2019 Multi-Hazard Mitigation Plan

LaGrange County

W. Don Wismer, Director
LaGrange County EMA
County Office Bldg.
114 West Michigan Street
LaGrange, IN 46761

The Polis Center
1200 Waterway Boulevard
Suite 100
Indianapolis, IN 46202
317-274-2455

Table of Contents

List of Figures

List of Tables

Chapter 1 – Overview

Introduction

The LaGrange County Multi-Hazard Mitigation Plan (MHMP) serves as a guide for the county's assessment of hazards, vulnerabilities, and risks and actively incorporates the participation of a wide range of stakeholders and the public in the planning process. This plan aids the county and towns in preventing, protecting against, responding to, and recovering from disasters that may threaten the community's economic, social, and environmental well-being. This plan documents historical disasters, assesses probabilistic disasters through Hazus-MH and Geographic Information Systems (GIS) analyses, and addresses specific strategies to mitigate the potential impacts of these disasters.

The LaGrange County Emergency planning team and The Polis Center at Indiana University-Purdue University Indianapolis (IUPUI) originally developed the LaGrange County MHMP in 2011. The MHMP is not a static document but must be modified to reflect shifting conditions. This 2019 MHMP update represents a collaborative effort to ensure that the planning document accurately reflects changes within the community and addresses each jurisdiction's unique needs.

Disaster Mitigation Act of 2000

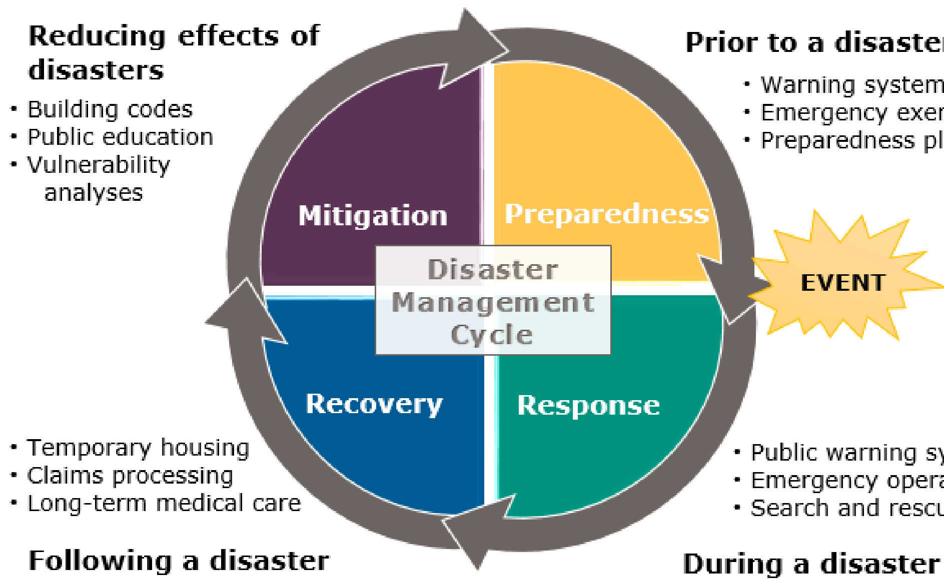
With the development of the federal Disaster Mitigation Act of 2000, FEMA requires counties to have an MHMP in order to be eligible for Hazard Mitigation Grant Program (HMGP) funds. All jurisdictions must have in place a multi-hazard mitigation plan and update the plan within a five-year time span. This plan update addresses changes in development, progress in local mitigation efforts, and alterations in priorities. This plan update will remain effective for 5 years from the date of community adoption.

The procedures outlined in the plan are based upon guidance provided by FEMA and are consistent with the requirements and procedures defined in the Disaster Mitigation Act of 2000. The analysis includes three components: 1) profile and analysis of hazard events, 2) inventory of vulnerability assessment of community assets, and 3) development of hazard mitigation strategies.

Hazard Mitigation

Hazards are events that are potentially dangerous or harmful and are often the root causes of unwanted outcomes. Both natural and human-caused hazards threaten loss of life and property in the county and are included in the plan. As Figure 1 shows, hazard mitigation is a part of the disaster management cycle and is defined as any action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards.

Figure 1. An Integrated Planning Process



Hazard mitigation planning and the subsequent implementation of the projects, measures, and policies developed as part of this plan are the primary mechanisms in achieving FEMA's goal of reducing hazards. Local governments have the responsibility to protect the health, safety, and welfare of their citizens. This plan recognizes the importance of mitigation for the following goals:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Prevent damage to a community's unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other community objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Developing and putting into place long-term strategies that reduce or alleviate loss of life, injuries, and property resulting from natural or human-caused hazards accomplish these goals. These long-term strategies must incorporate a range of community resources including planning, policies, programs, and other activities that can make a community more resistant to disaster.

Chapter 2 – Public Planning Process

Planning Team

The LaGrange County MHMP planning team is composed of individuals representing the county and its participating jurisdictions. The LaGrange County Emergency Management Agency acted as the designated responsible entity and coordinated the development of the planning team. Each community jurisdiction was encouraged to engage in the planning process, and invitations were sent via email to a wide range of community leaders and involved stakeholders. Some of the invited stakeholders for LaGrange County were: County Attorney's Office, LaGrange County Council, LaGrange County Commissioners, Parkview Hospital, Red Cross, local Amish leaders, Area Utility Companies, and The National Weather Service. Invited stakeholders were encouraged to attend meetings, answer surveys, and ultimately review the plan. In order to complete the 10-step process outlined by FEMA in the *Local Mitigation Planning Handbook*, the planning team participated in a series of surveys and meetings, which are documented in the Appendices. The participation status of each incorporated jurisdiction is summarized in Table 1.

Table 1. LaGrange County Incorporated Jurisdictions Participation

Jurisdiction Name	Jurisdiction Type	2011 participant	Received Invitation to Participate	2018/2019 participant
LaGrange County	County	Yes	Yes	Yes
LaGrange	Town	Yes	Yes	Yes
Shipshewana	Town	Yes	Yes	Yes
Topeka	Town	Yes	Yes	Yes
Wolcottville	Town	Yes	Yes	Yes
Lakeland School Corporation	School	No	Yes	Yes
Westview School Corporation	School	No	Yes	Yes

Each chapter of the MHMP was reviewed, revised, and expanded using current information and includes new feedback from taskforce members with an emphasis on updating the goals, objectives, and strategies. The mitigation planning requirements identified in 44 CFR 201.6 call for all incorporated jurisdictions participating in a multi-jurisdictional MHMP to take part in the planning process. Examples of participation include, but are not limited to, attending planning meetings, contributing research, data or other information related to hazards and strategies, and commenting on drafts of the plan. The hazard mitigation planning team members are summarized in Table 2.

Table 2. Hazard Mitigation Planning Team

Name	Title	Organization	Jurisdiction
W. Don Wismer	Director	EMA	LaGrange County
Mark Eagleson	Town Manager	Town of LaGrange	Town of LaGrange
Bob Shanahan	Town Manager	Town of Shipshewana	Town of Shipshewana
Stewart Bender	Town Manager	Town of Topeka	Town of Topeka
Jason Boggs	Town Council President	Town of Wolcottville	Town of Wolcottville
Eva Merkel	Superintendent	Lakeland School Corporation	Lakeland Schools
Brian Bills	Director of Transportation, Buildings & Grounds	Westview School Corporation	Westview Schools

All members of the planning committee were actively involved in attending meetings, providing available GIS data and historical hazard information, reviewing and providing comments on the draft plans, assisting in the public input process, and coordinating the county's formal adoption of the plan. Appendix A includes the sign-in sheets listing which meetings each team member attended and any meeting minutes provided by the county.

County	EMA Name	Participation
Elkhart	Jennifer Tobey	No
Steuben	Randy Brown	Attended Meeting
DeKalb	Roger Powers	Attended Meeting
Noble	Michael T. Newton	No

Review of Existing Plans

LaGrange County and the local communities utilize land use plans, emergency response plans, municipal ordinances, and building codes to direct community development. The planning process incorporated the existing natural hazard mitigation elements from these previous planning efforts. Table 3 lists the plans and studies used in the development of the plan. Additional information related to jurisdiction capabilities is discussed in Chapter 5.

Table 3. Planning Documents Used for MHMP Planning Process

Author (s)	Year	Title	Description	Where Used
FEMA National Flood Insurance Program	2013	Flood Insurance Study	Flood Insurance Study revises and supersedes the FIS reports and Flood Insurance Rate Maps (FIRMs) in the geographic area of LaGrange County, Indiana,	Section 4.1 major watersheds and flood areas
The Polis Center and LaGrange County	2012	LaGrange County Hazard Mitigation Plan	Hazard mitigation plan that was approved by FEMA and included the county's mitigation strategies.	All Sections update and review

Planning Process Timeline and Steps

The LaGrange County planning team met on October 9th, 2018 for the MHMP update kickoff. Prior to the second meeting, the team completed a survey related to the hazard rank and strategy status. The team then met on November 8th, 2018 to discuss survey results. The planning team confirmed the communities' hazard priorities and clarified any conflicting survey results for the county and each community.

The planning team invited the public to a meeting on December 4th, 2018. During this meeting, the overall purpose of the plan was reiterated and public input was sought. While no one from the public attended, the group numbered over 40 members including many local stakeholders from many different areas of industries and government agencies. The group reviewed a copy of the draft plan and was provided with a presentation on the risk assessment and mitigation strategies. As a group, the mitigation strategies were reviewed, updated as needed, and a few strategies were added to reflect the changing desires of the county. The draft plan was revised based on comments from the planning team following the meetings. The planning team recognized the need to improve public involvement in the next mitigation update. They will work to encourage more input from the public while also keeping them informed on mitigation practices in the county. Appendix A includes sign in sheets, any meeting minutes and invitations to participate, and Appendix B includes the published announcement of the meeting.

The county continually works to engage with the public by posting community meetings and training opportunities on the county website as well as on the county's social media resources including Facebook and Twitter. In addition, a final copy of the plan will be available online through the county's website.

Chapter 3 – Community Profile

In order to provide a basic understanding of the characteristics of the community, this section offers a general overview of LaGrange County including the physical environment, population, and identification of available services.

General County Description

LaGrange County is located in northeastern Indiana and is situated approximately 160 miles north of the capital city of Indianapolis. According to the 2016 Census Bureau's American Community Survey (ACS) 5-year, the county covers 379.6 square miles and had a population of 38,395. The Town of LaGrange is the county seat and the largest incorporated community in the county but contained only 7% of the population in 2016. Figure 2 displays a general map of LaGrange County and its incorporated communities while LaGrange County's townships and their respective incorporated communities are outlined in Table 4.

Figure 2. LaGrange County Incorporated Boundaries

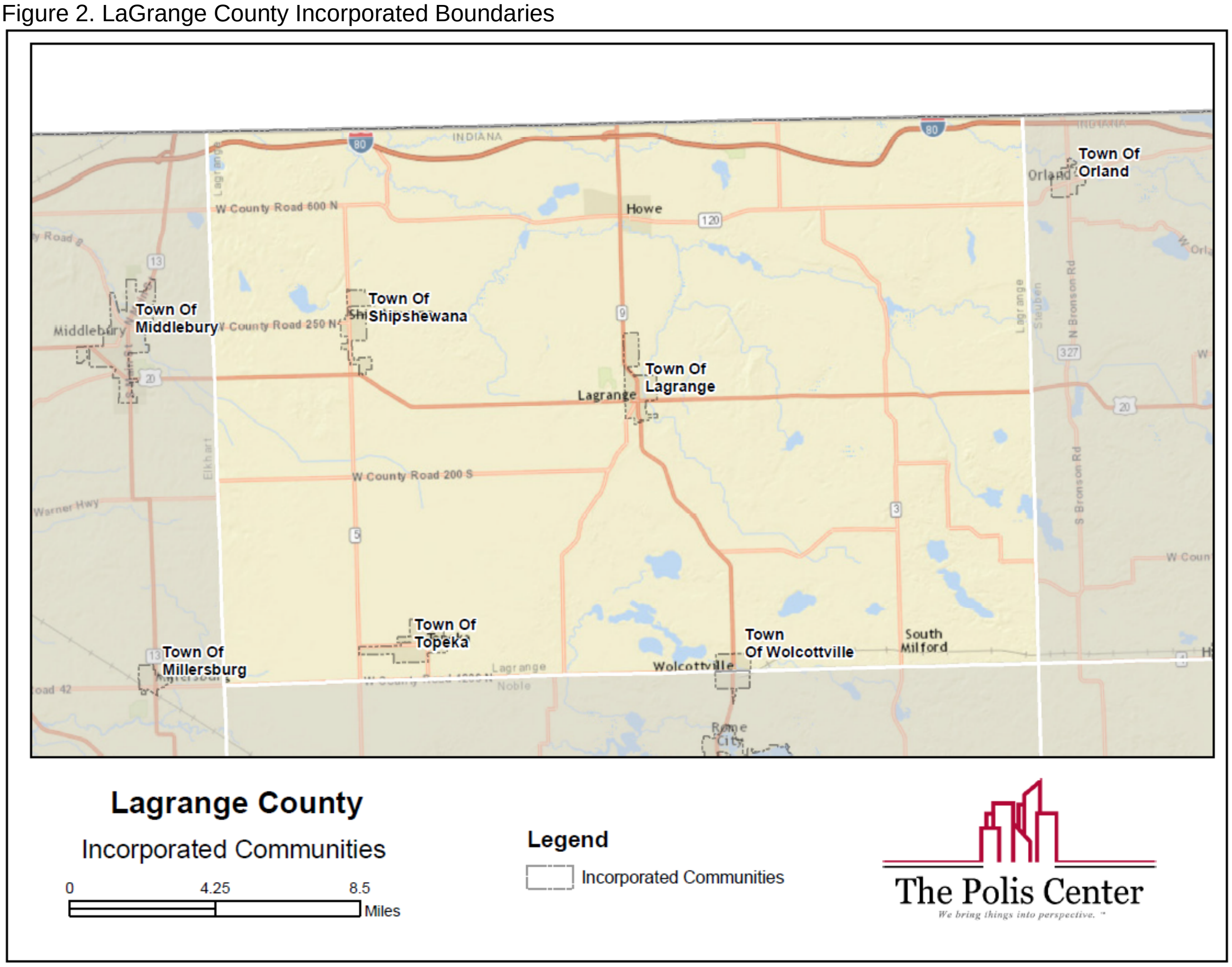


Table 4. LaGrange County Townships and Incorporated Communities

Township	Communities located in Township
Bloomfield	LaGrange
Clay	-
Clearspring	Topeka*
Eden	Topeka*
Greenfield	-
Johnson	Wolcottville
Lima	Howe
Milford	-
Newbury	Shipshewana
Springfield	-
Van Buren	-

**The Town of Topeka is in both Clearspring and Eden*

Historical Setting

Founded in April 1, 1832, LaGrange County shares its name with Lafayette's home near Paris. Lafayette was a French aristocrat and military leader, who fought in the American Revolution and befriended several of the American Founding Fathers. Initially, the community of Howe, then known as Lima, was the county seat, but in the 1840s, the county seat was relocated to the Town of LaGrange in the center of the county.

Prior to the European settlement in the area, the Miami and the Potawatomi Native Americans hunted the region's bountiful wildlife on the forested land that now consists of LaGrange County. An influx of settlers, primarily from New England, arrived between 1830 and 1837. Many of these early settlers claimed descent from the English Puritans and brought with them their work ethic and farming practices. As the number of western immigrants increased, Congress passed the Removal Act, which led to the forcible relocation of the Potawatomi Indians and their chief Shipshewana.

In the spring of 1842, Amish and Mennonite settlers from Pennsylvania made the journey on covered wagons to LaGrange County. Many of the Mennonite and Amish settlers spoke a German dialect and nearly a third of LaGrange County residents still identify as having German ancestry. Today, the northern Indiana Amish community in LaGrange and Elkhart Counties is the largest Amish settlement in Indiana and the 3rd-largest nationwide.

Physical Characteristics

Climate and Precipitation

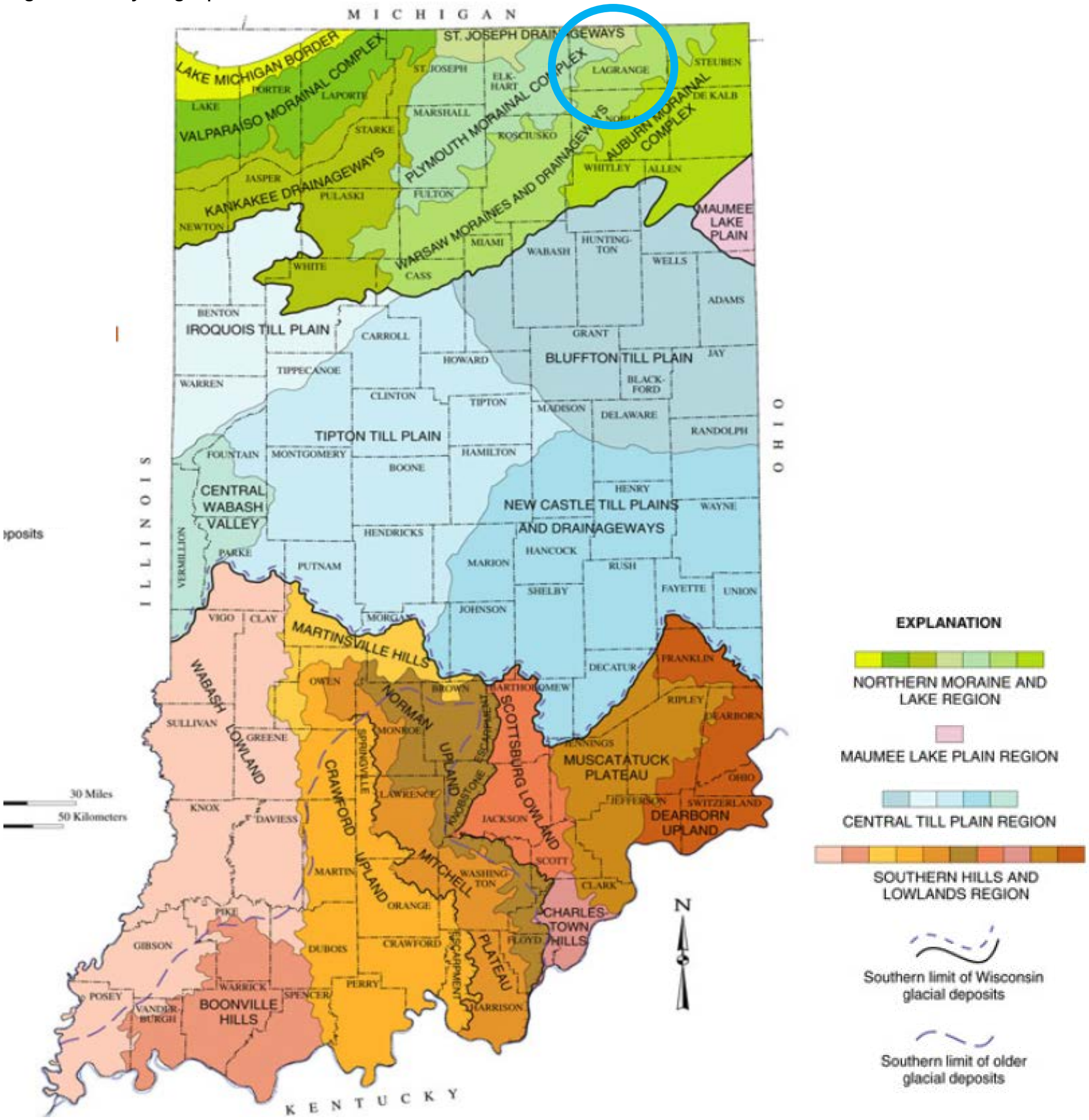
The LaGrange County climate is characteristic of northern Indiana. Winter temperatures can fall below freezing starting in November and extending through March. Based on National Climatic Data Center (NCDC) norms from 1981 to 2010, the average winter minimum temperature is 18.3° F and the average high is 33.2° F. In summer, the average low is 59.5° F and average high is 81° F. Average annual precipitation is 37.8 inches. The average winter precipitation is 6.19 inches.

Geology and Topography

The landscape of LaGrange County is largely composed of rolling farmland with a few abrupt changes in terrain. Numerous lakes, bogs, marshes, and rivers dot the countryside. The hilly terrain typifies the scenery that is the result of the ice that once overspread the region during times of glacial retreat. According to the United States Department of Agriculture Soil Survey of LaGrange County, the highest point in the county is 1,217 feet above sea level and is in Springfield Township near the unincorporated community of Mount Pisgah. The lowest point in the county is Fish Lake in Van Buren Township at 755 feet above sea level.

LaGrange County's topography is within the Plymouth Morianal Complex, the Warsaw Moraines and Drainageways, and the Auburn Morainal Complex. The Indiana Geological Survey reports that the bedrock in LaGrange County is primarily Mississipian in the north and Devonian in the south. Mississipian bedrock is characterized by the presence of shale, sandstone, siltstone, limestone, and gypsum. Devonian bedrock is split between an upper part of carbonaceous shale and a lower part made up of dolostone, limestone, and shale.

Figure 3. Physiographic Divisions of Indiana



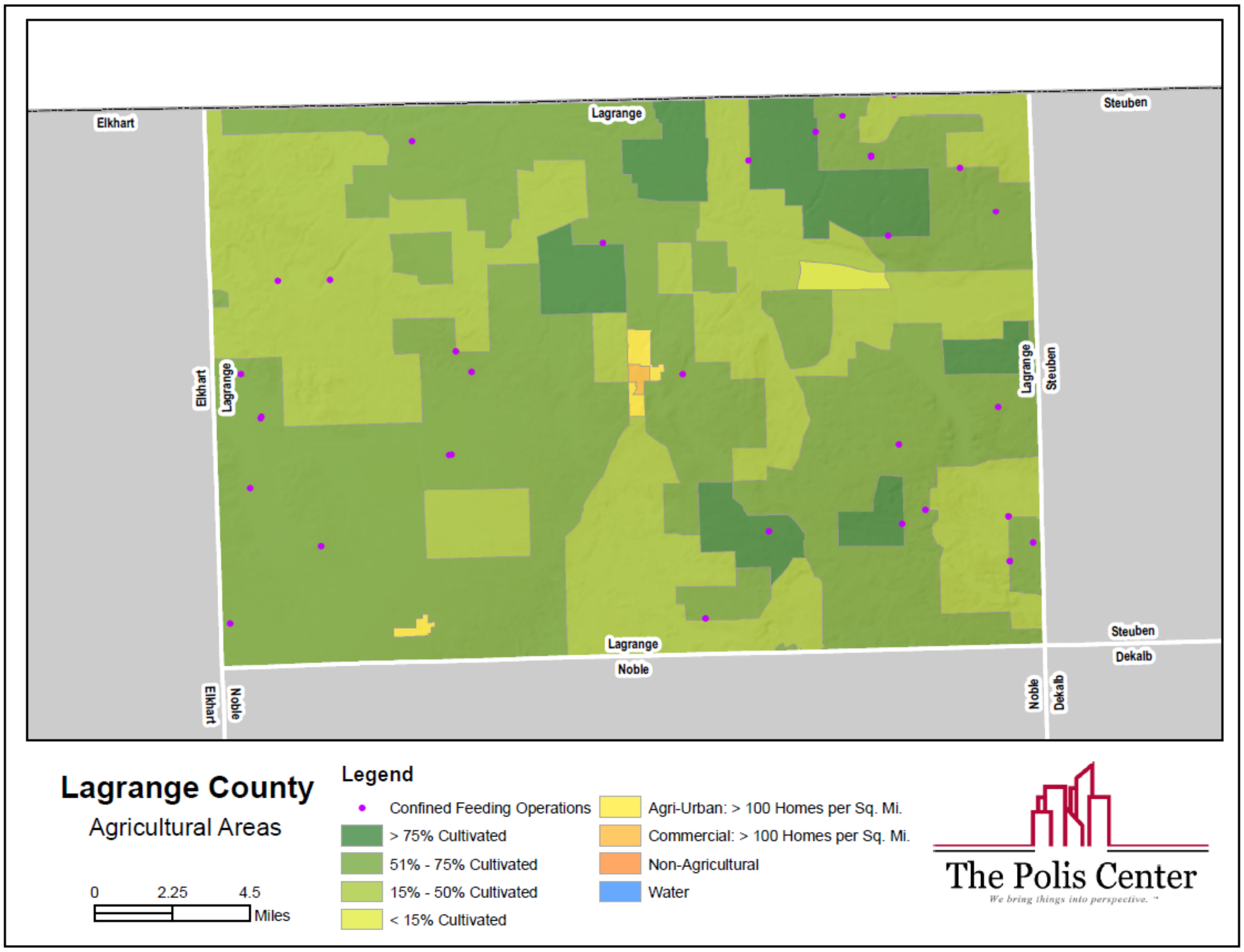
Indiana Geological Survey

Land Use and Ownership

Agriculture

The 2012 U.S. Census of Agriculture reports that there are 2,419 farms in the county covering 204,092 acres. Of this farming land, 72.2% is cropland, 11.7% is pasture, 8.4% is woodland, and 7.6% is classified as “other uses.” Figure 4 displays the agricultural areas in LaGrange County.

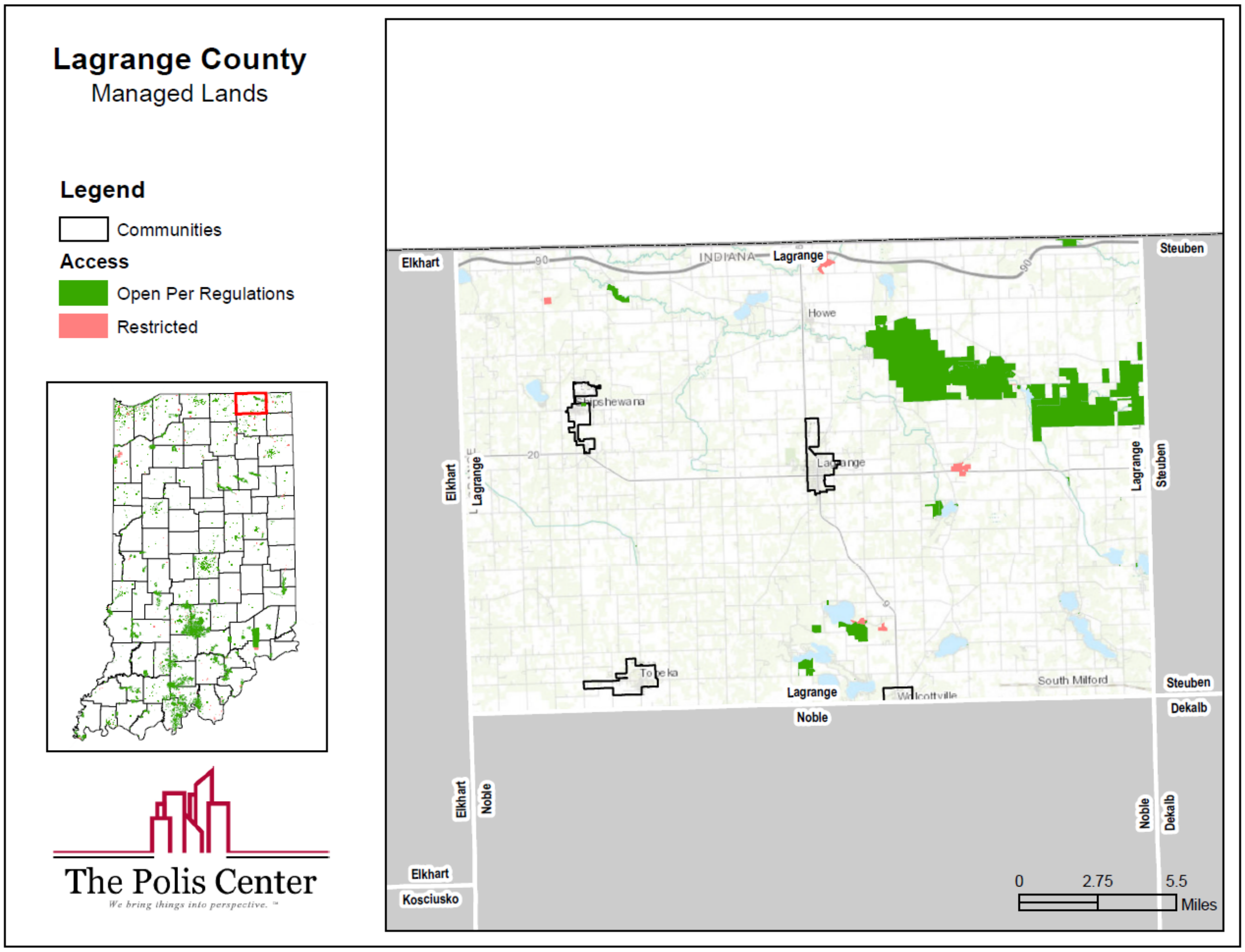
Figure 4. LaGrange Agricultural Areas



Managed Lands

The Indiana Department of Natural Resources (IDNR) maintains an inventory of managed properties. These natural and recreation areas are managed by either the IDNR Fish & Wildlife, IDNR Nature Preserves, federal, local or non-profits and is maintained by the Indiana Natural Heritage Database. By establishing conservation areas and parkland, the county is able to preserve plant and animal species and combat air & land pollution, and water quality issues. Figure 5 depicts managed land in LaGrange County.

Figure 5. LaGrange County Managed Lands



Major Waterways and Watersheds

Water resources are vital to the county because they provide enhanced recreational and economic opportunities. Important water resources include surface and groundwater from aquifers, watersheds, lakes, rivers, and wetlands. Water resources provide for riparian habitats, fish, wildlife, household, livestock, recreation, aesthetic, and industrial uses.

Watersheds

LaGrange County is located within the St. Joseph Watershed (HUC 04050001). According to the St. Joseph River Watershed Management Plan, the watershed drains 4,685 square miles from 15 counties, and the major tributaries of the watershed include the Prairie, Pigeon, Fawn, Portage, Coldwater, Elkhart, Dowagiac, and Paw Paw rivers and Nottawa Creek. The abundance of groundwater allows almost all of people in the basin to use it as their source of drinking water.

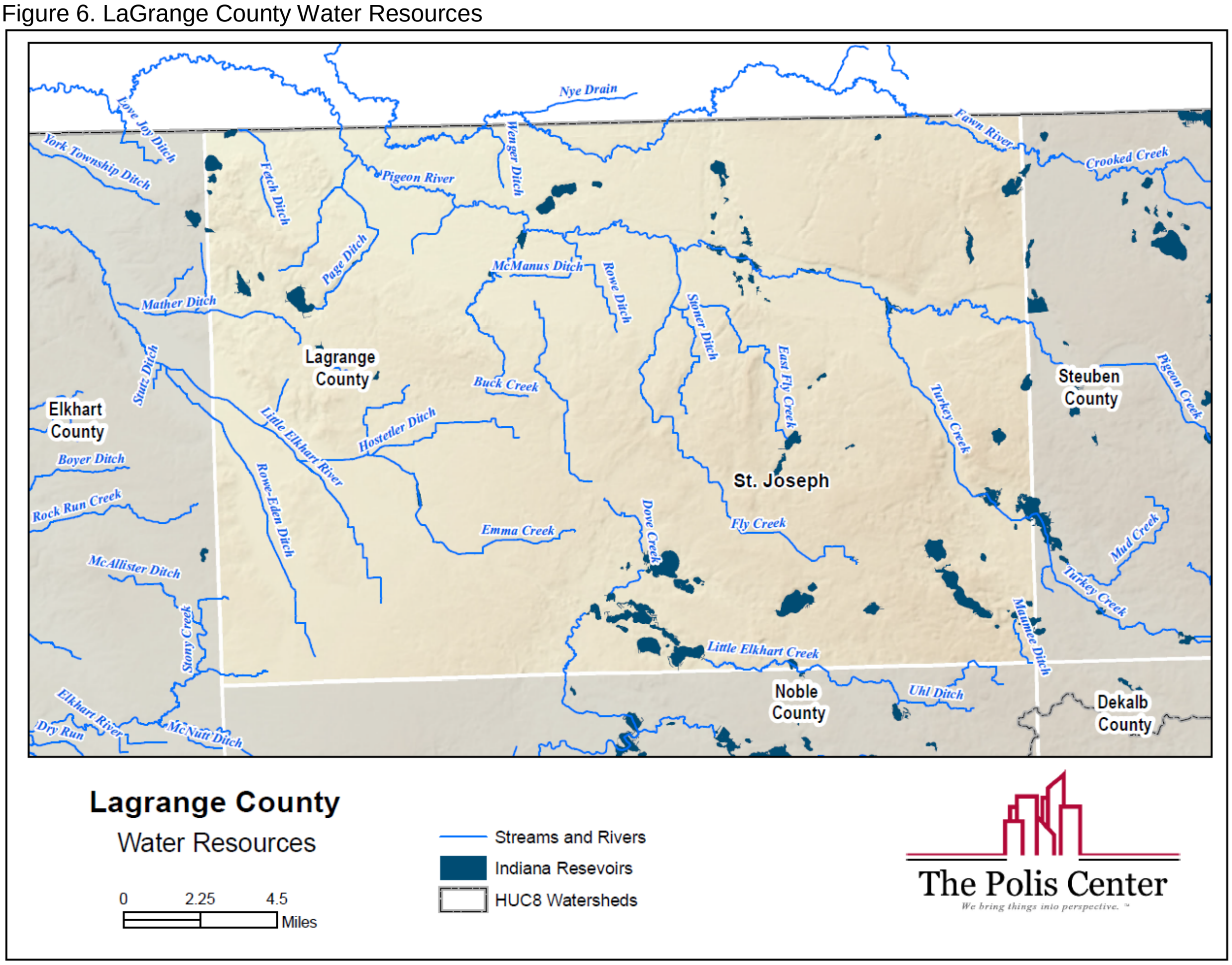
Rivers and Streams

The LaGrange County National Hydrography Dataset (NHD) contains over 491.7 miles of streams, rivers, and artificial paths. Major streams and rivers in the county are displayed in Figure 6. Fly Creek winds through the Town of LaGrange, and Little Elkhart Creek flows through Wolcottville. According to the Indiana Natural Resources Commission, Fawn River is partially navigable but has been found to be non-navigable at Greenfield Mills.

Lakes and Reservoirs

Lakes provide drinking water and a habitat for a variety of fish and wildlife. Lakes can function as a potential source of transportation and support recreational and commercial fishing industries. The DNR Department of Fish and Wildlife maintains a list of the lakes in Indiana and the general assembly has established the listing of Public Freshwater Lakes (PFL). The DNR Division of Water regulate these lakes using the Lake Preservation Act (I.C. 14-26-2) and/or Lowering of 10 Acre Lakes Act or "Ditch Act" (I.C. 14-26-5). LaGrange County has 51 PFLs.

Figure 6. LaGrange County Water Resources



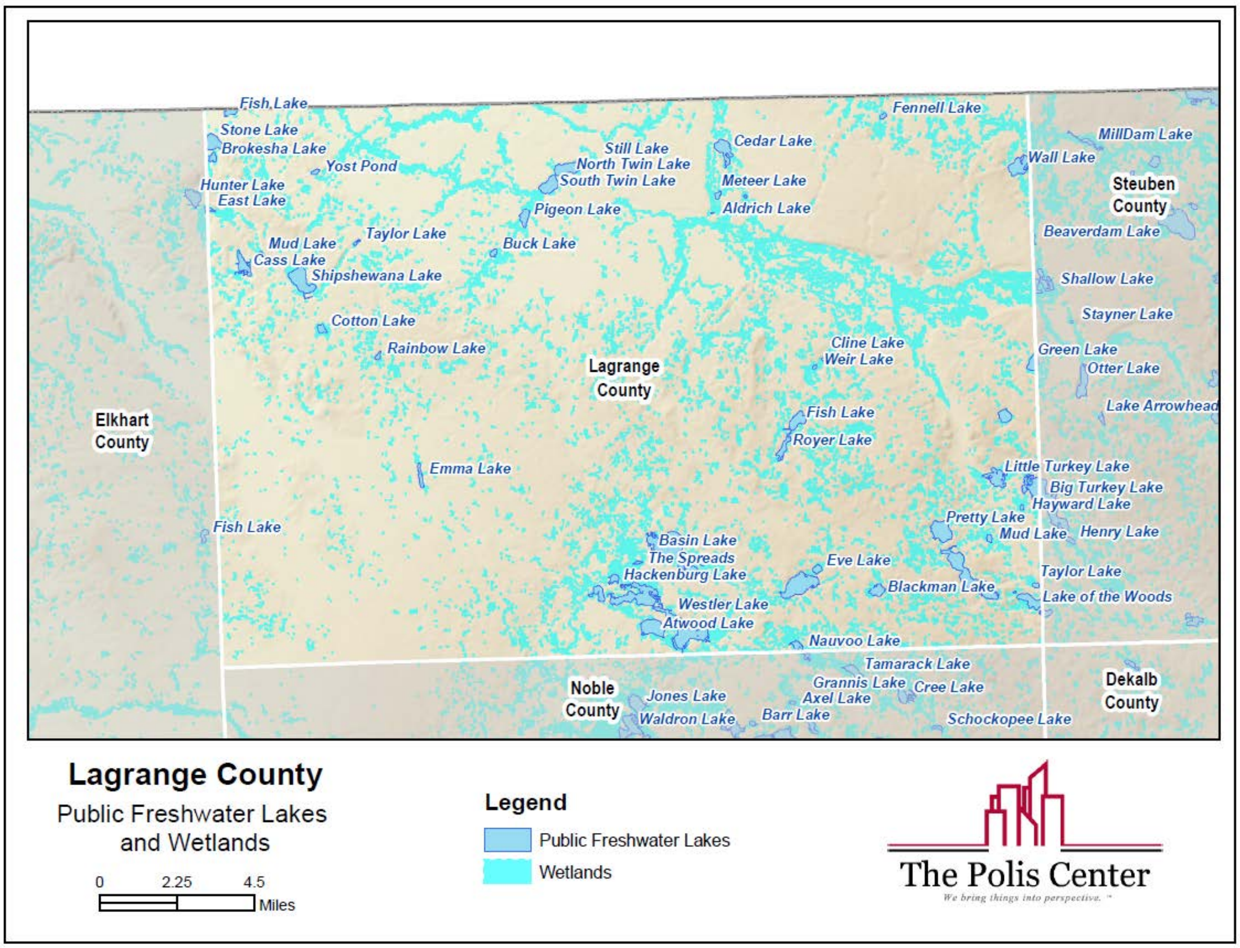
Water resource data courtesy of IDNR

Wetlands

The EPA and the Indiana Department of Environmental Management (IDEM) have identified Indiana's wetlands and other aquatic resources as important features to protect and wisely use for the benefit of present and future generations. Wetlands are vital features of the Indiana landscape that provide beneficial services for people and wildlife including: protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters and maintaining surface water flow during droughts and dry periods.

Figure 7 displays the lakes and wetlands in LaGrange County.

Figure 7. Public Freshwater Lakes and Wetlands



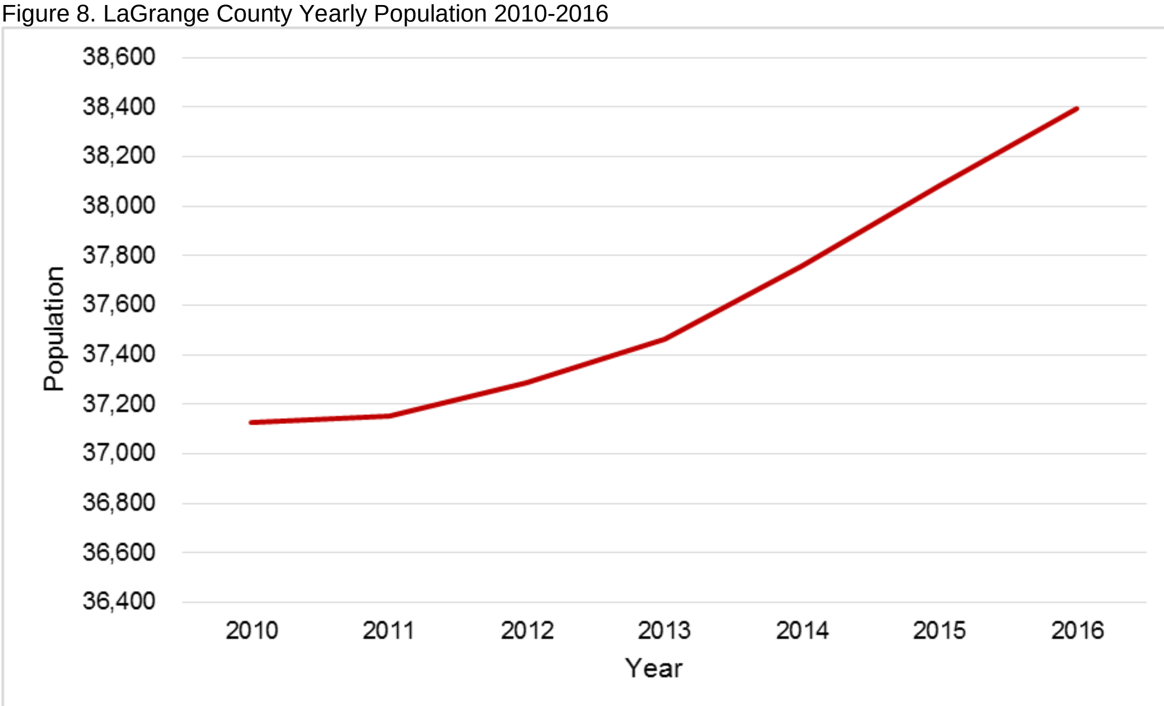
Water resource data courtesy of Indiana Map

People

Population and Demographics

In 2010, the US Census Bureau determined that LaGrange County had a population of 37,128. As of 2016, the ACS 5-year estimates that 38,395 people resided in LaGrange County. The population increased by 3.4% between 2010 and 2016. The population of LaGrange County is gradually increasing as displayed in Figure 8.

