Noble County Multi-Hazard Mitigation Plan

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Prepared for:

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXHIBITS

APPENDICES

EXECUTIVE SUMMARY

The Federal Emergency Management Agency (FEMA) defines the disaster life cycle as the process through which emergency managers respond to disasters when they occur; help people and institutions recover from them; reduce the risk of future losses; and prepare for emergencies and disasters. In **Figure i** each phase in the Emergency Management Lifecycle; Mitigate, Prepare, Respond, and Recover has a description of the phase as well as a time frame within the disaster cycle. Although each of the phases is visually tied to a specific time period within the life cycle of the disaster, mitigation can take place throughout much of the disaster life cycle. The Noble County Multi-Hazard Mitigation Plan (MHMP) update focuses on the mitigation activities that may be implemented throughout the disaster life cycle.

Figure i: Disaster Life Cycle

According to FEMA, mitigation is most effective when it is based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs. The MHMP planning process identifies hazards, the extent that they affect the municipality, and formulates mitigation practices to ultimately reduce the social, physical, and economic impact of the hazards.

The overall goals of the Noble County MHMP, which align closely with the State of Indiana MHMP, are:

- Lessen the impacts of disasters and enhance community resilience.
- Minimize the loss of life and injuries caused by disasters.
- Promote mitigation activities both prior to and following a disaster.

To achieve the stated goals the community strategy includes the following:

1) Lessen the impacts of disasters and enhance community resilience by:
   a. Supporting resilience opportunities within the community
   b. Incorporating the MHMP into local ordinances, local planning efforts, and the community comprehensive plans
   c. Evaluating and strengthening collaboration among organizations
   d. Making sure essential facilities can withstand disasters
   e. Supporting the NFIP
   f. Identifying opportunities to reduce repetitive loss incidents

2) Minimize the loss of life and injuries caused by disasters by:
   a. Providing adequate warning systems for the residents
   b. Developing public awareness and outreach programs
   c. Providing adequate shelter availability
   d. Developing a program of affordable housing that is resilient to flooding
   e. Improving education and training for emergency personnel and officials
   f. Developing ways to provide education, awareness, and warning of disasters to the underserved populations.

3) Promote mitigation activities prior to and following a disaster by:
   a. Ensuring better communication between federal, state, and local officials
   b. Seizing opportunities to buy out properties, floodproof buildings, or improve building codes

c. Conducting new studies and/or research opportunities to reduce impacts from disasters and prepare for future events anticipating the impacts of our changing climate.
d. Conducting outreach efforts to educate community members about the risks and hazards in their area as well as encouraging the implementation of a variety of mitigation actions.

For National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must either adopt their own MHMP or participate in the development of a multi-jurisdictional MHMP. Further, it is required that local jurisdictions review, revise, and resubmit the MHMP every five years. The following are incorporated communities that have provided information, attended meetings, and participated in the planning process, the planning process used to update the Noble County MHMP satisfies the requirements of a multi-jurisdictional plan.

- Noble County
- City of Ligonier
- Town of Avilla
- Town of Rome City
- City of Kendallville
- Town of Albion
- Town of Cromwell
- Town of Wolcottville

During planning committee meetings, those in attendance revisited the latest edition of the Noble County MHMP and identified new critical facilities and local hazards; reviewed the State's mitigation goals and updated the local mitigation goals; reviewed the most recent local hazard data, vulnerability assessment, and maps; evaluated the effectiveness of existing mitigation measures and identified new mitigation projects; and reviewed materials for public participation. Keeping in mind the ever-changing climate, the team also examined the needs of underserved populations that may be more vulnerable to the impacts of the listed hazards. Meetings were conducted with key groups such as city planners, health department specialists, representatives of organizations serving the underserved populations and various emergency responders. Their information has been incorporated into this MHMP update. This plan update will examine each of the hazards with data from the past five years, where possible.

The review of hazards and risks is based on the methodology described in the Local Mitigation Planning Policy Guide FP 206-21-0002, effective April 19, 2023. The plan identifies the hazards assessed, the nature of each hazard including historic occurrences, vulnerabilities, and the relationship to other hazards. Using a ranking tool known as the Calculated Risk Priority Index (CPRI), the planning team scored each of the hazards. **Table i** lists the hazards in the plan and the ranking of each. The CPRI scores reflect the hazards of most concern by the planning team members.

Table i: CPRI Ranking for All Hazards

Hazard	2025 Rank	CPRI Score
Hailstorm, Thunderstorm, and Windstorm	1	3.28
Tornado	2	3.19
Winter Storms and Ice	3	3.03
Hazardous Material Incident	4	3.01
Fires and Wildfire	5	2.97
Extreme Temperatures	6	2.78
Drought	7	2.40
Flood	8	2.33
Dam and Levee Failure	9	2.22
Earthquake	10	1.47
Landslide, Land Subsidence, and Fluvial Erosion	11	1.31

The plan concludes with a discussion about mitigation actions. The MHMP lists a variety of mitigation actions the planning team members would like to accomplish within the next five years to enhance the resilience of Noble County. In addition, it celebrates the mitigation successes from the previous MHMP plans and community actions which contribute to mitigating the various risks and hazards identified.

Lastly, this MHMP is a living document which has a five-year life span. During the next five years, Noble County and the incorporated communities that adopt this plan will work to complete the mitigation actions as well as regularly noting items for the next plan update. The county EMA and planning team members will also use tools contained in the appendices, or similar documents, to track progress, and note changes that may impact community resilience.

CHAPTER 1: INTRODUCTION

DISASTER LIFE CYCLE

The Federal Emergency Management Agency (FEMA) defines the disaster life cycle as the process through which emergency managers respond to disasters when they occur; help people and institutions recover from them; reduce the risk of future losses; and prepare for emergencies and disasters. The disaster life cycle, shown in **Figure 1** includes four phases:

Figure 1: Disaster Life Cycle

Mitigation – to prevent or to reduce the effects of disasters (building codes and zoning, vulnerability analyses, public education)
Preparedness – planning, organizing, training, equipping, exercising, evaluation and improvement activities to ensure effective coordination and the enhancement of capabilities (preparedness plans, emergency exercises/training, warning systems)
Response – the mobilization of the necessary emergency services and first responders to the disaster area (search and rescue; emergency relief)
Recovery – to restore the affected area to its previous state (rebuilding destroyed property, re-employment, and the repair of other essential infrastructure)

The Noble County Multi-Hazard Mitigation Plan (MHMP) focuses on the mitigation phase of the disaster life cycle. According to FEMA, mitigation is most effective when it is based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs. Recent reviews of grant programs have determined for every $1 spent on mitigation efforts, between $6 and $10 are saved within the community on efforts following disasters. The MHMP planning process identifies hazards, the extent that they affect the municipality, and formulates mitigation practices to ultimately reduce the social, physical, and economic impact of the hazards.

The following chapters will address the planning process used to complete the updating of the existing MHMP, basic community information to orient the reader to the county and the incorporated communities, a discussion of nine natural and two manmade hazards detailing their recent occurrence and risks posed to the county, a discussion of the mitigation strategy, outline of the implementation plan and a discussion of how the plan will be maintained. Images and tables in **bold** are linked within the document as well as being linked in the table of contents. By clicking on these bolded features while holding the control key, the document will automatically move to item identified in the bold text.

CHAPTER 2: PLANNING PROCESS

REQUIREMENT 44 CFR 201.6 (d)(3):

A local jurisdiction must 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 5 years in order to continue to be eligible for mitigation project grant funding.

According to the Code of Federal Regulations (44 CFR §201.1(b)), the purpose of mitigation planning is for state, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

A FEMA-approved MHMP is required to apply for and/or receive project grants under the Building Resilient Infrastructure and Communities (BRIC), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA). Additional detailed studies may need to be completed prior to applying for these grants even though this plan meets the requirements of Disaster Mitigation Act (DMA) 2000 and eligibility requirements of the above listed grant programs. Acronyms referenced throughout this plan are contained in **Appendix 1**.

The NFIP requires participating communities to adopt either their own MHMP or participate in the development of a multi-jurisdictional MHMP to be eligible for future mitigation funds. The Indiana Department of Homeland Security (IDHS) and the United States Department of Homeland Security (US DHS)/FEMA Region V offices administer the MHMP program in Indiana. Local jurisdictions are required to review, revise, and resubmit the MHMP every five years. The MHMP updates must demonstrate that progress has been made in the last five years to fulfill the commitments outlined in the previously approved MHMP. The update may validate the information in the previously approved MHMP or may be a major rewrite depending on community needs and planning guidance. The updated MHMP is not intended to be an annex to the previously approved plan; it stands on its own as a complete and current MHMP. The Noble County MHMP update is a multi-jurisdictional planning effort led by the Noble County Emergency Management Agency (EMA). This plan was prepared in partnership with Noble County (referred to in this document as county), the cities of Kendallville and Ligonier (referred to in this document as cities), and the towns of Albion, Avilla, Cromwell, Rome City, and Wolcottville (referred to in this document as towns).

Representatives from these communities attended the committee meetings, providing valuable information about their community, reviewing, and commenting on the draft MHMP, and assisting with local adoption of the updated plan. As each of the jurisdictions had an equal opportunity for participation and representation in the planning process, the process used to update the Noble County MHMP satisfies the requirements of DMA 2000 in which multi-jurisdictional plans may be accepted.

The Community Rating Service (CRS) program is a voluntary incentive program that recognizes and encourages community floodplain activities that exceed the minimum NFIP requirements. As a result, flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote education and awareness of flood insurance. Savings on flood insurance premiums are proportional to the points assigned to various activities. A minimum of 500 points is required to be a participating community within the CRS program and receive a 5% flood insurance premium discount. Class 10, or communities with 0-499 points, are non-participating communities and do not receive a

Figure 2: NFIP/CRS Logo

discount on flood insurance. This MHMP could contribute as many as 374 points toward participation in the CRS. Throughout this plan, activities that could count toward CRS points are identified with the NFIP/CRS logo (**Figure 2**). **Appendix 2** breaks down how this MHMP can contribute toward participation in the CRS.

2.1 Schedule

REQUIREMENT §201.6(c)(1):

The plan shall document the planning process used to prepare the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Preparation for the Noble County MHMP update began when IDHS notified the county of the FEMA grant award and availability of grant funds. The plan update process began immediately upon the hiring of Christopher B. Burke Engineering, LLC (Burke). The planning process to update the 2020 MHMP took 18 months. This included a review period by IDHS and FEMA for the draft MHMP update, and time for Noble County and communities to adopt the final MHMP update.

2.2 Planning Committee and Involvement of Other Interested Parties

In June 2025, the EMA began to compile a list of planning committee members to guide the MHMP update planning process. Committee members were contacted through their personal contact info and were relayed information on the meeting time and location. These individuals were specifically invited to serve on the committee because they were knowledgeable of local hazards; had been involved in hazard mitigation activities; had the tools necessary to reduce the impact of future hazard events; and/or served as a representative on the prior planning committee in 2020. The surrounding counties of Allen, DeKalb, Elkhart, Kosciusko, LaGrange, Steuben, and Whitley were invited to attend the team meetings and were given an opportunity to provide input and feedback to the plan throughout the planning process and during draft review. While the EMA Directors from DeKalb, LaGrange, and Whitley Counties attended, no comments or corrections were received from the neighboring EMA offices. **Table 1** lists the individuals that actively participated on the committee and the entity they represented.

Table 1: Noble County MHMP Planning Team

Name	Agency	Title	Community Representing
Jan Abbs	Indiana Search and Rescue Team	CEO	Rome City
Mike Adams	Albion Fire Department	Assistant Chief	Albion
Dave Baum	Noble County Information Technology	Director	Noble County
Ann Carpenter	Noble County EMA	Deputy Director	Noble County
Jay Cheshier	Noble County E911	Director	Noble County
Scott Cole	Albion Police Department	Town Marshal	Albion
Gabe Creech	Noble County EMA	Director	Noble County
Kody Forker	Albion Fire Department	Captain	Albion
Michael Hatfield	Town of Cromwell	Town Marshal	Cromwell
Steve Hook	Noble County GIS Department	GIS Manager	Noble County
Angie Kidd	Common Grace Ministries	Executive Director	Business/Industry
Mike Klopfenstein	Noble County Building Dept.	Building Commissioner	Noble County
Jackie Knafel	Noble County Commission	County Coordinator	Noble County
Kelly Landers	Noble County E911	Assistant Director	Wolcottville

Name	Agency	Title	Community Representing
Gary Leatherman	Noble County Commissioners	President	Noble County
Mindy London	Kendallville Public Library	Executive Director	Kendallville
Shelley Mawhorter	Noble County Auditor's Office	Auditor	Noble County
Jeremy McKinley	Kendallville Fire Department	Chief	Kendallville
Brandon Rittenhouse	Whitley County EMA	Deputy Director	Whitley County
Edward Scott	Whitley County EMA	Director	Whitley County
Angela Scott	Ligonier Public Library	Director	Ligonier
Zack Smith	Noble County Highway Department	County Engineer	Noble County
Teresa Tackett	Noble County Planning Commission	Plan Director	Noble County
Rob Tomlinson	Noble County Treasurer's Office	Treasurer	Noble County
Sara Wagar	Noble County EMA	RACES	Albion
Brian Walker	Noble County Sheriff Department	Chief Deputy	Avilla
Jeremy Weaver	Ligonier Fire Department	Chief	Ligonier
Max Webber	Noble County Sheriff Department	Sheriff	Noble County
Robert Amber	Albion Fire	Fire Chief	Albion
Leigh Pranger	Rome City	Town Manager	Rome City
Bill Morr	LaGrange County	LaGrange EMA	LaGrange County
Jason Meek	Dekalb County EMA	EMA Director	Dekalb County

Members of the committee participated in the MHMP update through various team meetings as well as outside group meetings where mitigation opportunities are supported or addressed. During the MHMP team meetings, the committee:

- Reviewed the state's mitigation goals and updated the local mitigation goals
- Reviewed the most recent local hazard data, vulnerability assessment, and maps
- Evaluated and ranked the hazards based on probability of occurrence, impact, warning time, and duration of the hazard event
- Revisited existing (in the prior MHMP) critical and essential infrastructure and identified new critical infrastructure and local hazards
- Evaluated the effectiveness of existing mitigation measures and identified new mitigation projects
- Reviewed materials for public participation

A sign-in sheet recorded those present at each meeting to document participation. Meeting agendas and summaries are included in **Appendix 3**. Members of the committee also reviewed a draft MHMP, provided comments and suggestions, and assisted with adoption of the Noble County MHMP update.

2.3 Public Involvement

The Noble County EMA Director kept the public up to date about the planning process by regularly reporting on the planning effort at public commissioner's meetings, LEPC meetings, and other events. A draft of the Noble County MHMP update was posted to the Official Website of Noble County Indiana for public review and comment. A media release indicating the posting of the draft MHMP and the ability to comment was submitted for release. No comments or corrections were received from the public or the committee **(This highlight will be updated after the period of review)**. The media release, web page posting, and any comments received are included in **Appendix 4**.

Neighboring EMAs were invited to review the draft plan during the period of public review and comment. No comments or corrections were received from the neighboring EMAs. **(This highlight will be updated after the period of review.)**

2.4 Plans, Studies, Reports, and Technical Information

Requirement 201.6(c)(1)

The plan shall include a review and incorporation, if appropriate, of existing plans, studies, reports, and technical information

During the development of the Noble County MHMP update, several relevant sources of information were reviewed either as a document or through discussions with local personnel. This exercise was completed to gather updated information from the time of the development of the previous Noble County MHMP, and to assist the committee in developing potential mitigation measures to reduce the social, physical, and economic losses associated with hazards affecting Noble County.

This planning effort included the review of community-specific plans and studies for incorporation in this plan update. For the purposes of this planning effort, the following materials (among others) were discussed and utilized:

- MHMP Noble County (2019)
- Noble County Comprehensive Plan (2018)
- Noble County GIS data
- City of Kendallville Comprehensive Plan Update (2019)
- City of Ligonier Comprehensive Plan Update (2019)
- Noble County Ordinances
- City of Kendallville and Ligonier Ordinances
- Ordinances for the towns of Albion, Avilla, Cromwell, Rome City, and Wolcottville

The above plans and ordinances target many of the same issues and plans included in this report. The MHMP has and continues to be used to inform decision makers during preparation of various documents in the county. This MHMP planning effort sought to use existing plans to inform the planning team about mitigation actions that would support the community development, as outlined in the comprehensive plan, and to support and/or enhance existing ordinances. The Noble County Building Department has jurisdiction over all unincorporated areas of the county and over the towns of Albion, Avilla, Cromwell, Rome City, and Wolcottville. The cities of Kendallville and Ligonier have their own building departments.

In addition to local agencies and offices such as those listed above, several regional and state agencies were contacted and subsequently provided data for this planning effort. Those contacts, and the information they provided, include:

- Indiana Department of Natural Resources, Division of Water – Flood insurance policies, claims, and payment information; NFIP Participation; DNR listed Dams and associated records; Dam Breach Inundation App; and IN Floodplain Information Portal
- Indiana Department of Natural Resources, Other Divisions – Mining Records
- Indiana Geologic Survey and Water – Earthquakes in Indiana; Liquefaction Potential Map: Karst Regions and Maps of Karst locations
- Indiana Geographic Information Office - IndianaMap
- Indiana Department of Homeland Security – Current Fire and Building Code Information
- FEMA, Region V – Repetitive loss structure counts and insurance payments and FIRM Maps and Flood Studies

- Midwest Regional Climate Center – Climate Trends; County specific climate reports
- National Weather Service –- Confirmation of Winter Storm Severity Index (WSSI) tool; local storm reports; weather event photos

The CRS program credits NFIP communities with a maximum of 170 points: up to 15 points for organizing a planning committee composed of staff from various departments; up to 120 points for involving the public in the planning process; and up to 35 points for coordinating among other agencies and departments to resolve common problems relating to flooding and other known natural hazards.

CHAPTER 3: COMMUNITY INFORMATION

Figure 3: Noble County Location

Noble County was originally inhabited by the Miami Indians. It was established in 1836 and was named after James Noble, a Virginian man who moved to Brookville Indiana and became a United States Senator. The county is part of northeast Indiana and sits just northwest of Fort Wayne. It contains a mix of urban, suburban, and rural areas. It is bordered on the north by LaGrange County and contains the Chain O' Lakes State Park.

Noble County grew slowly before the 1850's. The construction of railroads to Fort Wayne and the rest of the country brought thousands of settlers and immigrants. Industrialization began with the aid of railroad and shipping. As a result of the location of Fort Wayne and the industrialization era, Noble County grew to be more populated than most rural counties in the State.

Even with the industrial decline the population in Noble County has been either growing or remaining the same. Economic adjustment in the 1900s and 2000s, and suburban growth have increased commuter populations of workers employed in nearby counties. This may explain in part why Noble County has not seen the population declines many other rural counties have.

Noble County has a significant population of people who either live in Noble County and commute out of the county or live in a nearby county and commute into the county. In the event of a disaster nearly 11K people would likely flee either into or out of the county which could clog up roadways and potentially cause an accident to occur.

Noble County is above the state average for preschool and school age children (at 6.5% and 17.7% respectively) and is below the state average for college age people and young adults (at 8.3% and 24.4% respectively). This could show a worrying trend of children leaving the county which could hurt the future workforce of Noble County. Additionally, Noble County has a larger Hispanic population than most Indiana counties at 11.7% of the population. It is important to consider this community when a disaster occurs.

Noble County is mainly low and flat, except for a few sand ridges and dunes. The central part of the county is higher and has more topography. The total area of Noble County is 417.43 square miles of which seven square miles is water. The county has two cities, Kendallville and Ligonier, is divided into 13 townships, and the town of Albion serves as the county seat. The location of the county within the State of Indiana is identified in **Figure 3**. A list of the top ten employers in Noble County is included below.

Top Ten Employers within Noble County

1. Ti Fluid System
2. Kraft Heinz Company
3. Busche Enterprise Division Inc
4. Silgan Plastics LLC
5. Bosch Automotive Motor Systems
6. Kautex
7. Tenneco Inc
8. Parkview Noble Hospital
9. Hendrickson Truck Commercial Vehicle Systems
10. Colwell Industries Inc

3.1 CRITICAL AND ESSENTIAL INFRASTRUCTURE

REQUIREMENT §201.6(c)(2)(ii)(A):

The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas….

Figure 4: Noble County Courthouse

Critical facilities, critical infrastructure, and essential facilities are the assets, systems, and networks, whether physical or virtual, so vital to local governments and the United States that their incapacitation or destruction would have a debilitating effect on security, economic security, public health or safety, or any combination thereof.

These structures are vital to the community's ability to provide essential services and protect life and property; are critical to the community's response and recovery activities; and/or are the facilities, the loss of which, would have a severe economic or catastrophic impact. The operation of these facilities becomes especially important following a hazard event.

Utilizing information from the Noble County EMA and GIS Department alongside FEMA data, **Table 2** shows the 310 critical and essential facilities for the MHMP update. Facilities that serve multiple facility types have been counted in accordance with their primary function. Additionally, there may be insufficient data to accurately list all critical and essential facilities in the county. **Figure 4** shows the Noble County Courthouse as one of the critical facilities. The following list identifies the number of each of the critical and essential facilities identified.

Table 2: Critical and Essential Facilities

Critical and Essential Facilities							
Facility Type	**Count**	**Facility Type**	**Count**	**Facility Type**	**Count**	**Facility Type**	**Count**
Airport	8	Emergency Operations Center (EOC)	1	Mobile Home Park	26	Shelter	1
Courthouse	1	Fire Station	15	Nursing Home	8	Substation	24
Dam	18	Healthcare	1	Oil Pumping Station	1	Tier II Facility	73
Daycare	5	Large Employer	24	Place of Worship	63	Wastewater Treatment	2
EMS	2	Law Enforcement	8	School	29		

Information provided by the EMA, Noble County GIS, the MHMP planning committee members, and federal/state GIS layers were utilized to identify the types and locations of critical structures throughout Noble County. Draft maps were provided to the planning committee and EMA, along with the planning committee for their review and all comments were incorporated into the maps and associated databases.

Exhibit 1 illustrates the critical infrastructure identified throughout the unincorporated Noble County and the individual municipalities. **Appendix 5** lists the critical structures in Noble County by community. Non-critical structures include residential, industrial, commercial, and other structures not meeting the definition of a critical facility and are not required for a community to function. The development of this MHMP focused only on critical and essential structures; non-critical structures are neither mapped nor listed.

3.2 COMMUNITY CAPACITY

REQUIREMENT §201.6(c)(3):

The plan shall document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs.

The Indiana Fire Prevention and Building Safety Commission is tasked with the establishment and maintenance of fire and building safety codes throughout the state. The commission is also responsible for reviewing variance requests, code modification proposals, and orders enforcing the fire and building safety law. Only the commission is permitted to adopt codes for the state thus prohibiting local communities from adopting codes other than those adopted by the state. All jurisdictions of the state are required to follow the state adopted fire safety and building laws.

The State of Indiana is presently working with subject matter experts to update the current fire and building safety codes to more recent International Code Council versions. Due to the hearing and adoptions processes this is a multi-year effort. It is hoped that within the next five years updated fire safety and building codes will be adopted to assist the community in becoming more resilient.

Local building officials serve as the local authority for building construction matters within their jurisdiction. Within Noble County, the county and the cities of Kendallville and Ligonier have building commissioners who administer the building codes and zoning ordinances for the county. For all other communities, the county commissioner serves as the "code official" for commercial building construction. **Appendix 6** lists the local building official as well as other key positions in each jurisdiction.

The county and most communities continue to regularly update their local floodplain ordinances within a 15-year timeframe. The towns of Albion and Avilla established their floodplain ordinances around 2015. The local floodplain administrators may want to begin updating the ordinances within these communities to restrict and promote safer development within the floodplain.

Due to the small population of Cromwell, community capacity for new projects is limited and there may be activities which are shared with the county. Additionally, the community may have multiple positions which are held by one person or not held by any one person.

Noble County has ordinances for burning, floodplain regulations, stormwater, subdivisions, water conservation, and zoning. Many of the communities within Noble County have most if not all the same ordinances the county has. As a very rural county, community leaders take advantage of grant funding to help address non-budgeted activities. The planning team identified multiple community-wide needs

that will be addressed more in **Chapter 5**. As needs for capacity building are identified, the communities and their leadership work together to ensure the challenges are addressed.

CHAPTER 4: RISK ASSESSMENT

REQUIREMENT §201.6(c)(2):

The risk assessment shall provide the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessment must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

A risk assessment measures the potential loss from a hazard incident by assessing the vulnerability of buildings, infrastructure, and people in a community. It identifies the characteristics and potential consequences of hazards, how much of the community may be affected by a hazard, and the impact on community assets. The risk assessment conducted for Noble County and the communities within is based on the methodology described in the Local Mitigation Planning Handbook published by FEMA in 2023 and is incorporated into the following sections:

Section 4.1: Hazard Identification lists the natural, technological, and political hazards selected by the planning committee as having the greatest direct and indirect impact on the county as well as the system used to rank and prioritize the hazards.

Section 4.2: Hazard Profile for each hazard, discusses 1) historic data relevant to the county where applicable; 2) vulnerability in terms of number and types of structures, repetitive loss properties (flood only), estimation of potential losses, and impact based on an analysis of development trends; and 3) the relationship to other hazards identified by the planning committee.

Section 4.3: Hazard Summary provides an overview of the risk assessment process; a table summarizing the relationship of the hazards; and a composite map to illustrate areas impacted by the hazards.

4.1 HAZARD IDENTIFICATION

4.1.1 Hazard Selection

The MHMP planning committee reviewed the list of natural and technological hazards in the 2020 Noble County MHMP and discussed recent events and the potential for future hazard events. The committee identified those hazards which affected Noble County and each community selecting the hazards to study in detail as part of this planning effort. As shown in **Table 3**, these hazards include dam and levee failure; drought; earthquake; extreme temperatures; fires and wildfire; flooding; hailstorm, thunderstorm, and windstorm; hazardous material incident; landslide, land subsidence, and fluvial erosion; winter storms and ice; and tornado. Since the COVID pandemic, the Health Department continues to develop plans and policies to better respond to and reduce the spread of both routine human disease-causing organisms as well as zoonotic diseases and changes in that field.

