 to $74,999	26.1%
$75,000 to $99,999	9.2%
$100,000 to $149,999	8.5%
$150,000 to $199,999	0.0%
$200,000 or more	0.0%
Median Family Income	$36,563
Mean Family Income	$49,389

2.7 Village of Caldwell

Tables 2.12 to 2.14 summarize Village of Caldwell's population, housing statistics, and income statistics. The tables show that the Village's population increased by 344 people (19.7 percent) from 2010 to 2017. For housing units, the Village had lower combined homeowner and rental vacancy rates than the County (9.5 percent). Related to income, the largest percentage of families (18.4 percent) had an income between $25,000 and $34,999; 18.8 percent of families had an annual income of less than $15,000.

Table 2.12: Village of Caldwell Population Totals 2010-2017

Year & Source	Population Total
2010 Census	1,748
2011 ACS Estimate	1,536
2012 ACS Estimate	1,927
2013 ACS Estimate	1,631
2014 ACS Estimate	1,577
2015 ACS Estimate	1,747
2016 ACS Estimate	1,781
2017 ACS Estimate	2,092

Table 2.13: Village of Caldwell Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	1,075
Occupied Housing Units (Owned & Rented)	972
Vacant Housing Units (Owned & Rented)	103
Vacancy Rate of Owned & Rented Housing	9.5%

Table 2.14: Village of Caldwell Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	8.8%
$10,000 to $14,999	10.0%
$15,000 to $24,999	15.9%
$25,000 to $34,999	18.4%
$35,000 to $49,999	12.8%
$50,000 to $74,999	13.4%
$75,000 to $99,999	11.0%
$100,000 to $149,999	8.7%
$150,000 to $199,999	0.0%
$200,000 or more	0.9%
Median Family Income	$33,664
Mean Family Income	$46,793

2.8 Village of Dexter City

Tables 2.15 to 2.17 summarize Village of Dexter City's population, housing statistics, and income statistics. The tables show that the Village's population declined by 44 people (34.1 percent) from 2010 to 2017. For housing units, the Village had a lower combined homeowner and rental vacancy rate than the County (15.5 percent). Related to income, the largest percentage of families (21.1 percent) had an income between $50,000 and $74,999; 29.0 percent of families had an annual income of less than $15,000.

Table 2.15: Village of Dexter City Population Totals 2010-2017

Year & Source	Population Total
2010 Census	129
2011 ACS Estimate	128
2012 ACS Estimate	131
2013 ACS Estimate	158
2014 ACS Estimate	132
2015 ACS Estimate	128
2016 ACS Estimate	107
2017 ACS Estimate	85

Table 2.16: Village of Dexter City Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	45
Occupied Housing Units (Owned & Rented)	38
Vacant Housing Units (Owned & Rented)	7
Vacancy Rate of Owned & Rented Housing	15.5%

Table 2.17: Village of Dexter City Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	15.8%
$10,000 to $14,999	13.2%
$15,000 to $24,999	15.8%
$25,000 to $34,999	0.0%
$35,000 to $49,999	15.8%
$50,000 to $74,999	21.1%
$75,000 to $99,999	18.4%
$100,000 to $149,999	0.0%
$150,000 to $199,999	0.0%
$200,000 or more	0.0%
Median Family Income	Unavailable through Census.gov
Mean Family Income	$41,687

2.9 Village of Sarahsville

Tables 2.18 to 2.20 summarize Village of Sarahsville's population, housing statistics, and income statistics. The tables show that the Village's population increased by three people (1.8 percent) from 2010 to 2017. For housing units, the Village had an approximate combined vacancy rate of 15.4 percent, which is lower than that of the County. Related to income, the largest percentage of families (28.2 percent) had an income between $25,000 and $34,999; 5.6 percent of families had an annual income of less than $15,000.

Table 2.18: Village of Sarahsville Population Totals 2010-2017

Year & Source	Population Total
2010 Census	166
2011 ACS Estimate	188
2012 ACS Estimate	174
2013 ACS Estimate	164
2014 ACS Estimate	168
2015 ACS Estimate	149
2016 ACS Estimate	177
2017 ACS Estimate	169

Table 2.19: Village of Sarahsville Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	84
Occupied Housing Units (Owned & Rented)	71
Vacant Housing Units (Owned & Rented)	13
Vacancy Rate of Owned & Rented Housing	15.4%

Table 2.20: Village of Sarahsville Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	0.0%
$10,000 to $14,999	5.6%
$15,000 to $24,999	9.9%
$25,000 to $34,999	28.2%
$35,000 to $49,999	26.8%
$50,000 to $74,999	19.7%
$75,000 to $99,999	4.2%
$100,000 to $149,999	4.2%
$150,000 to $199,999	1.4%
$200,000 or more	0.0%
Median Family Income	$40,417
Mean Family Income	$45,742

2.10 Village of Summerfield

Tables 2.21 to 2.23 summarize Village of Summerfield's population, housing statistics, and income statistics. The tables show that the Village's population decreased by nine people (-3.5 percent) from 2010 to 2017. For housing units, the Village had a combined homeowner and rental vacancy rate of 29.3 percent, which is higher than the combined vacancy rate of the County. Related to income, the largest percentage of families (21.3 percent) had an income between $25,000 and $34,999; 29.7 percent of families had an annual income of less than $15,000.

Table 2.21: Village of Summerfield Population Totals 2010-2017

Year & Source	Population Total
2010 Census	254
2011 ACS Estimate	254
2012 ACS Estimate	254
2013 ACS Estimate	243
2014 ACS Estimate	235
2015 ACS Estimate	213
2016 ACS Estimate	232
2017 ACS Estimate	245

Table 2.22: Village of Summerfield Housing Statistics 2017 Estimate

Housing Statistics	Number
Total Housing Units	133
Occupied Housing Units (Owned & Rented)	94
Vacant Housing Units (Owned & Rented)	39
Vacancy Rate of Owned & Rented Housing	29.3%

Table 2.23: Village of Summerfield Income Statistics 2017 Estimate

Family Income Statistics	Percentage of Households
Less than $10,000	19.1%
$10,000 to $14,999	10.6%
$15,000 to $24,999	4.3%
$25,000 to $34,999	21.3%
$35,000 to $49,999	11.7%
$50,000 to $74,999	11.7%
$75,000 to $99,999	10.6%
$100,000 to $149,999	8.5%
$150,000 to $199,999	2.1%
$200,000 or more	0.0%
Median Family Income	$30,625
Mean Family Income	$44,932

3 | Planning Process

3.1 Methodology

The Planning Process chapter describes the steps involved in the development of the Noble 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

Noble 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:

- Local Floodplain Management Ordinances
- Noble County Emergency Operations Plans
- Noble County Comprehensive Land Use Plan
- Noble County 2014 Multi-Jurisdictional Hazard Mitigation Plan
- Ohio Enhanced Mitigation Plan (2014)
- 2019 State of Ohio Hazard Mitigation Plan (SOHMP)

3.3 Noble County Authority to Adopt Plan

Table 3.1 lists the existing authorities and regulations in plan in Noble County and its municipalities. It is important to note that the only building codes are commercial except in the Village of Caldwell. Additionally, there are zoning ordinances only in the Village of Caldwell.

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

Community	Planning Commission	Comprehensive Plan	Floodplain Regulation	Building Codes	Zoning Ordinances	Capital Budget	Public Works Budget
Noble County	Yes	Yes	Yes	Yes	Yes	(none)	Limited in-kind wages only.
Village of Batesville	Shared County	Shared County	Yes	Yes	No	(none)	Limited in-kind wages only.
Village of Belle Valley	Shared County	Shared County	Yes	Yes	No	(none)	Limited in-kind wages only.
Village of Caldwell	Shared County	Shared County	Yes	Yes	Yes	(none)	Limited in-kind wages only.
Village of Dexter City	Shared County	Shared County	Yes	Yes	No	(none)	Limited in-kind wages only.

Community	Planning Commission	Comprehensive Plan	Floodplain Regulation	Building Codes	Zoning Ordinances	Capital Budget	Public Works Budget
Village of Sarahsville	Shared County	Shared County	Yes	Yes	No	(none)	Limited in-kind wages only.
Village of Summerfield	Shared County	Shared County	Exempt (no floodplain area)	Yes	No	(none)	Limited in-kind wages only.

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 Journal-Leader*. 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.

Noble County

- Noble County Commissioners
- Noble County Auditor
- Noble County EMA
- Noble County EMA Executive Board
- Noble County Engineer
- Noble County GIS
- Noble County Health Department
- Noble County Jobs and Family Services
- Noble County Sheriff's Office
- Noble County Soil & Water

City and Village Members

- Village of Batesville
- Village of Belle Valley
- Village of Belle Valley Volunteer Fire Dept.
- Village of Caldwell
- Village of Caldwell Volunteer Fire Company
- Village of Dexter City
- Village of Sarahsville
- Village of Summerfield
- Village of Summerfield Volunteer Fire Dept.

Township Members

- Beaver Township
- Brookfield Township
- Buffalo Township
- Center Township
- Elk Township
- Enoch Township
- Jackson Township
- Jefferson Township
- Marion Township
- Noble Township
- Olive Township
- Seneca Township
- Sharon Township
- Stock Township
- Wayne Township

Local Schools and Universities

- Caldwell Superintendent
- Shenandoah Superintendent
- OSU Extension

Private Organizations

- Antero Resources
- Ascent
- Blue Racer
- Enbridge
- Magnum Magnetics
- Markwest West
- Rover Pipeline
- Summit Acres
- United Ambulance

Water Companies

- Village of Caldwell
- Clear Water
- Pure Water
- Noble Water
- Noble Water Authority
- Tri County Water
- Guernsey County Water

Other County and State Agencies

- Ohio Department of Transportation
- Belmont County EMA
- Guernsey County EMA
- Guernsey County Water
- Morgan County EMA
- Muskingum County EMA
- Monroe County EMA
- Washington County EMA

Table 3.2: Participating Jurisdictions

Community/Organization	Representative(s)	Meetings Attended
County		
Noble County Commissioners	Brad Peoples, Commissioner	1
Noble County DJFS	Pamela Moore, Administrative Hearing Officer	1, 2
Noble County EMA & HS	Chasity Schmelzenbach, EMA Director Hailey Rossiter, Administrative Assistant	1, 2
Noble County Engineer	Del George, Engineer Corinna Fleeman, GIS Coordinator	1, 2
Noble County Health Department	Kirby Moore, Director of EH	2
Noble County Sheriff	Robert Pickenpaugh, Sheriff	1, 2
Noble Local Schools	Ruth Naw, Board Member Chris Rich, Transportation Supervisor	1, 2
Villages		
Village of Batesville	Garrison Emery, Mayor	*
Village of Belle Valley	Jane Perez, Mayor	*
Village of Caldwell	Misty Wells, Mayor	1 & *
Village of Dexter City	Christy Blair, Village Clerk	*

Community/Organization	Representative(s)	Meetings Attended
Village of Sarahsville	Molly Moore, Council Member	*
Village of Summerfield	Tabitha Schafer, Mayor Mike Mallett, Fire Chief	1 & *

These representatives were unable to attend the Core Planning Committee meetings in person, so they participated via the online surveys and through direct conversations with the County Emergency Management Agency Director 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, Richard Hays from Washington County EMA and Jeff Jadwin from the Muskingum County EMA both participated in the planning process. Richard Hays attended both Core Planning Committee meetings and Jeff Jadwin attended 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 Noble County Hazard 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 Noble County Hazard Mitigation Plan update.
- The role of the Core Planning Committee in the update process.
- Contact information for both Noble County EMA and Burton Planning Services.
- Dates and times of the Core Planning Meetings on September 18, 2019 at 2:30PM and October 16, 2019 at 2:30 PM.

3.5.2 Core Planning Committee Meeting 1

The first Core Planning Committee meeting took place on Wednesday, September 18, 2019 at 2:30 PM at the Noble County Emergency Operations Center (48535 Cold Water Creek Road, Caldwell, Ohio 43724). The meeting was announced to the Core Planning Committee via email on August 27, 2019. A total of 20 people attended, including two representatives from the Noble County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Noble County EMA Director, Chasity Schmelzenbach, who had each attendee introduce themselves. She then introduced Anna van der Zwaag and Jim Lenner from 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 Noble County Hazard Mitigation Plan. Following the completion of the presentation, Ms. van der Zwaag guided the attendees through a discussion related to the goals, hazard priorities, and mitigation actions for the 2020 Plan. This discussion included the completion of the following surveys:

Goals Survey:
The purpose of this survey was to reflect on the goals included in the 2014 Multi-Jurisdictional Hazard Mitigation Plan to determine if they were still relevant to the 2020 Plan. Each attendee reviewed the previous goals and associated objectives 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 Hazard 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 2014 Multi-Jurisdictional 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. Attendees were then asked to discuss goals and objectives related to the hazards that were not included in the previous plan.

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 2014 Multi-Jurisdictional Hazard Mitigation Plan, reflect on the status of each action, and determine if that action should be included in the 2020 Hazard Mitigation Plan. Each action was discussed as a group, with specific feedback provided by the Noble County EMA Director and other representatives.

As the previous mitigation actions were discussed, representatives were asked about projects and mitigation actions they would like to see in their community that were not included in the previous plan. Representatives were also asked to think about projects they would like to see completed for hazards that were not included in the previous plan.

3.5.3 Public Meeting 1
The first Public Meeting took place on Wednesday, September 18, 2019 at 5:30 PM at the Noble County Emergency Operations Center (48535 Cold Water Creek Road, Caldwell, Ohio 43724). A total of seven people attended, including two representatives from the Noble County Emergency Management Agency and two representatives from Burton Planning Services.

The meeting began with a brief introduction from Noble County EMA Director, Chasity Schmelzenbach, who had each attendee introduce themselves. She then introduced Anna van der Zwaag and Jim Lenner from 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 a discussion related to the goals, hazard priorities, and mitigation actions for the 2020 Plan. This discussion included the completion of the three surveys 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 townships and jurisdictions within Noble County.

3.5.4 Core Planning Committee Meeting 2

The second Core Planning Committee meeting took place on Wednesday, October 16, 2019 at 2:30 PM at the Noble County Emergency Operations Center (48535 Cold Water Creek Rd, Caldwell, Ohio 43724). A total of 17 people attended, including one representative from the Noble 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 New 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 Hazard Mitigation Plan.

3.5.5 Public Meeting 2

The second Public Meeting took place on Wednesday, October 16, 2019 at 5:30 PM at the Noble County Emergency Operations Center (48535 Cold Water Creek Rd, Caldwell, Ohio 43724). A total of five people attended, including one representative from the Noble 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 New 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 Hazard Mitigation Plan.

3.6 Public Comment Period

The 2020 Noble County Hazard Mitigation Plan will be made available to the public for review and comment for 15 days, beginning in January.

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 Noble 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 Storms. Other hazards, such as coastal erosion and coastal flooding are not applicable to Noble County and have not been included in previous hazard mitigation plans. 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 Identification and Risk Assessment

4.1 Complex/Coordinated Incident

4.1.1 Description

The Complex/Coordinated Incident 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 a hazard, and so an assessment of Active Aggressors has also been included in this section, as they have the potential to incite terror. 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.

4.1.2 Location

Complex/Coordinated Incidents 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.

4.1.3 Extent

The extent of each of these complex/coordinated 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.

4.1.4 History

There have been no reported terrorism events in Noble 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 Noble County, local officials have determined that the risk of such an incident occurring in Noble County exists.

4.1.5 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.

4.1.6 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 Noble 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 Noble 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 Noble 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 Incident or act of terror that results in a temporary freeze of goods or services has the potential to limit or suspend economic activity in Noble County as well.

4.1.7 Land Use and Development Trends
Complex/coordinated incidents 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.

4.2 Dam Failure

4.2.1 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 that 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 either Class I - IV 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.