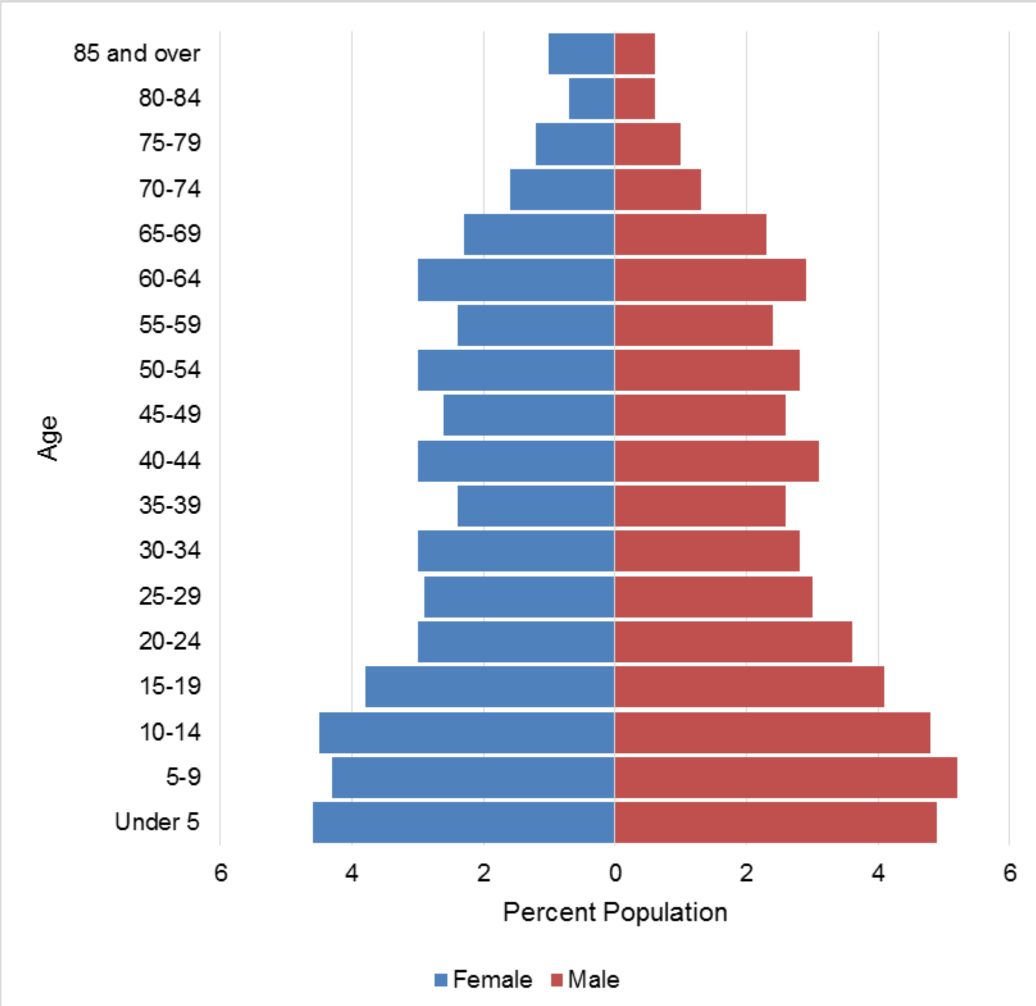
Figure 8. LaGrange County Yearly Population 2010-2016



American Community Survey 5-Year Estimates

The 2016 median age of LaGrange County is 31.1 compared to the state median of 37.4. The age distribution of LaGrange County is shown in Figure 9. Of the population age 25 and older, 21.1% have completed a high school education or higher while 11.2% have completed a bachelor's degree or higher.

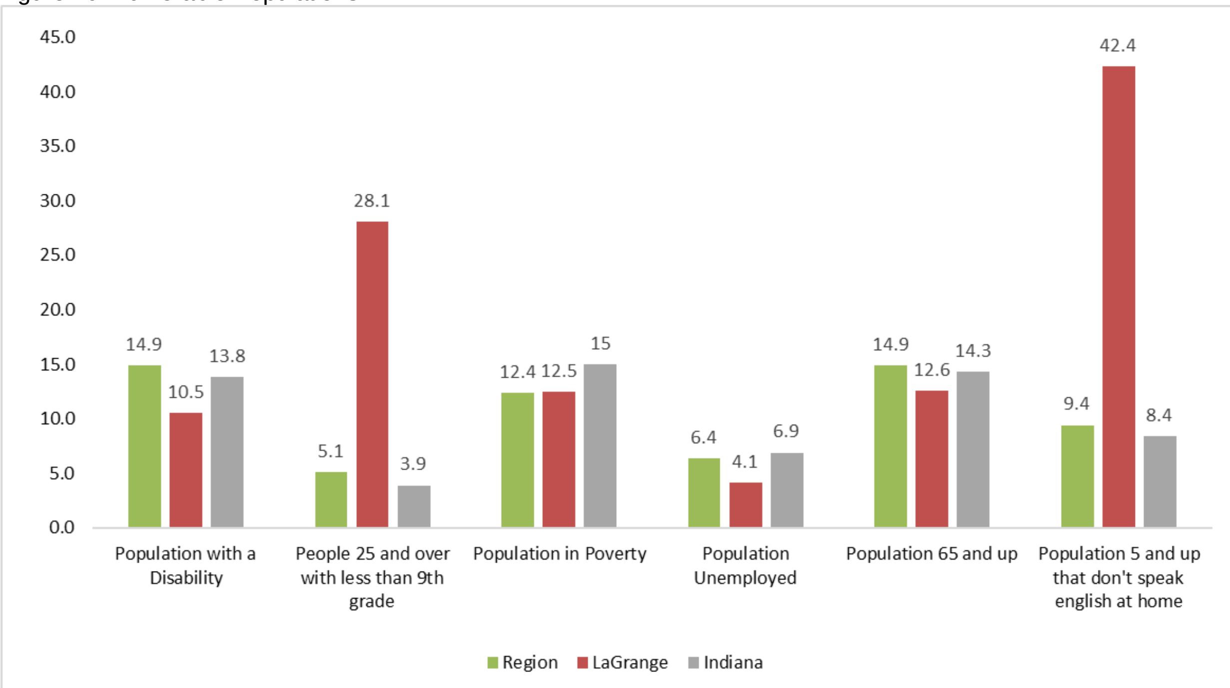
Figure 9. Distribution of Ages in LaGrange County



American Community Survey 5-Year Estimates

Some populations may require special attention in mitigation planning because they may suffer more severely from the impacts of disasters. It is important to identify these populations, termed special needs populations, and develop mitigation strategies to help them become more disaster-resilient. Although there are numerous types of vulnerable populations, there are five focus groups, which include the population age 65 and over, population 25 years and over with less than a 9th grade education, population for whom poverty status is determined, population with a disability, and the population 5 years and over that speaks a language other than English at home. In Figure 10, LaGrange County is compared to the nearby counties, as well as to Indiana, by the percent population of each special needs category within the county/state.

Figure 10. Vulnerable Populations



American Community Survey 5-Year Estimates

Compared to the surrounding counties, LaGrange County has a high percentage of people over five years who speak a language other than English and a high percentage of people aged 25 and over with less than a 9th grade education. However, these figures may prominently be due to the large community of Amish people, who sometimes speak Pennsylvanian Dutch or German at home.

Housing

Approximately, 79.3% of LaGrange County households consist of families, compared to 65.8% of people in Indiana living with families. According to the ACS 5-year estimates, in 2016 the county had an average household size of 3.2 people.

Economy and Employment

According to the ACS 5-year estimates, the 2016 annual per capita personal income in LaGrange County was $21,774, compared to an Indiana per capita income of $26,117. The median household income is $53,947, which is higher than the state median household income of $50,433.

Of the LaGrange work force, 48.3% are employed in the manufacturing industry while educational services, health care, and social assistance accounts for 13% of industry. The major employers in LaGrange County are listed in Table 5.

Table 5. Major Employers in LaGrange County

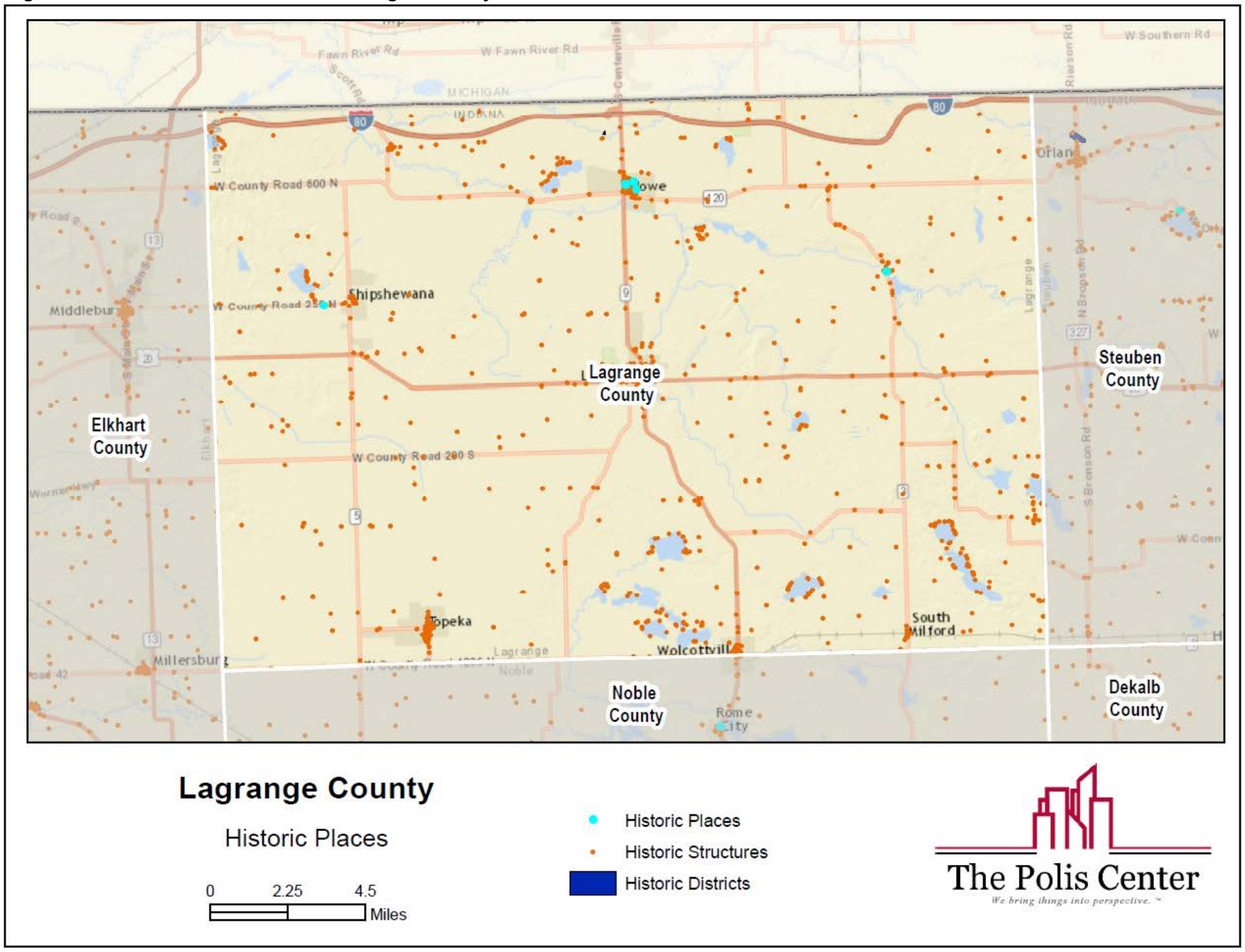
Company Name
Champion Home Builders Inc.
K-z Inc.
Nishikawa Cooper Llc
K-z Inc.
Lakepark Industries of Indiana
Open Range Rv Co
Prairie Heights Community School
Dometic Corp
F S Bancorp
J O Mory Inc.
Blue Gate Restaurant & Bakery

HoosierData Business Lookup

Culture

According to the Indiana Historic Sites and Structures Inventory, LaGrange County has seven historic places that appear on the National Register of Historic Places and one historic district in Lima. The locations of the historic structures are shown in Figure 11.

Figure 11. Historic Places in LaGrange County



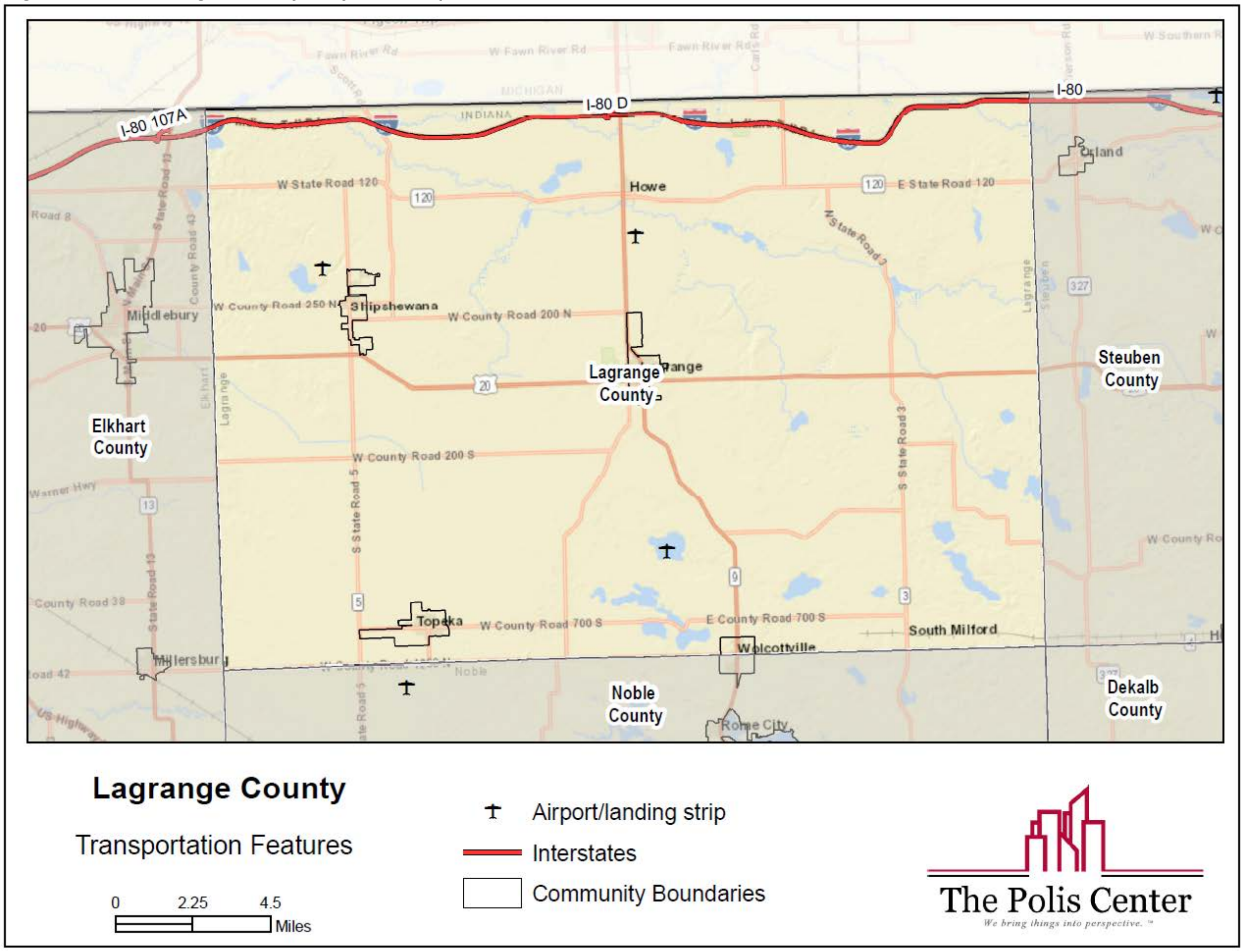
Indiana State Historical Architectural and Archaeological Research Database

Transportation and Commuting Patterns

The county transportation system is composed of roads, highways, airports, public transit, railroads, and trails, designed to serve all residents, businesses, industries and tourists.

Figure 12 identifies the major transportation features of LaGrange County.

Figure 12. LaGrange County Major Transportation Features



Indiana Department of Transporation

The Indiana Department of Transportation (INDOT) Fort Wayne District manages the state transportation resources for the county. Of the 1,297 miles of road in the county, 181 are state roads, 731 are county and over 240 are under the authority of local jurisdictions.

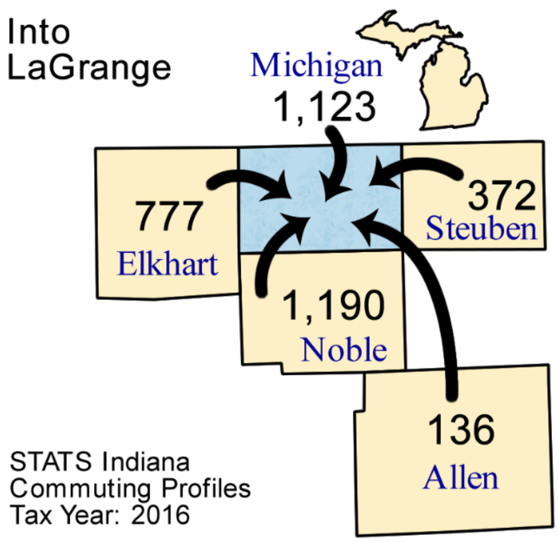
LaGrange County has two main rail corridors: Conrail Railroad and Pigeon River Railroad. Conrail is a service provider for CSX Corporation and Norfolk Southern Corporation. There are 53 miles of railroads in LaGrange County, but many of these railroads are no longer in use.

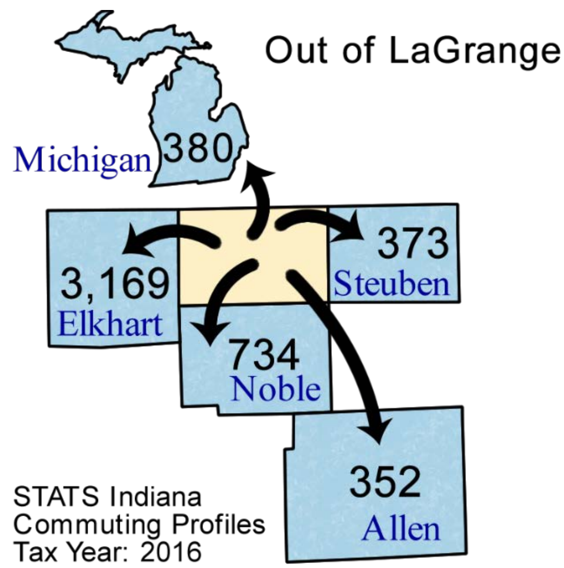
The nearest major airport is Kalamazoo/Battle Creek International Airport and is nearly 50 miles from the center of LaGrange County. LaGrange County has six small and privately owned airfields that can provide air access during a disaster.

Commuting Patterns

County-to-county commuting patterns provide a gauge of the economical connectivity of neighboring communities. According to STATS Indiana 2016 data, there are 24,844 people who live in LaGrange County and work (implied resident labor force). Of these residents, around 5,645 work outside the county. An additional 4,195 people living in other counties commute to LaGrange County for work. Figure 13 indicates the number of workers 16 and older who commute to or from LaGrange County for work.

Figure 13. Commuting Patterns





STATS Indiana

Chapter 4 – Risk Assessment

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation practices must be based on sound risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. A risk assessment consists of three components: hazard identification, vulnerability analysis, and risk analysis.

Hazard Identification/Records

Existing Plans

Identifying and prioritizing the hazards the community is exposed to are the first steps before conducting a risk assessment. The 2011 LaGrange County MHMP identified the major hazards to which LaGrange County is exposed. The following sections present historical data regarding hazard incidents and resultant costs in LaGrange County.

Historical Hazards

Historical storm event data was compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage reported to the National Weather Service (NWS) from various local, state, and federal sources. It should be noted that these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to given weather events.

The NCDC data included 237 reported events in LaGrange County between 1965 and December 31, 2017 (see Appendix C for events since 2010). The counts of these events by category is represented in Figure 14.

NCDC reports 92 events since the adoption of the LaGrange County 2011 plan. These recent events and their counts are reported in Figure 15.

Figure 14. Count of NCDC Events in LaGrange County (1965-2018)

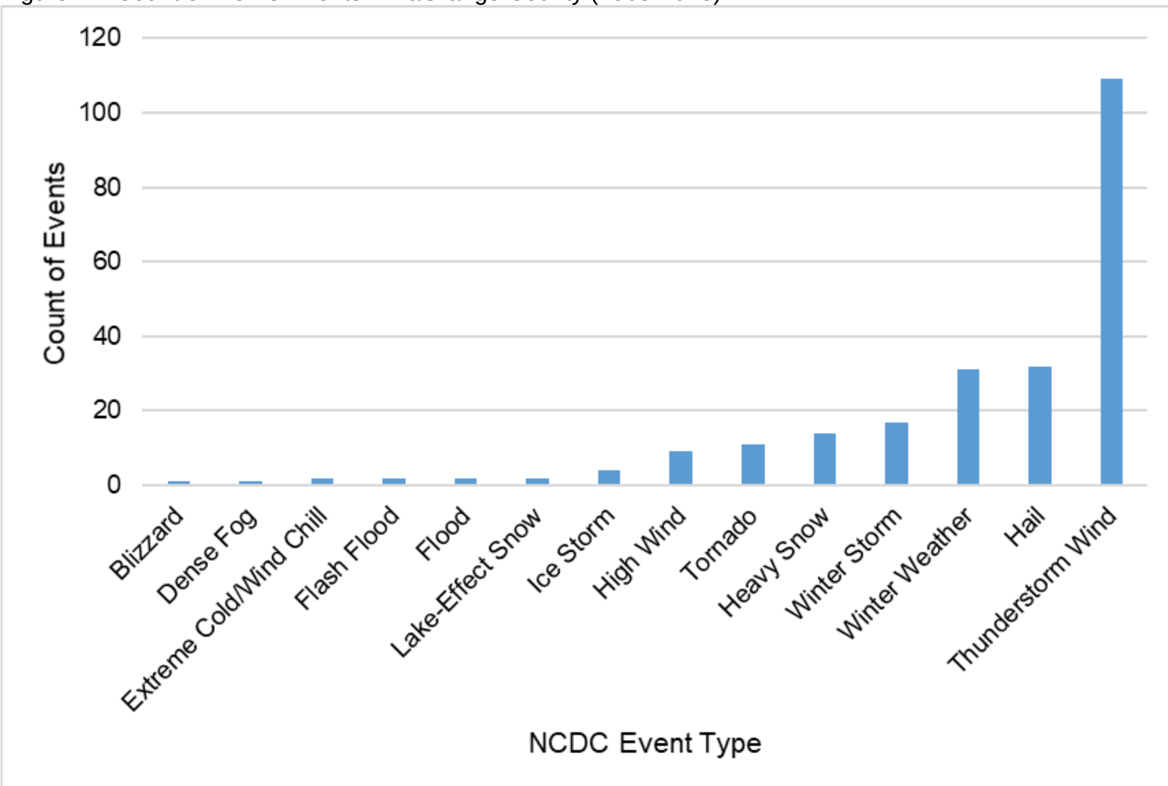
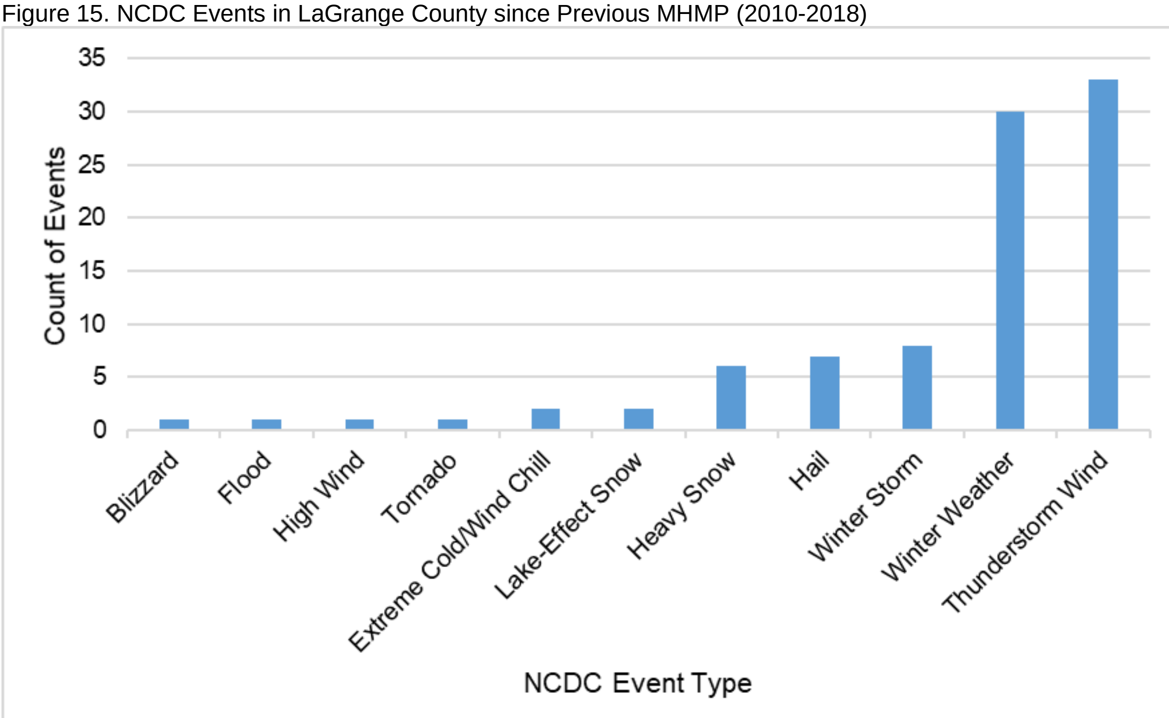


Figure 15. NCDC Events in LaGrange County since Previous MHMP (2010-2018)

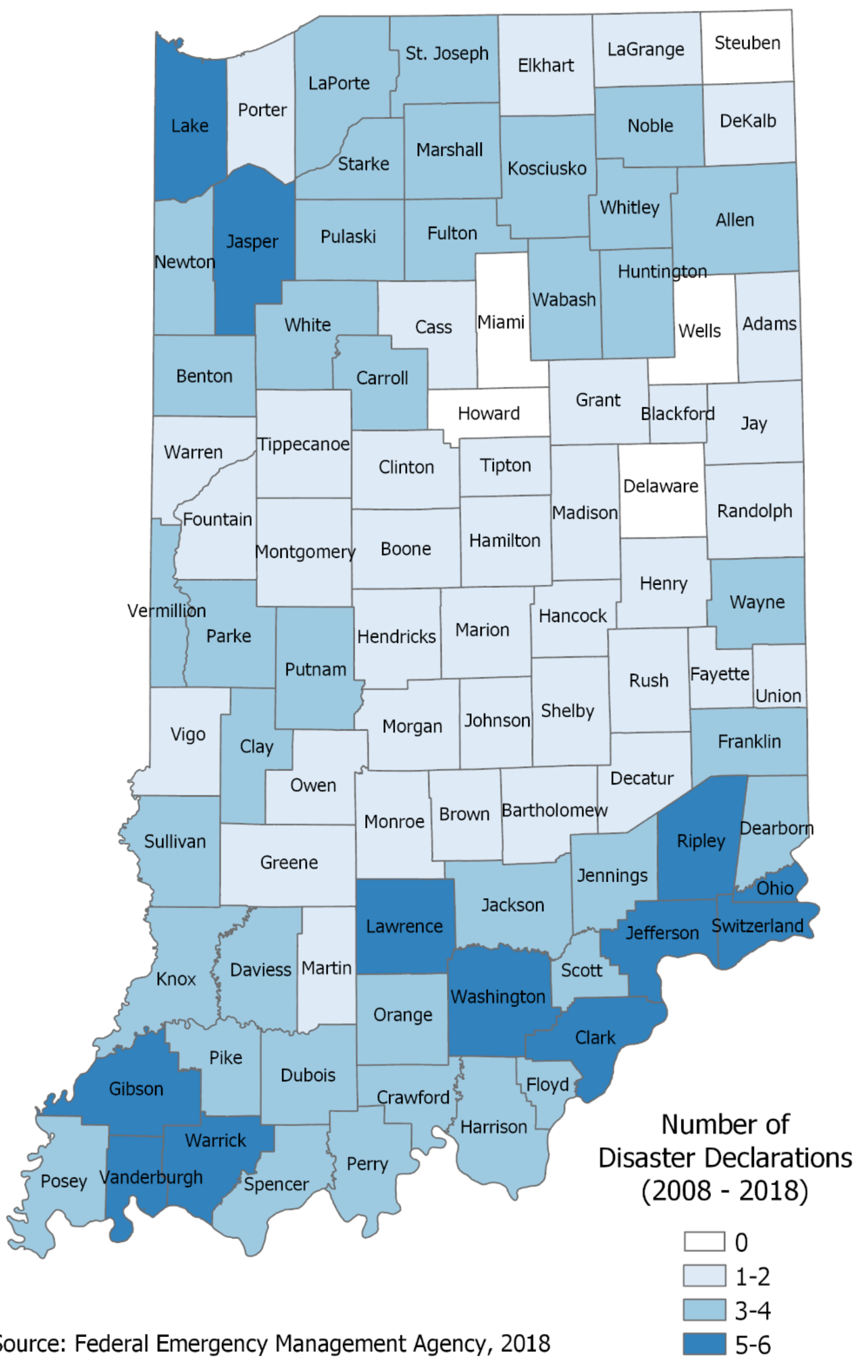


A table listing all events and their injury, death, and property loss statistics are included in Appendix C.

FEMA Declared Disasters

Since 2000, FEMA has declared 19 disasters for the state of Indiana. The following map shows the number of disasters by county in the state since 2008.

Figure 16. Disaster Declarations for Indiana



Source: Federal Emergency Management Agency, 2018

The FEMA-Declared Disasters for LaGrange County (2000-2017) table shows the details of the major disaster declarations, including FEMA hazard mitigation funding and total assistance, for LaGrange County. LaGrange County has received federal aid for 1 disaster declaration since 2000.

Table 6. FEMA-Declared Disasters and Emergencies for LaGrange County (2000-2017)

Disaster Number	Date of Incident	Date of Declaration	Disaster Description	Type of Assistance
4173	1/5/2014 – 1/9/2014	4/22/2014	Severe Winter Storm and Snowstorm	PA, HMGP

PA – Public Assistance Program, IA – Individual Assistance Program, HMGP – Hazard Mitigation Grant Program

The type of payments following a disaster help with ranking the severity of disasters and also a guide to developing mitigation activities and projects. Highway departments have claimed significant damages from flooding and fluvial erosion, and rural electrical cooperatives have historically been vulnerable to ice storms and high winds. The total eligible amount of PA data awarded for 4173 was $88,099.38 in emergency protective measures.

Other Disaster Relief

In addition to potential state funding, homeowners and businesses can be eligible for low-interest and long-term loans through the U.S. Small Business Administration (SBA). SBA was created in 1953 as an independent agency of the federal government to aid, counsel, assist, and protect the interests of small business concerns. The program also provides low-interest, long-term disaster loans to businesses of all sizes, private nonprofit organizations, homeowners, and renters following a declared disaster. The loans can also provide resources for homeowner associations, planned unit developments, co-ops, condominiums, and other common-interest developments. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.

Through the disaster loan program, SBA provides loan data, including FEMA and SBA disaster numbers, type (business or home), year, and various reporting amounts on the verified and approved amount of real estate and contents. LaGrange County has no SBA data listed.

Hazard Ranking

The Calculated Priority Rating Index (CPRI) is a process that evaluates the probability, consequence, warning time, and duration of a hazard in order to develop a hazard priority rank. The committee drew on the natural probability and impact ranked in the county's previous MHMP, the most recent CPRI assessment, community input from the hazard risk and probability survey in which communities were provided NCDC data summaries and the previous CPRI scores, and discussion from meeting two when developing a consensus on the hazard priority for the county for the purposes of this plan.

The following formula and table provide information on the weighted factors considered when determining a CPRI score for each hazard.

Table 7. Summary of Calculated Priority Risk Index (CPRI) Categories and Risk Levels
CPRI Risk Factor Score = [(Probability*.45) + (Consequence*.30) + (Warning Time*.15) + (Duration*.10)]

CPRI Category	DEGREE OF RISK			Assigned Weighting Factor
	Level ID	**Description**	**Index Value**	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001	1	45%
	Possible	Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 0.01 and 0.001.	2	
	Likely	Occasional occurrences with at least two or more documented historic events. Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 0.1.	4	
Consequence	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible quality of life lost. Shutdown of critical facilities for less than 24 hours.	1	30%
	Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability and there are no deaths. Moderate quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least one death. Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours		4	15%
	6 to 12 hours		3	
	12 to 24 hours		2	
	More than 24 hours		1	
Duration	Less than 6 hours		1	10%
	Less than 24 hours		2	
	Less than one week		3	
	More than one week		4	

- **Probability** – a guide to predict how often a random event will occur. Annual probabilities are expressed between 0.001 or less (low) up to 1 (high). An annual probability of 1 predicts that a natural hazard will occur at least once per year.

- **Consequence/Impact** – indicates the impact to a community through potential fatalities, injuries, property losses, and/or losses of services. The vulnerability assessment gives information that is helpful in making this determination for each community.

- **Warning Time** – plays a factor in the ability to prepare for a potential disaster and to warn the public. The assumption is that more warning time allows for more emergency preparations and public information.

- **Duration** – relates to the span of time local, state, and/or federal assistance will be necessary to prepare, respond, and recover from a potential disaster event.

Table 8 displays the county's CPRI results for each hazard and their resultant rank.

Table 8. Calculated Priority Risk Index for LaGrange County

Natural Hazards	Probability	Consequence	Warning Time	Duration	Risk Factor
Tornadoes	4 – Highly Likely	4 - Catastrophic	4 - < 6 hours	4 - >1 week	**4.0**
Flooding	4 – Highly Likely	2 - Limited	4 - < 6 hours	3 - < 1 week	**3.30**
Summer Storms	4 – Highly Likely	3 -Critical	3- 6-12 hours	2 - < 24 hours	**3.35**
Winter Storm	4 – Highly Likely	3 -Critical	2 – 12-24 hours	3 - < 1 week	**3.30**
Extreme Temperatures	3 - Likely	2 - Limited	1 - 24+ hours	4 - >1 week	**2.50**
Hazmat Incident	2 – Possible	2 - Limited	4 - < 6 hours	4 - >1 week	**2.50**
Harmful Organisms & Infectious Agents	2 – Possible	2 - Limited	3- 6-12 hours	4 - >1 week	**2.35**
Earthquake	2 – Possible	1 - Negligible	4 - < 6 hours	4 - >1 week	**2.20**
Flash Flooding	2 – Possible	1 - Negligible	4 - < 6 hours	3 - < 1 week	**2.10**
Ground Failure	1 – Unlikely	2 - Limited	4 - < 6 hours	4 - >1 week	**2.05**
Drought	2 – Possible	2 - Limited	1 - 24+ hours	4 - >1 week	**2.05**
Wildfire	1 – Unlikely	2 - Limited	4 - < 6 hours	2 - < 24 hours	**1.85**
Dam Failure	1 – Unlikely	1 - Negligible	4 - < 6 hours	2 - < 24 hours	**1.55**
Levee Failure	1 – Unlikely	1 - Negligible	4 - < 6 hours	2 - < 24 hours	**1.55**

The ranking methodology in the previous LaGrange County plan differs from the current methodology. The previous plan marked Tornado, Severe Thunderstorms, and Winter Weather (snow & ice) as the most significant hazard risks. The only noticeable change in the current hazard rank is in the elevation of rank for Flooding and Summer Storms. The county previously ranked summer storms as a high probability and did so again. Flooding was previously ranked as low probability. The Tornado consequence, which was previously ranked as having minimal consequence was elevated to a catastrophic consequence.

Hazard Risk Assessment by Jurisdiction

The risk assessments identify the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. While some hazards are widespread and will impact communities similarly (e.g., winter storms), others are localized, leaving certain communities at greater risk than others (e.g., flash flooding, exposure to a particular high-risk dam). The following table illustrates each community's risk to flooding/flash flooding, dam/levee failure, hazardous materials incidents, and ground failure and are highlighted within the risk assessment.

Table 9. Localized Hazards for Incorporated Jurisdictions

	Flooding	Flash Flooding	Dam Failure	Levee Failure	Hazardous Incident	Ground Failure
Town of LaGrange	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Town of Wolcottville	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Town of Shipshewana	Possible	Possible	Unlikely	Unlikely	Possible	Unlikely
Town of Topeka	Possible	Possible	Unlikely	Unlikely	Possible	Possible

Vulnerability Assessment

Asset Inventory

The vulnerability assessment builds upon the previously developed hazard information by identifying the community assets and development trends. Determining the hazard rank is pertinent to determining the area of vulnerability. The county infrastructure and facilities inventories are a critical part of understanding the vulnerability at risk of exposure to a hazard event.

The assets presented in the analysis results are broken into two main groupings, Facilities Inventory and Building Inventory. The facilities inventory is reviewed and updated by the county before the analysis begins. The building inventory is created by the analysis team using assessor data combined with either parcel centroids or building footprints depending on what was provided by the county. The creation and update process for these two asset groups are described below.

Facilities Inventory

Of the approximately 15 facility categories, five are essential: schools, police and fire stations, medical facilities and emergency operation center(s). The remaining facilities are referred to as critical and include a variety of facility types that are critical to the everyday operations of the county. The local planning team updates these critical facilities using the previous plan GIS data as the starting point. The facilities and their counts for the county are listed in Table 10. At the beginning of the planning process these facilities were reviewed by the planning team and updates were provided as needed to the analysis team. These updated facilities are provided to the county as well as being maintained in a statewide database by The Polis Center.

Table 10. Count of Critical Facilities in LaGrange County

Facility Type	Number of Facilities
Care Facilities	15
Emergency Operations Centers	1
Fire Stations	8
Police Stations	5
Schools	68

Building Inventory

The building inventory for the county is used in the flood, earthquake, tornado, and hazmat analyses. It is created by joining the local assessor data building improvements, obtained from to the Indiana Department of Local Government Finance (IDLGF), with either parcel centroids or building footprint data depending on what is available. This provides an estimate of the building replacement cost. For the purposes of the analysis, only replacement cost is considered which is calculated using RS Means. RS Means provides cost estimates based on square footage and construction type. The total building counts and replacement cost for the county as a whole are shown below, grouped by the occupancy code. NOTE: The assessor records often do not include nontaxable parcels and associated building improvements. Therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Table 11. Building Counts and Estimated Replacement Costs for LaGrange County

Occupancy Code	Count	Replacement Cost
Residential	10,141	$1,712,297,686
Commercial	509	$1,004,836,141
Industrial	236	$1,337,140,394
Agriculture	3,532	$1,221,718,891
Religious	157	$257,066,593
Government	93	$180,957,139
Education	92	$337,826,375
Total	**14,760**	**$6,051,843,219**

Hazus-MH

The initial Multi-Hazard Mitigation Plan (MHMP) for LaGrange County, Indiana was submitted to FEMA and approved in 2011. Existing Hazus-MH technology was used in the development of the vulnerability assessment for flooding and earthquakes.

It is important to note that Hazus-MH is not a substitute for detailed engineering studies. Rather, it serves as a planning aid for communities interested in assessing their risk to flood, earthquake, and hurricane-related hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project.

Past & Future Development

As the county's population continues to grow, the residential and urban areas will extend further into the county, placing more pressure on existing transportation and utility infrastructure while increasing the rate of farmland conversion. LaGrange County will address specific mitigation strategies in Chapter 5 to alleviate such issues.

Because LaGrange County is vulnerable to a variety of natural and technological threats, the county government, in partnership with the state government, must make a commitment to prepare for the management of these types of events. LaGrange County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

According to the Indiana Department of Local Government Finance, 1200 of LaGrange County's parcels have experienced some sort of construction since 2009. Of those, 274 are located within either the special flood hazard areas, the tornado path area or the toxic plume area, identified in sections, 4.1, 4.4, and 4.8 of this plan. While these new constructions might have increased the vulnerability of the county to those hazards, they are only a small portion (23%) of the recent years' development.

Hazard Profiles

The following hazard profiles outline the hazard risk exposure for the county. The hazard is first described and then reviewed in the historical context of the county. In many cases, an analysis subsequently follows the hazard context that analyzes the facility and building inventory risk.

4.1 Flash Flood and Riverine Flood

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the US. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry of the catchment, and flow dynamics and conditions in and along the river channel. Floods in LaGrange County can be classified as one of two types: flash floods or riverine floods, which are both common in Indiana.

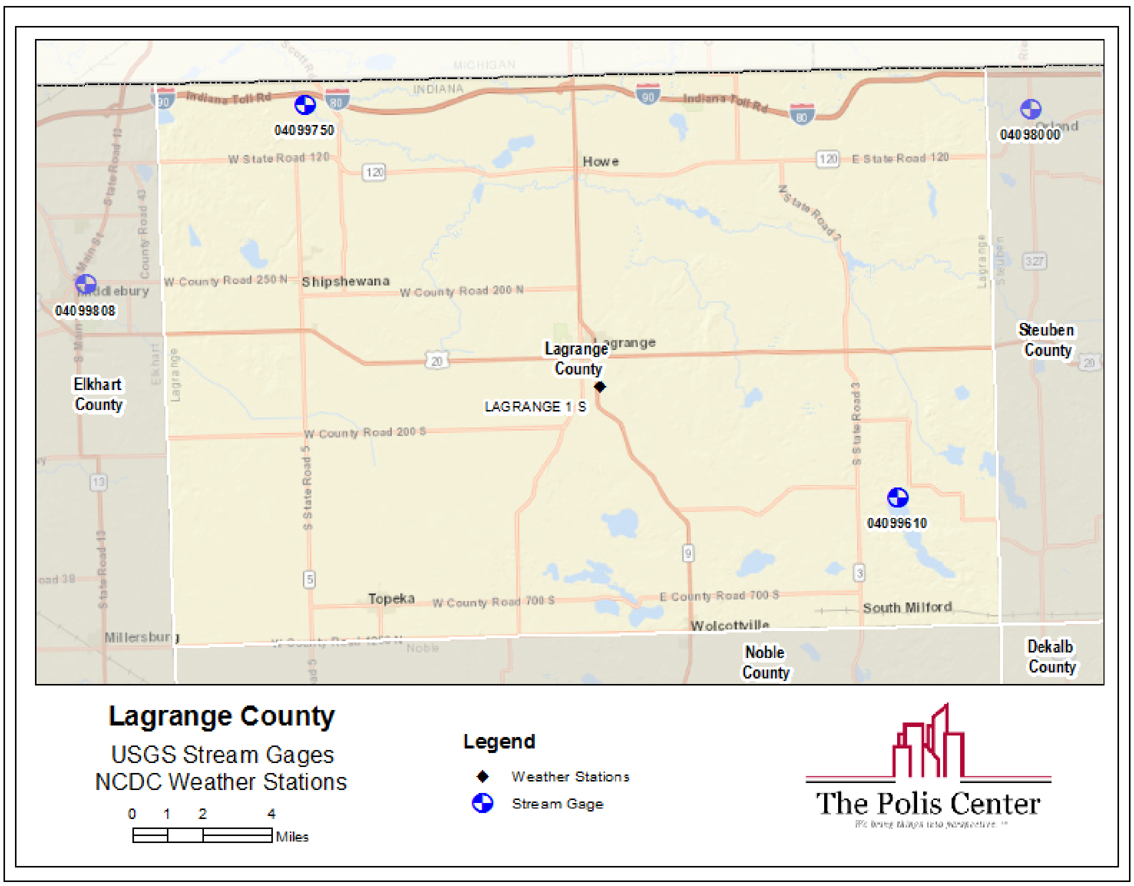
Flash floods generally occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally-intense damage and, sometimes, loss of life due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person, while another 18 inches might carry off a car. Generally, flash floods cause damage over relatively localized areas, but they can be quite severe in the areas in which they occur. Urban flooding is a type of flash flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Flash floods can occur at any time of the year in Indiana, but they are most common in the spring and summer months.