Table 3: Hazards Selected

Type of Hazard	List of Hazards	MHMP	
		Previous Plan	Current Plan
Natural	Drought	Yes	Yes
	Earthquake	Yes	Yes
	Extreme Temperatures	Yes	Yes
	Fires and Wildfire	Yes	Yes
	Flood	Yes	Yes
	Hailstorm, Thunderstorm, and Windstorm	Yes	Yes
	Landslide, Land Subsidence, and Fluvial Erosion	Yes	Yes
	Winter Storms and Ice	Yes	Yes
	Tornado	Yes	Yes
Technological	Dam and Levee Failure	Yes	Yes
	Hazardous Material Incident	Yes	Yes

4.1.2 Hazard Ranking

The planning committee ranked the selected hazards in terms of importance and potential for disruption to the community using a modified version of the CPRI. CPRI is a tool by which individual hazards are evaluated and ranked according to an indexing system. The CPRI value (as modified by Burke) can be obtained by assigning varying degrees of risk probability, magnitude/severity, warning time, and the duration of the incident for each event, and then calculating as index value based on a weighted scheme. For ease of communication, simple graphical scales are used.

Probability:

Probability is defined as the likelihood of the hazard occurring over a given period. The probability can be specified in one of the following categories:

- Unlikely – incident is possible, but not probable, within the next 10 years
- Possible – incident is probable within the next five years
- Likely - incident is probable within the next three years
- Highly Likely – incident is probable within the next calendar year

Magnitude / Severity:

Magnitude/severity is defined by the extent of the injuries, shutdown of critical infrastructure, the extent of property damage sustained, and the duration of the incident response. The magnitude can be specified in one of the following categories:

- Negligible – few injuries OR critical infrastructure shutdown for 24 hours or less OR less than 10% property damaged OR average response duration of less than six hours
- Limited – few injuries OR critical infrastructure shut down for more than one week OR more than 10% property damaged OR average response duration of less than one day
- Significant – multiple injuries OR critical infrastructure shut down of at least two weeks OR more than 25% property damaged OR average response duration of less than one week
- Critical – multiple deaths OR critical infrastructure shut down of one month or more OR more than 50% property damaged OR average response duration of less than one month

Warning Time:

Warning time is defined as the length of time before the event occurs and can be specified in one of the following categories:

- More than 24 hours
- 12-24 hours
- 6-12 hours
- Less than six hours

Duration:

Duration is defined as the length of time that the actual event occurs. This does not include response or recovery efforts. The duration of the event can be specified in one of the following categories:

- Less than six hours
- Less than one day
- Less than one week
- Greater than one week

Calculating the CPRI:

The following calculation illustrates how the index values are weighted and how the CPRI value is calculated. CPRI = (Probability x 0.45) + (Magnitude/Severity x 0.30) + (Warning Time x 0.15) + (Duration x 0.10). For the purposes of this planning effort, the calculated risk is defined as:

- **Low** if the CPRI value is between 1 and 2
- **Elevated** if the CPRI value is between 2 and 3
- **Severe** if the CPRI value is between 3 and 4

The CPRI value provides a means to assess the impact of one hazard relative to other hazards within the community. A CPRI value for each hazard was determined for each incorporated community in Noble County, and then a weighted CPRI value was computed based on the population size of each community. **Figure 4** presents each community, population, and the weight applied to individual CPRI values to arrive at a combined value for the entire county. Weight was calculated based on the average percentage of each community's population in relation to the total population of the county. Thus, the results reflect the relative population influence of each community on the overall priority rank.

Table 4: Determination of Weighted Value for Communities

Community	Population (2024)	% of Total Population	Weighted Value
Noble County (w/o incorporated communities)	25,675	53.7%	0.54
City of Kendallville	10,326	21.6%	0.22
City of Ligonier	4,650	9.7%	0.10
Town of Albion	2,252	4.7%	0.05
Town of Avilla	2,494	5.2%	0.05
Town of Cromwell	484	1.0%	0.01
Town of Rome City	1,315	2.8%	0.03
Town Wolcottville	615	1.3%	0.01
Total	**47,811**	**100.0%**	**1.00**

4.2 HAZARD PROFILES

The hazards studied for this report are not equally threatening to all communities throughout Noble County. While it would be difficult to predict the probability of an earthquake or tornado affecting a specific community, it is much easier to predict where the most damage would occur in a known hazard area such as a floodplain or near a facility utilizing an Extremely Hazardous Substance (EHS). The magnitude and severity of the same hazard may cause varying levels of damage in different communities.

In the past six years Indiana has had four FEMA disaster declarations and one FEMA Emergency Declaration. Noble County was included in one disaster declaration and the FEMA Emergency Declaration. The full list of disaster declarations can be seen in **Appendix 7**. The county name is bolded where it was included in the declaration.

In addition, the US Small Business Administration (SBA) had disaster declarations for 29 Indiana events. Of all these events in Indiana, Noble County was included in two. The full list of all disasters and emergency declarations can be found in **Appendix 7**.

This section describes each of the hazards that were identified by the planning committee for detailed study as a part of this MHMP update. The discussion is divided into the following subsections:

- **Hazard Overview** provides a general overview of the causes, effects, and characteristics that the hazard represents
- **Historic Data** presents the research gathered from local and national courses on the hazard extent and lists historic occurrences and probability of future incident occurrence
- **Assessing Vulnerability** describes, in general terms, the current exposure, or risk, to the community regarding potential losses to critical infrastructure and the implications to future land use decisions and anticipated development trends. Impacts on specific populations of communities are also addressed within this section
- **Relationship to Other Hazards** explores the influence one hazard may have upon another

4.2.1 Drought

Overview

Drought, in general, means a moisture deficit extensive enough to have social, environmental, or economic effects. Drought is not a rare and random climate incident; rather, it is a normal, naturally recurring feature of climate. Drought may occur in all climactic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration and is different from aridity, which is restricted to low rainfall regions.

There are four academic approaches to examining droughts; these are meteorological, hydrological, agricultural, and socio-economic. Meteorological drought is based on the degree, or measure, of dryness compared to a normal, or average amount of dryness, and the duration of the dry period. Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply. Agricultural drought is related to agricultural impacts; and focuses on precipitation shortages, differences between actual and potential evapo-transpiration, soil water deficits, reduced ground water or reservoir levels, and crop yields. Socioeconomic drought relates the lack of moisture to community functions in the full range of societal functions, including power generation, the local economy, and food source.

Figure 5 from the U.S. Drought Monitor, describes the rationale to classify the severity of droughts.

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: • Short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • Some lingering water deficits • Pastures or crops not fully recovered
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low • Some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	• Crops or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages and/or restrictions
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

Figure 5: US Drought Monitor Drought Classification Descriptions

Location

As rain patterns change there are periodic times when the county is deemed "Abnormally Dry" or D0. Most of these instances are resolved quickly as sufficient rain arrives and the soil rehydrates. On occasion, the rain is insufficient to address the dryness and weather conditions cause the soil to further dry out, stressing crops and reducing lake levels. Drought may occur in all climactic zones, but its characteristics vary significantly from one region to another. Although drought declarations may be made for portions of the county, the entire county is vulnerable to the impacts of drought.

Extent and History

Drought is a temporary aberration and is different from aridity, which is restricted to low rainfall regions. **Figure 6**, developed based on data gathered from the U.S. Drought Monitor, shows the distribution of weeks in drought over the January 1, 2020 through November 30, 2025 period.

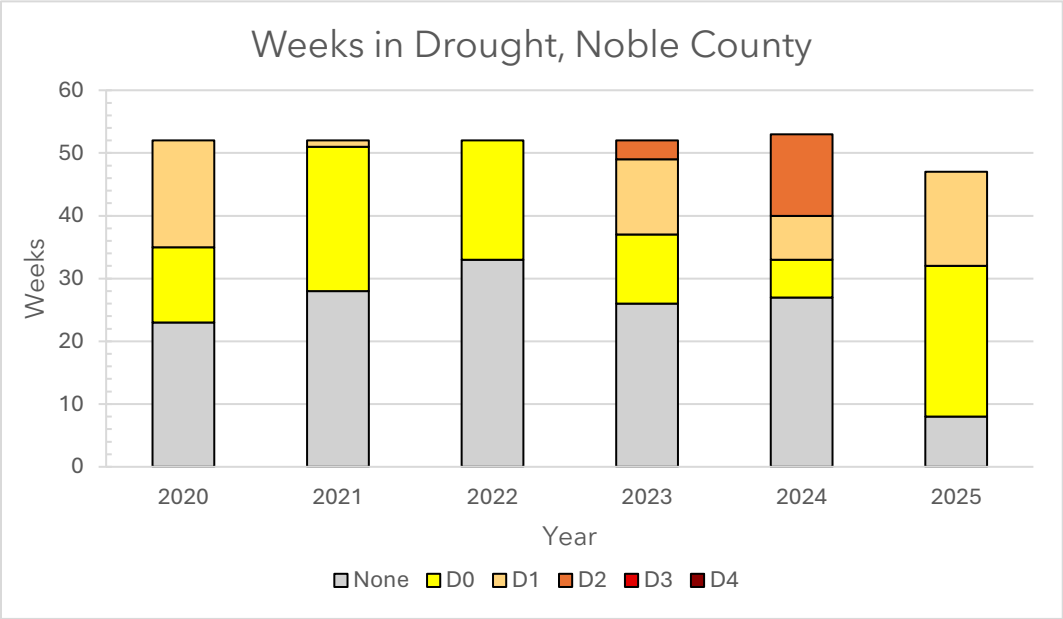


Figure 6: Drought Occurrences From January 1, 2020 - November 30, 2025

Probability

The planning committee, utilizing the CPRI, determined the overall risk of drought throughout Noble County is "Elevated." The impact of drought was determined to be different throughout the county due to the possible agricultural impacts and impacts to water wells. The committee agreed that a drought is "Possible" to "Highly Likely" (to occur within the next year), and the magnitude of drought is anticipated to be "Limited" on average. The variation in the probability is likely due to a more noticeable impact in rural areas, where farming occurs. In areas with stable water supplies lower-level droughts may go unnoticed. It is anticipated that with the enhanced weather forecasting abilities, the warning time for a drought is greater than 24 hours and the duration will be greater than one week. A CPRI summary is shown in **Appendix 8**.

According to the National Drought Mitigation Center, scientists have difficulty predicting droughts more than one month in advance due to numerous variables such as precipitation, temperature, soil moisture, topography, and air-sea interactions. Further anomalies may also enter the equation and create more dramatic droughts or lessen the severity of droughts.

Future Conditions

Climate change has a significant role in the drought conditions. **Figure 7** charts the annual maximum temperatures and shows trends utilizing data from the National Centers for Environmental Information (NCEI). The NCEI is an organization within the National Oceanic Atmospheric Administration (NOAA) that is responsible for studying and archiving the data that NOAA collects.

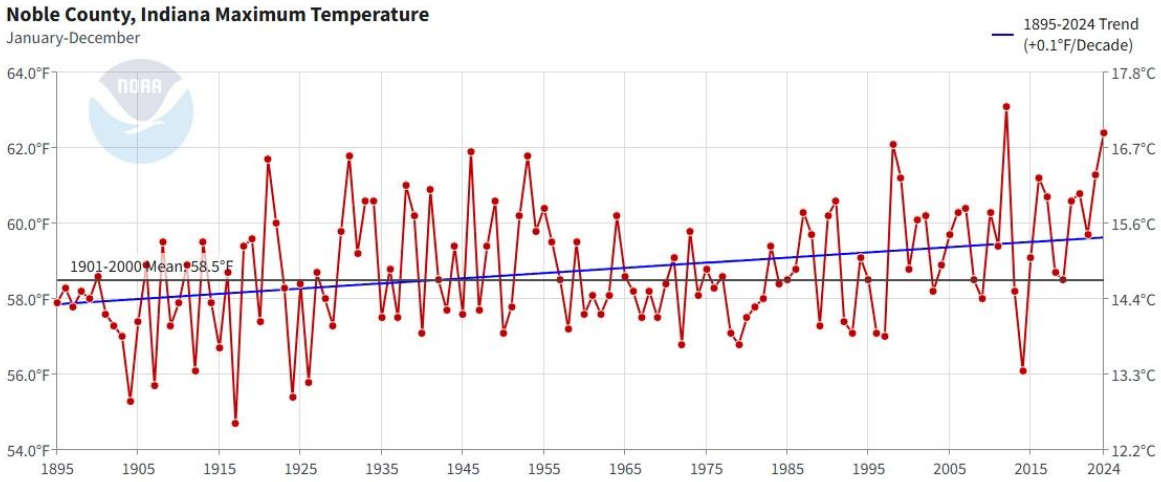


Figure 7: Annual Maximum Temperatures From 1895 - 2024

According to the 2022 NCEI State Climate Summary for Indiana the following observations have been observed based upon climate change:

- The average temperature has risen almost 2°F since the middle of the 19th century
- Temperatures in the 21st century have been higher than any other historical period with the exception of the early 1930s Dust Bowl era

This is also verified in the Indiana Climate Change Impacts Assessment report from Purdue University. "This assessment documents that significant changes in Indiana's climate have been underway for over a century, with the largest changes occurring in the past few decades." The authors wrote, "These projections generally suggest that the trends that are already occurring will continue, and the rates of these changes will accelerate. They indicate that Indiana's climate will warm dramatically in the coming decades, particularly in summer. Both the number of hot days and the hottest temperatures of the year are projected to increase markedly."

The assessment also notes that seasonal shifts in precipitation may lead to seasonal short-term droughts. In either scenario, changes in precipitation are not anticipated to relieve the area of a probability of a drought occurring.

Prior to municipalities expanding, provisions and considerations should be given regarding the potential additional demand for both water usage and fire response efforts. Following such expansion or development plans, alternative water sources should be explored.

Vulnerability

This type of hazard will generally affect entire counties and even multi-county regions at one time. Within Noble County, direct and indirect effects from a lengthy period of drought may include:

Direct Effects:

- Urban, developed areas, and local wildlife areas may experience revenue losses from decreased tourism; landscaping companies, golf courses revenue losses due to lack of growth and plant death; restrictions on industry cooling and processing demands; reduced incomes for businesses dependent on crop yields, and increased potential for fires

Figure 8: Crop Failure Caused by drought

- Rural areas within the county may experience revenue losses from reductions in decreased livestock and crop yields as well as increased incidence of field fires (**Figure 8**)
- Loss of tree canopy due to increased susceptibility to pests and diseases
- Citizens served by drinking water wells or surface water supplies may be impacted during low water periods and may require drilling of deeper wells or loss of water service for a period
- According to Purdue's Indiana Climate Change Impacts Assessment, climate change will cause temperatures to rise, and rainfall patterns to shift, which will make managing multiple water needs increasingly difficult. This could result in more drought conditions

Indirect Effects:

- Loss of income of employees from businesses and industry affected; loss of revenue to support services (food service and suppliers)
- Loss of revenue from recreational or tourism sectors associated with reservoirs, streams, and other open water venues
- Lower yields from domestic gardens increase the demand of purchasing produce and increase domestic water usage for landscaping
- Increased demand for emergency responders and firefighting resources due to grass fires and increased medical calls for people having respiratory issues because of increased dust amounts
- Drought conditions could make it more difficult for the underserved population as many of them do not have air conditioning, which makes breathing more difficult and air quality conditions can become compromised

Potential Impacts

It is difficult to estimate the potential losses associated with a drought for Noble County because of the nature and complexity of this hazard and the limited data on past occurrences. However, for the purpose of this MHMP update, a scenario was used to estimate the potential crop loss and associated revenue lost due to a drought similar to that experienced during the drought of record from 1988. In 2023, Noble County produced approximately 12M bushels of corn and 3M bushels of soybeans, as reported by the United States Department of Agriculture (USDA) National Agricultural Statistics Service. Using national averages of $4.26 per bushel of corn and $11.11 per bushel of soybeans, the estimated crop receipts for 2023 would be $85.4M. Using the range of crop yield decreases reported in 1988 and 1989, just after the 1988 drought period (50%-86%) and assuming a typical year, economic losses could range between $42.7-73.4M; depending on the crop produced and the market demand.

Relationship to Other Hazards

Discussions with the planning committee were held regarding the similar effects of prolonged periods of extreme heat and the similar impacts that may be experienced during these times. Planning and mitigation efforts for one hazard may benefit the other. It is anticipated that rural areas of the county may be more susceptible to brush and rangeland or woodland fires during a drought, while urban areas may experience these impacts in areas where several abandoned buildings or overgrown lots exist, and this may lead to increased losses associated with a fire.

4.2.2 Earthquake

Overview

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes strike suddenly, without warning. Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can move off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage.

Location

There are 45 states and territories in the United States at moderate to very high risk from an earthquake, and they are located in every region of the country (**Figure 9**). California experiences the most frequent damaging earthquakes; however, Alaska experiences the greatest number of large earthquakes – most located in uninhabited areas. The largest earthquakes felt in the United States were along the New Madrid Fault in Missouri, where a three-month long series of quakes from 1811 to 1812 occurred over the entire Eastern United States, with Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking. Several smaller historic faults are located throughout the state of Indiana.

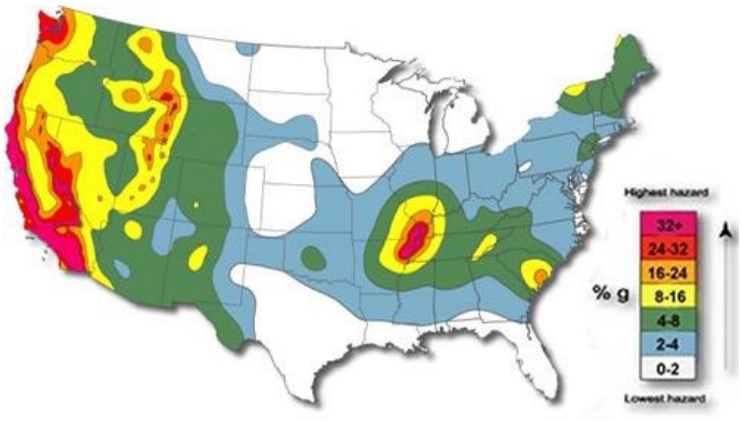


Figure 9: Earthquake Risk Areas in the US

Extent and History

The nearest known areas of concern for Noble County are the Wabash Seismic Zone (stretching from southeast Indiana to western Indiana), and the New Madrid Fault Zone (located southwest of Indiana and occasionally affecting Southwest portions of the state).

According to Indiana Geological Survey, there are three earthquakes that have occurred in or near Noble County. The first was on January 26, 2012, just north of the county around Topeka with a magnitude of 3.0. An earthquake of this magnitude may be felt by people who are sitting still and people inside buildings on the upper floors. The second was on April 3, 2019, near the northeastern border of Indiana with a magnitude of 2.4. The most recent earthquake took place on December 29, 2024, just across the border into Ohio with a magnitude of 2.9.

Additionally, some soils in Indiana are highly susceptible to liquefaction during earthquake conditions. Liquification occurs when water saturated soils temporarily lose their strength and act like a fluid. This process can trigger landslides, cause buildings to sink into the ground, and can destroy roads and bridges. Some areas within Noble County show signs of potential for liquefaction, especially near the western portion of the county where there are areas that are rated as high. (**Figure 10**)

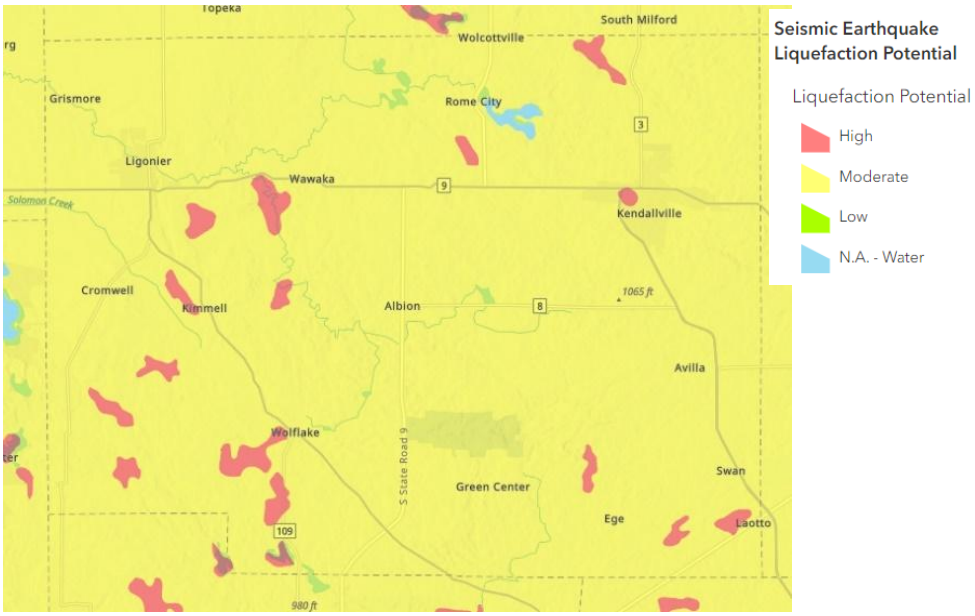


Figure 10: Noble County Liquefaction Potential Areas

Probability

Based on historical earthquake data, local knowledge of previous earthquakes, and that Noble County has not been directly impacted by an earthquake, the committee determined that the probability of an earthquake occurring in Noble County or any of the communities is "Unlikely." Should an earthquake occur, the impacts associated with this hazard are anticipated to be "Negligible" in all areas of the county. As with all earthquakes, it was determined that the residents of Noble County would have little to no warning time (less than six hours) and that the duration of the event would be expected to be less than six hours. A CPRI summary is shown in **Appendix 8**.

Future Conditions

While the occurrence of an earthquake in or near to Noble County may not be the highest priority hazard studied for the development of the plan, it is possible that residents, business owners, and visitors may be affected should an earthquake occur anywhere within the state. For that reason, Noble County should continue to provide education and outreach regarding earthquakes and earthquake insurance along with education and outreach for other hazards. As the county and the communities within grow and develop, the proper considerations for the potential of an earthquake to occur may help to mitigate social, physical, or economic losses in the future.

It can be anticipated that while all structures in Noble County will remain at risk of earthquake damage and effects, new construction or redevelopment may reduce the overall risks. As redevelopment or growth occurs, the new construction may be significantly sturdier. Further, as blighted, or abandoned areas are addressed, those communities and the county are less susceptible to economic and physical damage associated with earthquakes. Since the last planning effort, no significant development has occurred within the county.

Vulnerability

Earthquakes generally affect broad areas and potentially many counties at one time. Within Noble County, direct and indirect effects from an earthquake may include:

Direct Effects:

- Urban areas may experience more damage due to the number of structures, the multi-story nature of the structures, and critical infrastructure (fire houses, cell phone towers, health care facilities) located in these areas.
- Rural areas may experience losses associated with agricultural structures such as barns and silos
- Bridges, buried utilities (gas lines, water lines, pipelines), and other infrastructure may be affected throughout the county and municipalities
- The homeless or underserved population will need to be checked on, especially if they seek shelter under bridges or structures that are not stable

Indirect Effects:

- Noble County may be called upon to provide emergency response personnel to assist in the areas with more damage
- Provide shelter for residents of areas with more damage
- Delays in delivery of goods or services originating from areas more affected by the earthquake or originating at locations beyond the damaged areas, but that would have to be re-routed to avoid damaged areas

Potential Impacts

To determine the losses associated with an earthquake, the Hazards US Multi-Hazard (HAZUS-MH) software was utilized in the Noble County MHMP update. HAZUS-MH is a nationally standardized risk modeling methodology which identifies areas with an elevated risk for natural hazards and estimates physical, economic, and social impacts of earthquakes, hurricanes, floods, and tsunamis. For this plan, an arbitrary earthquake scenario placed a magnitude 5.0 within the county.

Per the HAZUS-MH scenario noted above the following is anticipated to be:

- Total economic losses are anticipated to be near $977.4M with moderate damage to approximately 3,654 buildings, which is over 16% of the buildings, of which 161 are anticipated to be damaged beyond repair

- There are 41 critical facilities (one hospital, 22 schools, one EOC, seven Police Stations, and 10 Fire Stations) with six facilities having at least 50% or more damage and 20 facilities with functionality of greater than 50% on day one

- Highways would have no bridges, segments, and tunnels with moderate damage and zero road segments and zero bridges with reduced functionality on day one, and zero highway segments and bridges with moderate damage

- All other transportation segments (railways, buses, and ports) would be expected to remain undamaged. No airports would have at least moderate damage

- The utilities (two potable water, nine wastewater, zero natural gas, zero oil systems, zero electrical power, and two communication) would have at least one potable water, three wastewater, and two communications with at least moderate damage. There would be 173 water leaks, 87 wastewater leaks, one natural gas leaks and 43 water breaks, 22 wastewater breaks, and zero natural gas breaks

- There would be 193K tons of debris generated of which 48% would be reinforced Brick/wood and the remaining being Concrete/steel. It would take 7,720 truckloads (@25 tons/truck)

- The model estimates 245 households displaced and 125 people will seek temporary shelter

- Residential occupancies would be anticipated to sustain the largest level of damage, representing 45% of total damages

- No fires due to the earthquake were anticipated

The HAZUS-MH model computes anticipated economic losses for the hypothetical earthquake due to direct building losses and business interruption losses. Direct building losses are the costs to repair or to replace the damage caused to the building and contents, while the interruption losses are associated with the inability to operate a business due to the damage sustained. As businesses are damaged or destroyed many will be forced to close until repairs have been made. These closures often generate economic losses that can affect the business, their employees, the local jurisdiction, and Indiana.

The HAZUS-MH Earthquake Model allows local building data to be imported into the analysis. However, these local data are imported as "general building stock," meaning that the points are assigned to a census tract rather than a specific XY coordinate. HAZUS performs the damage analysis as a county wide analysis and reports losses by census tract. While the results of the hypothetical scenario appear to be plausible, care should be taken when interpreting these results.

Relationship to Other Hazards

Hazardous materials incidents may occur because of damage to material storage containers or transportation vehicles involved in road crashes or train derailments. Further, dam failures, flash floods, landslides, or levee breaks may occur following an earthquake or associated aftershocks due to the shifting of the soil in these hazard areas. These types of related hazards may have greater impacts on Noble County communities than the earthquake itself. It is not expected that earthquakes will be caused by other hazards studied within this plan.

4.2.3 Extreme Temperature

Overview

Extreme Heat

Extreme heat is defined as a temporary elevation of average daily temperatures that hover 10 degrees or more above the average high temperature for the region for the duration of several weeks. According to the NWS, "The Heat Index or the "Apparent Temperature" is an accurate measure of how hot it really feels when the relative humidity is added to the actual air temperature." To find the heat index temperature, refer to the heat index chart in **Figure 11**. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index (how hot it feels) is 121°F.