4.2.2 Location

Dam locations can be seen in **Figure 4.2.1**. Dam properties are also listed in **Table 4.2.1.**

Figure 4.2.1: Dam Locations in Noble County, Ohio

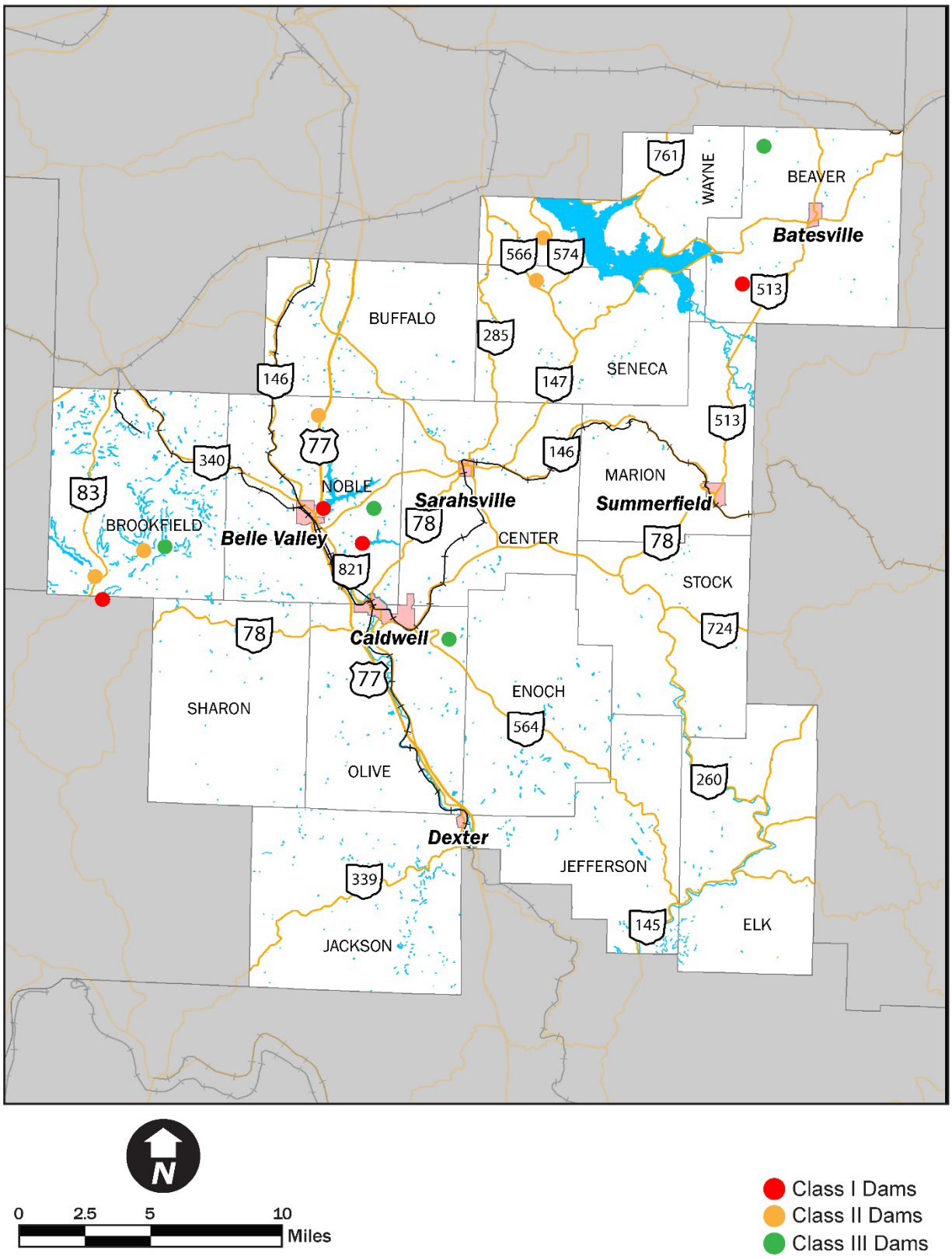


Table 4.2.1: Dams in Noble County, Ohio

Class	Name	Owner	Impoundment	Length	Height	Pool Area (Acres)	Volume (acres/ feet)	EAP (as of 10/1/19)
I	Ohio Power Company Pond MM-62 Dam	American Electric Power	Dam and Spillway	930	52.5	13	554	N/A
I	Wolf Run Lake Dam	ODNR	Dam and Spillway	700	76	214	7737	Yes
I	Caldwell Lake Dam	Village of Caldwell	Dam and Spillway	550	74.5	49.9	3165	Yes
I	Cline Lake Dam	Dr. Richard Cline	Dam and Spillway	450	47	8.3	191.9	Yes
II	Ohio Power Company Pond NB-90 Dam	American Electric Power	Dam and Spillway	605	50.8	5.5	1114	N/A
II	Ohio Power Company Pond NB-43 Dam	American Electric Power	Dam and Spillway	800	59.8	13.1	1979.2	N/A
II	Mathews Pond Dam	Gene Mathews	Dam and Spillway	300	58.1	2	41	N/A
II	Buffalo Hills Lake Dam	Buffalo Hills Properties LTD	Dam and Spillway	387	15.4	2.5	18.7	N/A
II	Darty Stowe Lake Dam	State Convention of Baptists in Ohio	Dam and Spillway	450	37.5	4.7	78.1	N/A
III	Ohio Power Company Pond NB-64 Dam	American Electric Power	Dam and Spillway	400	38	2.6	115	N/A
III	Eastern AG Research Station Dam	Eastern AG Research Station - OSU	Dam and Spillway	360	52	4.1	44.7	N/A
III	Schafer Lake Dam	JoAnn Steed et al	Dam and Spillway	330	33	2.3	30	N/A
III	Traska FWI Dam	Antero Resources	Upground	1650	27	2.8	62	Yes

**All dams included in in Table 4.2.1 are "Earthfill" in structure. The Traska FWI Dam is "Earthfill, Homogenous".*

4.2.3 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.
- Flooding of high-value 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 III dams or levees, or other dams or levees of high value. Damage to dams or levees can include, but not be limited to, overtopping of the structure.

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 in the Ohio Administrative Code Rule 1501:21-12-01 (2010), and Class IV dams and levees not otherwise listed as high-value properties in this rule.
- 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; the loss of human life is unlikely.

4.2.4 History

There have been no reported dam failures in Noble County.

4.2.5 Probability

As there have been no reported dam failures in Noble County, future dam failures are unlikely but not impossible. Additionally, since there are no historic dam failure events have occurred in the County, the annualized damages associated with this hazard average to $0 per year.

4.2.6 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 possible in a Class I dam failure. Loss of life is unlikely but not impossible in the dam failure of the other classes.

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

The Ohio Department of Natural Resources (ODNR) holds record of the completion of Emergency Action Plans (EAPs) for the dams in Noble County. To date, Noble County has record of EAPs for Wolf Run Lake Dam, Caldwell Lake Dam, Cline Lake Dam, and Traska Lake Dam.

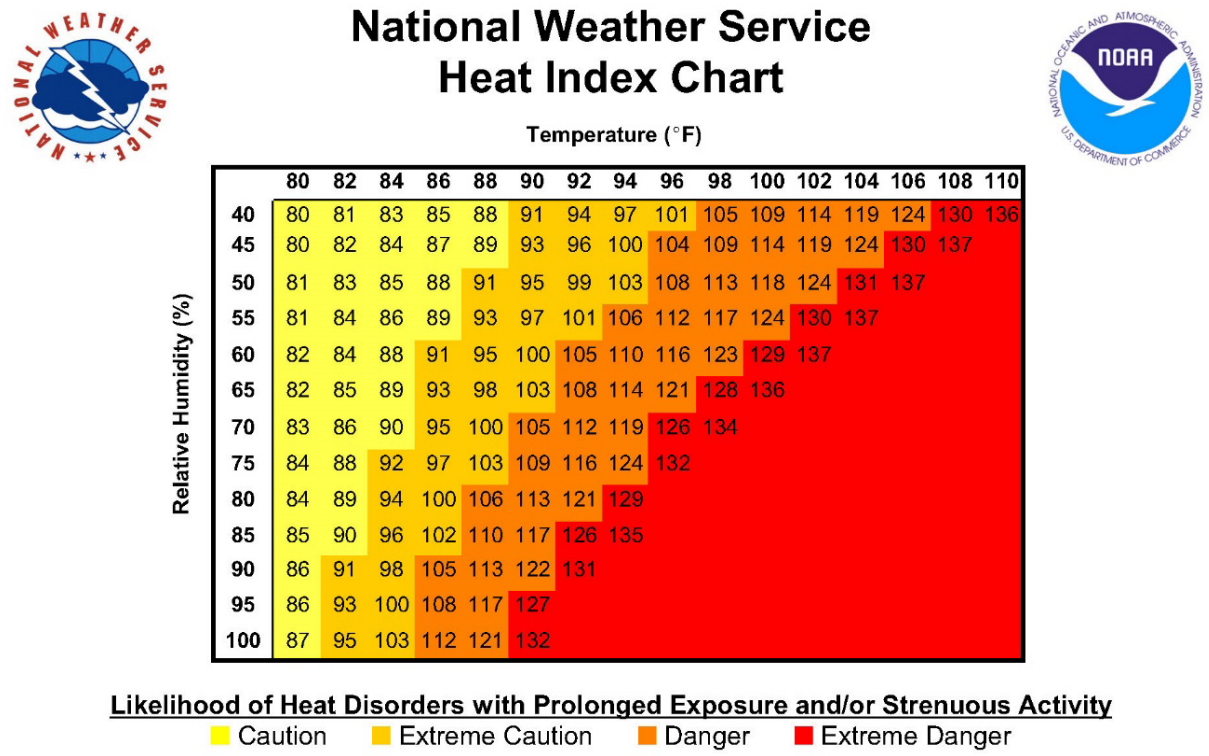
4.2.7 Land Use and Development Trends
Development that has occurred in areas that will flood after a dam failure should be prepared for rapid flooding. Land use plans can limit development in these areas.

4.3 Drought and Extreme Heat

4.3.1 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 4.3.1**.

Figure 4.3.1: Heat Index Chart (Source: National Weather Service)



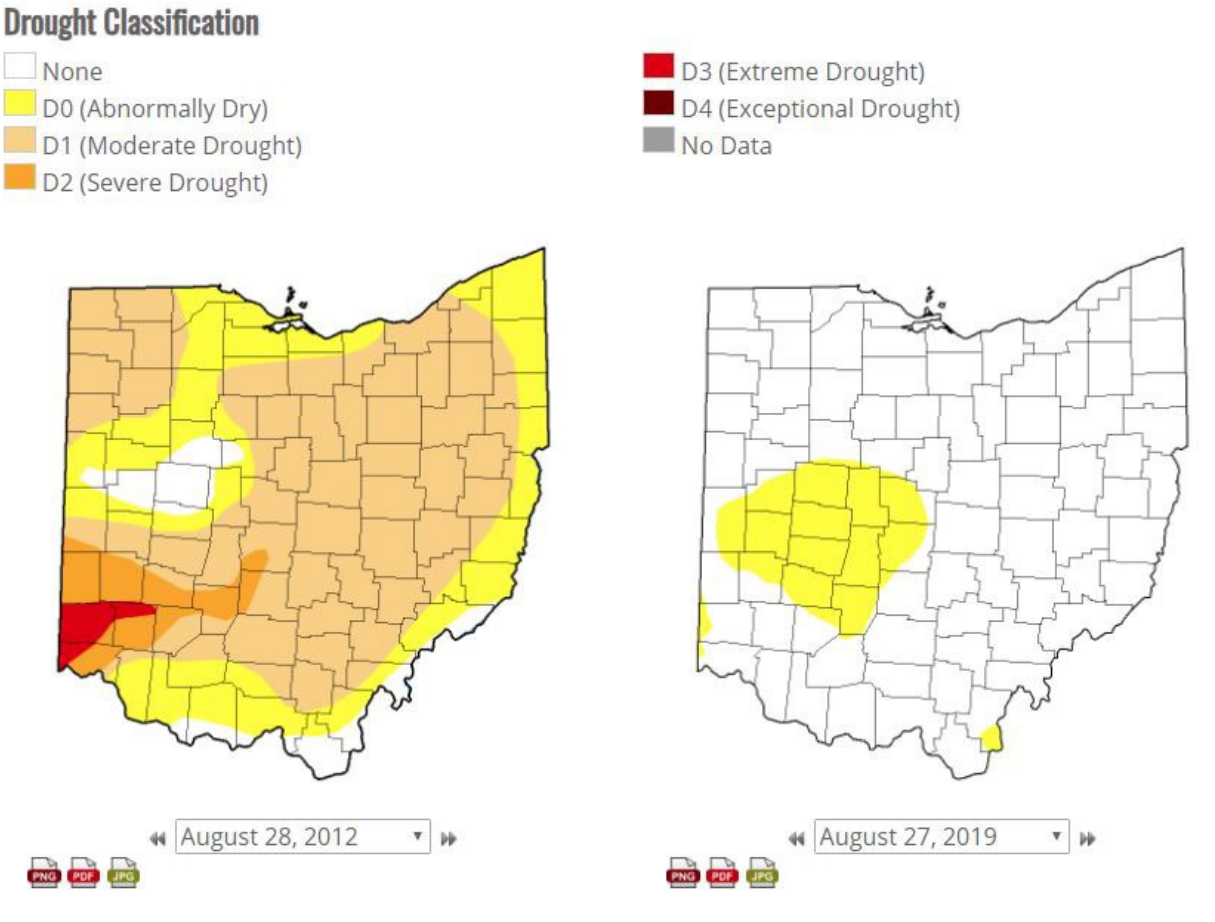
A drought is a shortage in atmospheric moisture or precipitation over an extended period of time. Droughts are common throughout all climatic zones and can range in length from a couple weeks to multiple years or decades in some areas. According to the National Oceanic and Atmospheric Administration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

4.3.2 Location

Drought and extreme heat is a countywide hazard that can affect all locations and jurisdictions in Noble 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 4.3.2** 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 4.3.2: 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.*

4.3.3 Extent

Due to the widespread nature of extreme heat events, all structures, croplands, and infrastructure may experience impacts. 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 Noble 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 Palmer Drought Severity Index 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 Palmer Drought Severity Index is a standardized index with values typically falling between -4.00 and +4.00, although extreme conditions can be greater in value (**Table 4.3.1**). Negative values

indicate drought conditions while positive values represent wet conditions. Values around zero represent near normal conditions.

Table 4.3.1: 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

4.3.4 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 Noble County, the NCDC has record of one ongoing drought event in Noble County from August 1999 to September 1999, which did not result in crop or property damages. 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

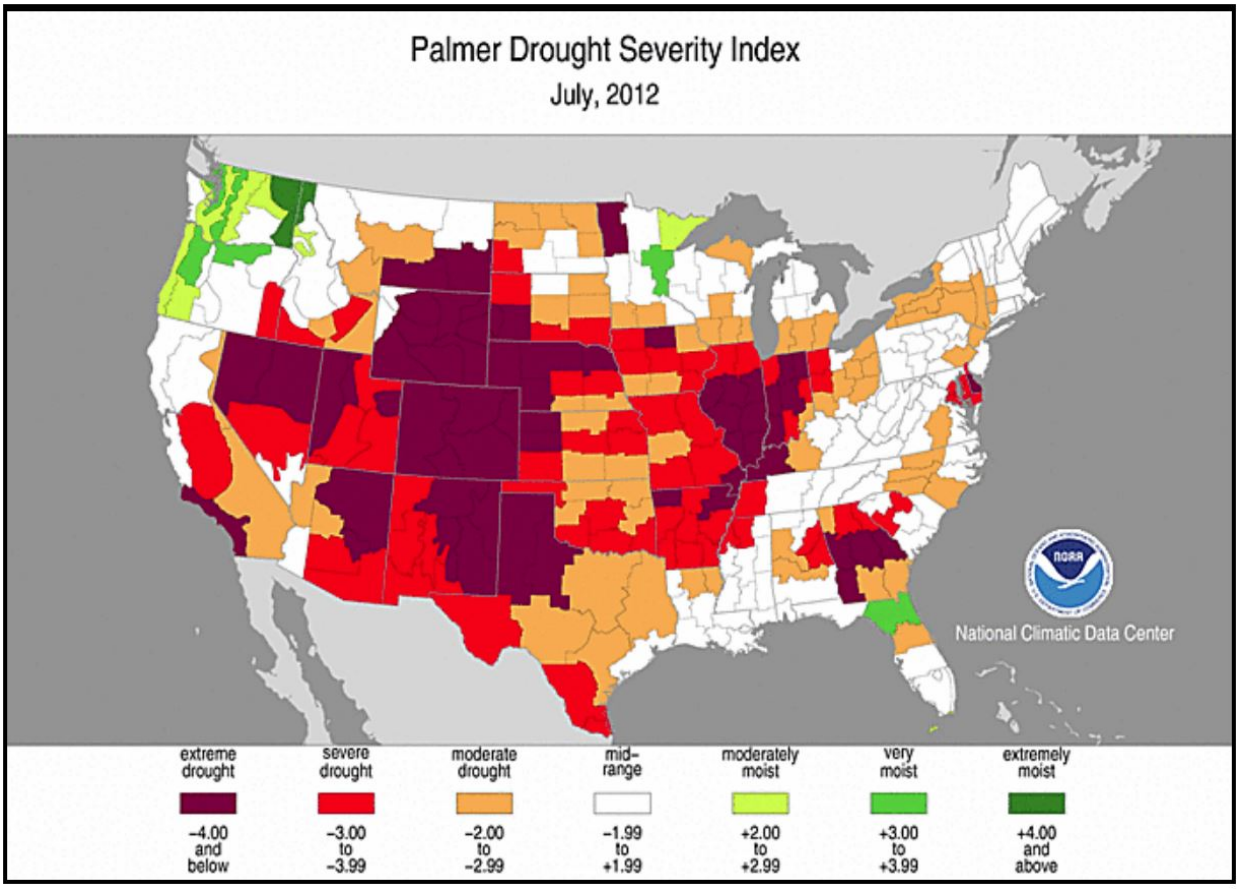
The National Weather Service recorded the drought of Summer 2012 with the following description:

"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, Noble 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 Noble County, to warrant a Secretarial disaster declaration. This declaration was issued on September 5, 2012.

Figure 4.3.3 displays the PDI of July 2012 for the continental United States.

Figure 4.3.3: Palmer Drought Severity Index for the United States in July of 2012



Drought, August-September 1999

August: The dry conditions that actually began in July 1999 continued through the month of August. On August 10, 1999, the USDA declared all of Eastern Ohio an agricultural disaster area. Precipitation deficits for the period of May through August show the area to be anywhere between two and eight inches below normal. Preliminary estimates predicted a $600 million agricultural loss statewide from the drought.

September: September rainfall for Eastern Ohio again averaged below normal, with the Palmer Drought Severity Index keeping the entire area under a moderate to severe drought. The Crop Moisture Index also showed abnormally dry conditions continuing across all of Eastern Ohio.

In the August-September Drought of 1999, there were less than 45 days of safe yield remaining.

4.3.5 Probability

Noble 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. More specifically, the County has record of two drought events from August 1999 to September 2016, which amounts to an 11.7 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.

4.3.6 Vulnerability Assessment

Drought does not have a significant impact on structures, but does have potential for significant impacts to business and people, as well as critical infrastructure. This is due to the fact that Noble County's source for over 90 percent of all the public water systems are the two surface water reservoirs. Additionally, the greatest impacts of drought are on agricultural interests, as crops may fail, and livestock may not have sufficient water resources. Economic losses are the greatest threat from droughts to Noble County. According to the 2017 Census of Agriculture developed by the USDA, top crop items based on acreage for Noble County include forage (hay/haylage), corn for grain, and corn for silage or greenchop. Commodity Loss Statistics for these crops are included in **Table 4.3.2** 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, Noble County's corn yields decreased by 5.91 percent between 2011 and 2012. Additionally, the County's corn production decreased by 26.70 bushels per acre harvested between 2011 and 2012. The total acreage of hay harvested decreased by 1,000 acres between 2011 and 2012, and total hay production decreased by 2,300 tons between those same years. This resulted in an ultimate decrease in hay yield of 0.10 tons per acre harvested between 2011 and 2012.