Riverine floods refer to floods on large rivers at locations with large upstream catchments. Riverine floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for riverine floods than for flash floods, generally providing ample warning for people to move to safe locations and, to some extent, secure property against damage. Riverine flooding on the large rivers of Indiana generally occurs during either the spring or summer.

Stream gages

The USGS, in cooperation with many state agencies and local utility and surveyor offices, help maintain stream gages, which provide the capability to obtain estimates of the amount of water flowing in streams and rivers. IDNR and IDEM use the stream gage data for water quantity and quality measurements. Local public safety officials use the data at these sites, along with the resources from the NWS, to determine emergency management needs during periods of heavy rainfall. The location of stream gages in the county are shown in Figure 17.

Figure 17. USGS Stream Gages and NCDC Weather Stations



Flood History in LaGrange County

LaGrange County has experienced a total of 4 flooding events since 1997. The most recent event was in March 2018. According to Fox 55, residents along Witmer Lake experienced flooding due to the ground and lake being frozen and February rains having nowhere to go. One resident remarked that this was the fastest rising flood they have ever had and the water rose up in about three days. According to Wane-TV News Channel 15's website, the LaGrange County Commissioners issued a local disaster declaration for flooded areas which could allow for future disaster assistance. Additional details for NCDC events are included in Appendix C.

Geographic Location for Flooding

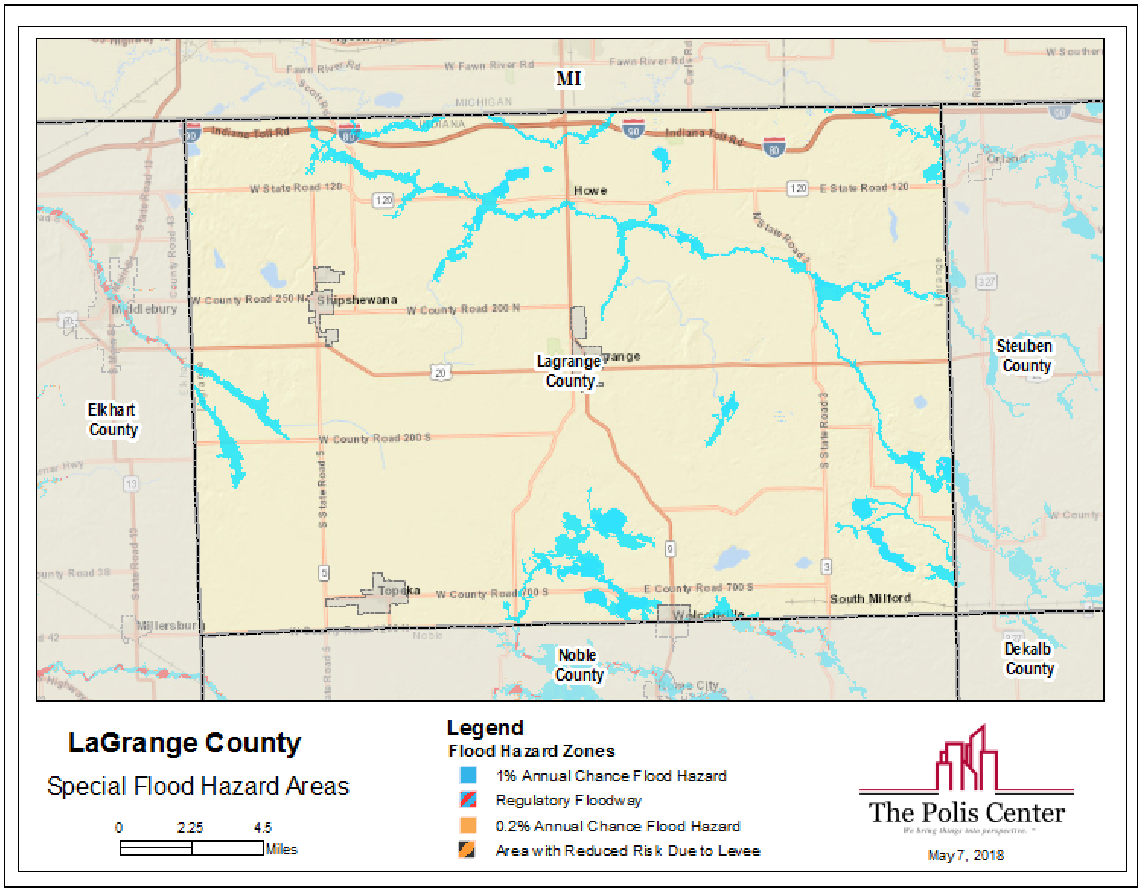
Most river flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Severe thunderstorms may cause flooding during the summer or fall, but tend to be localized. According to the LaGrange County Flood Insurance Study (FIS), major flooding in the county primarily occurs along the Little Elkhart River, Pigeon River and their tributaries.

Flash floods, brief heavy flows in small streams or normally dry creek beds, also occur within the county. Flash flooding is typically characterized by high-velocity water, often carrying large amounts of debris. Urban flooding involves the overflow of storm drain systems and is typically the result of inadequate drainage following heavy rainfall or rapid snowmelt.

Hazard Extent for Flooding

The Special Flood Hazard Areas (SFHA) are defined as the areas that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance flood is also referred to as the base flood or 100-year flood. The SFHAs in LaGrange County are identified in Figure 18.

Figure 18. Special Flood Hazard Areas (SFHA) in LaGrange County



NFIP Analysis

If a structure is located in a high-risk area, the 1% annual chance flood hazard, and the owner has a mortgage, they are required to purchase flood insurance through a federally regulated or insured lender. Flood insurance is not federally required in moderate- to low-risk areas, but it is still a good idea. The National Flood Insurance Program (NFIP) is a program in which, if a community enforces a floodplain management ordinance, the federal government will make flood insurance available in order to protect against flood loss.

Since the NFIP plays such a vital role in mitigating flood risk, understanding the status of hazard maps and reported losses occurring can provide insight on new strategies to mitigate the impacts and losses of future events. The communities in LaGrange County that participate in the NFIP, their NFIP number, current effective map date, and program entry date are provided in Table 12.

Table 12. NFIP Participation and Mapping Dates

NFIP Community	NFIP Number	Effective Map Date	Join Date
LaGrange County	180125#	11/20/2013	02/01/94
Topeka	180526#	(NSFHA)	11/20/13
Wolcottville	185216B	03/02/15	05/25/78

FEMA provides annual funding through the National Flood Insurance Fund (NFIF) to reduce the risk of flood damage to existing buildings and infrastructure. These grants include Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and the Severe Repetitive Loss program. The long-term goal is to significantly reduce or eliminate claims under the NFIP through mitigation activities.

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the National Flood Insurance Program (NFIP), which has suffered flood loss damage on two occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is 25% of the market value of the structure at the time of each flood loss.

The Indiana State NFIP Coordinator and FEMA Region V were contacted to determine the location of repetitive loss structures. FEMA Region V reported only 3 single-family structures as repetitive loss, all located in unincorporated LaGrange County. There were no severe repetitive losses reported for LaGrange County. Table 13 documents the LaGrange County NFIP claims data as of 12/31/2017.

Table 13. NFIP Claims Data for LaGrange County

Community	Number of Policies	Value of Insurance Claims/Pmts	Num. Insurance Claims/ Losses
LaGrange County	221	$40,720,700	40
Town of Topeka	4	$735,000	-

To help understand flood risk, the total structures in the SFHA are compared to the total number of policies in the community. This is based on approximate building locations, and therefore should not be used as an absolute comparison. However, this information may be used to target further mitigation through further engagement with the NFIP. In addition, this may be a tool to help understand if there would be an interest in becoming involved in a discount program with the Community Rating System (CRS). Table 14 provides a comparison of number of buildings in the 1% flood probability boundary to the number of policies, and then provides a percent of insured structures represented by those policies. The last column in the table provides an estimate of the exposure that is insured.

Table 14. Comparison of Estimated Building Exposure to Insured Buildings

Community	Buildings in 100 Year Floodplain[1]	Exposure of Buildings in Floodplain	Number of Policies	Value of Insurance Claims/Pmts	Approximate Percent of Buildings Insured	Approximate Percent of Exposure Insured
LaGrange County	1,234	$202,610,691	221	$40,720,700	18%	20%
Town of Topeka	-	-	4	$735,000	-	-

Risk Identification for Flood Hazard

In Meeting #2, the planning team determined that the probability of flooding is highly likely with limited consequences, whereas flash flooding was ranked as possible to occur with negligible consequences. Flooding and flash flooding both have a warning time of less than 6 hours. Flooding and flash flooding's average duration was determined to be more than 1 week. The calculated CPRI for flooding is 3.30, while the CPRI for flash flooding is 2.10.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

Hazus-MH Analysis using 100 year (1% chance) flood boundary

Hazus-MH was used to estimate the damages incurred for a 1% annual chance flood event in LaGrange County using the SFHA and a 10-meter DEM (digital elevation model) to create a flood depth grid. Hazus-MH was then used to perform a user-defined facility (UDF) analysis of LaGrange County. The UDFs were defined by intersecting the Hazus-MH generated flood depth grid with the LaGrange County building inventory. These data were then analyzed to determine the depth of water at the location of each building point and then related to depth damage curves to determine the building losses for each structure.

Hazus-MH estimates the SFHAs would damage 1,234 buildings county-wide at a cost of $79 million. In the modeled scenario, the unincorporated areas of LaGrange County contained all of

[1] The count and exposure of buildings in the floodplain reported in this table is based on an account of all structures in the floodplain that were represented in the county property assessment data.

the damage. The total estimated numbers and cost of damaged buildings by community are given in Table 15 and Table 16. Figure 19 depicts the LaGrange County buildings that fall within the SFHA.

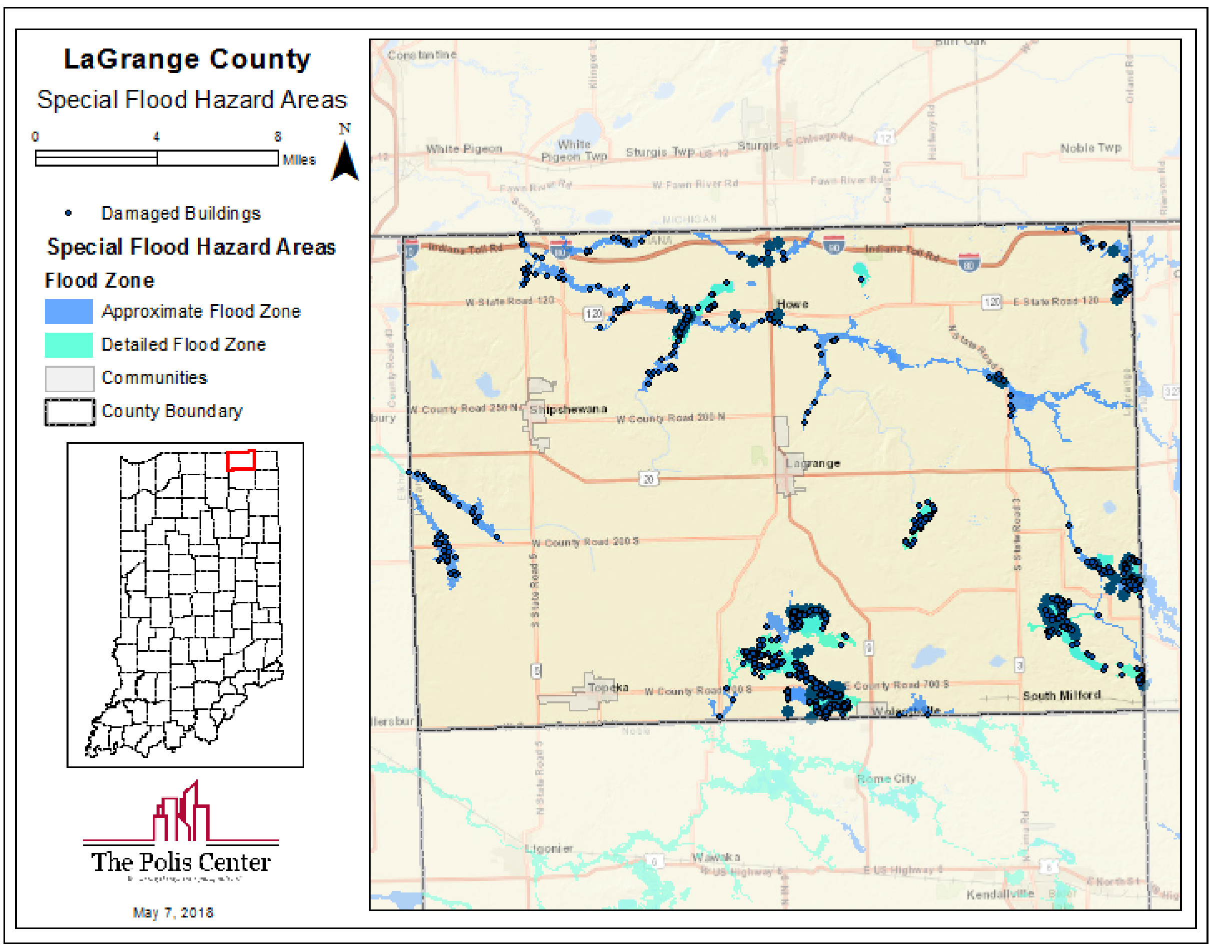
Table 15. Estimated Number of Buildings Damaged by Community and Occupancy Class

Community	Total Buildings Damaged	Building Occupancy Class						
		Agriculture	Commercial	Educ.	Govt.	Industrial	Religious	Residential
LaGrange (unincorporated)	1,234	108	9	0	0	2	4	1,111
Total	**1,234**	**108**	**9**	**0**	**0**	**2**	**4**	**1,111**

Table 16. Estimated Cost of Buildings Damaged by Community and Occupancy Class

Community	Cost Buildings Damaged	Building Occupancy Class						
		Agriculture	Commercial	Educ.	Govt.	Industrial	Religious	Residential
LaGrange (unincorp.)	$78,990,101	$8,522,497	$1,496,518	$0	$0	$1,381,834	$4,301,175	$63,288,077
Total	**$78,990,101**	**$8,522,497**	**$1,496,518**	**$0**	**$0**	**$1,381,834**	**$4,301,175**	**$63,288,077**

Figure 19. Estimated Buildings Damaged in SFHA



Overlay Analysis of Essential Facilities

Essential and other critical facilities can become damaged during the 1% annual chance flood. Damages to these types of facilities can severely impact the ability of the community to respond and recover from disasters. Damaged facilities located within towns or cities have been mapped in the following figures. In LaGrange County, no essential or critical facilities were modeled as having sustained damaged in the 1% annual chance flood.

Community Development Trends and Future Vulnerability

Controlling floodplain development is the key to reducing flood-related damages. Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible. Damage to these can cause the backup of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

Another key strategy in natural hazard mitigation is the conversion of frequently-flooded land to wetlands. Wetlands promote human well-being in many ways including improvements to water purification, increased water supply, climate regulation, flood regulation, and opportunities for recreation and tourism. According to a report by the US EPA, a one-acre wetland can store approximately three-acre feet of water, which is equal to one million gallons. Furthermore, trees and other wetland vegetation slow the speed of flood waters, ultimately lowering flood heights and naturally mitigating potential flood-related destruction.

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

Relationship to other Hazards

Severe storms and blizzards - Summer storms lead to logjams, and snowmelt can contribute to flooding and, under the right circumstances, flash flooding.

Dam Failure - Flood events can compromise the structural integrity of dams.

Public Health - Public health can be affected as a result of wastewater spills due to flooding or power failures.

Water Main Breaks - Surges in water pressure as a result of water pumps starting after power outages can lead to water main breaks.

4.2 Earthquake

Hazard Definition for Earthquake

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. Ninety-five percent of earthquakes occur at the plate boundaries; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern US.

Ground shaking and tremors from strong earthquakes can collapse buildings and bridges; disrupt gas, electric, and communication (e.g. phone, cable, Internet) services; and sometimes trigger landslides, flash floods, and fires. Buildings with foundations resting on unconsolidated landfill and other unstable soil and trailers or homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage.

Magnitude, which is determined from measurements on seismographs, measures the energy released at the source of the earthquake. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, human structures, and the natural environment. Table 17 and Table 18 list earthquake magnitudes and their corresponding intensities.

Table 17. Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Table 18. Earthquake Magnitude vs. Modified Mercalli Intensity Scale

Earthquake Magnitude	Typical Maximum Modified Mercalli Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

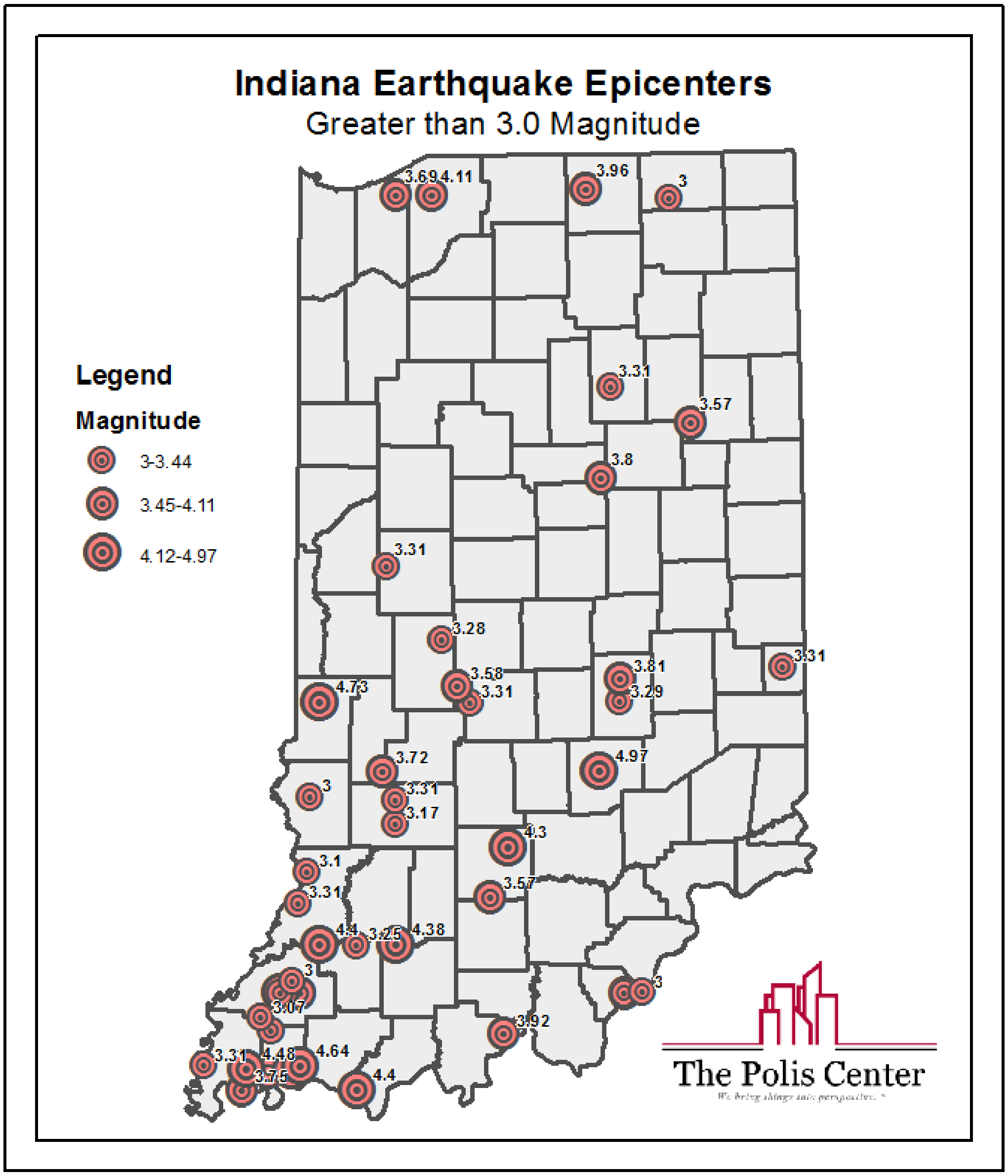
Earthquake History in LaGrange County

The most seismically active area in the Central US is referred to as the New Madrid Seismic Zone. Scientists have learned that the New Madrid fault system may not be the only fault system in the central US capable of producing damaging earthquakes. The Wabash Valley Fault System in Indiana shows evidence of large earthquakes in its geologic history, and there may be other currently unidentified faults that could produce strong earthquakes.

At least 43 earthquakes, M3.0 or greater, have occurred in Indiana since 1817. The last such event in Indiana was a M3.1 centered just north of Vincennes on May 10, 2010. A M3.8 earthquake occurred near Kokomo in December later that same year with approximately 10,390 individuals submitting felt reports to the USGS.

The majority of seismic activity in Indiana occurs in the southwestern region of the state. Earthquakes originate just across the boundary in Illinois and can be felt in Indiana.

Figure 20. Indiana Earthquake Epicenters Map



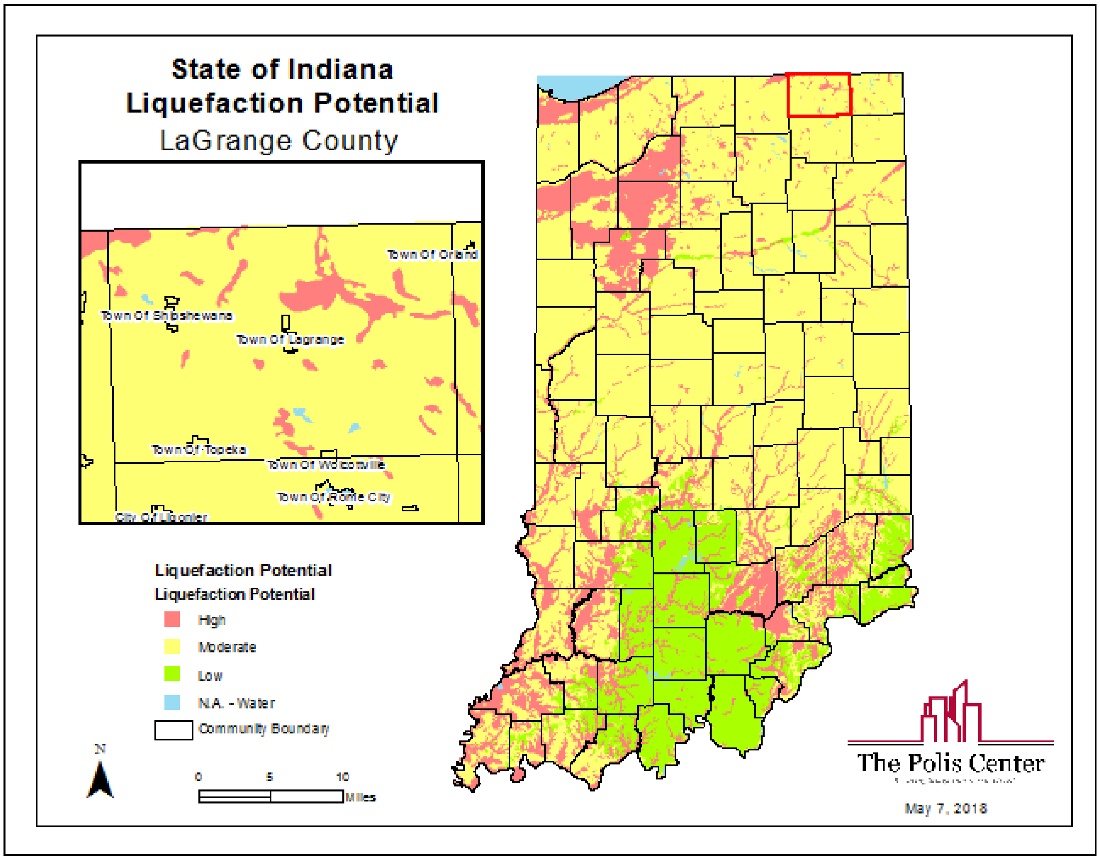
Geographic Location for Earthquake

LaGrange County occupies a region susceptible to an earthquake along the Wabash Valley Fault System. Return periods for large earthquakes within the New Madrid System are estimated to be 500 years. Moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System is a sleeper that threatens the southwest quadrant of the state and may generate an earthquake large enough to cause damage as far north and east as Central Michigan.

Hazard Extent for Earthquake

The extent of the earthquake is countywide. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. A National Earthquake Hazards Reduction Program (NEHRP) compliant soils map was used for the analysis which was provided by IGS. The map identifies the soils most susceptible to failure and ranks their liquefaction potential. LaGrange County is primarily made up of soils ranking as moderate potential for liquefaction. Areas around bodies of water are ranked with a high probability in various locations around the county.

Figure 21. NEHRP State of Indiana Liquefaction Potential



Risk Identification for Earthquake

In Meeting #2, the planning team determined that the probability of an earthquake as possible with negligible results. Earthquakes were determined to have a warning time of less than six hours with a duration more than 1 week. The calculated CPRI for earthquakes in LaGrange County is 2.20.

Vulnerability Analysis for Earthquake

During an earthquake, the types of infrastructure that could be impacted include roadways, runways, utility lines and pipes, railroads, and bridges. Because an extensive inventory of the infrastructure is not available to this plan, it is important to emphasize that any number of these structures could become damaged in the event of an earthquake. The impacts to these structures include broken, failed, or impassable roadways and runways; broken or failed utility lines, such as loss of power or gas to a community; and railway failure from broken or impassable tracks. Bridges also could fail or become impassable, causing traffic risks, and ports could be damaged, which would limit the shipment of goods. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of numbers and types of buildings and infrastructure.

Hazus-MH for Earthquake Analysis model estimates damages and loss of buildings, lifelines, and essential facilities from deterministic and probabilistic scenarios. The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake.

The building damage total loss amount is developed by the building inventory attributes inputs. Depending on the material of construction, type of foundation, and year of construction, the rebuilding expense will be affected.

Four events were modeled. The first scenario is the New Madrid Scenario. This scenario is based on the 1918 New Madrid 7.7 earthquake. The second scenario uses the Mount Carmel, IL 2010 location as the epicenter and a magnitude of 6.8. This location is part of the Wabash Valley Fault System. The model uses Liquefaction and Soils data maps in order to account for the local soil conditions for estimating ground motion and liquefaction.

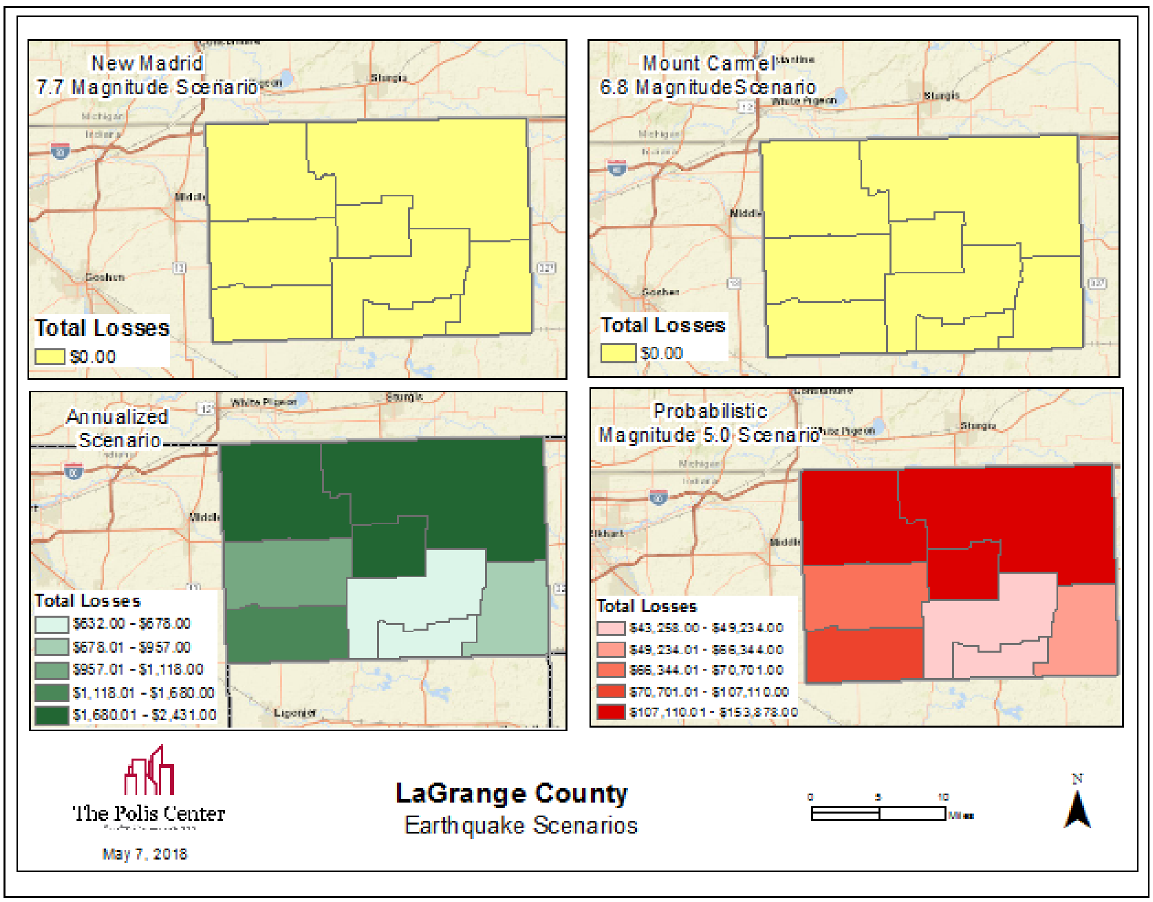
Additionally, the analyses included two different types of probabilistic scenarios. These types of scenarios are based on ground shaking parameters derived from U.S. Geological Survey probabilistic seismic hazard curves. The first probabilistic scenario was a 500-year return period scenario. This evaluates the average impacts of a multitude of possible earthquake epicenters with a magnitude that would be typical of that expected for a 500-year return period. The second probabilistic scenario allowed calculation of annualized loss. The annualized loss analysis in Hazus-MH provides a means for averaging potential losses from future scenarios while considering their probabilities of occurrence. Hazus-MH then calculates the probabilities of these events as well as the interim events, calculates their associated losses, and sums these losses to calculate an annualized loss.

The Building Damage Summary by Earthquake Event table displays damages for all 4 scenarios run by Hazus-MH. Table 19 displays building loss amounts for all 4 scenarios. In addition to the dollar amount of losses, the table displays the number of buildings damaged and to what extent. Figure 22 displays the Earthquake Scenarios total losses for each scenario broken down by census tract.

Table 19. Building Damage Summary by Earthquake Event

Scenario	Total Loss in Dollars	Moderate	Extensive	Complete
New Madrid, KY M7.7	0.00	0	0	0
Mount Carmel, IL M6.8	0.00	0	0	0
Probabilistic	1.18 Million	11	0	0
Annualized	0.02 Million	0	0	0

Figure 22. Earthquake Scenarios for LaGrange County



Community Development Trends and Future Vulnerability

Community development will occur outside of the low-lying areas in floodplains with a water table within five feet of grade that is susceptible to liquefaction. New construction, especially critical facilities, will accommodate earthquake mitigation design standards.

The possibility of the occurrence of a catastrophic earthquake in the central and eastern United States is real as evidenced by history and described through this section. The impacts of significant earthquakes affect large areas, resulting in the unavailability of public services and systems needed to aid the suffering and displaced. These impaired systems are interrelated in the hardest struck zones. Power, water and sanitary lines, and public communications may be lost; highway, railways, rivers, and ports may not allow transportation to the affected region. Furthermore, essential facilities such as fire and police departments and hospitals, may be disrupted if not previously improved to resist earthquakes.

As with hurricanes, mass relocation may be necessary, but the residents who are suffering from the earthquake can neither leave the heavily impacted areas nor receive aid or even communication in the aftermath of a significant event.

Relationship to other Hazards

Ground Failure- According to the National Academies of Sciences Engineering Medicine, the major cause of earthquake damage is ground failure. Some ground failures induced by earthquakes are the result of liquefaction of saturated sands and silts, the weakening of sensitive clays, or by the crumbling and breaking away of soil and rock on steep slopes. Ground failure has been known to cause buildings to collapse and to severely hinder communication and transportation systems.

Utility Failure- Earthquakes frequently damage utilities, particularly underground facilities and older storage tanks, but nearly every utility can be vulnerable to the shaking that earthquakes induce. Seismic damage to buried utilities are often influenced by ground conditions and subsurface strain distribution. Since utilities are typically part of a larger network system, damages to key locations in a network can potentially set off a chain reaction that affects significant portions of the utility system as a whole. Earthquake damage to utilities can also potentially create secondary hazards such as fires or hazmat situations since some utilities may handle volatile or flammable substances.

4.3 Ground Failure

Hazard Definition for Ground Failure

Indiana has three types of ground failure. Ground failure is a general reference to landslides, fluvial erosion, and subsidence to include karst sinkholes, and underground coal mine collapse.

Landslides

Landslides are a serious geologic hazard common to almost every state in the US. It is estimated that, nationally, they cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

The term landslide is a general designation for a variety of downslope movements of earth materials. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement. The main causes of landslides include:

- Significant ground vibration
- Slope failure due to excessive downward movement, gravity
- Groundwater table changes (often due to heavy rains)

Preventive and remedial measures include modifying the landscape of a slope, controlling the groundwater, constructing tie backs, spreading rock nets, etc. The expansion of urban and recreational development into hillside areas has resulted in an increasing number of properties subject to damage as a result of landslides. Landslides commonly occur in connection with other major natural disasters such as earthquakes, wildfires, and floods.

Karst

Southern Indiana has a network of underground caves formed by what is known as karst landscape. According to the Indiana Geological Survey, karst topography is a distinctive type of landscape largely shaped by the dissolving action of groundwater on carbonate bedrock, usually limestone. This geological process, which takes thousands of years, is characterized by unique features such as sinkholes, fissures, caves, disappearing streams, springs, rolling topography, and underground drainage systems. Structures built above a karst formation could potentially be subject to land subsidence and collapse into a resulting sinkhole.

LaGrange County has no karst areas.

Underground Coal Mines

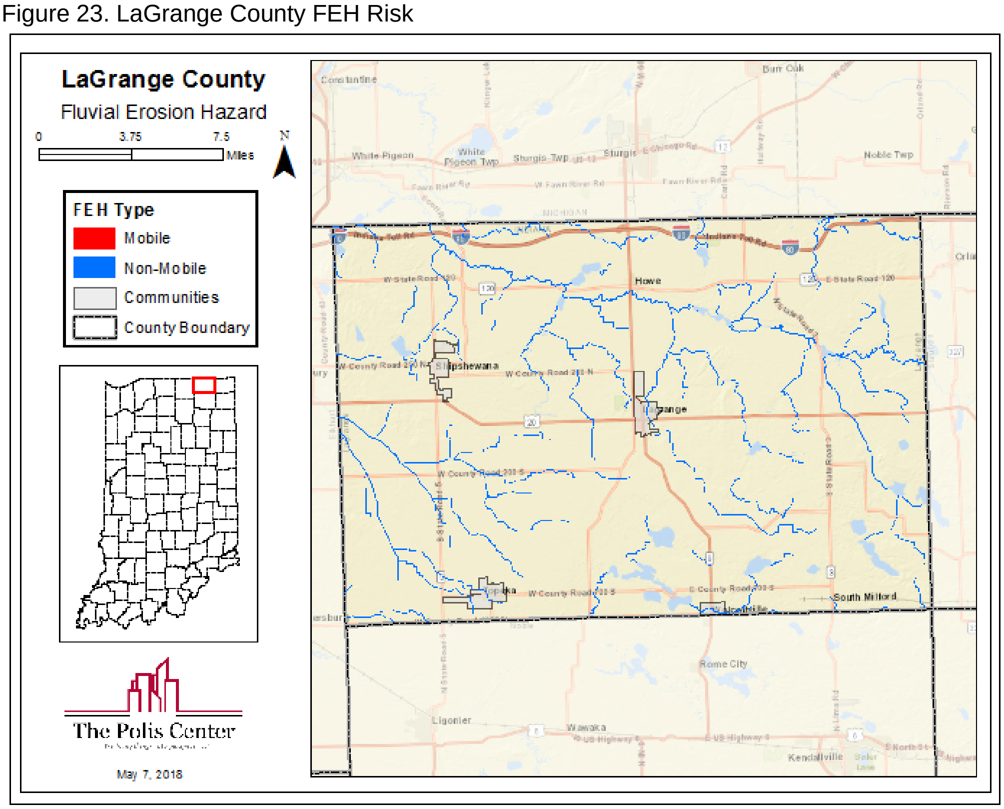
According to the Indiana Geological Survey’s GIS Atlas, there are areas of underground coal mines which could lead to ground failure. Roof failure has always been a major concern in underground coal mining. The majority of underground mines in southwest Indiana are older mines since abandoned and thus susceptible to collapse.

LaGrange County has no underground coal mines.

Fluvial Erosion

Streams naturally migrate (change course and move laterally) over time. This movement is called a Fluvial Erosion Hazard (FEH). The rate and intensity of movement is dependent upon many factors including drainage area, geology, and human actions. FEH represents a significant concern in areas where human development and infrastructure are established in close proximity to natural waterways. In mild cases, this may be seen as the gradual loss of a farm field or the undermining of a fence row when gradual channel migration consumes private land. In more severe cases, the FEH risk may threaten properties and/or structures to the degree that they become uninhabitable or even lost to natural channel processes. Figure 23 highlights streams found to be “actively migrating” which can indicate an increased FEH risk.

Figure 23. LaGrange County FEH Risk



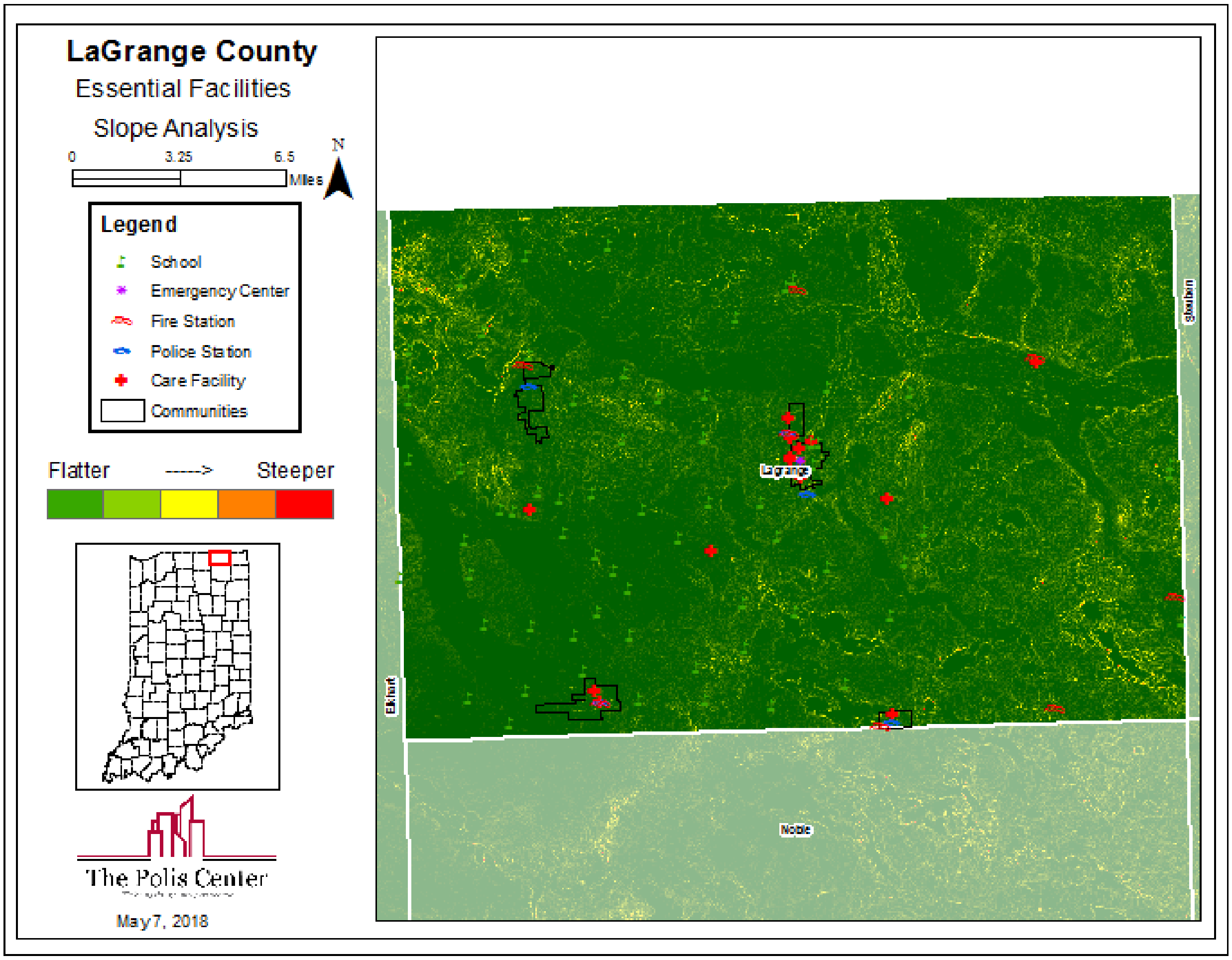
Ground Failure History in LaGrange County

The planning team did not identify any major ground failure events including landslide and land subsidence events.

Geographic Location for Ground Failure

Figure 24 shows the slope analysis for LaGrange County. The terrain of LaGrange County is driven by the rivers and streams laced throughout the county. Areas of steeper slope were examined in relationship to the infrastructure and were mapped in the Vulnerability Analysis section below.

Figure 24. LaGrange County Slope Analysis



Hazard Extent for Ground Failure

The extent of the ground failure hazard is closely related to development near the regions that are at risk. The extent will vary within these areas depending on the potential of elevation change, as well as the size of the underground structure. The hazard extent of ground failure is related to various concentrated areas as shown on the maps.