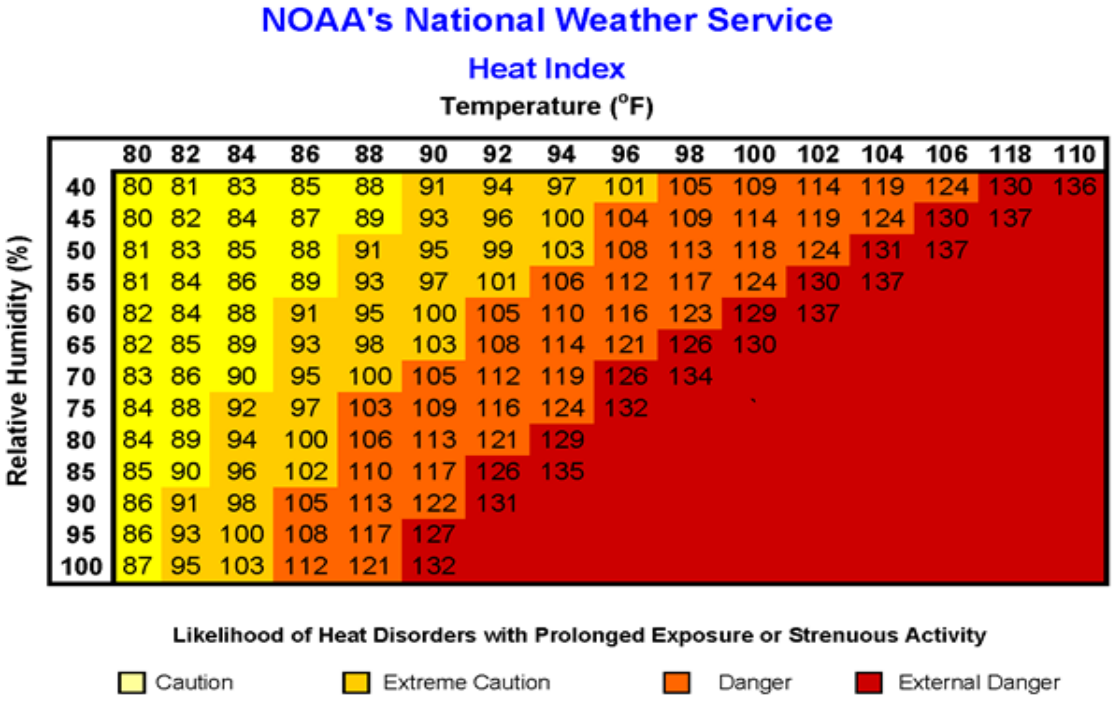


Figure 11: NWS Heat Index Chart

The NWS has three levels of Excessive Heat Notifications:

1. A heat advisory - means that temperatures of at least 100°F or Heat Index values of at least 105°F are expected
2. An excessive heat watch means that heat index values are expected to reach or exceed 110°F and not fall below 75°F for at least a 48-hour period
3. An excessive heat warning means that heat index values are expected to reach or exceed 110°F and not fall below 75°F for at least a 48-hour period, beginning in the next 24 hours. A warning may also be issued for extended periods with afternoon heat index values of 105°F-110°F

It is important to also note that these heat index values were devised for shady, light wind conditions. Exposure to full sunshine may increase heat index values by up to 15°F. Further, high winds, particularly with very hot, dry air, can also be extremely hazardous.

As **Figure 12** indicates, there are four cautionary categories associated with varying heat index temperatures. Each category provides a heat index range along with effects on the human body. People with underlying health issues, the very old or very young, may be impacted at lower temperatures since their systems are less likely to be able to compensate for the heat and humidity.

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Figure 12: Extreme Heat Effects by Heat Index

Additionally, as later discussed in **Chapter 4.3.9** (Winter Storms and Ice), over time the minimum temperature in the county is increasing. This increase will exacerbate any heat as it lessens the cooling capacity of the nighttime. This may put more stress on people at night as they will not be able to cool off as much.

Extreme Cold

Extreme cold is defined as a temporary, yet sustained, period of extremely low temperatures. The jet stream winds are strongest during the winter months when continental temperature extremes are greatest. When the jet stream pulls arctic cold air masses over portions of the United States, temperatures can drop below 0° F for one week or more. Sustained extreme cold poses a physical danger to all individuals in a community and can affect infrastructure function as well.

Temperature (F)

Wind Speed (MHP)	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
5	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64
45	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
50	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67
55	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68
60	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69

Frostbite Occurs in 120 minutes or less | Frostbite occurs in 30 minutes or less

Frostbite occurs in 10 minutes or less | Frostbite occurs in 5 minutes or less

Figure 13: Wind Chill Chart

In addition to strictly cold temperatures, the wind chill temperature (WCT) must also be considered when planning for extreme temperatures. The WCT, according to the NWS, is how cold people and animals feel when outside and it is based on the rate of heat loss from exposed skin. **Figure 13** identifies the Wind Chill Chart and how the same ambient temperature may feel vastly different in varying wind speeds.

Extent and History

The effects of extreme temperatures extend across large regions, typically affecting several counties, or states, during a single event. According to NOAA's National Climatic Data Center (NCDC) for the period of January 1, 2020, to November 30, 2025, there have been zero excess heat events and two extreme cold/wind chill events.

On December 24, 2022, the NWS reported that an extremely cold event ushered in wind chills ranging from -25°F to -40°F. More recently, wind chills ranging from -25°F to -35°F were reported on January 14, 2024. Although the committee members recall several hot days with heat indexes greater than 100 in the past five years, neither NCDC nor the local NWS office website had any reports. No damage or losses associated with the prolonged cold temperatures or heat events were reported. The NCDC provides storm event information for all states, territories, and counties covering roughly 50 event types. A list of the events that have occurred within Noble County from January 1, 2020, through November 30, 2025, and their reported location, property damages, crop damages, injuries, and deaths are included in **Appendix 9**.

Probability

It is difficult to predict the probability that an extreme temperature event will affect Noble County residents within any given year. However, based on historic knowledge and information provided by the community representatives, an extreme temperature event is "Likely" (to occur within the next three years) to "Highly Likely" (to occur within the next year). If an event did occur, the committee said the magnitude would result in "Negligible" to "Critical." Some of the disagreement may come from the difference in infrastructure, farming, or population makeup. However, on average the community rated the magnitude as "limited." **Appendix 8** identifies the CPRI for extreme temperatures including both heat and cold events for all communities in Noble County.

Assessing Vulnerability

As noted above, this type of hazard will generally affect entire counties and even multi-county regions at one time; however, certain portions of the population may be more vulnerable to extreme temperatures. For example, outdoor laborers, very young and very old populations, low-income populations, and those in poor physical condition are at an increased risk of being impacted during these conditions.

By assessing the demographics of Noble County, a better understanding of the relative risk that extreme temperatures may pose to certain populations can be gained.

- 18% of the county's population is over 65 years of age
- 6.4% of the population is below the age of 5
- 10.6% of the population is living below the poverty rate

People within these demographic categories are more susceptible to social or health related impacts associated with extreme heat (**Figure 14**). Families below the poverty line are less likely to have functioning air conditioning in their homes. Because of high energy costs those who do have air conditioning may be less likely to use the units in a way to benefit their health and well-being. The same factors are key when looking at heating sources in cold temperatures (**Figure 15**). Elderly people and those living below the poverty line are more likely to rely on alternative heating sources because of the cost of energy. These alternative heating sources are frequently the cause of carbon monoxide poisoning and/or house fires.

Figure 14: Extreme Cold

Figure 15: Excessive Heat

Within Noble County, direct and indirect effects from a prolonged period of extreme temperature may include:

Direct Effects:

- Direct effects are primarily associated with health risks to the elderly, infants, people with chronic medical disorders, lower income families, outdoor workers, and athletes. Health risks can range from heat exhaustion or mild hypothermia to death due to heat stroke, amputations due to frost bite or death due to severe hypothermia

Indirect Effects:

- Increased need for cooling or warming shelters
- Increased medical emergency response efforts
- Increased energy demands for heating or cooling

Estimating Potential Losses

It is difficult to estimate the potential losses due to extreme temperatures as damage is not typically associated with buildings but instead with populations and people.

This hazard is not typically as damaging to structures or critical infrastructure as it is to populations, so monetary damages associated with the direct effects of the extreme temperature are not possible to estimate accurately.

Indirect effects:

- Increased expenses for facilities such as healthcare or emergency services due to the increased number of calls and people seeking assistance
- Manufacturing facilities where temperatures are normally elevated may need to alter work hours or experience loss of revenue if forced to limit production during the heat of the day.
- Energy suppliers may experience demand peaks during the hottest and/or coldest portions of the day.
- Extreme cold indirect effects include pipes freezing resulting in loss of access to water for industrial processes as well as personal hygiene, sanitation and hydration of livestock and people. These effects may disproportionately impact vulnerable populations (elderly people and children) within Noble County

Future Considerations

As more citizens are experiencing economic difficulties, local power suppliers along with charitable organizations have implemented programs to provide cooling and heating mechanisms to residents in need. Often, these programs are donation driven and the need for such assistance must be demonstrated. As susceptible populations increase, and/or as local economies are stressed, such programs may become more necessary to protect the county's at-risk populations. Additionally, the increase in the number of unsheltered homeless in the area calls for innovative approaches to addressing heating and cooling needs after traditional business hours when this population is particularly susceptible.

The Indiana Climate Change Impacts Assessment identifies several temperature related considerations of which communities should be aware of and begin planning to avoid further impacts. For example, rising temperatures will increase the number of extreme heat days, thereby increasing the potential for heat related illnesses, potential hospitalizations, and medication costs to vulnerable populations. In addition, added days of extreme heat will impact agriculture, manufacturing, and potentially, water sources. Increasing greenspaces within the cities and towns not only provide benefits of stormwater control, carbon sequestration, and air pollution filtration, but also are great for reducing the energy from the sun reaching the ground surface, thus cooling the area. Future community planning should include the incorporation of heat tolerant green infrastructure to lessen the impacts of extreme heat upon the community.

New construction associated with development of residential areas often brings upgraded and more efficient utilities such as central heating and air units further reducing vulnerabilities to the aging populations in those municipalities mentioned above. Conversely, new developments associated with industrial or large commercial structures in the inner-urban centers often result in increased heat over time, which may cause additional stress to labor-related populations. Since the last planning effort, there has not been significant residential and commercial development within the county.

Relationship to Other Hazards

While extreme temperatures may be extremely burdensome on the power supplies in Noble County, the committee concluded that this type of hazard is not expected to cause any hazards studied. It is anticipated that due to prolonged extreme temperatures, primarily long periods of elevated temperatures, citizens may become increasingly agitated and irritable, and this may lead to a disturbance requiring emergency responder intervention.

4.2.4 Fires and Wildfire

Overview

A wildfire, also known as a forest fire, vegetation fire, or a bushfire, is an uncontrolled fire in wildland areas and is often caused by lightning; other common causes are human carelessness and arson. Small wildfires may be contained to areas less than one acre, whereas larger wildfires can extend to areas that cover several hundred or even a thousand acres. Weather conditions can determine the nature and severity of a wildfire event. Very low moisture and windy conditions can help to exacerbate combustion in forested or brush areas and turn a small brush fire into a major regional fire event in a very short period. Wildfires can be very devastating for residents and property owners.

A structural fire is an incident where a fire starts within a structure and is largely contained to that structure. Causes of structure fires can be related to electrical shorts, carelessness with ignition sources and/or alternative heating sources, poor storage of flammable materials, as well as arson. These types of fires can be deadly if no warning or prevention measures are present. The most dangerous aspect of structural fires is the production of toxic gases and fumes that can quickly accumulate in enclosed areas of structures and asphyxiate those who might be in the structure.

Problems associated with structural fires are compounded when high-rise buildings catch fire because high-rise fires hinder the ability of rescue workers to fight the fire, reach impacted building occupants, and evacuate impacted occupants. These operations can be complicated as the height of the structure increases and the occupancy changes within the structure. Rescue efforts are more complicated when people with disabilities are involved with structure fires. Lastly, structural collapse is another concern associated with high-rise fires especially when people are trapped and severely injured. However, it is important to note that the concern associated with structural collapse, is not limited to high-rise buildings; the collapse of smaller residential buildings can also lead to severe injury and death.

Combating a structure fire and or wildfire is extremely dangerous. If weather conditions change suddenly, the fire may change course and/or increase in strength potentially overtaking neighboring structures and firefighters, causing severe injury or death. Fires can travel at speeds greater than 45 mph. Members of the homeless community, hunters and/or campers may also be in the area of the fires with no means to escape. Fire response capabilities are limited by the ever-dwindling number of volunteer firefighters able to respond, especially during "normal working hours." This further increases the risks for first responders and community members alike.

Extent and History

According to the NCDC for the period of January 1, 2020, to November 30, 2025, there have been zero wildfire events.

An example of a structure fire from Noble County is provided in **Figure 16**. Structure fires can cause wildfires and brush fires most commonly through a process called spotting. This occurs when burning particles, embers, or firebrands, are carried by the wind to start new fires elsewhere. Although Indiana has a very low to relatively low risk of wildfires according to the FEMA National Risk Index, damage to structures,

Figure 16: Noble County Barn Fire

contents, crops, forests, and vehicles is significant for each municipality on an annual basis. Additionally, wildfires can cause long-term issues such as environmental damage and chronic illnesses. These effects, according to the United States Geological Service (USGS), cause the annual cost of wildfires in the US to be $425B.

Although there have been no reports of wildfires or grass fires, it is important for rural areas to be diligent about fire safety and reporting. Due to the often spread out and woodsy makeup of rural areas, fires can have longer periods of going unreported when compared to urban/more dense areas. This could allow the fires to worsen before local fire departments have a chance to put them out, leading to more damage to crops or property and increasing the number of injuries or deaths.

The NCDC does not report structure fires; therefore, local sources were utilized to provide information regarding residential and business fires. Residential fires have been the most common fire hazard affecting Noble County in the last several years. Information provided in **Table 5** highlights the number of fire calls the county fire departments responded to during the time period January 2019 through December 2024. Damage to structures, contents, crops, forests, and vehicles is significant for each municipality on an annual basis. Social losses, such as being unable to work following a residential structure fire or losses associated with a business fire should also be considered as an impact.

Table 5: Noble County Fire Calls

Department	2019-2024
Albion Volunteer Fire Department	1008
Avilla Volunteer Fire Department	890
Churubusco-Smith Township Volunteer Fire Department (Base 200)	223
Johnson Township Volunteer Fire Department	109
Kendallville Volunteer Fire Department	2286
Laotto Volunteer Fire Department	409
Ligonier Volunteer Fire Department	1255
Noble Township Fire Department	644
North Webster-Tippecanoe Volunteer Fire Department	8
Orange Township Fire Department	716
Sparta Township Volunteer Fire Department	569
Topeka Volunteer Fire Department	94
Total	**8,211**

Probability

The planning committee determined the probability of a fire to occur within the county to be "Likely" (likely to occur within the next three years) to "Highly Likely" (likely to occur within the next year). The town of Cromwell disagreed, rating the probability as "Unlikely" (Likely to occur within the next ten years). This disagreement is likely due to the smaller, more rural makeup of the community. The overall risk from fire was rated as "Elevated." **Appendix 8** identifies the CPRI rankings for fire in Noble County.

Assessing Vulnerability

Physical, economic, and/or social losses impact not only the property owner whose property was damaged by the fire, but also the community. Typically, a structural fire is limited to one or two structures, as the fire response focuses on extinguishment as well as containment thus preventing the fire from spreading to neighboring structures as seen in **Figure 17**. This type of action works to reduce the magnitude and severity. Nonetheless, the loss of or damage to historic structures, town squares, etc. takes a toll on the community spirit as well as the financial and physical loss.

Figure 17: Local Structure Fire in Noble County

Noble County has roughly 5K acres of managed lands, such as the Chain O' Lakes State Park, the Tri-County Fish and Wildlife Area, and Mallard Roost Wetland Conservation Area. These areas are a common gathering place and include short-term housing areas. Special consideration should be given to these areas when an event occurs. Additionally, IDNR will occasionally utilize prescribed burns on these areas to prevent much larger, uncontrolled fires from occurring.

A large portion of the county is rural, which is also susceptible to brush and/or crop fires, especially in times of drought. Since agriculture is a large source of income for the community, field fires, especially during harvest season, or barn fires after crops have been stored have an immense impact.

Direct and indirect effects of fires and wildfires within Noble County may include:

Direct Effects:

- Loss of structures (residential, high-rise buildings, as well as agricultural)
- Loss of vital equipment (industrial and agricultural)
- Loss of forests
- Loss of natural resources and wildlife

Indirect Effects:

- Loss of revenue as businesses may be closed
- Loss of revenue from reduced tourist activities in the county including Noble County's managed lands
- Increased emergency response times based on safety of roads
- Loss of income if dependent on crop production or timber harvest

Estimating Potential Losses

Given the nature and complexity of a potentially large hazard such as a wildfire, it is difficult to quantify potential losses to property and infrastructure. As a result, all critical and non-critical structures and infrastructure may be at some degree of risk.

Monetary damages associated with the direct effects of the fires are difficult to estimate, other than utilizing historic information as provided. Indirect effects would cause increased efforts associated with emergency response services as wildfires are difficult to contain and may accelerate very quickly. Further, multi-level business or residential structures place increased risks to those who work or live within those structures or nearby structures.

Future Considerations

As populations increase and community growth increases, the need to respond to fire will remain an important municipal effort. As new construction or re-development occurs, especially new or existing critical infrastructure, it is important to ensure that these new structures are equipped to deal with the potential risks associated with this hazard. Those may include increased risk for wooden or flammable outer structures and potential lengthy power outages. With the adverse impacts of extreme temperatures and drought upon the heavily forested areas, consideration must be given to mitigating fire risks for structures that are built in the rural areas to limit losses should a wildland fire take place.

In addition, increased populations require increased housing. Many urban communities develop large multi-family residential structures, or apartment complexes, where structures are not only in close proximity to each other but also house a large number of citizens. As communities age, some structures may become abandoned, significantly increasing the risk of fire due to potential vagrant populations and lack of maintenance. These areas should be considered at risk and potentially demolished to avoid such risk and potential hazard.

Firefighting responses can be slowed due to the limited numbers of volunteers available at various times of the day. Increasing numbers of people working outside of the community in which they reside limits volunteer presence to outside of normal working hours. Recruitment initiatives will need to be considered as the firefighting needs and staffing levels change.

Fires can also result in substantial indirect costs. Increased emergency response times, loss of work or the inability to get to work, as well as business interruption, are possible indirect effects of a fire and how it may affect those businesses related to cropland or natural resource areas.

Relationship to Other Hazards

Fires may certainly result in a hazardous materials incident if storage structures are within the path of the fire. Material storage containers farther away from the burn path may become damaged by high winds and embers resulting in a spill or release of materials. Fires may result from lightning either alone or associated with a thunderstorm. Typical wind speeds during a thunderstorm may also exacerbate the impacts from any ignitions from the lightning.

4.2.5 Flood

Overview

A flood, as defined by the NFIP, is a general and temporary condition of partial or complete inundation or two or more acres of normally dry land area or of two or more properties from overflow of inland or tidal waters, or unusual and rapid accumulation or runoff of surface waters from any sources, or a mudflow. Floods can be slow or fast rising but generally develop over a period of days.

The traditional benchmark for riverine or coastal flooding is a 1% Annual Exceedance Probability, formerly known as the 100-year flood. This is a benchmark used by FEMA to establish a standard of flood protection in communities throughout the country. The 1% AEP is referred to as the "regulatory" or "base" flood. Another term commonly used, the "100-year flood", can be misleading. It does not mean that only one flood of that size will occur every 100 years, but rather there is a 1% chance of a flood of that intensity and elevation happening during any given event. In other words, the regulatory flood elevation has a 1% chance of being equaled, or exceeded, in any given event and it could occur more than once in a relatively brief time period. The area impacted by the 1% AEP flood event is called the Special Flood Hazard Area (SFHA).

Log and ice jam flooding is a concern for the more populated areas. Although log jams can occur at any time of the year, ice jams are predominantly and early or late winter occurrence when air temperature rises after freezing temperatures which allow lake and river ice to form. Flooding occurs when pieces of ice either jam up against stationary sheets of ice or against structures in the river such as bridge pylons. The jammed ice can form a dam causing water levels behind it to rise causing localized flooding and pushing large pieces of ice out of the stream. The greatest challenge with ice jams is the lack of good science to predict when the jams will form and where jam formation is likely. With the variations in temperatures in late winter and early spring ice jams are becoming more common. Log jams, like ice jams, accumulate in low flow areas and near bridges and similar structures located in the stream, causing water levels to rise. Bridges and culverts are most frequently impacted since water flow is easily blocked at these locations forcing water outside of the riverbanks into neighborhoods and businesses.

Extent and History

According to the NCDC for the period of January 1, 2020, to November 30, 2025, there have been zero flash floods and zero traditional riverine floods.

While there were no reported floods within the county during this time period, it is still likely that floods did occur and were not reported. Additionally, one of the thunderstorm wind events noted that heavy rain caused flooding which may have affected Noble County. Any floods that did occur could have caused property or crop damage and may have resulted in injuries or deaths. **Appendix 9** provides the NCDC information regarding floods that have been

Figure 18: Noble County Flooding From 2017

reported in the county. **Figure 18** shows a flood from Noble County.

Within Noble County there are six primary waterways:

- Elkhart River
- Blue River
- Tippecanoe River
- North and South Branch Elkhart Rivers

Figure 19: Stream Gauge Locations in Noble County

The county is situated in four major drainage basins; the northern portion is located within the St. Joseph (MI) Region, and the southern section is split between the St. Joseph (OH) region, the Eel (WR) region, and the Tippecanoe region. There are 62 other major waterways in Noble County including Friskney Ditch, Little Elkhart River, Little Cedar Creek, Willow Creek, Dry Run, and Dillon Creek. See **Appendix 10** for list of major waterways and stream gauges.

Stream gages are utilized to monitor surface water elevations and/or discharges at key locations and time periods. Some such gages are further equipped with NWS's National Water Prediction Service (NWPS) capabilities. These gages have the potential to provide valuable information regarding historical high and low water stages, hydrographs representing current and forecasted stages, and a map of the surrounding areas likely to be flooded. Within Noble County, there are two USGS gages shown in **Figure 19**. The two USGS gages are: North Branch Elkhart River at Sylvan Lake and North Branch Elkhart River at Cosperville. **Table 6** shows informationabout the county's gages.

Table 6: Stream Gages of Noble County

Site Number	Site Name	Flood Levels				Crests	
		Major	Moderate	Minor	Action	Recent	Historic
04100180	North Branch Elkhart at Sylvan Lake	N/A	N/A	N/A	N/A	10.35 Ft. (2021)	11.14 Ft. (1996)
04100222	North Branch Elkhart River at Cosperville	8 Ft.	7 Ft.	6 Ft.	5 Ft.	6 Ft. (2021)	8.12 Ft. (1982)

A watershed management plan (WMP) is a strategy for achieving water quality goals by characterizing the watershed, setting goals and actions steps, and developing an implementation plan to address documented problems. Ultimately, the purpose of the WMP is to guide resource managers, watershed coordinators, policy makers, community organizations, and other relevant stakeholders in restoring and protecting the waterbodies within a given watershed. According to Indiana Department of Environmental Management's (IDEM) WMP website, there are six plans that cover Noble County:

- Elkhart river WMP 6-177
- Lower Elkhart River WMP 68996
- Little Elkhart WMP 4-142
- Little Elkhart River WMP 7-182 Addendum
- Tippecanoe River (Upper) WMP 3-757
- Cedar Creek WMP 01-383

Appendix 6 lists which watershed management plans apply to which jurisdiction.

These are to identify ways to restore and protect the quality of the streams or rivers. In addition, there was a revised St. Joseph River (Lake Erie) watershed TMDL completed in March 2019.

To help mitigate flooding problems along the North Branch of the Elkhart River Corridor, Christopher B. Burke Engineering completed a Flood Risk Management Plan for Noble County. The plan includes a detailed review of the North Branch Elkhart River discussing the local geology, climate, hydrology, hydraulics, and geomorphology. The plan also establishes eight recommendations for the communities along the river, which overlap with some mitigation actions proposed in this plan. Additionally, Christopher B. Burke Engineering has completed a Flood Mitigation Master Plan for the Maumee River Basin Commission which includes flood mitigation measures and implementation plans for Noble County and the town of Avilla. These may be utilized to improve overall flood impacts within the county. As communities develop there may be additional communities within the Maumee River Basin which should work with the MRBC to mitigate flood impacts.

Flood insurance is key for flood recovery. Any property having received two insurance claim payments for flood damages totaling at least $1,000, paid by the NFIP within any 10-year period since 1978, is defined as a repetitive loss property. These properties are important to the NFIP because they account for approximately one-third of the country's flood insurance payments. **Table 7** identifies the number of repetitive losses and claims in Noble County per community, as provided by FEMA.

Table 7: Repetitive Properties and NFIP Claims

Community	# Repetitive Loss Properties	Number of Claims			
		Occupancy Type			Total # of Claims
		Residential	Business	Non-Residential	
Noble County	23	23	0	0	67
City of Kendallville	0	0	0	0	0
City of Ligonier	0	0	0	0	0
Town of Albion	1	1	0	0	2
Town of Avilla	0	0	0	0	0
Town of Cromwell	0	0	0	0	0
Town of Rome City	9	9	0	0	23
Town of Wolcottville	0	0	0	0	0
TOTAL	**33**	**33**	**0**	**0**	**92**

There have been several claims made for damages associated with flooding in Noble County since 1978. Since 1978 in the town of Albion, for example, there have been four claims at repetitive loss properties resulting in $9,580.49 in payments. **Table 8** further indicates the current premiums and coverage totals for individual communities.

Table 8: Insurance Premiums and Coverage

Community	Flood Insurance Premiums	Flood Insurance Coverage
Noble County	$105.3K	$31.1M
City of Kendallville	$3.9K	$1.5M
City of Ligonier	$569	$70.0K
Town of Albion	$300	$70.0K
Town of Avilla	$0	$0
Town of Cromwell	$0	$0
Town of Rome city	$11.2K	$3.7M
Town of Wolcottville	$0	$0
TOTAL	**$121.3K**	**$36.5M**

Probability

As determined by the committee, the probability of flooding occurring throughout Noble County is "Possible" to "Likely." The committee also determined that an accurate warning time would range from less than six hours to over 24 hours. This is likely based on the differences in terrain and waterways. Additionally, some communities have more resources available which can provide a larger warning time. Finally, the duration of such an event is anticipated to last less than a week or greater than a week. A summary of riverine flooding CPRI is shown in **Appendix 8**.

Assessing Vulnerability

Flood events may affect substantial portions of Noble County at one time as river systems and areas with limited drainage cover much of the county and the incorporated communities. With an increase in high volume rain events, the low-lying roads within the county are vulnerable to frequent inundation isolating and/or restricting access to some parts of the county. The average annual rainfall today is 39.48 inches, however, according to the NCEI the annual rainfall for the county is increasing by 0.31 inches per decade. See **Figure 20** for precipitation trends from 1895-2024.