Table 4.3.2: Commodity Loss Statistics between 2011 and 2012 (Source: USDA)

Commodity	Units	Non-Drought Year 2011 (acres)	Drought Year 2012 (acres)	Change	Change Amount
Corn, grain - planted	Acres	1,100	600	Down	-500
Corn, grain - harvested	Acres	1,000	510	Down	-490
Yield	%	90.91	85.00	Down	-5.91
Corn, grain-production	Bushels	140,000	57,800	Down	-82,200
Yield	Bushels/acre harvested	140.0	113.3	Down	-26.70
Hay (excluding alfalfa) - harvested	acres	15,800	14,800	Down	-1,000
Hay (excluding alfalfa) - production	Tons	32,400	30,100	Down	-2,300
Yield	Tons/acre harvested	1.90	1.80	Down	-0.10

4.3.7 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.

4.4 Earthquakes

4.4.1 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 4.4.1**).

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.

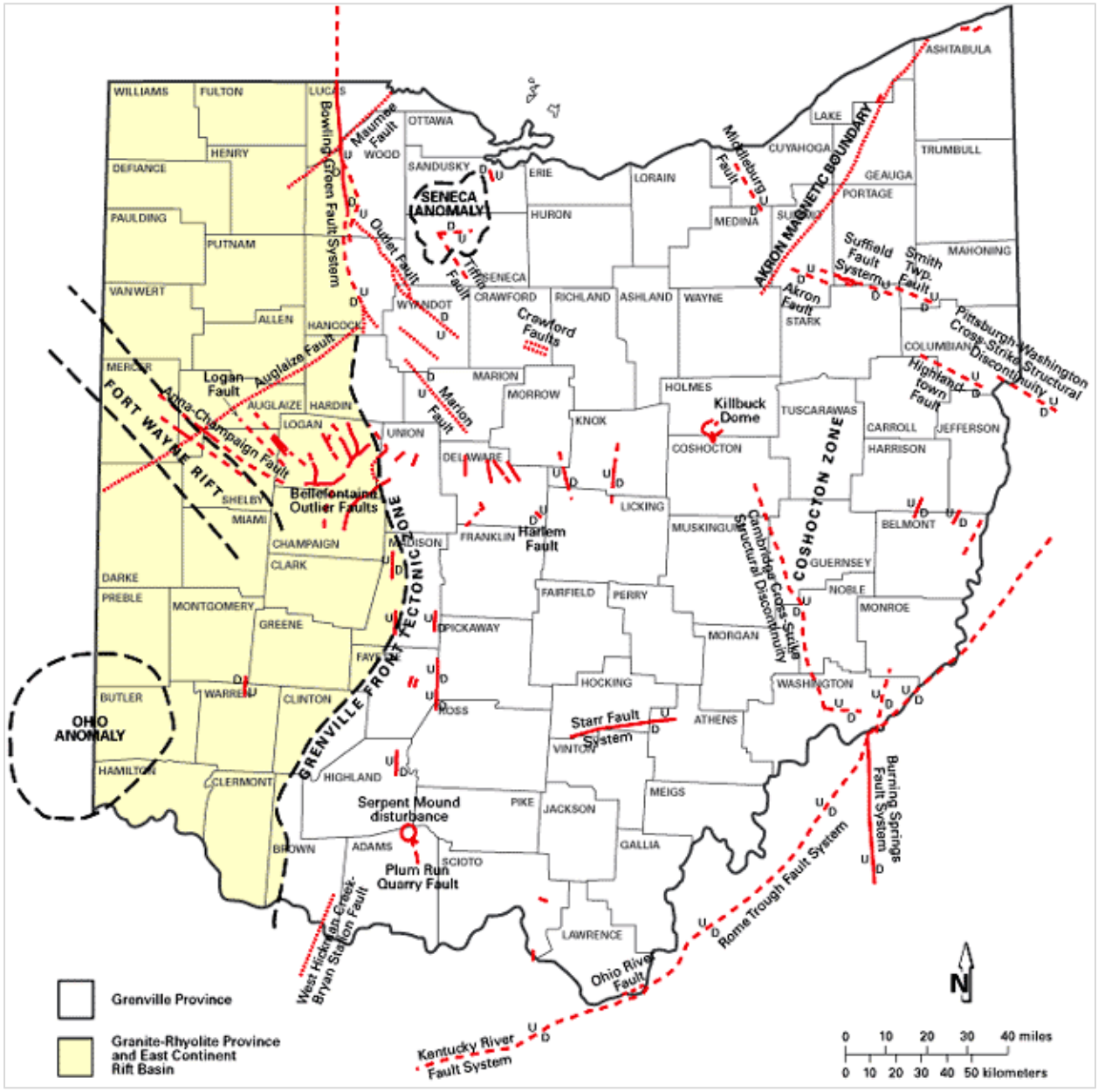
4.4.2 Location

Earthquakes are countywide hazards and can affect all areas and jurisdictions within Noble 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, the Ohio Seismic Network's map of Deep Structures in Ohio (**Figure 4.4.1**) indicates that Noble County is located near a line of structural discontinuity known as the "Cambridge-Cross-Strike".

Table 4.4.1: 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

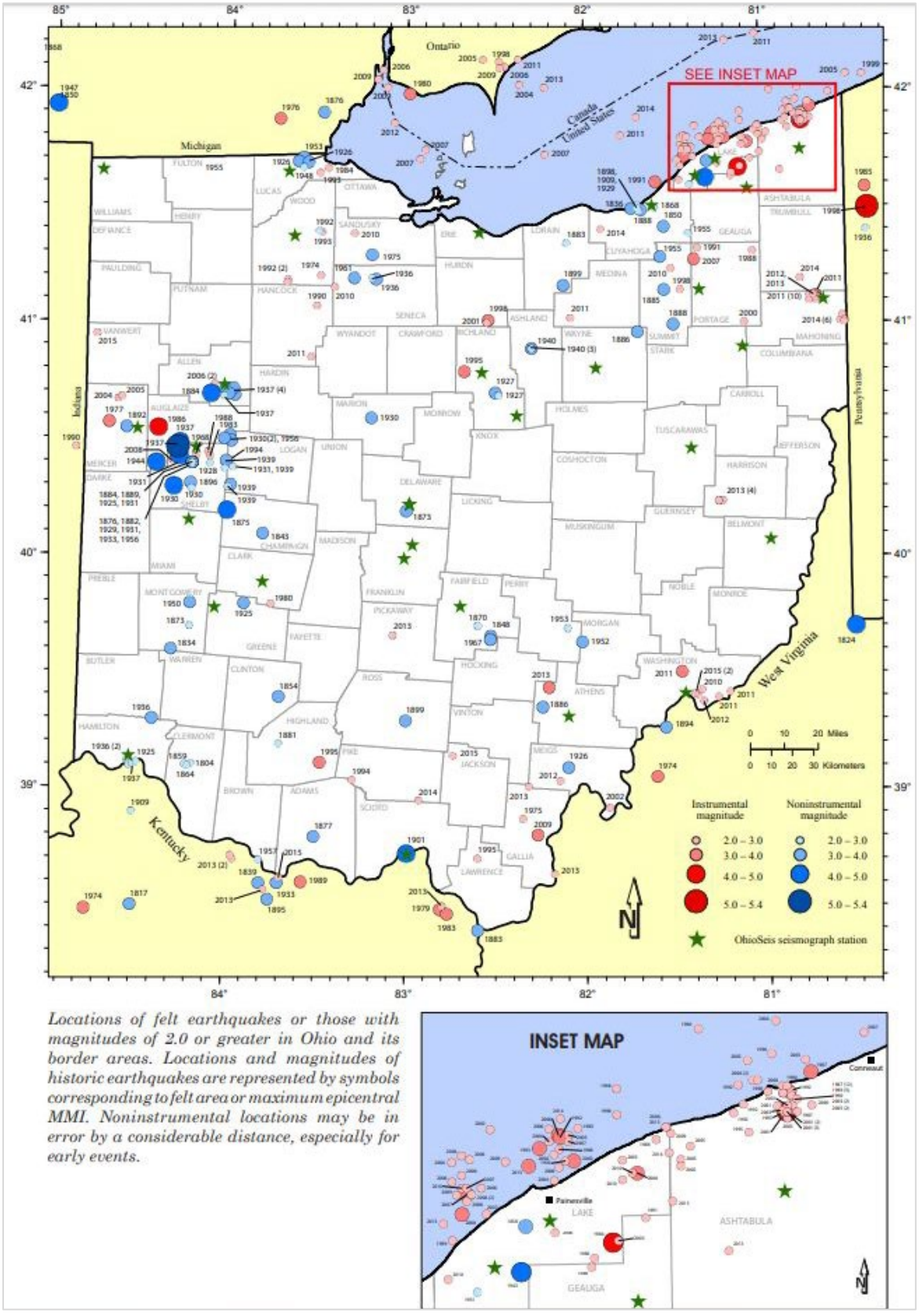
Figure 4.4.1 Map of Deep Structures in Ohio (Source: ODNR)



4.4.3 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 them (**Figure 4.4.2**). The Station P52A seismometer is located in the closest proximity to Noble County and is ideally situated in central-southeastern Ohio. Since the station was installed in July of 2012, this seismometer has recorded many earthquakes and other disturbances.

Figure 4.4.2: Earthquake Epicenters in Ohio (Source: Ohio Department of Natural Resources)



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 produce fire.

4.4.4 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 4.4.2** 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 Noble County. As such, the ODNR has history of two earthquake event with an epicenter within the County from March 17, 2011 to June 10, 2019. No damages were reported for either event.

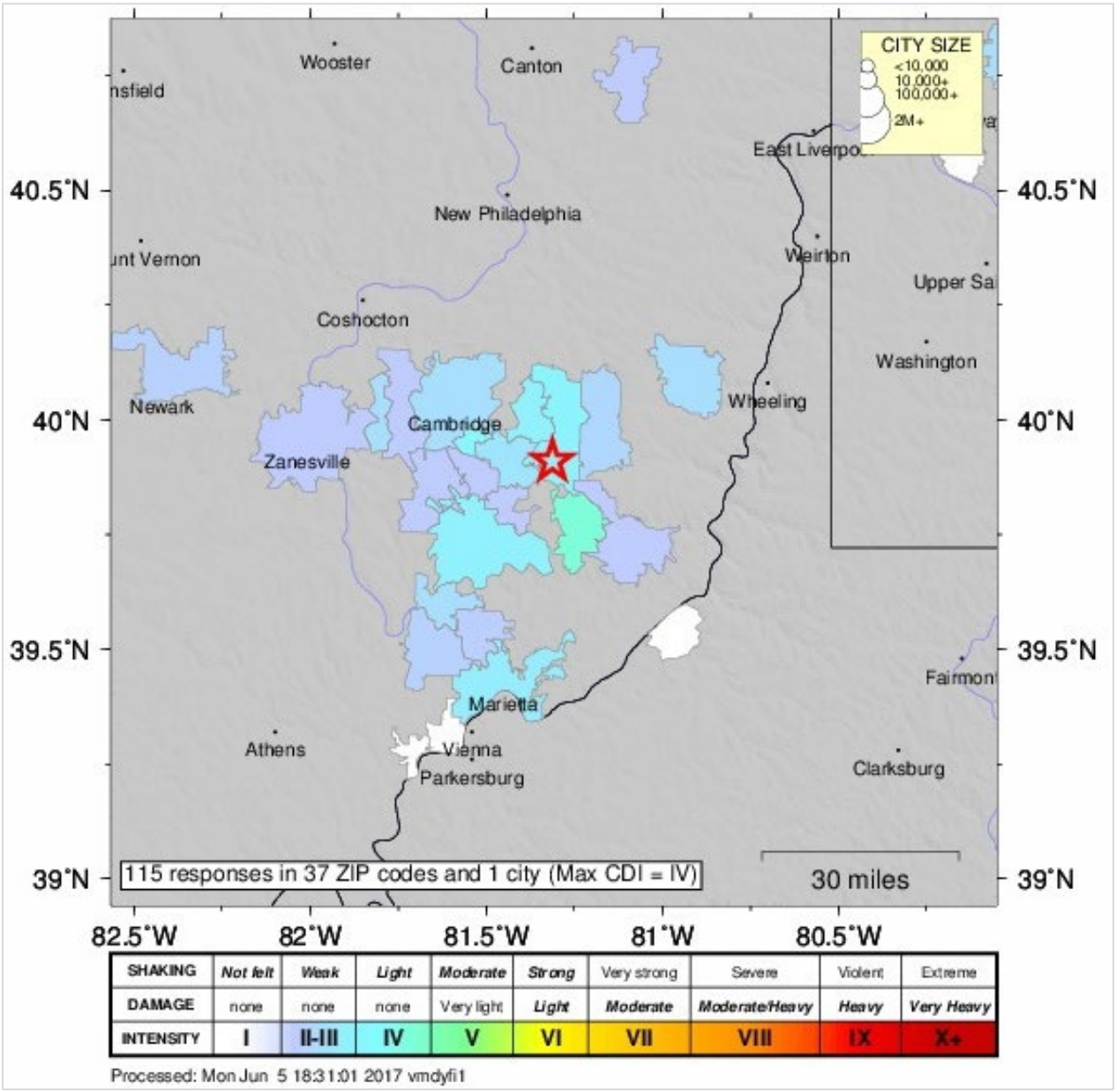
November 1, 2018

Three small earthquakes occurred within two hours of each other on November 1, 2018, between 4:30 PM and 6:40 PM in southwest Noble County, approximately one mile northeast of the community of Dungannon (Jackson Township). There were no felt reports and there were no damages. There have been several small earthquakes in this general area in the past year.

June 3, 2017

A widely felt earthquake occurred at 11:08 PM on June 3, 2017, approximately one mile south of the Village of Batesville, Noble County, Ohio. More than 90 felt reports were submitted to the U.S. Geological Survey's website, ranging from Marietta to Newark, Ohio. No damages were reported and would not be expected with an earthquake of this magnitude. **Figure 4.4.3** displays the USGS Community Internet Intensity Map for this earthquake, which depicts the intensity of shaking felt reports.

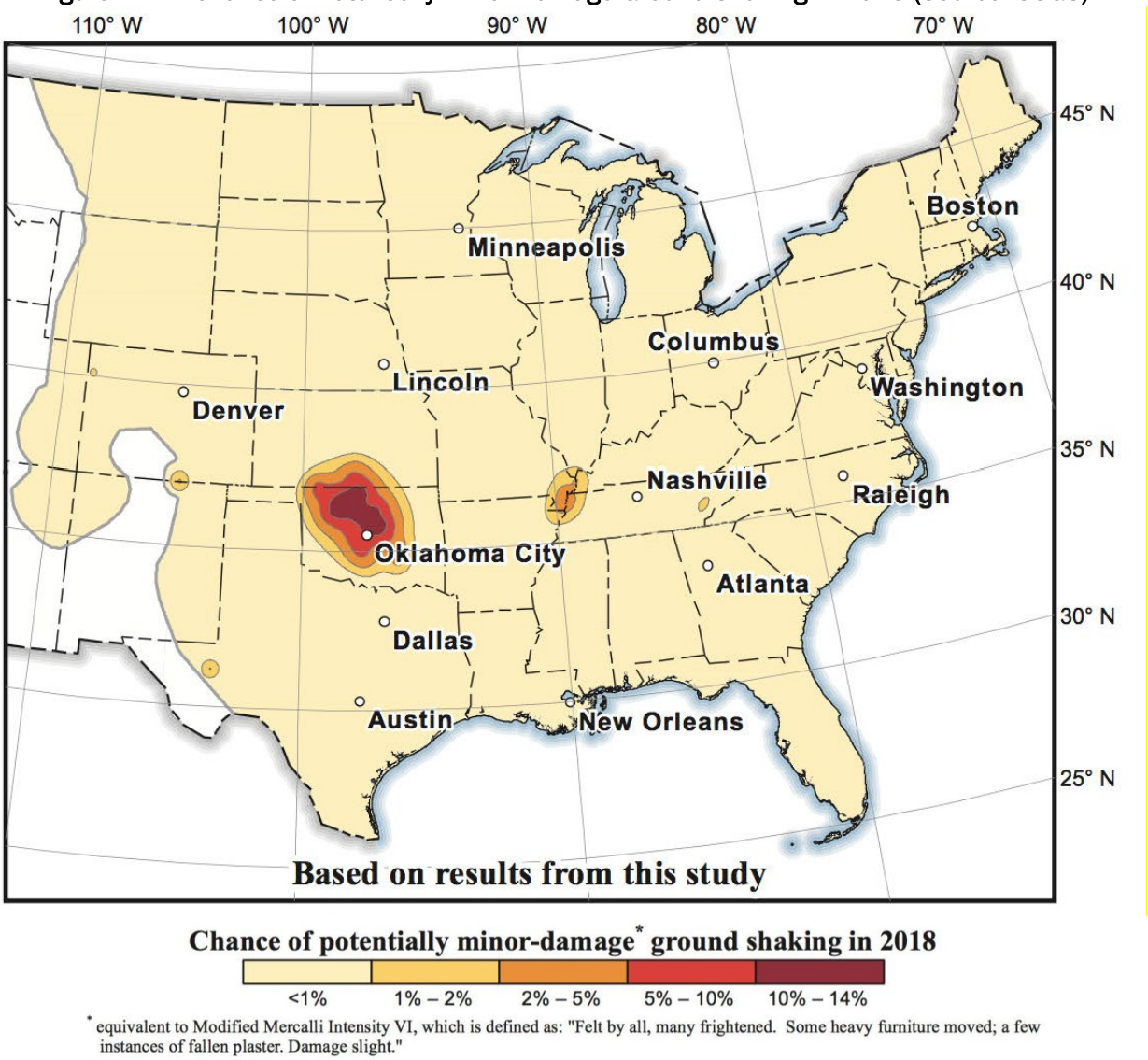
Figure 4.4.3: USGS Community Internet Intensity Map from June 3, 2017 Earthquake



4.4.5 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 Noble County (**Figure 4.4.4**).