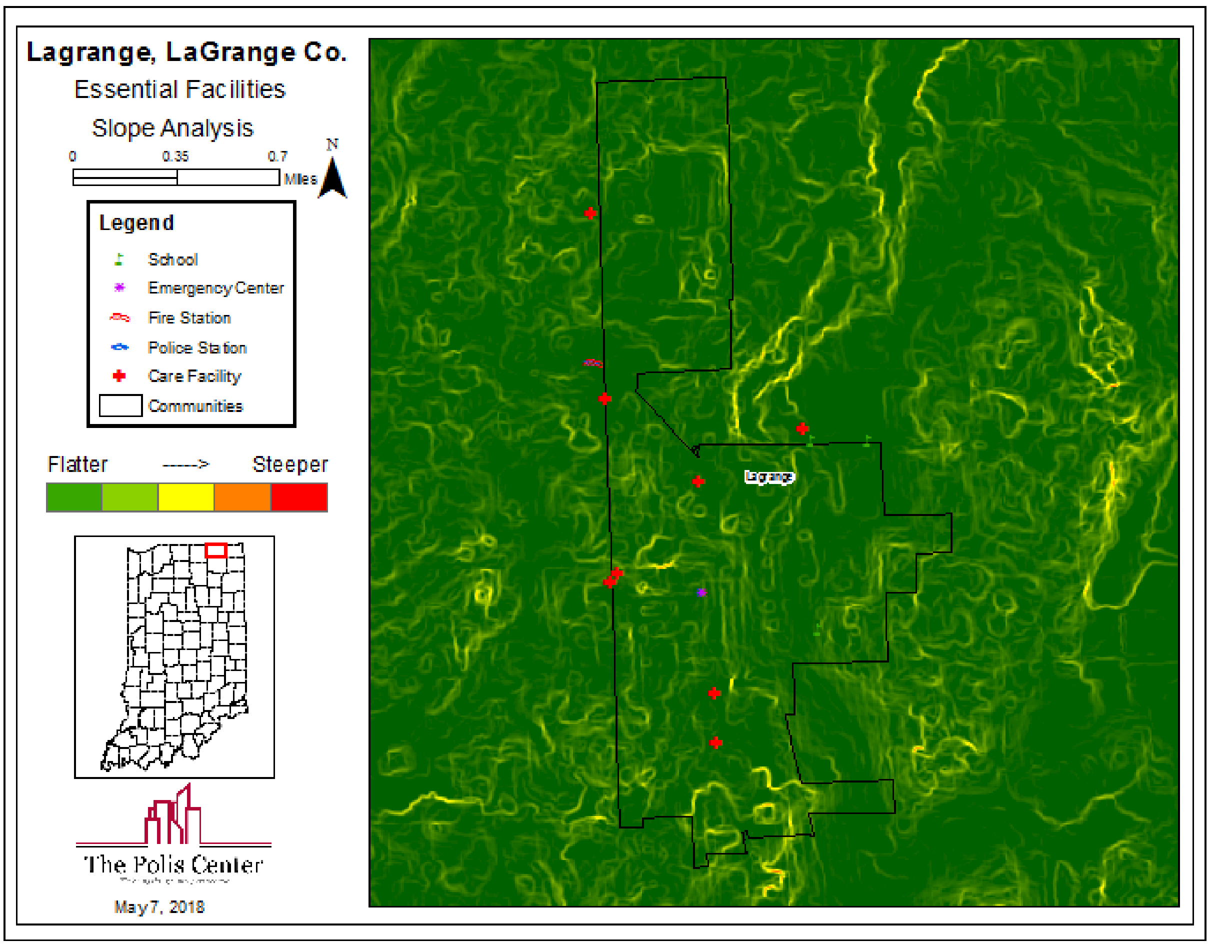
Risk Identification for Ground Failure

In Meeting #2, the planning team determined that the probability of ground failure is unlikely with limited consequences. The warning time for ground failure is less than 6 hours with a duration of less than 1 week. The calculated CPRI for ground failure is 2.05.

Vulnerability Analysis for Ground Failure

The terrain of LaGrange County is largely smooth except for slopes around rivers or creeks. The existing essential facilities of LaGrange County are not subjected to any major slope failure but have been mapped for reference in Figure 25.

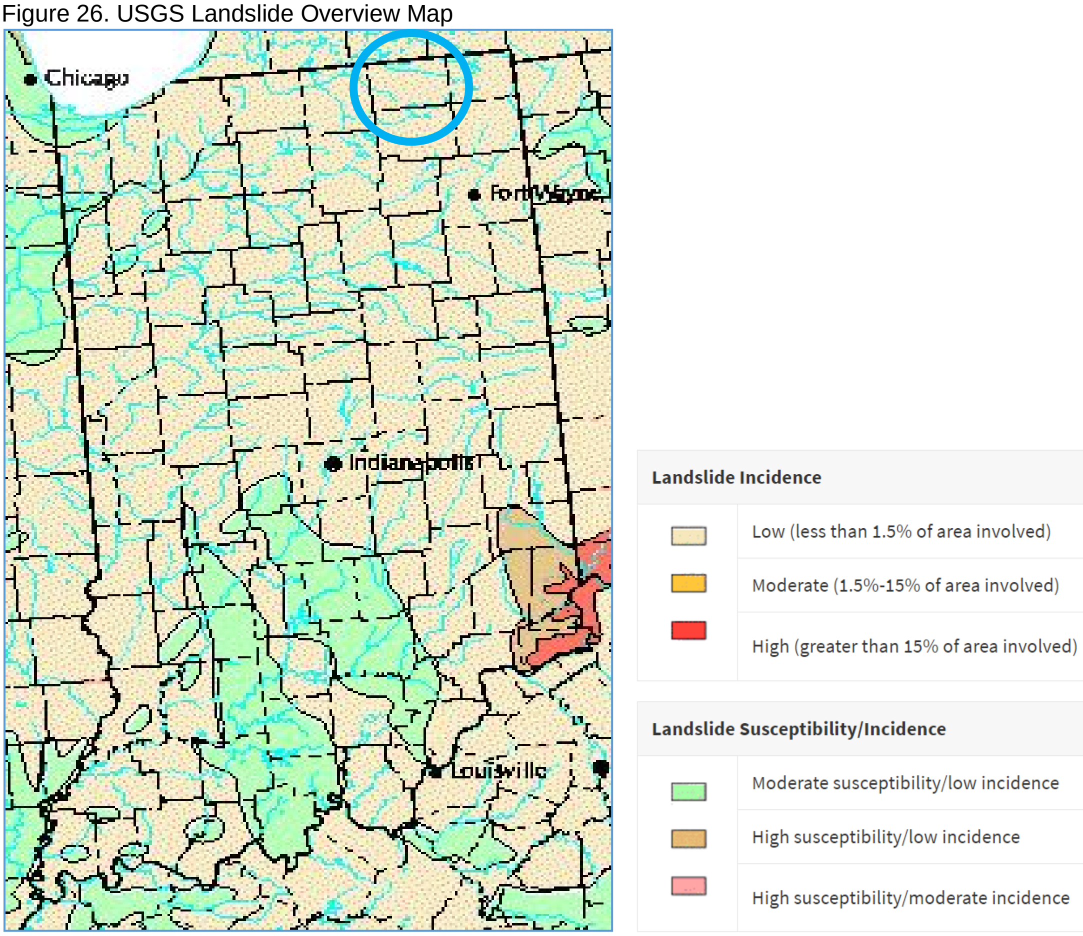
Figure 25. Slope Map-LaGrange County Zoomed



The US Geological Survey's Landslide Overview Map of the Conterminous United States shows two large zones in south-central Indiana as having moderate susceptibility for landslides, but with low incidence of landslides. In contrast, the majority of northern Indiana has a very low (less than 1.5% of the area involved) incidence of landslides and only the northwest is shown as having a moderate level of susceptibility. Areas in the southwest and to the east are more likely to fail because of a landslide.

As seen in the USGS Landslide Overview Map figure, LaGrange County predominantly lies in the low landslide incidence zone.

Figure 26. USGS Landslide Overview Map



Community Development and Future Vulnerability

All future communities, buildings, and infrastructure will remain vulnerable to ground failure in the areas of LaGrange County where the structures are located near streams and rivers, and in areas of significant elevation change. In areas with higher levels of population, the vulnerability is greater than in open areas with no infrastructure demands. Continued development will occur in many of these areas. Currently, LaGrange County reviews new developments for compliance with the local zoning ordinance. Newly planned construction should be reviewed with the historical mining maps to minimize potential subsidence structural damage.

Relationship to other Hazards

Flooding – Flooding is typically the leading cause to ground failure, particularly along streams. Ground failure and flooding combine to impact property and infrastructure such as roads and bridges.

4.4 Summer Storms and Tornadoes

Hazard Definition for Summer Storm

Thunderstorms

Severe thunderstorms are defined as thunderstorms with one or more of the following characteristics: strong winds, large damaging hail, or frequent lightning. Severe thunderstorms most frequently occur in Indiana during the spring and summer but can occur any month of the year at any time of day. A severe thunderstorm's impacts can be localized or widespread in nature. The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service classifies a thunderstorm as severe when it meets one or more of the following criteria:

- Hail with a one-inch diameter or higher
- Wind speeds equal to or greater than 58 miles per hour
- Thunderstorms that produce a tornado

The National Weather Service does not consider lightning frequency a criterion for issuing a severe thunderstorm warning; however, frequent and dangerous lightning is considered a severe weather hazard. NOAA consistently ranks lightning as one the top weather killers in the United States.

Lightning

Lightning is caused by the discharge of electricity between clouds or between clouds and the surface of the earth. In a thunderstorm there is a rapid gathering of particles of moisture into clouds and forming of large drops of rain. This gathers electric potential until the surface of the cloud (or the enlarged water particles) is insufficient to carry the charge, and a discharge takes place, producing a brilliant flash of light. The power of the electrical charge and intense heat associated with lightning can electrocute on contact, split trees, ignite fires, and cause electrical failures. Most lightning casualties occur in the summer months, during the afternoon and early evening.

Hail

Hail is a product of a severe thunderstorm. Hail consists of layered ice particles which are developed when strong updrafts within the storm carry water droplets above the freezing level. They remain suspended and continue to grow larger, until their weight can no longer be supported by the winds. The NWS uses the following descriptions when estimating hail sizes: pea size is ¼ inch, marble size is ½ inch, dime size is ¾ inch, quarter size is 1 inch, golf ball size is 1 ¾ inches, and baseball size is 2 ¾ inches. Individuals who serve as volunteer “storm spotters” for the NWS are located throughout the state, and are instructed to report hail dime size (¾ inch) or greater. Hailstorms can occur throughout the year; however, the months of maximum hailstorm frequency are typically between May and August. Although hailstorms rarely cause injury or loss of life, they can cause significant damage to property, particularly roofs and vehicles.

Windstorms

Windstorms can and do occur in all months of the year; however, the most severe windstorms usually occur during severe thunderstorms in the warm months. Associated with strong thunderstorms, downbursts are severe localized downdrafts from a thunderstorm or rain shower. This outflow of cool or colder air can create damaging winds at or near the surface. Downburst winds can potentially cause as much damage as a small tornado and are often confused with tornadoes due to the extensive damage that they inflict. As these downburst winds spread out, they are frequently referred to as straight-line winds. Straight-line winds can cause major structural and tree damage over a relatively large area.

Summer storms, including thunderstorms, hailstorms, and windstorms affect LaGrange County on an annual basis. Thunderstorms are the most common summer hazardous event in the county, occurring primarily during the months of May through August, with the severest storms most likely to occur from mid-May through mid-July. Typically, thunderstorms are locally produced by cumulonimbus clouds, are always attended by lightning, and are often accompanied by strong wind gusts, heavy rain, and sometimes hail and tornadoes.

Hazard Definition for Tornado

According to the National Severe Storms Laboratory, a tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust and debris. Tornadoes are the most violent of all atmospheric storms.

Since 2007, tornado strength in the United States is ranked based on the Enhanced Fujita scale (EF scale), replacing the Fujita scale introduced in 1971. The EF scale uses similar principles to the Fujita scale, with six categories from 0-5, based on wind estimates and damage caused by the tornado. The EF Scale is used extensively by the NWS in investigating tornadoes (all tornadoes are now assigned an EF Scale number), and by engineers in correlating damage to buildings and techniques with different wind speeds caused by tornadoes.

Tornado damage curves for the Fujita Scale are shown in the following table. The approximate width of the damage and minimum percent damage provide a better understanding of the capabilities of the tornado funnels as the sizes increase.

Table 20. Tornado Path Widths and Damage

Enhanced Fujita Scale	Path Width (feet)	Maximum Expected Damage
EF5	3,000	100%
EF4	2,400	100%
EF3	1,800	80%
EF2	1,200	50%
EF1	600	10%
EF0	300	0%

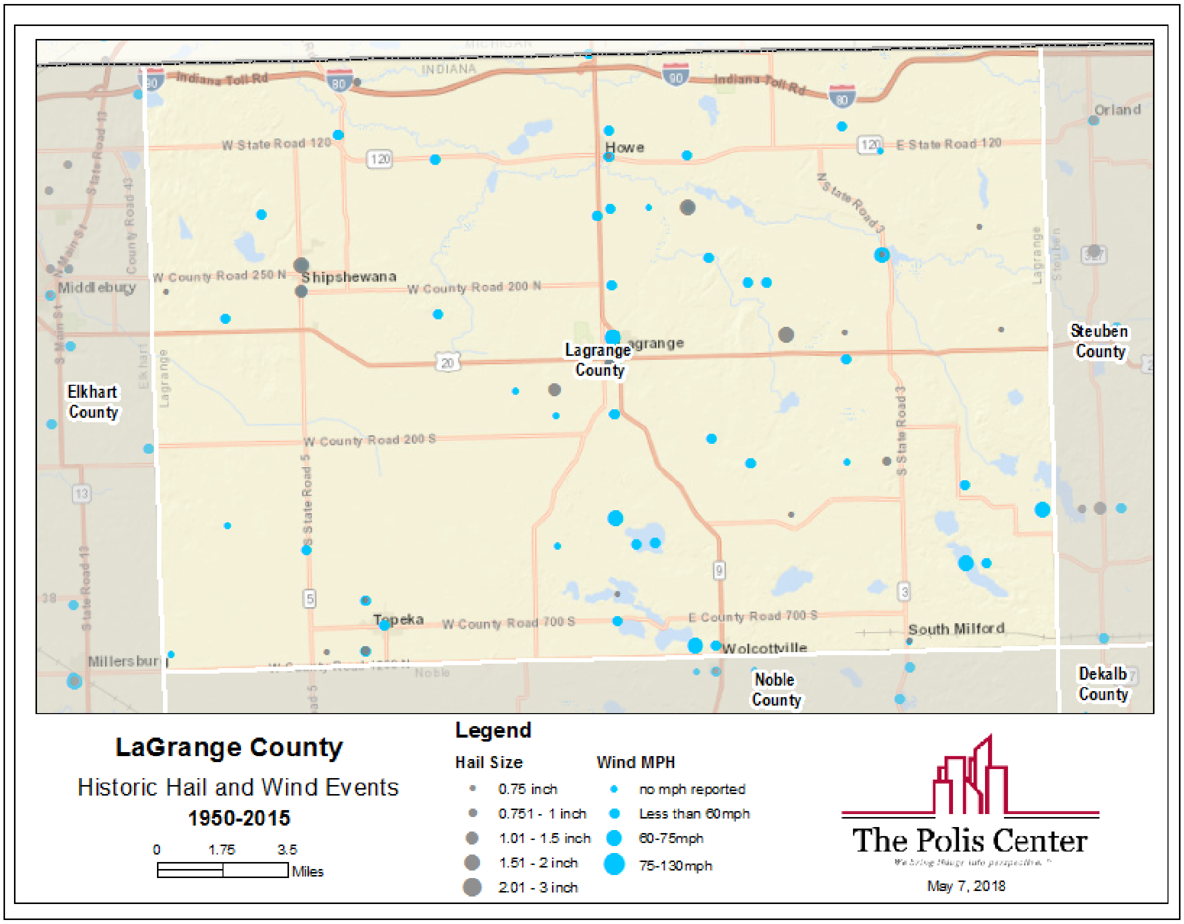
Summer Storm and Tornado History in LaGrange County

Summer Storm

The history of summer storms in LaGrange County was determined by analyzing the hail, high wind, lightning, strong wind, and thunderstorm wind events for the county in the NCDC database. From 1973 to 2012, there were 130 summer storm-related reports. Since 2012 there have been 20 summer storm-related reports, not including reports of tornadoes. None of these events have any reported injuries or property damage costs, but there was one reported fatality. In July 2014 Emergency management officials reported that a tree, six inches in diameter, fell on a residence located on Big Long Lake crushing a 64-year-old male individual. Additional NCDC events and details about their associated impacts can be found in Appendix C.

Figure 27 displays the locations for historic hail and wind events in the county.

Figure 27. LaGrange County Historic Hail and Wind Events



Tornado

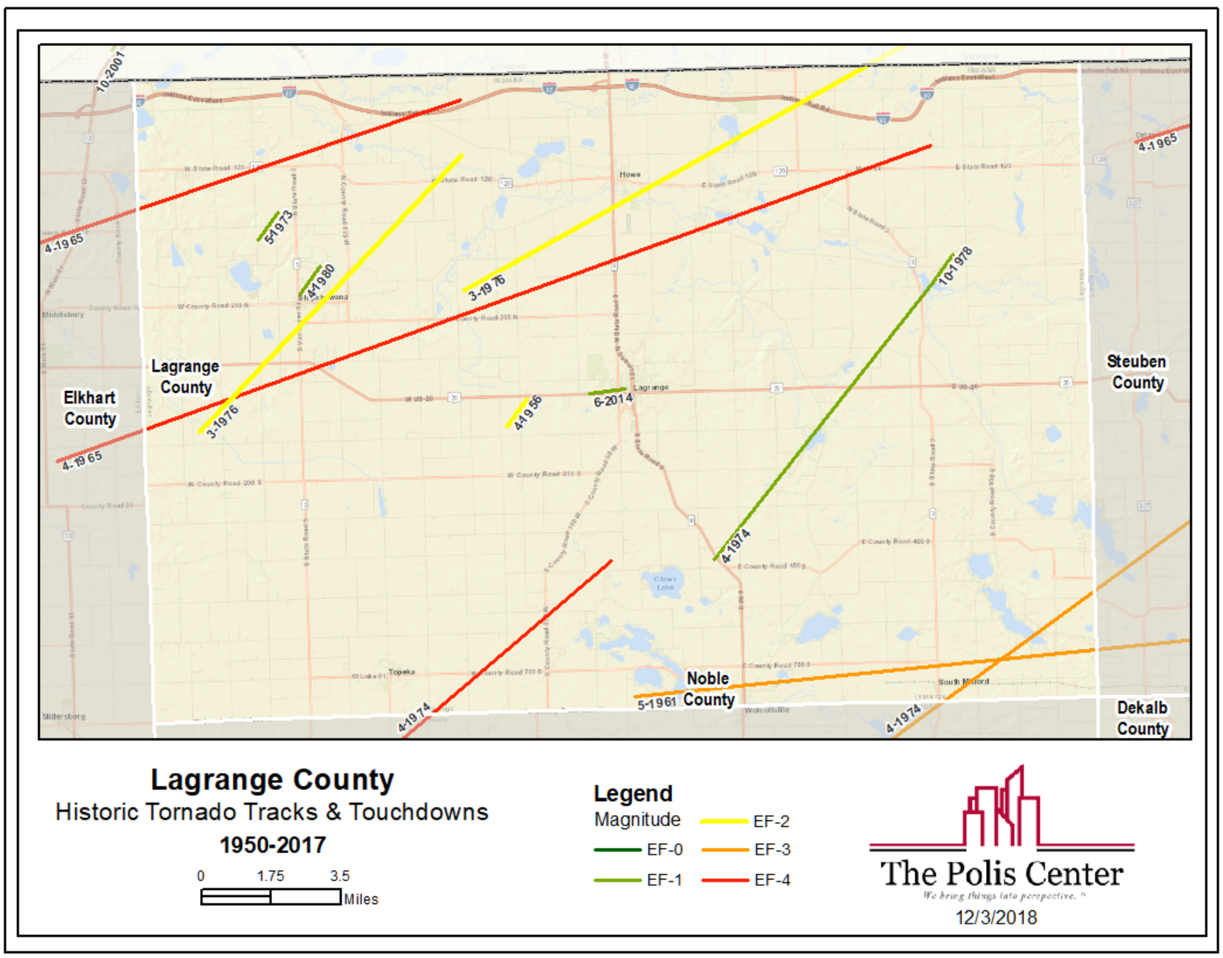
According to the NCDC there have been 11 occurrences of tornadoes within LaGrange County since 1965. The most recent tornado occurred in July 2014 in the Town of LaGrange. The National Weather Service found damage consistent with an EF1. The tornado touched down just west of LaGrange uprooting and snapping numerous trees as it entered the town just south of the local hospital. The tornado caused minor structural damage to homes along Grant Street before lifting off just west of South Mountain Street. Maximum wind speeds were estimated at 95 mph. LaGrange County NCDC recorded tornadoes are identified in Table 21. Additional details for NCDC events are included in Appendix C. Figure 28 displays historical tornadoes for LaGrange County.

Table 21. LaGrange County Tornadoes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
LaGrange	4/11/1965	Tornado	F4	5	41	2.5M	0
LaGrange	4/11/1965	Tornado	F4	5	42	0	0
LaGrange	4/3/1974	Tornado	F3	0	0	0	0
LaGrange	4/3/1974	Tornado	F1	0	5	25K	0
LaGrange	3/12/1976	Tornado	F2	0	8	25K	0
LaGrange	3/12/1976	Tornado	F2	0	9	250K	0
LaGrange	10/5/1978	Tornado	F1	0	0	25K	0
LaGrange	4/8/1980	Tornado	F1	0	0	2.5K	0
LaGrange	5/18/1997	Tornado	F0	0	1	1.5M	0
Stone Lake	5/18/1997	Tornado	F0	0	1	1.5M	0
LaGrange	7/1/2014	Tornado	EF1	0	0	0	0

** NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.*

Figure 28. Historical Tornado Tracks and Touchdowns for LaGrange County



Geographic Location for Summer Storm and Tornado

The entire county has the same risk for occurrence of summer storms and tornadoes. They can occur at any location within the county.

Hazard Extent for Summer Storm and Tornado

The extent of the summer storm and tornado hazards vary both in terms of the extent of the path of the event and the wind speed.

Risk Identification for Summer Storm and Tornado

In Meeting #2, the planning team determined that the probability of a summer storm is highly likely with critical consequences. The warning time for a summer storm is 6 to 12 hours with a duration of more than 24 hours. The calculated CPRI for summer storm is 3.35. The planning team ranked the tornado hazard as highly likely with catastrophic consequences. The warning time for a tornado is less than 6 hours with a duration of more than 1 week. The calculated CPRI for a tornado is 4.0.

Vulnerability Analysis for Summer Storm and Tornado

During a tornado, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a tornado. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

All facilities are vulnerable to severe thunderstorms. These facilities will encounter many of the same impacts as any other building within the jurisdiction including structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality, such as a damaged police station would no longer be able to serve the community.

During a severe thunderstorm, the types of infrastructure that could be impacted include roadways, utility lines and pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these structures could become damaged during a severe thunderstorm. The impacts to these structures include impassable roadways, broken or failed utility lines, causing loss of power or gas to the community, or railway failure from broken or impassable tracks. Additionally, bridges could fail or become impassable, causing risks to traffic.

GIS Tornado Analysis

The following analysis completed for the plan update utilizes an example scenario to gauge the anticipated impacts of tornadoes in the county in terms of numbers and types of buildings and infrastructure.

GIS overlay modeling was used to determine the potential impacts of an EF-4 tornado. The analysis used a hypothetical tornado path that runs for 16 miles through the northern half of the county. This scenario includes impacts to the major employers of the county. The selected widths were modeled after a recreation of the Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 22 depicts tornado damage curves as well as path widths.

Table 22. Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
EF-5	3000	100%
EF-4	2400	100%
EF-3	1800	80%
EF-2	1200	50%
EF-1	600	10%
EF-0	300	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with a decreasing amount of damage away from the center of the path. This natural process was modeled in GIS by adding damage zones around the tornado path.

Figure 29. EF-4 Tornado Analysis, Using GIS Buffers

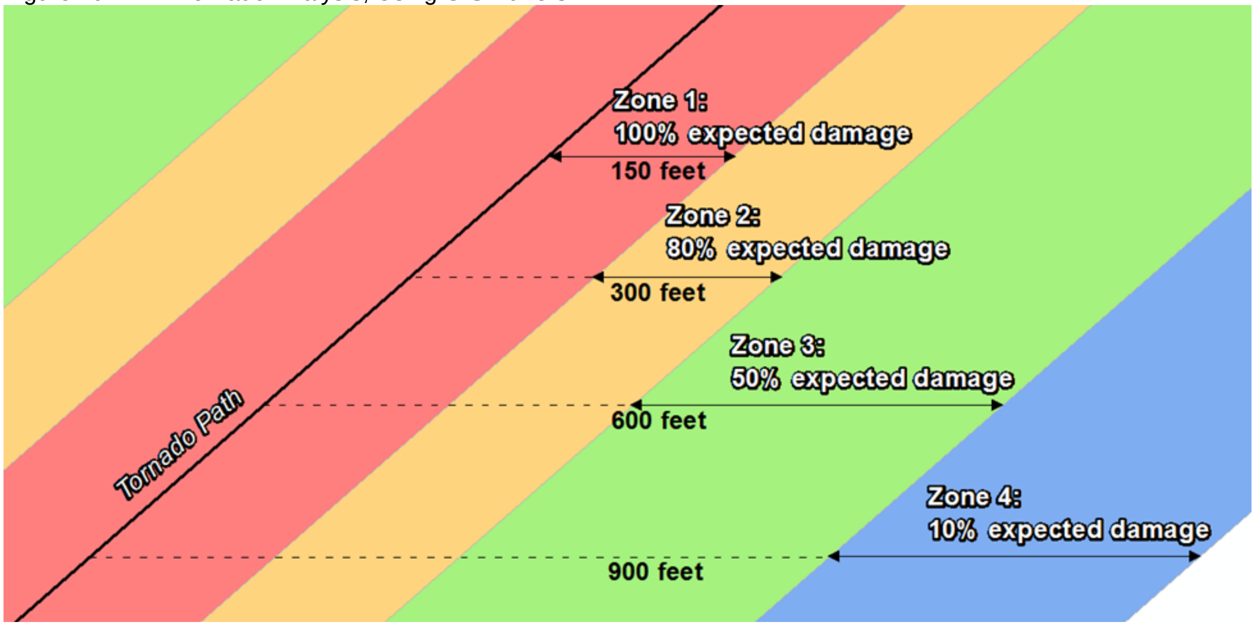


Table 23. EF-4 Tornado Zones and Damage Curves

Fujita Scale	Zone	Buffer (feet)	Damage Curve
EF-4	4	900-1200	10%
EF-4	3	600-900	50%
EF-4	2	300-600	80%
EF-4	1	0-300	100%

The results of the analysis are depicted in Table 24 and Table 25.. The GIS analysis estimates that 655 buildings will be damaged. The estimated building losses are $105.5 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against the Building Inventory created at an earlier stage using the Assessor data in combination with Parcel records. NOTE: The assessor records often do not include nontaxable parcels and associated building improvements therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Table 24. Estimated Building Losses by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	98	92	177	154
Commercial	1	5	9	11
Industrial	0	1	1	1
Agriculture	15	13	22	30
Religious	0	4	3	2
Government	1	1	7	6
Education	0	0	0	1
Total	**115**	**116**	**219**	**205**

Table 25. Estimated Losses by Zone

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$20,193,135	$11,197,530	$17,364,670	$2,619,598
Commercial	$484,895	$5,035,142	$6,011,030	$941,026
Industrial	$0	$1,659,392	$310,690	$289,984
Agriculture	$3,125,186	$2,969,519	$2,693,535	$941,051
Religious	$0	$13,105,838	$9,505,940	$668,846
Government	$191,884	$2,075,872	$3,539,635	$567,906
Education	$0	$0	$0	$107,667
Total	**$23,995,100**	**$36,043,293**	**$39,425,500**	**$6,136,078**

Figure 30. Modeled F4 Tornado Damage Hypothetical Path

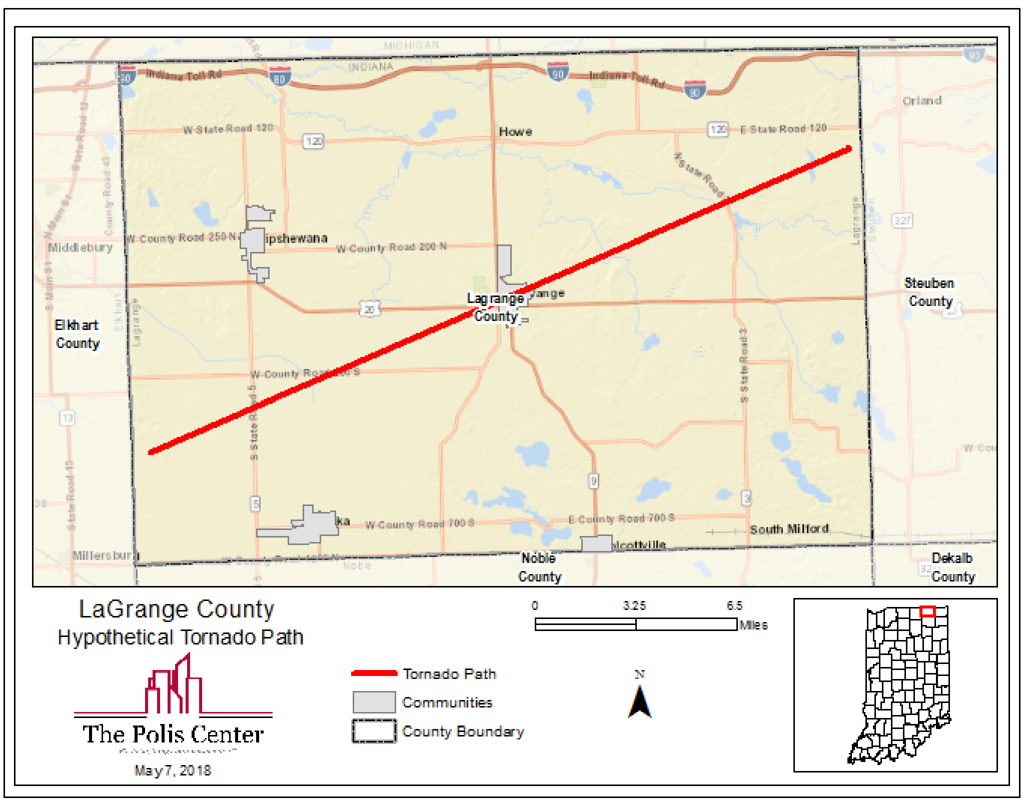


Figure 31. Tornado Path with Damaged Buildings

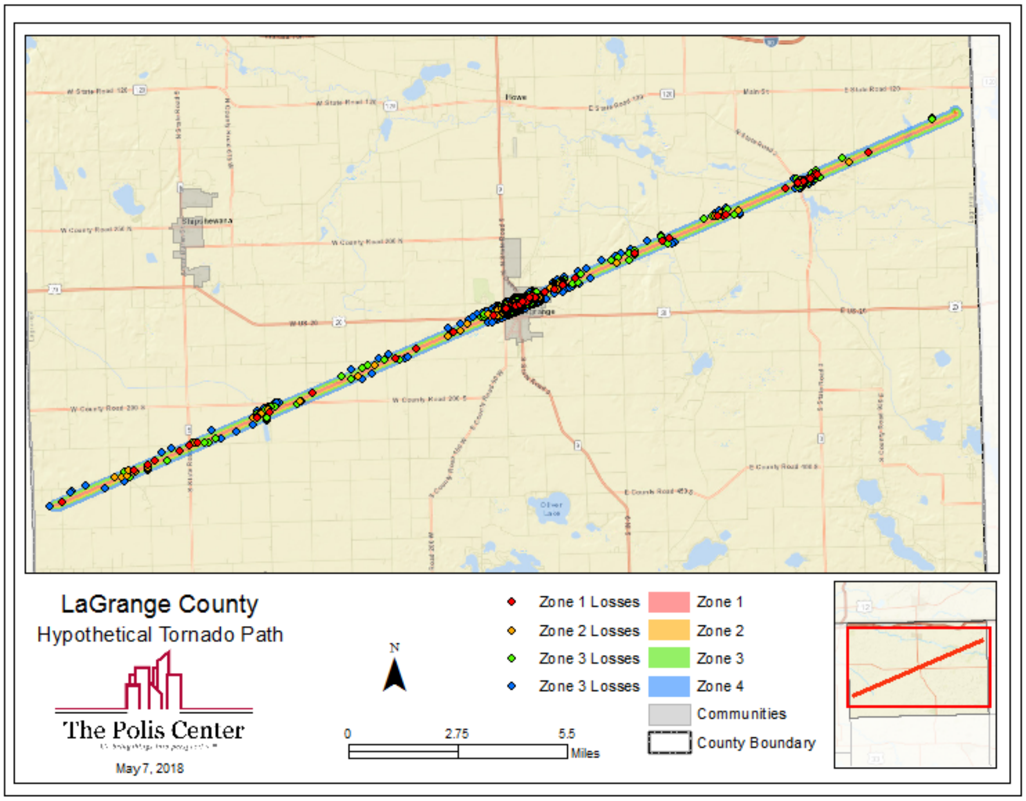
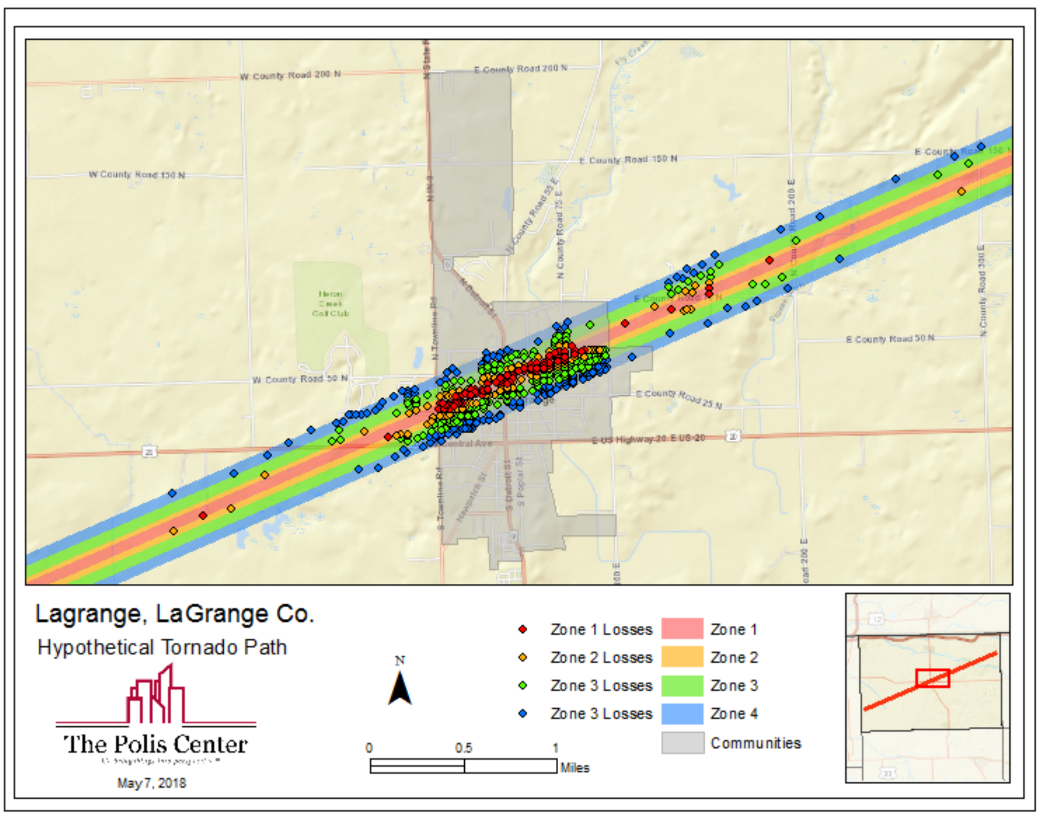


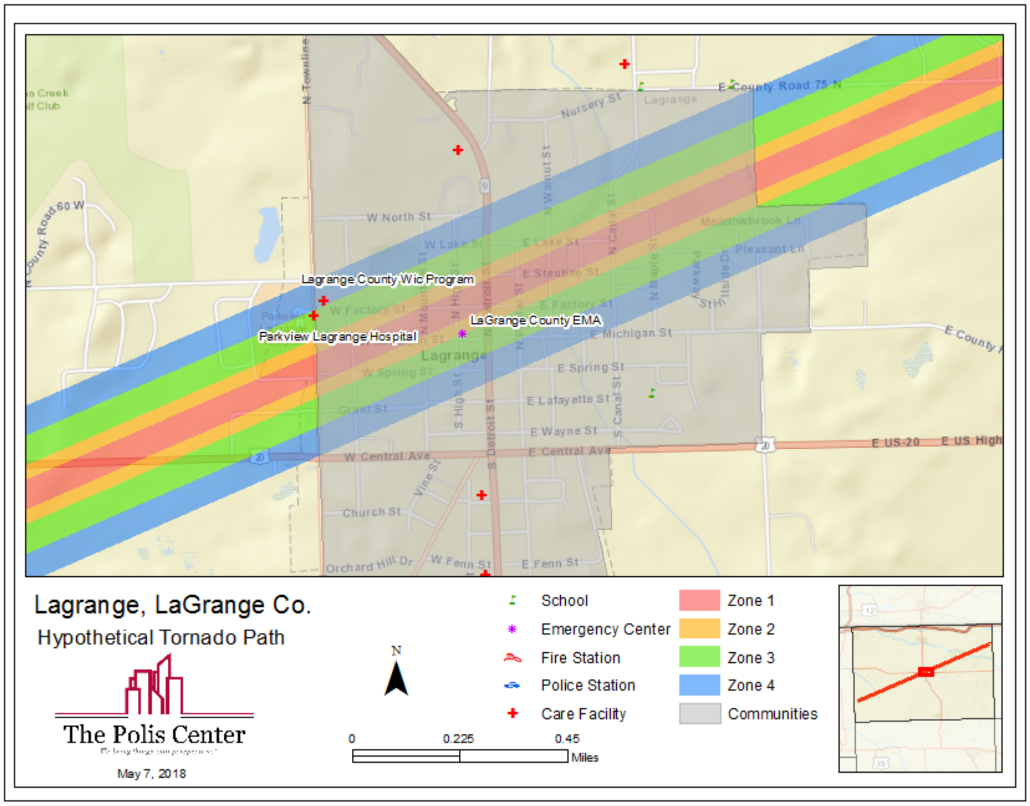
Figure 32. Tornado Path: LaGrange County Zoomed In



Facility and Infrastructure Damage

The essential facilities damaged in the hypothetical tornado path are shown in Figure 33. Critical facilities damaged in the hypothetical path can be found in Appendix E.

Figure 33. Hypothetical Damages to Essential Facilities, LaGrange County



Community Development Trends and Future Vulnerability

The entire population and buildings have been identified as at risk because summer storms and tornadoes can occur anywhere within the state of Indiana at any time of the day. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for LaGrange County is included in Table 11. All critical facilities in the county and communities within the county are at risk. Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warnings of approaching storms are also vital to preventing the loss of property and ensuring the safety of LaGrange County residents.

Relationship to other Hazards

Flooding - Thunderstorms with heavy amounts of rainfall can cause localized flooding, which can impact property and infrastructure such as roads.

Public Health - Public health can be impacted as a result of wastewater spills due to flooding.

Wildland Fire - Lighting strikes may ignite a wildland fire. Windstorms that result in downed timber increase the fuel load in a forest that may increase the risk of wildfire.

Structural Fire - Lighting strikes may ignite a structural fire.

4.5 Drought

Hazard Definition for Drought

The meteorological condition that creates a drought is below normal rainfall. However, excessive heat can lead to increased evaporation, which will enhance drought conditions. Droughts can occur in any month. Drought differs from normal arid conditions found in low rainfall areas. Drought is the consequence of a reduction in the amount of precipitation over an undetermined length of time (usually a growing season or more).

The Palmer Drought Severity Index (PDSI), developed by W.C. Palmer in 1965, is a soil moisture algorithm utilized by most federal and state government agencies to trigger drought relief programs and responses. The objective of the PDSI is to provide standardized measurements of moisture, so that comparisons can be made between locations and periods of time—usually months. The PDSI is designed so that a -4.0 in Indiana has the same meaning in terms of the moisture departure from a climatological normal as a -4.0 does in South Carolina.

The U.S. Drought Monitor (USDM) provides a national assessment on drought conditions in the United States. The following table is a reference from the classification scheme provided by the USDM, and the correlation between PDSI and the category, descriptions, and possible impacts associated with those level events. This classification is often used to refer to the severity of droughts for statistical purposes. The USDM provides weekly data for each county, noting the percent of land cover in the condition of the drought category identified below.

Table 26. USDM Index

Category	Description	Possible Impacts	Palmer Drought Severity Index
D0	Abnormally Dry	Going into drought: -short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits	-1.0 to -1.9
D1	Moderate Drought	-Some damage to crops, pastures -Streams, reservoirs, or wells low, some water shortages developing or imminent -Voluntary water-use restrictions requested	-2.0 to -2.9
D2	Severe Drought	-Crop or pasture losses likely -Water shortages common -Water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	-Major crop/pasture losses -Widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	-Exceptional and widespread crop/pasture losses -Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

In the past decade, the US has continued to consistently experience drought events with economic impacts greater than $1 billion; FEMA estimates that the nation's average annual drought loss is $6 billion to $8 billion. For Indiana alone, the National Drought Mitigation Center reported hundreds of drought impacts in the past decade ranging from water shortage warnings to reduced crop yields and wild fires.

Drought History in LaGrange County

Since the last MHMP, the National Drought Mitigation Center and the Indiana Drought Monitor have recorded several incidences of drought in LaGrange County.

Like the rest of Indiana, LaGrange County was affected by the 2012 Central US drought. LaGrange County experienced a period of drought from mid-July through the first week of August 2012. At the drought's peak, 100% of land area in LaGrange County was at category D3 (extreme drought) for four weeks. In response to the disaster, the United States Department of Agriculture streamlined the disaster designation process. Along with approximately two-thirds of Indiana counties, LaGrange County enacted an open burn ban in response to the dry weather conditions during the 2012 drought. The 2012 drought negatively impacted agriculture and business, so small businesses in LaGrange County were eligible for aid from the Small Business Administration (SBA).

Since the 2012 drought, the National Drought Mitigation Center reported drought impacts in both 2015 and 2016. In October 2015, soybeans, winter wheat, and pastures were affected by dryness.

During the summer of 2016, dry weather caused Indiana pastures to brown. County crops were stressed from lack of rain, and late planted corn withered.

Geographic Location for Drought

Droughts are regional in nature. All areas of the county are vulnerable to the risk of drought.

Hazard Extent for Drought

Droughts can be widespread or localized events. The extent of the droughts varies both in terms of the extent of the heat and the range of precipitation.

Risk Identification for Drought

In Meeting #2, the planning team determined that the probability of a drought is possible with limited consequences. The warning time for a drought is at least 24 hours with a duration of more than 1 week. The calculated CPRI for drought is 2.05.

Vulnerability Analysis for Drought

Drought impacts, as described in the drought history previously, are a distributed threat across the entire jurisdiction; therefore, the county is vulnerable to this hazard and can expect the same impacts within the affected area.