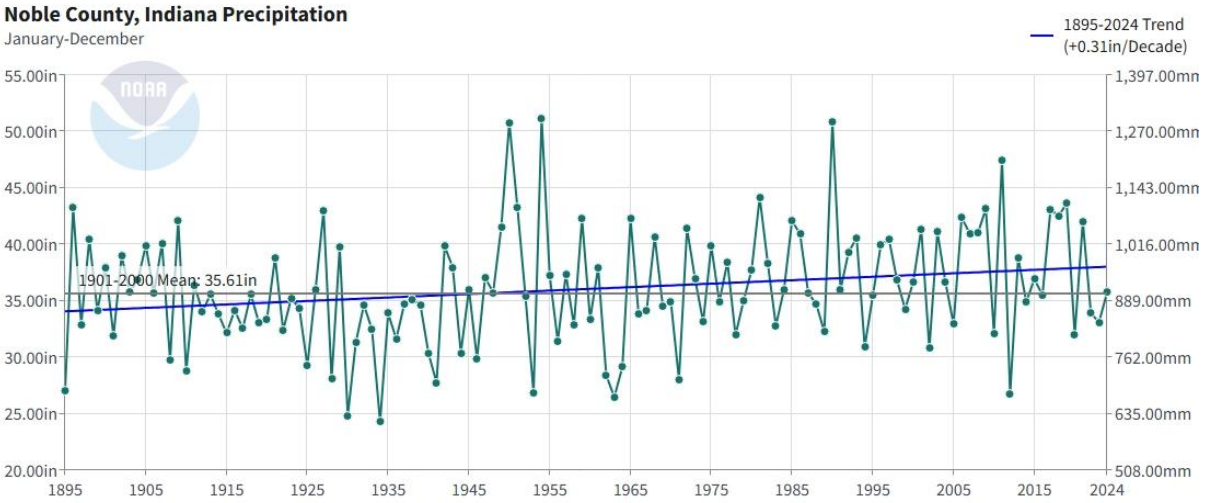


Figure 20: Annual Precipitations from 1895 – 2024

Noble County personnel discussed the presence of wetlands within the Northwestern portion of the county. These areas help prevent flooding as they can hold onto a lot of water. Careful consideration should be used when draining, filling, or altering wetlands as they could harm the local ecosystem and increase flooding.

NFIP floodplain maps used to understand flood risk and to determine requirements for flood insurance and construction. To view the exact map titles, see **Appendix 6**. For an overview of the current FEMA flood maps, an aggregate is available within **Figure 21**. A similar map of the Noble County floodplain including critical and essential facilities is available in **Exhibit 2**.

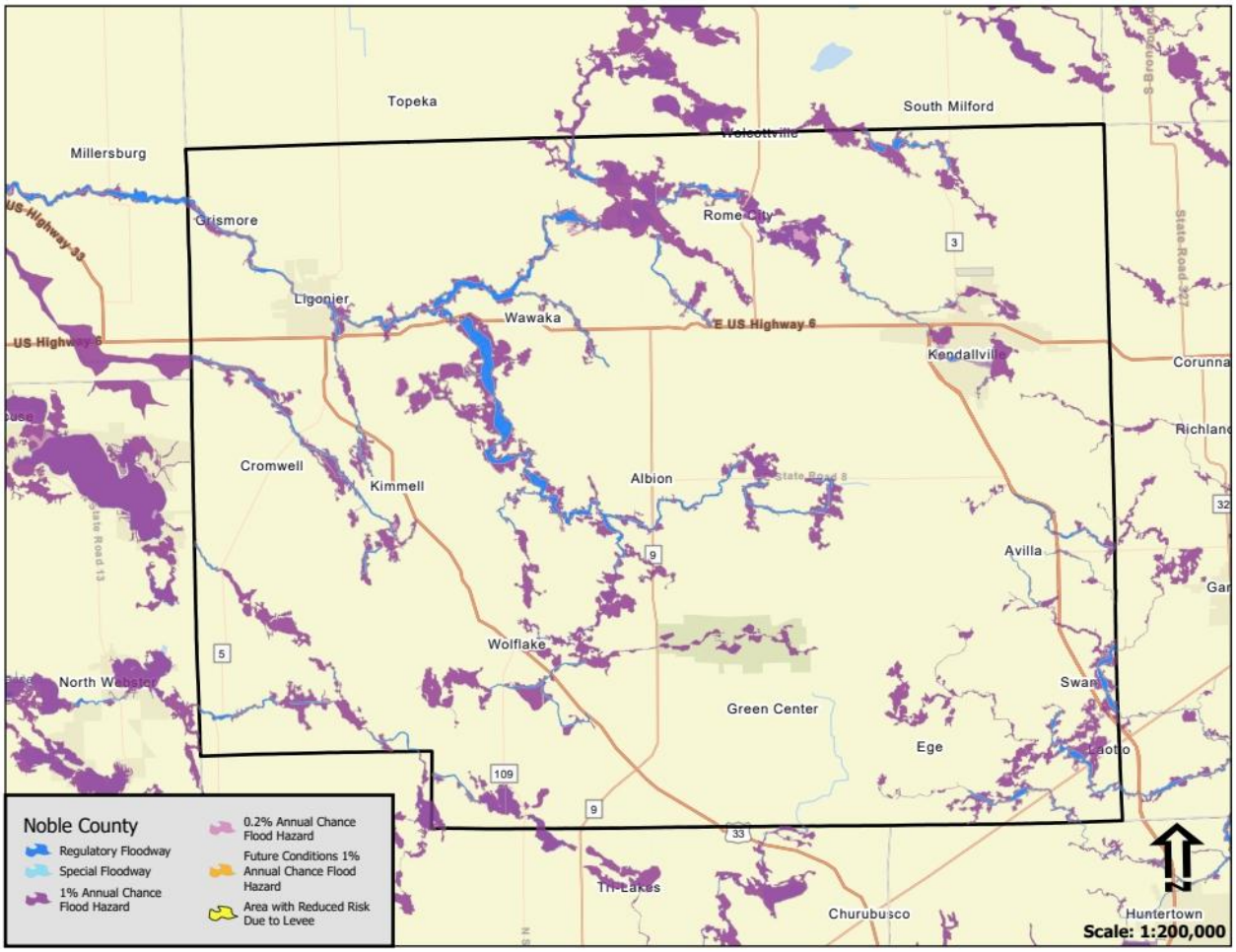


Figure 21: Noble County Flood Map 5/2/2022

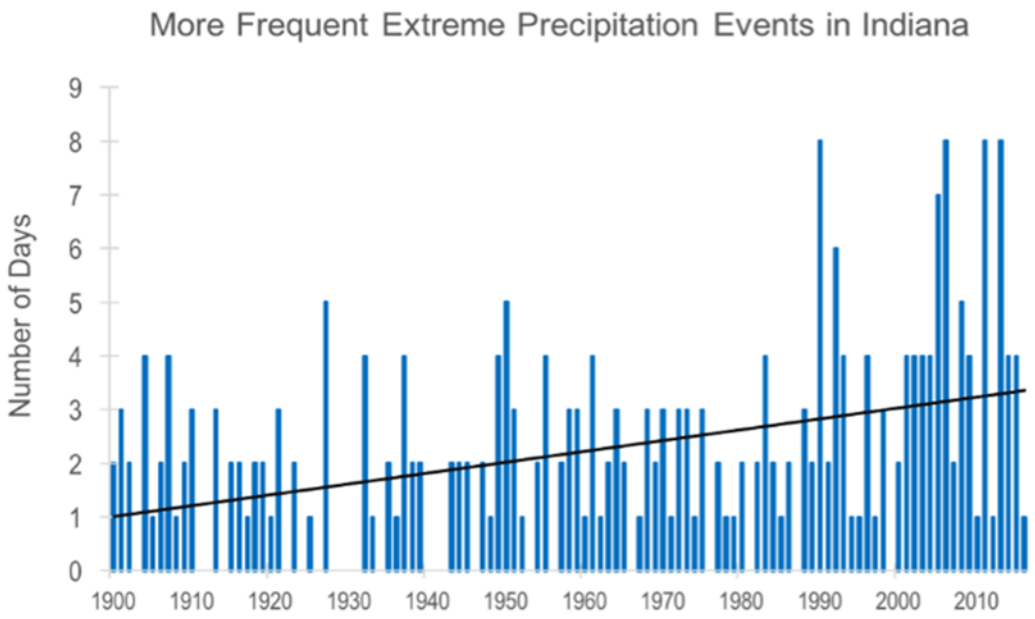


Figure 23: Extreme Precipitation Events in Indiana

Purdue University Indiana Climate Change Impacts Assessment Report analyzed the increased frequency of short duration high volume rain events, also known as extreme precipitation events, in Indiana. According to the report, an extreme rain event occurs when more than 0.86 inches of rain falls in a day. Since 1900, the number of days per year with extreme rain has been increasing by 0.2 days per decade on average. However, most of that increase has occurred since 1990. In **Figure 22** the trend line shows an increase in the number of days where the rainfall exceeds 99th percentile. This ever-increasing trend is resulting in more frequent flash flood and overland flood events.

Indiana has experienced an increase in the number of rain events, especially extreme rain events, while the overall duration of rain has decreased. This has led to Indiana receiving more rain in shorter amounts of time.

This is also verified in the Indiana Climate Change Impacts Assessment report from Purdue University (**Figure 23**). In the report, the authors wrote, "This assessment documents that significant changes in Indiana's climate have been underway for over a century, with the largest changes occurring in the past few decades." These projections suggest that the trends that are already occurring will continue, and the rates of these changes will accelerate.

Noble County has a flood inundation map library for the gage along the North Branch Elkhart River in Cosperville. This map library may be utilized to predict areas of flooding within the city based on a selected gage height. When set to the major action level, or 8Ft, this gage identifies areas with flooding at a water height of 8Ft. Additionally, the map library conducts a HAZUS loss estimate which estimates $1.9M in building damages when the gage reaches its major action level.

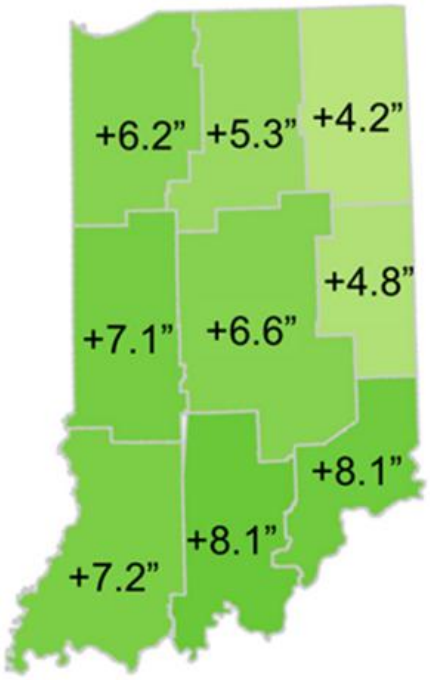


Figure 22: Annual Average Precipitation Trends

As outlined in **Table 9**, most communities within Noble County participate in the NFIP. The town of Cromwell has chosen not to participate.

Table 9: Noble County Participation in NFIP

Identification Number	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Regular-Emergency Program Date
180183	Noble County	2/2/1973	8/15/1978	5/2/2017	1/3/1979
180185	City of Kendallville	6/14/1974	1/6/1983	3/2/2015	1/6/1983
180186	City of Ligonier	7/16/1976	1/6/1983	3/2/2015	1/6/1983
180184	Town Of Albion	6/7/1974	3/2/2015	3/2/2015	8/19/1986
180630	Town of Avilla		1/3/1979	3/2/2015	6/5/2013
	Town Of Cromwell	Non-Participating Community			
180385	Town of Rome City	7/11/1975	10/15/1982	3/2/2015	10/15/1982
185216	Town of Wolcottville		3/2/2015	3/2/2015	2/6/2024

Noble County, the cities of Kendallville and Ligonier, and the towns of Albion, Avilla, Rome City, and Wolcottville do not participate in the CRS program. The program entitles those residents in SFHA to receive a discount on their flood insurance based on the community participation in floodplain management practices that exceed the minimum requirements of NFIP. Participation could reduce future potential flood damage and encourage efficient floodplain management.

Many of the flood risk areas are located within the boundaries of the disadvantaged and underserved population census blocks. With less financial capacity to mitigate flooding, this becomes an additional burden on the communities. Flash flooding, being less predictable, does not allow the advanced warning to be able to protect property and seek shelter out of harm's way, thus increasing vulnerability throughout the county, especially the underserved and disadvantaged community members.

Within Noble County, direct and indirect effects of a flood event may include:

Direct Effects:

- Decreased income and value of properties and contents due to damage by increased water
- Increased costs associated with additional response personnel, evacuations, and sheltering needs
- Increased potential impacts to infrastructure and buildings located within the SFHA
- Increased cleanup costs for more frequent flash flood impacts
- Decreased productivity of land due to loss of topsoil and deposition of sand from flood inundation of farm fields

Indirect Effects:

- Increased response times for emergency personnel when roads are impassable
- Increased costs associated with personnel carrying out evacuations in needed areas
- Increased risk of explosions and other hazards associated with floating propane tanks or other debris
- Increased economic loss associated with missed work or school due to closures or recovery activities
- Decreased revenue due to cancellation of special events in impacted areas or water related activities that become too dangerous due to high water
- Increased expenditures for debris removal costs and return local drainage to normal function
- Difficulty notifying the underserved populations which may not have access to radio, television, or social media of evacuations

Estimating Potential Losses

Critical and non-critical structures located in regulated floodplains, poorly drained areas, or low-lying areas are most at risk for damage associated with flooding. For this planning effort, a GIS Desktop Analysis methodology was utilized to estimate flood damage.

For the GIS Desktop Analysis method, an analysis was completed utilizing the effective Digital FIRMs (DFIRMs) overlaid upon a Modified Building Inventory developed with information provided by Noble County. Structures located within each flood zone were tallied using GIS analysis techniques.

In the assessment, any structure listed as less than 400 ft^2 in area or classified in the Assessor's database as a non-habitable structure was assumed to be an outbuilding. It was assumed that a building was located on a parcel if the value listed in the "Assessed Value (Improvements)" showed a value greater than zero dollars. Parcels that intersected any portion of the FEMA flood zones were considered to be flood prone, and subsequently, further analyzed separately from parcels without structures. Structure values were calculated using the 2021 FEMA HAZUS Inventory Technical Manual and considered the value of the building and the contents of the building. Occasionally, some counties will have buildings that have not been classified and are therefore unable to be accounted for. The cities and towns within Noble County had no unclassified structures. Noble County had five unclassified structures. This may mean the actual damages from a flood would be greater than the estimates in this section.

To estimate anticipated damages associated with each flood zone in Noble County and the communities, it was estimated that 25% of structures in the flood zones would be destroyed, 35% of structures would be 50% damaged, and 40% of structures would be 25% damaged. **Table 10** identifies the estimated losses associated with structures in the floodway, the 1% AEP outside of the floodway, and the 0.2% AEP outside the 1% AEP areas by community within Noble County. Tables nine through eleven only show communities with structures within the flood hazard layers, all others are omitted.

Table 10: Noble County Building Inventory Utilizing Best Available Data

Location	Floodway		1% AEP Outside of Floodway		FEMA Approximate 1% AEP zone Outside Floodway	
	#	$	#	$	#	$
Noble County	816	$156.5M	1,667	$223.8M	30	$5.8M
City of Kendallville	41	$6.7M	57	$7.7M	22	$2.4M
City of Ligonier	31	$4.5M	12	$1.9M	4	$1.0M
Town of Albion	3	$0.4M	2	$0.8M	1	$0.1M
Town of Avilla	10	$1.2M	3	$0.9M	1	$0.1M
Town of Rome City	0	$0	236	$26.2M	0	$0
TOTAL	**901**	**$169.3M**	**1,977**	**$261.3M**	**58**	**$9.4M**

Utilizing the same GIS information and process, critical infrastructure within each of the flood hazard areas in Noble County was assessed and are included in **Table 11**. These buildings are included in the overall number of structures and damage estimate information provided in **Table 10**.

Table 11: Critical Infrastructure in the Flood Zones

Community	Floodway	1% AEP Outside of Floodway	0.2% AEP Outside of 1% AEP Floodplain
Noble County			
City of Kendallville		Kendallville Wastewater Treatment Plant	
City of Ligonier			
Town of Albion			
Town of Avilla			
Town of Rome City		St. Gaspar Del Bufalo Catholic Church	

Utilizing the information in **Table 10** regarding the number of structures within each of the flood hazard areas, it is also important to note the number of flood insurance policies within each area in Noble County. **Table 12** provides the comparison between the number of structures in the 1.0% AEP and the number of flood insurance policies. It is also important to note that flood insurance is voluntary unless the property owner carries a federally subsidized mortgage; insurance coverage may be discontinued when the mortgage is completed.

Table 12: Structures in the 1.0% AEP and Number of Flood Insurance Policies

Community	# Structures in 1.0% AEP and the Floodway	# Policies
Noble County	2,513	175
City of Kendallville	120	6
City of Ligonier	47	1
Town of Albion	6	1
Town of Avilla	14	
Town of Rome City	236	14
Total	**2,936**	**197**

Future Considerations

As the municipalities within Noble County grow in population and redevelop, it can be anticipated that the number of critical and non-critical infrastructures will also increase accordingly. Noble County; the cities of Kendallville and Ligonier; and the towns of Albion, Avilla, Rome City, and Wolcottville have adopted floodplain ordinances which help to keep structures out of areas of highest risk. **Table 13** is a compilation of the most recent ordinance adoptions for each community.

Table 13: Most Recent Floodplain Ordinance

Community	Date Floodplain Ordinance Adopted
Noble County	2/23/2015
City of Kendallville	2/25/2015
City of Ligonier	2/23/2015
Town of Albion	10/28/2014
Town of Avilla	1/21/2015
Town of Cromwell	
Town of Rome City	2/23/2015
Town of Wolcottville	1/9/2024

All the listed communities discourage critical facilities such as schools, medical facilities, community centers, municipal buildings, and other critical infrastructure from being located within the 1% AEP floodplain. New structures must also be protected to that level along with flood-free access to reduce the risk of damage caused by flooding and to ensure that these critical infrastructures will be able to continue functioning during major flood events. Flooding due to poor drainage, low-lying land, or flash flooding is also an important consideration. It will be important for recognition of potential flood impacts to residents and businesses in these areas to be coupled with proper planning for future development and redevelopment of the flood zones. This would also include studying the Best Available Data Layer and inundation areas mapped through the development of the Indiana Floodplain Portal as well as studies of all the streams with one square mile of drainage area or greater (**Figure 24**).

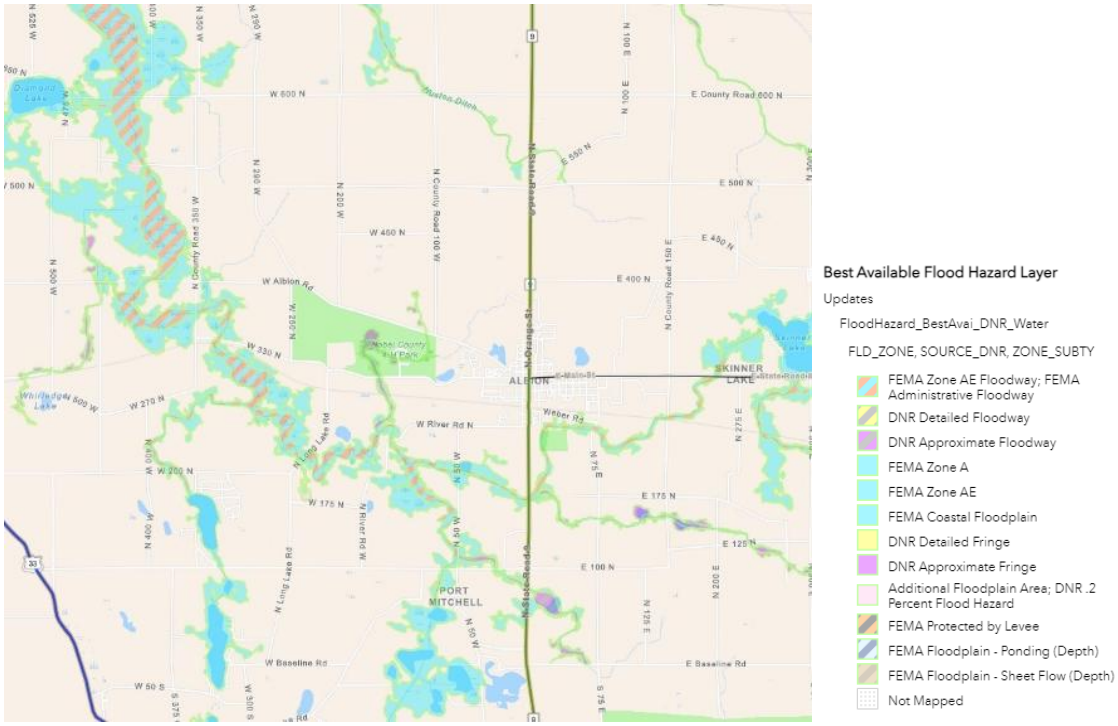


Figure 24: Sample of Flood Designated Areas in Noble County

It is important to ensure that owners and occupants of residences and businesses within the known hazard areas, such as delineated or approximated flood zones and Fluvial Erosion Hazard (FEH) areas, are well informed about the potential impacts from flooding incidents as well as proper methods to protect themselves and their property.

Increased precipitation, as predicted in the Indiana Climate Change Impacts Assessment, is anticipated to come in the form of heavier, shorter events which lead to the increased potential for flooding and stress on infrastructure such as sanitary and storm sewers. Heavy precipitation events are anticipated to occur more frequently as temperatures rise, producing rain when previously there was snow.

Despite these efforts, the overall vulnerability and monetary value of damages is expected to increase in the area unless additional measures, such as those discussed later in **Chapter 5** of this report, are implemented.

Indirect effects of flooding may include increased emergency response times due to flooded or redirected streets, the danger of dislodged and floating propane tanks causing explosions, and the need for additional personnel to carry out the necessary evacuations. Additional effects may include sheltering needs for those evacuated and the loss of income or revenue related to business interruptions. Several communities within Noble County host numerous special events near to or on the rivers and waterways. These special events may have to be cancelled or postponed due to flooding or high-water levels.

Relationship to Other Hazards

While flooding creates social, physical, and economic losses, it may also cause other hazards to occur. For example, flooding may increase the potential for a hazardous materials incident to occur. Above ground storage facilities may be toppled or become loosened and migrate from the original location. In less severe situations, the materials commonly stored in homes and garages such as oils, cleaners, and de-greasers, may be mobilized by flood waters. Should access roads to hazardous materials handlers become flooded, or if bridges are damaged by flood waters, response times to more significant incidents may be increased, potentially increasing the damage associated with the release.

Increased volumes of water during a flood event may also lead to a dam failure. As the water levels rise in areas protected by dams, at some point, these structures may overtop or may breach, leading to even more water being released. These two hazards, flood, and dam failure, when combined, may certainly result in catastrophic damage.

In a similar fashion, a snowstorm or ice storm can also lead to flooding on either a localized or regional scale. When a large amount of snow or ice accumulates, the potential for a flood is increased. As the snow or ice melts, and the ground becomes saturated or remains frozen, downstream flooding may occur. Ice jams near bridges and culverts may also result in flooding of localized areas and potentially damage the bridge or culvert itself.

Repeated flooding may also create impacts associated with landslides along riverbanks and bluff areas. As floodwaters travel through the systems, saturating shorelines and increasing volumes and velocities of water, the natural process of fluvial erosion may be exacerbated. As these processes are increased, structures and infrastructure located on bluffs or in proximity to the river may be at risk.

Flooding in known hazard areas may also be caused by dams that experience structural damage or failures not related to increased volumes or velocities of water. These “sunny day failures,” while not typical, may occur wherever these structures exist throughout the county.

4.2.6 Hailstorms, Thunderstorms, and Windstorms

Overview

Hail occurs when frozen water droplets form inside a thunderstorm cloud and then grow into ice formations held aloft by powerful thunderstorm updrafts, and when the weight of the ice formations become too heavy, they fall to the ground as hail. Hail size ranges from smaller than a pea to as large as a softball, and can be very destructive to buildings, vehicles, and crops. Even small hail can cause considerable damage to young and tender plants. Residents should take cover immediately in a hailstorm, and protect pets and livestock, which are particularly vulnerable to hail, and should be under shelter as well.

Thunderstorms are defined as strong storm systems produced by a cumulonimbus cloud accompanied by thunder and lightning and often by gusty winds and heavy rains. All thunderstorms are considered dangerous as lightning is one of the by-products of the initial storm. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms. Other associated dangers of thunderstorms included tornadoes, high winds, hail, and flash flooding.

Windstorms or high winds can result from thunderstorm inflow and outflow, or downburst winds when the storm cloud collapses, and can result from strong frontal systems, or gradient winds (high- or low-pressure systems). High winds are speeds reaching 50 mph or greater, either sustained or gusting.

Extent, History, and Location

In Noble County, the NCDC has recorded nine hailstorms and 35 thunderstorm/windstorm events between January 1, 2020, and November 30, 2025.

According to the Midwest Regional Climate Center (MRCC) hail is considered severe if a thunderstorm produces hail stones larger than one inch in diameter, or larger than the size of a quarter. On May 7, 2024 the city of Kendallville and the town of Avilla both experienced hail over three inches in diamaeter, almost the size of a softball, and reported over $300,000 in property damage over six events. There were no reports of crop damage, injuries, or deaths.

Significant windstorms are characterized by the top wind speeds achieved during the incident. Such high wind events characteristically occur in conjunction with thunderstorms and have historically occurred year-round with the greatest frequency and damage occurring in May, June, and August. Within Noble County, NCDC reports 10 instances where top wind speeds were 60 mph or greater. The 35 instances of thunderstorms and high wind events were on 17 different dates. Of those instances there was one report of injuries and no deaths. The injury was the result of a mobile home being removed from its foundation. There were no reports of crop damage associated with these events. However, between all the events there was $108K of property damage reported with $30K coming from one event. On May 7, 2024, healthy tree branches around 12 inches in diameter were torn off trees and wind driven hail damaged siding on a home. Many event reports included in the NCDC did not provide descriptive information on the social, physical, and economic losses resulting from individual storms specific to Noble County. In local storm reports at the NWS, where damages were reported, narrative descriptions of the event rarely extended beyond reports of damage to broken tree limbs, downed power lines, or roof damage.

The ever-changing climate has impacted the frequency of hailstorms, thunderstorms, and windstorms. Based on information published by NOAA, the average intensity of rain is increasing while the duration of rain events is decreasing. With these circumstances, extreme events may be increasing because there could be more rain in a shorter time period.