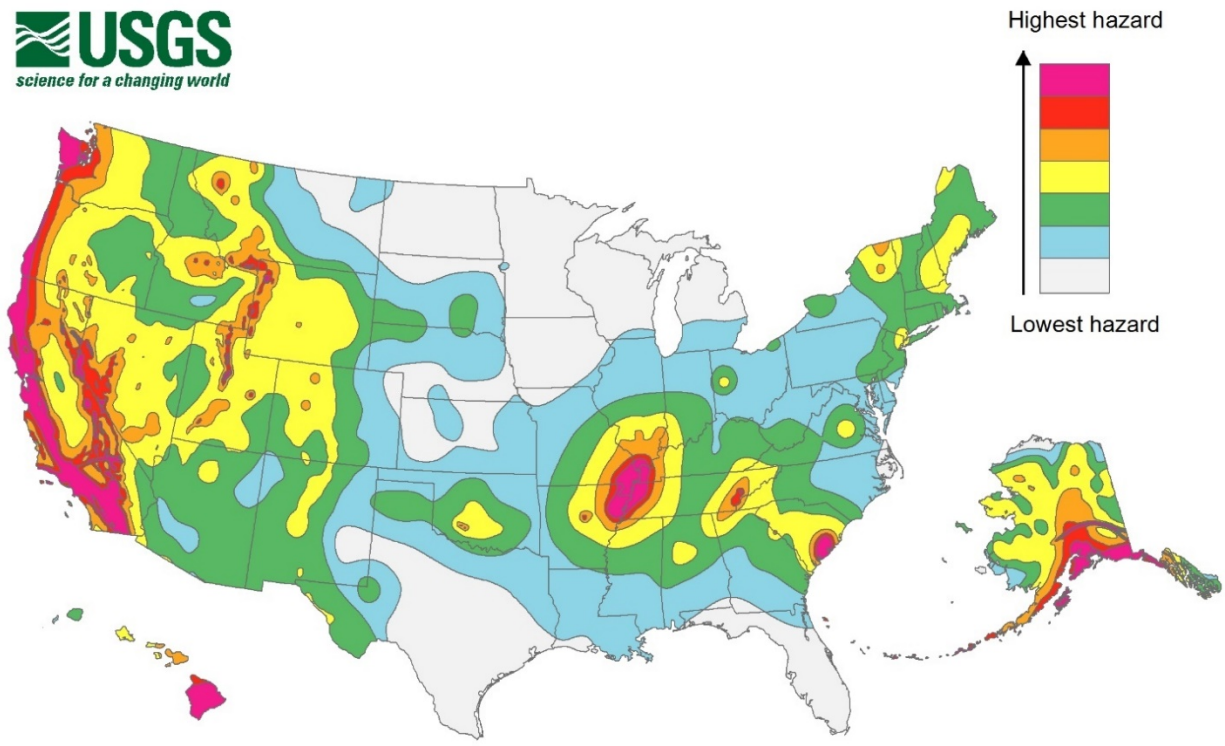
Figure 4.4.4: Chance of Potentially Minor-Damage Ground Shaking in 2018 (Source: USGS)



The USGS also determined the long-term hazard of earthquakes for the United States (**Figure 4.4.5**). 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 Noble 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 4.4.5: Probability of Earthquakes in the United States (Source: USGS)



4.4.6 Vulnerability Assessment

Infrastructure Impact

While there were two known earthquakes recorded in Noble County's history, the associated 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 Noble 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 Noble 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

While there were two recorded earthquake events in Noble County's history, the property damage incurred as a result is unknown. 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 4.4.2** lists all structures within Noble 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

Noble 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

While there were two recorded earthquake events in Noble County's history, the economic losses experienced as a result are unknown. Earthquakes have the potential to damage infrastructure, resulting in economic burden of clean up and repairs. Potential economic losses and damages associated with Noble County structures and potential worst-case scenarios are recorded in **Table 4.4.2**, 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 4.4.2: Structure Vulnerability from Earthquakes

Structure Type	Number of Properties Exposed	Total Value of Structures	Damage for 1% Scenario	Damage for 5% Scenario
Residential	7,607	192,267,400	1,922,674	12,016,713
Non-Residential	8,804	315,598,848	3,155,988	19,724,928
Critical Facilities	32	20,426,408	204,264	1,276,651
Total	**16,411**	**507,866,248**	**6,348,328**	**31,741,641**

**Totals do not include critical facilities. Critical facilities are counted as non-residential facilities.*

4.4.7 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.

4.5 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 4.5.1: 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 Noble County. Flash flooding is more likely to occur in developed areas. **Figure 4.5.1** shows the location of the 100-year floodplain.

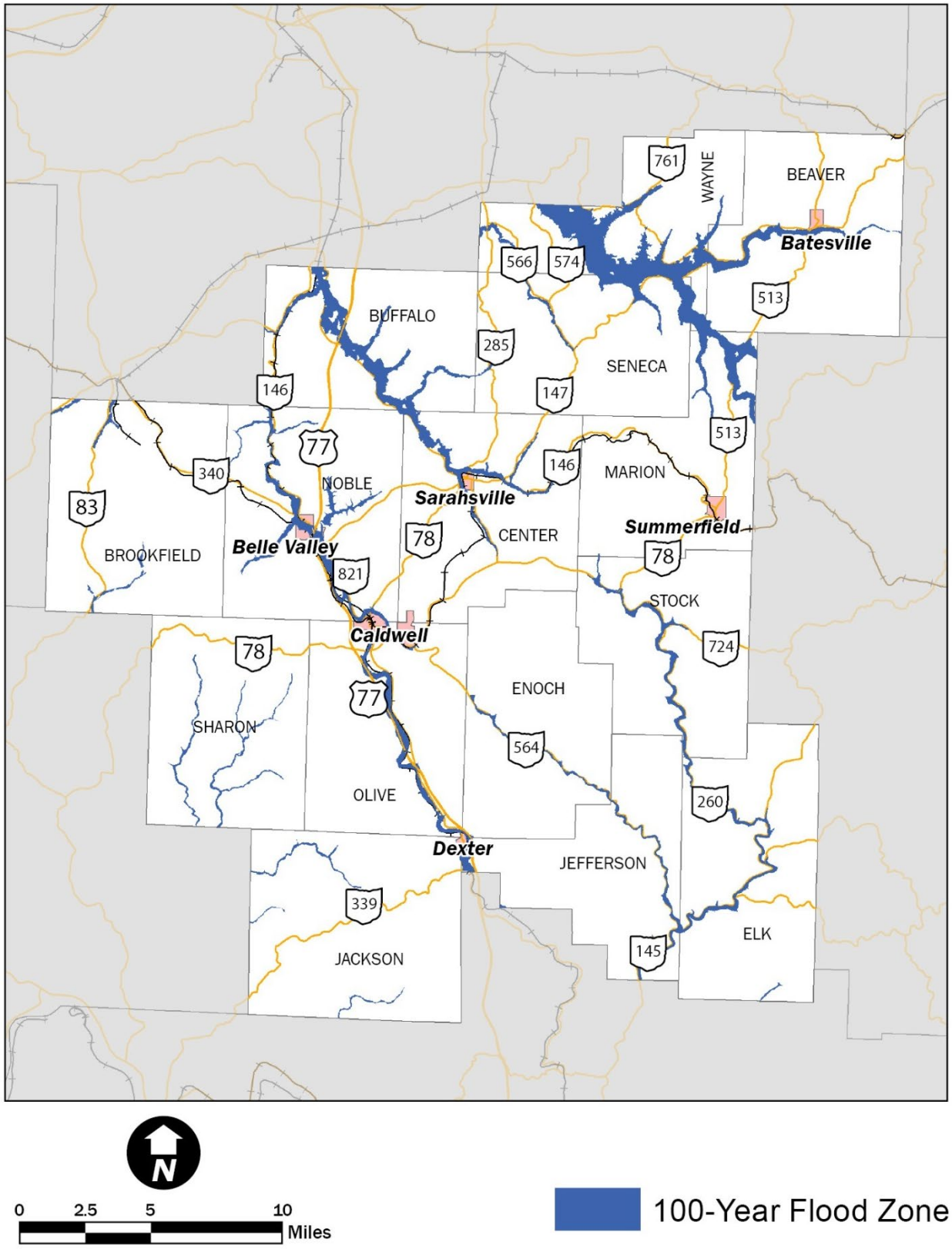
4.5.3 Extent

Noble County currently has six flood insurance maps (see **Appendix F**). These were most recently updated in January 2011. Noble County has a floodplain ordinance to minimize flood impacts on development and on the community as a whole. This ordinance requires the following:

- Homes and attached garages must be elevated two feet above the Base Flood Elevation. Floods with enclosures beneath the elevated floor must have at least two flood openings.
- Other structures must be elevated or dry flood proofed to at least the Base Flood Elevation
- Accessory buildings 400 square feet or less do not have to meet these requirements, but must meet basic standards to reduce flood damage.
- No fill may be brought onto a site without the same amount being removed in the floodplain from the same property.
- All development in the floodplain requires a permit.

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

Figure 4.5.1: 100-Year Flood Zone



Noble County and five communities within the County participate in the National Flood Insurance Program (NFIP). These communities include the Villages of Batesville, Belle Valley, Caldwell, Dexter City, and Sarahsville. The Village of Summerfield 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 Noble 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 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. Based on these definitions, Noble County and its jurisdictions have 15 repetitive loss properties and no severe repetitive loss properties.

Table 4.5.1: Repetitive Loss Properties

Community Name	Zone	Firm	Building Payment	Contents Payment	Losses	Total Paid
Village of Belle Valley	X	N	$34,285	$0	2	$34,285
Village of Belle Valley	AE	N	$60,565	$7,880	2	$68,444
Village of Belle Valley	X	Y	$28,733	$9,204	2	$37,938
Village of Belle Valley	X	N	$57,987	$5,607	2	$63,594
Village of Belle Valley	X	N	$64,881	$9,330	2	$74,212
Village of Belle Valley	X	Y	$34,979	$1,839	2	$36,818
Village of Belle Valley	X	N	$18,760	$0	2	$18,760
Village of Belle Valley	X	N	$61,756	$16,746	2	$78,501
Village of Caldwell	A	N	$17,415	$0	2	$17,415
Village of Caldwell	A	N	$14,479	$0	2	$14,479
Village of Caldwell	X	Y	$59,915	$24,152	2	$84,068
Village of Dexter City	X	N	$95,942	$30,171	2	$126,114
Noble County	C	Y	$71,216	$41,115	2	$112,331
Noble County	X	N	$3,672	$12,379	2	$16,051
Noble County	A	N	$6,241	$0	2	$6,241

**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 have been 70 floods or flashfloods in Noble County between January 1996 and February 2019. These events have caused $10,681,000 in property damages and $10,000,000 in crop losses. There are no reported injuries; however, there are five reported deaths. Described below are any events that have been declared an emergency, any events that have caused deaths or injuries, and the three most damaging events over the past decade. All events are listed individually in Appendix A.

Flooding in Eastern and Southeastern Ohio between February 5, 2019 and February 13, 2019

A Major Disaster Declaration (DR-4424) was declared in Ohio on April 8, 2019 for the February flooding. The NCDC reports no flood events during this time period.

Flooding in Eastern and Southeastern Ohio between February 14, 2018 and February 25, 2018

A Major Disaster Declaration (DR-4360) was declared in Ohio on April 17, 2018 for the February flooding. The NCDC reports no flood events during this time period. Noble County was included in the declaration.

Flooding in Noble County on January 11, 2005

Flooding in Noble County caused $50,000 in property damage. Throughout the evening, several roads were flooding including SR-339, SR-821, SR-147, SR-260, and SR-513. Nine of 11 state roads were closed by flooding by the end of the night.

Flooding in Noble County on January 1, 2005

Flooding in Noble County caused $50,000 in property damage. Several roads were flooded, including SR-145, SR-146, SR-260, and SR-564. Flooding continued into the next day.

Flooding in Noble County on September 19, 2004

Flooding in Noble County on September 19, 2004 caused over $200,000 in property damage.

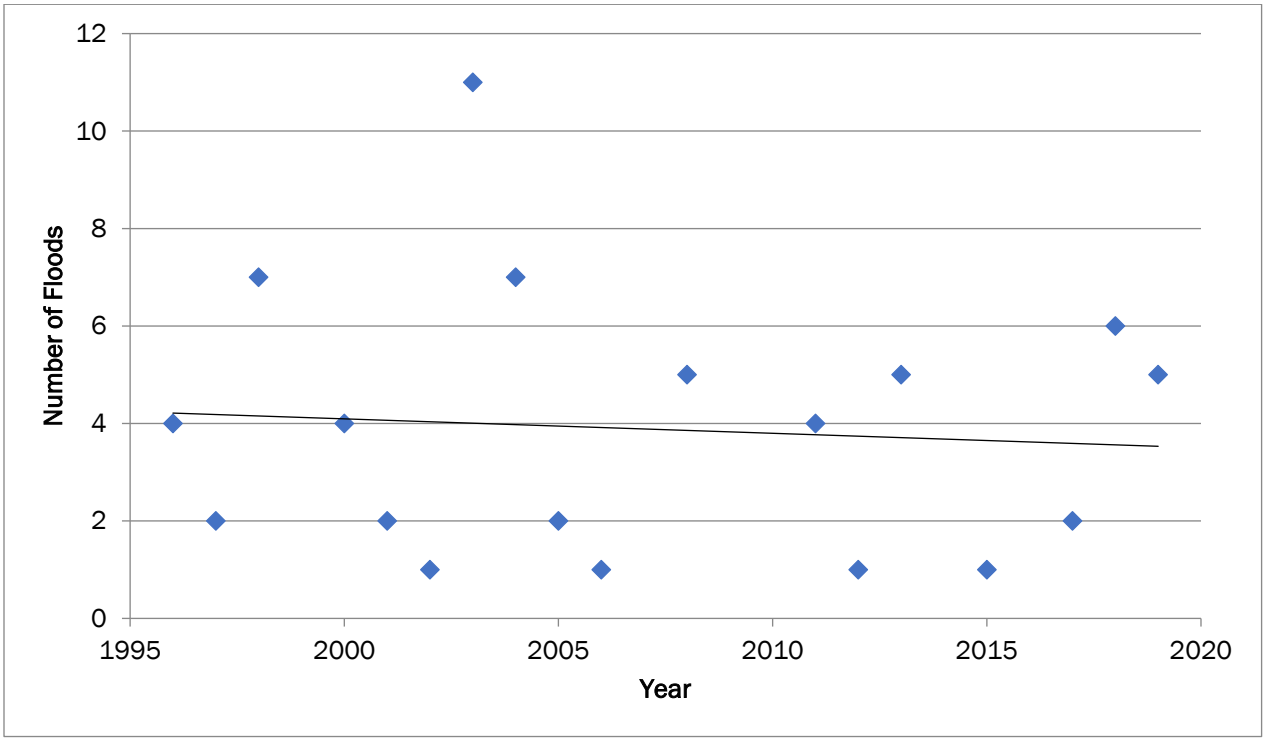
Countywide Flash Flooding on June 27, 1998

A round of thunderstorms starting on the evening of June 27, 1998 created widespread flash flooding throughout Noble County. These floods caused five deaths during the evening of June 27 and early morning hours of June 28. In the Village of Caldwell, a 90-year-old man and 89-year-old woman were killed as flash flooding from the nearby Duck Creek washed part of their home away. Numerous roadways across the county were closed. Two fatalities occurred as people tried to drive through water on the roads. Two more deaths occurred in Caldwell as a 71-year-old and 31-year-old were killed when they tried to drive their cars through high water. In Belle Valley, a 37-year-old man was killed when he attempted to swim in the flood waters of the West Fork of the Duck Creek after being stranded on the roof of a building. Several rescues by boat were required across the County. The hardest hit areas were the Mount Ephriam, Fredericksdale, Belle Valley, and the Caldwell area. In addition to flooded private homes, many businesses in towns across the county suffered extensive damage, losing most of their inventory and equipment.

4.5.5 Probability

Figure 4.5.2 shows the trend of flood events over time between January 1996 and February 2019. The trend line is nearly flat, showing that flood occurrences per year are steady over time, which means Noble County can expect to have annual flood events similar to those that have occurred in the recent past.

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 Noble County, including highways, railways, and airports could suffer over $450,000 in damages during a 100-Year flood. Natural gas lines and wastewater systems at risk in Noble County total $72,000

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. Flood events in Noble County have caused an annual average of $464,000 in property damages between January 1996 and February 2019. **Table 4.5.1** lists the number and value of all the properties that are exposed to 100-Year floods.

Loss of Life

There are five reported deaths from a flashflood event on June 27, 1998. Loss of life is possible in future floods or flashfloods.

Economic Losses

Floods can halt economic activity, block roadways, and destroy agricultural crops. Building contents up to $25,000 are expected to be exposed during a 100-Year flood event. Crop losses are also expected during floods or flashfloods.

Table 4.5.1: Structure Vulnerability

Structure Type	Value (Exposed)	Percent of Total
Residential	$1,038,330,000	79.20%
Commercial	$136,591,000	10.40%
Industrial	$59,306,000	4.50%
Agriculture	$7,773,000	0.60%
Religious	$37,515,000	2.90%
Government	$15,916,000	1.20%
Education	$15,617,000	1.20%
Structure Type	$1,311,048,000	100.00%

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.