Community Development Trends and Future Vulnerability

Drought impacts, as described in the drought history section, are a threat across the entire jurisdiction; therefore, the county is vulnerable to this hazard and can expect varying impacts within the affected area. Future development will remain vulnerable to drought events. Typically, some urban and rural areas are more susceptible than others. Excessive demands for water in populated urban areas place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of drought.

Relationship to other Hazards

Wildfires - A drought situation can significantly increase the risk of wildfire.

Extreme Temperatures - A drought situation can significantly worsen with long periods of high temperatures.

4.6 Winter Storms: Blizzards, Ice Storms, Snowstorms

Hazard Definition for Winter Storm

Severe winter weather consists of various forms of precipitation and strong weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human-health risks such as frostbite, hypothermia, and death.

Ice Storms

Ice or sleet, even in the smallest quantities, can result in hazardous driving conditions and can be a significant cause of property damage. Sleet can be easily identified as frozen raindrops. Sleet does not stick to trees and wires. The most damaging winter storms in Indiana have been ice storms. Ice storms are the result of cold rain that freezes on contact with objects having a temperature below freezing. Ice storms occur when moisture-laden gulf air converges with the northern jet stream, causing strong winds and heavy precipitation. This precipitation takes the form of freezing rain, coating power lines, communication lines, and trees with heavy ice. The winds then will cause the overburdened limbs and cables to snap, leaving large sectors of the population without power, heat, or communication. Falling trees and limbs also can cause building damage during an ice storm. In the past few decades, numerous ice-storm events have occurred in Indiana.

Snowstorms

Significant snowstorms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snowstorm with winds of 35 miles an hour or greater and/or visibility of less than one-quarter mile for three or more hours. The strong winds during a blizzard blow about falling and already existing snow, creating poor visibility and impassable roadways. Blizzards have the potential to result in property damage.

Indiana has been struck repeatedly by blizzards. Blizzard conditions not only cause power outages and loss of communication, potentially for days, but can also make transportation difficult. The blowing of snow can reduce visibility to less than one-quarter mile, and the resulting disorientation makes even travel by foot dangerous, if not deadly.

Damages from blizzards can range from significant snow removal costs to human and livestock deaths. Because of the blinding potential of heavy snowstorms, drivers are also at risk of collisions with snowplows or other road traffic. Stranded drivers can make uninformed decisions, such as leaving the car to walk in conditions that put them at risk. Drivers and homeowners without emergency plans and kits are vulnerable to the life-threatening effects of heavy snow storms such as power outages, cold weather, and inability to travel, communicate, obtain goods or reach their destinations. Heavy snow loads can cause structural damage, particularly in areas where there are no building codes or for residents living in manufactured home parks.

Winter Storm History in LaGrange County

The NCDC database identified 37 winter storm, heavy snow, ice storm, winter weather, or blizzard events for LaGrange County since 2011. In February 2014 snowfall accumulated quickly, up to 3 to 4 inches, covering roads and making them slick. Wind gusts up to 35 mph in addition to periods of heavy snow caused near whiteout conditions at times. Significant snow blowing and drifting made some secondary roads impassable, causing some school delays and closures. In January 2016 Broadcast media reported slide-offs, accidents and numerous school delays due to snow accumulation and blowing across the county. The snow accumulation ranged between 3 and 5 inches with the heaviest snow fall occurring in the northern portion of the county. The accumulating snow combined along with temperatures in the teens and reduced visibility created difficult driving conditions. On December 15, 2016 numerous accidents were reported due to low visibility and snow covered roads from the lake effect snow showers. One deadly crash involving a tractor trailer and a car at exit 133 on the toll road caused all eastbound lanes to be closed for several hours: there was one fatality. Additional details for NCDC events are included in Appendix C.

Geographic Location for Winter Storm

Severe winter storms are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Winter Storm

The extent of the historical winter storms varies in terms of storm location, temperature, and ice or snowfall. A severe winter storm can occur anywhere in the jurisdiction.

Risk Identification for Winter Storm

In Meeting #2, the planning team determined that the potential for a winter storm is highly likely with critical consequences. The warning time for a winter storm is 6-12 hours with a duration of less than 1 week. The calculated CPRI for a winter storm is 3.30.

Vulnerability Analysis for Winter Storm

Winter storm impacts are equally distributed across the entire jurisdiction; therefore, the entire county is vulnerable to a winter storm and can expect the same impacts within the affected area. A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 11. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

During a winter storm, the types of infrastructure that could be impacted include essential and critical facilities, roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged during a winter storm. Potential impacts include broken gas and/or electricity lines or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Community Development Trends and Future Vulnerability

Any new development within the county will remain vulnerable to these events. Because the winter storm events are regional in nature, future development will be equally impacted across the county.

Relationship to other Hazards

Flooding - Melting from heavy snows can cause localized flooding which can impact property and infrastructure such as roads.

Wildland or Structural Fire - Heavy storms that result in large amounts of downed timber can result in an increase of dead or dying trees left standing, thus providing an increased fuel load for a wildfire. There is an additional risk of increased frequency of structural fires during heavy snow events, primarily due to utility disruptions and the use of alternative heating methods by residents.

Public Safety - Drivers stranded in snowstorms may make uninformed decisions that can put them at risk; residents who are unprepared or vulnerable may not be able to obtain goods or reach their destinations. EMS providers may be slowed by road conditions to respond to emergencies. Ice storms may result in power outages due to downed power lines, putting people at risk for cold temperature exposure and reducing the ability to spread emergency messages to the public via television, radio or computer.

4.7 Extreme Temperatures

Hazard Definition for Extreme Temperatures

Extreme Cold

What constitutes an extreme cold event and its effects varies by region across the US. In areas unaccustomed to winter weather, near freezing temperatures are considered “extreme cold.” Extreme cold temperatures are typically characterized by the ambient air temperature dropping to approximately zero degrees Fahrenheit or below.

Exposure to cold temperatures—indoors or outdoors—can lead to serious or life-threatening health problems, including hypothermia, cold stress, frostbite or freezing of the exposed extremities, such as fingers, toes, nose, and earlobes. Certain populations—such as seniors age 65 or older, infants and young children under five years of age, individuals who are homeless or stranded, or those who live in a home that is poorly insulated or without heat (such as mobile homes) — are at greater risk to the effects of extreme cold.

The magnitude of extreme cold temperatures is generally measured through the Wind Chill Temperature (WCT) Index. WCT is the temperature felt outside and is based on the rate of heat loss from exposed skin by the effects of wind and cold. As the wind increases, the body is cooled at a faster rate causing the skin’s temperature to drop. The NWS issues a Wind Chill Advisory when the minimum wind chill is between -15°F and -24°F. A Wind Chill Warning is issued when the minimum wind chill drops to -25°F or below.

In 2001, the NWS implemented a new WCT Index, designed to more accurately calculate how cold air feels on human skin. The index, shown in Figure 34, includes a frostbite indicator, showing points where temperature, wind speed, and exposure time will produce frostbite in humans.

Figure 34. NWS Wind Chill Temperature Index

NWS Windchill Chart

Wind (mph) \ Temperature (°F) Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Extreme Heat

Human beings need to maintain a constant body temperature if they are to stay healthy. Working in high temperatures induces heat stress when more heat is absorbed into the body than can be dissipated out. Heat illness such as prickly heat, fainting from heat exhaustion, or heat cramps are visible signs that people are working in unbearable heat. In the most severe cases, the body temperature control system breaks down altogether and body temperature rises rapidly. This is a heat stroke, which can be fatal. The NWS issues a heat advisory when, the heat index rises to around 110°F or higher as well as if the maximum heat index is from 95°F to 100°F for four consecutive days. Excessive Heat Warnings are issues with the maximum heat index is greater or equal to 105°F and the minimum heat index of at least 75°F for a 48-hour period as well as if heat advisory conditions are met for four consecutive days.

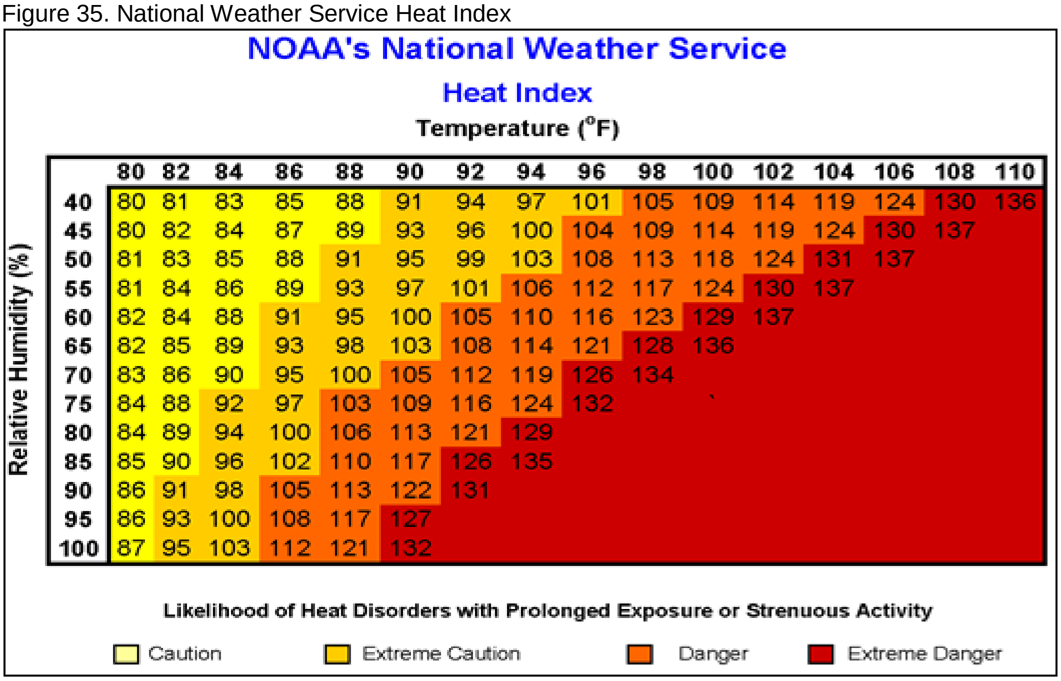
Heat is the leading weather-related killer in the United States, even though most heat-related deaths are preventable through outreach and intervention. According to NOAA, the summer of 2016 was one of the five hottest on record dating to the late 19th century.

Unusually hot summer temperatures have become more frequent across the contiguous 48 states in recent decades (see the High and Low Temperatures indicator), and extreme heat events (heat waves) are expected to become longer, more frequent, and more intense in the future. As a result, the risk of heat-related deaths and illness is also expected to increase. Temperatures that hover

10 degrees Fahrenheit or more above the average high temperature for a region, and last for several weeks, constitute an extreme heat event (EHE). An extended period of extreme heat of three or more consecutive days is typically referred to as a heat wave. Most summers see EHEs in one or more parts east of the Rocky Mountains. They tend to combine both high temperatures and high humidity; although some of the worst heat waves have been catastrophically dry.

Heat alert procedures are based primarily on Heat Index Values. The Heat Index—given in degrees Fahrenheit—is often referred to as the apparent temperature and is a measure of how hot it really feels when the relative humidity is factored with the actual air temperature. The National Weather Service Heat Index Chart can be seen in Figure 35.

Figure 35. National Weather Service Heat Index



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Source: Office of Atmospheric Programs. (2006). Excessive Heat Events Guidebook. United States Environmental Protection Agency. Washington, D.C.

Extreme Temperature History in LaGrange County

The NCDC reported two occurrences of extreme temperatures in LaGrange County since the previous plan. Both records were extreme cold. The two recent extreme cold events occurred in January 2014 and January 2015 respectively. The 2014 event saw temperatures drop into the single digits as arctic air filtered in behind a powerful winter storm that dropped more than a foot of heavy snow on the region. Wind gusts from the west were estimated between 30 and 40 mph which created deadly wind chills and significant blowing and drifting snow. Dangerous wind chills between 30 and 40 degrees below zero were common. The extreme cold and blowing snow made many north-south roads impassable or restricted to single lanes. There were numerous reports of accidents and slide-offs across the region due to slick roads which also caused many businesses and schools to be closed. The January 2015 event saw wind chills which ranged between 20 to 30 degrees below zero. The dangerously cold temperatures led to numerous school closing and delays. There were no injuries or deaths reported for either event.

Geographic Location for Extreme Temperature

Extreme temperatures are regional in nature. All areas of LaGrange County are vulnerable to the risks of extreme cold or extreme heat.

Hazard Extent for Extreme Temperature

Extreme temperatures are normally widespread events. Extreme heat commonly occurs in the summer while extreme cold is most frequently associated with the winter months.

Risk Identification for Extreme Temperature

In Meeting #2, the planning team determined that the probability of an extreme temperature hazard is likely with limited consequences. Extreme temperatures were determined to have a warning time of more than 24 hours with a duration less than one week. The calculated CPRI for extreme temperatures in LaGrange County is 2.50.

Vulnerability Analysis for Extreme Temperature

Extreme temperature impacts are an equally distributed threat across the entire jurisdiction; therefore, the county is vulnerable to this hazard and can expect the same impacts within the affected area. According to FEMA, approximately 175 Americans die each year from extreme heat.

Prolonged exposure to extreme heat may lead to serious health problems, including heat stroke, heat exhaustion, or sunburn. Certain populations — such as seniors age 65 and over, infants and young children under five years of age, pregnant women, the homeless or poor, the obese, and people with mental illnesses, disabilities, and chronic diseases — are at greater risk to the effects of extreme heat and extreme cold. Depending on severity, duration, and location these populations may not have ready access to cooling or warming centers.

Community Development Trends and Future Vulnerability

Because extreme temperatures are regional in nature, future development will be impacted across the county. Although urban and rural areas are equally vulnerable to this hazard, those living in urban areas may have a greater risk from the effects of a prolonged heat wave. The atmospheric conditions that create extreme heat tend to trap pollutants in urban areas, adding contaminated air to the excessively hot temperatures and creating increased health problems. Furthermore, asphalt and concrete store heat longer, gradually releasing it at night and producing high nighttime temperatures. This phenomenon is known as the "urban heat island effect." Local officials should address extreme temperature hazards by educating the public on steps to take before and during the event and locations of cooling and warming centers.

Relationship to other Hazards

Drought and Wildfire - Dry, hot conditions can reduce the protective moisture of woodlands and increase the risk of wildfire.

Public Safety - Anyone exposed to extreme heat can develop heat exhaustion and heat stroke. The elderly, children and those who engage in outdoor work or recreation may be most susceptible to the danger of extreme heat.

4.8 Hazardous Material Release

Hazard Description for Hazardous Material Release

The State of Indiana has numerous active transportation lines that run through many of its counties. Active railways transport harmful and volatile substances between our borders every day. The transportation of chemicals and substances along interstate routes is commonplace in Indiana. The rural areas of Indiana have considerable agricultural commerce, creating a demand for fertilizers, herbicides, and pesticides to be transported along rural roads. Finally, Indiana is bordered by two major rivers and Lake Michigan. Barges transport chemicals and substances along these waterways daily. These factors increase the chance of hazardous material releases and spills throughout the State of Indiana.

The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials and chemicals, dust, and bombs. An explosion potentially can cause death, injury, and property damage. In addition, a fire routinely follows an explosion, which may cause further damage and inhibit emergency response. Emergency response may require fire, safety and law enforcement, search and rescue, and hazardous materials units.

Hazardous Incident History in LaGrange County

LaGrange County has not experienced a significantly large-scale hazardous material incident at a fixed site or during transport resulting in multiple deaths or serious injuries, although there have been many minor releases that have put local firefighters, hazardous materials teams, emergency management, and local law enforcement into action to try to stabilize these incidents and prevent or lessen harm to LaGrange County residents.

Geographic Location for Hazardous Material Release

The hazardous material hazards are countywide and are primarily associated with the transport of materials via highway, railroad, and/or river barge.

Hazard Extent for Hazardous Material Release

The extent of the hazardous material (referred to as hazmat) hazard varies in terms of the quantity of material being transported as well as the specific content of the container. Hazardous material impacts are an equally distributed threat across the entire jurisdiction; therefore the entire county is vulnerable to a hazardous material release and can expect the same impacts within the affected area. The main concern during a release or spill is the population affected. This plan will therefore consider all buildings located within the county as vulnerable.

Risk Identification for Hazardous Material Release

In Meeting #2, the planning team determined that the probability of a hazardous materials release was possible with limited consequences. Hazardous materials releases were determined to have a warning time of less than six hours with a duration longer than 1 week. The calculated CPRI for hazardous material releases in LaGrange County is 2.55.

Vulnerability Analysis for Hazardous Materials Release

The hazardous material release hazards are countywide and primarily are associated with the transport of materials by highway and/or railroad. During a hazardous material release, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads and bridges. The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials/chemicals, dust, and bombs. An explosion potentially can cause death, injury, and property damage. In addition, a fire routinely follows an explosion, which may cause further damage and inhibit emergency response.

GIS Hazmat Analysis

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a chlorine release at the intersection of Central Avenue and South Detroit Street located centrally in the Town of LaGrange.

ALOHA generates a threat zone area where a hazard (such as toxicity or thermal radiation) has exceeded a user-specified Level of Concern (LOC). ALOHA will display up to three threat zones overlaid on a single picture using Acute Exposure Guideline Levels (AEGLs). AEGLs are exposure guidelines designed to help responders deal with emergencies involving chemical spills or other catastrophic events where members of the general public are exposed to a hazardous airborne chemical.

AEGLs are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures.

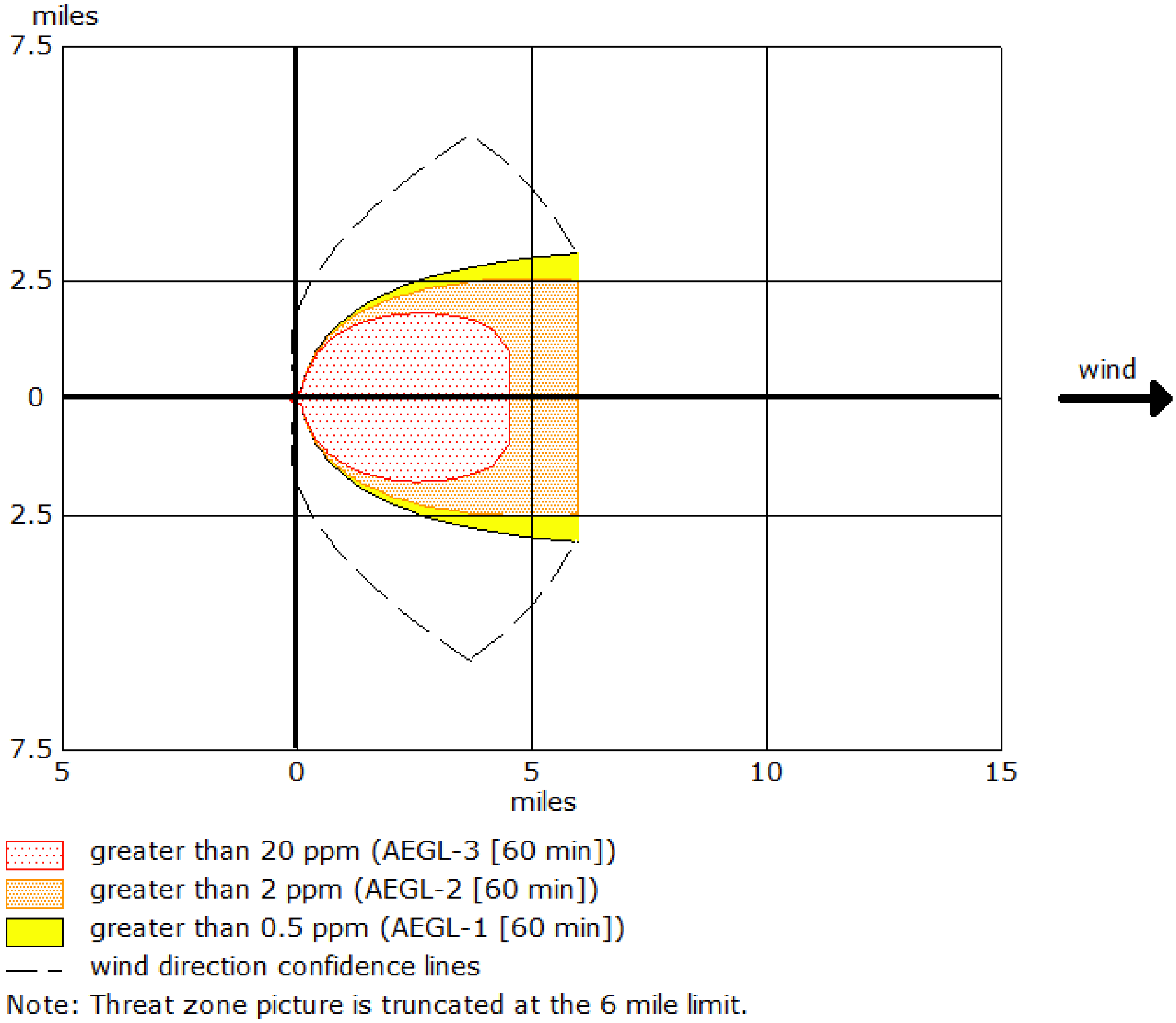
- Zone 1 (AEGL 1): Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure

- Zone 2 (AEGL 2): Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape

- Zone 3 (AEGL 3): Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million (ppm). Figure 36 is an illustration of the toxic threat plume footprint as determined by ALOHA.

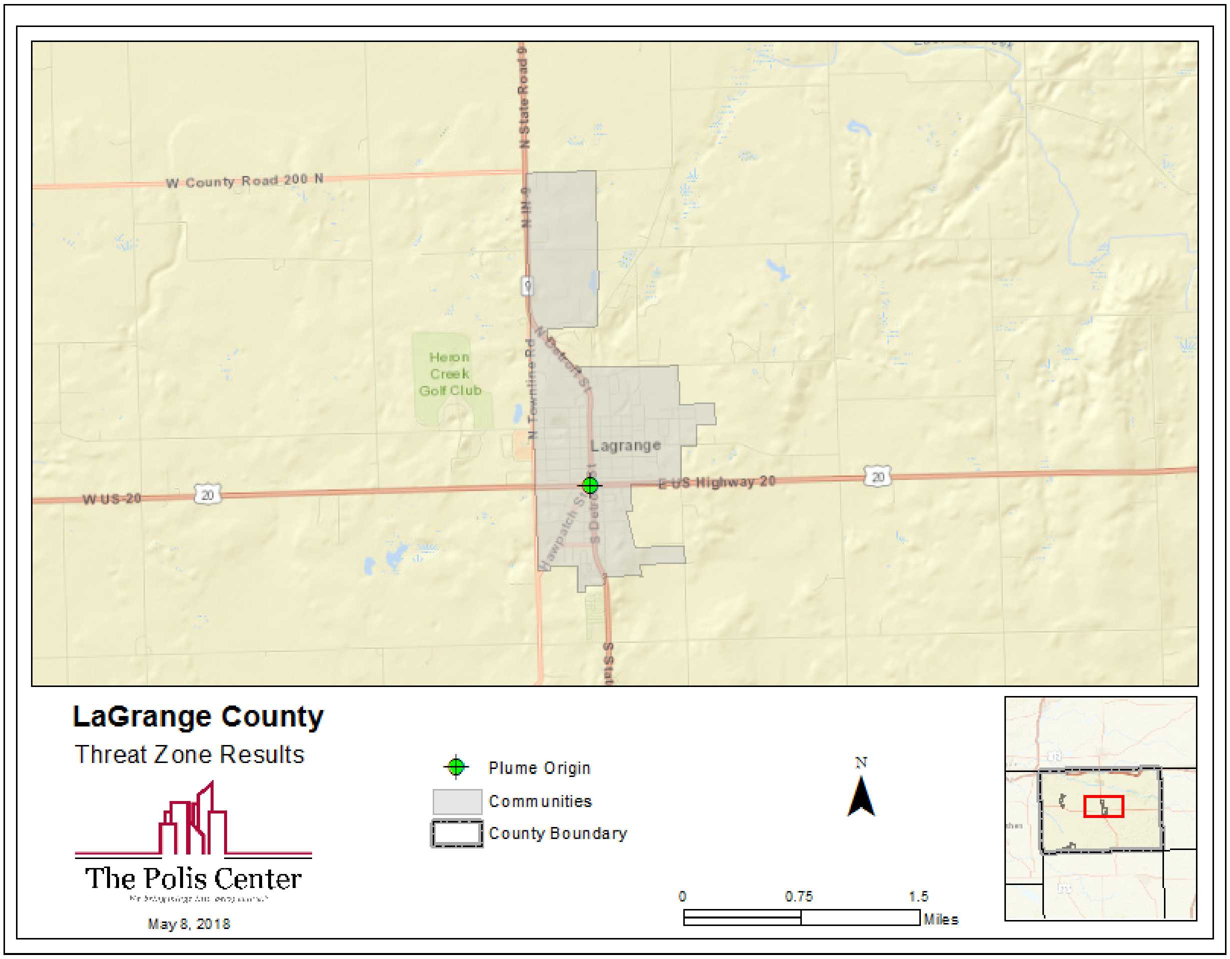
Figure 36. Toxic Threat Plume Footprint Generated by ALOHA



For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed, and the ALOHA atmospheric modeling parameters were based on the actual conditions at the location when the model was run including wind speed of 5 mph. The temperature was 68°F with 75% humidity and clear skies.

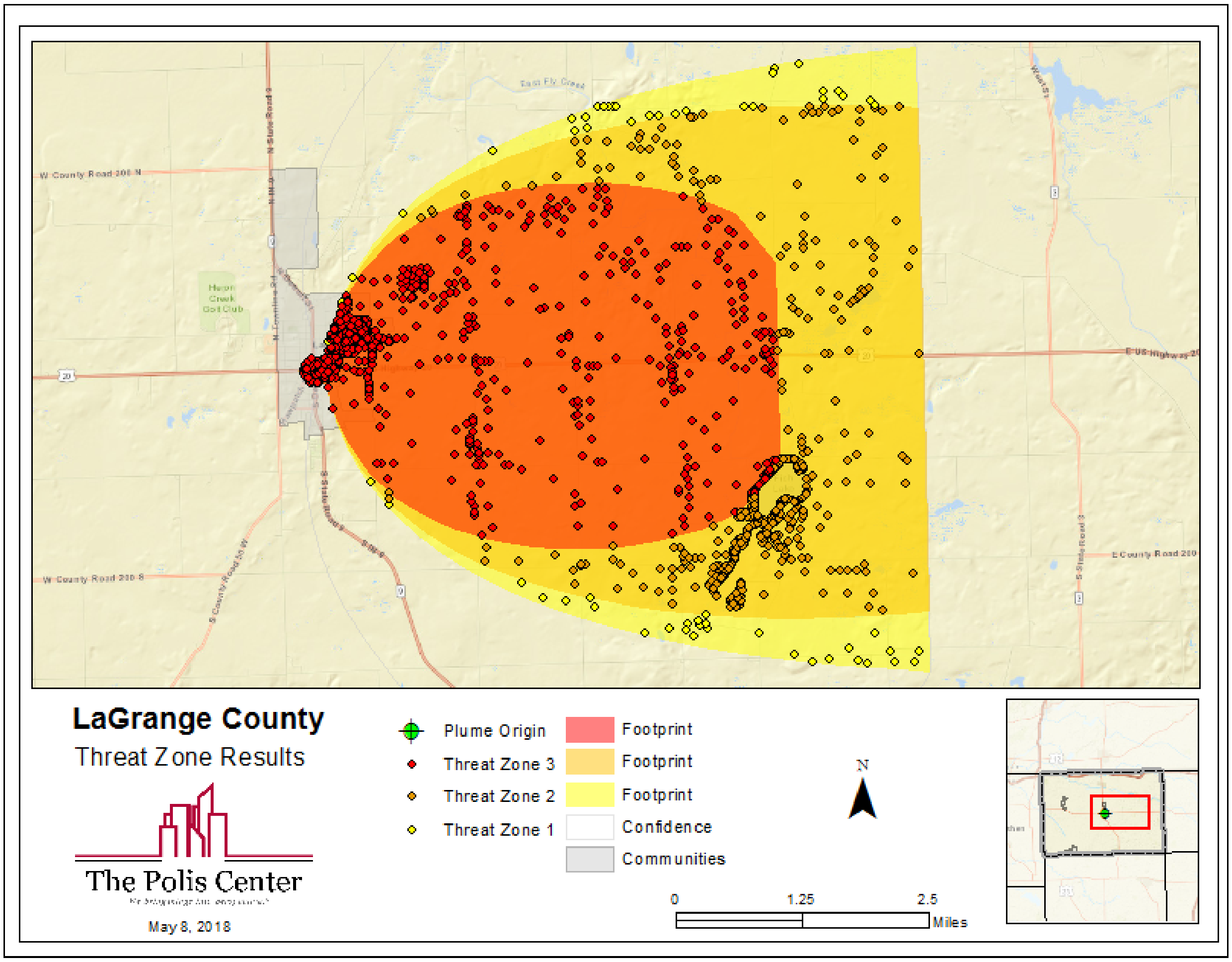
This modeled release was based on a leak from a 2.5 foot-diameter hole in the tank. According to the ALOHA parameters, approximately 2,240 pounds of material would be released per second. Figure 37 shows the location of the release.

Figure 37. Location of Release



The LaGrange County Building Inventory was added to ArcMap and overlaid with the threat zone footprint. The Building Inventory was then intersected with each of the three footprint areas to classify each point based upon the plume footprint in which it is located. Figure 38 depicts the LaGrange County Building Inventory after the intersect process.

Figure 38. Location of Release and Building Inventory by Threat Zone



The results of the analysis against the Building Inventory counts are depicted in Table 27.

Table 27. Estimated Exposure for all Threat Zones

	Number of Buildings within the Hazmat Plume		
Occupancy	AEGL 3 (most severe)	AEGL 2	AEGL 1 (least severe)
Agriculture	134	98	31
Commercial	29	0	1
Education	8	2	1
Government	4	0	1
Industrial	27	2	1
Religious	8	3	0
Residential	515	356	24
Total	**1,725**	**461**	**59**

Table 28 summarizes the replacement costs of buildings within each threat zone. Values represent only those portions of each zone that are not occupied by other zones.

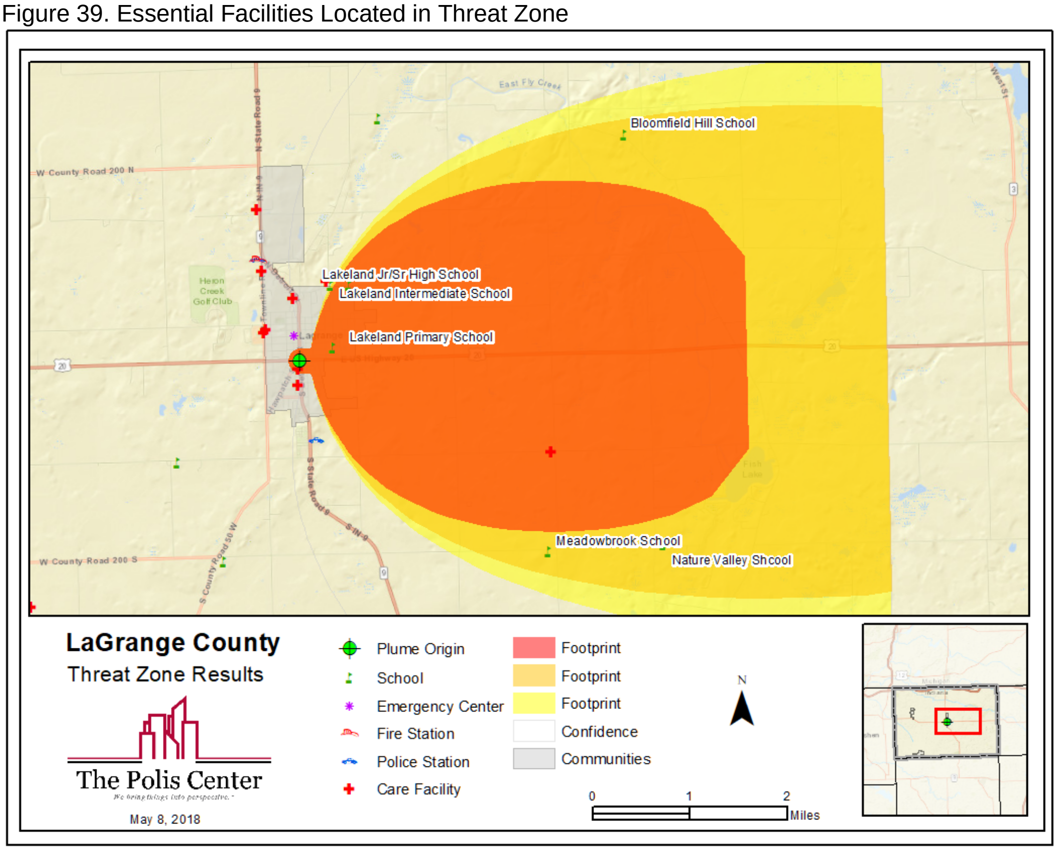
Table 28. Estimated Replacement Cost for all Threat Zones

	Replacement Cost of Buildings within the Hazmat Plume		
Occupancy	AEGL 3 (most severe)	AEGL 2	AEGL 1 (least severe)
Agriculture	$33,353,284	$21,086,504	$7,088,005
Commercial	$86,456,127	$0	$1,035,293
Education	$58,596,821	$1,462,323	$318,623
Government	$3,294,457	$0	$2,140,094
Industrial	$106,056,967	$40,920	$64,032
Religious	$25,475,910	$2,691,857	$0
Residential	$78,360,906	$43,725,415	$2,725,268
Total	**$391,594,472**	**$69,007,019**	**$13,371,314**

Essential Facilities

All facilities affected by the plume have been mapped and labeled in Figure 39. Appendix E contains a map and list of critical facilities that fall in the plume.

Figure 39. Essential Facilities Located in Threat Zone



Community Development Trends and Future Vulnerability

Because the hazardous material hazard events may occur anywhere within the county, future development will be impacted, especially development along major roadways. The major transportation routes and the industries located in LaGrange County pose a threat of dangerous chemicals and hazardous materials release.

Relationship to other Hazards

Flood- Hazmat incidents are likely when flood incidents occur.

4.9 Dam and Levee Failure

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a large barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities land-ward of the levee. Dams and levees can fail due to either 1) water heights or flows above the capacity for which the structure was designed; or 2) deficiencies in the structure such that it cannot hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood event. When that maximum is exceeded by more than the design safety margin, the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the frequency of levee failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe or, sometimes, an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Low-Head Dams

Another type of dam low-head, or in-channel, dams can present a safety hazard to the public because of their ability to trap victims in a submerged hydraulic jump formed just downstream from the dam. Recent deaths and injuries around these structures in the state, have brought the attention of this issue to the surface for local, state and federal officials. Current initiatives led by the Indiana Silver Jackets—a multi-agency coalition that leverages efforts to address natural hazards—have focused on the identification of these dams statewide, as well as various efforts to notify the public on their dangers.

Non-Levee Embankments

Along with accredited levees regulated by federal agencies, there are also what are referred to as Non-Levee Embankments (NLE), which typically parallel the direction of natural flow. An embankment is an artificial mound of soil or broken rock that supports railroads, highways, airfields, and large industrial sites in low areas, or impounds water. NLEs are often highways or railroads built on fill in low lying areas and thus tend to impose lateral constraints on flood flows, and typically contain the following characteristics:

- NLEs are elevated linear features adjacent to waterways and within the floodplain.
- They are typically man-made and include agricultural embankments built by landowners and road and railroad embankments banks.
- They are levee-like structures, but are not certified or engineered to provide flood protection.

The National Committee on Levee Safety estimates that the location and reliability status of 85% of the nation’s NLEs are unknown. In Indiana, the majority of NLEs are unidentified and are typically not maintained. NLEs impose lateral constraints on flood flows, reducing the floodplain storage capacity and increasing the flood velocity. As a result, downstream flooding and the potential for stream erosion can increase. As such, NLEs can give a false sense of security and protection to the people residing near NLEs. For these reasons, it is extremely important to map where these features are located.

Living with levees is a shared responsibility. While operating, maintaining levee systems are the levee sponsor responsibility, local officials are adopting protocols and procedures for ensuring public safety and participation in the NFIP.

Dam and Levee Failure History in LaGrange County

According to the LaGrange County Hazard Analysis, there are no records or local knowledge of any dam or certified levee failure in the county.

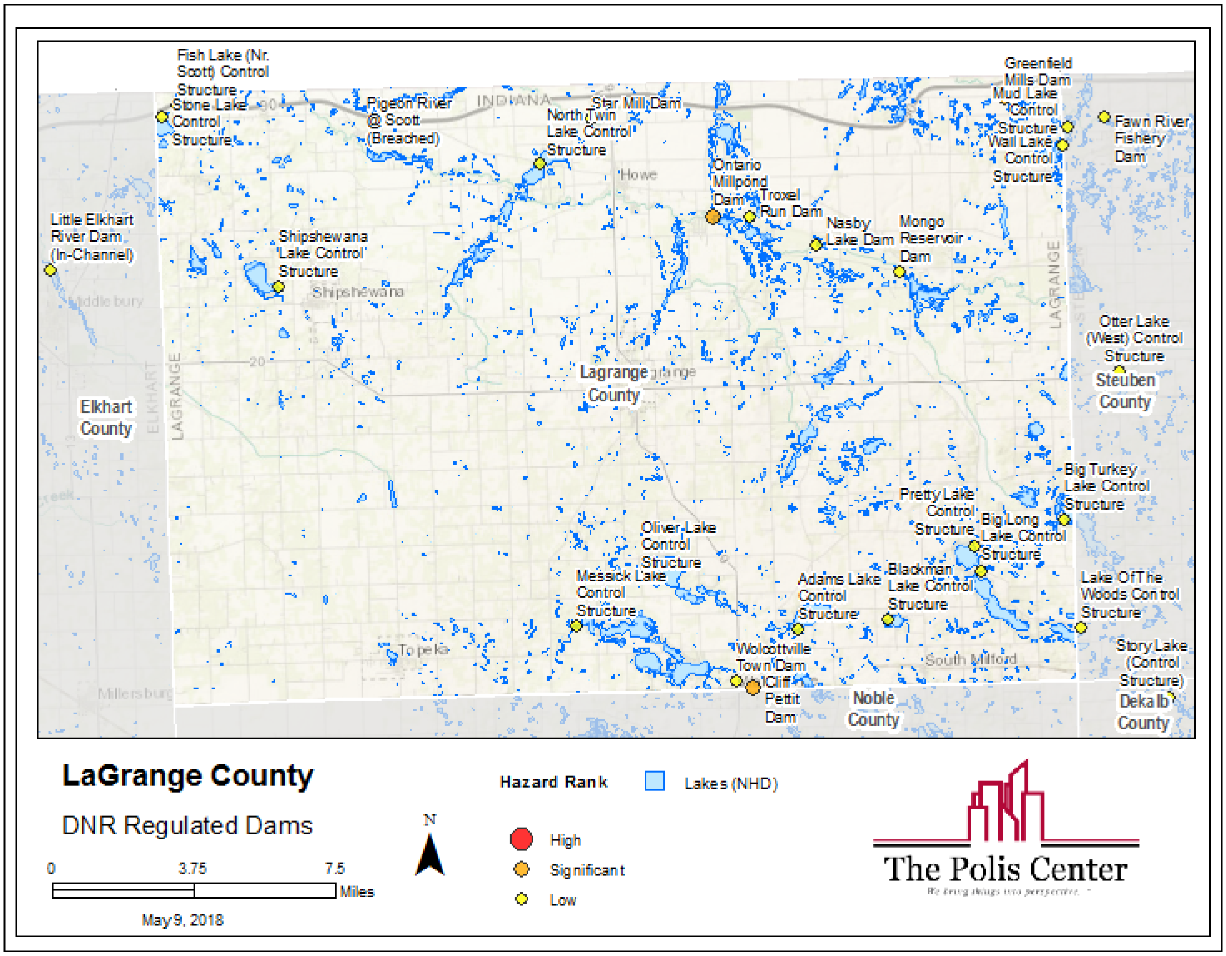
Geographic Location for Dam and Levee Failure

A review of the IDNR dam database revealed 6 state-regulated dams located in LaGrange County. Table 29 summarizes the dam information and Figure 40 maps the dams on a county level. LaGrange County does not have any high hazard dams so only the in-channel dams are individually mapped in the vulnerability section. A review of the Army Corp of Engineers (USACE) and Indiana Department of Natural Resources' data identified no certified levees or non-levee embankments in the county.

Table 29. Indiana Department of Natural Resources Dam Inventory

Dam Name	Hazard Rank	EAP?
Wolcottville Town Dam	LOW	NO
Greenfield Mills Dam	SIGNIFICANT	NO
Ontario Millpond Dam	SIGNIFICANT	NO
Troxel Run Dam	LOW	NO
Nasby lake Dam	LOW	NO
Mongo Reservoir Dam	LOW	NO

Figure 40. LaGrange County DNR Regulated Dams with Hazard Classification



Hazard Extent for Dam and Levee Failure

When dams are assigned the low (L) hazard potential classification, it means that failure or incorrect operation of the dam will result in no human life losses and no economic or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams in which failure or incorrect operation results in no probable loss of human life; however it can cause economic loss, environment damage, and disruption of lifeline facilities. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification are those dams in which failure or incorrect operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to IDNR and the National Inventory of Dams, one dam was classified as high hazard, and was recorded as having an Emergency Action Plan (EAP). An EAP is not required by the

State of Indiana but is strongly recommended in the 2007 Indiana Dam Safety & Inspection Manual.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps clearly reflect the flood protection capabilities of levees, and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or in some cases private individuals or organizations—are responsible for ensuring that the levees they own are maintained according to their design. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the one-percent-annual-chance flood.

Risk Identification for Dam and Levee Failure

In Meeting #2, the planning team determined that the probability of dam or levee failure is unlikely, with both having negligible consequences. The warning time for dam or levee failure is less than 6 hours with a duration of less than 24 hours. The calculated CPRI for dam or levee failure is 1.55.

Vulnerability Analysis for Dam and Levee Failure

There are several in-channel dams listed in the IDNR dam database. They pose a different type of threat to the county as they can easily trap incautious river goers in their strong currents. LaGrange County has 6 state regulated in-channel dams that are mapped in the figures below.

Figure 41. LaGrange County Dams, In-channel.