Appendix 9 provides the NCDC information regarding hailstorms, thunderstorms, and windstorms that have been reported within the county.

Probability

The committee determined the probability of a hailstorm, thunderstorm, or windstorm occurring anywhere throughout Noble County is "Highly Likely" and will typically affect broad portions of the county at one time resulting in potentially "Limited" to "Significant" damages. As advancements in technologies such as weather radar systems and broadcast alerts are continually made, the warning time for such incidents may increase. Currently, the committee feels that the warning time is anticipated to be six to 12 hours on average, and the duration is expected to range from less than six hours to less than a week.

Indicative of a regional hazard, the probability, magnitude, warning time, and duration of a hailstorm, thunderstorm, or windstorm are expected to be similar throughout the county. These events are highly unpredictable, and the occurrences are distributed throughout the county, sometimes impacting one community more often or more severely than another. Therefore, the CPRI values reflect the distributed risk and associated priority for a hailstorm, thunderstorm, or windstorm. A CPRI summary is provided in **Appendix 8**.

Specific locations and frequency of hailstorms, thunderstorms, and windstorms are difficult to predict as many of these individual events are without significant warning time and may have impacts on very limited areas or may affect broader areas. However, based on NCDC data and personal experiences of the committee, it was determined that all areas within the county are anticipated to experience a hailstorm, thunderstorm, or windstorm within the calendar year. More likely, these communities will be impacted by several of these hazard events each year. The magnitude is anticipated to be similar based on the number of critical infrastructure and populations of each of the municipalities.

Assessing Vulnerability

The effects of a hailstorm, thunderstorm, or windstorm may be minimal to extensive in nature and may affect small or broad ranges of land area. Within Noble County, direct and indirect effects from a hailstorm, thunderstorm, or windstorm may include:

Direct Effects:

- Damages to infrastructure (power lines)
- Damages to individual properties (homes, cars)
- Physical injuries may be experienced by those unable to find shelter during storm events, such as homeless people, hikers, and outdoor workers

Indirect Effects:

- Downed power lines due to falling tree limbs as seen in **Figure 25**
- Losses associated with power outages

- Damages sustained from blowing debris
- Cancellation or interruption of special events

Estimating Potential Losses

Figure 25: Damage from High Thunderstorm Winds

Due to the unpredictability of this hazard all critical infrastructure and non-critical structures in Noble County are at risk of damage including temporary or permanent loss of function. For hailstorms, thunderstorms, and windstorms, it is not possible to isolate specific critical infrastructure or non-critical structures that would be vulnerable to damage. However, areas where utility lines are above ground and areas where dead or dying trees have not been removed may be at a higher risk of property damage or power outages during hailstorms, thunderstorms, and windstorms. Additionally, mobile homes and accessory buildings such as pole barns and sheds may also be at a higher risk of damage from hailstorms, thunderstorms, and windstorms if not properly anchored to the ground. Homeless individuals and families who have alternative means of sheltering may experience greater losses since the stability of tents and alternative structures does not withstand the damaging forces of the storms.

Future Considerations

As the population of the communities in Noble County develops and redevelops, it can be anticipated that the number of structures will also increase. To reduce the vulnerability for damage resulting from a hailstorm, thunderstorm, or windstorm, measures such as proper anchoring are vital. This includes not only roof anchors but also mobile home anchors. Proper tree maintenance, and burial of power lines should be completed. Adoption and enforcement of the current International Building Codes is key to ensuring structures can withstand the power of wind and hailstorms. While measures can be taken to remove existing structures or prevent future structures from being built in known hazard areas such as floodplains and hazardous materials facility buffers, such measures are not applicable to hailstorms, thunderstorms, and windstorms due to the diffuse nature and regional impacts of this hazard.

Indirect effects resulting from a hailstorm, thunderstorm, or windstorm can include power outages caused by downed tree limbs or flying debris, damage resulting from prolonged power outages, and damage to structures or property because of debris. Damage to homeless encampments resulting in loss of personal property and potential injuries are also a concern during storms.

Relationship to Other Hazards

Hailstorms, thunderstorms, and windstorms may be the precursor for other hazards. For example, hazardous materials incidents can be the result of a hailstorm, thunderstorm, or a windstorm. Material storage containers can become damaged by high winds, debris, or even lightning, and can result in a spill or release of materials. With wind speeds greater than 58 mph, tankers and other transportation vehicles carrying hazardous materials are also at risk while on the road. High winds may also cause gaseous substances to travel farther distances at a much faster rate, increasing the evacuation area necessary to protect residents and visitors of Noble County.

Additionally, rainfall typically occurs with a thunderstorm, and this additional precipitation may lead to localized flooding or riverine flooding depending on the amount of rain during the event. Debris from a windstorm may also lead to localized flooding if debris is deposited over drains or if obstructions are created by downed limbs, trees, or other storm related debris. A similar concern due to the potential precipitation would be dam failure. High winds may place debris near spillways, blocking the emergency drainage mechanism for the dams. High winds may also lead to structural damage to a dam or may cause damage to nearby trees or other structures, leading to indirect damage.

The risk of social losses also increases during a hailstorm, thunderstorm, or windstorm, as these hazards often result in downed power lines, utility poles, and trees. Debris such as this may impede traffic patterns and make it difficult for emergency vehicles (Fire, Emergency Medical Services (EMS), and Police) to pass through affected areas or people may be directly injured because of falling or flying debris.

4.2.7 Landslide, Land Subsidence, and Fluvial Erosion Hazard

Overview

Land subsidence, according to the USGS, is "a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials." Further, there are three processes that contribute to subsidence: compaction of aquifer systems, drainage and subsequent oxidation of organic soils, and dissolution and collapse of susceptible rocks.

Another important consideration is Fluvial Erosion Hazard (FEH). This represents the risk associated with natural stream movements and losses associated with buildings and infrastructure. In some cases, this may be represented by a gradual movement of a stream across a farm field. In other, more extreme instances, homes or other infrastructure may be lost as steep riverbanks or bluffs sluff into the water below.

Location

The USGS maps locations of highly mobile streams or streams whose position changes over time as they carve out the earth surrounding them. According to USGS, the Elkhart River is currently not migrating. Additionally, IDNR's map of fluvial erosion hazards shows that all waterways near cities or towns are relatively stationary. This means that while the river may move slowly over long periods, the rivers position is mostly stable. While the waterways of Noble County are not currently migrating, they have the potential to in the future. Development along the banks of these waterways could be susceptible to erosion should the river transition to an actively migrating stream.

IndianaMap shows that there is no known karst geology within the county. The National Park Service says, "karst is a type of landscape where the dissolving of the bedrock has created sinkholes, sinking streams, caves, springs, and other characteristic features." These areas can be dangerous to people and infrastructure as they can develop quickly and leave large holes in the ground.

Additionally, IndianaMap shows that there are no underground mining operations within the county. Underground mining operations can occasionally lead to landslides and land subsidence as voids, or areas where materials were excavated, are left. This can cause the ground above them to collapse leading to a landslide or land subsidence.

To date, there have not been any landslides or subsidence events reported in Noble County.

Extent and History

Noble County has no known Karst geology. However, even some of the portions that have no known karst are considered at a relatively low risk for landslides according to the National Risk Index. The risk index considers expected annual loss as well as vulnerabilities by census tract and community resilience. The Risk Index for Landslide in Noble County is shown in **Figure 26**. There are two areas around the cities of Kendallville and Ligonier which have no expected annual loss. To date there have been no known significant landslides, land subsidence, or fluvial erosion within the county.

The Risk Index expects an annual loss of $21.9K for Noble County. The Risk Index calculates expected annual loss by multiplying exposure (the representative value of buildings, population, or agriculture potentially exposed to landslides), annualized frequency (the frequency or probability of a landslide occurring), and historic loss ratio (represents the estimated percentage of exposed building value, population, or agriculture value expected to be lost due to landslide).

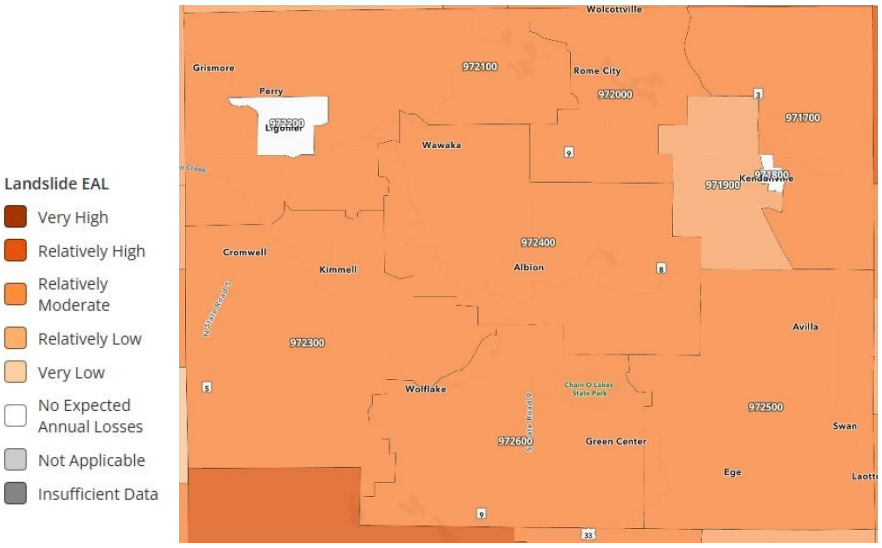


Figure 26: Expected Annual Loss From Landslides in Noble County

Probability

The committee determined the probability of a landslide or subsidence occurring in Noble County is "Unlikely." Any event is expected to result in potentially "Negligible" damages on average. Currently, the committee feels that the warning time is expected to be greater than 24 hours and the duration is expected to last less than a week. These events are highly unpredictable and the risk, although very low according to the committee, is distributed throughout the county. Therefore, the CPRI values reflect the distributed risk and associated priority for a landslide or subsidence event. A CPRI summary is provided in **Appendix 8**.

Assessing Vulnerability

Within Noble County, direct and indirect effects may include:

Direct Effects:

- Damages to infrastructure (power lines, roads, bridges)
- Damages to individual properties (homes, cars)
- Loss of cropland immediately adjacent to the rivers

Indirect Effects:

- Increased response time for emergency vehicles
- Losses associated with affected land (crop loss)
- Potential contamination of groundwater resources
- Loss of business due to roadway access and power loss

Estimating Potential Losses

According to the National Risk Index, expected annual losses have been calculated for the areas in Noble County which are at risk of damage including temporary or permanent loss of function. The greatest factor involving the higher risk rating is the potential for larger segments of the population to be exposed to the potential hazard.

In addition, areas where FEH meander belt widths (FEH Zones) have been identified, may be at a higher risk of property damage caused by such events. To prepare a community based basic "what-if" scenario, the Indiana FEH GIS layers were overlaid onto parcel data provided by the county. **Table 14** identifies the number of structures and potential damage within the FEH areas.

Table 14: Summary of Parcels and Essential Structures in the FEH Zone

Community	Potential Damages		
	# Parcels	# Structures	# Essential Facilities
Noble County	2297	220	0
City of Kendallville	148	54	0
City of Ligonier	136	34	1
Town of Albion	0	0	0
Town of Avilla	6	0	0
Town of Cromwell	0	0	0
Town of Rome City	19	0	0
Town of Wolcottville	0	0	0

Future Considerations

As the populations of the communities in Noble County grow, it can be anticipated that the number of critical and non-critical structures will also increase. To reduce the vulnerability for damages resulting from a landslide or land subsidence, FEH area GIS layers along with the floodplain information should be integrated into the building permit or approval process. In recent years, no significant development has occurred within these areas of Noble County. However, depending on the location, any development may increase the vulnerability to this hazard.

Although the county rivers are considered relatively stable, having little lateral movement annually, extreme precipitation events may cause erosion to take place in previously stable areas. Given this potential it is key the community continues to discourage construction of infrastructure and homes in the meander belt widths for each stream, such as the Blue River; Elkhart River; North, Middle, and South Elkhart Rivers; and the Tippecanoe River.

As future growth takes place, the indirect effects resulting from a landslide or land subsidence event can cause challenges for the community if transportation routes are damaged, and businesses must close due to access issues and loss of power. Cascading impacts in smaller counties can have long lasting effects on the local economy, community growth, health, and welfare.

Relationship to Other Hazards

A landslide, subsidence event or FEH event may be the precursor for other hazards. Depending on the location of the event, material storage containers can become damaged resulting in a spill or release of materials and potentially contaminating groundwater reserves. Dam failures may occur in much the same fashion if located in the potential hazard areas, or resulting from heavy saturation following a rainstorm, heavy snow, or rapid snow melt. FEH may result in flooding in areas previously not impacted by flood due to debris clogging drainage ways and loss of earthen berms near the waterways.

Similarly, these types of events may be caused by hail, thunder, or windstorms and their effects on the soils; an earthquake may release the ground enough to set a slide in motion; or a flood may add increased soil saturation or weight to at-risk areas increasing the potential for an event and resulting damages.

4.2.8 Tornado

Overview

A tornado is generated when conditions in a strong cell are produced that exhibit a wall of cool air that overrides a layer of warm air. The underlying layer of warm air rapidly rises, while the layer of cool air drops – sparking the swirling action. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally from April through June in Indiana, although tornadoes can occur at any time of year. Tornadoes tend to occur in the afternoons and evenings; over 80% of all tornadoes strike between 3:00 pm and 9:00 pm but can occur at any time of day or night.

The classification of tornadoes utilizes the Enhanced Fujita Scale of tornado intensity and damage. Tornado intensity ranges from low intensity (EF0) tornadoes with effective wind speeds of 65-85 mph to high intensity (EF5+) tornadoes with effective wind speeds of 200+ mph. (**Table 15**).

Table 15: Enhanced Fujita Scale for Tornadoes

EF-Scale	Windspeed, mph	Character of Damage	Relative Frequency	Typical Damage
EF0	65-85	Light damage	29%	Shallow rooted trees blown over; damage to roofs, gutters, siding
EF1	86-110	Moderate damage	40%	Mobile homes overturned, roofs stripped, windows broken
EF2	111-135	Considerable damage	24%	Large trees snapped, light-object missiles generated, cars lifted
EF3	136-165	Severe damage	6%	Severe damage to large buildings, trains overturned
EF4	166-200	Devastating damage	2%	Whole houses destroyed; cars thrown
EF5	200+	Incredible damage	<1%	High-rise buildings significantly damaged, strong framed homes blown away

Extent, History, and Location

In Noble County, the NCDC has recorded two tornadoes from January 1, 2020, to November 30, 2025.

Of the two events, both were EF1. There were no injuries or deaths during the events and there were no crop damages reported. There were, however, $600K in property damages. The tornado on September 24, 2024, ripped some of the roofing off a house and then pushed a wall in. It also tore the entire outer shell of a chicken building off. **Appendix 9** provides the NCDC information regarding tornadoes that have been reported within the county.

Probablility

The committee estimated the probability of a tornado occurring in Noble County would be "Likely" to "Highly Likely" on average and the magnitude and severity of such an event to be "Significant" to "Critical" on average. The overall risk index is "Severe" throughout the county. As with many hazardous events, the committee anticipated a short warning time of typically less than six hours, and a short duration, less than a day. The individual answers of many communities varied from each other. This could be due to the different makeup of each community, the critical and essential facilities within each community, and the community's capacity to detect and respond to tornadoes. The CPRI summary is shown in **Appendix 8**.

The Indiana State Climate Office estimates that throughout Indiana, there is an average of 20 tornado touchdowns per year. Based on the number of tornado touchdowns previously reported through the NCDC and local weather agencies, the committee determined the risk from a tornado was elevated.

Assessing Vulnerability

As the path of a tornado is not pre-defined, it is difficult to isolate specific critical infrastructure and non-critical structures, or areas of Noble County that would be vulnerable to a tornado. Direct and indirect effects from a tornado may include:

Direct Effects:

- Increase damage to older construction including residential and business structures, mobile homes, and accessory structures (pole barns, silos, and sheds)
- Damage to structures in the immediate pathway (businesses, residences, and warehouses)
- Loss of alternative housing stock nearby
- Damages to above ground utility lines and structures

Indirect Effects:

- Loss of revenue for affected businesses.
- Expenses related to community clean-up and debris removal from public rights of way and public facilities
- Inability for property owners to work while dealing damages from the tornado and debris removal from high winds
- Affected business owners may experience loss of revenue if they are unable to continue operations following the event. Similarly, if a business is affected and unable to operate, employees may experience a loss of wages during the period of recovery

Estimating Potential Losses

Due to the unpredictability of this hazard, all critical and non-critical structures within the county are at risk of future damage or loss of function. Estimates of potential physical losses were determined through a hypothetical exercise where an EF2 intensity tornado traveled through portions of the county and the communities. This is intended to present a "what-if" scenario of a tornado incident and associated damages. Damage estimates were derived by assuming that 25% of all structures in the path of the tornado would be completely destroyed, 35% of the structures would be 50% damaged, and 40% of the structures would sustain 25% damage. These estimations were also determined utilizing three wind speed zones based on distance from the tornado path. Zone one is nearest the center of the tornado path, while Zone three is the farthest from the path and with a theoretically lower wind speed. **Table 16** provides summary data for the hypothetical tornado, which

is identified on **Exhibit 3**. Tables 16-17 only include communities in the path of the tornado and structures not labeled as unclassified, of which there was one in Noble County, two in the city of Kendallville, and one in the town of Albion. The actual damages may be slightly higher.

Table 16: Summary of Hypothetical Tornado Damages

Community	Zone 1		Zone 2		Zone 3		Total	
	#	$	#	$	#	$	#	$
Noble County	121	$23.3M	39	$5.4M	56	$9.2M	**216**	**$37.8M**
City of Kendallville	202	$24.1M	151	$17.9M	160	$18.1M	**513**	**$60.2M**
Town of Albion	71	$9.1M	52	$7.5M	38	$6.1M	**161**	**$22.6M**
Totals	**394**	**$56.5M**	**242**	**$30.8M**	**254**	**$33.4M**	**890**	**$120.6M**

Utilizing the same GIS information and process, critical infrastructure within each of the hypothetical tornado zones are included in **Table 17**. These buildings are included in the above table showing the number of structures and damage estimate information.

Table 17: Critical Infrastructure Within Hypothetical Tornado

Community	Zone 1	Zone 2	Zone 3
City of Kendallville	Kendallville Police Department, Mount Pleasant Lutheran Church, Restoration Lutheran Church	Back to Bethel Christian Church Inc, Bread of Life Tabernacle the Pentecostals of Kendallville, Daystar Christian Fellowship Inc, Evangelical Church of North America and Indiana Corporation, Extend International, Faith Unity Fellowship Incorporated Charles M Hoover Ministries, Fellowship Baptist Church of Kendallville Inc, Fellowship Bible Church of Kendallville Ind, First church of God Inc, Harbor of Love Baptist Church Inc, Kendallville Trinity Church United Methodist Foundation Inc, New Life Tabernacle Inc, Salem United Baptist Church Inc, Trinity United Methodist church	Grace Christian Church Incorporated
Town of Albion	Church of Jesus Christ, Noble County EMS – Albion Quarter, Noble County Sheriffs Department / Noble County Jail	Albion Fire Department, Albion volunteer Fire Department	Albion Police Department

Future Considerations

The communities within Noble County host numerous events each year in addition to the regular tourist attractions and outdoor recreation opportunities which attract thousands of guests. Due to this, it is imperative that the EMA place continued importance on the need to maintain their outdoor warning siren coverage and/or support alternative notification methods for people who may not be tuned in to local media. Because of the dispersed population concentration, coverage is limited to the more densely populated portions of the county. The existing outdoor warning siren locations are identified in **Figure 27**.

While it can be anticipated that new construction associated with development may be stronger than older or existing construction, existing older structures, barns, pole buildings, silos, and mobile homes remain threatened by tornados. The unincorporated portions of the county will remain vulnerable, especially where the outdoor warning siren coverage is not present. It is impossible to predict the path of a tornado and therefore all current and future development will continue to be at risk for damage. Risks to the citizens of the county may be lessened through participation in mass notification programs, use of weather radios, and turning on the emergency alert feature on cell phones. Having multiple means of warning citizens, businesses and visitors about incoming weather events is critical to continued economic growth and well-being of the communities and the county.

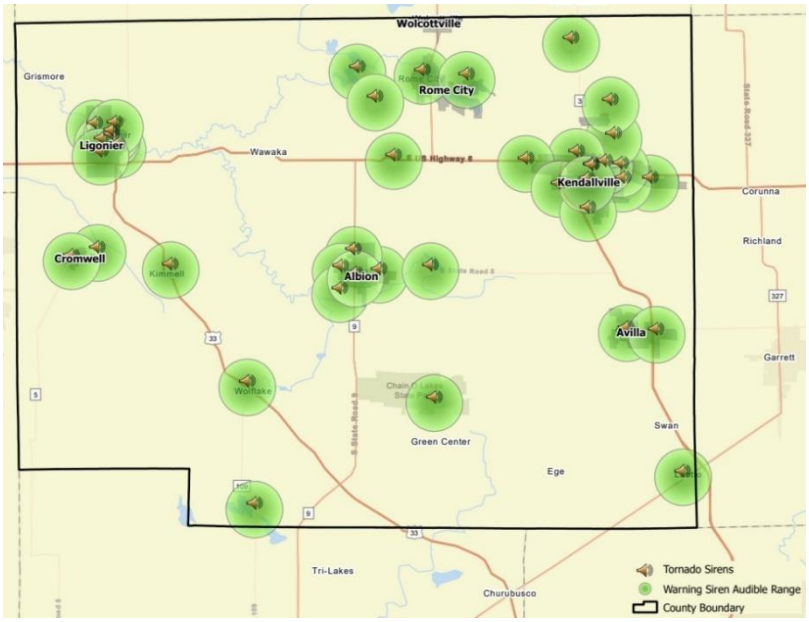


Figure 27: Outdoor Warning Siren Locations in Noble County

Relationship to Other Hazards

Tornadoes may result in a hazardous material incident. Material storage containers can become damaged by high winds and debris can result in a spill or release of materials. As wind speeds increase, the potential for damage to above ground storage containers also increases. Tankers and other transportation vehicles carrying hazardous materials are also at an increased risk while on the road or rail.

Tornadoes may also result in a dam failure as the increased wind speeds and debris caused by the tornado may directly impact the dam or cause indirect damage by clogging outlet structures and/or emergency spillways. In addition, tornadoes may lead to structural fires as the destruction path is sometimes long and broad, leading to an increased number of potentially damaged homes, exposed power lines, gas leaks, and substantial amounts of debris.

4.2.9 Winter Storms and Ice

Overview

A winter storm can range from moderate snow over a few hours to blizzard conditions with high winds, ice storms, freezing rain or sleet, heavy snowfall with blinding wind-driven snow, and extremely cold temperatures that can last for several days. Winter storms are typically accompanied by cold temperatures and blowing snow, which can severely reduce visibility. A winter storm is defined as one that drops four or more inches of snow during a 12-hour period, or six or more inches during a 24-hour span.

An ice storm occurs when freezing rain falls from clouds and freezes immediately on contact with a variety of surfaces. All winter storms make driving and walking extremely hazardous. The aftermath of a winter storm can affect a community or region for days, weeks, and even months.

Storm effects such as extreme cold, flooding, snow, and ice accumulation can cause hazardous conditions and hidden problems for people in the affected area. People can become stranded on the road or trapped at home, without utilities or other services, including food, water, and fuel supplies. The conditions may overwhelm the capabilities of a local jurisdiction. Winter storms are considered deceptive killers as they may indirectly cause transportation accidents and injury and death resulting from exhaustion/overexertion, hypothermia and frostbite from wind chill, and asphyxiation. House fires occur more frequently in the winter due to the use of alternative heat sources, such as space heaters, and lack of proper safety precautions.

Wind chill is a calculation of how cold it feels outside when the effects of temperature and wind speed are combined. On November 1, 2001, the NWS implemented a replacement WCT index for the 2001/2002 winter season. The reason for the change was to improve upon the current WCT Index, which was based on the 1945 Siple and Passel Index.

A winter storm watch indicates that severe winter weather may affect your area. A winter storm warning indicates that severe winter weather conditions are on the way. In the event of a blizzard, a winter storm warning will be issued and include the details of the blizzard - that large amount of falling or blowing snow and sustained winds of at least 35 mph are expected for several hours.

Location

Being in Northern Indiana, winter storms are common in Noble County and the surrounding region. Such conditions can result in substantial personal and property damage, even death. The NWS recently (October 15, 2018) consolidated their watch and warning products. In doing so, blizzards and lake effect snows are no longer separate watches and warnings but instead are detailed as a part of winter storm watches and warnings. A large number of winter storm products are available such as the WSSI which helps communities better understand the potential impacts of the storm. **Figure 28** shows the description of the WSSI impacts. More detailed information with regard to the timing of the storms is provided as the event gets closer to the forecast area.

Potential Winter Storm Impacts	
	Winter Weather Area **Expect Winter Weather.** • Winter driving conditions. **Drive carefully.**
	Minor Impacts **Expect a few inconveniences to daily life.** • Winter driving conditions. **Use caution while driving.**
	Moderate Impacts **Expect disruptions to daily life.** • Hazardous driving conditions. **Use extra caution while driving.** • Closures and disruptions to infrastructure may occur.
	Major Impacts **Expect considerable disruptions to daily life.** • Dangerous or impossible driving conditions. **Avoid travel if possible.** • Widespread closures and disruptions to infrastructure may occur.
	Extreme Impacts **Expect substantial disruptions to daily life.** • Extremely dangerous or impossible driving conditions. **Travel is not advised.** • Extensive and widespread closures and disruptions to infrastructure may occur. Life-saving actions may be needed.

Figure 28: Winter Storm Impacts

Figure 29 shows how Noble County's minimum temperature is warming at a rate of 0.3°F each decade since roughly 1895. This increase will likely result in the county experiencing less snow and more ice. This tradeoff is due to the atmosphere's greater likelihood of being above freezing which will melt any snow and then refreeze the drops of rain resulting in freezing rain or sleet.