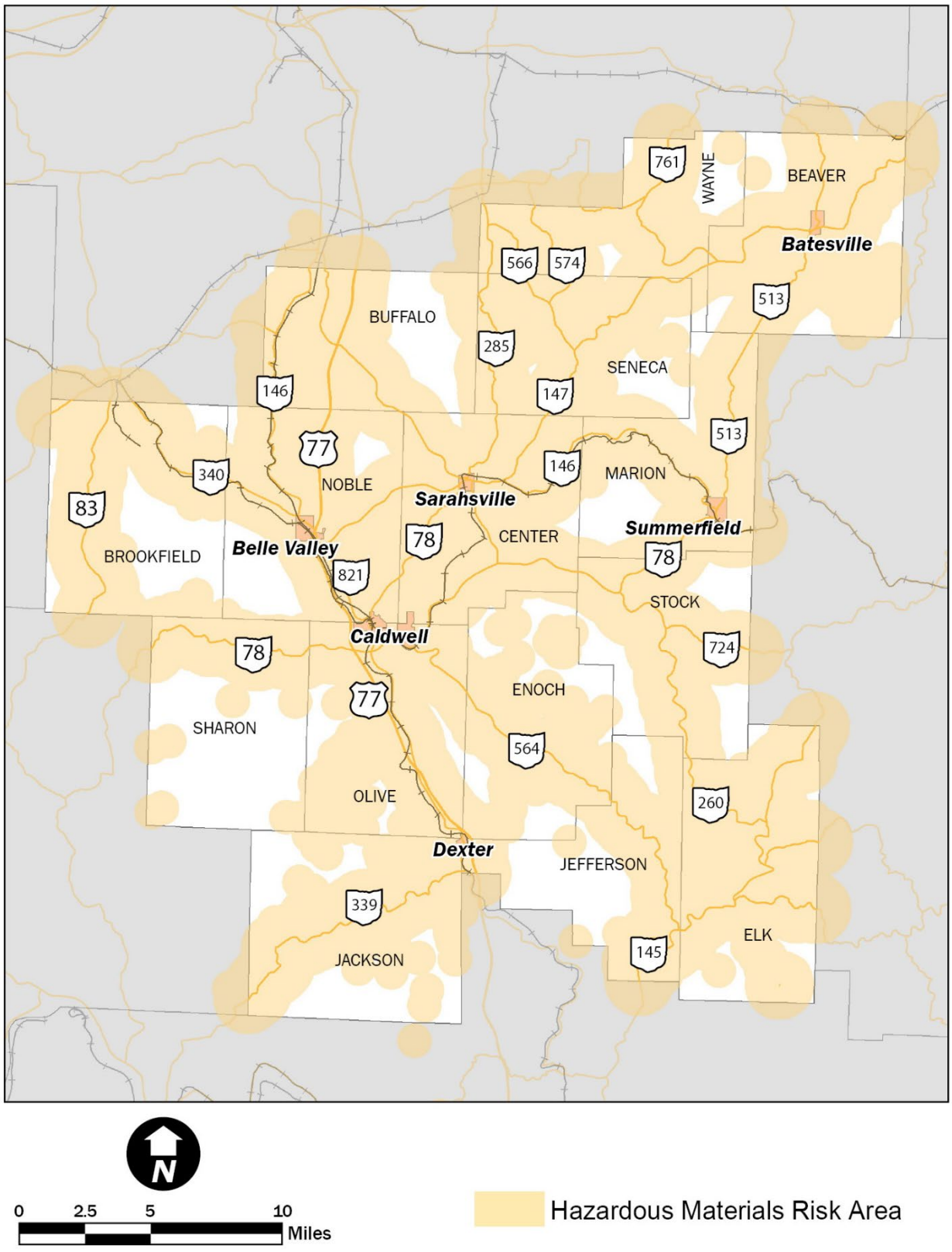
The U.S. Nuclear Regulatory Committee regulates materials that produce ionizing radiation, which includes by-product material and radioactive substances.

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 15 recorded hazardous material spills and releases in Noble County from May 2017 through September 2019. Estimated property and crop damages have not been recorded.

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

Table 4.6.1: Hazardous Materials Spills

Date	Location	Product	Amount	Spill Size
May 2017	Olive Township	Crude Oil	One gallon	Small: 500 gal/4000 lbs
May 2017	Jackson Township	Brine Oil and Gas Related	Unknown	Small: 500 gal/4000 lbs
August 2017	Elk Township	Bol Alert / Boil Advisory / Drinking Water Issues	Unknown	Unknown Amount
April 2018	Wayne Township	Material White	Unknown	Unknown Amount
May 2018	Olive Township	Air Fire Facility	Unknown	Small: 500 gal/4000 lbs
December 2018	Olive Township	Diesel Fuel	25 gallons	Small: 500 gal/4000 lbs
December 2018	Stock Township	Brine Oil and Gas Related	Five gallons	Small: 500 gal/4000 lbs
December 2018	Stock Township	Natural Gas Condensate	Unknown	Unknown Amount
December 2018	Jackson Township	Bentonite / Drilling Mud	30 barrels	Unknown Amount
February 2019	Village of Summerfield	Natural Gas Condensate	Unknown	Unknown Amount

Date	Location	Product	Amount	Spill Size
February 2019	Village of Summerfield	Diesel Fuel	Unknown	Unknown Amount
March 2019	Enoch Township	Diesel Fuel	Unknown	Unknown Amount
March 2019	Brookfield Township	Material White	Unknown	Unknown Amount
April 2019	Marion Township	Natural Gas	Unknown	Unknown Amount
September 2019	Center Township	Fish Kill	Unknown	Unknown Amount

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	7,607	$48,066,850	$192,267,400	$240,334,250
Non-Residential	7,842	$72,903,880	$291,615,520	$364,519,400
Critical Facilities	32	$5,106,602	$20,426,408	$25,533,010
Total	15,449	$120,970,730	$483,882,920	$604,853,650

**Totals do not include critical facilities. Critical facilities are counted as non-residential facilities.*

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

Invasive Species are species that have potential negative impacts on the environment and economy of Noble 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. Individual species are limited by habitat.

4.7.3 Extent

Noble County is part of the U.S. Department of Agriculture's Southeast Ohio Noxious and Invasive Weed Treatment Program. This program provides financial assistance through the Environmental Quality Incentives Program to eligible agricultural producers to removes spotted knapweed, autumn olive, and tree of heaven. A list of invasive species nearby or within Noble County can be found in **Table 4.7.1**.

Table 4.7.1: Invasive Species in Ohio

Type	Name
Terrestrial Plant	Japanese Honeysuckle
Terrestrial Plant	Japanese Knotweed
Terrestrial Plant	Autumn-Olive
Terrestrial Plant	Buckthorns
Terrestrial Plant	Purple Loosestrife
Terrestrial Plant	Common Reed or Phragmites
Terrestrial Plant	Reed Canary Grass
Terrestrial Plant	Garlic Mustard
Terrestrial Plant	Multiflora Rose
Terrestrial Plant	Bush Honeysuckles
Terrestrial Plant	Wild Parsnip
Terrestrial Animal	Feral Swine
Insect	Asian Longhorned Beetle
Insect	Emerald Ash Borer
Insect	Gypsy Moth
Insect	Hemlock Wooly Adelgid
Aquatic Plant	Curlyleaf Pondweed

There are at least three invasive insect species that have the potential to impact Noble County:

- The **Emerald Ash Borer** targets ash trees. This insect was first found in Ohio in 2003 and has been found in every county. Since the Emerald Ash Borer has been found in every county, there are no quarantines in effect within Ohio's borders; however, the State of Ohio is still listed in the Federal quarantine boundary.
- The **Hemlock Woolly Adelgid** was first discovered in Meigs County, but it has been observed in the eastern region of Ohio. As its name suggests, the Hemlock Woolly Adelgid impacts hemlock trees by stealing nutrients as the base of the tree's needles. Early infestations can be spotted when white, woolly sacs appear near the base of the needles. At a forest level, a thinning hemlock canopy could be caused by the Adelgid. All Hemlock Woolly Adelgids are female and reproduce asexually. Every year, one generation is born in the spring and one in the winter. Feeding and egg laying typically occur during the Autumn season, and hibernation or dormancy occurs during the growing season.
- 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.

4.7.4 History

Gypsy moths have been sighted in Brookfield Township in western Noble County. Additionally, the Emerald Ash Borer was discovered in Ohio in 2003 and quickly spread to all 88 counties soon thereafter. It is also possible that any of the species listed above have at one point been in Noble County.

4.7.5 Probability

While the exact probability of experiencing invasive species is difficult to quantify, it is very probable that Noble County will see one or more 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 direct impacts to the population of Noble County from the invasive species discussed above; however, it is possible that as invasive species migrate, some will pose a greater risk to population health.

Property Damage
Due to the likelihood that one or more of these invasive species will impact Noble County, it is also likely that property damage, in the form of reduced values from impacts on landscaping, will occur.

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 Landslides, Erosion, and Mine Subsidence

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). Most of Noble County has either high incidence of landslides or high susceptibility with moderate incidence of landslides.

The extent of abandoned mines in Noble County, according to ODNR, is partially unknown. There are many mine locations that have fully unknown extents within Noble County. Currently, there are no abandoned mines that have fully known extents. ODNR is currently searching for historic mine maps to update their database. Please see **Appendix D: Sources** for a link to the historic mine map online submittal form.

4.8.3 Extent

Landslides

There are three major types of landslides:

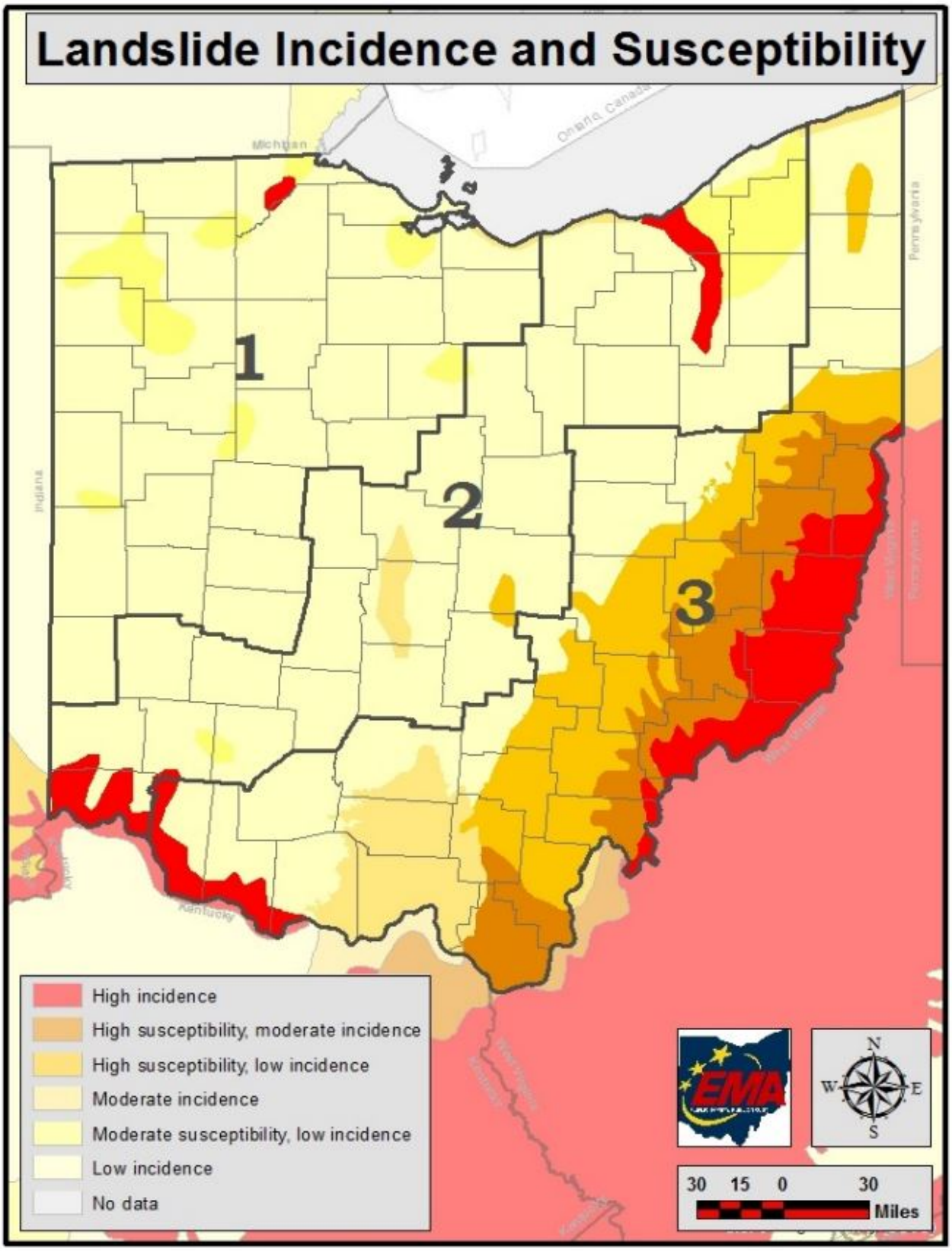
- Rotational slump, caused by the movement of a mass of weak rock or sediment as a block unit along a slope. These are the largest types of landslides found in Ohio.
- Earthflow, caused by a mass of rock or sediment flowing downslope. These are the most common landslides in Ohio.
- Rockfall, a rapid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

Mine Subsidence

The size and number of abandoned mines in Noble County is unknown. The true extent of potential mine subsidence events is unknown until the abandoned mines within Noble County are fully mapped.

Noble County is one of 26 counties where mine subsidence insurance is mandatory. Any individual living in Noble County must pay one dollar per year when they purchase or renew their homeowners insurance.

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



4.8.4 History

Figures 4.8.2 and 4.8.3 show that Noble County has moderately high occurrences of landslides and rock falls as compared to other counties within Ohio, with 301 total landslides and 292 rockfall sites as of June 18, 2019.

4.8.5 Probability

Landslides

According to the ODNR, Noble County falls within an area subject to severe slope failure. Landslides should be considered a likely event.

Mine Subsidence

Figure 4.8.4 shows the location of mine cores and the known extent of abandoned underground mines. It is impossible to tell the full extent of abandoned mines under Noble County. Until the extent of these mines can be fully mapped, mine subsidence should be considered a likely event.

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 Noble 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, nor should they be placed above known abandoned mines. 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)

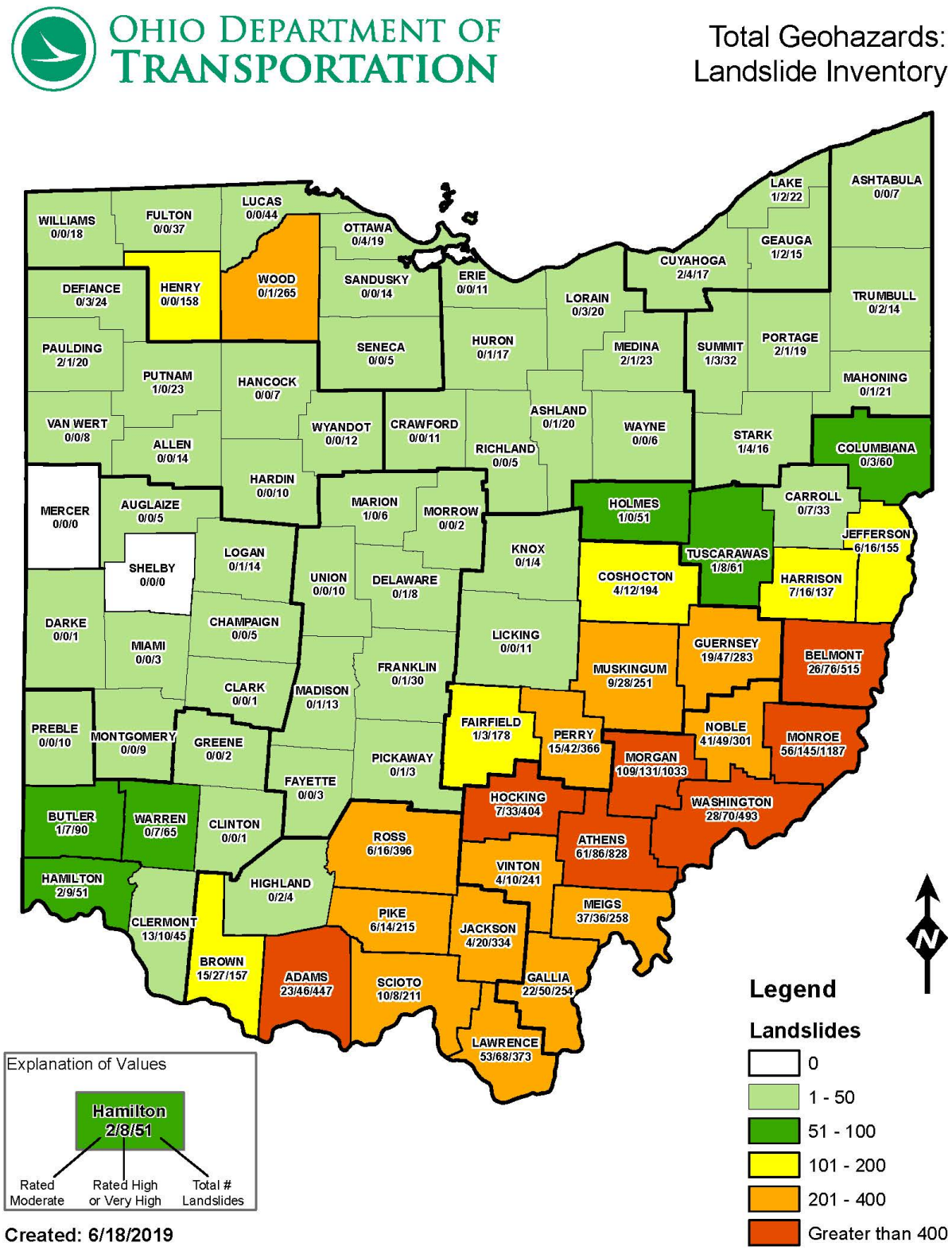


Figure 4.8.3: State of Ohio Total Geohazards Rockfall Inventory (Source: Ohio EMA)