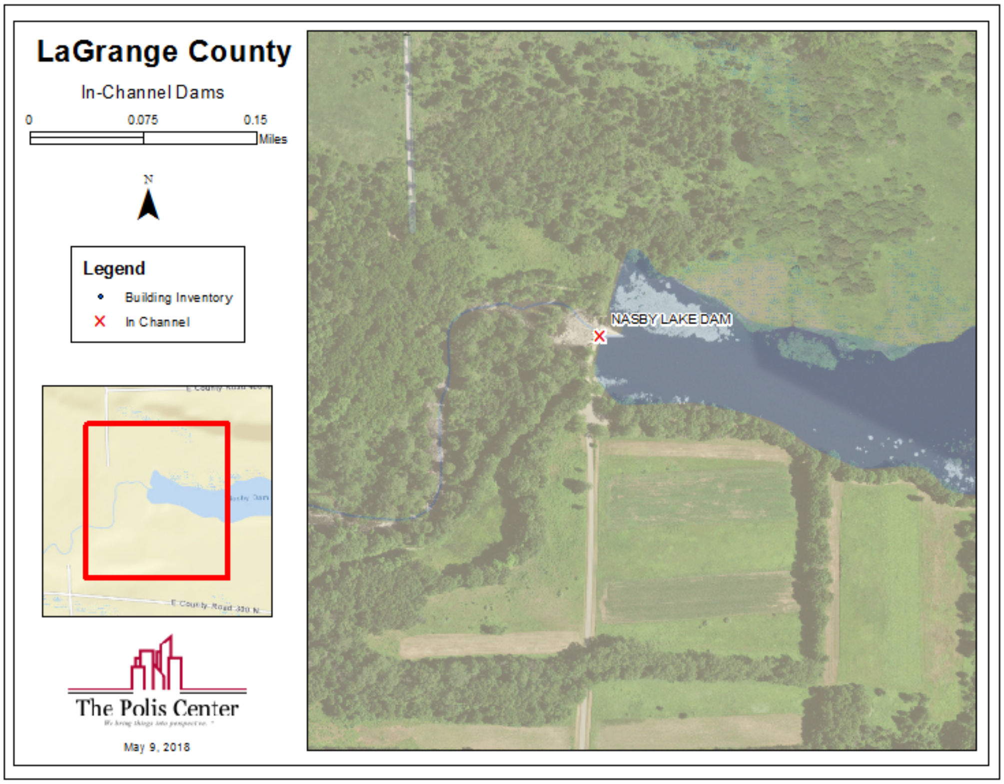


Figure 42. LaGrange County Dams, In-channel

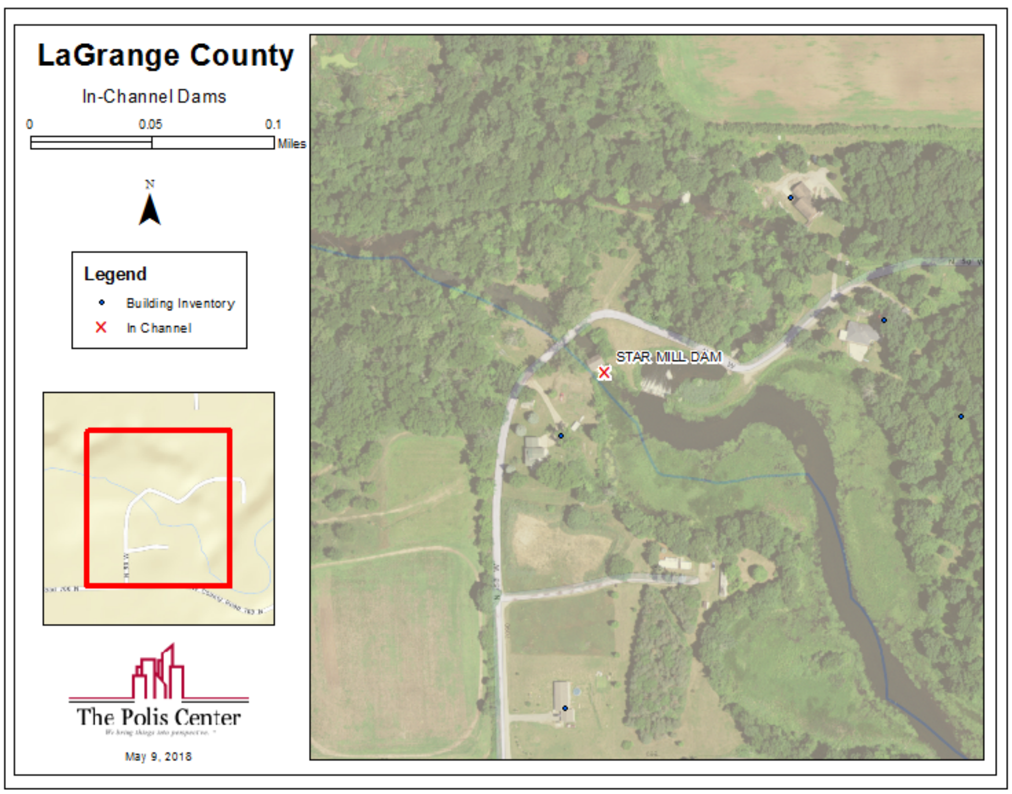


Figure 43. LaGrange County Dams, In-channel

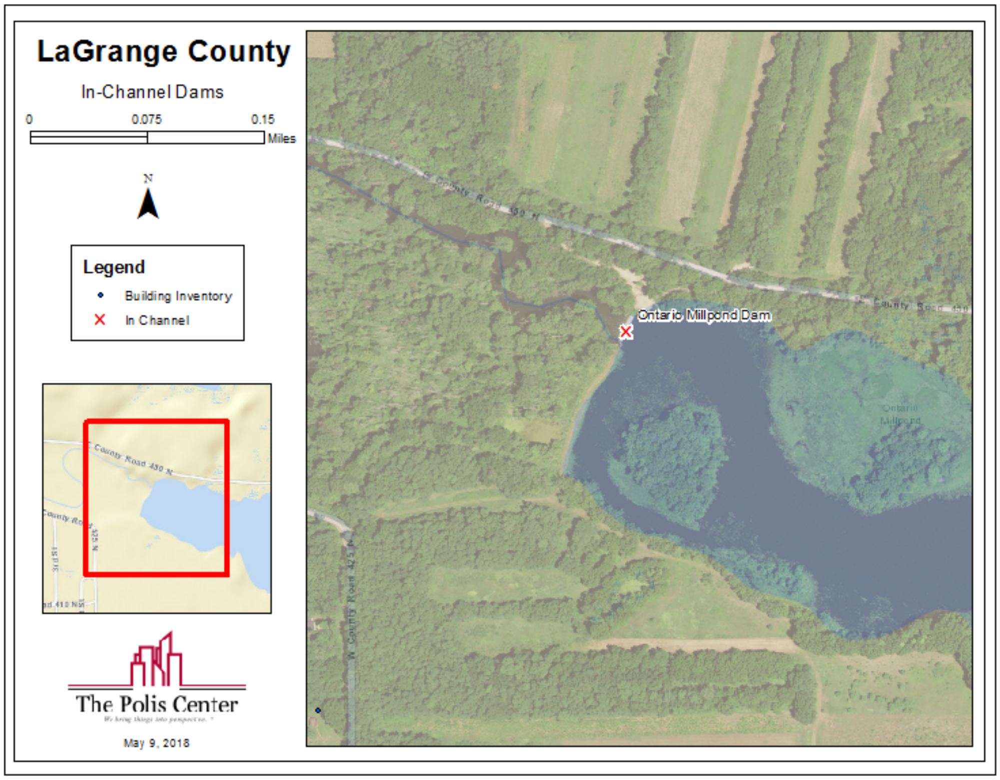


Figure 44. LaGrange County Dams, In-channel

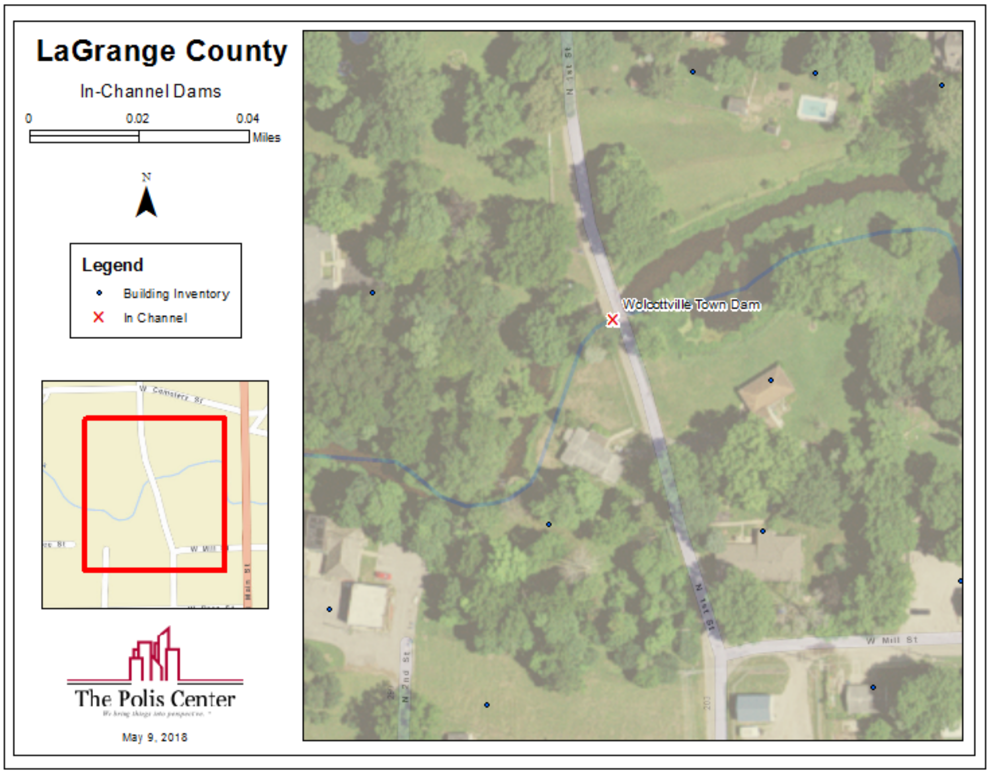


Figure 45. LaGrange County Dams, In-channel

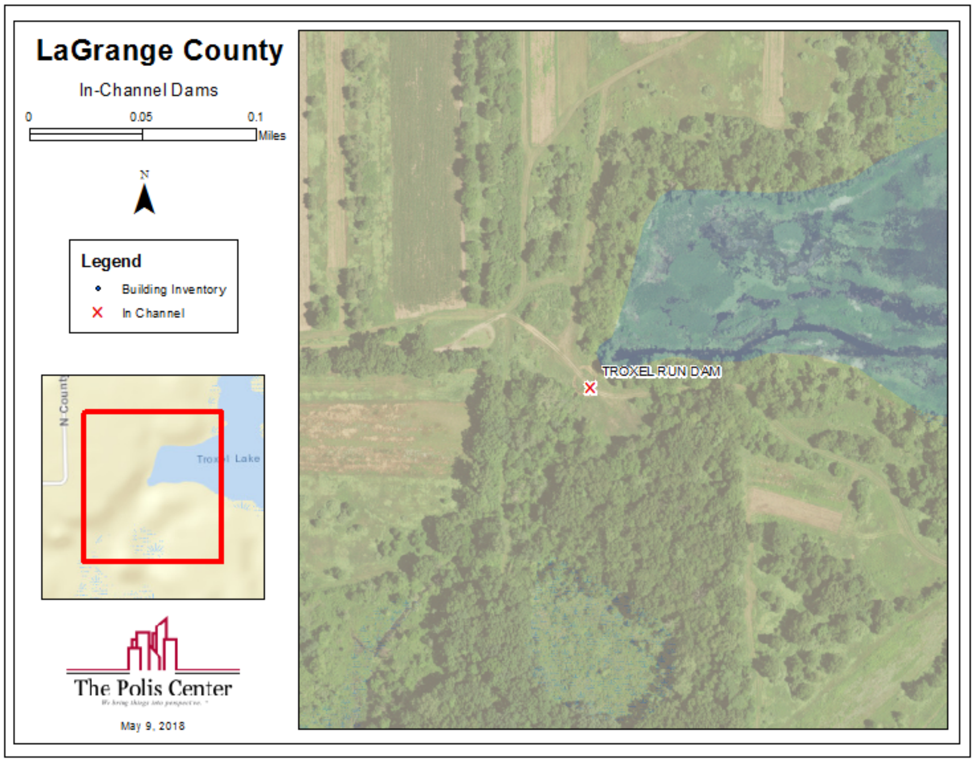
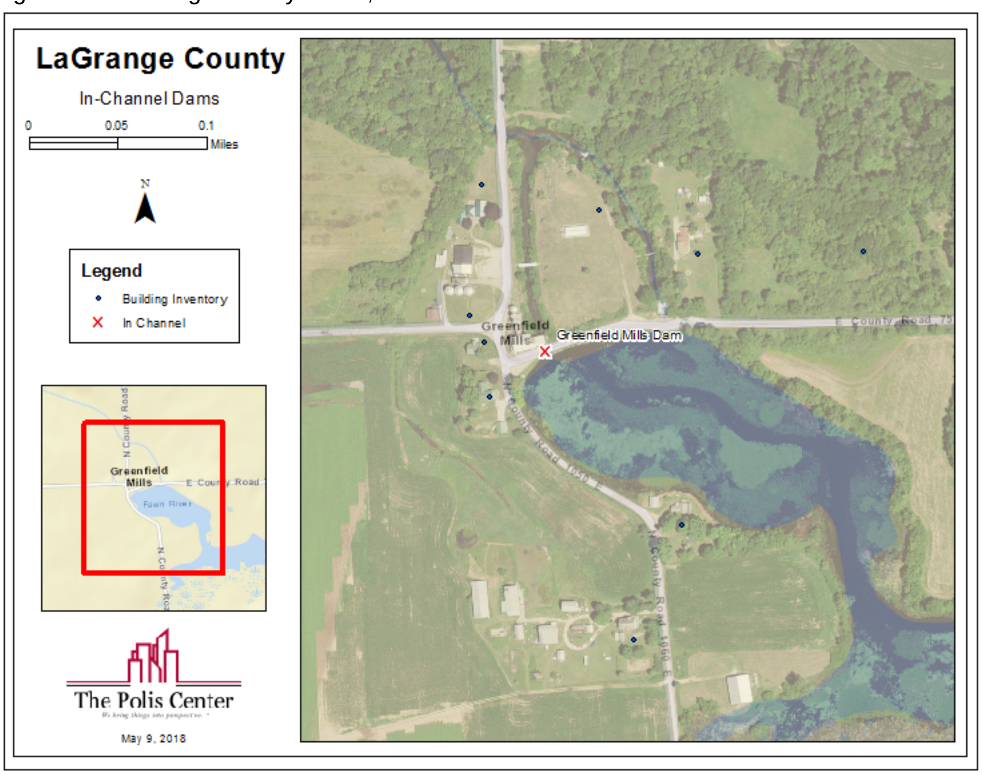


Figure 46. LaGrange County Dams, In-channel



The extent of potential levee failure varies across the county. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the "one-percent-annual chance" flood. If this accreditation is maintained, portions that would be mapped as Special Flood Hazard Area appear on a FIRM map as Zone X, protected by levee. A review of the USACE and FEMA data identified no certified levee segments in LaGrange County.

Community Development Trends and Future Vulnerability

The county recognizes the importance of maintaining its future assets, infrastructure, and residents. Inundation maps can highlight the areas of greatest vulnerability in each community. The LaGrange County Planning Commission reviews new development for compliance with the local zoning ordinance.

Relationship to Other Hazards

Flooding – Flooding is typically the leading cause of dam or levee failure incidents.

Drought – Property owners living around dams may have problems accessing boating equipment during times of drought.

4.10 Wildfire

Hazard Definition for Wildfire

The hazard extent of wildfires is greatest in the heavily forested areas of southern Indiana. The IDNR Division of Forestry assumes responsibility for approximately 7.3 million acres of forest and associated wild lands, including state and privately-owned lands. Indiana's wildfire seasons occur primarily in the spring—when the leaf litter on the ground dries out and before young herbaceous plants start to grow and cover the ground (green up)—and in the fall—after the leaves come down and before they are wetted down by the first heavy snow. During these times, especially when weather conditions are warm, windy, and with low humidity, cured vegetation is particularly susceptible to burning. When combined, fuel, weather, and topography; present an unpredictable danger to unwary civilians and firefighters in the path of a wildfire. Human action can not only intervene to stop the spread of wildfires, but can also mitigate their onset and effects. Forest and grassland areas can be cleared of dry fuel to prevent fires from starting and can be burned proactively to prevent uncontrolled burning.

Wildfire History in LaGrange County

There have been no recently recorded wildfires or damages from wildfires reported in LaGrange County.

Geographic Location for Wildfire

Wildfires can affect any area of the county that may be experiencing a drought.

Hazard Extent for Wildfire

Wildfires can be widespread or localized events.

Risk Identification for Wildfire

In Meeting #2, the planning team determined that the probability of a wildfire is unlikely with limited consequences. The warning time for a wildfire is less than 6 hours with a duration of less than 24 hours. The calculated CPRI for wildfire is 1.85.

Vulnerability Analysis for Wildfire

Residential, commercial and recreational areas are all vulnerable to wildfires. Areas of concentrated vegetation such as national parks or forests can be exceptionally vulnerable to wildfire.

Community Development Trends and Future Vulnerability

Because wildfire hazard events may occur anywhere within the county, future development will be impacted. Major future development areas will be supplied with water distribution, including hydrants for fire protection.

Relationship to other Hazards

Flooding and Erosion – Wildfires can completely eliminate vegetation and pose an increased risk to flooding and erosion effects.

Drought and Extreme Heat – Dry, hot conditions can reduce the protective moisture of woodlands and increase the risk of wildfire.

Hazardous Material Release – Storage tanks carrying chemicals including chlorine, anhydrous ammonia, and fuel tanks located at farms pose an increased risk to wildfire ignition.

4.11 Infectious Agents or Harmful Organisms

Hazard Definition for Infectious Agents or Harmful Organisms

The spread of harmful organisms and infectious agents are occasionally overlooked, potential natural hazards that can be exacerbated following other natural disasters. This hazard can include invasive species, such as the Emerald ash borer, or vector-borne diseases, such as West Nile fever.

Emerald Ash Borer

The Emerald ash borer (EAB), *Agrilus planipennis*, is an exotic beetle thought to have arrived in the United States by 2002 and was discovered near Detroit, Michigan. Indiana was one of the second states recognized to have the beetle, having been discovered in northern Indiana in 2004. The adult beetles do not pose harm to the ash trees, as they nibble on ash foliage. The immature, or larvae stage, feed on the inner bark of the ash trees, disrupting its ability to transport nutrients and water. The EAB is responsible for killing millions of ash trees in North America. It has cost municipalities, property owners, nursery owners, and forest industries millions of dollars.

Vector-Borne Illness

Vector-borne diseases are caused by infectious microorganisms that are transmitted to people via living organisms including blood-sucking arthropods such as mosquitoes, ticks, fleas, and spiders. Natural disasters, particularly meteorological events such as cyclones, hurricanes, and flooding, can influence transmission of vector-borne disease. The crowding of infected and vulnerable hosts, a debilitated public health infrastructure, and disruptions of ongoing control processes are risk factors for transmission of vector-borne disease. The Indiana State Department of Health (ISDH) identifies sleeping sickness (Eastern equine encephalitis virus), La Crosse encephalitis (La Crosse virus), St. Louis encephalitis (St. Louis encephalitis virus), West Nile fever (West Nile virus), and dengue fever (dengue virus), as mosquito-borne diseases that Hoosiers should take steps to protect themselves against.

The health department has also reported more than 200 cases of tick-borne illness in Indiana in 2016 alone. The ISDH highlighted Lyme disease, Rocky Mountain spotted fever, and Erlichiosis as tick-borne diseases particularly prevalent in Indiana. Over the past few years, Indiana has experienced a rise in tick-borne Lyme disease. There were approximately 100 confirmed cases of Lyme disease in 2014, but only 26 cases in 2006. Increased summer tick populations frequently follow mild winters, and back-to-back mild winters can cause a notable surge in tick numbers, along with the diseases they carry. In June of 2017, a young Indiana girl died after contracting Rocky Mountain spotted fever from a tick bite. Recently, a new tick-transmitted virus has made headlines through the state. The Centers for Disease Control confirmed two cases of Heartland virus in Indiana. Both infected patients survived.

Infectious Agents or Harmful Organisms History in LaGrange County

Emerald Ash Borer

EAB has been detected in LaGrange County. As of 2017, the entire state of Indiana lies within the Federal quarantine boundaries and LaGrange County lies within the state-quarantined area.

Vector-Borne Illness

Mosquitoes carrying West Nile virus have been found in LaGrange County. Most people who get infected with West Nile virus will have either no symptoms or mild symptoms, but a few individuals may contract a more severe form of the disease.

Geographic Location for Infectious Agents or Harmful Organisms

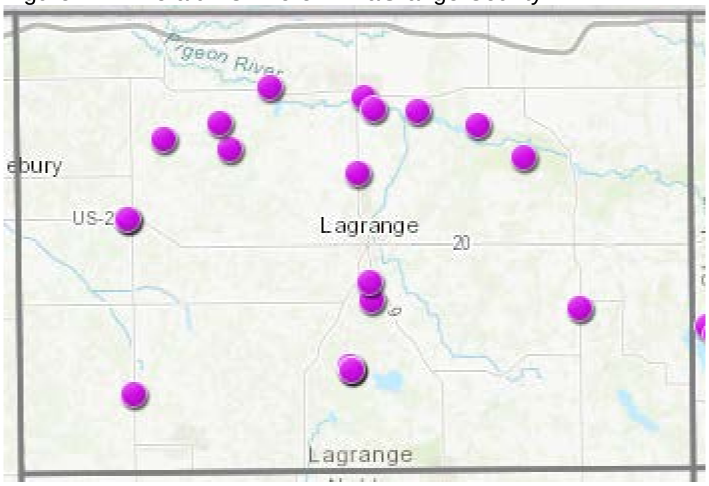
Emerald Ash Borers are most commonly found in forested areas but can also negatively impact neighborhoods or any other areas that have trees.

Mosquitoes are drawn to areas of standing water and are commonly most active at dusk and dawn; however, all areas are affected by mosquito populations.

Hazard Extent for Infectious Agents or Harmful Organisms

An exposure analysis identifies the existing and future assets located in identified hazard areas. The areas with reported identification of the EAB in LaGrange County are identified in Figure 47 with magenta dots.

Figure 47. Emerald Ash Borer in LaGrange County



Risk Identification for Infectious Agents or Harmful Organisms

In Meeting #2, the planning team determined that the probability of an infectious agent or harmful organism hazard as possible with limited consequences. The warning time for an infectious agent or harmful organism hazard is about 6 to 12 hours with a duration of less than 1 week. The calculated CPRI for harmful organisms is 2.35.

Vulnerability Analysis for Infectious Agents or Harmful Organisms Hazard

All communities can be potentially at risk for an epidemic and experience increased risk during hazards the cause displacement, contamination of the water supply, and/or deprivation of essential utilities, or when residents are not exposed to educational resources outlining preventive steps.

Community Development Trends and Future Vulnerability

Future development will remain vulnerable to these events. EABs have killed millions of ash trees in Indiana, Michigan, Illinois, Ohio, and Ontario and will continue to do so until the insects are effectively contained or eliminated, or a strain of more resistant trees is developed.

According to the National Institute of Allergy and Infectious Diseases, tick-borne illnesses will continue to remain a problem as people build homes in wilderness areas where ticks and their animal hosts live; however, urban environments can also host ticks and the pathogens they can transmit.

Eliminating areas of standing water may help diminish the disease-carrying mosquito population by removing or treating stagnant bodies of water areas that serve as mosquitoes' breeding grounds.

Relationship to other Hazards

The risk for infectious disease transmission is primarily associated with displacement and the characteristics of the displaced population, the proximity of sterile water and function restrooms, the nutritional status of the displaced, the level of immunity to vaccine-preventable infections, and the availability of access to healthcare services.

Flooding – Increased risk of vector-borne diseases. EAB-damaged trees may pose a risk for increased logjam events. In the aftermath of flooding, a plethora of standing water combined with a possibly weakened health infrastructure and an interruption of ongoing control programs increases the risk factors for vector-borne disease transmission. While initial flooding may wash away existing mosquito-breeding sites, standing water caused by heavy rainfall or overflow of rivers can create new breeding sites.

Earthquake – In the aftermath of earthquakes, some populations have experienced infection outbreaks associated with increased exposure to airborne dust from landslides.

Tornadoes – Natural disasters like tornadoes, which impact communities on a large-scale and cause displacement, have been associated with an increased risk in disease.

Utility Failure – Power outages and the disruption of water treatment and supply plants can affect the proper functioning of health facilities and has also been linked with an increase in diarrheal illness.

Chapter 5 – Mitigation Goals and Strategies

The goal of mitigation is to protect lives and build disaster-resistant communities through minimizing disruptions to local and regional economies, reducing the future impacts of hazards including property damage, and supporting best use practices for public and private funds spent on recovery assistance. This chapter discusses the general mitigation vision and mitigation goals to reduce or avoid long-term vulnerabilities to the hazards identified in the preceding chapter. Successful mitigation actions and projects are based on well-constructed risk assessments, which are provided in Chapter 4.

Community Capability Assessment

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of county capabilities to determine whether the activities may be improved to more effectively reduce the impact of future hazards. The following sections highlight the existing plans and mitigation capabilities within all of the communities.

Planning and Regulatory

Planning and regulatory capabilities include the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. In the following subsection, the team details the NFIP program and local plans, codes, and ordinances in place that serve to make the county more resilient to disasters.

National Flood Insurance Program (NFIP)

According to FEMA, the NFIP is a federal program created by Congress to mitigate future flood losses nationwide through community-enforced building and zoning ordinances and to allow access to affordable, federally-backed flood insurance protection for property owners. Providing an insurance alternative to disaster assistance, the NFIP is designed to alleviate the escalating costs of repairing flood damage to buildings and their contents. If communities participate in the NFIP through adopting and enforcing a floodplain management ordinance to reduce future flood risks to new construction in SFHAs, the federal government has agreed to make flood insurance available within the community as a financial protection against flood losses. In order to remain eligible for future mitigation funds, NFIP communities must adopt either their own MHMP or participate in the development of a multi-jurisdictional MHMP.

Unincorporated LaGrange County and the community of Topeka participate in the NFIP. The total number of policies, written premiums in-force, and coverage of insurance in-force are identified in the following table.

Table 30. NFIP Policies and Coverage

NFIP Community	Total Number of Policies	Insurance In-force whole	Written Premium in-force
LaGrange County (unincorporated)	228	40,605,300	195,968
Topeka	4	735,000	1,208

In order to assure coverage is available for all policy holders, the county and its NFIP communities will assure the continued compliance of the state floodway and NFIP requirements.

The Indiana Flood Control Act grants the IDNR regulatory control over floodway areas in any state waterway (streams less than 1 square mile in drainage area). Within the Flood Control Act, the General Assembly created a permitting program. Two of the fundamental provisions of the Act's regulatory programs consist of the following:

(1) An abode or place of residence may not be constructed or placed within a floodway.

(2) Any structure, obstruction, deposit, or excavation within a floodway must receive written approval from the Director of the Department of Natural Resources for the work before beginning construction.

The DNR is the Cooperating Technical Partner for the FEMA Floodplain Mapping program and provides floodway site determinations upon request. The DNR performs both the Community Assistance Call (CAC) and Community Assistance Visit (CAV) for the NFIP program. The CAV and CAC serve as each NFIP community's assurance that the community is adequately enforcing its floodplain management regulations and prices opportunities for technical assistance by the DNR on behalf of FEMA.

The NFIP's Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced. Besides the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment. Technical assistance on designing and implementing some activities is available at no charge. Participating in the CRS provides an incentive to maintaining and improving a community's floodplain management program over the years. Neither LaGrange County nor any of its jurisdictions participate in the CRS program.

Plans and Ordinances

LaGrange County and its incorporated communities have a number of plans and ordinances in place to ensure the safety of residents and the effective operation of communities. These include the Soil Survey of LaGrange County, the LaGrange County Comprehensive Plan, and the LaGrange County Zoning Ordinance. Information was collected through surveys with planning team representatives of the county and towns. The results of these surveys can be found in

Appendix F. The review of this information was used to inform the development of mitigation strategies for the 2019 plan update.

Table 31. Jurisdictions Planning Mechanisms

Capabilities	La Grange County	LaGrange	Shipshewana	Topeka	Wolcottville	Lakeland School Corp	Westview School Corp
Planning							
Comprehensive Plan	2010	-	-	-	-	2018	2018
Emergency Operations Plan	-					2018	-
Watershed Plan	St. Joseph River Watershed Management Plan 2005	Pigeon River Watershed Management Plan 2013		Five Lakes Watershed Management Plan 2006		-	-
Resilience Report	2013						
Ordinances							
Zoning Ordinance	2005						
Building Codes/ Ordinance	2005					-	Yes
Floodplain Ordinance	2018					-	-
Storm Water Ordinance	-	-	-	-	-	-	-
Erosion Ordinance	State Erosion Control Rule 5 (327 IAC 15-5)						-
Burning Ordinance	2012	1992	-	-	-	-	-

The floodplain ordinance date is based upon the currently effective map date provided by the FEMA status book report for Communities Participating in the National Flood Program.

Many of these plans or policies can help implement the goals, objectives and strategies in LaGrange County's MHMP. The LaGrange County Emergency Management Director is responsible for meeting with each jurisdiction yearly throughout the next five years. During these meetings, the local Emergency Management Director will review all local planning mechanisms and collaborate with the Towns to ensure the MHMP is becoming as integrated into local plans as possible. These Local Planning Mechanisms are meant to work cooperatively together in order to ensure the health, safety, and welfare of LaGrange County and its corresponding jurisdictions. Although only one of the planning mechanisms has been updated since the initial hazard mitigation plan was adopted, town, and county officials will integrate related plans with hazard mitigation goals, objectives, and strategies when feasible and appropriate.

General Mitigation Goals

In Section 4.0 of this plan, the risk assessment identified a number of natural hazards that LaGrange County experiences. The MHMP planning team members understand that although hazards cannot be eliminated altogether, LaGrange County can work toward building disaster-resistant communities. Following are a list of goals, objectives, and actions identified in the previous LaGrange County MHMP. These goals remain valid and represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps that will assist the communities in attaining the listed goals.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

(a) Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

(b) Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

(d) Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the community.

(e) Objective: Improve emergency sheltering in the community.

Goal 2: Create new or revise existing plans/maps for the community

(a) Objective: Support compliance with the NFIP.

(b) Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.

(c) Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate community residents on the hazards affecting their county

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education and training of emergency personnel and public officials.

Mitigation Strategy Worksheet Summary

As part of the mitigation update process, broader community input was gathered to better understand not only the localized hazards that might impact the county, but also to generate ideas on how best to solve those problems. Planning team members & participants answered the mitigation strategy survey which provided them the opportunity to comment on hazards specific to their areas of the county. These responses are summarized below and, where applicable, new strategies have been added to Table 33.

Flood

- Flooding was marked as a problem in unincorporated areas of LaGrange. No respondents identified specific areas of concern nor did they have any specific ideas on how to reduce any flooding concerns.

Dam/Levee Failure

- Respondents stated that dam failure was a concern countywide. Suggested mitigation ideas proposed were to enforce dam inspections.

Tornado

- Many respondents stated that their biggest natural hazard concern for the county & their communities was a tornado. The Town of Shipshewana in particular identified this event as particularly hazardous to their town as the town sees millions of visitors each year. Other respondents noted that the primarily rural and agricultural nature of the county meant spotty siren coverage countywide. Potential mitigation suggestions included increasing siren coverage for the county as well as testing early warning systems.

Earthquake

- Respondents proposed the idea of continued education on earthquake preparedness as well as practicing earthquake drills.

Severe Summer Storms

- Summer storms were generally thought to be one of the most dangerous events to the county. Many of the same sentiments that were stated for tornado risk were repeated for summer storms. Respondents felt that continuing the efforts to improve early warning systems as well as offering more community shelters could help to reduce the impact of summer storms.

Winter Storms

- Respondents generally felt that while the frequency of winter storms in the area was high, many of the communities have taken measures to guard against consequences. Several respondents stated that keeping communication lines open during severe winter storms would be their biggest concern for their communities.

Hazardous Material Spills

- Responses in regards to hazardous material spill were limited. Most respondents stated that working with other local entities to coordinate efforts to contain or redirect hazardous materials would be the best option.

Mitigation Actions and Projects

Upon completion of the risk assessment and development of the goals and objectives, the planning committee was provided a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The types of mitigation actions are listed as follows:

- **Prevention:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important. The plan team assessed the status and priority of the existing strategies using the FEMA mitigation evaluation criteria STAPLE + E. Table 32 lists the factors to consider in the analysis and prioritization of actions. Some actions may occur before the top priority due to financial, engineering, environmental, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

Table 32. STAPLE+E Criteria

Criteria	Description
S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. It is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.

E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Understanding the dynamics of STAPLE + E leads to the project's success. Developing questions evolving around the evaluation criteria, similar to those outlined below, helps the team prioritize the projects.

Social:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:

- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:

- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental:

- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

Hazard Mitigation Actions

LaGrange County and its included municipalities share a common Hazard Mitigation Plan and worked closely to develop it. These communities work together with their town councils and the LaGrange County Emergency Management Director to ensure that the hazards and mitigation actions included in this plan are accurate and addressed in their jurisdictions. The jurisdictions responsible for each action consist of the following:

- LaGrange County
- LaGrange
- Shipshewana
- Topeka
- Wolcottville

Table 33 lists all mitigation actions for LaGrange County and its jurisdictions. Each of these mitigation action charts detail the hazard, the mitigation action to address the identified hazard, its current stage of implementation, the timeframe for implementation going forward, the jurisdictions who have identified they will work to implement the action, the responsible parties to carry through with implementation, and comments on how the plan will be implemented through existing planning mechanisms and funding to make implementation happen.

Additionally, the LaGrange County planning team assigned the mitigation actions priority rankings for implementation (1=High Priority; 2= Moderate Priority; 3= Low Priority). Mitigation actions given a “high” priority ranking will ideally be implemented within 5 years of the MHMP plan adoption date. Mitigation actions ranked as a “medium” priority may be addressed within 5-10 years from the MHMP plan adoption date, and “low” priority mitigation actions may take over 10 years before action completion. Although higher ranking priorities may constitute a greater county concern than lower ranking priorities, the availability of funds may cause some mitigation actions to take longer to implement.

All of the mitigation actions identified in the 2011 LaGrange County Hazard Mitigation Plan have been carried over into the 2019 plan based on the advisement of the LaGrange County Emergency Management Director and the consensus of the steering committee. Not all of the 2011 mitigation actions have been fully completed, and they are identified in the 2019 plan to reflect their ongoing implementation.

The status designations include the following:

- **Identified** – actions are in the preliminary stages and have not yet started
- **Complete** – the action is complete
- **Ongoing** – actions require continuing application
- **In Progress** – actions are currently being acted upon
- **Deferred** – no progress has been made
- **Deleted** – the action is no longer relevant

The mitigation action types encompass the following areas:

- **Prevention** – expand mapping, loss-prevention programs, buyouts, regulations
- **Property Protection** – identify vulnerable areas and populations, retrofit vulnerable buildings, structural improvement
- **Public Education** – information sessions, presentations, disclosure, website information, brochures, educational resources, and hazard awareness
- **Natural Resource Protection** – conservation, erosion control, stream corridor restoration, wetland restoration, resource management
- **Emergency Services** – emergency alerts, evacuation plans, expand emergency operations
- **Structural Improvement** – acquisitions and elevations of structures in flood prone areas, structural retrofits, retaining walls, retention structures, culverts, and safe rooms.

Mitigation Actions by Community

This is a multi-jurisdictional plan that covers LaGrange County, its school districts, and the communities of LaGrange, Shipshewana, Topeka, and Wolcottville. The LaGrange County risks and mitigation activities identified in this plan also incorporate the concerns and needs of townships and other entities participating in this plan.

Table 33. Mitigation Actions

#	Hazard Type	Mitigation Action Type	Goals & Objectives Met	Action	Community	Status	Priority	Coordinating Agency	Potential Funder	Source
1	Multiple Hazards	Prevention	Goal 1; Objective c	Develop an expanded mitigation focused floodplain management program	LaGrange, Town Of	Identified	Low	Planning	Other	RiskMAP Process
2	Flood	Prevention	Goal 1; Objective c	Log jam removal to reduce flooding risks	LaGrange, Town Of	Complete		Planning	Other	RiskMAP Process
3	Flood	Structural Improvement	Goal 1; Objective c	Road stabilization at CR 500S, SR 5 @ 1200W	LaGrange County	In Progress	Medium	Other	PDM	RiskMAP Process
4	Flood	Structural Improvement	Goal1; Objective c	Reduction of flooding on Oliver Lake and Dallas Lake	LaGrange County	In Progress	Medium	Public Works	PDM	RiskMAP Process
5	Flood	Structural Improvement	Goal 1; Objective c	Undersized culvert at State Road 3 South Milford	LaGrange County	Identified		State Agency	PDM	RiskMAP Process
6	Flood	Prevention	Goal 2; Objective c	Study low lying areas of LaGrange county	LaGrange County	Identified	Low	Planning	Other	RiskMAP Process
7	Flood	Structural Improvement	Goal 1; Objective c	Elevation of State Highway 9	LaGrange County	Identified	Low	State Agency	PDM	RiskMAP Process
8	Flood	Structural Improvement	Goal 1; Objective c	Bridge Elevation	LaGrange County	Identified	Low	Other	PDM	RiskMAP Process
9	Flood	Structural Improvement	Goal 2; Objective b	Flood Plan for Topeka	Topeka	Complete		Planning	General Funds	RiskMAP Process
10	Multiple Hazards	Emergency Services	Goal 1; Objective b	Obtain additional generators and adaptors for critical facilities	LaGrange, Town Of	In Progress	Low	Emergency Management	Other	RiskMAP Process
11	Tornado	Emergency Services	Goal 1; Objective d	Expand and upgrade tornado siren coverage	LaGrange, Town Of	Complete		Emergency Management	Other	RiskMAP Process

#	Hazard Type	Mitigation Action Type	Goals & Objectives Met	Action	Community	Status	Priority	Coordinating Agency	Potential Funder	Source
12	Flood	Property Prevention	Goal 2; Objective a	Acquire structures near Witmer and Wester Lakes at risk to local flooding	LaGrange, Town Of	Identified	Low	Emergency Management	Other	RiskMAP Process
13	Flood	Prevention	Goal 1; Objective c	Construct a retention pond	Topeka	Completed		EMA	FEMA, IDHS, Local funds	Hazard Mitigation Plan
14	Flood	Structural Improvement	Goal 1; Objective c	Elevate County Road 700 North	LaGrange County	Completed		EMA, local jurisdictions	Local Funds, FEMA, INDOT	Hazard Mitigation Plan
15	Tornado, Thunderstorm	Emergency Services	Goal 1, Objective d	Procure NOAA weather radios for schools, fire departments, and businesses	LaGrange County, LaGrange, Shipshewana, Topeka, Wolcottville	Completed		EMA	FEMA, IDHS	Hazard Mitigation Plan
16	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Emergency Services	Goal 1; Objective b	Procure emergency generators for schools, fire stations, community centers, and shelters; also portable generators for lift stations	LaGrange County, LaGrange, Shipshewana, Topeka, Wolcottville	In Progress	High	EMA	FEMA, IDHS	Hazard Mitigation Plan
17	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat, Fire	Emergency Services	Goal 1; Objective d	Institute Reverse 911 & IPAWS	LaGrange County, LaGrange	Identified	High	EMA	IDHS, FEMA, Local Funds	Hazard Mitigation Plan
18	Flood, Tornado, Earthquake, Thunderstorm, Drought, Winter Storm, Hazmat, Fire	Public Education	Goal 3; Objective a	Develop a public education program to inform residents of potential hazards and emergency plans	LaGrange County, LaGrange, Shipshewana, Topeka, Wolcottville	On Going	High	EMA	FEMA, IDHS	Hazard Mitigation Plan
19	Flood	Property Protection	Goal 2; Objective a	Encourage communities to participate in the NFIP through public education	LaGrange, Shipshewana, Wolcottville	On Going	High	EMA	FEMA, IDHS	Hazard Mitigation Plan

#	Hazard Type	Mitigation Action Type	Goals & Objectives Met	Action	Community	Status	Priority	Coordinating Agency	Potential Funder	Source
20	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm	Emergency Services	Goal 1; Objective d	Upgrade existing and install new warning sirens, especially in unincorporated areas	LaGrange County	Identified	High	EMA, local jurisdictions	Local Funds, IDHS, FEMA	Hazard Mitigation Plan
21	Flood	Property Protection	Goal 1; Objective a	Review finish grade requirements for building/developments and enforce on all new construction	LaGrange	On Going	High	EMA, local jurisdictions	Local Funds	Hazard Mitigation Plan
22	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Structural Improvement	Goal 1; Objective e	Establish a new hardened shelter for tourist population	Shipshewana	Identified	Medium	EMA	IDHS, FEMA, Local Funds	Hazard Mitigation Plan
23	Drought	Structural Improvement	Goal 2, Objective c	Conduct a study to determine a location for a cooling center	LaGrange	Identified	Medium	EMA, local jurisdictions	Local Funds	Hazard Mitigation Plan
24	Flood	Prevention	Goal 1; Objective c	Continuing storm water ordinances for development areas	LaGrange County	On Going	Low	EMA, local jurisdictions	Local Funds	Hazard Mitigation Plan
25	Winter Storm	Emergency Services	Goal 2; Objective c	Develop a database of special needs populations	LaGrange County	Identified	Low	EMA, local non-profits	IDHS, FEMA	Hazard Mitigation Plan
26	Tornado, Earthquake, Thunderstorm, Winter Storm	Property Protection	Goal 1; Objective c	Continue a program for maintenance and clearing of power lines near tree lines	LaGrange County, LaGrange	On Going	Low	EMA, local utilities	Local Funds	Hazard Mitigation Plan
27	Earthquake	Prevention	Goal 2; Objective c	Identify safe water storage areas	LaGrange County, LaGrange, Shipshewana, Topeka, Wolcottville	Identified	Low	EMA, local jurisdictions, local FPA	IDHS, FEMA, Local Funds	Hazard Mitigation Plan
28	Tornado, Thunderstorm	Emergency Services	Goal 1; Objective e	Identify locations for & establish storm shelter throughout the county	LaGrange County, LaGrange, Shipshewana, Topeka, Wolcottville	Identified	High	EMA, town councils	IDHS, FEMA	2019 Hazard Mitigation Plan

Chapter 6 – Plan Maintenance and Implementation

Implementation and Maintenance

The LaGrange County MHMP is intended to serve as a guide for dealing with the impact of both current and future hazards for all people and institutions within the jurisdiction. As such it is not a static document but must be modified to reflect changing conditions if it is to be an effective plan. The goals, objectives and mitigation strategies will serve as the action plan. Even though individual strategies have a responsible party assigned to it to ensure implementation, overall responsibility, oversight, and general monitoring of the action plan has been assigned to the LaGrange County Emergency Management Director.

Goals identified by the county will be addressed by the County Commissioners and the Town Councils will be responsible for implementing their corresponding strategies.