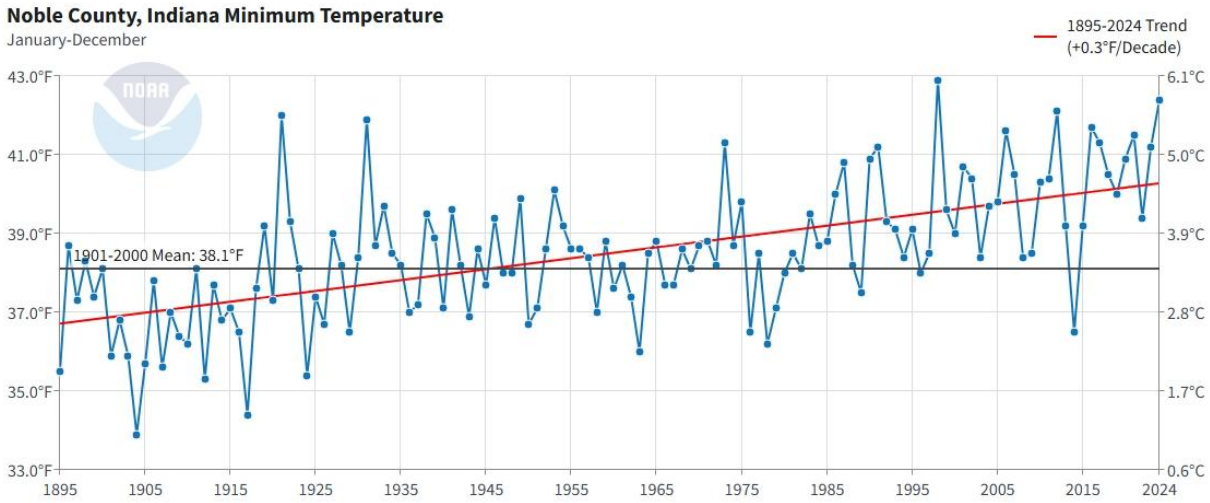


Figure 29: Annual Minimum Temperatures From 1895 - 2024

Extent and History

In Noble County, the NCDC has recorded two heavy snows, zero ice storms, zero lake-effect snows, four winter storms, and 22 winter weather events from January 1, 2020, to November 30, 2025.

NCDC reports indicated no property damage, no additional crop damage and no injuries, or deaths associated with any of the events. Many narrative descriptions indicated poor travel conditions, lots of power outages and debris associated with the winter weather events. On February 16, 2021, there were reports of six to nine inches of snow. Followed by February 3, 2022, when 10 to 14 inches of snow fell across the county. Most recently, on February 2, 2025, when one to three inches of snow fell it resulted in hazardous travel conditions, numerous slide offs, and accidents. Committee members discussed inaccuracies in the number of winter storms and lake-effect snows reported by the NCDC. Rather, committee members recalled numerous winter storms and lake-effect snows throughout the past six years. **Appendix 9** provides the NCDC information regarding winter storms and ice that have been reported within the county.

Probability

The probability, magnitude, warning times, and duration of a snowstorm or ice storm causing disruption to residents and businesses in Noble County, as determined by the planning committee, is expected to be mostly consistent throughout the county and communities. It is "Highly Likely" that this type of hazard will occur in the area and will typically affect the entire county, and possibly several surrounding counties at one time, resulting in primarily "Limited" to "Significant" damages. The typical warning time for severe temperatures or several inches of snow associated with a winter storm is usually greater than 24 hours while the duration of the incident is anticipated to be less than one week. A CPRI summary is shown in **Appendix 8**.

Based on historical data and the experience of the planning committee, snowstorms have become less common in Noble County with the changing climate. However, ice storms bring more extensive challenges to the communities. Actions have been taken to mitigate many impacts from snow and ice storms. Lake effect snowstorms can be less predictable, depositing greater amounts of snow in a contiguous county and lesser amounts in Noble County or the opposite. The committee considered only the larger, more detrimental events for this effort.

Assessing Vulnerability

A snowstorm typically affects a large regional area with potential for physical, economic, and/or social losses. Direct and indirect effects of a snowstorm or ice storm within the county may include:

Direct Effects:

- A higher number of businesses rely on the outside workforce and may experience loss of production as employees may not be able to get to work. The high number of residents traveling to other areas for work results in a loss of income due to the inability to reach their normal worksites
- Rural (county) roads may be impassable
- Expenses related to snow removal or brine/sand applications
- Weight of ice and wet snow impacts older structures roofs as well as powerlines
- Large ice and snow events interrupt economic activity within the community

Indirect Effects:

- Loss of revenue as businesses are closed
- Increased emergency response times based on safety of roads
- Loss of income if workers are unable to get to their place of employment
- Delayed impacts due to supply chain disruptions – products not received or shipped on time cause lost wages and revenues
- Cancellation of special events and reduced tourist activities impact the local economy

Estimating Potential Losses

Given the nature and complexity of a regional hazard such as a snowstorm, it is difficult to quantify potential losses to property and infrastructure. As a result, all critical and non-critical structures and infrastructure are at risk from snowstorm and ice storm incidents.

For planning purposes, information collected about snowstorms impacting other communities around the nation is also useful in assessing the potential social, physical, and economic impact that a winter storm could have on communities.

In December 2008, Allen County had a wintry combination of freezing rains, snow, and ice. This storm was the largest disaster for Indiana Michigan Power with 110K Allen County customers without power. One thousand six hundred (1.6K) additional crew members were brought in to restore electrical service to the county. According to the Journal Gazette, $10M–$12M were spent to clean up the debris and make repairs, including labor costs, for this event.

While the above example indicates the wide-ranging and large-scale impact that winter storms can have on a community or region, winter storms generally tend to result in less direct economic impacts than many other natural hazards. According to the workshop on the social and economic impacts of weather, which was sponsored by the U.S. Weather Research Program, the American Meteorological Society, the White House Subcommittee on Natural Disaster Relief, and others, winter storms resulted in an average of 47 deaths and more than $1B in economic losses per year between 1988 and 1995. However, these totals account for only 3% of the total weather-related economic loss and only 9% of fatalities associated with all weather-related hazards over the same period.

Additionally, all Noble County police vehicles are four-wheel drive which assists the police with arriving to a scene quicker which can prevent further harm from occurring. However, Noble County personnel have noted that the county struggles to find enough people to run snowplows. It is important for the county to do outreach and possibly provide incentives for people to run the snowplows.

Future Considerations

As populations increase and communities continue to grow, the need to respond to snowstorms or ice storms will remain an important municipal effort. As new construction or re-development occurs, especially new or existing critical infrastructure, it is important to ensure that these new structures are equipped to deal with the potential risks associated with this hazard. Those may include lengthy power outages and potentially impassable transportation routes, making it difficult to obtain supplies or for passage of response vehicles. These hazard events will typically affect the entire county, perhaps multiple counties, and therefore all developments, current and future, will be at risk for damage associated with snow and ice storms. In addition, there will be a need for additional

warming shelters for the underserved populations and for stranded commuters on their way to or from work. This not only includes daytime available spaces but also overnight accommodation as the winter storms are often accompanied by very cold temperatures and wind chills.

Winter storms can also result in substantial indirect costs. Increased emergency response times, loss of work or the inability to get to work, as well as business interruption, are possible indirect effects of a winter storm. According to a report by the National Center for Environmental Predictions, the cold and snowy winter in late 1977 and early 1978, which impacted several heavily populated regions of the country, was partially responsible for reducing the nation's Gross Domestic Product (GDP) from an estimated growth rate of between 6% and 7% during the first three quarters of 1977 to approximately -1% in the last quarter of 1977 and 3% during the first quarter of 1978.

Relationship to Other Hazards

Winter storms and ice storms can lead to flooding as the precipitation melts and enters local receiving waters. This increased volume of water on already saturated, or still frozen ground can quickly result in flood-related damage to structures and properties as well as within the stream or river channel. Noble County has an increased risk of flooding following heavy precipitation events. The increased flooding may then lead to a dam failure within the same area, further exacerbating the damage.

Hazardous materials incidents may be caused by poor road conditions during winter storms or ice storms. Many hazardous materials are transported by rail or by tanker over highways and interstates. In the more rural areas of the county, or where open areas are more susceptible to snow drifts on roads, the possibility of a traffic related hazardous materials incident may increase due to road obstruction and lack of visibility.

Power outages and other infrastructure failures may also occur during a winter storm. Weight from snow and ice accumulations can directly or indirectly cause power lines to fail. During extreme cold temperatures, power outages may prove deadly for certain populations such as the homeless, the elderly or ill. Power outages in the winter are especially dangerous as families try to generate heat using alternative heat sources. Alternative heating sources may not be safely used or may be placed too close to combustible materials resulting in fires and burn injuries or death.

4.2.10 Dam and Levee Failure

Overview

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams typically are constructed of earth, rock, concrete, or mine tailings. A dam failure is a collapse, breach, or other failure resulting in downstream flooding.

Of the approximately 80K dams identified nationwide in the National Inventory of Dams (NID), the majority are privately owned. Each regulated dam is assigned a downstream hazard classification based on the potential loss of life and damage to property should the dam fail. The three classifications are high, significant, and low. With changing demographics and land development in downstream areas, hazard classifications of regulated are updated continually. The following definitions of hazard classification currently apply to dams in Indiana:

> High-hazard Dam: a structure, the failure of which may cause the loss of life and severe damage to homes, industrial and commercial buildings, public utilities, major highways, or railroads.
>
> Significant-hazard Dam: a structure, the failure of which may damage isolated homes and highways or cause the temporary interruption of public utility services.
>
> Low-hazard Dam: a structure, the failure of which may damage farm buildings, agricultural land, or local roads.

In Indiana, not all dams are regulated. To be regulated by the IDNR, the dam must meet at least one of the following criteria:

- The dam has a drainage area of more than one square mile
- The dam is 20 feet in height or greater
- The dam impounds a volume of more than 100 acre-feet of water

A dam's classification may be changed to a High-hazard classification through a successful petition by a downstream property owner. If this occurs, then the dam will also be regulated by IDNR. Federally owned and operated dams are not under IDNR's jurisdiction. Examples of Federally regulated dams include Federal Energy Regulatory Commission (FERC) and US Army Corps of Engineers (USACE) structures. Although regulations are similar, there are additional requirements based on the regulating agency.

A levee is a flood control structure engineered and designed to hold water away from a building. Levees protect buildings from flooding as well as from the force of water, from scour at the foundation, and from impacts of floating debris. Flood protection levees principle causes of levee failure, like those associated with dam failure, include overtopping, surface erosion, internal erosion, and slides within the levee embankment or the foundation walls. Levees are designed to protect against a particular flood level and may be overtopped in a more severe event. When a levee system fails or is overtopped, the result can be catastrophic and often more damaging than if the levee were not there, due to increased elevation differences and water velocity. The water flowing through the breach continues to erode the levee and increases the size of the breach until it is repaired or water levels on the two sides of the levee have equalized. The FEMA and USACE remind people living and working behind levees that there is always a residual risk when living or working in a facility located behind a levee. Levees reduce the risk of a flood, but do not completely eliminate that risk.

Location

Within Noble County, there are 19 structures listed in the IDNR dams list. Of the 19 in the county, two are classified as a high hazard dam, two are classified as a significant hazard dam, and three are classified as low hazard dams, and 12 are low hazard lake control structures. **Table 18** shows all the structures listed on the NID.

Table 18: Dams in Noble County

State ID	Dam Name	Owner Type	State Regulated Dam	Hazard Potential Classification	IEAP Prepared
57-1	Sylvan Lake Dam	Conservancy District	Yes	High	Yes
57-2	Lake Maxler Dam	Private	Yes	Low	No
57-3	Wilmot Pond Dam	Unassigned	Yes	Significant	No
57-5	Lake Barbara Dam	Private	Yes	Significant	No
57-6	Bear Lake Control Structure	State	No	Low	No
57-7	Big Lake Control Structure	State	No	Low	No
57-8	Bixler Lake Control Structure	Local Government	No	Low	No
57-9	High Control Structure	Private	No	Low	No
57-10	Latta Lake Control Structure	Private	No	Low	No
57-11	Little Long Control Structure	Private	No	Low	No
57-12	Lower Long Lake Control Structure	Local Government	No	Low	No
57-13	Rivir Lake Control Structure	State	No	Low	No
57-14	Skinner Lake Control Structure	State	No	Low	No
57-15	Waldron Lake (West Lakes) Control Structure	State	No	Low	No
57-16	Crooked Control Structure	State	No	Low	No
57-17	Richard Meyer Lake Dam	Private	No	Low	No
57-18	Marvin Morgan Dam	Private	No	High	No
57-19	Richard Grieger Lake Dam	Private	Yes	Low	No
57-20	Deer Lake (Control Structure)	Local Government	No	Low	No

According to the National Levee Database (NLD) managed by the USACE, there are no certified levees systems within the county.

The Indiana Silver Jackets Team completed a survey of levee-like features also known as non-levee embankments. The non-levee embankments are not certified or engineered structures. They are earthen structures which act like levees, however, cannot protect the features behind the structures adequately. In fact, non-levee embankments impose lateral constraints on flood flows, reducing the floodplain storage capacity and increasing the flood velocity. These non-levee embankments can cause stream erosion and downstream flooding. Some farms along the rivers and streams rely on these embankments to keep flood waters out of their fields. Non-levee embankments are discussed in the section because they are commonly mistaken to be "real" levees. People frequently build behind these structures with an expectation of safety, but these structures were never intended to provide such protection and their ability to hold back floodwater is unpredictable at best. Non-levee embankments can and often do restrict the movement of water to a certain limitation at which time the structure may fail without warning. The IDNR houses the Non-Levee Embankment site which shows the Non-Levee Embankments for Noble County. **Figure 30** depicts a sample of the agricultural (purple) and transportation (green) non-levee embankments in the southeastern corner of the county.

Figure 30: Sample of Non-Levee Embankments in Noble County

Extent and History

According to multiple local news sources, Sylvan Lake Dam has failed four times, all in the nineteenth century. There have also been multiple issues with the dam since its original construction. The dam had an increased risk of failure due to the overall condition and age which prompted a major reconstruction project which finished in July of 2025.

According to the NID inspection database of dams whose inspections are public information, the high hazard dam named Marvin Morgan Dam has not been rated and the Sylvan Lake Dam has been rated as fair. According to the database a rating of fair may be used when "No existing dam safety deficiencies are recognized for normal operations. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency." Additionally, of the two dams classified as significant, both are rated as poor. According to the database a rating of poor may be used when "a dam safety deficiency is recognized for normal operating conditions which may realistically occur," and when "remedial action is necessary."

Dam inspections can provide an assessment of the overall structural integrity and condition. A dam with a rating of unsatisfactory is more likely to fail than a dam rated as satisfactory. The Sylvan Lake Dam inspections are current according to the database which also shows that the Marvin Morgan Dam has not been inspected since August 15, 1996. The EMA should encourage the owners to complete the required inspections and any needed corrective actions to limit the risk of a dam failure.

Probability

Based on the information provided to them and their local knowledge, experience, and expertise, the committee determined the probability of a dam failure is "Unlikely." The magnitude of a dam failure can have "Negligible" to "Critical" damages. This is likely due to the difference in ratings and lack of dams in some areas of the county. The warning time is expected to be less than six hours on average. Overall, the committee felt the risk from a dam failure was "Elevated." **Appendix 8** provides a summary of the planning committee's expectations during a dam failure.

Assessing Vulnerability

The actual magnitude and extent of damage due to a dam or levee failure depends on the nature of the breach, the volume of water that is released, and the width of the floodplain valley to accommodate the flood wave. Due to the conditions beyond the control of the dam or levee owner or engineer, there may be unforeseen structural problems, natural forces, mistakes in operation, negligence, or vandalism that may cause a structure to fail.

Incident and Emergency Action Plans (IEAPs) are now required for all high hazard dams by state law; however, these plans are not mandated for the low and significant hazard structures. Dam owners are, however, encouraged to prepare an IEAP to help identify whom to notify and what actions may need to take place in the event of an incident or emergency event affecting the dam. Additionally, these plans show at-risk structures that may be affected by a dam failure. For the state regulated high hazard dams, the IDNR dam safety webpage shows which areas may be inundated during a dam failure. All dam owners are encouraged to develop an IEAP

The Sylvan Lake Dam, a high hazard dam, owned by the Rome City Conservation District, has developed an IEAP. **Figure 31** shows an example of the anticipated inundation areas during a worst-case scenario breach of the dam under full maximum pool conditions.

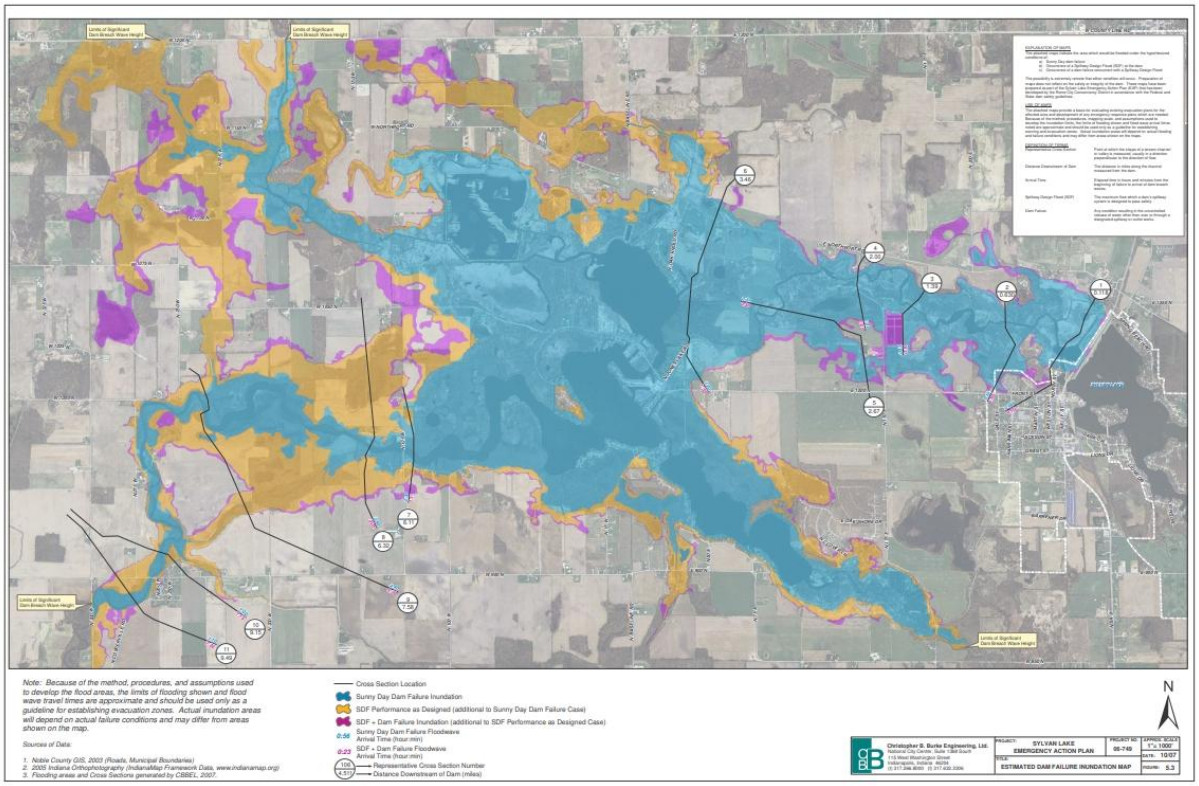


Figure 31: Sylvan Lake Dam Breach Inundation Area

Within Noble County, direct and indirect effects from a dam failure may include:

Direct Effects:

- Loss of life and severe damage to downstream homes, industrial and commercial buildings, public utilities, major highways, or railroads
- Loss of use of reservoirs for flood control, recreation, and water supply

Indirect Effects:

- Environmental damage includes altered landscapes, eroded soils, habitat destruction, and loss of wildlife from sudden releases of water
- Water quality impacts if contamination is in the water. This could potentially cause human health problems as well as fish and wildlife injury or death
- Increased response times due to damaged or re-routed transportation routes and/or bridges
- Long lasting economic impacts on the community due to business closures, and relocation of impacted property owners
- Economic impacts also include the cost of property damage, cleanup, and recovery
- Social impacts, such as displacement of people and disruption of communities

Estimating Potential Losses

The greatest dam or levee failure risk for Noble County is a breach of the two high hazard dams in the county, Sylvan Lake Dam and Marvin Morgan Dam. The potential inundation path of the Sylvan Lake Dam shows that State Road 9 may be flooded or washed away, depending on the type of breach, as the road rests at the bottom of the downstream slope of the dam. While the Marvin Morgan dam has not developed an IEAP, the inundation path may be estimated using topography around the area. The Marvin Morgan dam has potential to inundate State Road 8 and a large portion of the town of Albion.

Utilizing GIS maps and orthoimagery, the infrastructure and other features of dams can be identified. This imagery will show properties that would be isolated due to the inundation of the roadways leading in and out of the area as well as those properties which would be inundated.

Using the same methods identified in the flood section of this plan the building replacement values were calculated for each community that would be impacted by a sunny-day failure of the Sylvan Lake Dam. The town of Rome City has no building within the inundation area. Noble County has a total of 464 structures within the sunny-day dam inundation area that would cost $38M to replace. Over 90% of these structures are residential. Additionally, a critical and essential facility, the St. Gaspar Del Bufalo Catholic Church (Map ID 158), which serves as both a church and a shelter is within the inundation area. Church leadership and the EMA should consider actions to protect this facility against a potential dam failure.

Careful consideration should be given to any future development planned for the potential inundation area as it may increase the cost to replace these structures or increase the at-risk population if the Sylvan Lake Dam were to fail.

Future Considerations

As areas near existing levees and dams continue to grow in population, it can be anticipated that the number of critical and non-critical structures could also increase accordingly. Location of these new facilities should be carefully considered, and precautions should be taken to ensure that schools, medical facilities, municipal buildings, and other critical infrastructure are located outside of the delineated or estimated levee and dam failure inundation areas. Also, flood-free access should be provided for these facilities. Until development or re-development downstream of a dam is prohibited, those areas remain vulnerable to losses and damage associated with a failure of that structure.

It is also particularly important to all downstream communities and property owners that dam IEAPs are developed, kept up-to-date, and routinely exercised to ensure the greatest safety to those within the hazard area. Although not mandated, this is the best management practice for Significant and Low Hazard dams as well.

Relationship to Other Hazards

With the potentially large volumes and velocities of water released during a breach, it can be expected that such a failure would lead to flooding and debris flow within the inundation areas downstream of the dam. Nearby bridges and roads are also in danger of being destroyed or damaged due to a dam failure. Bridges may become unstable, and portions of road surfaces may be washed away. Entire roads may be undermined by the forces of the water and debris. Other infrastructure such as utility poles and lines may be damaged as the water and debris flows along. Buried utility pipes may become exposed due to scouring; all of which may lead to utility failures within the area downstream of the dam failure.

Due to flood and debris flow damages, hazardous materials facilities and transportation routes may be damaged resulting in releases. If LP gas tanks are located nearby, they may be torn from their mountings and would become part of the flowing debris as well as leaking their contents from the ruptured service lines.

4.2.11 Hazardous Materials Incident

Overview

Hazardous materials are substances that pose a potential threat to life, health, property, and the environment if they are released. These releases create a serious hazard for workers, neighbors, and emergency response personnel. Emergency response to a release of hazardous material may require fire, safety/law enforcement, search and rescue, and hazardous materials response units.

As materials are transported for treatment, disposal, or transport to another facility, all infrastructure, facilities, and residences near the transportation routes are at an elevated risk of being affected by a hazardous materials release. Often these releases can cause serious harm to Noble County and its residents if proper and immediate actions are not taken. Most releases are the result of human error or improper storage and corrective actions to stabilize these incidents may not always be feasible or practical in nature.

Railways often transport materials that are classified as hazardous, and preparations need to be made and exercised for situations such as derailments, train/vehicle crashes, and/or general leaks and spills from transport cars.

Location

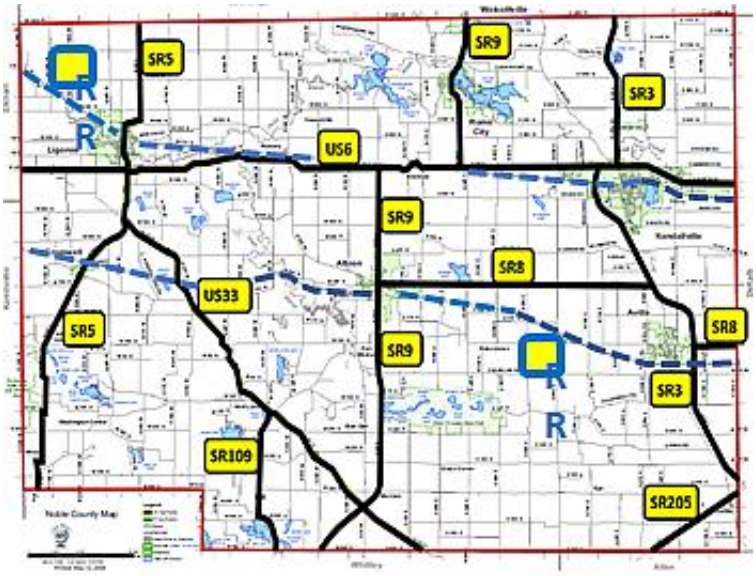


Figure 32: Noble County Transportation Map

During conversations with committee members and through information provided by local news outlets, it was noted that numerous small and moderately-sized incidents involving manufacturing facilities and transportation routes have occurred since the development of the original MHMP. However, the number of SARA Title III Tier II facilities utilizing, storing, and/or manufacturing chemicals has decreased over the years as facilities reduce the amount hazardous materials on site. Both Tier II and other chemical facilities as well as businesses and industries rely on just-in-time delivery which results in an increase in the number of delivery vehicles transporting hazardous materials across the county. Major highways in Noble County are: **Figure 32**

- US Routes 6 and 33
- State Roads 3, 5, 8, 9, 109, 205

There are several major railroads that are in the county including railroads transporting both commerce and public. They include the following:

- CSX Transportation
- Kendallville Terminal Railroad
- Norfolk Southern Railway

The volume of traffic increases the potential for incidents. Noble County does have a hazardous materials response capacity and has mutual aid hazardous materials response capabilities.

Extent and History

According to IDEM from January 1, 2020 to November 30, 2025 there were 51 reported spills in Noble County. On October 17th 2022, approximately 3K gallons of sewage were spilled near Rome City and on November 6th 2022, 900 gallons of sewage were spilled in Rome City. Additionally on August 30, 2022, 250 gallons of Diesel were spilled east of the town of Avilla after a semi and car accident occurred. According to the Noble County EMA's Facebook, the Noble County EMA, Kendallville Hazmat team, Avilla Fire Department, Avilla Police Department, Noble County Sheriffs Department, Indiana State Police, and Noble County EMS were all on scene responding. IDEM and local news sources did not discuss details of most other Noble County spills. However, it is likely that some of these spills involved mutual aid, long-term cleanup, and road closures. All hazardous material incidents require emergency response.

Probability

According to the committee, the probability of a hazardous material release or incident is "Possible" to "Highly Likely" due to the number transportation routes within each community and the county. "Limited" damages are anticipated on average to result from an incident. The level of damage is dependent upon the location of the event and the type of material released. As with hazards of this nature, a short warning time and a short duration are anticipated in the event of a hazardous materials incident. A CPRI summary is shown in **Appendix 8**.