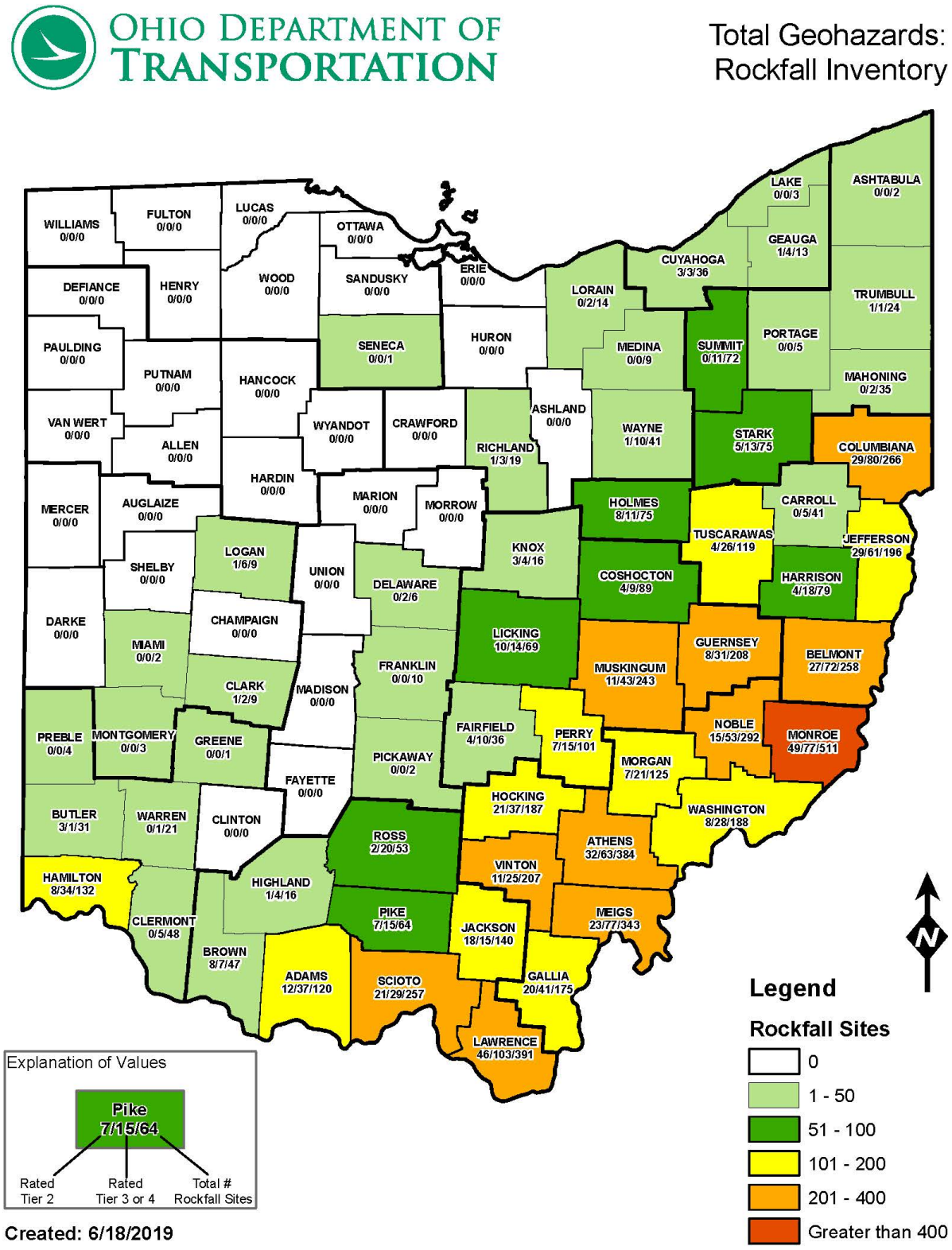
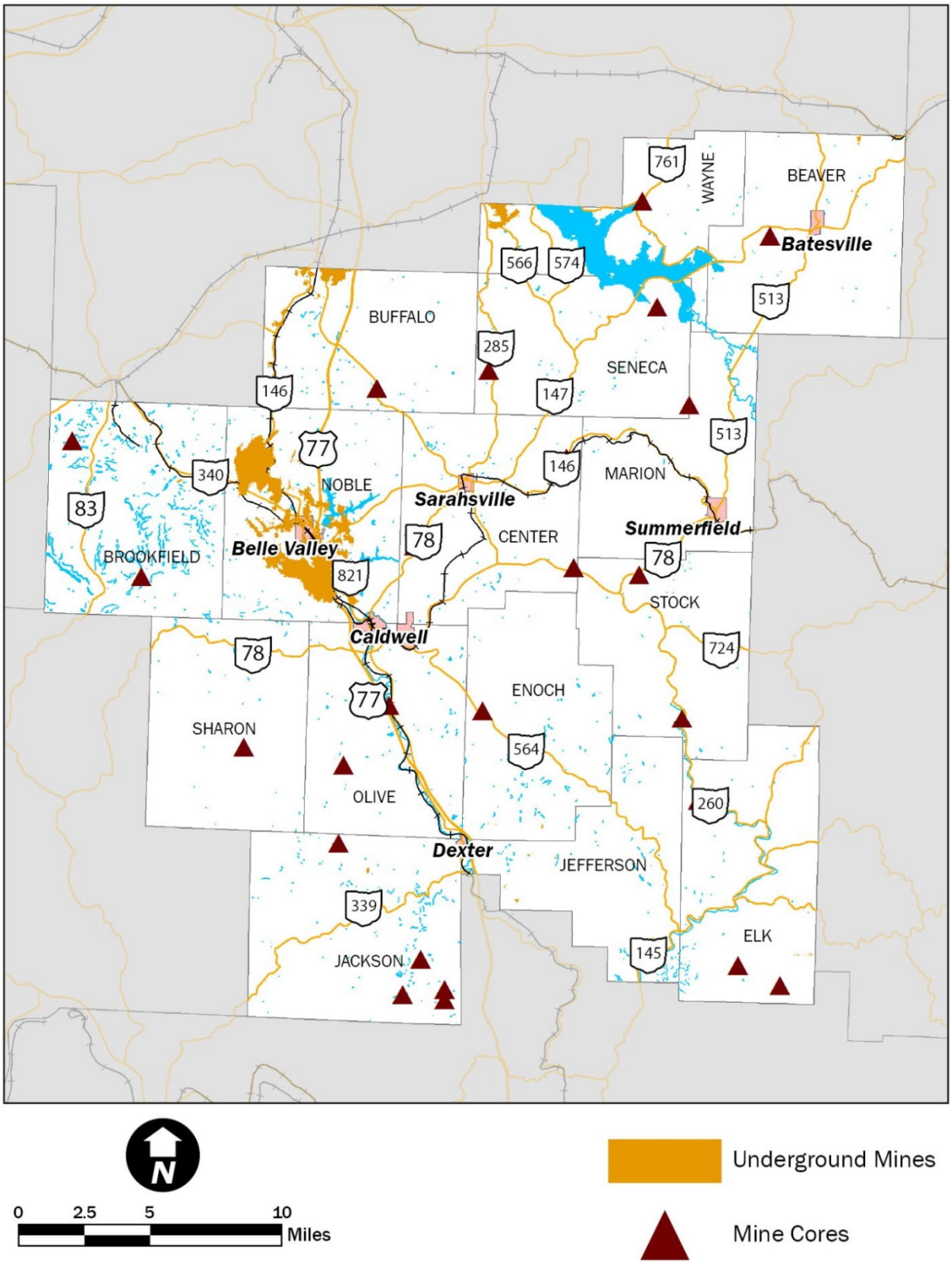


Figure 4.8.4 Known Underground Mine Locations



4.9 Severe Storms

4.9.1 Description

Severe storm events may include severe thunderstorms, high wind, hail, and lightning. Tornadoes and flooding may also be categorized as severe storm-related 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, Noble 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 Pittsburgh is responsible for issuing Severe Thunderstorm Watches and Warnings for Noble 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.

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).

4.9.2 Location

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

4.9.3 Extent

Severe storm events have the potential to create large-scale damage in Noble 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.

4.9.4 History

According to the NCDC, there have been 83 thunderstorm wind events, 18 hail events, nine high wind events, one strong wind events, and no lightning events recorded in Noble County from July 1968 to May 2019. These events resulted in $1.09 million in property damage and $0 in crop damage. These events were not responsible for any deaths or injuries. These events are summarized in **Table 4.9.1**, below. A complete list of severe storm events can be found in **Appendix A**.

Table 4.9.1: Severe Storm Events in Noble County since 1971

Severe Storm Event Type	Number of Events	Injuries	Deaths	Property Damages	Crop Damages
Thunderstorm Wind	83	0	0	$634,200	$0
Hail	18	0	0	$0	$0
High Wind	9	0	0	$446,000	$0
Strong Wind	1	0	0	$10,000	$0
Lightning	0	0	0	$0	$0
Total	111	0	0	$1,090,200	$0

Noble County was associated with six disaster declarations related to these severe summer storm events between July 1968 and May 2019. These six declarations are listed below, while all other severe storm events are listed in **Appendix A**.

Major Disaster Declaration: August 20, 2012 (DR-4077-OH)
A Major Disaster Declaration was made on August 20, 2012 for the incident period of June 29, 2012 through July 2, 2012. Noble County, along with 36 other counties in the State were included in this declaration. Over $16 million in funds were made available to the State following FEMA's final review and approval of Public Assistance projects related to this event.

Major Disaster Declaration: July 13, 2011 (DR-4002-OH)
A Major Disaster Declaration was made on July 13, 2011 for the incident period of April 4, 2011 through May 15, 2011. Noble County, along with 20 other counties in the State received Public Assistance as a result of this event.

Major Disaster Declaration: September 19, 2004 (DR-1556-OH)
A Major Disaster Declaration was made on September 19, 2004 for the incident period of August 27, 2004 through September 27, 2004. Noble County received both Individual and Public Assistance as a result of this declaration. In total, 21 counties including Noble County, received Individual Assistance for this disaster.

Major Disaster Declaration: June 3, 2004 (DR-1519-OH)
A Major Disaster Declaration was made on June 3, 2004 for the incident period of May 18, 2004 through June 21, 2004. In total, 15,716 Individual Assistance (IA) applications were approved as a result of this disaster.

Major Disaster Declaration: June 30, 1998 (DR-1227-OH)
A Major Disaster Declaration was declared on June 30, 1998 for the incident period of June 24, 1998 through July 5, 1998. A total of 23 counties, including Noble County, were associated with this disaster.

Major Disaster Declaration: August 23, 1980 (DR-630-OH)
A Major Disaster Declaration was declared on August 23, 1980 for the incident period of August 23, 1980.

4.9.5 Probability
According to the NCDC, there have been 111 severe storm events reported in Noble County from July 1968 to May 2019, with total losses reaching more than $1.09 million in property damage. This amounts to between two and three severe storm events annually with average annual damages of $21,376.

4.9.6 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 Noble County is approximately 14,354. 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 approximately $21,376 in property and crop damages annually. Due to the non-site-specific nature of this hazard, Table 4.9.2 lists all structures within Noble County as having potential impacts from severe storms.

Loss of Life
Although no injuries or loss of life was reported due to the 111 severe summer storm 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 111 severe summer storm events since 1968, 17 events resulted in property damage of $20,000 or more. The costliest storm in the County's history was a high wind event on September 14, 2008 which caused $250,000 in property damage.

Table 4.9.2: Structure Vulnerability from Severe Storms

Structure Type	Number of Properties Exposed	Value of Vulnerable Structures		
		Land	Building	Total
Residential	7,607	$48,066,850	$192,267,400	$240,334,250
Non-Residential	8,804	$78,899,712	$315,598,848	$394,498,560
Critical Facilities	32	$5,106,602	$20,426,408	$25,533,010
Total	16,411	$126,966,562	$507,866,248	$634,832,810

**Totals do not include critical facilities. Critical facilities are counted as non-residential facilities.*

4.9.7 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.

4.10 Severe Winter Weather

4.10.1 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.

4.10.2 Location

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

4.10.3 Extent

The average annual snowfall in Noble County is 23 inches. Snowfall typically occurs between November and April. January is the coldest month on average.

4.10.4 History

There have been at least 24 winter storm events in Noble County since January 1996. These events have caused at least $200,000 in property damage. There are no reported injuries, deaths, or crop losses.

There have been three emergency declarations covering Noble County. The public assistance amount for each emergency declaration was divided between all jurisdictions impacted by the event, including those outside of Noble County,

Major Disaster Declaration on February 15, 2005 (DR-1580-OH)
Severe winter storms, ice, and mudslides impacted Noble County on February 15, 2005. $120,432,304 of public assistance was distributed throughout all impacted counties.

Major Disaster Declaration on March 14, 2003 (DR-1453-OH)
An ice and snowstorm impacted Noble County on March 14, 2003. $39,621,605 in public assistance was distributed throughout all impacted counties.

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

Only three events have caused property damage in Noble County since January 1996. These events are described below.

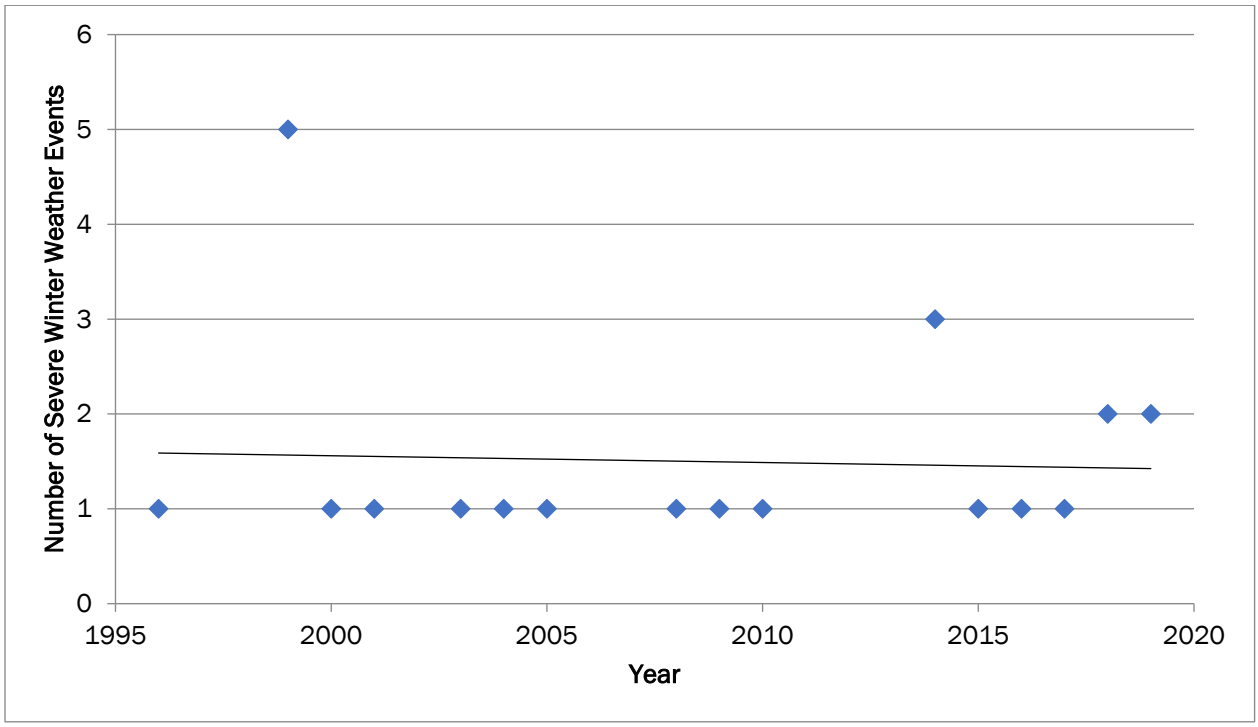
Ice Storm in Noble County on January 22, 2005
Snow began to fall in the early morning of January 22. The precipitation changed to freezing rain and sleet by late morning. By noon, the ice was half an inch thick in the Village of Caldwell and one inch thick in the Community of Woodsfield. This storm caused at least $6,000 in property damage.

Heavy Snow in Noble County on February 16, 2003
A massive, slow-moving snowstorm began early in the morning on February 16. Noble County received 17 inches of snow. Outside of Noble County, a building's roof collapsed under the weight of the snow, causing $200,000 in property damage. Even though the damage was outside of Noble County, the storm that hit the County was capable of causing property damage.

Severe Winter Storm in Noble County on January 13, 1999
A powerful winter storm brought another combination of snow and freezing rain to all of East Central Ohio, including Noble County. The precipitation began as snow, with between one and three inches of accumulation reported before the snow turned to freezing rain. The ice accumulation brought numerous power lines and large tree branches down, resulting in power outages to over 10,000 homes across the area. This storm caused at least $5,000 in property damage.

4.10.5 Probability
Figure 4.10.1 shows the trend of severe winter weather events over time between January 1996 and February 2019. The trend line is nearly flat, showing that severe winter weather events per year are steady over time, which means Noble County can expect to have annual severe winter weather events similar to those that have occurred in the recent past.

Figure 4.10.1: Severe Winter Weather Trend



4.10.6 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 Noble 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 an annual average of $8,000 in property damage in Noble County.