It will be the community's responsibility to gather a local task force to update the Multi-Hazard Mitigation Plan on a routine basis. Every year, the County Emergency Management Director will call a meeting to review the plan, mitigation strategies and the estimated costs attached to each strategy. All participating parties of the original Local Task Force and cities will be invited to this meeting. Responsible parties will report on the status of their projects. It will be the responsibility of the committee to evaluate the plan to determine whether:

- Goals and objectives are relevant.
- Risks have changed.
- Resources are adequate or appropriate.
- The plan as written has implementation problems or issues.
- Strategies have happened as expected.
- Partners participating in the plan need to change (new and old).
- Strategies are effective.
- Any changes have taken place that may affect priorities.
- Any strategies should be changed.

In addition to the information generated at the Local Task Force (LEPC and CEMP) meetings, the County Emergency Management Director will also annually evaluate the Multi-Hazard Mitigation Plan and update the plan in the event of a hazardous occurrence. After the fourth annual update meeting, the LaGrange County Emergency Management Director will finalize a new Local Task Force to begin the required five-year update process. This will be accomplished in coordination with LaGrange County jurisdictions, and the entire Multi-Hazard Mitigation Plan shall be updated and submitted to FEMA for approval (within 5 years of plan adoption). These revisions will include public participation by requiring a public hearing and published notice in addition to multiple Local Task Force meetings to make detailed updates to the plan.

Public participation for updates is as critical as in the initial plan. Public participation methods that were used in the initial writing will be duplicated for any future update processes – direct mailing list of interested parties, public meetings, press releases, surveys, questionnaires, and resolutions of participation and involvement. Additional methods of getting public input and involvement are encouraged such as placing copies of the plan in the LaGrange County Emergency Management Director's Office and town offices, in addition to placing the plan on the LaGrange County and social media websites. Furthermore, jurisdictions will be encouraged to place a notice on their websites stating the plan is available for review at the town offices. Notifications of these methods could be placed in chamber newsletters and local newspapers. Committee responsibilities will be the same as with updates.

Chapters 5 focuses on mitigation strategies for natural hazards and jurisdiction-specific mitigation strategies for both natural and man-made/technological hazards. The Multi-Hazard Mitigation Plan proposes a number of strategies, some of which will require outside funding in order to implement. If outside funding is not available, the strategy will be set aside until sources of funding can be identified. In these situations, LaGrange County and cities will also consider other funding options such as the county's/cities'/towns' general funds, bonding and other sources. Based on the availability of funds and the risk assessment of that hazard, the county will determine which strategies should be continued and which should be set aside. Consequently, the action plan and the risk assessment serve as a guide to spending priorities but will be adjusted annually to reflect current needs and financial resources.

The last step requires an evaluation of the strategies identified in the goals and policies framework, selecting preferred strategies based on the risk assessment, prioritizing the strategy list, identifying who is responsible for carrying out the strategy, and the timeframe and costs of strategy completion. LaGrange County and its jurisdictions have incorporated the preferred strategies including identification of the responsible party to implement, the timeframe and the cost of the activity with the goals and policies framework.

Local Plan Integration

The Hazard Mitigation Planning Team and the Local Task Force members shall recognize this document as an important planning tool for their communities and will recommend its use as a reference as their communities complete other related plans. The county Emergency Management Director will contact the LaGrange County Plan Commission Executive Director to ensure this plan will be used as the county updates their Comprehensive Plan as well as any other relevant community ordinances such as zoning, floodplain, capital improvement plans, etc. The county Emergency Management Director shall also contact the head of other departments as they work other stand-alone plans that might relate to this one or its strategies such as those for park and recreation, sustainability, etc. As each planning mechanism is updated, the Local Task Force will reevaluate the status of the mitigation strategies and determine whether any changes in them is needed.

The Emergency Management Advisory Council (EMAC) will continue to serve as the advisory body that provides general supervision and control over the emergency management and the disaster programs for the county and its multiple jurisdictions. The quarterly meetings will continue to be available to the public and other mitigation team members through the EMAC and other mitigation projects avenues such as RiskMAP.

Since the adoption of the last Hazard Mitigation Plan, only one ordinance has been updated in the county, the LaGrange County flooding ordinance. This ordinance, updated in 2018, recognizes multiple zones related to a 100-year flood event, and limits development in them. This ordinance covers cover the whole County. This ordinance follows the State of Indiana Model Ordinance template, which identifies multiple subtypes of flood related zones based on the average depths of a 100-year flood, and provides different development restrictions for each zone.

Adoption, Implementation and Maintenance

County Adoption

One of the first steps in implementing the plan is to make sure that it is officially adopted in a public hearing. The task force and the public commented on the draft plan. The task force reviewed comments, modifications were made and a final draft was sent to FEMA for review, comment and approval. After FEMA approved the plan, the board of commissioners of the County of Lagrange adopted the plan. A public hearing was held to obtain any additional comments that the public or others wished to make. A copy of the county adoption resolution is located in Appendix G.

Town Adoption

The Multi-Hazard Mitigation Plan for LaGrange County is a multi-jurisdictional plan. All communities in the county – towns– were involved in the various stages of the planning process and a mitigation strategies have been identified for each jurisdiction. Each of LaGrange County's towns passed resolutions to participate in the county plan. Following official adoption of the plan by the county, each town and township was notified. Each chose whether or not to adopt the plan as well. Each were encouraged to adopt, thereby enabling them to apply for HMGP funds independently, not under the umbrella of the county. Copies of the town resolutions are in Appendix G.

Implementation and Maintenance Guidelines.

The LaGrange County Multi-Hazard Mitigation Plan is intended to serve as a guide/reference to mitigate the impact of both current and future hazards for all county residents and institutions. As such, it is not a static document but must be modified to reflect changing conditions if it is to be an effective plan. The goals, objectives, and mitigation strategies will serve as a work or action plan. Individual strategies have a party assigned to it to help ensure implementation, oversight, and general monitoring of the action plan; however, oversight has been assigned to the County Emergency Management Director. The following guidelines will help implement the goals, objectives and strategies of the plan. An implementation committee will be used to assist in this process. The existing task force, the planning commission, other appropriate county committee, or any other group of stakeholders could serve as the implementation committee to review implementation opportunities identified in the plan. Implementation of strategies should be a collaborative effort of the participating jurisdictions. This committee should operate by group consensus and create recommendations for implementation to bring forward to the proper governing entity for consideration. Guidelines for the committee include:

1. Commitment to the plan and overall mitigation vision.
2. Protect sensitive information.
3. Take inventory of strategies in progress.
4. Determine strategies that no longer are needed or new strategies that have emerged.
5. Set priorities. Assign responsibilities to complete.
6. Seek funding.

7. Meet minimum bi-annually – one meeting to set the course of action and a second to monitor progress.
8. Report to all respective boards for action.
9. Advisory capacity.

Assigning strategies and implementation activities in this plan to certain entities does not guarantee completion. The strategies and activities addressed in this plan will be addressed as funding and other resources become available and approval by the responsible jurisdiction takes place.

The County Emergency Management Director has the overall responsibility of tracking the progress of mitigation strategies. The County Emergency Management Director will request updates from responsible agencies and cities on their mitigation actions after each disaster and at least annual to coincide with plan evaluation. Post disaster monitoring will evaluate the effectiveness of mitigation actions that have been completed and determine implementation of planned strategies. Monitoring may lead to developing a project that may be funded by FEMA's Hazard Mitigation Assistance Programs.

Continued Public Involvement

Annual reviews to change the plan will be led by the County Emergency Management Director using the implementation committee. It will be their responsibility to review the plan and mitigation. Yearly reviews are due on the anniversary of the plan approval. Responsible parties and the implementation committee will report on the status of their projects. Committee responsibility will be to evaluate the plan to determine whether:

- Goals, objectives and strategies are relevant.
- Risks that have changed including the nature, magnitude, and/or type of risks.
- Resources are adequate or appropriate.
- The plan as written has any implementation problems or issues.
- Deadlines are being met as expected.
- Partners participating in the plan are appropriate.
- Strategies are effective.
- New developments affecting priorities.
- Strategies that should be changed.

Updates every five years are led by the County Emergency Management Director in coordination with the county's municipalities to complete a rewrite for submitting to FEMA. A task force, similar to the one created to complete the plan, will be formed and used in the planning process to rewrite the plan. These revisions will include public participation by requiring a public hearing and published notice. Future updates should address potential dollar losses to vulnerable structures identified. Any major changes in the plan may include additional public meetings besides just a public hearing.

Public participation for updates is as critical as in the initial plan. Public participation methods that were used in the initial writing should be duplicated for any updates – direct mailing list of interested parties, public meetings, press releases, surveys, questionnaires, and resolutions of participation and involvement. Additional methods of getting the public input and involvement are encouraged such as placing copies of the plan in public libraries for public comment or placing the plan on county and town websites. Notifications of these methods could be placed in newsletters and the local newspapers. Committee responsibilities will be the same with updates as with the original plan.

The action plan proposes a number of strategies, some of which will require outside funding to implement. If outside funding is not available, the strategy may be set aside until sources of funding can be identified or modified to work within the funding restrictions. In these situations, the county and entities will also consider other funding options such as the county's general fund, bonding and other sources. Based on the availability of funds and the risk assessment of the hazard, the county will determine which strategies they should continue to work on and which should be set aside. Consequently, the action plan and the risk assessment serve as a guide to spending priorities but will be adjusted annually to reflect current needs and financial resources. It is not a legally binding document.

Updates require an evaluation of the strategies identified in the goals and policies framework, selecting preferred strategies based on the risk assessment, prioritizing the strategy list, identifying who is responsible for carrying out the strategy, and the timeframe and costs of strategy completion. LaGrange County has incorporated the preferred strategies including identification of the responsible party to implement, the timeframe, and the cost of the activity in the plan framework.

This plan will be integrated into other county plans such as the County Comprehensive Plan, the County Water Plan, the County Transportation Plan, and all Emergency Operations Plans. Chapter one can serve as an executive summary to be attached to those plans as necessary. The County Board encourages jurisdictions to address hazards in their comprehensive plans, land use regulations, zoning ordinances, capital improvement and/or building codes by including some of the mitigation strategies in their plans. Many of the plans or policies can include strategies from the Hazard Mitigation Plan. They are meant to blend and complement each other so that strategies are duplicated and occur in different plans as appropriate.

Bibliography & Quick Reference

References are separated from the county specific resources. The Quick Reference is a guide to the federal & state programs discussed within the plan.

References

Any Place America. "Indiana Topo Maps & Elevations." www.anyplaceamerica.com/directory/in/.

Census of Agriculture. "2012 Census Volume 1, Chapter 2: County Level Data. *United States Department of Agriculture*. www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Indiana/.

Centers for Medicare & Medicaid Services. "Health Care Provider Guidance- Emergency Preparedness for Every Emergency." www.cms.gov.

Centers for Disease Control and Prevention. "Fact Sheet: Protect Yourself from Animal- and- Insect-Related Hazards After a Disaster." cdc.gov/disasters/animalhazards/facts.html. Accessed 2017.

Costello, Becca, "State Confirms 2 Cases of Tick-Borne Heartland Virus In 2 Years. Indiana Public Media. 12 Jul. 2017. indianapublicmedia.org.

Dakss, Brian. "Plant Blaze to Burn Self Out." CNS News, 15 Jan. 2005. cbsnews.com.
National Weather Service. "Central Indiana Fire Weather Forecasts." National Oceanic and Atmospheric Administration. weather.gov/ind/fire.

Evans, Brad. "Landslides Force Emergency Closures on 2-Tri-State Roads." WLWT5. 8 Apr. 2014. www.wlwt.com/news/sr-262-in-indiana-closed-for-month-after-landslide/25369526

FEMA. "Disaster Declarations for Indiana." fema.gov/disasters/grid/state-tribal-government/56.

Franzmeier, D.P., G.C. Steinhardt, D.G. Schulze. Indiana Soil and Landscape Evaluation Manual. Purdue University. Version 1.0. https://www.extension.purdue.edu/extmedia/ay/ay-323.pdf.

Indiana Department of Homeland Security, The Polis Center. "2014 State of Indiana Standard Multi-Hazard Mitigation Plan." www.savi.org/savi/documents/Polis%20docs/Indiana%20SHMP%20FINAL.pdf.

Indiana Department of Natural Resources: Division of Water. "Indiana's Water Shortage Plan." 20 Mar. 2015. https://www.in.gov/dnr/water/files/watshplan.pdf.

Indiana Department of Natural Resources. "Floodplain Administrator's Guide." September 2014. https://www.in.gov/dnr/water/files/FloodAdmGuide.pdf.

Indiana Department of Natural Resources. Emerald Ash Borer Locations. indnr.maps.arcgis.com/apps/webappviewer/index.html?id=496c7e33f2e74e4f842d926e0.

Indiana State Department of Health. “Campground Roster.” www.in.gov/isdh/22865.htm

Indiana State Department of Health. “Mosquito Bourne Diseases.” www.in.gov/isdh/23592.htm.

Infectious disease profiles. http://www.in.gov/isdh/files/2015_County_Profiles.pdf

Jafari, Najmeh. Armindokht Shahsanai, Mehrdad Memarzadeh, Amir Loghmani. “Prevention of Communicable Diseases after Disaster: A Review.” *Journal of Research in Medical Sciences*. Jul. 2011, pp. 956-962. ncbi.nlm.nih.gov/pmc/articles/PMC3263111. Accessed 2017.

Logan, William Newton, Edgar Roscoe Cumings, Clyde Arnett Malott, Stephen Sargent Visher, William Motier Tucker, John Robert Reeves, William B. Burford. Handbook of Indiana Geology. Indiana Division of Geology. The Department of Conservation, 1922. Pg. 84-88. books.google.com

Martins, Tim. “Clean Water Act Abstracts.” National Aeronautics and Space Administration. www.grc.nasa.gov/WWW/k-12/fenlewis/cwa.htm.

Moore, Tom. “Summer 2016 Was One of Hottest on Record in Lower 48 States, NOAA Says.” weather.com/news/climate/news/noaa-summer-2016-us-report.

National Fire Protection Association. “Fire Loss in the United States.” http://www.nfpa.org.

NOAA. “Storm Events Database.” ncdc.noaa.gov. Accessed 2017.

National Weather Service. “Indiana Local Climate.” National Oceanic and Atmospheric Administration. www.weather.gov.

National Weather Service. StormReady® in Indiana. http://www.weather.gov/stormready/in-sr.

Sapp, A.D., T.G. Huff, G.P. Gary, D.J. Icove, P. Horbert. “Report of Essential Findings from a Study of Serial Arsonists.” National Criminal Justice Reference Service. www.ncjrs.gov. 1994.

SAVI. “MAP.” savi.org/savi/Map.aspx?ObjectID=0&NoMapItems=True.

STATS Indiana, 2012. “Indiana County Profile.” www.stats.indiana.edu/profiles.

U.S. Bureau of the Census. Population of Counties by Decennial Censuses. https://www.census.gov/population/cencounts/in190090.txt

U.S. Census Bureau. American Community Survey 5-year estimates, 2009-2013. www.census.gov.

United States Department of Agriculture- Farm Service Agency. “County FSA Updates.” content.govdelivery.com.

U.S. Department of Agriculture. “Published Soil Surveys for Indiana.” Natural Resources Conservation Service. www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=IN.

U.S. Department of Homeland Security. “Communications Sector.” www.dhs.gov/communications-sector.

United States Environmental Protection Agency. “Climate Change Indicators in the United States.” www.epa.gov/climate-indicators.

U.S. Environmental Protection Agency. “Hazard Mitigation Assistance Available to Water and Wastewater Utilities.” www.epa.gov/fedfunds.

U.S. Environmental Protection Agency. “Tire Fires: Extinguishing Tire Fires.” 3.epa.gov/epawaste.

U.S. Fire Administration. “Fire Prevention and Public Education.” www.usfa.fema.gov/statistics.

U.S. Fish and Wildlife Service: Endangered Species. “Indiana: County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species.” www.fws.gov/midwest/endangered/lists/indiana-cty.html.

United States Geological Society. Landslide Map of the Conterminous United States. https://landslides.usgs.gov/hazards/nationalmap/legend.php

United States Geological Society. USGS Definition of “Streamgage.” https://water.usgs.gov/nsip/definition9.html

United States Geological Society. “Earthquake Hazards Program.” http://earthquake.usgs.gov/learn/glossary/?termID=105.

United States Government Accountability Office. “Budgeting for Disasters: Approaches to Budgeting for Disasters in Selected States. “*U.S. GAO*, Mar. 2015. www.gao.gov/assets/670/669277.pdf.

Watson, John T., Michelle Gayer, Marie A. Connolly. “Epidemics after Natural Disasters.” National Center for Biotechnology Information. *Emerging Infectious Diseases*. Jan. 2007. ncbi.nlm.nih.gov/pmc/articles/PMC2725828.

County Specific Resources

F.A. Battey & Co. Counties of LaGrange and Noble, Indiana: Historical and Biographical. 1882. https://archive.org/details/countiesoflagran00infaba. Accessed 2018.

Rosenberry, Lois Kimball Mathews. The expansion of New England; the spread of New England settlement and institutions to the Mississippi River, 1620-1865. Boston: Houghton Mifflin, 1909. https://archive.org/details/expansionofnewen00roseiala. Accessed 2018.

Stutzman, Ida and Eli J. Bontreger, “How It All Began: A History of the Town.” Ed. Julie Wolfe. http://shipshewana.org/?page_id=223. Accessed 2018.

U.S. Census Bureau. “People Reporting Ancestry.” 2012-2016 American Community Survey 5-Year Estimates. factfinder.census.gov. Accessed 2018.

State Resources

All Agency, Indiana Drainage Handbook: http://www.in.gov/dnr/water/4893.htm

DNR, NFIP and Floodplain management resources: floodmaps.in.gov

DNR, lake and river construction regulations: http://www.in.gov/dnr/water/4963.htm

DNR authority under the Flood Control Act is further described: 312 IAC 10: Floodplain Management

DNR, LARE resource: "LARE Project Reports." http://www.in.gov/dnr/fishwild/3303.htm

DNR, SHAARD: "SHAARD Database." http://www.in.gov/dnr/historic/4505.htm

DNR, State historical county survey: http://www.in.gov/dnr/historic/2824.htm

DNR, Invasive Species, Gypsy Moth and EAB: http://www.in.gov/dnr/3123.htm to report, call: (317) 232-412

Evaluating Earthquake Losses due to Ground Failure and Identifying their Relative Contribution can be accessed through the following link: http://www.iitk.ac.in/nicee/wcee/article/13_3156.pdf.

IDEM, State Rule 5, Land Management: http://www.in.gov/idem/permits/water/wastewater/wetwthr/storm/rule5.html

IDEM, Meth Cleanup Information: http://www.in.gov/idem/health/2385.htm

IDNR, Water Shortage Plan: https://www.in.gov/dnr/water/files/watshplan.pdf

Indiana State Police, Meth Resources: https://socratadata.iot.in.gov/Government/ISP-Meth-Lab-Locations-Map/ktyc-iiu7

Indiana State Department of Health, HIV Outbreak: http://www.in.gov/isdh/files/2015_County_Profiles.pdf

INDOT, Traffic Wise, Real-time traffic Conditions: http://pws.trafficwise.org/pws/

INDOT, Preservation Initiative: http://www.in.gov/indot/3371.htm

Purdue, Invasive Species, EAB Resources: https://extension.entm.purdue.edu/EAB/

Federal Resources

EPA, Local Emergency Planning Committees: https://www.epa.gov/epcra/energize-your-local-emergency-planning-committees-lepc

EPA, Excessive Heat Events Guidebook: https://www.epa.gov/heat-islands/excessive-heat-events-guidebook

ESRI Map: https://www.arcgis.com/apps/PublicInformation/index.html?appid=4ae7c683b9574856a3d3b7f75162b3f4

Extreme Heat: https://www3.epa.gov/climatechange/pdfs/print_heat-deaths-2014.pdf

FEMA Training Guide: https://training.fema.gov/emiweb/is/is393a/is393.a-lesson4.pdf

FEMA, Commuter Emergency Plans: http://www.fema.gov/media-library/assets/documents/90370

FEMA, Safe Room Guidance: https://www.fema.gov/media-library/assets/documents/3140

FEMA, Local Mitigation Planning Handbook: https://www.fema.gov/media-library/assets/documents/31598

US Fish and Wildlife, endangered and threatened species:
https://www.fws.gov/midwest/endangered/saving/outreach.html

US Fish and Wildlife, Bat Children Resources:

https://www.fws.gov/midwest/endangered/mammals/inba/curriculum/InbaKidsCavesOhMy.pdf

USGS, FIM maps: http://water.usgs.gov/osw/flood_inundation/

USGS, NHD Data: https://nhd.usgs.gov/data.html

US Fish and Wildlife, Endangered and Threatened Species:
https://www.fws.gov/midwest/endangered/saving/outreach.html

Tornado Buffers: http://www.spc.noaa.gov/faq/tornado/ef-scale.html

Indiana State Department of Health County Profiles: http://www.in.gov/isdh/files/2015_County_Profiles.pdf

Appendices Table of Contents

Appendix A: Multi-Hazard Mitigation Planning Team Meeting Documentation

Figure 48 Invitation to Participate

Good Morning,

Lagrange County is starting the process of updating the Multi Hazard Mitigation Plan. This plan is required by FEMA to be updated every 5 years. Lagrange County is working with the Polis Center at Indiana University- Purdue University Indianapolis (IUPUI) to update the county information on critical facilities, community capabilities as well as addressing the progress of any ongoing mitigation projects in the county.

Your presence is requested at a series of 3 meetings to satisfy the participation requirement of the mitigation plan. All incorporated communities and the county are required to participate in order to be eligible for mitigation funds. We would like the participation of as many different departments as possible in order to make this mitigation plan a well thought out document that reflects the true needs and desires of Lagrange County. Part of the grant requirement is that each county is required to meet an "in-kind" match of 25% which is "earned" through time spent participating in this update process both at meetings and outside. These meetings will be an opportunity for you to gain more knowledge about the mitigation plan update process as well as to provide input on specific hazards in your communities.

Again, it is vital for each incorporated community to participate if you wish to apply for mitigation funds in the next 5 years. The Polis Center will also work to provide a list of potential grants and funders for mitigation projects that could help to improve the disaster resiliency of our communities.

Our first meeting will be held on **October 9th at 1pm** at the Lagrange County Annex Building, 114 W. Michigan Street and will last one hour. Please complete the attached documents and bring them to this first meeting. The "Community Capability" document is meant to identify the plans, ordinances, and governmental departments for which you have authority to implement mitigation actions. The second document, "Strategy Worksheet," is a way to gather your input on the problems areas in your community. Please note, any time spent on these worksheets will count towards the match, so PLEASE track that time! I have attached another document, "Personal Time Tracking Sheet," for your use.

If you have any questions or concerns about this process, please email me at wwismer@lagrangecounty.org, or bring them to the first meeting. Thank you in advance for your participation in this update process.

Thank you,

W. Donald Wismer
Emergency Management Director
LaGrange County
260-463-4719

Lagrange County Hazard Mitigation Plan Update Meeting Number: Date: 10-9-18

NAME	TITLE/ROLE	COMMUNITY (County, Town, City)	EMAIL ADDRESS	Mileage (Round Trip)	Time Spent on Surveys
Roger Powers	Director	DeKalb County	rapowers@co.dekalb.in.us	100	
Rand Brown	Director	Steuben Co. EMA	emergencymanagement@co.steuben.in.us	44	1.2 hr
Peter Cook	County Council	LaGrange Co	pcookbuffaloman@aol.com	16	
Tom Fitch	marshal	Shipshewana	police@shipshewana.org	16	1 hr.
Tyler Terry	Stroh Fire chief Lagrange County Utility	Stroh, Lagrange Co	tylerterry72@icloud.com	20	
Mark Eagleson	Town Manager	Town of LaGrange	meagleson@lagrangein.org	2	
BRAD MCCREA	NIPSCO	ANGOLA AREA	bmccrea@nisource.com	40	
Martin Franke	District Manager LaGrange Co SWCD	LaGrange County	martin.franke@in.nacdnet.net	2	
DAVE ELICK	FIRE CHIEF	LAGRANGE	dave_elick@yahoo.com	3	
David Billows	Red Cross		d.billows51@yahoo.com	15	
Jennifer McBride	Recorder	LaGrange	jmcbride@lagrangecounty.org		
Sarah Farlow	Engineer	LaGrange Co.	SFarlow@lagrangecounty.org	1	
Randy VanWagner	Superintendent	LaGrange Co	rvanwagner@lagrangecounty.org	1	
James Lemon	treasurer	LaGrange Co	jlemon@lagrangecounty.org	0	
Steve Engleking	Purdue Extension CED	LaGrange Co.	sengleking@purdue.edu	—	

Lagrange County Hazard Mitigation Plan Update Meeting Number: Date: 10/9/18

NAME	TITLE/ROLE	COMMUNITY (County, Town, City)	EMAIL ADDRESS	Mileage (Round Trip)	Time Spent on Surveys
Steve Scott	Administrator	Millers Merry Manor	ADMPP3@millersmerrymanor.com	1.0 m	4.0 hr
Freeman Miller		F&N Woodwork	FNWood@CenturyNet	9 mi	45 Min
Tad Hite	Town Council	Shipshewana	thite@shipshewana.org		30 min
Rick Dolsen	IDHS District 3 Coordinator	IDHS	rdolsen@dhs.in.gov	50	1 HR
Rita Lehner	GIS Coordinator	LaGrange Co	rlehner@LaGrange Co	—	
Rex Pranger	SURVEYOR	LAGRANGE Co	RPRANGER@LAGRANGECOUNTY.ORG	—	—
Amos Dodson	Meteorologist	(NWS) Syracuse, IN	amos.dodson@noaa.gov	—	
Robert Stauffer	Shipshewana Town Manager	SHIPSHEWANA	townmanager@shipshewana.org	20 MILES	2-HOURS
HAROLD GINGERICH	County Council	LAGRANGE	harjan68@hotmail.com	28 miles	—
Jason Boggs	County Building Commissioner Wolcottville Town Board	LaGrange County & Town of Wolcottville	Jboggs@lagrangecounty.org	—	—

done 11/8/18

Hazard Mitigation Plan Update Meeting Number:

Date: 11-8-18

NAME	TITLE/ROLE	COMMUNITY (County, Town, City)	EMAIL ADDRESS	Mileage	Time Spent on Surveys
Don Wismer	L.C. EMA				
Chris Roller	Meteorologist NWS Northern IN	North Webster IN	christopher.roller@noaa.gov		
Bill More	Director of Communications				
Mark Eagleson	Town Manager	Town of Lagrange			
Adam Sams	General Manager	Lagrange County Utility	adam lcrud@gmail.com		
Tyler Terry	Fire Chief	Stroh	TylerTerry72@icloud.com		
Brian Bills	Director of Transportation Buildings & Grounds	Westview School Corp	billsb@westview.k12.in.us	16 ✓	
Larry Miller	County Commissioner	LaGrange	lmiller@lagrangecounty.org		
Eva Metzler	Superintendent LLC	Lakeland	emerkel@lakelandindiana.net		
Cathy Shrock	Bus. Mgr/Treas	Lakeland	CPhillips@lakelandlakers.net		
Bob M[illegible]	Director of IT	Lagrange County			
Rick Dolsen	District Coordinator	IDHS	rdolsen@dhs.in.gov	50 ✓	
Jennifer McBride	Recorder	County	jmbride@lagrangecounty.org	15 Stops	
Rick Miller	Plan Comm	County	RMiller@LaGrangeCounty.org		

Hazard Mitigation Plan Update Meeting Number:

Date: 11-8-18

NAME	TITLE/ROLE	COMMUNITY (County, Town, City)	EMAIL ADDRESS	Mileage	Time Spent on Surveys
David Hockley	American Red Cross		ddhockley@yahoo.com	—	— ✓
Steve Scott	Administrator	Miller's Merry Manor		1.0 ✓	2.5 ✓
Jason Haner	Mgr Gas Ops	NIPSCO	JHANER@NISOURCE.COM		
Aaron Fugate	Highway Dept.				
Vicki Northup	LaGrange Co Highway				
Deb Naylor	GTS				
Harold Gingerich	LaGrange Co Council				
Jeremy Hoover	Parkview LaGrange Hospital	Parkview Health			
Stewart Bender	Town Manager	Town of Topeka	TownManager@Topeka-IN.Gov	56 ✓	
Bill [illegible]	Media				

Appendix B: Public Notices in the Local Media

(260) 585-5242
Telephone Number, with Area Code
WC 177 #1549 hspaxlp S5,12,19

All persons having claims against this estate, whether or not now due, must file the claim in the office of the Clerk of this Court within three (3) months from the date of the first publication of this notice, or within nine (9) months after the decedent's death, whichever is earlier, or the claims will be forever barred.

Dated at LaGrange, Indiana, this 9th day of November, 2018.

Bonnie J. Brown CF
Clerk of LaGrange County

Bill D. Eberhard, Jr.
EBERHARD, WEIMER, CLOUSE & GLICK, P.C.
115 South Detroit Street
LaGrange, IN 46761
(260) 463-7154
#1558 hspaxlp S12,19

PUBLIC NOTICE

The Multi-Hazard Mitigation Planning Committee of Lagrange County will host a public information and strategy planning session at 9am on December 4th, 2018 at the County Annex Building located at 114 West Michigan Street.

Over the last several months, a planning committee, consisting of community members, has worked with the Polis Center at Indiana University-Purdue University Indianapolis (IUPUI) to update the county Multi-Hazard Mitigation Plan. Once the plan is updated, the committee will submit it to FEMA for approval.

The planning committee is interested in receiving public input on the plan. Anyone that would like to provide input or has any questions should contact Emergency Management Agency Director Don Wismer at 260-463-4719.

LC 26 #1560 hspaxlp S12/N16

IN THE LAGRANGE CIRCUIT COURT
Case Number: 44C01-1810-EU-000034

STATE OF INDIANA) SS:
COUNTY OF LAGRANGE)

IN THE MATTER OF THE UNSUPERVISED ADMINISTRATION OF THE ESTATE OF MARY K. STROOP, DECEASED

NOTICE OF ADMINISTRATION

Notice is hereby given that on the 30th day of Oct., 2018, Ann M. Zook and Andrew G. Stroop were appointed as co-personal representatives of the estate of Mary K. Stroop, deceased, who died on the 6th day of September, 2018.

All persons having claims against this estate, whether or not now due, must file the claim in the office of the Clerk of this Court within three (3) months from the date of the first publication of this notice, or within nine (9) months after the decedent's death, whichever is earlier, or the claims will be forever barred.

Dated at LaGrange, Indiana, this 1st day of Nov., 2018.

Bonnie J. Brown CF
Clerk of the Circuit Court
of LaGrange County

Cheryl L. Weimer, Attorney
Eberhard, Weimer, Clouse & Glick, P.C.
115 S Detroit Street
LaGrange, IN 46761
Phone: (260) 463-7154
#1546 hspaxlp S5,12

Nationwide 1-800-398- #1559 hspaxlp S12,1

Appendix C: Historical Hazards from NCDC since 2010

Location/County	Date	Event	Dir. Injuries	Indir. Injuries	Dir. Deaths	Indir. Deaths	Crop Damage Cost	Property Damage Cost	Description
LAGRANGE	February 1, 2011	Blizzard	0	0	0	0	0.00K	0.00K	Blizzard conditions were experienced during the late afternoon and evening hours of February 1st as an intense low pressure system approached from the southwest. Wind gusts in excess of 40 mph, combined with the falling heavy snow and sleet, created reduced visibilities below an eighth of a mile at times. Snowfall rates of 1 to 3 inches per hour were common, with snow and sleet totals across the county generally ranging between 6 and 10 inches. A CoCoRaHS observer reported 8.6 inches of total snow and sleet accumulation 10 miles east of LaGrange, along with 3 foot snow drifts and numerous road closures. The significant blowing and drifting snow resulted in numerous accidents and school closings across the region.
LAGRANGE	January 6, 2014	Extreme Cold/Wind Chill	0	0	0	0	0.00K	0.00K	Temperatures dropped into the single digits and teens below zero as arctic air filtered in behind a powerful winter storm that dropped more than a foot of heavy snow on the region. Strong westerly winds, with gusts between 30 and 40 mph, created deadly wind chills and significant blowing and drifting snow. Dangerous winds chills between 30 and 45 degrees below zero were common. The extremely cold temperatures and significant blowing snow kept many north-south roads impassable or restricted to single lanes. There were numerous reports of accidents and slide-offs across the region due to the slick roadways, with many businesses and schools closed each day.
LAGRANGE	January 8, 2015	Extreme Cold/Wind Chill	0	0	0	0	0.00K	0.00K	Wind chills during the morning and early afternoon hours of January 8th ranged between 20 below zero and 30 below zero. This dangerous cold led to numerous school closings and delays across the region.
SHIPSHEWANA FLD ARPT	February 20, 2018	Flood	0	0	0	0	0.00 K	54000.00 K	A slow release of a snow pack, containing one to over two inches of water, occurred in the days leading to the event which started the process of river rises in many areas. Low pressure tracked from northwest Iowa into northern Lower Michigan, which ushered in a rapid warmup and equally rapid release of any remaining water in the snow-pack. Several rounds of rain occurred between the 19th and 21st of February across the region, fed by record high precipitable water levels (by February standards) in the 1.3 to 1.5 inch range. A swath of four to six inches of rain fell northwest of a Logansport to Kendallville line. All these factors combined to cause extensive flooding on several rivers in the St Joseph, Kankakee and Upper Wabash river basins, with record crests occurring on some rivers. These water levels forced evacuations of homes and closure of businesses and schools, rescues from those driving into flood waters and an overwhelming of water treatment facilities in a few communities. While exact damage figures

									were not available at the time of entry of the data, preliminary data suggests values into the millions (possibly $10 million or higher).
LAGRANGE	July 2, 2011	Hail	0	0	0	0	0.00K	0.00K	
LAGRANGE	July 6, 2012	Hail	0	0	0	0	0.00K	0.00K	
LAGRANGE	September 5, 2014	Hail	0	0	0	0	0.00K	0.00K	
SHIPSHEWANA	June 11, 2015	Hail	0	0	0	0			Picture of half dollar sized hail received.
SHIPSHEWANA FLD ARPT	February 28, 2017	Hail	0	0	0	0	0.00 K	0.00 K	A warm front moved into far southern Lower Michigan, enhancing low level shear and an already unstable environment to allow for a line of thunderstorms to develop and become severe as it tracked across far southern Lower Michigan and far northern Indiana. While the main bowing segments were across Lower Michigan, an supercell developed on the southern flank of the line, producing hail and damaging winds, but no tornadoes as it remained rooted in the warm sector, away from the greatest shear. Additional severe weather occurred with a second line of storms during the early morning hours of March 1st.
SHIPSHEWANA	February 28, 2017	Hail	0	0	0	0	0.00 K	0.00 K	A warm front moved into far southern Lower Michigan, enhancing low level shear and an already unstable environment to allow for a line of thunderstorms to develop and become severe as it tracked across far southern Lower Michigan and far northern Indiana. While the main bowing segments were across Lower Michigan, an supercell developed on the southern flank of the line, producing hail and damaging winds, but no tornadoes as it remained rooted in the warm sector, away from the greatest shear. Additional severe weather occurred with a second line of storms during the early morning hours of March 1st.
EDDY	November 5, 2017	Hail	0	0	0	0	0.00 K	0.00 K	Warm front provided the focus for morning thunderstorms that eventually turned into a bowing segment across NE IN into NW Ohio. Storms also developed across central Indiana and moved into portions of NE IN and NW Ohio. A cyclic supercell impacted Blackford and Jay county with a long tracked tornado and damage along its track. Flooding issues also occurred in some areas due to training and efficient rain producers.
LAGRANGE	November 29, 2011	Heavy Snow	0	0	0	0	0.00K	0.00K	Rain changed over to heavy wet snow Tuesday afternoon and continued into the evening hours before ending. Snowfall totals range from around 5 inches in far eastern portions of the county to between 8 and 10 inches across central and western areas. There was a report of

									9.5 inches of total snow accumulation 1 mile east-northeast of LaGrange. Snow fell at 1 to 2 inches per hour at times. The heavy wet snow created localized power outages, along with hazardous driving conditions which resulted in a few accidents and slide-offs. There were also reports of school delays and cancellations the next morning.
LAGRANGE	March 5, 2013	Heavy Snow	0	0	0	0	0.00K	0.00K	Snow overspread the area during the afternoon hours of March 5th and became heavy at times during the evening and early overnight hours. Total snow accumulations across the county generally ranged between 4 and 7 inches. There was a report of 6.1 inches 1 miles east of LaGrange. The intensity of the heavy snow and sub-freezing surface temperatures allowed the snow to accumulate on roadways. This resulted in hazardous travel conditions across the region with numerous school closings the morning of March 6th.
LAGRANGE	February 1, 2015	Heavy Snow	0	0	0	0	0.00K	0.00K	Light snow developed during the late evening hours of January 31st and became heavy at times February 1st into early February 2nd. Total snow accumulations across the county generally ranged between 14 and 17 inches. Wind gusts of 20 to 25 mph, combined with the falling snow, created reduced visibilities and blowing snow. Numerous events were cancelled across the region, along with reports of slide-offs and accidents due to snow covered and slick roads. There were also reports of road closures in rural areas as unplowed roads became impassible. The heavy, wet, nature of the snow also led to sporadic power outages.
LAGRANGE	November 21, 2015	Heavy Snow	0	0	0	0	0.00K	0.00K	Snow overspread the area during the morning hours and became heavy at times in the afternoon on November 21st. There were reports of a few accidents and slide-offs across the region due to reduced visibilities and slushy accumulations on roadways. Total snow accumulations across the county ranged between 6 and 9 inches.
LAGRANGE	December 11, 2016	Heavy Snow	0	0	0	0	0.00K	0.00K	Light snow developed early on December 11th and became moderate to heavy at times during the day. Some freezing rain mixed in for a time late in the afternoon and evening before precipitation ended early on December 12th. Snowfall totals across the county generally ranged between 6 and 9 inches. Light ice accretions were also reported. Roads were snow covered and slick with a few reports of slide-offs and accidents across the region. Many schools were delayed or cancelled the following day (December 12th).
LAGRANGE	February 9, 2018	Heavy Snow	0	0	0	1	0.00 K	0.00 K	Snow, heavy at times, accumulated to between 10 and 14 inches of snow across far northern Indiana on February 9th creating hazardous travel conditions.
LAGRANGE	March 8, 2017	High Wind	0	0	0	0	0.00 K	0.00 K	Deep low pressure (968 mb) was located across northern Ontario with strong westerly low level jet across Great Lakes/Ohio Valley region. Deep mixing occurred of stronger wind fields aloft resulting in sustained winds of 40 to 45 mph with gusts of 55 to over 60 mph.

									Reports of tree or roof damage was noted in several counties. Roughly south of US-30, winds were not quite as strong, but frequent gusts to 45 mph or slightly higher did cause more sporadic wind damage reports.
LAGRANGE	January 1, 2012	Lake-Effect Snow	0	0	0	0	0.00K	0.00K	Lake effect snow, heavy at times, developed behind a strong cold front as arctic air filtered in over relatively warm lake waters. Total snow accumulations generally ranged between 3 and 6 inches across the county, with higher amounts across far western LaGrange County based on radar and reports out of eastern Elkhart County. The falling snow combined with gusty winds created reduced visibilities to less than a quarter of a mile at times, along with blowing and drifting snow. This led to cancelled events and reports of slide-offs and accidents across the region.
LAGRANGE	December 12, 2017	Lake-Effect Snow	0	0	0	0	0.00 K	0.00 K	Bands of locally heavy lake effect snow created difficult travel and whiteout conditions on December 12th.
LAGRANGE	September 3, 2011	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Law enforcement officials reported trees and power lines down throughout the county.
HONEYVILLE	September 3, 2011	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	County officials reported trees down on the west side of the Elkhart and LaGrange county line, between County Roads 28 and 32.
LAGRANGE	September 3, 2011	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A local newspaper reported a large tree limb, roughly 18 inches in diameter, was blown down by the strong winds, landing on the north side of the county courthouse. No damage occurred to the building from the tree limb.
HOWE	July 11, 2011	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Trained spotters reported multiple trees, up to two feet in diameter, snapped at the Howe Military Academy.
MONGO	May 29, 2011	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Amateur radio operators reported a large tree blocking State Route 3, just south of Mongo.
HOWE	July 1, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	The public reported a power line was blown down.
LAGRANGE	July 17, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Local officials reported a power line down at the intersection of County Roads 1290 North and 300 East.
LAGRANGE	July 17, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Law enforcement officials reported several trees down with power outages throughout the county.
HOWE REID EASH ARPT	July 6, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A local newspaper and trained spotter reported 17 to 19 trees were toppled on one property on the west side of State Route 9, a few hundred yards south of County Road 400 North . Nine of the trees were uprooted with the rest snapped above the base.

LAGRANGE	July 17, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A report of a tree being blown down, landing on a SUV, was found posted on Facebook.
HOWE REID EASH ARPT	July 6, 2012	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A trained spotter reported a metal shed was blown over.
HOWE	September 11, 2013	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	The public reported several 15 to 19 foot tall trees down in the area, some onto power lines.
HOWE	September 11, 2013	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	The Tri-Lakes Fire Department reported the roof off one building and the Hampton Inn suffering damage.
ELMIRA	June 25, 2013	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A trained spotter estimated a 60 mph wind gust.
PLATO	August 19, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Local officials reported trees were blown down on East County Road 175 North.
PLATO	June 18, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Emergency management officials reported utility lines and poles down at County Road 600 East and 100 South.
STROH	July 1, 2014	Thunderstorm Wind	0	0	1	0	0.00K	0.00K	Emergency management officials reported a six to eight foot diameter tree fell into a residence on Big Long Lake. A 64 year old male was crushed by the tree, killing him.
SHIPSHEWANA	June 18, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	The public reported multiple trees down across the area.
LAGRANGE	July 1, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Emergency management officials reported widespread tree damage in town. There was a partial roof and wall collapse at Parkside School.
STROH	July 1, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Emergency management officials reported widespread tree damage across the area.
TOPEKA	July 1, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	A trained spotter estimated 60 mph wind gusts.
LAGRANGE	June 18, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Emergency management officials reported several large trees limbs were down across the county.
STROH	September 20, 2014	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Emergency management officials reported a 14 inch diameter tree was blown down.
SEYBERTS	June 25, 2015	Thunderstorm Wind	0	0	0	0			Healthy 6 inch diameter tree branches down over the road.
LAGRANGE	July 12, 2016	Thunderstorm Wind	0	0	0	0	0.00K	0.00K	Local media reported a six inch diameter maple tree trunk was blown down. There was some indications of rot.