Vulnerability

Within Noble County, direct and indirect effects from a hazardous materials incident may include:

Direct Effects:

- Acute or chronic health issues due to chemical exposure
- Closure of impacted railroad crossings
- Possible crop or livestock damage from chemical exposure
- Damage to infrastructure from leaks, accidents, or recovery operations
- Expense of decontamination and reconstruction of affected structures

Indirect Effects:

- Loss of revenue or production while testing, recovery, and/or reconstruction occurs
- Anxiety or stress related to the event
- Potential evacuation of neighboring structures or facilities
- Evacuation and/or relocation of homeless persons living in the impacted area
- Added expenses detouring traffic around incident location
- Expenses incurred due to response, testing, and cleaning of the affected areas

While the possibility of an incident occurring may be possible, the vulnerability of Noble County has been lowered due to the enactment of SARA Title III national, state, and local requirements. SARA Title III, also known as the Emergency Planning and Community Right to Know Act (EPCRA), establishes requirements for planning and training at all levels of government and industry. EPCRA also establishes provisions for citizens to have access to information related to the type and quantity of hazardous materials being utilized, stored, transported, or released within their communities.

One local result of SARA Title III is the formation of the LEPC. This committee has the responsibility for preparing and implementing emergency response plans (ERP), cataloging Safety Data Sheets (SDS) formerly known as Material Safety Data Sheets (MSDS), creating chemical inventories of local industries and businesses, and reporting materials necessary for compliance.

In Noble County, facilities are subject to SARA Title III provisions due to the presence of listed hazardous materials in quantities at or above the minimum threshold established by the act. These facilities are also required to create and distribute emergency plans and facility maps to local emergency responders such as the LEPC, fire departments, and police departments. With this knowledge on hand, emergency responders and other local government officials can be better prepared to plan for an emergency and the response it would require, and to better prevent serious effects on the community involved.

Estimating Potential Losses

Figure 33: Hazardous Material Spill

In addition, the very nature of these events makes predicting the extent of their damage very difficult. A small-scale spill or release might have a minor impact and would require only minimal response efforts. Another slightly larger incident might result in the disruption of business or traffic patterns, and in this situation, might require active control response measures to contain a spill or release, such as in **Figure 33**. However, even small, or moderate events could potentially grow large enough that mass evacuations or shelter-in-place techniques are needed, multiple levels of response are utilized, and additional hazards such as structural fires and/or additional hazardous materials releases (or explosions) may occur. Given the unpredictable nature of hazardous materials incident, an estimate of potential losses was not generated.

Is it important to note that Kendallville has a Level A HazMat team which can help with response time within the county. This team could limit the spread and severity of the incident.

Future Considerations

Additional facilities, both critical and non-critical in nature, may be affected if a hazardous materials release were to occur along a transportation route. Carriers of hazardous materials travel all of the state roads. As businesses and industries increase in the area, the increased use of these routes will increase the number of transportation related incidents.

By restricting development within the known hazardous materials facility buffer zones, future losses associated with a hazardous materials release can be reduced. Critical infrastructure should be especially discouraged from being located within these areas. Further, by restricting construction in these zones, the number of potentially impacted residents may also be reduced, lowering the risk for social losses, injuries, and potential deaths. Future construction of hazardous materials facilities should be located away from critical infrastructure such as schools, medical facilities, municipal

buildings, and daycares. Such construction would likely reduce the risk to highly populated buildings and populations with physical or social, emotional, or behavioral challenges or considerations such as children, the elderly, and medically-fragile individuals.

Many facilities constructed within close proximity to a hazardous materials facility are similar due to local zoning ordinances. This reduces the risk and vulnerability of some populations. However, there are several facilities and numerous transportation routes located throughout each of the communities making current and future development at risk for losses associated with a hazardous materials release.

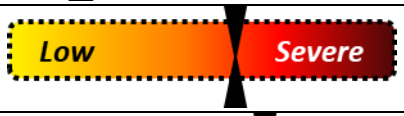
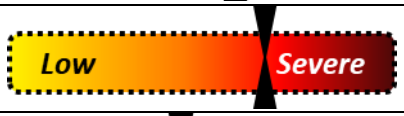
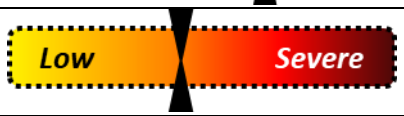
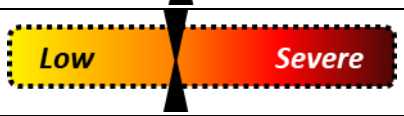
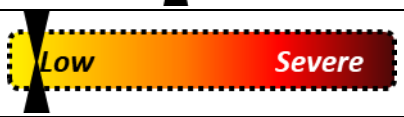
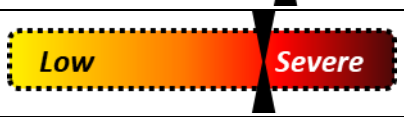
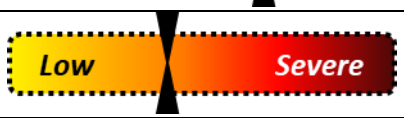
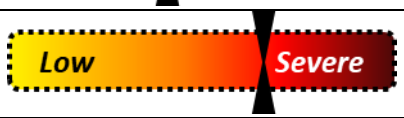
Relationship to Other Hazards

Dependent on the nature of the release, conditions may exist where a fire or spark ignites a flammable or explosive substance. As the fire spreads throughout the facility or the area, structural and/or property damage will increase. If the hazardous substances are in enclosed containers such as railroad tank cars, cylinders, other containers, or near heat generating events such as a fire, explosion becomes a risk as well. Response times to a hazardous materials incident may be prolonged until all necessary information is collected detailing the type and amount of chemicals potentially involved in the incident. Depending on the nature of the incident, further delays may take place until qualified hazardous materials responders with the appropriate response and monitoring equipment can be transported to the incident location. While this may increase structural losses, it may decrease social losses such as injuries or even deaths.

4.3 Hazard Summary

For the development of this MHMP, the committee utilized the CPRI method to prioritize the hazards they felt affected Noble County. Hazards were assigned values based on the probability or likelihood of occurrence, the magnitude or severity of the incident, as well as warning time and duration of the incident itself. A weighted CPRI was calculated based on the percent of the county's population present in the individual communities. **Table 19** summarizes the CPRI values for the various hazards studied within this MHMP and their ranking.

Table 19: All CPRI Scores Combined

Type of Hazard	List of Hazards	Weighted Average CPRI	Ranking
Natural	Drought		2.40
	Earthquake		1.47
	Extreme Temperatures		2.78
	Fires and Wildfire		2.97
	Flood		2.33
	Hailstorm, Thunderstorm, and Windstorm		3.28
	Landslide, Land Subsidence, and Fluvial Erosion		1.31
	Tornado		3.19
	Winter Storms and Ice		3.03
Technological	Dam and Levee Failure		2.22
	Hazardous Material Incident		3.01

It is important to understand the cause-and-effect relationship between the hazards selected by the committee. **Table 20** can be utilized to identify those relationships. For example, a winter storm (along the side of the table) can result in a flood (along the top of the table). In a similar fashion, a hazardous materials incident (along the top of the table) can be caused by an earthquake; flood; tornado; or a winter storm or ice storm (along the side of the table).

Table 20: Hazard Reference Table

EFFECT → / CAUSE ↓	Drought	Earthquake	Extreme Temperatures	Fires and Wildfire	Flood	Hail, Thunder, and Wind	Landslide, Subsidence, and FEH	Tornado	Winter Storms and Ice	Dam and Levee Failure	HazMat Incident
Drought				X							
Earthquake				X			X			X	X
Extreme Temperatures											X
Fires and Wildfire											X
Flood							X			X	X
Hail, Thunder, and Wind				X	X		X			X	X
Landslide, Subsidence, and FEH					X					X	X
Tornado				X						X	X
Winter Storms and Ice					X					X	X
Dam and Levee Failure					X		X				X
HazMat Incident				X							

As a method of better identifying the potential relationships between hazards, the community exhibits can be referenced to indicate the proximity of one or more known hazard areas such as the delineated floodplains and the locations of EHS facilities. For this reason, many of the communities in Noble County may be impacted by more than one hazard at a time, depending on certain conditions. It can be

anticipated that if a flood were to occur within these areas, there would be a potentially increased risk of a facility experiencing a hazardous materials incident. These areas may also be at greater risk of a dam or non-levee embankment failure.

Future development in areas where multiple known hazard areas (dam failure inundation areas, floodplains and surrounding hazardous materials facilities) overlap should undergo careful design, review, and construction protocol to reduce the risk of social, physical, and economic losses due to a hazard incident. While it may certainly be difficult, critical infrastructure should not be constructed within these regions.

The ever-changing climate can also have a significant impact on these hazards. According to NOAA NCEI the State Climate Summary for Indiana, the following observations have been observed based upon climate change:

- The global average temperatures have risen over 1.5°F since the beginning of the 20th Century. Temperatures in the 21st century have been higher than any other historical period with the exception of the early 1930s Dust Bowl era
- Indiana has experienced increases in the number and intensity of rain events while the individual duration of the rain events has been decreasing
- Extreme events are increasing, especially flooding

CHAPTER 5: MITIGATION STRATEGY

This chapter identifies the overall goal for the development and implementation of the Noble County MHMP. A summary of existing and proposed mitigation practices discussed by the committee is also provided.

5.1 MITIGATION GOAL

REQUIREMENT §201.6(c)(3)(i):
[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The committee reviewed the mitigation goals as outlined within the previous Noble County MHMP and determined that the goals remain valid and effective. In summary, the overall goal of the Noble County MHMP is to reduce the social, physical, and economic losses associated with hazard incidents through emergency services, natural resource protection, prevention, property protection, public information, and structural control mitigation practices. The three specific goals to achieve the overall goal of the plan are:

1) Lessen the impacts of disasters and enhance community resilience
2) Minimize the loss of life and injuries caused by disasters
3) Promote mitigation activities both prior to and following a disaster

5.2 MITIGATION PRACTICES

REQUIREMENT §201.6(c)(3)(ii):

[The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

REQUIREMENT §201.6(c)(3)(iii):

[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

In 2005, the Multi-Hazard Mitigation Council conducted a study about the benefits of hazard mitigation. This study examined grants over a 10-year period (1993-2003) aimed at reducing future damages from earthquakes, wind, and floods. It found that mitigation efforts were cost-effective at reducing future losses; resulted in significant benefits to society; and represented significant potential savings to the federal treasury in terms of reduced hazard-related expenditures. This study found that every $1 spent on mitigation efforts resulted in an average of $4 savings for the community. The study also found that FEMA mitigation grants are cost-effective since they often lead to additional non-federally-funded mitigation activities and have the greatest benefits in communities that have institutionalized hazard mitigation programs.

A more recent (2019) study by the National Institute of Building Sciences reviewed over 20 years of federally funded mitigation grants, not only from FEMA but also from the US Economic Development

Administration (EDA) and the US Department of Housing and Urban Development (HUD). From this broadened review, it has been determined that for every $1 spent on mitigation through federal grants, $6 is saved on disaster costs. In addition, it was determined that by adopting all the building codes put forth in the 2015 International Code, $11 can be saved for every $1 invested. Lastly, by designing and constructing buildings which exceed select items in the 2015 International Code, $4 can be saved for every $1 invested in those changes.

Six primary mitigation practices defined by FEMA are:

- **Emergency Services** – measures that protect people during and after a hazard
- **Natural Resource Protection** – opportunities to preserve and restore natural areas and their function to reduce the impact of hazards
- **Prevention** – measures that are designed to keep the problem from occurring or getting worse
- **Property Protection** – measures that are used to modify buildings subject to hazard damage rather than to keep the hazard away
- **Public Information** – those activities that advise property owners, potential property owners, and visitors about the hazards, ways to protect themselves and their property from the hazards
- **Structural Control** – physical measures used to prevent hazards from reaching a property

5.2.1 Existing Mitigation Practices

As part of this planning effort, committee members were provided a copy of the prior MHMP's mitigation actions. Team members reviewed those actions and were asked to consider any and all other mitigation actions based on the hazards discussed in the first meeting. At the second planning team meeting, the committee discussed the strengths and weaknesses of existing mitigation practices and made recommendations for improvements, as well as suggested new practices. The committee also examined practices employed by neighboring communities assessing the viability of those actions within Noble County. The following is a summary of existing hazard mitigation practices within Noble County. Mitigation measures that were included in the previous Noble County MHMP are noted as such. A list of the former mitigation actions included in the previous MHMP and their status may be found in **Appendix 11**.

Emergency Services

- The county has outdoor warning sirens which cover almost all areas where there are concentrations of people (cities, towns, and census designated places) and maintains them in operational condition. The sirens are operated on and are regularly assessed using a centralized system
- The county regularly reviews locations of existing outdoor warning sirens and prioritizes areas for new or updated sirens
- Two stream gages, maps, and alerts are utilized for flood monitoring, forecasting, and flood warnings for the various streams in the county
- Noble County, the cities of Kendallville and Ligonier, and the towns of Albion, Avilla, Rome City, and Wolcottville continue to participate in the NFIP
- Purchases of additional firefighting equipment have been made with grant money, allowing the county to reach its equipment goal
- Noble County has significantly progressed their goal of forming a Noble County mobile command center. The county received a trailer from Ft. Wayne and is continuing to develop the command center

- An emergency action plan (EAP) template has been created and is being used for large events within the county
- The Noble County Community Organizations Active in Disasters (COAD) helps to protect the public during and after an event and assists the EMA with recovery efforts
- Additional firefighting equipment has been purchased with grant funds to address the needs of multiple fire stations. The county will regularly purchase and update equipment in accordance with the NFPAs standards
- Noble County has received a trailer for a mobile command center and continues to develop the center
- The county has begun development of a damage assessment app to speed up damage assessments after events
- Noble County continues to encourage the development of approved safe rooms

Natural Resource Protection

- The city of Kendallville participates in the Tree City USA program to protect areas community trees, establish tree growth, and raise awareness of the importance of trees
- Noble county is a part of both the St. Joseph River Basin Commission and the Maumee River Basin Commission
- The county, the city, and the towns have IDEM WMPs that apply to their jurisdictions to assist in protecting their watersheds. The following WMPs apply to the county: Cedar Creek WMP 01-383, Elkhart River WMP 6-177, Little Elkhart WMP 4-142, Little Elkhart River WMP 7-182 Addendum, Lower Elkhart WMP 68996, and Tippecanoe River (Upper) WMP 3-757. A breakdown of which WMPs apply to which community can be seen in **Appendix 6**

Prevention

- Noble County has created additional GIS layers to better show floodplain inundation to protect the areas from additional development while allowing passive uses
- Noble County has developed a template for large event EAPs and continues to encourage the use of it
- The Noble County GIS Department has begun developing standards and protocols for countywide data layers
- Noble County continues to explore and implement fuel reserve/emergency provision contacts to fuel power back-up generators for use during and after events

Property Protection

- Noble County's floodplain ordinance establishes measures to protect homes within floodplains from flooding damages

Public Information

- The Noble County EMA has two portable electronic messaging boards which are used to provide information to the public on current hazard information
- Noble County participates in the NWS StormReady program to better prepare the community for extreme weather events
- Noble County's Floodplain Administrator regularly alerts property owners within dam inundation areas, such as the West Lakes, about potential hazards.

Structural Control

- Noble County's floodplain ordinance has established provisions to prevent critical facilities from being built within floodplains

5.2.2 Proposed Mitigation Practices

After reviewing existing mitigation practices, the committee reviewed mitigation ideas for each of the hazards studied and identified which of these they felt best met their needs as a community according to selected social, technical, administrative, political, and legal criteria. The following identifies the key considerations for each evaluation criteria:

- **Social** – mitigation projects will have community acceptance, they are compatible with present and future community values, and do not adversely affect one segment of the population
- **Technical** – mitigation projects will be technically feasible, reduce losses in the long-term, and will not create more problems than they solve
- **Administrative** – mitigation projects may require additional staff time, alternative sources of funding, and have some maintenance requirements
- **Political** – mitigation projects will have political and public support
- **Legal** – mitigation projects will be implemented through the laws, ordinances, and resolutions that are in place
- **Economic** – mitigation projects can be funded in current or upcoming budget cycles
- **Environmental** – mitigation projects may have negative consequences on environmental assets such as wetlands, threatened or endangered species, or other protected natural resources

Table 21 lists a summary of all proposed mitigation practices identified for all hazards, as well as information on the local status, local priority, benefit-cost ratio, project location, and responsible entities. Because of the large number of funding opportunities, a list of potential funding sources can be found in **Appendix 12**. The proposed mitigation practices were assigned a priority by the planning team. Projects identified to be of "high" local priority may be implemented within five years from final plan adoption. Projects identified to be of "moderate" local priority may be implemented within five-ten years from final plan adoption, and projects identified by the committee to be of "low" local priority may be implemented within 10+ years from final plan adoption. However, depending on availability of funding, some proposed mitigation projects may take longer to implement.

As part of the process to identify potential mitigation projects, the planning committee weighed the benefit derived from each mitigation practice against the estimated cost of that practice. This basic benefit-cost ratio was based on experience and professional judgement and was utilized to identify the mitigation practices as having a high, moderate, or low benefit-cost ratio. Preparing detailed benefit-cost ratios was beyond the scope of this planning effort and the intent of the MHMP.

The update of this MHMP is a necessary step of a multi-step process to implement programs, policies, and projects to mitigate the effect of hazards in Noble County. The intent of this planning effort was to identify the hazards and the extent to which they affect the county and to determine what type of mitigation strategies or practices may be undertaken to mitigate these hazards. A FEMA-approved MHMP is required to apply for and/or receive project grants under BRIC, HMGP, and FMA. Although this MHMP meets the requirements of DMA 2000 and eligibility requirements of these grant programs additional detailed studies may need to be completed prior to applying for these grants. **Chapter 6** of this plan includes an implementation plan for all high-priority mitigation practices identified by the committee.

The CRS program credits NFIP communities a maximum of 97 points for setting goals to reduce the impact of flooding and other known natural hazards (2 points); identifying mitigation projects that include activities for prevention, property protection, natural resource protection, emergency services, structural control projects, and public information (up to 95 points).

Table 21: Proposed Mitigation Measures

Mitigation Practice	Prior Plan or New	Mitigation Strategy	Hazard Addressed	Proposed Enhancements	Priority	Benefit-Cost Ratio	Responsible Entity
Emergency Preparedness and Warning							
1. Increase coordination between event planners and the event security program to develop EAPs for all large events	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☒ Public Information ☐ Structural Control	All Hazards	Educate large event planners about EAP templates and encourage submission	High	High to Moderate	EMA Large Events Leaders
2. Coordinate with private building owners utilizing large dynamic message boards to provide hazard relevant messaging	Prior		All Hazards	Develop a facility contact list and prepare scripted messages applicable for most hazard events	Low		EMA County 911 Message Board owners
3. Inventory assets and prioritize needs for additional firefighting equipment of each fire station or first response agencies	Prior		All Hazards	Maintain current purchasing and updating in accordance with the National Fire Protection Association's (NFPA) standards	Low		County, Township, and Town Fire Chiefs First Responder Agencies EMA
Emergency Response and Recovery							
1. Develop consistent methods and protocols, both locally and off-site, for the backup measures of county and municipal records to prevent cybersecurity issues	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☐ Property Protection ☒ Public Information ☐ Structural Control	All Hazards	a. Develop a Noble County cybersecurity response and recovery plan b. Conduct cybersecurity training for all personnel	High	High	EMA Noble County IT Personnel
2. Improve disaster preparedness and emergency response at the local level through the COAD program. Increase volunteers through trainings and exercises to educate and coordinate response efforts	Prior		All Hazards	Revise COAD program to increase activity	High		EMA COAD Personnel
3. Identify funding for and secure upgrades to portables and mobile radios for the Albion Police Department	New		All Hazards	Inventory current equipment and identify needed equipment	High		Albion Police Department Chief EMA
4. Gather supplies for the Rescue Task Force to carry out operations	New		All Hazards	Secure necessary supplies for an active shooter (IV bags, vests, helmets, etc.)	High		Noble County Police Department Chief EMA
5. Inventory and prioritize needs for mobile data terminal hardware or software in response vehicles and purchase and install as prioritized	Prior		All Hazards	Acquire mobile data terminals for Fire and Police Departments as needed	Moderate		Fire Department Chiefs Police Department Chiefs EMA

Mitigation Practice	Prior Plan or New	Mitigation Strategy	Hazard Addressed	Proposed Enhancements	Priority	Benefit-Cost Ratio	Responsible Entity
6. Improve recordkeeping to achieve accurate and community specific information following each hazard event including extent, magnitude, costs, response, and recovery efforts	Prior		All Hazards	Develop a damage assessment app to improve damage assessments within the county	Moderate		EMA GIS/IT
7. Explore funding sources to be able to use emergency alert system jointly and transition to Next Generation 911	New		All Hazards	Identify standard operating procedures for EMA and county 911 for use of Next Generation 911	Low		EMA County 911
Land Use & Zoning							
1. Incorporate hazard information into the Comprehensive Land Use Plan and development review to better guide future growth and development	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☐ Public Information ☒ Structural Control	All Hazards	a. Explore funding to update land use plans b. Explore funding for the creation of a county-wide Comprehensive Plan	High	Moderate	County Commissioners County Council EMA
Power Back-up Generators							
1. Inventory, prioritize, and retrofit public facilities and/or critical facilities with appropriate wiring and electrical capabilities for utilizing a large generator for power back up	Prior	☒ Emergency Services ☐ Natural Resource Protection ☒ Prevention ☒ Property Protection ☐ Public Information ☐ Structural Control	All Hazards	Inventory and prioritize critical facilities for retrofitting wiring and generator capabilities	Moderate	Moderate	EMA Critical and Essential Facility Leaders
2. Investigate the potential to utilize alternative (solar) generators where appropriate	Prior		All Hazards	Determine locations or demonstration sites for alternatively powered generators	Low		EMA
3. Designate a fuel reserve transportation route	Prior		All Hazards	Determine most direct route with access between each fuel source and generator within the community	Low		County Highway Department City Street Department EMA
Public Education & Outreach							
1. Educate community members about Hyper-Reach and encourage signups	New	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☒ Public Information ☐ Structural Control	All Hazards	Explore methods for promoting Hyper-Reach Signups	High	Moderate	EMA County 911

Mitigation Practice	Prior Plan or New	Mitigation Strategy	Hazard Addressed	Proposed Enhancements	Priority	Benefit-Cost Ratio	Responsible Entity
2. Provide multi-lingual hazard preparedness literature (outdoor warning sirens, radio stations, go-kits, insurance protection, etc.) during Severe Weather Awareness Week, at public facilities, public events, and to populations within known hazard areas such as floodplains, downstream of a dam, near hazmat facilities, etc. (2015 Measure)	Prior		All Hazards	a. Conduct outreach to reach vulnerable populations such as the Amish, Arabic-speaking populations, and Hispanic communities within Noble County b. Share outreach material with libraries, places of worship, and other cultural centers	Moderate		EMA Amish Community Leaders Arabic Community and Faith Leaders Hispanic Community Leaders
3. Acquire tent with QR code on it for community members to scan to access resources and emergency information during festivals and events	New		All Hazards	Create QR code posters for resource information	Moderate		EMA
4. Develop an education program on stream maintenance, responsibilities, and options for cleaning	New		Flood	Identify problem areas within the county and communities and focus education accordingly	Moderate		Noble County Floodplain Administrators EMA
5. Translate Hyper-Reach to Spanish for Hispanic community	New		All Hazards	Identify other resources and information to translate into Spanish	Low		EMA County 911
Safe Rooms and Community Shelters							
1. Assess current agreements and develop any needed shelter agreements within the county/ Potential for tiered levels of shelters, domestic animal shelters, etc., especially in small communities	Prior	☒ Emergency Services ☐ Natural Resource Protection ☐ Prevention ☐ Property Protection ☒ Public Information ☒ Structural Control	All Hazards	a. Determine if additional shelter locations or services are needed b. Coordinate with American Red Cross (ARC)	High	Moderate	EMA ARC
2. Collaborate with facility owners to develop safe rooms/shelters in each mobile-home park	Prior		All Hazards	Explore having mobile-home park owners distribute safe room/shelter locations to residents (Consider adding to regular billing information)	High		EMA Mobile-Home Park Owners
3. Develop a centralized resource showing the locations of shelter within the county and encourage shelter owners to update information when necessary	New		All Hazards	Consider using Common Grace to host shelter information	High		Safe room/Shelter Owners EMA
4. Develop a domestic animal friendly evacuation plan and domestic animal friendly shelter	Prior		All Hazards	Develop plans and shelters for humans and domestic animals	Moderate		EMA
5. Clearly advertise location of safe areas and community shelters for large gatherings of people (sporting events, 4H fair, etc.)	Prior		All Hazards	Include shelter Information in pre-event emergency plans	Low		EMA
6. Use Hyper-Reach for emergency information	New		All Hazards	Prepare emergency messages for use when an event occurs	Low		EMA County 911

Mitigation Practice	Prior Plan or New	Mitigation Strategy	Hazard Addressed	Proposed Enhancements	Priority	Benefit-Cost Ratio	Responsible Entity
Building Protection							
1. Install additional dry hydrants in rural areas throughout the county	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☐ Public Information ☒ Structural Control	Fires and Wildfire	Consider installing dry hydrants at the Chain O' Lakes State Park as park staff expressed a need for hydrants	High	Moderate	County, Township, and Town Fire Chiefs EMA
2. Evaluate each fire department for their status relevant to the cumulative firefighting and building fund	Prior		All Hazards	Identify alternative funding sources to keep budgets consistent after recent legislative changes	High		County, Township, and Town Fire Chiefs EMA
3. Prohibit construction of critical facilities in known hazard areas (downstream of dams and floodplains) (2015 measure)	Prior		Flood, Dam Failure	Encourage future development away from special flood hazard areas, dam inundation areas, and fluvial erosion hazard areas	Moderate		Noble County Floodplain Administrators EMA
CRS							
1. Reduce flood insurance premiums in Noble County through participation in the NFIP's CRS program	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☒ Public Information ☐ Structural Control	Flood	Explore participation from the cities of Kendallville and Ligonier in the NFIP CRS program through the tracking and reporting of necessary documents	Moderate	High	Noble County Floodplain Administrator Kendallville and Ligonier Floodplain Administrators EMA
Floodplain Management							
1. Consider and explore methods to maintain streams within the county	New	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☒ Public Information ☒ Structural Control	Flood	Identify priority streams and regulated drains within the county	High	High to Moderate	Noble County Floodplain Administrators Noble County Surveyor EMA
2. Submit a petition to develop a West Lakes Conservancy District to address flooding	Prior		Flood	Complete necessary requirements and submit a petition to establish the conservancy district	Moderate		West Lakes Association EMA
3. Complete a Noble County Flood Mitigation Plan to set long-term strategies to mitigate flood impact county-wide	Prior		Flood	a. Mitigate flooding issues by implementing stream maintenance plans throughout the county b. Create maintenance plans	Moderate		Noble County Floodplain Administrators Noble County Surveyor EMA
4. Study the floodplain levels for West Lakes	New		Flood	Identify areas on and around West Lakes for potential buyouts/retrofitting to reduce flooding	Moderate		West Lakes Floodplain Administrator EMA

Mitigation Practice	Prior Plan or New	Mitigation Strategy	Hazard Addressed	Proposed Enhancements	Priority	Benefit-Cost Ratio	Responsible Entity
5. Protect existing critical facilities in floodplain	Prior		Flood	a. Verify that no critical facilities are within the 1% AEP flood zone b. For facilities within the 0.2% AEP flood zone ensure they have the necessary level of protection to protect them	Low		Noble County Floodplain Administrators Noble County, City, and Town Building Departments EMA
6. Institute a voluntary retrofit and/or buyout plan for structures subject to repetitive flooding utilizing the MRBC Voluntary Buyout Cost-Share Assistance Program	Prior		Flood	Consider additional acquisitions when the need arises	Low		Noble County Floodplain Administrators EMA
7. Complete flood depth mapping (RiskMAP) to better understand flood risk potential	New		Flood	a. Prioritize flood risk areas and secure funding to complete flood depth mapping to better understand floor potential b. Prioritize Big Lake, Knapp Lake, Skinner Lake, Small Lake, and West Lakes	Low		Noble County Floodplain Administrators Noble County Commissioners City and Town Councils EMA
GIS							
1. Make GIS maps available to all communities and migrate to ArcGIS Enterprise	New	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☒ Public Information ☐ Structural Control	All Hazards	Identify communities that do not have access to county GIS maps	High	Moderate	Noble County GIS EMA
2. Create a layer of Tier II sites and other critical facilities to be available on mobile terminals, phones, and other devices	Prior		All Hazards	Integrate readily available federal and state information into county GIS for Fire Department and Law Enforcement usage	Low		Noble County GIS EMA
3. Training GIS staff in HAZUS-MH to quantitively estimate losses in "what-if" scenarios	Prior		Earthquake, Flood	Provide training and use HAZUS in planning efforts	Low		Noble County GIS EMA
4. Explore 3D Indoor mapping of public buildings using Light Detection and Ranging (LIDAR)	New		All Hazards	Prioritize public buildings for mapping	Low		Noble County GIS EMA
Management of Dams							
1. Encourage owners of Marvin Morgan Dam (High Hazard) to develop an IEAP with inundation mapping	Prior	☒ Emergency Services ☒ Natural Resource Protection ☒ Prevention ☒ Property Protection ☐ Public Information ☒ Structural Control	Flood, Dam Failure	a. Encourage and assist owners in completing an IEAP and continuously implementing and exercising b. Encourage development of an Emergency Response Plan for the downstream school	High	High	EMA Marvin Morgan Dam owners

CHAPTER 6: IMPLEMENTATION PLAN

The following is a proposed plan for implementing all high priority mitigation practices identified in this plan. It should be noted that implementation of each of these proposed practices may involve several preparatory or intermediary steps. However, to maintain clarity, not all preparatory or intermediary steps are included.