Loss of Life

There are no reported deaths from any severe weather event in Noble 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.

4.10.7 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.

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 NWS office in Pittsburgh 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 in Pittsburgh 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 Noble 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 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 Noble 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

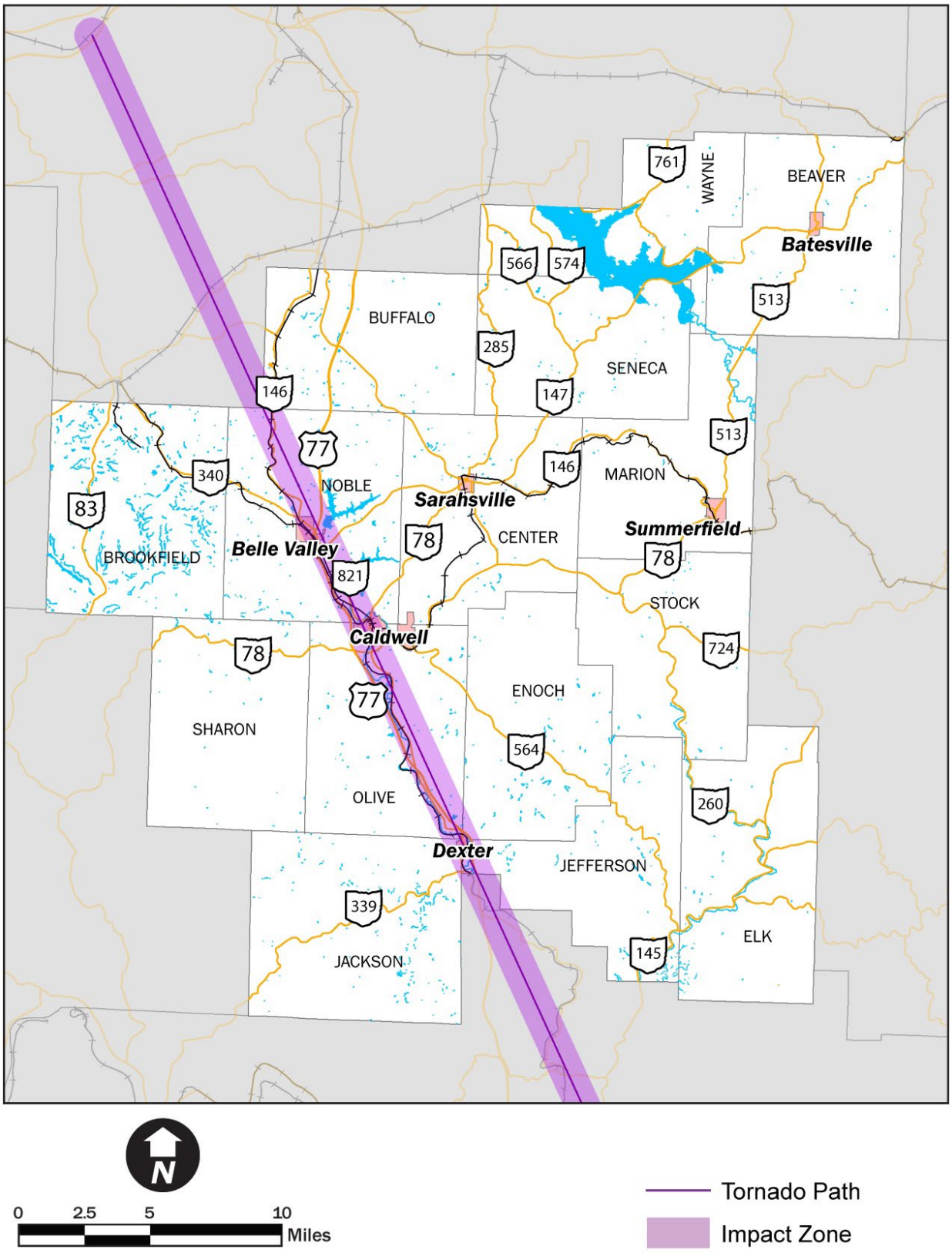


Table 4.11.1 Fujita and Enhanced Fujita Scale Classifications (Source: SOHMP)

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 three tornadoes in Noble County between March 1969 and February 2019, as reported by the NCDC. All three events are described below. Tornadoes in Noble County have caused $327,500 in property damage, one injury, and one death. There are no reported crop damages.

Tornado in Center Township on June 27, 1998

An F2 (EF-3) tornado with estimated 150 MPH winds was reported between the Villages of Sarahsville and Summerfield. The tornado demolished a mobile home, killing a 45-year-old woman. At least one person was injured. This tornado caused also caused $75,000 in property damage.

Tornado in Noble County on December 23, 1990

An F1 tornado caused $250,000 in property damage. There were no reported deaths or injuries.

Tornado in Noble County on March 24, 1969

An F1 tornado caused $2,500 in property damage There we no reported deaths of injuries.

4.11.5 Probability

There have been three tornadoes in Noble County and none within the past two decades. Tornadoes are unlikely in Noble County, but not impossible.

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 three tornadoes in Noble County and they have cause more than $300,000 in property damage. Potential property damages and structural vulnerability are described in **Table 4.11.2**.

Loss of Life

At least one life has been lost during a tornado in Noble 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	2,747	$15,281,694	$61,126,776	$76,408,470
Non-Residential	1,074	$12,867,012	$51,468,048	$64,335,060
Critical Facilities	20	$2,189,116	$8,756,464	$10,945,580
Total	**3,821**	**$28,148,706**	**$112,594,824**	**$140,743,530**

**Totals do not include critical facilities. Critical facilities are counted as non-residential facilities.*

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.

Noble County residents receive electric services from American Electric Power, the Guernsey-Muskingum Electric Cooperative, Washington Electric Cooperative, and South Central Power. Natural gas is provided by Columbia Gas of Ohio, Dominion Energy, and Utility Pipeline. Residential internet providers include Frontier Communications, Rowe Wireless, Spectrum, HughesNet, Viasat Internet, and Windstream. Caldwell Water, Clearwater, Guernsey County Water Company, Noble Water, Noble Water Authority, Purewater, and Tri-County Water provide water to Noble County and its residents.

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 Noble 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 Noble 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 Wildfires

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)*, Noble County has been identified as a county within the Ohio Department of Natural Resources Division of Forestry's Wildfire 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 Noble County except Brookfield, Marion, and Stock townships, as moderate risk. Brookfield, Marion, and Stock townships all were assessed to have a low risk of 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 57 total fire events from January 1, 2007 to December 31, 2017, which averaged to five to six fire events annually. These events burned a total of 481 acres, averaging 8.44 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 57 events, 45 fires (78.95 percent of events) burned less than 10 acres, while 11 events (19.30 percent of events) burned between 10-99.9 acres. One event (1.75 percent of 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 57 total fire events occurred in Noble County between 1/1/2007 to 12/31/2017, an average of five fire events are estimated to occur annually in the County.

4.13.6 Vulnerability Assessment

Infrastructure Impact

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

Population Impact

There is low to moderate risk of wildfire in Noble County. Accordingly, there is low to moderate 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 57 recorded wildfire events in Noble 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.

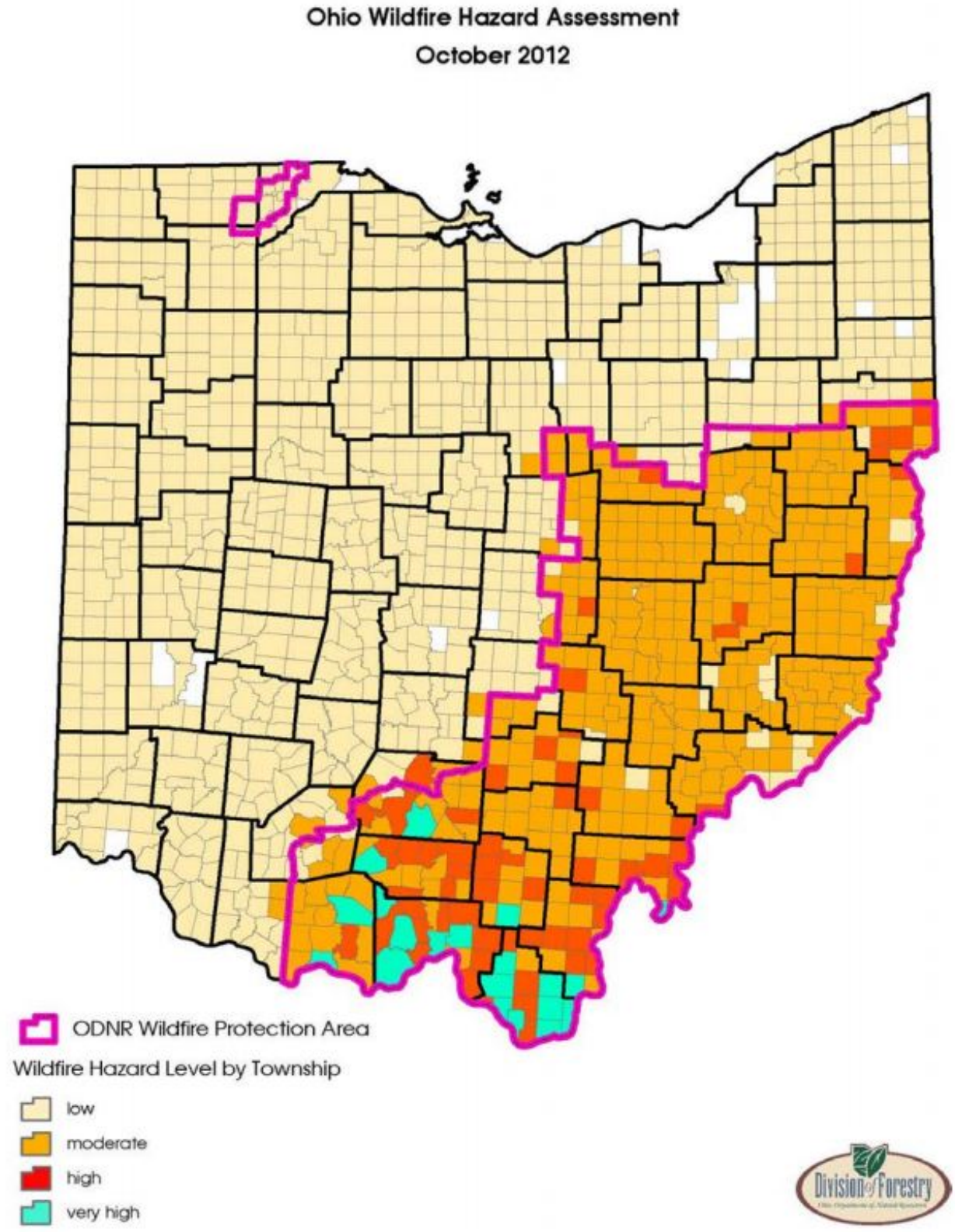
Due to the non-site-specific nature of this hazard, **Table 4.13.1** lists all structures within Noble County as having potential impacts from Wildfires. It also provides values for two worst-case scenarios valued at one percent damage and five percent damage.

Additionally, there are currently 41 State-owned and State-leased critical facilities located within Noble County, as determined by the Ohio Department of Natural Resources. All 41 of these facilities are located within the moderate wildfire risk area and have a value of approximately $50,894,080.

Loss of Life

Noble 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.

Figure 4.13.1: Ohio Department of Natural Resources Division of Forestry Wildfire Hazard Level



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 Noble County structures and potential worst-case scenarios are recorded in **Table 4.13.1**, below.

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	7,607	$240,334,250	$2,403,343	$12,016,713
Non-Residential	8,804	$394,498,560	$3,944,986	$19,724,928
Critical Facilities	32	$25,533,010	$255,330	$1,276,651
Total	**16,411**	**$634,832,810**	**$6,348,328**	**$31,741,641**

**Totals do not include critical facilities. Critical facilities are counted as non-residential facilities.*

4.13.7 Land Use and Development Trends

Because all communities in Noble County have low to moderate risk of wildfire events, communities within the moderate risk area should be especially aware of their risk and monitor new development accordingly.

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 Noble 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 (Flooding, 4.611), 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
Flooding	4.611	1
Landslide, Erosion, Mine Subsidence	4.111	2
Utility Failure	4.000	3
Hazardous Materials	3.944	4
Winter Weather	3.833	5
Severe Summer Storms	3.611	6
Complex/Coordinated Incident	2.941	7
Dam/Levee Failure	2.833	8
Tornadoes	2.750	9
Wildfire	2.500	10
Drought and Extreme Heat	2.222	11
Invasive Species	1.778	12
Earthquakes	1.694	13

Coastal erosion and hurricanes/tropical storms are hazards that are not applicable to Noble County and were not assessed; however, if remnants of hurricanes or tropical storms were experienced as high winds or severe storms, those events were included in the sever summer storms assessment. Four new hazards were added to the Noble County Hazard Mitigation Plan since the 2014 Plan. These include utility failure, Complex/Coordinated Incident, invasive species, and wildfire.

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 Noble 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 were determined to be infeasible during this review process were 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 Noble County in attaining the overall mission of the Core Planning Committee. As such, the Core Planning Committee assessed the goals and associated objectives of the 2014 Noble County Multi-Jurisdictional Hazard Mitigation Plan and had the opportunity to develop new goals and objectives for the 2020 update. Goals and objectives 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 and objectives, as well as corresponding mitigation actions are described in the following sections and organized by the associated hazard. It is important to note that the goals are not listed in order of importance but are listed alphabetically to coincide with the order of the hazards in the report.

5.2.1 Complex/Coordinated Incident

Goal 1: Minimize the loss of life and property due to Complex/Coordinated Incidents in Noble County.

- **Objective 1.1:** To minimize the effects of Complex/Coordinated Incidents to residents of Noble County.

Mitigation Actions:

1. Utilize barriers that block traffic at outdoor public events.
2. Purchase radios for schools.
3. Require public employees to participate in active shooter trainings.
4. Create a paper backup system for critical government operations.

5.2.2 Dam Failure

- **Goal 2:** Minimize the loss of life and property due to dam failure in Noble County.
    - **Objective 2.1:** To minimize the effects of dam failure to public and private property in Noble County.

Mitigation Actions:

1. Complete inundation maps for all Class I, II, and II dams.

5.2.3 Drought and Extreme Heat

- **Goal 3:** Minimize loss of life and property due to drought and extreme heat in Noble County.
    - **Objective 3.1:** To educate the citizens of Noble County on methods to reduce the effects of drought.
    - **Objective 3.2:** To minimize the impact of drought to life and property by reviewing and diversifying the County's water sources.

Mitigation Actions:

1. Continue the public awareness campaign to promote water saving techniques.
2. Develop public awareness campaign to heighten awareness of brush fires and preventative maintenance.
3. Identify and implement connection to a diversified public water system.
4. Encourage the use of local plant species to reduce water consumption.
5. Encourage the increase of tree plantings, especially near impervious surfaces such as parking lots.
6. Identify local drought indicators and record them at least once per month.
7. Organize outreach to provide appropriate support to vulnerable populations during severe events.

5.2.4 Earthquakes

- **Goal 4:** Minimize the loss of life and property due to earthquakes in Noble County.
    - **Objective 4.1:** To minimize the effects of earthquakes to public and private property in Noble County.

Mitigation Actions:

1. Develop an outreach program about earthquake risk and mitigation activities.

5.2.5 Flooding

- **Goal 5:** Minimize loss of life and property damage caused by flooding in Noble County.
    - **Objective 5.1:** To minimize the impact of flooding to life and property to include buildings, infrastructure, critical facilities, and critical infrastructure.

Mitigation Actions:

1. Acquire, retrofit, elevate, or relocate flood prone structures throughout Noble County.
2. Ensure that NFIP requirements are being met for structures located in the regulatory floodplain.
3. Notify owners in writing of flood prone properties and recommend the need for flood insurance.
4. Evaluate the feasibility of upstream surface flood storage for flood prone structures.
5. Identify structure inventory for properties at-risk to flood.
6. Update existing flood damage prevention resolutions and ordinances (as it relates to 44CFR 60.3).
7. Continue to acquire structures in identified repetitive loss areas throughout Noble County.
8. Create protocol for use of an early flood warning system.
9. Establish emergency evacuation plans for areas at-risk to flood.
10. Limit the coverage area of impervious surfaces by percent in new development.
11. Establish a green infrastructure program for the purpose of improving stormwater management.

5.2.6 Hazardous Materials

- **Goal 6:** Minimize the loss of life and property due to incidents involving hazardous materials in Noble County.
    - **Objective 6.1:** Continue to provide enhanced trainings, equipment, projects and plans for hazardous materials emergency response and mitigation in Noble County.

Mitigation Actions:

1. Purchase the equipment necessary to sustain hazardous materials emergency response teams.
2. Develop site-specific emergency plans for hazardous materials facilities.
3. Maintain inventory of hazardous waste generators and facilities to provide educational materials.
4. Update existing alarm systems to warn about hazardous materials spills.

5.2.7 Invasive Species

- **Goal 7:** Minimize the loss of life and property due invasive species in Noble County.
    - **Objective 7.1:** To minimize the effects of invasive species to public and private property in Noble County.

Mitigation Actions:

1. Develop a public awareness campaign to heighten awareness of locally occurring invasive species.

5.2.8 Landslide, Erosion, and Mine Subsidence

- **Goal 8:** Minimize the loss of life and property due to landslide, erosion, and mine subsidence in Noble County.
    - **Objective 8.1:** To minimize the effects of landslide, erosion, and mine subsidence to public and private property in Noble County.

Mitigation Actions:

1. Review regulations to maintain control of future development in high hazard areas.
2. Implement a brush clearing, bank stabilization and debris control program for flood prone waterways.
3. Encourage property owners and developers to submit historic abandoned mine maps to ODNR.
4. Identify and map erosion hazard areas.