LAGRANGE	July 1, 2014	Tornado	0	0	0	0	0.00K	0.00K	A NWS survey found damage consistent with a EF-1 tornado in a larger area of straight line wind damage. The tornado touched down just west of LaGrange on US-20 East of County Road 100 West, where tree limb damage was observed. The tornado tracked east towards LaGrange, uprooting and snapping trees as it entered the town south of the local hospital. Numerous trees were uprooted and snapped just west of South County Road 00 East between US-20 and Grant Street. The tornado produced minor structural damage to homes along Grant Street before lifting just west of South Mountain Street. Maximum winds were estimated at 95 mph.
LAGRANGE	January 12, 2012	Winter Storm	0	0	0	0	0.00K	0.00K	Snow, moderate to heavy at times, developed during the late afternoon hours of January 12th and continued through most of January 13th. Total snow accumulations generally ranged between 3 and 6 inches, with the heaviest amounts across northern portions of the county based on surrounding reports. Sustained winds of 15 to 25 mph, with gusts to 30 mph, led to considerable blowing and drifting snow. Slide-offs and accidents were reported across the region.
LAGRANGE	December 13, 2013	Winter Storm	0	0	0	0	0.00K	0.00K	Snow, moderate at times, overspread the area late December 13th and continued into December 14th. Total snow accumulations across the county ranged between 6 and 8 inches. There were reports of slide-offs and accidents as roads became snow covered and hazardous.
LAGRANGE	January 5, 2014	Winter Storm	0	0	0	0	0.00K	0.00K	Moderate to heavy snow developed during the morning hours of January 5th and continued into the early morning hours of January 6th. Total snow accumulations ranged between 12 and 16 inches across the county. Winds picked up and gusted to between 30 and 40 mph by late in the afternoon and evening creating blizzard-like conditions at times. This led to snow emergencies and closings of schools and businesses the next morning as many roads became impassable.
LAGRANGE	February 4, 2014	Winter Storm	0	0	0	0	0.00K	0.00K	Snow developed during the early evening hours of February 4th and became heavy at times during the morning hours of February 5th. Impressive snowfall rates of 1 to 2 inches per hour and reduced visibilities to a quarter of a mile at times created hazardous travel conditions. Numerous schools and businesses were closed on Wednesday, February 5th, due to the heavy snow and poor road conditions. Total snow accumulations ranged from 7 inches across northwest portions of the county to as much as 10 inches in the southeast.
LAGRANGE	March 12, 2014	Winter Storm	0	0	0	0	0.00K	0.00K	Rain changed over to snow during the early morning hours of March 12th, becoming moderate to heavy at times during the remainder of the morning. Wind gusts of 30 to 40 mph, combined with the falling snow, reduced visibilities to less than a quarter of a mile at times. Snowfall totals across the county generally ranged between 5 and 8

									inches. A few accidents and slide-offs were reported across the region due to snow covered and slick roads. Many schools were either closed or delayed.
LAGRANGE	February 24, 2016	Winter Storm	0	0	0	0	0.00K	0.00K	Snow, heavy at times, with reduced visibility and gusty winds of 25 to 35 mph created difficult travel conditions February 24th into early February 25th. Slide-offs and accidents were common across the region. Many schools were closed on both February 24th and February 25th. Snowfall totals generally ranged between 6 and 9 inches. There was a report of 7.5 inches near LaGrange.
LAGRANGE	February 24, 2011	Winter Weather	0	0	0	0	0.00K	0.00K	Moderate snow developed during the early morning hours of February 25th and continued through approximately 7:00 am ET that morning. Snowfall totals across LaGrange County generally ranged between 3 and 5 inches. The snow resulted in accidents and slide-offs across the region, along with school delays.
LAGRANGE	February 20, 2011	Winter Weather	0	0	0	0	0.00K	0.00K	Light freezing rain and freezing drizzle developed around noon on February 20th and continued through the rest of the day into the early morning hours of February 21st. Ice accretions between 0.10 and 0.20 were common across the county. This created icy roadways resulting in slide-offs and accidents. There was a lull in the precipitation during the morning of February 21st. Moderate to heavy snow developed in the afternoon, continuing into the early evening and accumulating to between 5 and 6 inches. The snow and ice led to school closings and hazardous driving conditions.
LAGRANGE	February 5, 2011	Winter Weather	0	0	0	0	0.00K	0.00K	Moderate to heavy snow overspread the area just after daybreak during the morning hours February 5th, and continued into much of the afternoon. Visibilities were reduced to between a quarter and a half a mile for much of the event, with total snow accumulations of 3-5 inches reported across the county. A CoCoRaHS observer 7 miles east-southeast of LaGrange reported 4.5 inches of snow accumulation. The snow created slick roads which led to slide-offs and accidents.
LAGRANGE	January 11, 2011	Winter Weather	0	0	0	0	0.00K	0.00K	A steady light to moderate snow, with visibilities reduced to less than a half of a mile at times, developed around daybreak on Tuesday and continued through much of the day into Tuesday evening. Snowfall totals across the county generally ranged between 3 and 5 inches. Temperatures were cold enough for the snow to stick to area roadways, which led to accidents and slide-offs across the region. The snow and slick roads also caused some school delays and closings.
LAGRANGE	December 26, 2012	Winter Weather	0	0	0	0	0.00K	0.00K	Snow fell on December 26th, with total snow accumulations ranging between 1 and 3 inches across the county. The falling snow combined with wind gusts in excess of 30 mph reduced visibilities to less than a quarter of a mile at times. Temperatures were in the upper 20s as the

									snow fell which allowed roads to become snow covered and slick. This resulted in slide-offs and accidents across the region.
LAGRANGE	January 20, 2012	Winter Weather	0	0	0	0	0.00K	0.00K	Snow fell during the afternoon and evening hours of January 20th, with total snow accumulations ranging between 2 and 3 inches across the county. Temperatures were in the teens as the snow fell which allowed roads to become snow covered and slick. This resulted in slide-offs and accidents across the region.
LAGRANGE	January 19, 2012	Winter Weather	0	0	0	0	0.00K	0.00K	A narrow, quick moving, band of moderate to heavy snow moved through the area during the morning and early afternoon hours of January 19th. Total snow accumulations across the county generally ranged between 2 and 3 inches. Roads quickly became snow covered and slick as temperatures fell into the teens and winds picked up. This led to some blowing snow, with visibilities reduced to around a quarter of a mile at times. Slide-offs and accidents were reported across the region.
LAGRANGE	January 27, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	A light mixture of snow, sleet, and freezing rain quickly changed over to all freezing rain during the evening hours of January 27th. Light ice accretions were reported, generally near a tenth of an inch. Secondary roads became slick and hazardous which resulted in a few accidents across northeast Indiana. The freezing rain changed over to rain and drizzle during the early morning hours of January 28th as temperatures warmed above freezing.
LAGRANGE	February 2, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	Snow covered roads led to a few accidents and slide-offs across the region on February 2nd as light to moderate snow fell for much of the day. Total snow accumulations ranged between 2 and 4 inches.
LAGRANGE	February 4, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	Snow covered roads led to a few accidents and slide-offs across the region on February 4th as light to moderate snow fell during the morning hours. Total snow accumulations ranged between 2 and 4 inches.
LAGRANGE	February 26, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	Moderate rain overspread the region on February 26th. Surface temperatures hovered near freezing during the morning and early afternoon hours which allowed the rain to freeze on mainly elevated surfaces. Ice accretions near a tenth of an inch were common on trees, power lines, bridges, and overpasses. This combined with wind gusts to 30 mph aided in downing a few tree limbs. There were also reports of isolated power outages and accidents across the region.
LAGRANGE	February 21, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	Snow and sleet overspread the area during the early morning hours of February 22nd before ending as a brief period of freezing drizzle. Total snow accumulations across the county generally ranged between 1 and 2 inches. Ice accretions were less than 0.05 inches. Temperatures in the

									20s allowed the light snow and ice to accumulate on area roadways. This led to a few accidents and slide-offs across the region.
LAGRANGE	March 24, 2013	Winter Weather	0	0	0	0	0.00K	0.00K	Snow overspread the area during the late evening hours of March 24th before tapering off late the next morning. Total snow accumulations across the country ranged between 2 and 4 inches. The intensity of the heavy snow, gusty winds, and reduced visibilities resulted in hazardous travel conditions across the region. Numerous school closings were reported the morning of March 25th, along with a few slide-offs and accidents.
LAGRANGE	February 17, 2014	Winter Weather	0	0	0	0	0.00K	0.00K	A quick 3 to 4 inches of snow allowed roads to become snow covered and slick. Wind gusts to 35 mph, combined with periods of heavier snow, created near whiteout conditions at times. Significant blowing and drifting snow also allowed some secondary roads to become impassible. There were school delays and closings on Tuesday, February 18th.
LAGRANGE	January 1, 2014	Winter Weather	0	0	0	0	0.00K	0.00K	A long duration light snow event started late in the afternoon on New Year???s Eve and continued through January 2nd as several upper level disturbances tracked east along a frontal boundary. Snowfall totals over the 2 days ranged between 6 and 8 inches. Temperatures in the teens allowed for roads to remain snow covered and slick with several accidents and slide-offs reported across the region.
LAGRANGE	February 1, 2014	Winter Weather	0	0	0	0	0.00K	0.00K	Light snow developed Friday night and became heavy at times during morning hours of Saturday, February 1st. The snow eventually became mixed with rain, sleet, and freezing rain in the afternoon before ending as a brief period of moderate snow in the early evening. There were reports of accidents and slide-offs across the region as roads became snow covered and slick. Total snow and sleet accumulations generally ranged between 3 and 5 inches.
LAGRANGE	January 8, 2015	Winter Weather	0	0	0	0	0.00K	0.00K	Periods of snow during the late afternoon hours of January 8th into the early morning hours of January 9th accumulated to between 2 and 3 inches. However, wind gusts ranging between 30 and 40 mph in tandem with the falling snow created whiteout conditions at times. Significant blowing and drifting of the snow created additional travel problems across mainly open and rural areas into the day on Friday. There were reports of slide-offs and accidents across the region, along with numerous school delays and closings.
LAGRANGE	February 14, 2015	Winter Weather	0	0	0	0	0.00K	0.00K	Wind gusts up to 45 mph and snow squalls along and behind an arctic front created near whiteout conditions at times on February 14th. Visibilities were reduced to less than 200 feet in heavier snow showers, with total snow accumulations generally ranging between a half inch

									and 2 inches. Several multi-vehicle accidents were reported across the region due to reduced visibilities and slick roads.
LAGRANGE	December 28, 2015	Winter Weather	0	0	0	0	0.00K	0.00K	A combination of freezing rain, sleet, and wind gusts to 40 mph created scattered power outages and downed trees. Slick spots on mainly elevated surfaces also aided in difficult travel and a few accidents. Ice accumulations across the county generally ranged between 0.05 and 0.20 inches.
LAGRANGE	January 12, 2016	Winter Weather	0	0	0	0	0.00K	0.00K	Reports of slide-offs and accidents, along with numerous school delays, were common on January 12th due to snow and blowing snow. Snow accumulations across the country generally ranged between 3 and 5 inches, heaviest across northern portions of the county. The accumulating snow combined with temperatures falling into the teens and reduced visibilities created difficult driving conditions.
LAGRANGE	January 12, 2016	Winter Weather	0	0	0	0	0.00K	0.00K	Reports of slide-offs and accidents, along with school delays, were common on January 12th due to snow and blowing snow. Snow accumulations across the country generally ranged between 1 and 3 inches. The accumulating snow combined with temperatures falling into the teens and reduced visibilities created difficult driving conditions.
LAGRANGE	January 3, 2016	Winter Weather	0	0	0	0	0.00K	0.00K	Lake effect snow showers accumulated to between 1 and 3 inches during the late evening hours of January 3rd through mid-morning January 4th, heaviest across western portions of the county. Reduced visibilities and slick roadways led to a few accidents and school delays across the region.
LAGRANGE	December 15, 2016	Winter Weather	0	0	0	1	0.00K	0.00K	Numerous weather-related accidents were reported during the morning hours of December 15th on the Indiana Toll Road due to low visibilities and snow covered roads from lake effect snow showers. At exit 133 of the Toll Road all eastbound lanes were closed for several hours due to a deadly crash with a tractor trailer and a car. This fatal accident occurred at approximately 9:10 am.
LAGRANGE	December 17, 2016	Winter Weather	0	0	0	0	0.00K	0.00K	Numerous accidents were reported across the region on December 17th due to icy roads, especially during the morning hours. A lull in the precipitation and temperatures warming to near freezing led to some improvement during the late morning and afternoon before untreated roads iced back up during the evening.
LAGRANGE	March 17, 2017	Winter Weather	0	0	0	0	0.0 K	0.0 K	A wintry mix of snow, sleet, and freezing rain with temperatures in the upper 20s to near 30 created icy roads during the morning hours of March 17th. An accident in LaPorte County resulted in 3 deaths.
LAGRANGE	December 24, 2017	Winter Weather	0	0	0	0	0.0 K	0.0 K	Light to moderate snow during the late morning and afternoon hours of December 24th transitioned to periods of heavy lake effect snow near Lake Michigan into early December 25th. Total snow

									accumulations ranged between 3 and 10 inches, heaviest across far north-central and northwest Indiana.
LAGRANGE	January 24, 2018	Winter Weather	0	0	0	0	0.0 K	0.0 K	Light freezing drizzle created slick roadways during the morning hours of January 24th. Numerous accidents were reported, with one fatality in Elkhart County.
LAGRANGE	February 4, 2018	Winter Weather	0	0	0	0	0.0 K	0.0 K	Snow, moderate at times, accompanied an upper level system that dropped 2 to 6 inches of snow on February 4th.

Appendix D: Essential & Critical Facilities List

Table 34. Medical Care Facilities

Facility Name	Address	Town
Redi-Care inc PC	2120 N Detroit St	LaGrange
Wolcottville Grocery	401 N Main St	Wolcottville
Tcp Save A Lot	126 S Main St	Topeka
John A Egli Md PC	315 Lehman Ave	Topeka
Alternative Lifestyles Inc	0999 S 250 W	LaGrange
New Eden Care Center Inc	7980 W 100 S	Topeka
LaGrange Surgery Center LLC	2500 N Ventura Way	LaGrange
ARC Opportunities Inc	0170 W 300 N	Howe
LaGrange County Council On Aging Inc	125 W Fenn St	LaGrange
Miller's Food And Drug	420 S Detroit St	LaGrange
Parkview LaGrange Hospital	207 N Townline Rd	LaGrange
LaGrange County WIC Program	304 N Detroit St	LaGrange
Miller's Merry Manor	787 N Detroit St	LaGrange
Life Care Center Of LaGrange	770 N 075 E	LaGrange
CVS 6501	975 N 00 EW	LaGrange

Table 35. School Facilities

Facility Name	Address	Town
Milford Elementary School	9245 E 500 S	Wolcottville
Prairie Heights Elem School	0455 S 1150 E	LaGrange
Prairie Heights Middle School	0395 S 1150 E	LaGrange
Prairie Heights Sr High School	0245 S 1150 E	LaGrange
Westview Jr-Sr High School	1635 S 600 W	Topeka
Westview Elementary School	1715 S 600 W	Topeka
Meadowview Elementary School	7950 W 050 S	Shipshewana
Topeka Elementary School	Main St Po Box 39	Topeka
Shipshewana-Scott Elem School	325 Middlebury St.	Shipshewana
Lakeland Jr/Sr High School	0805 E 075 N	LaGrange
Lakeland Intermediate School	1055 E 075 N	LaGrange
Lima-Brighton Elementary	Market & 3Rd Sts	Howe
Lakeland Primary School	1 Lemaster Cir	LaGrange
Wolcott Mills Elementary School	Myers & Sr 9 - Po Box 308	Wolcottville
Howe Military School	5755 N Sr 9	Howe
Bloomfield Hill School	3745 E 225 N	LaGrange
Blue Ridge School	8615 W 450 N	Shipshewana
Brookside School	300 N 1000 W	Middlebury

Cable Line School	4520 W 100 S	LaGrange
Chain O'Lakes	6645 S 150 E	Wolcottville
South Eden School	8750 N 750 S	Topeka
Lakeside Amish School	1535 W 550 S	Wolcottville
Woodside School	2350 N 250 W	LaGrange
Meadowview Amish School	4945 S 675 W	Topeka
Clay Ridge School	11980 W 300 S	Topeka
Clear Creek School	5495 W 300 S	Topeka
Clearspring School	4200 S 600 W	Topeka
Cottonwood Grove School	3570 S 500 W	Topeka
Country View School	1785 S 700 W	Topeka
Sunnyside School	4950 S 500 W	Topeka
Rock Run Shcool	6460 W 600 S	Topeka
Whispering Spring School	6695 S 1000 W	Topeka
Countryside School	0430 W 200 S	LaGrange
Hebron Christian School	0620 S 600 W	Topeka
Honey Brook School	8250 W 650 S	Topeka
Honeyview School	4495 N 950 W	Topeka
Indian Trail School	4655 N 150	Howe
Southeast Clay School	0940 W 100 S	LaGrange
New Valentine Amish School	1130 E300 S	LaGrange
Nature Valley Shcool	4225 East 200 South	LaGrange
Maple Grove School	2535 W 100 S	LaGrange
Townline Square School	1945 S 1000 W	Shipshewana
Shipshe Meadows School	2235 N 675 W	Shipshewana
Valley Line School	3055 N 500 W	Shipshewana
Pleasant Ridge School	4005 N 1150 W	Shipshewana
Tollway View Amish School	5290 W 700 N	Shipshewana
Paige Creek School	7870 W 776 N	Shipshewana
West Yoder School	8830 W 100 S	Shipshewana
Sunny Ridge School	9845 W 300 S	Topeka
Creekside Amish School	1280 E 250 N	LaGrange
East Townline School	4315 S 300 S	LaGrange
East Yoder School	0620 S 700 W	LaGrange
Eddy Village Amish School	7180 S 075 W	Wolcottville
Elm View School	4825-1 W 700 S	Ligonier
Forks Valley School	0580 N 1150 W	Middlebury
Golden Rule School	2315 N 400 W	LaGrange
Hawpatch School	4040 S 150 W	LaGrange
Pleasant Acres School	2605 W 100 N	LaGrange
Meadowbrook School	2960 E 200 S	LaGrange

Prairie View School	3460 W 200 S	LaGrange
Oak Hill Amish School	3455 E 300 S	LaGrange
Middle Barren School	2440 N 1100 W	Middlebury
Meadow Lark School	2970 N 1150 W	Middlebury
Yoder Center	1045 S 850 W	Shipshewana
Little Acorn School	1030 N 500 W	Shipshewana
Northside School	9785 W Sr 120	Shipshewana
Wabash Trail Amish School	2770 W 700 S	Ligonier
Spring Hill School	3040 W 600 S	Topeka

Table 36. Police Stations

Facility Name	Address	Town
LaGrange County Sheriff's Office	875 S Sr 9	LaGrange
Topeka Police Dept	101 S Main St	Topeka
Shipshewana Police Dept	345 N Morton St.	Shipshewana
LaGrange Police	104 N Townline Rd.	LaGrange
Wolcottville Police	104 W Race St.	Wolcottville

Table 37. Fire Stations

Facility Name	Address	Town
LaGrange Fire Dept	1201 N Townline Rd	LaGrange
Shipshewana Fire Department	1100 N Van Buren St.	Shipshewana
Topeka Fire Department	180 Crossfire Dr.	Topeka
South Milford Fire Department	7500 S 795 E	South Milford
Stroh Fire Department	11770E 425 S	Stroh
Mongo Fire Department	3155 N SR 3	Mongo
Howe Volunteer Fire Department	0175 W SR 120	Howe
Johnson Township Fire Department	W County Line Road	Wolcottville

Table 38. Emergency Operations Center

Facility Name	Address	Town
LaGrange County EMA	114 West Michigan St.	LaGrange

Critical Facilities

Table 39. Airport Facilities

Name	Address	Town	Use
LaGrange Hospital	Heliport	LaGrange	Private
Oliver Lake	Seaplane Base	LaGrange	Private
Reid-Eash	Airport	Howe	Private
Wolfe Field	Airport	Shipshewana	Private

Table 40. Communication Facilities

Name	Use	Address	Town
Tower # 32	Unknown	6885 N950 E	Howe
Tower # 1	Unknown	0750 S SR 5	Topeka
Tower # 10	Unknown	1290 S 050 W	LaGrange
Tower # 11	Unknown	0295 W US 20	LaGrange
Tower # 12	Unknown	0515 S 100 E	LaGrange
Tower # 13	Unknown	3310 E 300 E	LaGrange
Tower # 14	Unknown	3800 E 200 S	LaGrange
Tower # 15	Unknown	1245 S 400 E	LaGrange
Tower # 16	Unknown	055 O N 400 E	LaGrange
Tower # 17	Unknown	8485 E 300 N	Mongo
Tower # 18	Unknown	3375 E 250 N	LaGrange
Tower # 19	Unknown	4990 N 190 E	Howe
Tower # 2	Unknown	945 W Lake Street	Topeka
Tower # 20	Unknown	1190 N 720	Shipshewana
Tower # 21	Unknown	7855 N1200 W	Scott
Tower # 22	Unknown	8185 N 925 W	Shipshewana
Tower # 23	Unknown	6615 N900 W	Shipshewana
Tower # 24	Unknown	6502 N 775 W	Shipshewana
Tower # 25	Unknown	8017 N 600 W	Shipshewana
Tower # 26	Unknown	7085 W 700 N	Howe
Tower # 27	Unknown	7260 N 300 W	Howe
Tower # 28	Unknown	0650 E 700 N	Howe
Tower # 29	Unknown	4765 E 700 N	Howe
Tower # 3	Unknown	320 Hillcrest East	Topeka
Tower # 30	Unknown	6495 N 575 E	Howe
Tower # 31	Unknown	8565 E 750	Howe
Tower # 33	Unknown	1166 E 750 N	Howe
Tower # 4	Unknown	1885 W 700 S	Wolcottville
Tower # 5	Unknown	6460 E 700 S	Wolcottville
Tower # 6	Unknown	6325 S SR 3	Wolcottville

Tower # 7	Unknown	8257 W 400 S	Topeka
Tower # 8	Unknown	6950 S 1000 W	Topeka
Tower # 9	Unknown	170 S 375 W	LaGrange

Table 41. Hazmat Facilities

Name	Chemical Name	Address	Town
<Add Facility Name>	Unknown	7880 N Sr 9	<Add City Address>
<Add Facility Name>	Unknown	<Add Street Address>	<Add City Address>
Anr Pipeline	Methanol	2255 W Us 20	LaGrange
AT&T Communictions	Sulfuric Acid	3230 E Us 20	LaGrange
Central Office (Embarq)	Sulfuric Acid	117 S Poplar St.	LaGrange
Edd'S Supplies	Ammonia	2665N 850	Shipshewana
Faa-Qtz Arsr	Other	0695 S State Rd 9	LaGrange
Ferraellgas	Sec-Butyl Alcohol	Meter N Van Buren St.	Shipshewana
Gas City	Other	5450 N State Rd 9	Howe
Hoosier Propane	Other	1200 N Van Buren St.	Shipshewana
Hoosier Propane (Plato)	Other	105 S 500 E	<Add City Address>
Hubbard Milling	Cobalt	135 E Main St.	Shipshewana
Irving Gravel	Other	7445 E 400 S	LaGrange
Itr Concessions Co.	Other	7065 N 475 E	Howe
Itr Concessions Co.	Other	5000 E750 N	Howe
Itr Concessions Co.	Other	7200 N 600 N	Shipshewana
K-Z	Other	985 N 900 W	Shipshewana
Lake Park Industries	Other	750 E Middlebury St.	Shipshewana
Multi- Plex	Sulfuric Acid	6505 N State Rd 9	Howe
Nishiwaka Standard	Sulfuric Acid	324 S Morrow St.	Topeka
North Central Coop.	Other	0955 W Us 20	LaGrange
Shipshewana In Wcg	Lead	8210 W Us 20	Shipshewana
Starcraft Power Boats	Styrene	Warehouse Starcraft Dr.	Topeka

Table 42. Potable Water

Name	Address	City
LaGrange Water Works	211 E Michigan St.	LaGrange
Shipshewana Water	325 N Morton St.	Shipshewana
Topeka Municipal Water Utility	226 Pleasant Dr	Topeka
Wolcottville	305 E County Line	Wolcottville

Table 43. Waste Water Treatment Plants

Name	Address	City
Adams Lake Regional Sewer Dist	4500 E 700 S	Wolcottville
LaGrange Municipal WWTP	402 Nursery St.	LaGrange
LaGrange Region B WWTP	C.R. 950 E. & C.R. 275 S.	LaGrange
Shipshewana Municipal WWTP	2755 N 735 W	Shipshewana
Topeka Municipal WWTP	601 N Main St	Topeka
Waste Water Treatment Plant	C.R. 460 East And C.R. 495 Eas	Nr LaGrange
Wolcottville Municipal WWTP	604 W County Line Rd	Wolcottville

Figure 49. Tornado: Damaged Critical Facilities

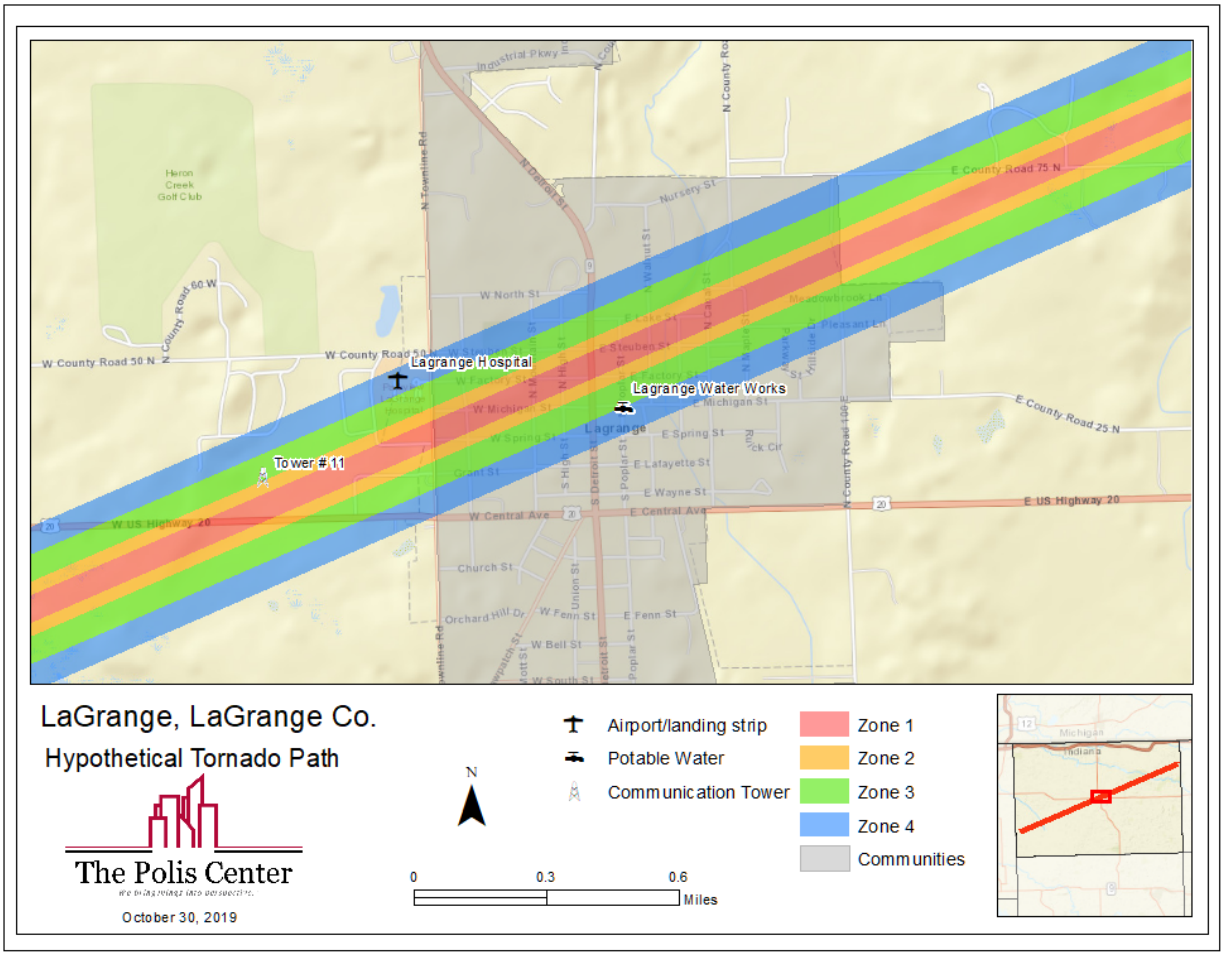
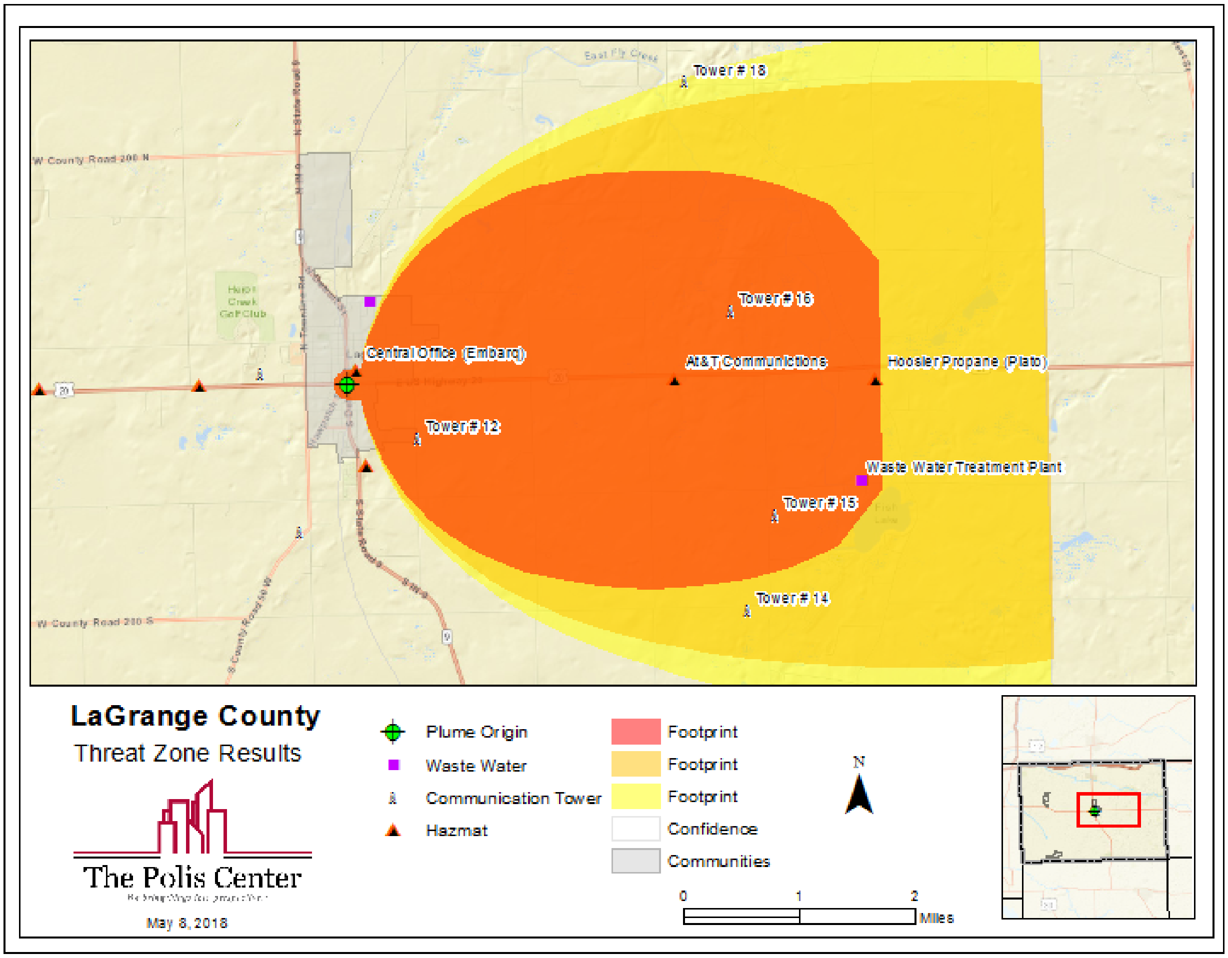


Figure 50. Hazmat: Damaged Critical Facilities



Appendix F: Community Capability Assessment Results

Capabilities	La Grange County	LaGrange	Shipshewana	Topeka	Wolcottville	Lakeland School Corp	Westview School Corp
Planning							
Comprehensive Plan	2010	-	-	-	-	2018	2018
Emergency Operations Plan	-					2018	
Watershed Plan	St. Joseph River Watershed Management Plan 2005	Pigeon River Watershed Management Plan 2013		Five Lakes Watershed Management Plan 2006		-	
Resilience Report	2013						
Ordinances							
Zoning Ordinance	2005						
Building Codes/ Ordinance	2005					-	
Floodplain Ordinance	2018					-	
Storm Water Ordinance	-	-	-	-	-	-	
Erosion Ordinance	State Erosion Control Rule 5 (327 IAC 15-5)						
Burning Ordinance	-	1992	-	-	-	-	

Capabilities	LaGrange County	LaGrange	Shipshewana	Topeka	Wolcottville	Lakeland School Corp	Westview School Corp
Capital Improvements Project Funding	-	Yes	Yes	Yes	-	Yes	Yes
Authority to Levey Taxes for Specific Purposes	-	Yes	Yes	Yes	Yes	Yes	Yes
Fees for water, sewer, gas or electric services	-	Yes	Yes	Yes	Yes	-	-
Impact fees for new development	-	Yes	-	-	-	Yes	-

Capabilities	LaGrange County	LaGrange	Shipshewana	Topeka	Wolcottville	Lakeland School Corp	Westview School Corp
Storm Water Utility Fee	-	-	Yes	-	Yes	-	-
Incur Debt through general obligation bonds and/or special tax bonds	-	Yes	Yes	Yes	Yes	-	Yes
Community Development Block Grant	-	-	-	-	-	-	-
	LaGrange County	**LaGrange**	**Shipshewana**	**Topeka**	**Wolcottville**	**Lakeland School Corp**	**Westview School Corp**
Chief Building Officer	Yes (county)			-	Yes (county)	-	Yes (Randy Miller)
Floodplain Administrator	Yes	-	Yes (county)	-	Yes (county)	-	-
Emergency Manager	Yes					-	Yes (Brian Bills)
Community Planner	Yes	-	-	-	-	-	-
Civil Engineer	-	Yes	Yes	Yes	Yes (county)	-	-
GIS Coordinator	Yes	-	Yes county	-	Yes (county)	-	-
	LaGrange County	**LaGrange**	**Shipshewana**	**Topeka**	**Wolcottville**	**Lakeland School Corp**	**Westview School Corp**
Planning Commission	Yes	-	Yes County	-	Yes (county)	-	-
Mitigation Planning Committee	-	-	-	-	-	-	-
Maintenance Programs to Reduce Risk	-	Yes	Yes	Yes	Yes	-	Yes
Mutual Aid Agreements	-	Yes	-	Yes	Yes	-	Yes
Warning Systems/Services (Ie. Reverse 911, Outdoor Warning Signals)	-	Yes	Yes	Yes	Yes	-	Yes
Hazard Data & Information	-	-	-	Yes	-	-	-
Grant Writing	-	-	-	Yes	-	-	Yes

Figure 51. Hazard Priority Survey Results. Total of 6 Reponses.

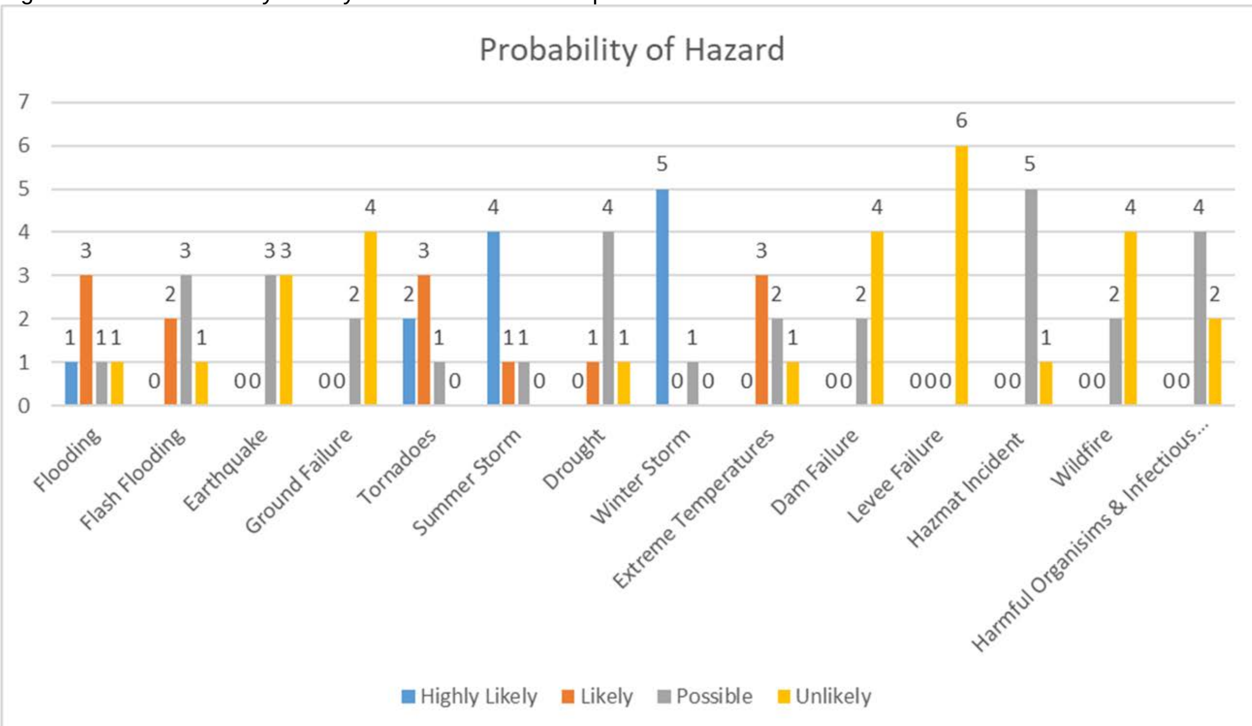
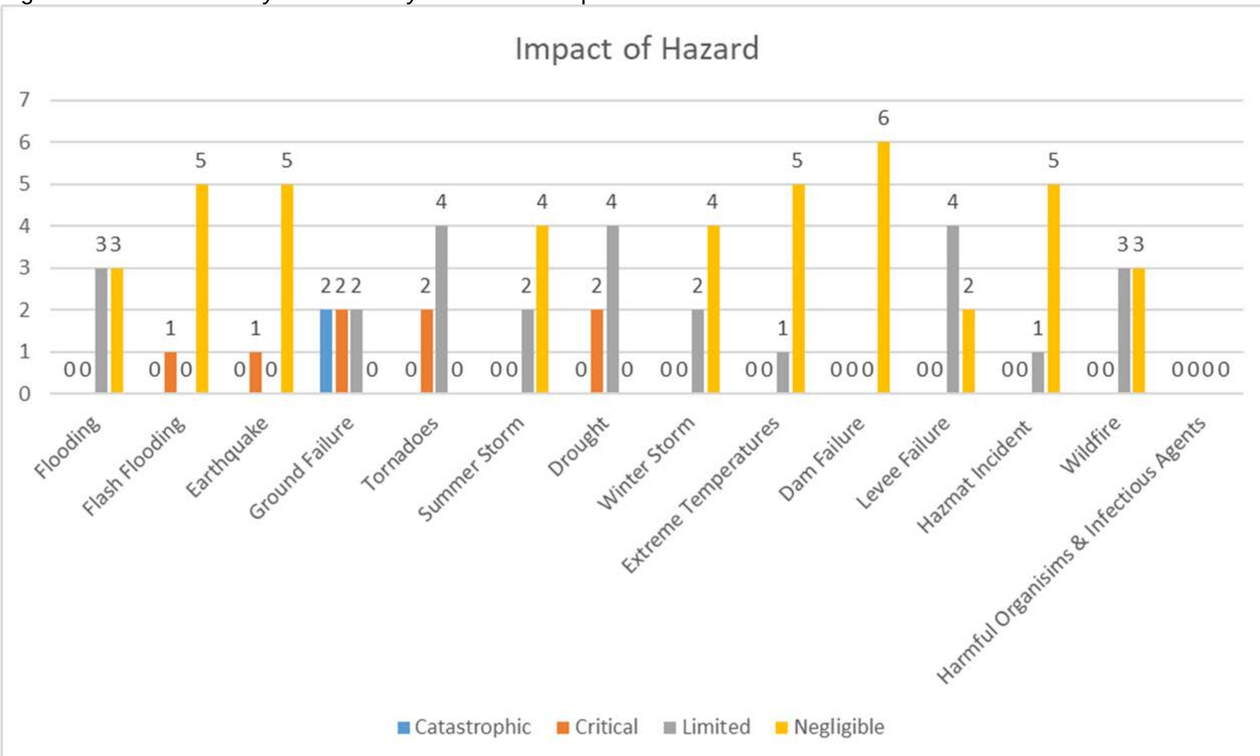


Figure 52. Hazard Priority Rank Survey. Total of 6 Responses.



Appendix G: Adopting Resolutions

RESOLUTION OF THE CITY OF _______________

ADOPTION OF THE LAGRANGE COUNTY
MULTI-HAZARD MITIGATION PLAN

WHEREAS the City of _______________ has participated in the hazard mitigation planning process as established under the Disaster Mitigation Act of 2000; and

WHEREAS, the Act establishes a framework for the development of a multi-jurisdictional LaGrange County Hazard Mitigation Plan; and

WHEREAS, the Act as part of the planning process requires public involvement and local coordination among neighboring local units of government and businesses; and

WHEREAS, the LaGrange County Plan includes a risk assessment including past hazards, hazards that threaten the County, an estimate of structures at risk, a general description of land uses and development trends; and

WHEREAS, the LaGrange County Plan includes a mitigation strategy including goals and objectives and an action plan identifying specific mitigation projects and costs; and

WHEREAS, the LaGrange County Plan includes a maintenance or implementation process including plan updates, integration of the plan into other planning documents and how LaGrange County will maintain public participation and coordination; and

WHEREAS, the Plan has been shared with the Indiana Department of Homeland Security and the Federal Emergency Management Agency for review and comment; and

WHEREAS, the LaGrange County Multi-Hazard Mitigation Plan will make the county and participating jurisdictions eligible to receive FEMA hazard mitigation assistance grants; and

WHEREAS, LaGrange County Multi-Hazard Mitigation Plan updates the existing Multi-Hazard Mitigation Plan adopted in _______________ (month/year); and

WHEREAS, this is a multi-jurisdictional plan and cities and towns that participated in the planning process may choose to also adopt the County Plan.

NOW THEREFORE, BE IT RESOLVED BY LAGRANGE COUNTY, INDIANA, that the City of ______________ supports the hazard mitigation planning efforts and wishes to adopt the LaGrange County Multi-Hazard Mitigation Plan.

This resolution was declared duly passed and adopted and was signed by the __________ and attested by the _________ this _____ day of _______, 201_.

____

Attest:

____