6.1 BUILDING PROTECTION

Install additional dry hydrants in rural areas throughout the county. Consider installing dry hydrants at the Chain O' Lakes State Park as park staff expressed a need for hydrants.

- Identify areas of the county that would benefit from the addition of dry hydrants and rank based on need
- Explore possible funding sources for purchase and installation
- Work with nearby community members for regular maintenance

Evaluate each fire department for their status relevant to the cumulative firefighting and building fund. Identify alternative funding sources to keep budgets consistent after recent legislative changes.

- Identify methods to evaluate fire departments
- Carry out evaluation of individual fire departments
- Implement changes to lower costs at fire departments that utilize higher portions of the budget

6.2 EMERGENCY PREPAREDNESS AND WARNING

Increase coordination between event planners and the event security program to develop EAPs for all large events. Educate large event planners about EAP templates and encourage submission.

- Reach out to large event planners early in the planning process
- Explain the benefits of creating an EAP
- Work with the event planner to create an EAP and be available to assist during a worst-case scenario

6.3 EMERGENCY RESPONSE AND RECOVERY

Develop consistent methods and protocols, both locally and off-site, for the backup measures of county and municipal records to prevent cybersecurity issues. Develop a Noble County cybersecurity response and recovery plan. Conduct cybersecurity training for all personnel.

- Develop a plan for managing county and municipal records, outlining specific limits for local and off-site handling of records accounting for possible cybersecurity concerns
- Hold training for any personnel managing county and/or municipal records
- Update methods and protocols regularly to ensure up to date information about potential risks

Improve disaster preparedness and emergency response at the local level through the COAD program. Increase volunteers through trainings and exercises to educate and coordinate response efforts. Revise COAD program to increase activity.

- Identify potential weaknesses in the current COAD program that may be causing low volunteer numbers
- Implement changes to increase volunteer participation in the program
- Develop trainings and/or exercises to increase the effectiveness of the COAD program

Identify funding for and secure upgrades to portables and mobile radios for the Albion Police Department. Inventory current equipment and identify needed equipment.

- Identify capacity limitations such as electrical supply, potential heat generation, controlled environment needs, etc. to identify the upper bounds on the number of units
- Identify any special needs for the MDTs, identify costs per unit and any installation costs, setup costs, etc. Create an anticipated budget for the project and potential funding sources
- Based on funding availability, procure and install units. The procurement may need to be phased depending on funding sources and timing

Gather supplies for the Rescue Task Force to carry out operations. Secure necessary supplies for an active shooter (IV bags, vests, helmets, etc.).

- Complete a comprehensive list of resources necessary to carry out operations including the item, quantity, cost, and frequency of replacement
- Explore programs that supply rural counties with supplies for reduced or no cost
- Identify potential funding sources for initial purchases of equipment and for regular purchases for additional supplies

6.4 FLOODPLAIN MANAGEMENT

Consider and explore methods to maintain streams within the county. Identify priority streams within the county.

- Explore legal drain status within the county and make changes as necessary
- Inform homeowners of their responsibilities to clean up the streams on their property
- Consider the creation of a plan to clear/maintain streams after events

6.5 GIS

Make GIS maps available to all communities and migrate to ArcGIS Enterprise. Identify communities that do not have access to county GIS maps.

- Identify methods for making GIS maps available to all communities
- Consider potential challenges that may occur as the GIS department migrates to ArcGIS Enterprise
- Regularly communicate with communities and share GIS maps as needed

6.6 LAND USE AND ZONING

Incorporate hazard information into the Comprehensive Land Use Plan and development review to better guide future growth and development. Explore funding to update land use plans. Explore funding for the creation of a county-wide Comprehensive Plan.

- Identify methods of incorporating hazard information into the Comprehensive Land Use Plan
- Select specific hazards to address and what impact they would have on land use
- Enact new Comprehensive Land Use Plan with hazard information

6.7 MANAGEMENT OF HIGH HAZARD DAMS

Encourage owners of Marvin Morgan Dam (High Hazard) to develop an IEAP with inundation mapping. Encourage and assist owners in completing an IEAP and continuously implementing and exercising. Encourage development of an Emergency Response Plan for the downstream school.

- Contact dam owner(s) of the Marvin Morgan Dam and inform them of the hazard classification for the dam and the potential liability if failure were to occur
- Suggest the development of an IEAP to inform the owner what to do in the event of a dam failure
- Work with owner(s) to develop IEAP with inundation mapping to show potential risks to specific properties

6.8 PUBLIC EDUCATION AND OUTREACH

Educate community members about and encourage signups. Explore methods for promoting Hyper-Reach Signups.

- Develop informational handouts to educate community members about Hyper-Reach and how the county will be using it during emergencies
- Encourage signups for events by making information available at the event
- Encourage community signups through information in high traffic areas and public spaces

6.9 SAFE ROOMS AND SHELTERS

Assess current agreements and develop any needed shelter agreements within the county/ Potential for tiered levels of shelters, domestic animal shelters, etc., especially in small communities. Determine if additional shelter locations or services are needed. Coordinate with ARC.

- Evaluate current shelter locations and capacity to determine limitations of current shelters.
- Within small communities, work with local leaders and business owners to identify potential shelters
- After an event requiring sheltering, determine if any areas of the county lacked adequate shelters

Collaborate with facility owners to develop safe rooms/shelters in each mobile-home park. Explore having mobile-home park owners distribute safe room/shelter locations to residents (Consider adding to regular billing information).

- Identify mobile-home parks without safe rooms and their owner
- Encourage mobile home-park owners to build safe rooms
- Assist owners in identifying potential funding sources for safe rooms

Develop a centralized resource showing the locations of shelter within the county and encourage shelter owners to update information when necessary. Consider using Common Grace to host shelter information.

- Create a comprehensive list of shelters within the county and add them to either the county website, Common Grace's website, or both
- Contact shelter owners and ask them to update their own shelter information when there is a change in hours, type of shelter, or other pertinent information
- Occasionally verify that shelter information is still up to date

CHAPTER 7: PLAN MAINTENANCE PROCESS

7.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

REQUIREMENT §201.6(c)(4)(i):

[The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

To effectively reduce social, physical, and economic losses in Noble County, it is important that implementation of this MHMP be monitored, evaluated, and updated. The EMA Director is ultimately responsible for the MHMP. As illustrated in Section 5.2 Mitigation Practices, this plan contains mitigation program, projects, and policies from multiple departments within each incorporated community. Depending on grant opportunities and fiscal resources, mitigation practices may be implemented independently, by individual communities, or through local partnerships. Therefore, the successful implementation of this MHMP will require the participation and cooperation of the entire committee to successfully monitor, evaluate, and update the Noble County MHMP.

The EMA Director will reconvene with the MHMP committee on an annual basis and following a significant hazard incident. The team will examine each mitigation action within the plan to evaluate its effectiveness by answering the following questions:

- Has the nature, magnitude, and/or type of risk changed? If so, what new mitigation actions are needed to address this change?
- Are the current resources appropriate for implementation? If not, what additional resources are needed to address the shortfall?
- Are there implementation problems, such as technical, political, legal, or coordination issues with other agencies? How can these issues be addressed?
- Have the outcomes occurred as expected? If not, is something else needed to achieve the desired outcome?
- Have the agencies and other partners participated as originally proposed? If not, determine why and how the action outcomes can be met.

During the annual meetings, the Implementation Checklist provided in **Appendix 13** will be helpful to track any progress, successes, and problems experienced. This will also be a tool to follow up on the progress made and effectiveness of the planned actions.

The data used to prepare this MHMP was based on "best available data" or data that was readily available during the development of this plan. Because of this, there are limitations to the data. As more accurate data becomes available, updates should be made to the list of essential facilities and infrastructure, the risk assessment, and vulnerability analysis.

DMA 2000 requires local jurisdictions to update and resubmit their MHMP within five years (from the date of FEMA approval) to continue to be eligible for mitigation project grant funding. In Noble County, the EMA Director will once again reconvene the MHMP committee for a series of meetings designed to replicate the original planning process. Information gathered following individual hazard incidents and annual meetings will be utilized along with updated vulnerability assessments to assess the risks associated with each hazard common in Noble County. These hazards, and associated mitigation goals and practices will be prioritized and detailed as in **Chapter 4** this MHMP. **Chapter 5** and **Chapter 6** will be updated to reflect any practices implemented within the interim as well as any additional practices

discussed by the committee during the update process. The plan update process will incorporate new planning guidance and best practices as planning requirements are updated.

Prior to submission of the updated MHMP, a public meeting, such as the county commissioners meeting, a representative of the planning team will present information about the plan to residents of Noble County and will provide them with an opportunity for review and comment of the draft MHMP. A media release will be issued providing information related to the update, the planning process, and details of the public invitation to review and comment on the plan update.

7.2 INCORPORATION INTO EXISTING PLANNING MECHANISMS

REQUIREMENT §201.6(c)(4)(ii):

[The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as the comprehensive or capital improvements, when appropriate.

Over the past 5 years the county and its communities have developed other planning mechanisms such as comprehensive plans. Noble County's Noble Tomorrow Plan, Kendallville's Comprehensive Plan, and Ligonier's Ligonier Tomorrow Plan were all considered when developing this plan. The goals of these plans included smart development to prevent floods and mitigate their severity, to join the NFIP CRS to reduce both flooding risks and costs, and to maintain and encourage natural drainage. This plan aims to mitigate all potential hazards and in turn, create a resilient community which can help protect the county and its communities and accomplish their goals.

The goals of these plans included strategic economic growth, transportation issues, and stormwater management issues. This plan aims to mitigate all potential hazards and in turn create a resilient community which can help protect the county in regard to their goals.

Many of the mitigation practices identified as part of this planning process are ongoing with some enhancement needed. Where needed, modifications will be proposed for each NFIP communities' planning documents and ordinances during the regularly scheduled update including comprehensive plans, floodplain management plans, zoning ordinances, site development regulations, and permits. Modifications include discussions related to hazardous material facility buffers, floodplain areas, and discouraging development of new essential facilities and infrastructure in known hazard areas.

The MHMP will be used to update stormwater, subdivision and zoning ordinances based upon recommendations from the plan. For example, information in this plan provides documentation to encourage local officials to make changes to reduce release rates, protect floodplains, provide no net loss in SFHA areas, and manage erosion and sediment control. These measures would help mitigate flooding. Recommendations within this plan could initiate new ordinances or studies, such as flood studies, flood response studies, and watershed management studies to protect against floods. The information included in this plan can be helpful in preparing comprehensive plans, transportation plans, and emergency plans to mitigate hazard material impacts and response to hazards such as tornados. These plans also illustrate the importance of planning on the unserved populations and how to develop mitigation efforts that include them in future plans.

In Noble County this is a similarly timed process. As the county embarks upon its ordinance updates, information is shared with the cities and towns, and the incorporated communities. Each community then evaluates the materials provided by the county and will seek adoption or incorporation on a similar schedule. This process has worked well in the past and is the anticipated method of future incorporation of materials into plan and ordinance updates. In a similar fashion the updating of comprehensive community plan, park plans, etc. will be able to incorporate at risk population information as well as

mitigation action opportunities. **Table 22** is an example of the process the communities use to incorporate planning elements into other community plans and ordinances.

Table 22: MHMP Incorporation Process

Step	Description of Process Action
1	Adopt MHMP at commissioner meeting, city council meeting, or town board meeting
2	Identify document update cycles for each of the following:
	a) Comprehensive Plan b) Capital Improvement Plan c) Zoning Ordinances d) Floodplain Ordinance e) Stormwater Plans f) Other plans not listed above
3	Present applicable data to the planning team and team leads for inclusion
4	Highlight applicable mitigation actions to be included in the plan
5	Assist with incorporation and adoption of the plans, as needed.

7.3 CONTINUED PUBLIC INVOLVEMENT

REQUIREMENT §201.6(c)(4)(iii):

[The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

Continued public involvement is critical to the successful implementation of the Noble County MHMP. Comments gathered from the public on the MHMP will be received by the EMA Director and forwarded to the MHMP committee for discussion. Education efforts for hazard mitigation will be the focus of the annual Severe Weather Awareness Week as well as incorporated into existing stormwater planning, land use planning, and special projects/studies efforts. Once adopted, a copy of this plan will be available for the public to review in the EMA Office and the Noble County website. Periodic reminder notices will be placed on social media to continue to solicit feedback and input on changes for the future plans.

Updates or modifications to the Noble County MHMP require public notice, reconvening the planning committee in accordance with FEMA local mitigation planning guidance and meeting with the incorporated community leaders prior to submitting revisions to the individual jurisdictions for approval and re-adoption.

The CRS program credits NFIP communities a maximum of 28 points for adopting the plan (2 points); establishing a procedure for implementation, review, and updating the plan; and submitting an annual evaluation report (up to 26 points).

REFERENCES

ASFPM Certified Floodplain Manager Program Information. (n.d.). Retrieved 2019, from Association of State Floodplain Managers: http://www.floods.org

Associated Press. (2021, April 5). *Wildfire burns more than 300 acres at Indiana dunes*. WFYI Indianapolis. https://www.wfyi.org/news/articles/wildfire-burns-more-than-300-acres-at-indiana-dunes

Department of Homeland Security. (2022). *National Risk Index for Natural Hazards*. Retrieved from Federal Emergency Management Agency: https://www.fema.gov/flood-maps/products-tools/national-risk-index

Department of Homeland Security. (n.d.). *Hazard Mitigation Assistance*. Retrieved 2023, from Federal Emergency Management Agency: www.fema.gov/hazard-mitigation-assistance

Department of Homeland Security. (n.d.). *Hazard Mitigation Planning*. Retrieved 2023, from Federal Emergency Management Agency: www.fema.gov/hazard-mitigation-planning

Department of Homeland Security. (n.d.). HAZUS-MH (v1.3). Federal Emergency Management Agency.

Department of Homeland Security. (n.d.). *National Flood Insurance Program Community Rating System*. Retrieved 2024, from Federal Emergency Management Agency: www.fema.gov/national-flood-insurance-program-community-rating-system

EvoGov. (n.d.). *Home*. Welcome to the Official Website for the City of Kendallville, Indiana - home. https://www.kendallvillein.gov/

Federal Emergency Management Agency (FEMA), Local Mitigation Planning Policy Guide, FP 206-21-0002, Released April 19, 2022, Effective April 19, 2023, OMB Collection #1660-0062, Retrieved from https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf

Federal Emergency Management Agency (FEMA), Natural Mitigation Saves Interim Report Fact Sheet, June 2018

Federal Emergency Management Agency (FEMA), NFIP Community Status Book, https://www.fema.gov/cis/IN.csv, accessed 12/12/23

Fires Roar Across Central Indiana. (2010, September 23). *www.upi.com*.

Geological Survey. (n.d.). *Earthquakes in Indiana*. Retrieved 2014, from Indiana Geological Survey: https://igws.indiana.edu/earthquakes/

Hansen, M. C. (2005). Educational Leaflet No. 9. *Earthquakes in Ohio* . Ohio Department of Natural Resources, Division of Geological Survey.

Hogan, J. (2021, June 19). *Gallery: Bloomington floods*. The Bloomingtonian. https://bloomingtonian.com/2021/06/19/gallery-bloomington-floods/

Home. Town of Avilla Indiana | Our Home Is Yours. (2025, May 29). https://avillaindiana.com/

Hoosiers By the Numbers, Major Employers for Noble County, https://www.hoosierdata.in.gov/nav.asp?id=197 , accessed 5/31/25

IN.gov. (2024, December 3). *Home*. Town of Rome City. https://www.in.gov/towns/townofromecity/

IN.gov. (2024, December 4). *Home*. Wolcottville. https://www.in.gov/towns/wolcottville/

IN.gov. (2024, November 15). *Home*. Noble County. https://www.in.gov/counties/noble/

IN.gov. (2024, November 6). *Home*. Ligonier. https://www.in.gov/cities/ligonier/

IN.gov. (2024, November 8). *Home*. Cromwell. https://www.in.gov/towns/cromwell/

Indiana Department of Environmental Management. (2022). Integrated Water Monitoring and Assessment Report. *303(d) List of Impaired Waters*. Retrieved from Nonpoint Source Water Pollution. https://www.in.gov/idem/nps/watershed-assessment/water-quality-assessments-and-reporting/section-303d-list-of-impaired-waters/

Indiana Department of Homeland Security. (n.d.). *Mitigation & Recovery*. Retrieved 2023, from Indiana Department of Homeland Security: https://www.in.gov/dhs/emergency-management-and-preparedness/mitigation-and-recovery/

Indiana Department of Natural Resources (2024), Indiana Floodplain Information Portal, Retrieved from https://secure.in.gov/dnr/water/surface-water/indiana-floodplain-mapping/indiana-floodplain-information-portal/

Indiana Department of Natural Resources, Fluvial Erosion Hazards Map, https://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=43e7b307a0184c7c851b5068941e2e23 , accessed 12/21/23

Indiana Department of Natural Resources. (2023). Dam Inspections and records. *Noble County, Indiana*, Retrieved from https://dowunity.dnr.in.gov/#/Community

Indiana Department of Natural Resources. (2024). Flood Insurance Information. *Noble County*, Retrieved from https://dowunity.dnr.in.gov/#/Community

Indiana Department of Transporatation (2022) Road and Railroad Maps – INDOT , retrieved 2025, from https://www.in.gov/indot/files/RailSystemMap_Med_StWide_11x17_RH_Final.pdfIndiana

Indiana Geological and Water Survey, Map of Indiana showing Known Faults and Historic Earthquake Epicenters having Magnitude 3.0 and Larger,Retrieved 2022, from https://igws.indiana.edu/bookstore/details.cfm?Pub_Num=MM84

Indiana University. (2022). *IndianaMap*. Retrieved from Indiana Geological & Water Survey: https://www.indianamap.org/

Indiana University. (n.d.). *Indiana Earthquakes*. Retrieved from Indiana Geological & Water Survey: https://igws.indiana.edu/earthquakes/recent

Insurance Institute for Business & Home Safety. (n.d.). Retrieved from Insurance Institute for Business & Home Safety: www.disastersafety.org

Mack, J. (2015, May 5). *Michigan Earthquake: "Big Deal" for a Couple of Reasons, US Geological Survey Scientist says.* Retrieved 2016, from www.mlive.com:

http://www.mlive.com/news/kalamazoo/index.ssf/2015/05/feds_on_michigan_earthquake_un.html#incart_river_index_topics

Maddox, O. (2021, June 14). *More crops affected as drought spreads throughout Indiana*. Purdue University. https://www.purdue.edu/newsroom/archive/releases/2012/Q2/more-crops-affected-as-drought-spreads-throughout-indiana.html

Midwest Regional Climate Center. (2024). *Midwest Climate: Climate Summaries*. Retrieved 2024, from Midwest Regional Climate Center: https://mrcc.purdue.edu/mw_climate/climateSummaries/climSumm.jsp

Myall, J. (2022, December 15). *Heating and housing relief package can't wait until January.* Maine Center for Economic Policy. https://www.mecep.org/blog/heating-and-housing-relief-package-cant-wait-until-january/

National Drought Mitigation Center. (n.d.). *US Drought Monitor*. Retrieved 2024, from https://droughtmonitor.unl.edu/

National Land Cover Database (2019). Retrieved 2024, from Multi-Resolution Land Characteristics Consortium: https://www.mrlc.gov/viewer/

National Oceanic and Atmospheric Administration. (n.d.). *Safety*. Retrieved from National Weather Service: https://www.weather.gov/safety/

National Oceanic and Atmospheric Administration. (n.d.). *Storm Events Database*. Retrieved 11/1/24, from National Centers for Environmental Information: https://www.ncdc.noaa.gov/stormevents/

National Weather Service Indianapolis , Heat Information Page, https://www.weather.gov/ind/heatinfo, accessed 12/14/23

National Weather Service, Flood gages and crests, https://water.noaa.gov/, accessed 11/1/24

NFIP Flood Insurance Data and Analytics. Retrieved August 2024 from:*https://nfipservices.floodsmart.gov/reports-flood-insurance-data*

No Adverse Impact. (n.d.). Retrieved 2022, from Assocation of State Floodplain Managers: https://www.floods.org/resource-center/nai-no-adverse-impact-floodplain-management/

Peng, Jin; 2018, Morphological Filters In Floodplain For Demextracted Data – Using Minimum Bounding Circle & Youden Index – Non-levee embankment description

Phases of disaster management - Community Emergency Response Guide | Emergency Management (fairfaxcounty.gov) https://www.fairfaxcounty.gov/emergencymanagement/cerg accessed 2/9/24

Phillips, A., Barboza, T., Vives, R., & Greene, S. (2021, October 7). *Heat waves are far deadlier than we think. how California neglects this climate threat*. Los Angeles Times. https://www.latimes.com/projects/california-extreme-heat-deaths-show-climate-change-risks/

Pinchok, M. (2021, January 3). *Downed power lines and fallen tree causes roadway closure and power outages in Pomeroy*. https://www.wsaz.com. https://www.wsaz.com/2021/01/03/downed-power-lines-and-fallen-tree-closes-roadway-in-pomeroy/

Public Law 106-390. (2000, October 30). *Disaster Mitigation Act of 2000*.

Purdue Climate Change Research Center, Purdue University. (2021). Retrieved from Indiana Climate Change Impacts Assessment: https://ag.purdue.edu/indianaclimate/

Purdue University. (2013, March 12). Indiana Crop Insurance Payouts Top $1 Billion . *Purdue Agricultural News*.

Revize. (n.d.). *Albion Indiana*. Town of Albion. https://www.albion-in.org/

STATS Indiana. (2024). Indiana IN Depth. *Noble County*. Retrieved from http://www.stats.indiana.edu/profiles/

The Guardian, Canadian Wildfires 2023, https://www.theguardian.com/world/2023/nov/09/canada-wildfire-record-climate-crisis, last accessed 12/14/23

Topographic -map.com, Topographic map of Noble County, https://en-us.topographic-map.com/map-mz4pz4/Ohio-County/ accessed 10/13/24

United States Department of Agriculture, Crop Loss Data, https://www.rma.usda.gov/-/media/RMA/State-Profiles/2022/Indiana-2022-State-Profile-Form_updated-1-10-23_PDF.ashx?la=en, accessed 12/14/23

United States Department of Agriculture, Soil Conservation Service. (n.d.). *Soil Survey of Noble County, Indiana*.

United States Department of Agriculture. (n.d.). *Indiana Field Office County Estimates*. Retrieved 2024, from National Agriculture Statistical Service: https://www.nass.usda.gov/Statistics_by_State/Indiana/Publications/County_Estimates/index.php

US Army Corps of Engineers. (2024). *Dams of Noble County, Indiana*. Retrieved from National Inventory of Dams: https://nid.sec.usace.army.mil/#/

U.S. Department of the Interior. (2022, April 27). *Karst landscapes*. National Parks Service. https://www.nps.gov/subjects/caves/karst-landscapes.htm#:~:text=Karst%20is%20a%20type%20of,limestone%2C%20marble%2C%20and%20gypsum.

US Drought Monitor – Retrieved 2024, from https://www.drought.gov/states/indiana/county/Noble

US Geological Survey Water Watch (nd) Retrieved from https://waterwatch.usgs.gov/m=real&r=in.

US Geological Survey, Seismic hazards map, https://www.usgs.gov/media/images/2014-seismic-hazard-map-indiana, accessed 12/14/23.