5.2.9 Severe Summer Storms

- **Goal 9:** Minimize loss of life and property due to severe summer storms in Noble County.
    - **Objective 9.1:** To minimize the effects of thunderstorms and electrical storms to public and private property in Noble County.
    - **Objective 9.2:** To minimize the effects of high winds to public and private property in Noble County.

Mitigation Actions:

1. Install uninterruptible power supplies on critical equipment in county and municipal facilities.
2. Install surge protectors on electronic equipment in county and municipal facilities.
3. Promote the use of roofing shingles designed to resist uplift forces.
4. Equip all county and public gathering places with lightning detectors.
5. Encourage structures on temporary foundations to be anchored to permanent foundations.

5.2.10 Severe Winter Weather

- **Goal 10:** Minimize the loss of life and property due to winter weather in Noble County.
  - **Objective 10.1:** To minimize the impact of winter weather on life and property to include buildings, infrastructure, critical facilities, and critical infrastructure.

Mitigation Actions:

1. Purchase the equipment necessary to efficiently remove snow and ice from county and township roads.
2. Provide sidewalk clearing services to vulnerable populations, such as the elderly and disabled.
3. Plant tree lines or other vegetation to limit blowing or drifting of snow onto critical roadways.
4. Coordinate with utility providers to bury overhead utility lines (outside of flood zones only).

5.2.11 Tornadoes

- **Goal 11:** Minimize the loss of life and property due to tornadoes in Noble County.
  - **Objective 11.1:** Increase the sustainability to the effects of high winds from tornadoes on public and private property in Noble County.

Mitigation Actions:

1. Construct community safe rooms in downtown Caldwell.
2. Continue to support and manage the tornado safety public awareness campaign in Noble County.
3. Promote enhanced anchoring of manufactured homes.
4. Encourage safe room installation.
5. Retrofit large gathering facilities with safe rooms.

5.2.12 Utility Failure

- **Goal 12:** Minimize the loss of life and property due to utility failure in Noble County.
  - **Objective 12.1:** To minimize the effects of utility failure to public and private property in Noble County.

Mitigation Actions:

1. Install power generators in public buildings and critical facilities.
2. Prepare public buildings to serve as shelters during long-term power outages.
3. Improve radio communication systems in public buildings and critical facilities.
4. Develop public outreach campaign to heighten awareness on preparedness for long-term power outages.

5.2.13 Wildfires

- **Goal 13:** Minimize the loss of life and property due to wildfires in Noble County.
  - **Objective 13.1:** To minimize the effects of wildfires to public and private property in Noble County.

Mitigation Actions:

1. Cut firebreaks into public wooded areas.
2. Develop a vegetation management plan.

3. Promote public education on smoking hazards and recreational fire risks.
4. Develop a wildfire response plan with all fire departments.

5.2.14 Multiple Hazards

Some mitigation actions that were developed are applicable to multiple hazard types. As such, they are grouped together. These mitigation actions include:

1. Support tree-trimming to prevent limb breakage and safeguard nearby utility lines during storms.
2. Work with the IBHS to identify appropriate construction practices for the region.
3. Gather and maintain local GIS data in an easily shareable format.
4. Install or upgrade County-wide public alarm systems.
5. Construct safe rooms throughout Noble County.

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 2014 Multi-Jurisdictional 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 Noble County Hazard 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 (1-60) 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**.

Appendix B also includes the status of all mitigation actions developed and included in the 2014 Multi-Jurisdictional Hazard Mitigation Plan. This table includes comments from the jurisdictions responsible for each action. The completed surveys that were used to make this table can be found in **Appendix F**.

Table 5.2: Mitigation Actions Priority Table, by Hazard

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Multiple Hazards								
1	Support tree-trimming to prevent limb breakage and for safeguarding nearby utility lines during severe storm events.	Noble County, Batesville, Belle Valley, Caldwell, Dexter City, Sarahsville, Summerfield,	1	1	Noble County EMA, Mayors/ Administrators of all Villages	General Operating Budget	02/01/20 - 12/31/24	Ongoing (40% Complete)
2	Work with the Insurance Institute for Business and Home Safety (IBHS) to identify appropriate construction practices for the region.	Noble County, Sarahsville,	1	4	Noble County EMA, Mayor/ Administrator of Sarahsville	Staff Time	02/01/20 - 12/31/24	New
3	Gather and maintain local GIS data, including tax parcels, building footprints, critical facility locations, and hazardous materials facilities in an easily shareable format.	Noble County, Caldwell, Sarahsville,	1	3	Noble County EMA, Mayors/ Administrators of Caldwell and Sarahsville	Staff Time	02/01/20 - 12/31/24	New
4	Install or upgrade County-wide public alarm systems.	Noble County, Belle Valley, Sarahsville,	1	2	Noble County EMA, Mayors/ Administrators of Belle Valley and Sarahsville	Emergency Management Performance Grant (EMPG) Special Project Grants	02/01/20 - 12/31/24	New
5	Construct community safe rooms throughout Noble County.	Noble County,	1	0	Noble County EMA	Capital Improvement Budgets	02/01/20 - 12/31/24	New
Complex/Coordinated Incident								
6	Utilize barriers that block traffic at outdoor public events.	Noble County, Belle Valley, Caldwell,	8	39	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
7	Purchase radios for schools.	Noble County, Belle Valley,	8	37	Noble County EMA, Mayor/ Administrator of Belle Valley	State Homeland Security Program (SHSP)	02/01/20 - 12/31/24	New

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
8	Require public employees to participate in active shooter trainings.	Noble County, Belle Valley, Caldwell,	8	38	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	State Homeland Security Program (SHSP)	02/01/20 - 12/31/24	New
9	Create a paper backup system for critical government operations.	Noble County, Belle Valley, Caldwell, Dexter City,	8	40	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Dexter City	State Homeland Security Program (SHSP)	02/01/20 - 12/31/24	New
Dam/Levee Failure								
10	Complete inundation maps for all Class I, II, and III dams.	Noble County,	9	0	Noble County Auditor/GIS	Staff Time	02/01/20 - 12/31/24	New
Drought and Extreme Heat								
11	Continue to promote the public awareness campaign to promote water saving techniques (such as low flow water saving showerheads and toilets).	Noble County, Belle Valley, Caldwell, Sarahsville,	12	54	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing, as necessary
12	Develop a public awareness campaign to heighten awareness about brush fires and preventative maintenance for homeowners.	Noble County, Belle Valley, Caldwell,	12	52	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	Ongoing, as necessary
13	Identify and implement connection to a diversified public water system.	Noble County, Belle Valley, Caldwell,	12	50	Noble County Engineer, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
14	Encourage the use of local plant species to reduce water consumption.	Noble County, Belle Valley,	12	55	Noble County EMA, Mayor/ Administrator of Belle Valley	General Operating Budget	02/01/20 - 12/31/24	New
15	Encourage the increase of tree plantings, especially near impervious surfaces such as parking lots.	Noble County, Belle Valley,	12	56	Noble County EMA, Mayor/ Administrator of Belle Valley	General Operating Budget	02/01/20 - 12/31/24	New

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
16	Identify local drought indicators, such as soil moisture, precipitation, temperature, and surface water levels, and record them at least once per month.	Noble County,	12	53	Noble County Engineer	Staff Time	02/01/20 - 12/31/24	New
17	Organize outreach to provide appropriate support (transportation to cooling centers, water delivery, etc.) to vulnerable populations, such as children or the elderly.	Noble County, Belle Valley,	12	51	Noble County EMA, Mayor/ Administrator of Belle Valley	General Operating Budget	02/01/20 - 12/31/24	New
Earthquakes								
18	Develop an outreach program about earthquake risk and mitigation activities in homes, schools, and businesses.	Noble County, Belle Valley,	14	58	Noble County EMA, Mayor/ Administrator of Belle Valley	General Operating Budget	02/01/20 - 12/31/24	New
Flooding								
19	Acquire, retrofit, elevate, or relocate flood prone structures throughout Noble County.	Noble County, Belle Valley, Caldwell, Sarahsville,	2	9	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing (90% Complete)
20	Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.	Noble County, Belle Valley, Caldwell, Sarahsville,	2	10	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	Staff Time	02/01/20 - 12/31/24	Ongoing (90% Complete)
21	Notify owners in writing of flood prone properties and recommend the need for flood insurance.	Noble County, Belle Valley, Caldwell,	2	5	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	Staff Time	02/01/20 - 12/31/24	Ongoing (80% Complete)

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
22	Evaluate the feasibility of upstream surface flood storage for flood prone structures that cannot be mitigated by conventional techniques.	Noble County, Caldwell,	2	14	Noble County EMA, Mayor/ Administrator of Caldwell	United States Army Corps of Engineers (USACE) Planning Assistance to States	02/01/20 - 12/31/24	Ongoing (90% Complete)
23	Identify structure inventory for properties at-risk to flood (specifically properties located in the special flood hazard area/1% annual chance area).	Noble County, Belle Valley, Caldwell,	2	11	Noble County EMA, Noble County Auditor/GIS, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	Ongoing (90% Complete)
24	Update existing flood damage prevention resolutions and ordinances (as it relates to 44CFR 60.3).	Noble County, Belle Valley, Caldwell, Sarahsville,	2	8	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	Staff Time	02/01/20 - 12/31/24	Ongoing (95% Complete)
25	Continue to acquire structures in identified repetitive loss areas throughout Noble County.	Noble County, Caldwell, Sarahsville,	2	13	Noble County EMA, Mayors/ Administrators of Caldwell and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing (95% Complete)
26	Create protocol for use of an early flood warning system.	Noble County, Belle Valley, Caldwell, Sarahsville,	2	7	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	Staff Time	02/01/20 - 12/31/24	Ongoing (30% Complete)
27	Establish emergency evacuation plans for areas at-risk to flood.	Noble County, Belle Valley, Caldwell, Sarahsville,	2	6	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing (90% Complete)
28	Limit the coverage area of impervious surfaces by percent in new development.	Noble County, Caldwell,	2	12	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
29	Establish a green infrastructure program to develop and expand existing parks, greenways, preserves, etc. for the purpose of improving stormwater management.	Noble County, Caldwell,	2	15	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
Hazardous Materials								
30	Purchase the equipment necessary to sustain hazardous materials emergency response teams.	Noble County, Caldwell, Sarahsville,	5	26	Noble County EMA, Mayors/ Administrators of Caldwell and Sarahsville	Capital Improvement Budgets	02/01/20 - 12/31/24	Ongoing, as necessary
31	Develop site-specific emergency plans for hazardous materials facilities throughout the municipalities and County.	Noble County, Belle Valley, Caldwell, Sarahsville,	5	27	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	Hazardous Materials Emergency Planning Grant (HMEP)	02/01/20 - 12/31/24	Ongoing (50% complete)
32	Maintain an inventory of hazardous waste generators and storage facilities and provide facility owner(s) education and awareness information.	Noble County, Caldwell, Sarahsville,	5	25	Noble County EMA, Mayors/ Administrators of Caldwell and Sarahsville	Hazardous Materials Emergency Planning Grant (HMEP)	02/01/20 - 12/31/24	Ongoing (90% Complete)
33	Update existing alarm systems to warn about hazardous materials spills.	Noble County, Belle Valley, Caldwell, Sarahsville,	5	24	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	Hazardous Materials Emergency Planning Grant (HMEP)	02/01/20 - 12/31/24	New
Invasive Species								
34	Develop a public awareness campaign to heighten awareness of locally occurring invasive species, including how to spot them and to prevent their distribution.	Noble County, Caldwell,	13	57	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
Landslide, Erosion, and Mine Subsidence								
35	Encourage municipal and County offices to review regulations to maintain control of future development in high hazard areas.	Noble County, Batesville, Belle Valley, Caldwell, Dexter City, Sarahsville, Summerfield,	3	16	Noble County EMA, Mayors/ Administrators of all Villages	General Operating Budget	02/01/20 - 12/31/24	Ongoing (20% Complete)
36	Implement a brush clearing, bank stabilization and debris control program for all flood prone waterways.	Noble County, Belle Valley, Caldwell,	3	17	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	Ongoing (50% complete)
37	Encourage property owners and developers to submit historic abandoned mine maps to the Ohio Department of Natural Resources.	Noble County, Belle Valley, Caldwell,	3	18	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
38	Identify and map erosion hazard areas.	Noble County, Belle Valley, Caldwell, Sarahsville,	3	19	Noble County Auditor/GIS, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
Severe Summer Storms								
39	Install uninterruptible power supplies on critical equipment in county and municipal facilities.	Noble County, Batesville, Belle Valley, Caldwell, Dexter City, Sarahsville, Summerfield,	7	33	Noble County EMA, Mayors/ Administrators of all Villages	General Operating Budget	02/01/20 - 12/31/24	Ongoing (30% Complete)
40	Install surge protectors on electronic equipment in county and municipal facilities.	Noble County, Batesville, Belle Valley, Caldwell, Dexter City, Sarahsville, Summerfield,	7	32	Noble County EMA, Mayors/ Administrators of all Villages	General Operating Budget	02/01/20 - 12/31/24	Ongoing (30% Complete)
41	Promote the use of special roofing shingles designed to interlock and resist uplift forces for both new construction and retrofits.	Noble County, Batesville, Belle Valley, Caldwell, Dexter City, Sarahsville, Summerfield,	7	35	Noble County EMA, Mayors/ Administrators of all Villages	General Operating Budget	02/01/20 - 12/31/24	Ongoing (50% complete)

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
42	Equip all county and public gathering places with lightning detectors.	Noble County, Batesville, Belle Valley, Caldwell, Sarahsville,	7	36	Noble County EMA, Mayors/ Administrators of Batesville, Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing, as necessary
43	Encourage structures on temporary foundations to be anchored to permanent foundations.	Noble County, Sarahsville,	7	34	Noble County EMA, Mayor/ Administrator of Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
Severe Winter Weather								
44	Purchase the equipment necessary to efficiently remove snow and ice from county and township roads.	Noble County, Belle Valley, Caldwell, Dexter City, Sarahsville,	6	28	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, Dexter City, and Sarahsville	Capital Improvement Budgets	02/01/20 - 12/31/24	Ongoing, as necessary
45	Provide sidewalk clearing services to vulnerable populations, such as the elderly and disabled.	Noble County, Caldwell, Sarahsville,	6	29	Noble County EMA, Mayors/ Administrators of Caldwell and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
46	Plant tree lines or other vegetation to limit blowing or drifting of snow onto critical roadways.	Noble County, Sarahsville,	6	30	Noble County EMA, Mayor/ Administrator of Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
47	Coordinate with utility providers to bury overhead utility lines (outside of flood zones only).	Noble County, Sarahsville,	6	31	Noble County Engineer, Mayor/ Administrator of Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
Tornadoes								
48	Construct community safe rooms in downtown Caldwell.	Noble County, Belle Valley, Caldwell,	10	43	Noble County EMA, Mayors/ Administrators of Belle Valley and Caldwell	Capital Improvement Budgets	02/01/20 - 12/31/24	Ongoing
49	Continue to support and manage the tornado safety public awareness campaign in Noble County.	Noble County, Belle Valley, Caldwell, Sarahsville,	10	42	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	Ongoing, as necessary

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
50	Promote enhanced anchoring of manufactured homes.	Noble County, Belle Valley,	10	41	Noble County EMA, Mayor/ Administrator of Belle Valley	General Operating Budget	02/01/20 - 12/31/24	Ongoing, as necessary
51	Encourage safe room installation in mobile home communities, critical facilities, and public buildings.	Noble County, Caldwell,	10	44	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
52	Retrofit large gathering facilities with safe rooms.	Noble County, Belle Valley, Caldwell, Sarahsville,	10	45	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
Utility Failure								
53	Install power generators in public buildings and critical facilities.	Noble County, Caldwell,	4	20	Noble County EMA, Mayor/ Administrator of Caldwell	Capital Improvement Budgets	02/01/20 - 12/31/24	New
54	Prepare public buildings to serve as shelters during long-term power outages.	Noble County, Caldwell,	4	22	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
55	Improve radio communication systems in public buildings and critical facilities.	Noble County, Caldwell,	4	21	Noble County EMA, Mayor/ Administrator of Caldwell	Capital Improvement Budgets	02/01/20 - 12/31/24	New
56	Develop a public outreach campaign to heighten awareness on being prepared for long-term power outages.	Noble County, Belle Valley, Caldwell, Sarahsville,	4	23	Noble County EMA, Mayors/ Administrators of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
Wildfires								
57	Cut firebreaks into public wooded areas.	Noble County, Caldwell,	11	46	Noble County EMA, Mayor/ Administrator of Caldwell	General Operating Budget	02/01/20 - 12/31/24	New
58	Develop a vegetation management plan.	Noble County, Caldwell,	11	49	Noble County EMA, Mayor/ Administrator of Caldwell	Staff Time	02/01/20 - 12/31/24	New

Hazard Mitigation Actions Priority Table, by Hazard								
#	Mitigation Action	Community	Hazard Priority	Action Priority	Lead Agency	Funding Source	Start/End	Status
59	Promote public education on smoking hazards and recreational fire risks.	Noble County, Belle Valley, Caldwell, Sarahsville,	11	48	Fire Depts of Villages of Belle Valley, Caldwell, and Sarahsville	General Operating Budget	02/01/20 - 12/31/24	New
60	Develop a wildfire response plan with all fire departments.	Noble County, Belle Valley, Caldwell,	11	47	Noble County EMA, Fire Depts of Villages of Belle Valley & Caldwell	Staff Time	02/01/20 - 12/31/24	New

6 | Schedule and Maintenance

6.1 Participation Overview

The 2020 Noble County Hazard Mitigation Plan will be adopted by all jurisdictions in Noble 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 Noble County Emergency Management Agency and Ohio Emergency Management Agency websites. The Noble 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 Noble County Emergency Management Agency Director or Deputy 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 Noble 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

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 Noble County Hazard 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 Noble 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 Noble 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.